2021 Nebraska State Hazard Mitigation Plan

Prepared for the State of Nebraska

FINAL – Approved January 27, 2021

NEBRASKA

Good Life. Great Strength.

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Pete Ricketts
Governor

STATE OF NEBRASKA
OFFICE OF THE GOVERNOR
P.O. Box 94848 • Lincoln, Nebraska 68509-4848
Phone: (402) 471-2244 • pete.ricketts@nebraska.gov

November 24, 2020

Mr. Paul Taylor, Regional Administrator
U.S. Department of Homeland Security
Federal Emergency Management Agency Region VII
11224 Holmes Rd.
Kansas City, MO 64131-3626

Under the authorities of the Nebraska Emergency Management Act, Reissue Revised Statutes of Nebraska, Section 81-829.41(e), (f), and (g), the Nebraska Emergency Management Agency, with the assistance of local, state, and federal stakeholders, has prepared this all-hazards mitigation plan to identify the risks, vulnerabilities of the state and to protect against or mitigate danger, damage, or loss from these risks.

As Governor, I formally adopt this state hazard mitigation plan for the State of Nebraska and ensure that the state will comply with all applicable federal statutes and regulations in compliance with 44 CRF 13.11 (c). I also direct the Nebraska Emergency Management Agency to amend the plan whenever necessary to reflect changes in state or federal laws and statutes as required by 44 CFR 13.11 (d).

Sincerely,

Pete Ricketts
Governor

PREFACE

The 2021 Nebraska State Hazard Mitigation Plan (SHMP) establishes the policies, plans, guidelines and procedures for the Hazard Mitigation Program in Nebraska. This plan is compliant with the Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended; Disaster Mitigation Act of 2000 and the applicable rules and regulations promulgated from these laws.

The Distribution List serves as the record of implementation of the plan, identifying the individuals and entities to whom the plan has been disseminated.

Distribution List

Number	Agency	Name	Position	Date
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Record of Changes

The 2021 Nebraska SHMP is a dynamic document that is under continual review. The document may be changed administratively at any time under the authority granted by the Governor to his/her designee in the Nebraska Emergency Management Agency (NEMA).

Administrative changes may include:

- Corrections or revisions that clarify context and readability
- Updates that reflect adopted policy and/or procedures
- Hazard data and risk information that enhances the current plan
- Updates to current Mitigation Actions and new Actions as approved by the Governor's Task Force for Disaster Recovery (GTFDR)
- Other authorized changes granted to NEMA by the Governor or his/her representative

It shall be the responsibility of the State Hazard Mitigation Officer (SHMO) or his/her designee to maintain this record of changes throughout the planning cycle.

Section/Page	Description of Change	Authorized by	Date
Section 2: Planning Process	• Pg. 33 Provided information regarding how the "Essential Plan Maintenance Policy (POL-02-102), October 10, 2020" and "State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis, October 15, 2020" were integrated in the 2021 State Hazard Mitigation Plan update in Table 2-8.	State Hazard Mitigation Officer	9/7/2021
Section 3.0: Hazard Identification and Risk Assessment	• Pg. 36, 3.0.1, added reference and data from the Oct 15, 2020 Risk Assessment and Appendix B – pg. 2-4, risk scoring system & Risk Assessment Results; pg. 5-6, Vulnerability Scoring System and results; pg. 7-9, Consequence analysis scoring systems and results. • Pg. 38, Step 1: Hazards for Initial Consideration, changed the number of hazards identified from current and previous State and Local hazard mitigation plans from 26 to 27 and added Land Subsidence and Landslide under the Natural column to Table 3.0-1. • Pg. 39, Step 2: Hazard Elimination, added twenty (20) hazards considered by the planning team based on the results of the State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis (HIRA), dated October 15, 2020. • Pg. 43, Step 3: Hazards Included in the 2021 SHMP, included chemical transportation and power failure to undergo a minimal or full risk assessment in the 2021 plan update. Additionally, added information over other hazards of concern in the third paragraph. • Pg. 46, changed "Explanation of HIRA Survey Ranking Reconciliation in the Plan" to "Reconciliation of 2020 HIRA Survey Ranking in the Plan" and added information over the 20 hazards considered in the HIRA Survey. • Pg. 68, added the citation "State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis, October 15, 2020."	State Hazard Mitigation Officer	9/7/2021

Section 3.2: Dam Failure	• Pg. 89, added Table 3.2-4 High hazard Dams in Poor Condition and information describing its purpose. • Pg. 90, add Figure 3.2-a "High Hazard Potential Dams in Poor Condition." and information describing its purpose. • Pg. 91, Adjusted "Table 3.2-4: Dams Under Construction" to "Table 3.2-5: Dams Under Construction." • Pg. 91, Adjusted "Figure 3.2-a: National Dam Safety Program/High Hazard Potential Dam Grant Program" to "Figure 3.2-b: National Dam Safety Program/High Hazard Potential Dam Grant Program."	State Hazard Mitigation Officer	9/7/2021
Section 4: Mitigation Strategy	• Pg. 283, 4.1 – Overview, added additional information over the definition of mitigation and additional minor corrections. • Pg. 284, 4.2 – Goals and Objectives, added reference to the "State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis." • Pg. 285, 4.2.1 – 2021 Goals and Objectives, added information over how the goals, objectives, and actions address short and long-term targets to reduce the level of risk. • Pg. 288 Summary – Goals and Objectives, changed to "Summary – Analysis of Goals and Objectives." • Pg. 289 4.3.1 – Pre-Disaster Capabilities, Risk/Vulnerability Assessment, added reference to the "State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis" • Pg. 292 4.3.4 – Flood Mitigation Capabilities, minor corrections. • Pg. 309 4.5 – Mitigation Actions, added information covering the hazards of highest concern. Additionally, added Table 4-11: Hazards of Highest Concern, identified in the HIRA, October 2020 and Mitigation Actions presented in the 2021 SHMP. • Pg. 311 "Table 4-11: Mitigation Ranking System" adjusted to "Table 4-12: Mitigation Ranking System." • Pg. 312 and 314, "Table 4-12: Sources for Federal and State Mitigation Funding Assistance" adjusted to "Table 4-13: Sources for Federal and State Mitigation Funding Assistance."	State Hazard Mitigation Officer	9/7/2021
Section 6: Plan Maintenance and Implementation	• Pg. 339, 6.2 Method and Schedule for Monitoring, Evaluating and Updating the Plan, pg. 6-2, added the section "Integration and Other State Plan Maintenance Policies and Processes." • Pg. 346, Five-Year Plan Update Process and Schedule table, pg. 6-9, insert: "(January 26, 2026)"	State Hazard Mitigation Officer	9/7/2021
Appendix C: Mitigation Action Tables and Worksheets	• Page 9, "Establish State Residential Safe Room Program" mitigation action.	State Hazard Mitigation Officer	9/7/2021

2021 Nebraska State Hazard Mitigation Plan

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ACRONYMS AND DEFINITIONS

APA	Approvable Pending Adoption, designation by FEMA that a hazard mitigation plan has met all plan requirements defined by 44 CFR, and is ready for adoption by a jurisdiction's governing body.
BRIC	FEMA grant program, Building Resilient Infrastructure and Communities
CARC	Climate Assessment Response Committee, replaced the Drought Assessment Response Team (DART) and updated a 1990 state-wide strategy to address drought with revisions in 1998, 2000 and 2004.
CDC	Centers for Disease Control and Prevention, the lead Public Health Agency for the U.S., headquartered in Atlanta, GA
CFR	Code of Federal Regulations
CRS	Community Rating System, the voluntary component of the National Flood Insurance Program.
DMA 2000	Disaster Mitigation Act of 2000
EAP	Emergency Action Plan, a plan required for high hazard dams that defines responsibilities and provides procedures designed to identify unusual and unlikely conditions that may endanger the structural integrity of a dam within sufficient time to take mitigating actions and notifications.
EMA	Emergency Management Agenc(y)(ies)
EMAP	Emergency Management Accreditation Program, the accepted industry accreditation standard for Local, State, Tribal, Federal Agency, U.S. Territory, International and Private Sector Emergency Management Programs; Nebraska's Program was first accredited in 2009 and re-accredited in 2015 .
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FEMA Region VII	Provides oversight for federal emergency management programs in Iowa, Nebraska, Missouri, and Kansas; headquartered in Kansas City, Missouri
FMA	FEMA's Flood Mitigation Assistance Program

FMAG	Fire Mitigation Assistance Grant Program
GAR	Governor's Authorized Representative, for the purpose of emergency management is the Assistant Director of NEMA.
GTFDR	Nebraska's Governor's Task Force for Disaster Recovery, co-chaired by NEMA and NeDNR, designated the Nebraska Hazard Mitigation Planning Team; created in 1994 to coordinate disaster recovery with an emphasis on efficient utilization of federal supplementary appropriations.
HHPD	High Hazard Potential Dam Grant Program
HIRA	Hazard Identification and Risk Assessment
HMGP	Hazard Mitigation Grant Program
LHMP	Local Hazard Mitigation Plan
NCEI	National Center for Environmental Information is part of the National Oceanic and Atmospheric Administration, and is the world's largest active archive of weather data.
NDA	Nebraska Department of Agriculture
NDED	Nebraska Department of Economic Development
NDEQ	Nebraska Department of Environmental Quality
NDHHS	Nebraska Department of Health and Human Services
NeDNR	Nebraska Department of Natural Resources
NEMA	Nebraska Emergency Management Agency
NFIP	National Flood Insurance Program
NFS	Nebraska Forestry Service
NG&PC	Nebraska Game & Parks Commission
NIAC	Nebraska Information Analysis Center, the state's Fusion Center providing an avenue for all state law enforcement agencies and participating private partners to receive, validate, analyze and disseminate intelligence information for all crimes and all hazards.
NOAA	National Oceanic and Atmospheric Administration

NRD	Natural Resource Districts, there are 23 in Nebraska, considered governmental entities of the state of Nebraska, lead agencies in the local hazard mitigation plan development and also responsible for water management, flood control, and other projects within their taxing authority.
NREC	Nebraska Rural Electric Association, represents the states Public Power Districts and rural electric cooperatives.
NWS	National Weather Service
PA	Public Assistance, disaster cost recovery and aid programs of the state and federal governments
PDM	Pre-Disaster Mitigation Grant Program; currently scheduled for replacement by the BRIC program.
Planning Team	Members of the Governor's Task Force for Disaster Recovery, with staff assistance from member agencies, including NEMA and NeDNR.
PPDs	Public Power Districts; political subdivisions of the State of Nebraska created by state enabling legislation in 1936; PPDs are publicly owned power generation and delivery systems in Nebraska.
RL	Repetitive Loss, designation for structures under the NFIP that have incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and at the time of the second incidence of flood-related damage, the contract for flood insurance contained increased cost of compliance coverage.
RRS	Nebraska Reissued Revised Statutes
SHMO	State Hazard Mitigation Officer, the lead coordinator for all hazard mitigation efforts being pursued within the State of Nebraska.
SHMP	State Hazard Mitigation Plan
SNS	Strategic National Stockpile, a Federal repository of medical supplies maintained by the U.S. Department of Health and Human Services to supplement state and local medical response operations during public health emergencies.
SVI	Social Vulnerability Index, a tool for measuring potential vulnerable populations based on deficiencies in income, mobility or other social factors; a high level of vulnerability indicates the potential for more resources to support the population during a disaster.

SRL	Severe Repetitive Loss, designation for structures under the NFIP that have incurred flood related damage for which four or more separate claims payments have been made under flood insurance coverage with the amount of each claim exceeding $5,000 and with the cumulative amount of claim payments exceeding $20,000; and for which at least two separate claims payments have been made under NFIP coverage, with the cumulative amount of claims exceeding the market value of the insured structure.
THIRA	Threat and Hazard Identification and Risk Assessment
UN-L	University of Nebraska – Lincoln
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USGS	United State Geological Survey
USHUD	U.S. Housing and Urban Development
WHO	World Health Organization

EXECUTIVE SUMMARY

In March 2019, communities in Nebraska experienced one of the most devastating weather events in their history. The severe winter weather system noted as a "bomb cyclone" brought significant impacts to the state in the form of snow, straight-line winds, ice jams, and, in many cases, historic flooding. Nearly 50 levee breaches on rivers and streams led to flood damage that was particularly devastating to many communities. Evacuations were ordered. Four individuals lost their lives. Preliminary damage estimates were above $1.3 billion. As of June 2020, more than $55 million in Federal assistance had been approved or obligated to help the state and its citizens recover. Federal aid alone is not sufficient to help communities recover. By integrating mitigation in all aspects of disaster planning, communities can build resilience and reduce or eliminate the risk of future hazard events. It is for this reason that the state wrote the 2021 Nebraska State Hazard Mitigation Plan.

Disasters can happen anytime, anywhere, and in any place. They can cause loss of life; damage buildings and infrastructure; and have devastating consequences for a community's economic, social, and environmental well-being. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies don't reflect the actual cost of disasters because tax dollars do not cover additional costs incurred by insurance companies and private entities. Many natural disasters are predictable. Much of the damage and expenses caused by these events can be reduced or even eliminated.

> **Mitigation**
>
> *is the thread that permeates national preparedness.*
>
> - *National Mitigation Framework*, U.S. Department of Homeland

The *2021 Nebraska State Hazard Mitigation Plan (SHMP)* brings hazard risk and disaster resilience efforts together as a community through the planning process and its related activities and tasks with the vision of long-term vulnerability reduction for the state and all its jurisdictions.

The hazard mitigation planning process benefits Nebraska and its communities in many ways:

- The hazard identification and risk assessment process establishes the foundation for **all hazards** and **all phases** of disaster and emergency management programs - preparedness, prevention/protection, response, recovery, and mitigation.

- The inclusive planning process builds partnerships by involving agencies, organizations, citizens, and businesses.
- The process increases education and awareness of threats and hazards, as well as their impacts, consequences, and risks.
- The plan communicates needs and priorities to Federal officials and positions local jurisdictions for financial and technical assistance.
- The plan provides for the most efficient and effective use of resources to address risk reduction.
- The process provides opportunities to align hazard risk reduction with other State and Local objectives.

Effective mitigation begins with identifying the threats and hazards a community faces and determining the associated vulnerabilities and consequences. Comprehensive assessment requires risk information based on credible science, technology, and intelligence validated by experience. No single threat or hazard exists in isolation. For example, a severe thunderstorm can lead to flooding, dam failures, and hazardous material spills.

Understanding risks makes it possible to develop strategies and plans to manage them. Managing risks from threats and hazards requires decision making to accept, avoid, reduce, or transfer those risks. Avoiding and reducing risks are ways to reduce a community's long-term vulnerability and build individual and community resilience.[1]

Risk, not the occurrence of incidents, drives this plan. By fostering comprehensive risk considerations, this plan encourages behaviors and activities that will reduce people's future exposure and vulnerability.

Successful mitigation leads to a more resilient community in the face of future disasters. Resilient communities proactively protect themselves against hazards, build self-sufficiency, and become more sustainable. Resilience…involves technical, organizational, social, and economic dimensions. It is fostered not only by government, but also by individual, organization, and business actions.

-National Response Framework, U.S. Department of Homeland Security

[1] *National Response Framework*, U.S. Department of Homeland Security, July 2013, p. i

SECTION 1: INTRODUCTION

Throughout this document, Federal Emergency Management Agency (FEMA) plan requirements and Emergency Management Accreditation Program (EMAP) standards are described in text boxes at the beginning of the appropriate sections. In addition, each section provides a summary of the changes made in the 2021 SHMP update.

44 CFR §201.4 Requirements

- S19. Did the state provide documentation that the plan has been formally adopted? [44 C.F.R. §201.4(c)(6)]
- S20. Did the state provide assurances? [44 C.F.R. §201.4(c)(7)]

EMAP Standards

4.2.1: The Emergency Management Program has a plan to implement mitigation projects and sets priorities based upon loss reduction. The plan:

(1) Is based on the natural and human-caused hazards identified in Standard 4.1.1 and the risks and consequences of those hazards;

(2) Is developed through formal planning processes involving Emergency Management Program stakeholders; and

(3) Establishes interim and long-term strategies, actions, goals, and objectives.

2021 SHMP Update

- Section reformatted for consistency with 44 CFR §201.4
- Describes the purpose, applicability, scope, regulatory requirements (compliance, assurances and adoption) of the plan
- Describes how the plan is organized
- Describes how data from the 2014 and 2019 SHMPs was incorporated into this update
- Includes a state profile to provide context for the hazard identification and risk assessment, capabilities assessment and mitigation strategy

The Disaster Mitigation Act of 2000 requires the revision of the Nebraska State Hazard Mitigation Plan every five years. The 2014 State Hazard Mitigation Plan (SHMP) was updated in 2019, meeting the five-year update requirement. Concurrent with the 2019 update planning process, the state was experiencing catastrophic levels of flooding. Because of the timing of this disaster, the State of Nebraska has determined the need for another update of the plan for 2021, which will capture new risk and vulnerability data from the flood response and recovery as well as other current information from Local Hazard Mitigation Plans adopted and approved since the adoption of the 2019 SHMP.

Responsibility for the maintenance and revision of the plan is assigned to the Recovery Section of the Nebraska Emergency Management Agency (NEMA), with the State Hazard Mitigation Officer (SHMO) as the Plan Coordinator. As with previous versions, this plan has brought

together a rich planning environment involving local, state, and federal entities with differing perspectives.

1.1 Purpose

The purpose of the ***2021 Nebraska State Hazard Mitigation Plan (SHMP)*** is to provide a comprehensive discussion of the natural, technological and human-caused hazards that present risks to the citizens, resources, and property of Nebraska along with identifying the state's objectives and commitment in reducing the risks and vulnerability from these hazards. This plan also serves to break the cycle of repetitive damage by coordinating the implementation of mitigation activities that eliminate or reduce the long-term risk to human life and property from hazards and their effects.

The SHMP seeks to provide a framework to reduce the risk hazards pose to the lives and property of Nebraskans. It expands on Nebraska's commitment of over 30 years of programming to reduce risk and provide the tools and resources to encourage and engage in mitigation activities by:

- Creating a vision for a resilient future
- Setting goals and objectives to build towards FEMA defined capabilities
- Promoting interagency coordination in the areas of hazard mitigation and resiliency
- Complying with state and federal requirements
- Identifying all hazards threatening the state
- Setting a framework for the effective creation and implementation of mitigation activities

Additionally, the purpose of the 2021 SHMP is to provide a comprehensive discussion identifying hazards that present potential risks to the citizens, resources, and property within the State of Nebraska.

1.2 Applicability and Scope

Hazard mitigation planning is the process through which hazards are identified, likely impacts defined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. The outcome of this process is a comprehensive strategy to reduce or eliminate disaster damages and the long-term risks to human life and property, the environment, the economy and the State's resources.

In March 2020, the State of Nebraska launched the collaborative planning effort to update the 2019 SHMP, in order to decrease future vulnerability to disasters and increase resiliency and sustainability. Although the 2019 SHMP would not technically expire until 2024, catastrophic flooding and related issues that occurred during the 2019 planning process highlighted critical changes in risk and vulnerability as well as capabilities, that were deemed important to capture and address in a more current plan. Consequently, NEMA and its planning partners elected to produce the SHMP update in 2021.

The SHMP is a state-level, **all-hazard plan** that geographically covers the entire area within the State's boundaries (hereafter referred to as the "Planning Area"). For the purpose of this plan, each county and municipality within the state is considered to be a "local jurisdiction".

The state of Nebraska includes four federally recognized tribes within the state's boundaries – the Santee Sioux Nation, Omaha Tribe of Nebraska, Ponca Tribe of Nebraska and Winnebago Tribe of Nebraska. For the purpose of this plan, each tribal nation within the state is considered to be a "tribal jurisdiction". Although each tribe typically assumes individual responsibility for its own mitigation program, some have participated in the planning process for Local Hazard Mitigation Plans (LHMPs). The State of Nebraska stands ready to support and collaborate for these efforts, including serving as the administrative agency to implement federally-funded mitigation projects, if requested.

1.3 Plan Adoption and Plan Expiration

The adoption of this plan completes a step of the planning process, in accordance with the requirements of the Disaster Mitigation Act of 2000. The purpose of formally adopting this plan is to secure buy-in from the State of Nebraska and its agencies and jurisdictions, raise awareness of the plan, and formalize the plan's implementation.

The 2021 Nebraska SHMP was **approved** by FEMA Region VII on **January 27, 2021**, and confirmed plan **expiration** on **January 27, 2026**.

The Governor's Authorized Representative (GAR), Assistant Director of NEMA, has adopted the 2021 update of the Nebraska Hazard Mitigation Plan for implementation on **November 24, 2020** and declared the document to be officially adopted by the state. A copy of the adoption is included at the beginning of this plan.

1.4 Compliance, Authorities and Regulations

This plan was prepared in compliance with the requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (as amended by the Disaster Mitigation Act of 2000); all aspects of 44 Code of Federal Regulations (CFR); interim and final rules; presidential directives; Office of Management and Budget circulars; and other federal government guidelines that pertain to hazard mitigation planning and activities. This plan also maintains Nebraska's eligibility for Public Assistance Categories C-G; Fire Management Assistance Grants (FMAG); Hazard Mitigation Grant Program (HMGP); Pre-Disaster Mitigation (PDM); Building Resilient Infrastructure and Communities (BRIC); and Flood Mitigation Assistance (FMA) as well as the increased cost share for repetitive and severe repetitive loss structures.

The State of Nebraska pledges continued compliance with all applicable federal statutes and regulations during the periods for which it receives grant funding, pursuant to 44 CFR §13.11(c), and will amend its plans whenever necessary to reflect changes in state or federal laws and

statutes as required in 44 CFR §13.11(d). The Disaster Mitigation Act of 2000 requires that the Nebraska State Hazard Mitigation Plan be revised every five years. This responsibility has been assigned to the Nebraska Emergency Management Agency (NEMA) Recovery Section. NEMA acts as the lead agency in overall hazard mitigation planning for the State of Nebraska. Other state and federal agencies are engaged to provide input and guidance on mitigation planning and activities in the state.

State Authorities

- Nebraska RRS 81-829.31 to 81-829.73 Emergency Management Act
- Title 67 – Nebraska Emergency Management Agency Chapter 7 – Standards and Requirements for Emergency Operations Plans
- Nebraska RRS 31-10 Floodplain Management Statute

Emergency Management Accreditation Program

In addition to compliance with the associated federal/state hazard mitigation program, including the applicable sections of the Disaster Mitigation Act of 2000, this plan is in compliance with the mitigation standards for accreditation outlined in the ***Emergency Management Accreditation Program (EMAP)***.

1.5 Roles and Responsibilities

Federal

- 44 CFR, §201.3(b) - The key responsibilities of the Regional Administrator are to:

  (1) Oversee all FEMA related pre- and post-disaster hazard mitigation programs and activities
  (2) Provide technical assistance and training to State, local, and Indian tribal governments regarding the mitigation planning process
  (3) Review and approve all Standard and Enhanced State Mitigation plans
  (4) Review and approve all local mitigation plans, unless that authority has been delegated to the State in accordance with §201.6(d)
  (5) Conduct reviews, at least once every five years, of State mitigation activities, plans, and programs to ensure that mitigation commitments are fulfilled, and when necessary, take action, including recovery of funds or denial of future funds, if mitigation commitments are not fulfilled

- 44 CFR, §201.4(d) and 201.6(d)(2) - The Regional review will be completed within 45 days after receipt from the State, whenever possible

State

- 44 CFR, §201.3(c) - The key responsibilities the State are to coordinate all State and local activities relating to hazard evaluation and mitigation and to:

  (1) Prepare and submit to FEMA a Standard State Mitigation Plan following the criteria established in §201.4 as a condition of receiving non-emergency Stafford Act assistance and FEMA mitigation grants. In addition, a State may choose to address severe repetitive loss properties in their plan as identified in §201.4(c)(3)(v) to receive the reduced cost share for the Flood Mitigation Assistance (FMA) and Severe Repetitive Loss (SRL) Programs, pursuant to §79.44(c)(2) of this chapter.
  (2) In order to be considered for the 20 percent HMGP funding, prepare and submit an Enhanced State Mitigation Plan in accordance with §201.5, which must be reviewed and updated, if necessary, every 5 years from the date of the approval of the previous plan.
  (3) At a minimum, review and update the Standard State Mitigation Plan every 5 years from the date of the approval of the previous plan in order to continue program eligibility.
  (4) Make available the use of up to the 7 percent of HMGP funding for planning in accordance with §206.434.
  (5) Provide technical assistance and training to local governments to assist them in applying for HMGP planning grants, and in developing local mitigation plans.
  (6) For managing states that have been approved under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c), review and approve local mitigation plans in accordance with §201.6(d).

- 44 CFR, §201.4(a) - Plan requirement. States must have an approved Standard State Mitigation Plans meeting the requirements of this section as a condition of receiving non-emergency Stafford Act Assistance and FEMA mitigation grants. Emergency assistance provided under 42 U.S.C. 5170a, 5170b, 5173, 5174, 5177, 5179, 5180, 5182, 5183, 5184, 5192 will not be affected. Mitigation planning grants provided through the Pre-Disaster Mitigation (PDM) program, authorized under section 203 of the Stafford Act, 42 U.S.C. 5133, will also continue to be available. The mitigation plan is the demonstration of the State's commitment to reduce risks from natural hazards and serves as a guide for State decision makers as they commit resources to reducing the effects of natural hazards.

- 44 CFR, §201.4(c)(7) Assurances. The plan must include assurances that the State will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, including 2 CFR, parts 200 and 3002.

- 44 CFR, §201.4(d) Review and updates. Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities and resubmitted for approval to the appropriate Regional Administrator every 5 years.

- 44 CFR, §201.6(d)(1) The State is responsible for the initial review and coordination of Local Mitigation Plans prior to sending the plan to the appropriate FEMA Regional Office for formal review and approval.

- 44 CFR, §201.7(d)(1) Indian tribal governments interested in the option of being a subgrantee under the State must submit the Tribal Mitigation Plan to the State Hazard Mitigation Officer for review and coordination. The State is responsible for the initial review and coordination prior to sending the plan to the appropriate FEMA Regional Office for formal review and approval.

1.6 Plan Organization

The 2021 Nebraska SHMP is organized in alignment with the DMA 2000 planning requirements and the FEMA Plan Review Tool, as follows:

- **Base Plan**
    - **Plan Adoption, Distribution and Record of Changes**
    - **Executive Summary**
    - **Section 1: Introduction and State Profile**
        - *States the purpose of the plan; provides the state's assurances of compliance with all applicable state and federal statutes and regulations.*
    - **Section 2: Planning Process**
        - *Explains the planning process including how the plan was revised, who was involved and the integration of other planning efforts.*
    - **Section 3: Hazard Identification and Risk Assessment**
        - *Features the overall risk assessment along with the hazard profiles outlining the type and location of hazards that can affect Nebraska. This serves as the factual basis for the state's mitigation strategy and priorities.*
    - **Section 4: Mitigation Strategy**
        - *Outlines the state mitigation capabilities and provides the state's mitigation blueprint. Specially, it examines the 2019 goals and objectives and lays out the mitigation core capabilities.*
    - **Section 5: Coordination of Local Planning**
        - *Evaluates the how the state's hazard management policies, programs, and capabilities support local and tribal governments through training, technical assistance and funding, where available. This section also describes the state's roles in funding, developing, coordinating, and approving local mitigation plans.*
    - **Section 6: Plan Maintenance**
        - *Outlines the method and schedule that NEMA and the Governor's Task Force for Disaster Recovery (GTFDR) use to monitor, evaluate, and update the plan. It also outlines how the state reviews progress on implementing the mitigation plan.*

- **Appendices to the Base Plan**
  - Planning Process Documentation
  - Hazard and Risk Data
  - Mitigation Action Tables and Worksheets
- **Power District Annexes**
  - The Nebraska Rural Electric Association (NREA) Annex and additional individual Public Power District Annexes address specific electrical planning efforts that align with the State's mitigation strategy.

SECTION 2: PLANNING PROCESS

44 CFR §201.4 Requirements

- S1. Does the Plan describe the process used to develop the plan? [44 C.F.R. §201.4(b) & (c)(1)]
- S2. Does the plan describe how the state coordinated with other agencies and stakeholders? [44 C.F.R. §201.4(b) and (c)(1)]

EMAP Standards (2019)

4.2.1: The Emergency Management Program has a plan to implement mitigation projects and sets priorities based upon loss reduction. The plan:

(1) Is based on the natural and human-caused hazards identified in Standard 4.1.1 and the risk and consequences of those hazards;

(2) Is developed through formal planning processes involving Emergency Management Program stakeholders; and

(3) Establishes short and long-term strategies, actions, goals, and objectives.

2021 SHMP Update

- Section reformatted for consistency with 44 CFR, §201.4
- Describes the development of the updated 2021 SHMP
- Incorporates data from the 2014 and 2019 SHMPs
- Describes program integration since the 2019 SHMP
- Describes the modified engagement methodology to accommodate social distancing measures required by the COVID-19 pandemic

This section documents the process used in the revision of the 2019 SHMP for 2021 including how the state coordinates with other agencies for state-wide planning efforts.

2.1 – Evolution of the State Hazard Mitigation Plan

2.1.1 – Planning History

Hazard mitigation planning has a lengthy history in Nebraska. During the 1970s, Nebraska Executive Orders addressed hazard mitigation measures as a result of disaster events. These actions were expanded upon as changes in the National Flood Insurance Program (NFIP) and other federal laws, such as the NFIP's Community Rating System (CRS) program, brought changes to planning and funding of mitigation actions.

Nebraska mitigation planning began after a series of devastating tornadoes, floods, and related severe storms resulted in federal disaster declarations DR 718 and DR 716 in 1984. The state set out to analyze the risk from the hazards that caused these disasters. The result was a 1985 Hazard Mitigation Plan outlining the risks, potential activities, and agencies to assist. This plan was revised and updated in 1991 and 1995 after additional severe storms.

At the same time of the initial mitigation plans, the Drought Assessment Response Team (DART) published a state-wide strategy to address drought in 1990. The Nebraska Climate Assessment Response Committee (CARC), replacing DART, has built on this plan with revisions in 1998, 2000, and 2004. Information, objectives, and implementation measures have been incorporated in the state hazard mitigation plan.
In 1994, Executive Order 94-3 created the **Governor's Task Force for Disaster Recovery (GTFDR)**. This task force guides the state's efforts in dealing with recovery and mitigation activities. The GTFDR has acted as the coordinator of mitigation plans since 1994 including revisions in 2000, 2005, 2008, 2011, 2014, and 2019.

The **State of Nebraska Flood Mitigation Plan** was originally developed by Nebraska Department of Natural Resources (NeDNR) during 2002 and published in 2003. Since that time, elements of the plan have been used as the basis for the flooding risk assessment and mitigation strategy alternatives within the state HMP. In 2013, NeDNR updated the State Flood Mitigation Plan and released it in coordination with the 2014 State Hazard Mitigation Plan. For the 2019, State Hazard Mitigation Plan, the Flood Mitigation Plan information was updated and integrated into the state hazard mitigation plan.

2.1.2 – Summary of Changes

The 2021 revision of the state hazard mitigation plan is considered to be a comprehensive review and update of the 2019 plan.

Table 2-1: Summary of Changes in the 2021 SHMP

Section	Change
Overall	• Comprehensive review and updating data and information • Increased readability and function • Reformatted to be consistent with FEMA planning guidance • Inclusion of EMAP requirements (2019 edition) in appropriate sections
Section 1: Introduction	• Streamlined to highlight key information locations in the plan • Updated to reflect content location changes • Brief profile provided for plan context
Section 2: Planning Process	• Participants and engagement information updated to reflect 2021 planning process and adaptation of engagement methodology to accommodate social distancing measures for the COVID-19 pandemic
Section 3: Hazard Identification and Risk Assessment	• Latest hazard impact and disaster declaration data added • Impact summary revised to reflect latest impacts and consequences • Restored chemical transportation, and power failure hazard profiles • Added new hazard profiles for extreme temperature and human infectious disease • Incorporated stakeholder input in hazard profiles • Detailed summary of 2019 flooding (DR-4420) impacts, and discussion of changes in level of risk and vulnerability added to Section 3.4 – Flood/Flash Flood

Section 4: Mitigation Strategy	• Adapted from the 2019 SHMP to include additional analysis on state and local capabilities • Goals and Objectives revised from the 2019 SHMP to align more closely with FEMA mitigation categories • Updated funding descriptions and requirements per latest FEMA guidance documents
Section 5: Local Coordination and Mitigation Capabilities	• New section added to emphasize the state's role in supporting local and tribal mitigation programs and capabilities.
Section 6: **Plan Maintenance**	• Expanded detail on plan monitoring, evaluating and updating to include roles and responsibilities, and description of specific method and schedule.

2.2 – Coordination and Documentation of the Planning Process

The Nebraska state-wide mitigation planning program is designed to coordinate the efforts of many state and local agencies and organizations in mitigation planning and programming on an ongoing basis. For the 2021 plan revision, the planning process was used to complement approved mitigation plans throughout the state with the promotion of continual local mitigation planning and an emphasis on the implementation of the state mitigation strategy described in **Section 4**. It is also intended to actively promote and coordinate mitigation planning and programming with local jurisdictions by accomplishing the following activities:

1. Encourage and facilitate a multi-organizational, multi-jurisdictional approach to mitigation planning, in an effort to develop interrelated and coordinated plans and programs at both the state and local levels.
2. Use a consistent and practical technical approach to mitigation plan development, allowing information exchange state-wide, including all jurisdictions and levels of government as well as volunteer and non-governmental organizations throughout the state.
3. Promote a mitigation planning process that prioritizes available time and resources to address the highest-risk hazards confronting the communities of Nebraska and the mitigation goals that have been established at both the state and local levels.
4. Recognize that mitigation planning and programming must be an ongoing and continuous process consistently updated to reflect changes in hazard conditions as well as the resources and capabilities available to mitigate vulnerabilities to those hazards.

2.2.1 – Core Planning Team

The Core Planning Team for the 2021 SHMP update was the Nebraska Emergency Management Agency (NEMA) Recovery Section staff, who brought in a contractor, IEM, to assist with the plan update tasks. The Core Planning Team first met on March 12, 2020 and established a work plan and schedule that would ensure the plan's timely completion. Almost simultaneously to the March meeting, the impacts of the COVID-19 (coronavirus) pandemic began to impact government operations and businesses throughout the United States, leading to numerous closures of government offices for an unspecified period of time.

During the March meeting of the Core Planning Team, it was determined that all aspects of the plan should be reviewed and revised to provide clarity and to ensure that the plan met the planning requirements of FEMA. In addition, an approach to capture updated data and information related to the impacts of the recent flooding in March 2019 was discussed to ensure that changes in risk and vulnerability would be captured during the planning process. The NEMA participants on the planning team were assembled to assist in this review and revision of the SHMP, and to serve as the contact point to facilitate the project phases and activities. This group was expanded to meet workload requirements and bring in additional input, as required.

Table 2-2: Core Planning Team

Name	NEMA Section/Agency	Title
Molly Bargmann	Recovery	Recovery Section Supervisor
Donny Christenson	Recovery	Recovery Section Manager
John Gassmann	Recovery	State Hazard Mitigation Officer
Lexy Hindt	Recovery	Deputy State Hazard Mitigation Officer
Nancy Freeman	IEM	Project Coordinator, Senior Mitigation Specialist
Sheila Hascall	IEM	Manager, Mitigation Programs
Miranda Rogers	IEM	Deputy Project Manager

2.2.2 – Planning Committee

The **Governor's Task Force for Disaster Recovery (GTFDR)** served as formal planning committee for the 2021 SHMP update. The GTFDR also included invited representatives of key stakeholder agencies involved in the 2019 SHMP planning process, as well as other representatives from agencies and organizations with mitigation-related focus or involvement.

Table 2-3: Governor's Task Force for Disaster Recovery and Participating Stakeholders

Name	Agency/Organization	Title
Danielle Balina	Nebraska Assoc. of County Officials	Assist. Finance Manager/Comms Director
Molly Bargmann	Recovery Section Manager	NEMA
Jon Cannon	Deputy Director	NACO
Donny Christensen	Recovery Section Administrator	NEMA
John Cook	Hazard Mitigation Planning Spec.	NEMA
Dan Curran	Deputy Director	NDED

Jeff Edwards	Envir. Quality Section Supr.	NDEE
Karl Elmshaeuser	State Director, Nebraska	USDA
Joe Francis	Envir. Quality Div. Administrator	NDEE
John Gassmann	State Hazard Mitigation Officer	NEMA
Joe Green	Hazard Mitigation Planning Spec.	NEMA
Casey Hartline	Hazard Mit. Grant Mgmt. Spec.	FEMA Region VII
Lexy Hindt	Deputy State Hazard Mit. Officer	NEMA
Earl Imler	Ops & Preparedness Section Mgr.	NEMA
Tony Krause	Flood Risk & Floodplain Mgr.	USACE – Omaha District
Jim Macy	Director	NDEE
Lynn Marienau	Communications Director	LNM
Denise Meeks	Community Programs Director	USDA
Katie Ringland	Engineer	NeDNR
Simone Rock	Certified Floodplain Manager	USACE
Tom Sands	Operations Division Manager	NDOT
Jessica Scharf	Hazard Mit. Planning Specialist	NEMA
Chris Schroeder	Long Term Recovery Specialist	NEMA
McKenzie Slack	Hazard Mit. Planning Specialist	NEMA
Heather Thole	Hazard Mit. Planning Specialist	NEMA
David Varner	Associate Director	UNL, Agricultural Extension
Brian Woltz	Acting Hazard Mitigation Assistance Branch Chief	FEMA Region VII

2.2.3 – Flexibility of the Planning Process

Realizing that the impacts of the pandemic would affect the activities of a typical hazard mitigation planning process involving face-to-face meetings, the Core Planning Team developed an **Engagement Strategy**, approved by FEMA Region VII, that would allow the process to move forward with flexibility to meet participation requirements of the planning process. [See Appendix A for Engagement Strategy.]

2.2.4 – Planning Process - Timeline

Figure 2-1: Planning Process Timeline

2.2.5 – Planning Committee Process

Coordination between state agencies and other organizations was accomplished through planning committee meetings with the GTFDR and stakeholders, conducted between June and September 2020, along with meetings of the Core Planning Team. As described above, the format of the GTFDR planning meetings was adapted to accommodate social distancing requirements due to the COVID-19 pandemic. Consequently, most meetings were conducted through web-based interface, with PowerPoint presentations and companion Word documents that allowed planning committee members to provide feedback to data and information presented during the web meeting. **Table 2-4** describes the meeting schedule, topics, participating group(s), and formats implemented during the planning process.

Table 2-4: 2021 SHMP Planning Committee Meetings (GTFDR and Stakeholders)

Date	Topic	Participant(s)	Format
March 12, 2020	Core Planning Team Initial Meeting	Core Planning Team IEM Contractors	Face-to-face meeting at NEMA office.
April 14, 2020	Kick-Off Meeting	Core Planning Team, GTFDR and IEM Contractor	Webex
June 23, 2020	Hazard Identification and Risk Assessment	Core Planning Team, GTFDR and IEM Contractor	Webex
July 21, 2020	Mitigation Strategy 1 – Goals and Objective and Capabilities	Core Planning Team, GTFDR and IEM Contractor	Webex
August 21, 2020	Mitigation Strategy 2 – Mitigation Actions and Priorities	Core Planning Team, GTFDR and IEM Contractor	Webex

October 1-31, 2020	Draft Plan Review and Approval	Core Planning Team, GTFDR and IEM Contractor	Webex

2.2.6 – Planning Committee - Participation

Over the seven-month planning period, between March and September 2020, more than 50 individuals participated in the planning process, which included meetings, technical assistance, plan review and input, and other activities. The listing of all participants in the 2021 plan update process is provided in **Appendix A, A-2 Record of Participation**.

2.2.7 - Stakeholder Participation

Participation of agencies and stakeholders was determined by the list of stakeholders involved in the 2019 plan revision along with members in the GTFDR. Coordination between state agencies and other organizations was accomplished with stakeholder meetings conducted during the planning process, along with periodic phone by meetings between the Core Planning Team and the contractor. The stakeholder meetings were conducted by phone and were in addition to the regular planning meetings of the GTFDR.

During these meetings, stakeholders were asked to provide insight into how their agencies/organizations engaged in mitigation and planning efforts along with input and information on the hazards facing the state. A list of the stakeholders included along with method of coordination are included in **Table 2-5**. Those who did not participate in the planning meetings or individual meetings provided input via technical review, assistance or data.

Table 2-5: Stakeholder Input – Hazard Data Review

Agency	Contact	Assistance/Input	Date
Nebraska National Guard	Michael S. Wilson	Reviewed Terrorism section and provided feedback for revision	6/18/2020
NOAA/National Weather Service	Brian Smith	Reviewed Severe Thunderstorm and provided feedback for revision	6/18/2020
University of Nebraska at Lincoln	David Varner, Dr. Rebecca Funk	Reviewed Animal Disease section and provided feedback for revision	6/23/2020
University of Nebraska at Lincoln	David Varner	Reviewed Drought section and provided feedback for revision	6/26/2020
National Drought Mitigation Center	Cory Knutson, Kelly Smith	Reviewed Drought section and provided feedback for revision	6/26/2020
Nebraska Department of Health and Human Services	Russ Wren	Reviewed Human Infectious Disease section and provided feedback for revision	7/7/2020

Nebraska Forestry Service	Matthew Holte	Reviewed Wildfire section and provided data feedback for revision	7/20/2020
7/20.2020University of Nebraska at Lincoln	David Varner	Reviewed Plant Disease and Pests section and provided feedback for revision	7/28/2020
Nebraska Department of Administrative Services – Risk Management	Allen Simpson	Provided State Asset data	7/28/2020
Nebraska Rural Electric Association	James Dukesherer	Provided information and data related to Public Power Districts	[Multiple dates]
U.S. Army Corps of Engineers	Simone Rock	Provided data sources for high water marks, and other data and graphics for the 2019 flood event.	10/02/20

In addition to the planning entities described above, Public Power Districts (PPDs) were invited to participate as key stakeholders in the State's plan. The PPDs were invited to form internal planning groups to assist in development of PPD-specific planning annexes that augment the Base Plain.

Throughout the planning process, between meetings and final submission, stakeholders were provided the opportunity to review drafts of hazard profiles and provide feedback along with data such as historical damages, frequency of current and future events, and resource ideas. A final draft was provided to the Planning Committee in October 2020 for review and comments. Stakeholder and FEMA review comments were combined with final core planning reviews to complete the final submission to FEMA in November 2020. **Table 2-6** summarizes the agencies' involvement and contributions in relation to the plan review and input.

Table 2-6: Stakeholder Input - Plan Review

Plan Section	Comments/Input	Name, Title, Agency	Date Submitted
Section 4	Clarification of continuity capabilities of State agencies	Logan Lueking, EM Prog. Spec., NEMA	8/4/20
All	Finalize plan format	John Gassman, SHMO, NEMA	8/4/20
Section 4	Goals and Objectives	Hannah Jones, Asst. Div. Admin., Nebraska Game & Parks Commission	8/6/20
Section 1	Clarification of "technical assistance" as "collaboration"	Heather Thole, Mit. Planning Spec., NEMA	10/19/20

Section 3.3	Long-term impacts of drought	Heather Thole, Mit. Planning Spec., NEMA	10/19/20
Section 3.9	Clarification of ice storm and blizzard; formatting	Heather Thole, Mit. Planning Spec., NEMA	10/26/20
Public Power Annexes	Final template format	John Gassmann, SHMO, NEMA John Cook, Mit. Planning Spec., NEMA	10/30/2020

Several federal agencies were involved as participants or utilized as information sources for the revision of the risk analysis and mitigation strategy:

1. U.S. Army Corps of Engineers Missouri River Omaha District
2. U.S. Small Business Administration
3. U.S. Department of Agriculture
4. U.S. Environmental Protection Agency Region VII
5. U.S. Department of Health and Human Services
6. National Weather Service, NOAA

2.3 – Statewide Mitigation Engagement

Mitigation engagement activities occur year around in the form of outreach webinars, applicant briefs, recovery related trainings, NEMA basic academy, and National Flood Insurance Program (NFIP) training, along with others. Table 2-7 reflects a sample of mitigation engagement since the 2019 plan.

Table 2-7: Statewide Mitigation Engagement

Event	Topic	Date(s)
Training	Jurisdictional Threat & Hazard Identification & Risk Assessment	April 28-29, 2020
Training	Critical Asset Risk Management	July 23-24, 2019
Training	Critical Infrastructure Security and Resilience Awareness	October 2, 2019
Hazard Survey	Statewide Hazard Survey of Local Emergency Management	June 2020
Training	BNSF Railroad Response HAZMAT Training	Multiple dates

2.4 – Integration with Other Plans, Programs, and Initiatives

2.4.1 – State, Federal, Local and Tribal

The Nebraska Hazard Mitigation Plan is part of an overall planning process that is ongoing in the State of Nebraska involving numerous state and local agencies and organizations. Aspects of mitigation objectives and activities have been included in the state's emergency operations plan; state and local recovery planning; local emergency operations plan; along with the local hazard mitigation plans. The plan update process included a broad review and consideration of data and information from these plans, programs and initiatives. **Table 2-8** lists the plans that were reviewed during the planning process and provides a brief description of the information was integrated into the 2021 SHMP update.

Table 2-8: Review and Integration with Other Plans, Programs and Initiatives

Plan/Program	How it was integrated in the 2021 SHMP Update
2013 Flood Hazard Mitigation Plan, State of Nebraska	Technical information integrated as background
2014 Understanding and Assessing Climate Change	Data and climate change data and information integrated in multiple hazard sections
DR-4420 After Action Review, 2019	Integrated after action information in flood section; Integrated state capabilities into Section 4
Comprehensive Plans and Flood Risk, A Resource Guide for Nebraska Communities, March 2015	Reviewed for background to community flood planning
Drought-Ready Communities, A Guide to Community Drought Preparedness, May 2011	Reviewed for background to drought planning
Essential Plan Maintenance Policy (POL-02-102), October 10, 2020	Reviewed to ensure the hazard mitigation plan maintenance method and schedule were not in conflict with general planning policy.
Floodplain Management Today, Nebraska Dept. of Natural Resources, "Who Lives in Nebraska Floodplains?", December 2016	Reviewed for data and background for flood section
Nebraska Division of Public Health Strategic Plan, 2017-2021	Reviewed for policy and background for human infectious disease section
Spencer Dam Failure Investigation Report, April 2020	Reviewed for data and background for dam failure section
State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis, October 15, 2020	Reviewed for hazard risk and vulnerability data as a foundation for all-hazard consideration in relation to mitigation; considered risk and vulnerability scoring results and consequence analysis for individual hazard sections.
The Implications of Climate Change for Nebraska: Summary Repot of Sector-Based Roundtable Discussions, September-October 2015	Data and climate change data and information integrated in multiple hazard sections
Local Hazard Mitigation Plans	Reviewed and data extracted for hazard risk and vulnerability, capabilities, projects

Nebraska has been active in the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) Grant, and the Flood Mitigation Assistance (FMA) grant for over three decades. The newest hazard mitigation funding opportunity was announced in August 2020 for the pre-disaster **Building Resilient Infrastructure and Communities (BRIC)** program, funded through the Hazard Mitigation Assistance (HMA). For Fiscal Year 2020, states and territories were allocated $33.6 million (up to $600,00 per applicant). The NEMA and NeDNR partner to coordinate the Governor's Task Force for Disaster Recovery, ensuring that funds are effectively managed and reducing duplication. Additionally, NEMA and NeDNR have also been regular participants in workshops at both the national and local levels.

A new addition to the Nebraska hazard mitigation program is the **High Hazard Potential Dam Grant Program (HHPD)**. As part of the plan update, technical information related to this program was added to **Section 3.4 Dam Failure,** and grant funding information was added to **Section 4 Mitigation Strategy**.

Federally recognized tribes within Nebraska generally develop and manage their own hazard mitigation programs and are supported by the State. Should tribes request assistance, the State is willing and able to respond.

2.4.2 – Challenges to Integration

Historically, staffing levels at the state level has been expressed as a challenge to plan and program integration efforts, and this was identified as a challenge in the 2019 SHMP. As of this 2021 update, the staffing level has increased and integration of local plan information has been enhanced with this plan revision. Continued focus on continuity of staffing will provide opportunities to increase engagement in local hazard mitigation planning and other local planning opportunities.

Lack of funding remains a challenge as many projects have become too expensive to undertake with current funding levels. Targeting partnerships and additional funding streams is a priority to address this challenge.

2.4.3 – Future Planning and Mitigation Efforts

The state remains committed to expanding the engagement of schools, not-for-profits, private businesses, and tribal partners in mitigation planning and activities. The state achieves these efforts by encouraging partnerships during and after the local hazard mitigation planning process along with encouraging active engagement between entities and local emergency management.

SECTION 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT

44 C.F.R. §201.4 Requirements

- S3. Does the risk assessment include an overview of the type and location of all-natural hazards that can affect the state? [44 C.F.R. §201.4(c)(2)(i)]
- S4. Does the risk assessment provide an overview of the probabilities of future hazard events? [44 C.F.R. §201.4(c)(2)(i)]
- S5. Does the risk assessment address the vulnerability of the state assets located in hazard areas and estimate the potential dollar losses to these assets? [44 C.F.R. §201.4(c)(2)(ii) and 201.4(c)(2)(iii)]
- S6. Does the risk assessment include an overview and analysis of the vulnerability of the jurisdictions to the identified hazards and the potential losses to vulnerable structures? [44 C.F.R. §201.4(c)(2)(ii) and §201.4 (c)(2)(iii)]
- S7. Was the risk assessment revised to reflect changes in development? [44 C.F.R. §201.4(d)]

EMAP Standard 4.1.1 & 4.1.2

4.1.1: The Emergency Management Program identifies the natural and human-caused hazards that potentially impact the jurisdiction using multiple sources. The Emergency Management Program assesses the risk and vulnerability of people, property, the environment, and its own operations from these hazards.

4.1.2: The Emergency Management Program conducts a consequence analysis for the hazards identified in Standard 4.1.1 to consider the impact on the following:

(1) public;

(2) responders;

(3) continuity of operations including continued delivery of services;

(4) property, facilities, and infrastructure

(5) environment;

(6) economic condition of the jurisdiction; and

(7) public confidence in the jurisdiction's governance.

2021 SHMP Update

Following the comprehensive hazard review and risk assessment, all hazards profiled in the 2019 State Hazard Mitigation Plan (SHMP) were moved forward to this plan. Justifications for hazards that were eliminated from further consideration are provided.

In addition, the following change was made to the natural hazards list:

- **Human Infectious Disease** was added for initial consideration, and following the initial risk assessment was fully profiled.
- **Chemical and Radiological Fixed Sites and Transportation, Extreme Temperatures, and Power Failure** were included as hazards to be minimally profiled to provide context to hazards identified in Local Hazard Mitigation Plans or Public Power District annexes.

An assessment of vulnerability related to the population has been added to this section, using the Centers for Disease Control and Prevention's Social Vulnerability Index.

Specific data and information related to each hazard type have been reviewed and updated from the 2019 Plan. Data sources are included at the end of this and each hazard section.

3.0.1 – Overview

To define effective mitigation actions to make Nebraska more resilient to the impacts of future disasters, it is necessary to understand the hazards that threaten the state and how they disrupt Nebraska communities. It is also necessary to understand how the communities are vulnerable to the impacts of the identified hazards and the scope or extent of that vulnerability. The foundation of the *2021 Nebraska State Hazard Mitigation Plan* (SHMP) is the statewide risk assessment. This assessment was built off the analysis of previous state plans, historical and statistical data, and Local Hazard Mitigation Plans, then updated to include recent data and shifts in hazard risk and vulnerability.

The purpose of this section is to provide, on a statewide basis, an understanding of the risks posed by the hazards that threaten Nebraska. The risk analysis is the basis for the Planning Team's hazard profiles.

This section of the plan presents the hazard identification and risk assessment, which includes detailed descriptions of ***natural, technological,*** and ***human-caused*** hazards that are known or are considered to be a threat to the people, property, infrastructure, environment, economy, or disaster operations of the state's jurisdictions.

The following plans, studies, and documents provided essential hazard information described in this plan update:

- Review of the State of Nebraska *Risk Assessment, Vulnerability Assessment and Consequence Analysis*, October 15, 2020
- Review of the *2019 Nebraska State Hazard Mitigation Plan*
- Review of the *2014 Nebraska State Hazard Mitigation Plan*
- Review of historical data of events that occurred since the 2019 SHMP was adopted, including input from subject matter experts and lessons learned from previous years
- Review of hazards identified in guidance materials provided by FEMA Region VII

- Assessment of current data archives provided by the NOAA National Centers for Environmental Information (Storm Events Database)
- Review of vulnerability and risk analyses contained in Local Multi-jurisdictional Hazard Mitigation Plans
- Statewide Hazard Identification and Risk Assessment (HIRA) Survey: Conducted by the Nebraska Emergency Management Agency (NEMA) in June 2020
- Review of climate change studies and publications from various local, state, national and international sources
- Review of past Federal Disaster Declarations
- Research of historical records, predictive models, and other verified data collected from a broad range of sources
- Review of *Essential Plan Maintenance Policy, POL-02-102*, dated October 10, 2020

Risk Assessment Terminology

- Risk – *Potential for damage, loss, or other impacts created by the interaction of hazards with community assets.*
- Vulnerability – *Characteristics of community assets that make them susceptible to damage from a given hazard or threat.*
- Exposure – *People and property within the area the potential hazard could affect.*
- 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.*

Hazard risk and vulnerability data presented in this plan should also be used in the development and update of other state and local plans to provide a consistent foundation for all policies, plans, and programs that address hazards and the potential for reduction of the risk, impacts, consequences, and costs of disasters.

[EMAP 4.1, 4.2] This section presents the hazards of highest concern, identified through a comprehensive risk assessment and consequence analysis. Hazards are described in terms of their characteristics, location and extent, history/previous events, probability of future occurrence, impacts and consequences, repetitive losses associated with the hazard (when applicable), and overall analysis of vulnerability. Hazards that are considered to have a minimal potential for occurrence or minimal impacts or consequences were excluded from the hazard profile and did not receive further consideration in relation to vulnerability or mitigation actions.

For the 2021 SHMP update, the risk assessment methodology was based on a quantitative analysis of risk developed to meet hazard mitigation planning criteria for both FEMA's ***natural*** hazard planning requirements under Title 44 C.F.R., Part 201.6, and the ***all-hazard (natural, technological, and human-caused)*** planning requirements defined by the **Emergency Management Accreditation Program** (EMAP) Standard, Chapter 4.3, Hazard Identification, Risk Assessment and Consequence Analysis (2013

edition). Because FEMA's mitigation planning requirements are limited to natural hazards only, the EMAP Standard was used to enhance the all-hazard process and allow consideration of other threat and hazard planning processes such as the Threat and Hazard Identification and Risk Assessment (THIRA), a capabilities-based assessment that considers a sub-set of hazards of highest concern.

In addition to guiding mitigation planning, the detailed analysis of specific impact and consequence factors provides guidance for all prevention, preparedness, response, and recovery plans, actions and resources when a hazard occurs. For this hazard and risk assessment exercise to be truly successful, the results must also inform the state's other planning efforts at the local level, such as land use, transportation, capital projects, and comprehensive plans, and be informed by them. The *2021 State of Nebraska Hazard Mitigation Plan* will be adopted as part of the state's comprehensive planning approach. This intentionally synergistic focus will facilitate key decision making at all levels.

3.0.2 - Hazard Identification Methodology

As described above, the 2021 plan revision planning team, the Governor's Task Force for Disaster Response (GTFDR), identified hazards within the previous two versions of the plan that remain relevant to Nebraska. In presenting these profiles, it is important to describe how the decisions in this version and the previous version were formulated.

Step 1: Hazards for Initial Consideration

- The initial step in identifying hazards for the 2021 plan update began with a broad range of all 27 natural, technological, and human-caused hazards extracted from current and previous State and Local hazard mitigation plans, and FEMA hazard mitigation planning guidance. The following hazards were initially considered:

Table 3.0-1: All Hazards for Initial Consideration

Natural	Technological	Human-Caused
Avalanche	Chemical Transportation	Civil Disorder
Animal Disease	Power Failure	Public Health Emergency
Coastal Erosion	Radiological Fixed Facility/Transportation	Terrorism
Coastal Storm/Hurricane	Transportation	Urban Fire
Dam Failure		
Drought		
Earthquake		
Expansive Soils		
Extreme Temperatures		

Flood/Flash Flood		
Land Subsidence and Landslide		
Levee Failure/Overtopping		
Plant Disease & Pests		
Severe Thunderstorm (Hail, High Winds)		
Severe Winter Storm		
Tornado		
Tsunami		
Volcano		
Wildfire		

Step 2: Hazard Elimination

The second step by the planning team was to identify which hazards are not likely to occur or significantly impact the state. Given Nebraska's central location in North America and its generally flat, high plains terrain, several hazards are precluded from occurring. There is no documentation or physical evidence to support that the following hazards have or will occur to a significant scale within the bounds of Nebraska:

- Avalanche
- Coastal Erosion
- Coastal Storms or Hurricanes
- Tsunamis
- Volcanoes

The planning team also considered the results of the *State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis (HIRA)*[2], dated October 15, 2020, which assessed the following twenty (20) hazards:

- Agricultural - Animal Disease
- Agricultural - Plant Disease
- Chemical Fixed Facility
- Chemical Transportation
- Civil Disorder
- Dam/Levee Failure

[2] The *Nebraska Statewide Hazard Identification and Risk Assessment (HIRA) Survey* is conducted every five years by NEMA, soliciting feedback through a Survey Monkey tool from the County Emergency Management Directors. The 2020 HIRA Survey included responses from 91 of the 93 counties. Additional information related to the HIRA Survey is in Appendix B.

- Drought
- Earthquake
- Flood/Flash Flood
- Power Failure
- Public Health Emergency
- Radiological Fixed Facility
- Radiological Transportation
- Severe Thunderstorm
- Severe Winter Storm
- Terrorism
- Tornado
- Transportation
- Urban Fire
- Wildfire

Following review of the hazards assessed in the HIRA, Some natural and human-caused hazards were determined to be a low risk due to infrequent occurrence or negligible impacts and did not provide a sufficient level of risk for mitigation purposes to justify conducting further analysis related to vulnerability or exposure.

Some hazards were eliminated from further consideration in the risk assessment by both the 2019 and 2021 planning teams, based on the previous state hazard mitigation plans combined with additional research to confirm that none of the risks associated with these hazards has changed within the last five years. Consequently, the following hazards were removed from further consideration for mitigation planning purposes. (This determination in no way indicates that these hazards should not be considered for other planning purposes such as preparedness, prevention, response, and recovery.)

Table 3.0-2: Hazards Eliminated from Further Consideration in the 2021 SHMP

HAZARD	JUSTIFICATION FOR ELIMINATION
Civil Disorder	• Civil disorder is an activity arising from mass actions of civil disobedience in which participants become hostile toward authorities and difficulties occur in maintaining public safety and order. Since 1900, records show over 20 incidents of civil disorder in the City of Omaha. Reasons range from racial tensions, political movements, to economic and labor disputes. Several other civil disorder incidents occurred throughout the state for similar reasons. • Records indicate that prior to May 2020, no state emergencies had been declared for a civil disorder event. However, on May 25, 2020 the Governor issued a Proclamation following incidents of civil unrest in Lincoln and Omaha, ordering National Guard units to support local officials. In addition, the State Emergency Operations Center was activated on May 31, 2020 to coordinate and supplement available law enforcement resources through state agencies to assist local law enforcement with anticipated ongoing public safety issues.

	• Despite the recent civil unrest/disorder incident in 2020, the number of this type of incidents is low, limited in scale, and typically within the scope of local plans and resources to manage. Consequently, the hazard will not be further profiled at this time. Civil unrest/disorder will be reconsidered as part of the annual evaluation activities during the lifecycle of this plan to determine if the risk level of the hazard has changed and should be addressed in the next plan.
Earthquake	• Historically, Nebraska has seen less than one earthquake per year between 1866 and 1990. However, from 1990 to December 2018, Nebraska had experienced a total of 60 earthquakes. The majority of them, 29 or 48%, happened in 2018 alone in the area around Arnold, NE. The magnitudes range from 2.1-4.1, based on the Richter scale, with an average of 2.96 for these 28 quakes. The average magnitude for the 59 quakes from 1990 to 2018 is 3.1. • While this is a large increase in the number of earthquakes, it is too early to tell whether the trend will continue. What is clear is the fact that in 43 years (1975 - 2018), Nebraska has experienced only 3 quakes that were a 4.0 or larger. This is only 4% of earthquakes for that period and occurring once per 14.33 years. Earthquakes with magnitudes 4.0-4.9 are described to cause minimal damage and unlikely to cause moderate/significant damage. Nearly all earthquakes in Nebraska, 96%, have been weak with many not able to be felt by residents. Only a couple have produced minor damage to buildings. • The most recent earthquake reported was a minor tremor registered as 2.9 in magnitude, located about 18 miles south-southwest of O'Neill, in Holt County. Despite this most recent event, the most likely earthquake situation that would impact Nebraska would be a strong earthquake on the New Madrid Seismic Zone. However, the majority of current activity is on the Humboldt Fault that extends from Kansas into the southeastern region of Nebraska. These impacts would not be in the form of damages but in assisting impacted states and residents. Given the low chance of impact to the state, earthquakes were not further profiled
Expansive Soils	• Expansive soils are soils and soft rock that tend to swell or shrink excessively due to changes in moisture content. The effects of expansive soils are most prevalent in regions of moderate to high precipitation, where prolonged periods of drought are followed by long periods of rainfall. • Areas of Nebraska have soil types that may contain expansive capabilities, but limited mapping along with extremely limited data on any occurrences of incidents or damages due to expansive soils, it was determined that mitigation activities would be limited.
Land Subsidence (Sinkholes)	• The loss of surface elevation due to the removal of subsurface support defines a sinkhole. Sinkholes range from broad, regional lowering of the land surface to localized collapse. The primary causes of most land subsidence include human activities such as underground coal mining, groundwater or petroleum withdrawal, and drainage of organic soils. An additional factor is the erosion of limestone of the subsurface. • There are no recognized areas of true karst topography, the topography for which land subsidence (sinkholes) is common, in Nebraska. Large

	parts of the state are underlain with limestone, it is overlaid with thick layers of sand and clay or of the type of limestone that does not erode. Additionally, Nebraska has a relatively high-water table reducing risk. • Based on this information, the team concluded with the 2014 plan and eliminated land subsidence and sinkholes from further consideration.
Landslides	• From the University of Nebraska's School of Natural Resources, the majority of Nebraska's landslides fall under five categories: rockfalls, earth slumps, rock spreads, rock slumps, complex slides, with earth slumps being the most common. Earth slumps involve non-bedrock deposits moving downward on a rotational failure plane. • A review of the University of Nebraska School of Natural Resources' Nebraska Landslides Database shows that a total of 313 landslides have been documented in the state since surveys began around 1986 with no significant damages documented. Landslides in this database may have occurred several years before being surveyed. This shows that no recorded landslides have occurred since the 2014 plan revisions along with no damages being recorded. • Landslides have been highly localized and did not exceed the capacity of local authorities to address. • For these reasons, the planning team eliminated landslides from further consideration
Radiological Fixed Facility/Transportation	• Facilities that use radiological materials are strictly controlled by federal and state air pollution and water quality regulations. • There are two nuclear power plants in Nebraska, both located along the Missouri River, both falling under the regulatory authority of the U.S. Nuclear Regulatory Commission and Omaha Public Power District. Both plants have made recent flood preparation upgrades • The power plants have ongoing coordination for radiological emergency planning with State and Local officials.
Transportation	• The 2014 State Hazard Mitigation Plan profiled transportation in factoring the occurrence of incidents involving hazardous materials or with large scale incidents. Traffic accidents occur daily in the state to various levels of severity. Other such incidents involving railways or aviation historically have been on a small scale and handle by local authorities. • Many transportation incidents involve either a natural hazard such as a winter storm or high winds; human error; or the failure of systems. Mitigation activities that would directly address a transportation hazard are limited with most activities addressing an underlying hazard such as flooding or severe winter storm. • For these reasons, transportation was eliminated from further profiling.
Urban Fire	• Historically, urban fires have been handled on the local level with limited state assistance. There has not been an incident where the State Emergency Operations Center has been activated and this hazard was not further profiled.

Step 3: Hazards Included in the 2021 SHMP

Historically, planning efforts in Nebraska have consistently identified similar hazards for further analysis and profiling. The 2011 State Hazard Mitigation Plan identified ten natural and human-caused hazards: severe winter storm, severe thunderstorm, tornado, drought, flood/flash flood, animal disease, wildfire, terrorism, earthquake, and dam/levee failure. The 2014 plan maintained the 2011 hazards and added plant disease, chemical transportation, earthquake, power failure, and transportation. The 2019 planning team made some adjustments to the 2014 hazard list, separating dam failure and levee failure into separate profiles and eliminating chemical transportation, earthquake, and transportation. Furthermore, plant disease was expanded to include dangerous pests. The result of the team's analysis identified 11 hazards to be further profiled in the 2019 SHMP.

For the 2021 SHMP update, the GTFDR confirmed that all 11 hazards profiled in the 2019 plan should be retained. In addition, at the GTFDR hazard identification and risk assessment planning meeting via WebEx on June 23, 2020, it was determined that two hazards that were previously eliminated in the 2019 SHMP, chemical transportation and power failure, should be re-instated for the 2021 SHMP. Input from meeting participants also supported adding two new hazards – extreme temperatures and human infectious disease - with the condition that a risk assessment overview first be conducted to determine whether the two new hazards, as well as chemical transportation and power failure, the two hazards previously eliminated in the 2019 plan, should undergo a minimal or full risk assessment for the 2021 plan update.

The resulting risk assessment overview was conducted, and the final list of hazards and the resulting disposition in the plan is presented in **Table 3.0-3**. This list of 15 hazards is the subset of all 26 hazards considered in the initial review of FEMA-defined hazards, previous hazard mitigation plans, and the HIRA, and is presented as the state's highest hazards of concern in relation to mitigation planning. The first twelve (12) hazards in the list are fully profiled in the 2021 SHMP; the three (3) additional hazards are included as “other hazards of concern” and minimally profiled, based on the outcome of the GTFDR’s selection in June 2020.

Table 3.0-3: Summary of Hazards Profiled in the 2021 SHMP

Hazard Profile	Justification for Profile	Final Disposition in 2021 SHMP
Animal Disease	• History of previous occurrences in multiple jurisdictions • High potential impact to State and local economies	• Full profile/risk assessment and vulnerability analysis

Hazard Profile	Justification for Profile	Final Disposition in 2021 SHMP
Dam Failure	• History of previous occurrences with property loss • Numerous dams throughout the state, including 2,922 State-regulated dams and 145 high hazard potential dams (Nebraska D.N.R., Dam Safety Program) • Dam maintenance issues and extreme weather events could cause failures • Numerous Federal Disaster Declarations for flooding	• Full profile/risk assessment and vulnerability analysis
Drought	• History of previous occurrences • Importance of large water users and agriculture to the state's economy • Numerous USDA disaster declarations • Potential for environmental impacts	• Full profile/risk assessment and vulnerability analysis
Flood/Flash Flood	• Extensive history of riverine flooding • High losses from previous floods • History of damaging ice jams and flash floods • Numerous dams throughout the state, including 145 high hazard potential dams • Dam maintenance issues and extreme weather events could cause failures • Numerous Federal Disaster Declarations for flooding • Significant impact to critical infrastructure	• Full profile/risk assessment and vulnerability analysis
Human Infectious Disease	• Increasing threat of infectious disease outbreaks, including influenza (H1N1) and coronavirus • Two Federal Disaster Declarations (one Emergency, on Major) in March and April 2020 for COVID-19 • Widespread recognition that appropriate mitigation actions save lives and reduce risk	• Full profile/risk assessment and vulnerability analysis

Hazard Profile	Justification for Profile	Final Disposition in 2021 SHMP
Levee Failure	• There are 137 levee systems in Nebraska, mostly in the Eastern half of the state • History of previous occurrences with property loss • Levee maintenance issues and extreme weather events could cause failures • Numerous Federal Disaster Declarations for flooding	• Full profile/risk assessment and vulnerability analysis
Plant Disease and Pests	• History of previous occurrences in multiple jurisdictions • High potential impact to State and local economies • Potential for environmental impacts	• Full profile/risk assessment and vulnerability analysis
Severe Thunderstorm	• Extensive history of frequent occurrences with health/safety, property and crop losses • 23 Federal Disaster Declarations since 1950 for severe storms • Significant impact to critical infrastructure	• Full profile/risk assessment and vulnerability analysis
Severe Winter Storm	• Significant history of previous occurrences • Potential for loss of life • Significant impact to critical infrastructure	• Full profile/risk assessment and vulnerability analysis
Terrorism	• Rising number of domestic and international threats elements confirm potential for incidents • Potential for significant impact to critical infrastructure	• Full profile/risk assessment and vulnerability analysis
Tornado	• Extensive history of frequent occurrences with health/safety, property and crop losses • Numerous Federal Disaster Declarations since 1950 • Significant impact to critical infrastructure	• Full profile/risk assessment and vulnerability analysis
Wildfire	• History of previous occurrences • Potential for loss of life • Potential for extensive property and crop loss • Significant impact to critical infrastructure • Potential for environment impacts	• Full profile/risk assessment and vulnerability analysis

Hazard Profile	Justification for Profile	Final Disposition in 2021 SHMP
OTHER HAZARDS OF CONCERN		
Chemical Fixed Sites and Transportation	• Multiple Local Hazard Mitigation Plans (LHMPs) address this hazard • Nebraska has approximately 3,624 facilities that report extremely hazardous chemicals under the Emergency Planning and Community Right to Know Act (EPCRA) • Numerous hazardous materials are transported throughout the state's road, rail and pipeline systems	**Minimally profiled to provide context for LHMPs** for the following reason(s): • Hazard threat is well-coordinated by State Emergency Planning Commission (SERC) and Local Emergency Planning Committees (LEPCs) • Hazard planning primarily addresses preparedness and response
Extreme Temperatures	• History of extensive previous occurrences • Multiple Local Hazard Mitigation Plans (LHMPs) address this hazard	**Minimally profiled to provide context for LHMPs** for the following reason(s): • Hazard planning primarily addresses preparedness and response
Power Failure	• History of previous occurrences • Significant impact to critical infrastructure	**Minimally profiled to provide context for LHMPs** for the following reasons: • Power failure is frequently an impact resulting from another hazard • Public Power District Annexes to the 2021 SHMP address hazard impacts, risks, vulnerability and potential actions

Reconciliation of 2020 HIRA Survey Ranking in the Plan

Although hazards are not ranked for the purpose of the 2021 SHMP update, the hazard ranking outcome of the State HIRA Survey in June 2020 was taken into account in evaluating all hazards that should be profiled, either fully or minimally, for the plan update. The HIRA hazard ranking results from the survey were evaluated during the risk assessment process for this plan update to ensure consistency with the hazards of highest concern. The reconciliation of the comparison of the HIRA survey results and the final hazards selected for profiling in the plan is described in **Table 3.0-4**. Of the 20 hazards considered in the HIRA Survey, the top 11 hazards and the hazards ranked as numbers 13, 15, and 17 are addressed in this plan. (Dam/Levee Failure is considered as a single hazard category in the HIRA survey, but profiled individually in the 2021 SHMP.

Table 3.0-4: State HIRA Survey (June 2020) – Hazard Ranking Order

Rank	Hazard	Reconciliation in Plan
1	Severe Winter Storm	Included
2	Severe Thunderstorm	Included
3	Tornado	Included
4	Power Failure	Included as other hazard of concern
5	Flood/Flash Flood	Included
6	Public Health Emergency	Included as "Human Infectious Disease"
7	Drought	Included
8	Wildfire	Included
9	Chemical Transportation	Included as other hazard of concern
10	Ag Animal Disease	Included
11	Ag Plant Disease	Included
12	Transportation	Not included
13	Chemical Fixed Facility	Included as other hazard of concern
14	Urban Fire	Not included
15	Terrorism	Included
16	Radiological Transportation	Not included
17	Dam/Levee Failure	Included
18	Civil Disorder	Not included
19	Earthquake	Not included
20	Radiological Fixed Facility	Not included

Step 4: Hazard Profiles

Individual profiles of each hazard addressed in this plan are presented in **Sections 3.1** through **3.13**.

Table 3.0-5: Hazard Profile Elements

Hazard Profile Element	Description

Hazard Definition and Characteristics	The hazard is defined or described in relation to its general characteristics, including types.
Location	In general, all of Nebraska is susceptible to most natural hazards, such as severe weather, flood, and drought. Other types of hazards, such as human infectious disease and plant disease and pests, may have more localized areas of impact. Potential impact areas for each hazard profiled in this plan are described in the specific hazard sections.
Previous Occurrences and Extent	Information on historical occurrences, including federally declared disasters and the extent of the loss of life, injuries, and damages are described in this sub-section. Extent also considers other measures of magnitude, such as water depth, speed of onset, or duration of the event. For most hazards, the longer the duration, the greater the extent of the impact.
Probability of Future Events and Impacts of Climate Change	Discussion of the likelihood of the hazard occurring in the future and changes in hazard trends and patterns. There is some challenge in using statistics to document past natural hazard events due to the difference in hazard definitions, how incidents are reported, and the type of database that produces an analysis of these events. For the purpose of this plan, the National Center for Environmental Information (NCEI), Storm Events Database (NOAA) serves as the primary data source for documenting previous weather occurrences and calculating future probability. ***Frequency Analysis:*** Where quantitative data was available, it was used to estimate the probability of the occurrence of a given event. The recurrence interval or return period is based on the probability that a given event will be equaled or exceeded in any given year. This was calculated by dividing the number of years on record by the number of events. Ten or more years of data are typically required to perform a valid frequency analysis for the determination of recurrence intervals. More confidence can be placed in the results of a frequency analysis based on, for example, 30 years of record than on an analysis based on ten years or less. In some instances, where more recent data was not available, other data that provided significant quantification of hazards in the 2019 Plan risk and vulnerability assessments either supplemented or was used in place of more recent data. In addition, data from previous occurrences assisted in the HAZUS-MH analysis for flood and high wind.
Local Plan Data	Information and data related to profiled hazards were extracted from the review of **22** regional hazard mitigation plans, referred to throughout the plan as the "Local Hazard Mitigation Plan" (LHMP), and integrated into the appropriate hazard section. In addition, data from the LHMPs was utilized to describe specific local risks and vulnerabilities, capabilities, and strategies throughout the plan.

Jurisdictional Vulnerability and Potential Losses	Discussion on the vulnerability of the state's population and local assets, including critical infrastructure and related estimated potential losses is provided, including specific local assets at risk.
Vulnerability of State Assets and Potential Dollar Losses	Discussion on the vulnerability of the state's assets, including critical infrastructure, and related estimated potential losses is provided, including specific local assets at risk.
Future Population and Development Trends	Discussion on the impact of development in hazard-prone areas throughout the state related to each hazard.
Factors for Consideration in the Next Planning Cycle	Describes specific points to consider in relation to each hazard when conducting plan maintenance for monitoring, evaluation, and update of the plan.
Data Sources	Provides a listing of all data sources that support each hazard section.

3.0.3 – General Hazard Information

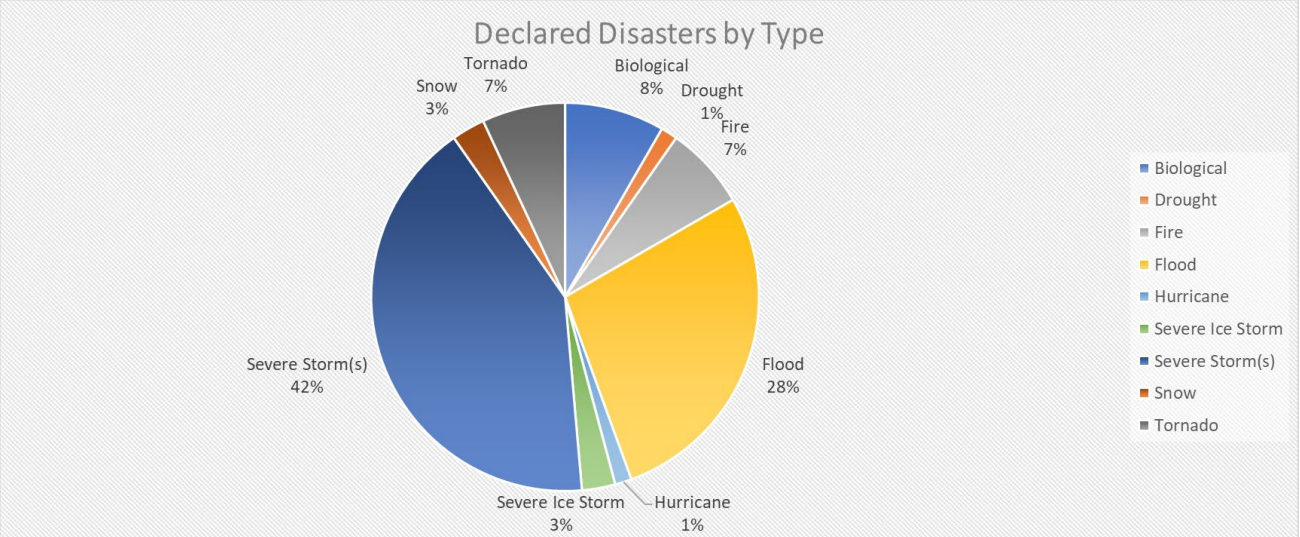
This section of the Plan provides general information that may be applicable to all hazards having the potential to impact jurisdictions in Nebraska. Individual characteristics of specific hazards are further described in the individual hazard sections that follow.

Declarations

FEMA Declarations

As of June 2020, Nebraska has received 72 federal emergency declarations, federal disaster declarations, and Fire Management Assistance Grant declarations since 1960, resulting in over $520 million in disaster funding. Countless other events required state assistance. These can be broadly grouped under eight types: biological, drought, fire, flood, hurricane, severe ice storm, severe storm, snow, and tornado. **Figure 3.0-a** shows a breakdown of the 72 declarations. The most common involve flooding and severe storms. Some of the events listed with severe storms included tornados.

Figure 3.0-a: Declared Disasters in Nebraska by Type, 1960 – June 2020



Source: FEMA

Table 3.0-6: All Federal Disaster Declarations in Nebraska by Type and Total Dollars, 1960-June 2020

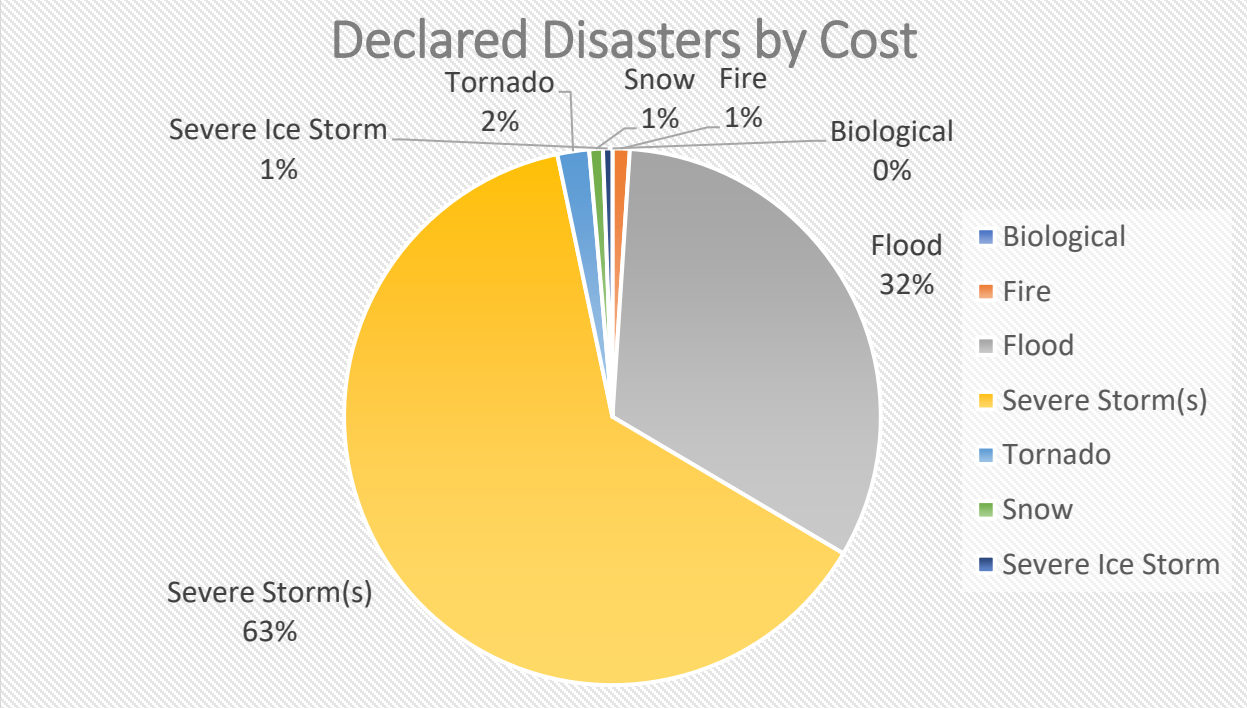
Federal Disaster Declarations					
Disaster	**Year**	**D.R. Type**	**Type**	**# of Counties**	**PA Funds**
98	1960	DR	Flood	0	$ -
131	1962	DR	Flood	0	$ -
134	1962	DR	Flood	0	$ -
156	1963	DR	Flood	0	$ -
174	1964	DR	Flood	0	$ -
221	1966	DR	Flood	8	$ -
228	1967	DR	Flood	56	$ -
303	1971	DR	Flood	19	$ -
308	1971	DR	Flood	9	$ -
406	1973	DR	Flood	15	$ -
467	1975	DR	Tornado	2	$ -
500	1976	DR	Severe Ice Storm	20	$ -
552	1978	DR	Flood	21	$ -
625	1980	DR	Tornado	3	$ -
716	1984	DR	Tornado	24	$ -
718	1984	DR	Tornado	1	$ -
873	1990	DR	Severe Storm(s)	23	$ -
908	1991	DR	Flood	7	$ -

Disaster	Year	D.R. Type	Type	# of Counties	PA Funds
954	1992	DR	Flood	8	$ -
983	1993	DR	Flood	13	$ -
998	1993	DR	Flood	52	$ -
1027	1994	DR	Snow	15	$ -
1123	1996	DR	Severe Storm(s)	4	$ -
1190	1997	DR	Severe Storm(s)	39	$ -
1286	1999	DR	Severe Storm(s)	3	$ 2,083,481.55
1373	2001	DR	Severe Storm(s)	28	$ 2,980,398.88
1394	2001	DR	Severe Storm(s)	1	$ 1,412,395.20
1480	2003	DR	Severe Storm(s)	19	$ 3,885,476.77
1517	2004	DR	Severe Storm(s)	39	$ 13,346,024.52
1590	2005	DR	Severe Storm(s)	11	$ 1,688,473.78
1627	2006	DR	Severe Storm(s)	29	$ 5,444,137.27
1674	2007	DR	Severe Storm(s)	59	$ 124,200,713.40
1706	2007	DR	Severe Storm(s)	19	$ 6,080,866.27
1714	2007	DR	Severe Storm(s)	15	$ 2,299,628.10
1721	2007	DR	Severe Storm(s)	6	$ 1,312,491.56
1739	2008	DR	Severe Ice Storm	8	$ 2,891,172.04
1765	2008	DR	Severe Storm(s)	5	$ 492,125.86
1770	2008	DR	Severe Storm(s)	62	$ 36,096,137.77
1779	2008	DR	Severe Storm(s)	4	$ 12,046,925.54
1853	2009	DR	Severe Storm(s)	17	$ 4,457,575.56
1864	2010	DR	Severe Storm(s)	7	$ 5,106,763.94
1878	2010	DR	Severe Storm(s)	58	$ 6,473,921.01
1902	2010	DR	Flood	37	$ 3,065,081.07
1924	2010	DR	Severe Storm(s)	61	$ 49,445,680.57
1945	2010	DR	Severe Storm(s)	7	$ 2,130,597.69
2655	2006	FM	Fire	1	$ -
2660	2006	FM	Fire	1	$ -
2661	2006	FM	Fire	1	$ -
2900	2011	FM	Fire	1	$ -
3022	1977	EM	Drought	2	$ -
3245	2005	EM	Hurricane	93	$ 393,813.27
3323	2011	EM	Flood	18	$ -
3488	2020	EM	Biological	93	8,685
4013	2011	DR	Flood	16	$ 62,444,842.87
4014	2011	DR	Severe Storm(s)	12	$ 3,344,622.68

Disaster	Year	D.R. Type	Type	# of Counties	PA Funds
4156	2014	DR	Severe Storm(s)	10	$ 2,635,144.54
4179	2014	DR	Tornado	6	$ 9,791,526.92
4183	2014	DR	Severe Storm(s)	12	$ 12,068,631.73
4185	2014	DR	Severe Storm(s)	12	$ 3,782,612.09
4225	2015	DR	Severe Storm(s)	28	$ 14,048,389.09
4321	2017	DR	Severe Storm(s)	10	$ 2,653,292.90
4325	2017	DR	Severe Storm(s)	20	$ 14,831,929.54
4375	2018	DR	Snow	30	$ 4,207,723.46
4387	2018	DR	Severe Storm(s)	11	$ 393,627.19
4420	2019	DR	Flood		99,774,858
4446	2019	DR	Flood		995,061
4521	2020	DR	Biological	93	25,817
5009	2012	FM	Fire	3	$ 5,281,075.21
Total			**72**		**$ 520,511,687**

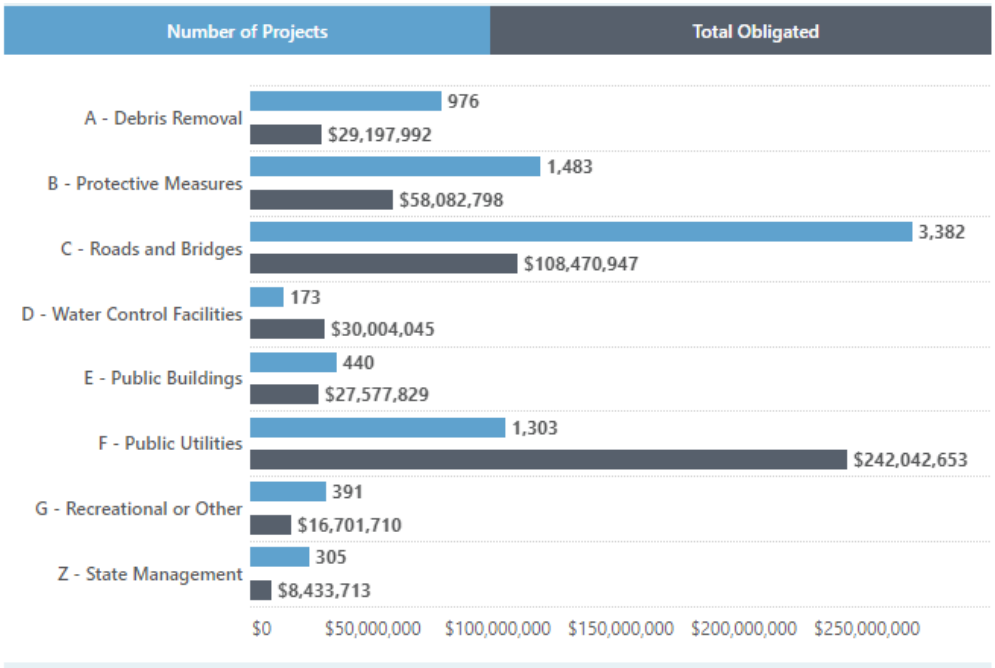
Source: FEMA

Figure 3.0-b: Declared Disasters in Nebraska by Cost, 1999 – June 2020



Source: FEMA

Figure 3.0-c: Total Public Assistance Dollars Obligated for All Federal Disaster Declarations, by Project, 1960-June 2020



Source: FEMA

Table 3.0-7: USDA Secretarial Disaster Declarations in Nebraska, 2012 – 2020

USDA Disaster Declarations		
Year	**Primary Counties**	**Contiguous Counties**
2020	N/A	Franklin, Webster
2019	Scotts Bluff	Banner, Box Butte, Boyd, Cedar, Cherry, Dakota, Dawes, Dixon, Dundy, Gage, Hitchcock, Keya Paha, Know, Morrill, Nemaha, Otoe, Pawnee, Red Willow, Richardson, Sheridan, Sioux
2018	N/A	Banner, Chase, Gage, Jefferson, Kimball, Nemaha, Otoe, Pawnee, Perkins, Richardson, Thayer
2017	N/A	Boyd, Cherry, Dawes, Gage, Keya Paha, Kimball, Knox, Pawnee, Richardson, Sheridan
2016	Kearney	Adam, Banner, Buffalo, Dawes, Franklin, Harlan, Kimball, Phelps, Sioux, Webster
2015	N/A	Dundy, Franklin, Harlan, Nemaha, Otoe, Richardson, Sioux
2014	Arthur, Blaine, Chase, Custer, Dawson, Deuel, Dundy, Frontier, Furnas, Garden, Garfield, Gosper, Grant, Hayes, Hitchcock, Hooker, Keith, Lincoln, Logan, Loup, McPherson, Perkins, Phelps, Red Willow, Sherman, Thomas, Valley	Brown, Buffalo, Burt, Cherry, Cheyenne, Franklin, Gage, Greeley, Harlan, Holt, Howard, Jefferson, Kearney, Morrill, Nuckolls, Pawnee, Richardson, Rock, Sheridan, Thayer, Washington, Webster, Wheeler
2013	All of the counties in the state except for the three contiguous counties (90)	Nemaha, Pawnee, Richardson
2012	All 93 counties	N/A

3.0.4 – Population Vulnerability

Residents of Nebraska may be at risk depending on their proximity to hazard-prone areas. In addition, specific hazards such as severe thunderstorms, severe winter storms, and tornadoes may put them at risk if impacted by excessive rainfall, straight-line wind, or tornado. Information about specific at-risk populations is addressed in each hazard section.

In addition to at-risk residents, some residents of the state may be considered vulnerable due to their everyday living conditions related to socioeconomic status, housing/transportation, or minority/language issues. Vulnerable populations are more susceptible to the impacts of disasters and may experience more long-term effects due to the loss of their social support network. **Table 3.0-8** provides a county-level ranking by poverty rate.

Table 3.0-8: Population, by County Poverty Rate

Population by County Poverty Rate (2020)		
County Name	***Poverty Rate***	***Rank***
Region 1		
Cass County	6.30%	5th
Douglas County	13.50%	75th
Sarpy County	5.30%	3rd
Washington County	9.80%	33rd
Region 2		
Fillmore County	9.90%	37th
Gage County	9.10%	24th
Jefferson County	10.60%	44th
Johnson County	10.10%	40th
Lancaster County	14%	80th
Nemaha County	11.50%	56th
Otoe County	10%	39th
Pawnee County	20.50%	91st
Richardson County	16.30%	88th
Saline County	11.60%	59th
Seward County	9.20%	25th
Thayer County	10.90%	51st
York County	9.70%	32nd
Region 3		
Antelope County	11.50%	58th
Boone County	7.30%	10th
Boyd County	9.80%	36th
Burt County	12.30%	64th

Population by County Poverty Rate (2020)		
County Name	***Poverty Rate***	***Rank***
Butler County	7.80%	13th
Cedar County	9.70%	29th
Colfax County	8.20%	16th
Cuming County	8%	14th
Dakota County	16.80%	89th
Dixson County	10.30%	42nd
Dodge County	13.20%	72nd
Holt County	8.90%	18th
Knox County	12.30%	65th
Madison County	16%	87th
Merrick County	10%	38th
Nance County	11.70%	62nd
Pierce County	6.80%	6th
Polk County	7.60%	11th
Saunders County	9%	22nd
Stanton County	9.50%	28th
Thurston County	30.50%	93rd
Wayne County	13.50%	76th
Wheeler County	2.60%	1st
Region 4		
Adams County	12.40%	67th
Blaine County	9.80%	34th
Buffalo County	14.40%	83rd
Clay County	11.10%	53rd
Custer County	11.90%	63rd
Dawson County	13.70%	79th
Franklin County	13.30%	74th
Furnas County	13.50%	78th
Garfield County	7.20%	9th
Gosper County	5.70%	4th
Greeley County	9.80%	35th
Hall County	13.50%	77th
Hamilton County	7.20%	8th
Harlan County	12.90%	70th
Howard County	10.20%	41st

Population by County Poverty Rate (2020)		
County Name	***Poverty Rate***	***Rank***
Kearney County	9.40%	26th
Loup County	8.90%	20th
Nuckolls County	10.80%	46th
Phelps County	7.10%	7th
Sherman County	10.70%	45th
Valley County	11.50%	57th
Webster	11.30%	54th
Region 5		
Arthur County	10.90%	50th
Brown County	16%	86th
Chase County	8%	15th
Cherry County	9%	23rd
Dundy County	10.50%	43rd
Frontier County	11%	48th
Grant County	21.10%	92nd
Hayes County	9%	21st
Hitchcock County	14.20%	81st
Hooker County	17.40%	90th
Keith County	13.10%	71st
Keya Paha County	7.70%	12th
Lincoln County	12.60%	69th
Logan County	9.70%	30th
McPherson County	16%	85th
Perkins County	4.80%	2nd
Red Willow County	11.70%	60th
Rock County	9.70%	31st
Thomas County	12.40%	68th
Region 6		
Banner County	8.90%	19th
Box Butte County	10.90%	47th
Cheyenne County	10.90%	49th
Dawes County	14.30%	82nd
Deuel County	11.10%	52nd
Garden County	11.70%	61st
Kimball County	11.40%	55th

Population by County Poverty Rate (2020)		
County Name	***Poverty Rate***	***Rank***
Morrill County	9.40%	27th
Scotts Bluff County	13.20%	73rd
Sheridan County	15.80%	84th
Sioux County	12.40%	66th

Source: https://www.welfareinfo.org/poverty-rate/nebraska/compare-counties-interactive

There are multiple methodologies and tools available to identify and measure the extent of vulnerability to some of these populations in relation to hazards. For the purpose of this plan, the Centers for Disease Control and Prevention (C.D.C.) Social Vulnerability Index (S.V.I.) is presented as one tool that provides a quantifiable ranking to indicate potential levels of vulnerability when disasters impact the jurisdiction.

C.D.C. Social Vulnerability Index

What is Social Vulnerability?

Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or a disease outbreak, or an anthropogenic event such as a harmful chemical spill. The degree to which a community exhibits certain social conditions, including high poverty, a low percentage of vehicle access, or crowded households, may affect that community's ability to prevent human suffering and financial loss in the event of a disaster. These factors describe a community's social vulnerability.

What is the C.D.C. Social Vulnerability Index?

The C.D.C. Agency for Toxic Substances and Disease Registry's *Geospatial Research, Analysis & Services Program (GRASP)* created C.D.C. Social Vulnerability Index (S.V.I.) to help public health officials and emergency response planners identify and map the communities that will most likely need support before, during, and after a hazardous event. S.V.I. indicates the relative vulnerability of every U.S. Census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. S.V.I. ranks the tracts on 15 social factors, including unemployment, minority status, and disability, and further groups them into four related domains:

- Socioeconomic Status
- Household Composition and Disability
- Minority Status and Language
- Housing and Transportation

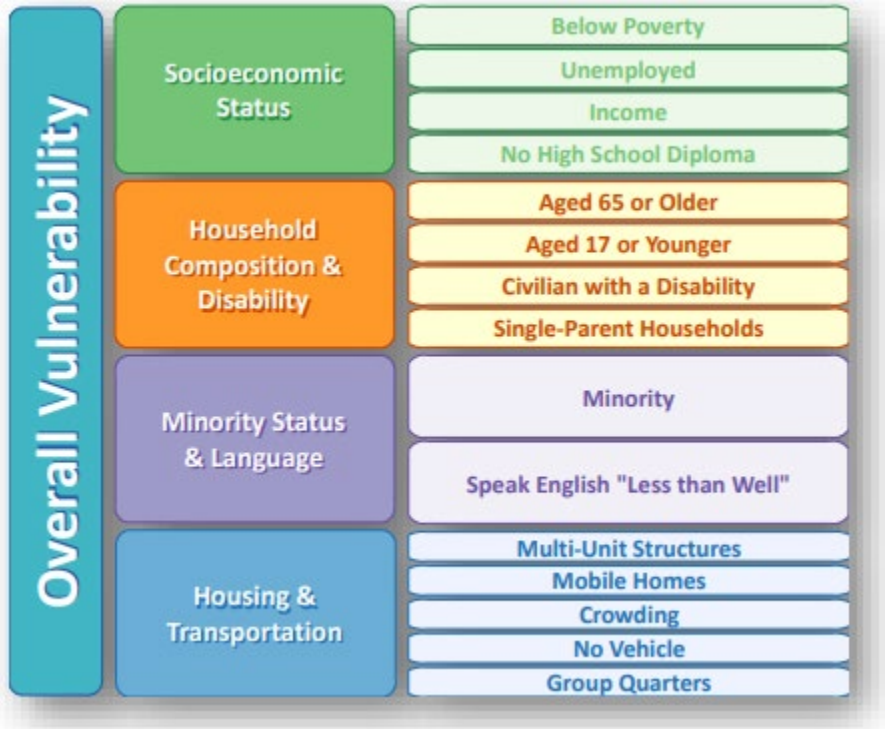
How can S.V.I. help communities be better prepared for hazardous events?

S.V.I. provides specific socially and spatially relevant information to help public health officials and local planners better prepare communities to respond to emergency events such as severe weather, floods, disease outbreaks, or chemical exposure. S.V.I. can be used to:

- Allocate emergency preparedness funding by community need.
- Estimate the amount and type of needed supplies like food, water, medicine, and bedding.
- Decide how many emergency personnel are required to assist people.
- Identify areas in need of emergency shelters.
- Create a plan to evacuate people, accounting for those who have special needs, such as those without vehicles, the elderly, or people who do not understand English well.
- Identify communities that will need continued support to recover following an emergency or natural disaster.
- Identify appropriate mitigation actions to lower hazard risk for vulnerable populations.

Source: CDC SVI 2016 Documentation, dated 2/13/2020

Figure 3.0-d: C.D.C. Social Vulnerability Index (S.V.I.) – Domains and Variables



Source: CDC SVI, American Community Survey (A.C.S.) 2012-2016.

Table 3.0-9: C.D.C. Social Vulnerability Index, by County (2016)

County	Overall S.C.I. Score	Social Vulnerability Level
Adams	0.2356	Low
Antelope	0.1264	Low
Arthur	0.0080	Low
Banner	0.0802	Low
Blaine	0.0780	Low
Boone	0.0430	Low
Box Butte	0.1671	Low
Boyd	0.1248	Low
Brown	0.1270	Low
Buffalo	0.1907	Low
Burt	0.1188	Low
Butler	0.1598	Low
Cass	0.0210	Low

County	Overall S.C.I. Score	Social Vulnerability Level
Cedar	0.0229	Low
Chase	0.2280	Low
Cherry	0.1582	Low
Cheyenne	0.0602	Low
Clay	0.1942	Low
Colfax	0.5778	Moderate to High
Cuming	0.3251	Low to Moderate
Custer	0.1041	Low
Dakota	0.8144	High
Dawes	0.2751	Low to Moderate
Dawson	0.7112	Moderate to High
Deuel	0.0840	Low
Dixon	0.3031	Moderate
Dodge	0.4540	Low to Moderate
Douglas	0.4900	Low to Moderate
Dundy	0.0226	Low
Fillmore	0.0723	Low
Franklin	0.0560	Low0.0917
Low	0.0570	Low
Furnas	0.2738	Low to Moderate
Gage	0.1500	Low
Garden	0.0137	Low
Garfield	0.0564	Low
Gosper	0.0067	Low
Grant	0.0755	Low
Greeley	0.0414	Low
Hall	0.6683	Moderate to High
Hamilton	0.0083	Low
Harlan	0.1283	Low
Hayes	0.0191	Low
Hitchcock	0.1098	Low
Holt	0.1165	Low
Hooker	0.1337	Low
Howard	0.0465	Low
Jefferson	0.1856	Low

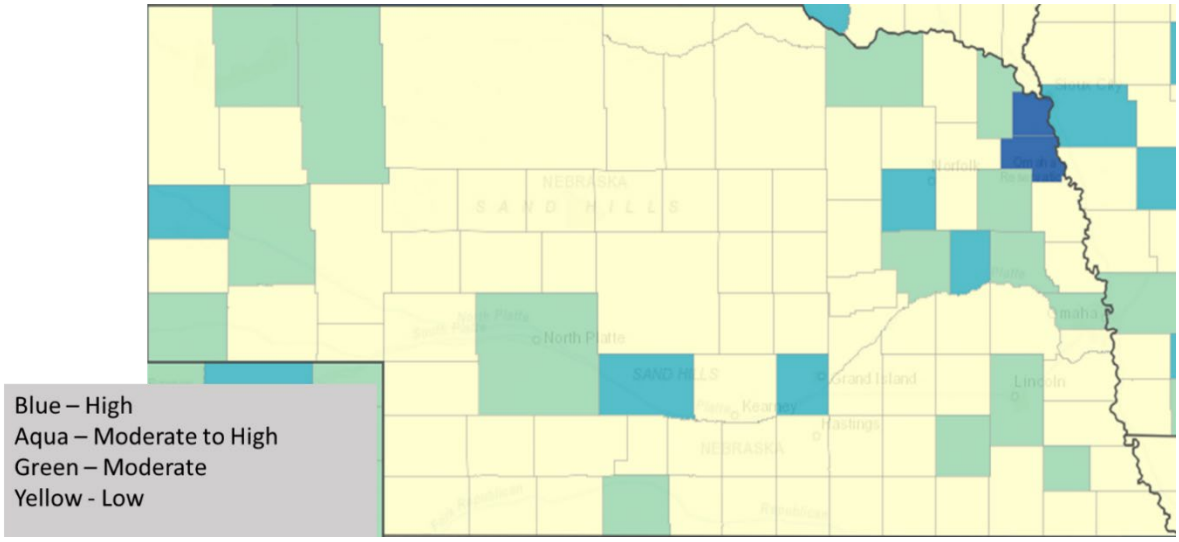
County	Overall S.C.I. Score	Social Vulnerability Level
Johnson	0.4174	Low to Moderate
Kearney	0.0360	Low
Keith	0.1544	Low
Keya Paha	0.0025	Low
Kimball	0.3884	Low to Moderate
Knox	0.2842	Moderate
Lancaster	0.3212	Low to Moderate
Lincoln	0.3508	Low to Moderate
Logan	0.0611	Low
Loup	0.0006	Low
Madison	0.5584	Moderate to High
McPherson	0.0634	Low
Merrick	0.1843	Low
Morrill	0.4301	Low to Moderate
Nance	0.1251	Low
Nemaha	0.1547	Low
Nuckolls	0.1391	Low
Otoe	0.2486	Low
Pawnee	0.2130	Low
Perkins	0.0239	Low
Phelps	0.1656	Low
Pierce	0.0188	Low
Platte	0.3219	Low to Moderate
Polk	0.1026	Low
Red Willow	0.2200	Low
Richardson	0.2073	Low
Rock	0.0099	Low
Saline	0.4559	Low to Moderate
Sarpy	0.1162	Low
Saunders	0.0280	Low
Scotts Bluff	0.5925	Moderate to High
Seward	0.0815	Low
Sheridan	0.3537	Low to Moderate
Sherman	0.0977	Low
Sioux	0.0016	Low

County	Overall S.C.I. Score	Social Vulnerability Level
Stanton	0.0770	Low
Thayer	0.0672	Low
Thomas	0.0035	Low
Thurston	0.8898	High
Valley	0.2066	Low
Washington	0.0379	Low
Wayne	0.1172	Low
Webster	0.0917	Low
Wheeler	0.0064	Low
York	0.1372	Low

Source: C.D.C., Social Vulnerability Index. https://svi.cdc.gov/map.html

Based on the CDC SVI scores, Thurston and Dakota Counties have the highest level of vulnerability.

Figure 3.0-e: Map of C.D.C. County Social Vulnerability Index Scores, as of 2016



Source: C.D.C., Social Vulnerability Index. https://svi.cdc.gov/map.html

3.0.5 - State Assets

The Nebraska Department of Administrative Services provided information on state resources. **Table 3.0-10** breaks down the number of facilitates by county and values.

Table 3.0-10: Total State Assets, by County

State Assets					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83,437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,394,719.81
Buffalo	76	$159,468,253.50	$2,209,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
Madison	48	$64,860,246.39	$20,843.00	$64,881,089.39	$64,881,089.39
York	28	$39,391,141.86	$2,922,000.00	$39,907,141.80	$39,907,141.80
Lincoln	75	$37,441,736.50	$975,273.00	$38,417,009.50	$38,417,009.50
Sarpy	27	$34,881,098.09	$2,708,030.00	$37,589,128.09	$37,589,128.09
Scotts Bluff	57	$34,157,816.52	$1,669,396.00	$35,827,212.52	$35,827,212.52
Otoe	25	$31,930,253.91	$1,511.00	$31,931,764.91	$31,930,253.91
Dixon	82	$30,170,808.69	$11,034.00	$30,181,842.69	$30,181,842.69
Fillmore	44	$29,462,198.62	$26,749.00	$29,488,947.62	$29,488,947.62
Red Willow	15	$16,917,752.75	$1,737,000.00	$18,654,752.75	$18,654,752.75
Knox	91	$13,801,386.23	$0.00	$13,801,386.23	$13,801,386.23
Cherry	85	$11,190,726.98	$0.00	$11,190,726.98	$11,190,726.98
Washington	22	$8,782,156.93	$0.00	$8,782,156.93	$8,782,156.93
Holt	16	$8,277,530.99	$0.00	$8,277,530.99	$8,277,530.99
Dodge	51	$7,954,293.85	$0.00	$7,954,293.85	$7,954,293.85
Keith	39	$7,750,956.21	$0.00	$7,750,956.21	$7,750,956.21
Custer	35	$7,280,614.98	$0.00	$7,280,614.98	$7,280,614.98
Garfield	18	$6,631,786.37	$4,814.00	$6,636,600.37	$6,636,600.37
Phelps	19	$6,522,208.88	$0.00	$6,522,208.88	$6,522,208.88
Valley	18	$6,415,412.64	$0.00	$6,415,412.64	$6,415,412.67
Antelope	22	$5,976,254.22	$0.00	$5,976,254.22	$5,976,254.22
Platte	12	$5,334,399.61	$0.00	$5,334,399.61	$5,334,399.61
Clay	19	$5,265,263.86	$0.00	$5,265,263.86	$5,265,269.86
Dundy	38	$5,154,250.81	$0.00	$5,154,250.81	$5,154,250.81

County	# of Properties	Insurance Value	Contents Insurance	Total Value	Replacement Cost
Frontier	59	$4,704,756.59	$0.00	$4,704,756.59	$4,704,756.59
Cheyenne	9	$4,697,594.77	$0.00	$4,697,594.77	$4,697,594.77
Jefferson	34	$4,639,986.05	$0.00	$4,639,986.05	$4,639,986.05
Richardson	57	$4,623,203.55	$3,227.00	$4,626,430.55	$4,626,430.55
Garden	13	$4,599,754.14	$1,893.00	$4,601,647.14	$4,601,647.14
Morrill	20	$4,291,169.99	$55,500.00	$4,346,669.99	$4,346,669.99
Box Butte	12	$3,845,611.03	$147,963.00	$3,993,574.03	$3,993,574.03
Kearney	18	$3,864,694.53	$0.00	$3,864,694.53	$3,864,694.53
Dawson	14	$3,799,475.72	$0.00	$3,799,475.72	$3,799,475.72
Thayer	17	$3,433,696.77	$0.00	$3,433,696.77	$3,433,696.77
Sheridan	8	$2,932,301.73	$0.00	$2,932,301.73	$2,932,301.73
Sioux	8	$2,873,081.52	$0.00	$2,873,081.52	$2,873,081.52
Nance	4	$2,802,588.58	$0.00	$2,802,588.58	$2,802,588.58
Howard	3	$2,764,243.32	$0.00	$2,764,243.32	$2,764,243.32
Deuel	6	$2,693,065.84	$0.00	$2,693,065.84	$2,693,065.84
Hayes	1	$2,458,627.60	$0.00	$2,458,627.60	$2,560,660.65
Gosper	25	$2,445,729.03	$0.00	$2,445,729.03	$2,445,729.03
Wayne	8	$2,387,180.36	$0.00	$2,387,180.36	$2,387,180.36
Loup	12	$2,318,651.22	$0.00	$2,318,651.22	$2,318,651.22
Chase	21	$2,277,086.55	$0.00	$2,277,086.55	$2,277,086.55
Cedar	12	$2,262,689.31	$0.00	$2,262,689.31	$2,262,689.31
Sherman	44	$2,255,452.74	$0.00	$2,255,452.74	$2,255,452.74
Nuckolls	4	$2,242,798.59	$0.00	$2,242,798.59	$2,242,798.59
Seward	6	$2,233,715.21	$0.00	$2,233,715.21	$2,233,715.21
Hitchcock	24	$2,079,519.84	$0.00	$2,079,519.84	$2,079,519.84
Logan	2	$2,035,359.92	$0.00	$2,035,359.92	$2,035,359.92
Saunders	10	$2,007,360.97	$0.00	$2,007,360.97	$2,007,360.97
Rock	3	$1,819,627.42	$2,907.00	$1,822,534.42	$1,822,534.42
Saline	8	$1,717,053.04	$0.00	$1,717,053.04	$1,717,053.54
Hamilton	4	$1,516,834.64	$0.00	$1,516,834.64	$1,516,834.64
Hooker	3	$1,473,958.22	$0.00	$1,473,958.22	$1,473,958.22
Pierce	19	$1,377,765.51	$0.00	$1,377,765.51	$1,377,765.51
Cuming	6	$1,328,036.42	$0.00	$1,328,036.42	$1,328,036.42
Perkins	4	$1,315,564.34	$0.00	$1,315,564.34	$1,315,564.34
Boyd	4	$1,159,208.67	$0.00	$1,159,208.67	$1,159,208.67
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**

Nemaha	6	$1,056,361.55	$0.00	$1,056,361.55	$1,056,361.55
Butler	3	$1,038,849.75	$0.00	$1,038,849.75	$1,038,849.75
Kimball	4	$950,815.37	$0.00	$950,815.37	$950,815.37
Merrick	4	$924,049.08	$0.00	$924,049.08	$924,049.08
Dakota	6	$917,944.70	$0.00	$917,944.70	$917,944.70
Boone	3	$897,108.98	$0.00	$897,108.98	$897,108.98
Keya Paha	2	$768,976.25	$0.00	$768,976.25	$768,976.25
Burt	8	$766,558.53	$0.00	$766,558.53	$766,558.53
Banner	4	$750,475.46	$0.00	$750,475.46	$750,475.46
Polk	6	$747,417.05	$0.00	$747,417.05	$747,417.05
Furnas	5	$666,877.01	$0.00	$666,877.01	$666,877.01
Harlan	3	$665,263.89	$0.00	$665,263.89	$665,263.89
Thomas	3	$645,440.80	$0.00	$645,440.80	$645,440.80
Colfax	4	$547,686.54	$0.00	$547,686.54	$547,686.54
Pawnee	6	$519,009.69	$0.00	$519,009.69	$519,009.69
Greeley	3	$477,705.59	$0.00	$477,705.59	$477,705.59
Wheeler	3	$469,511.28	$0.00	$469,511.28	$469,511.28
Webster	3	$447,823.64	$0.00	$447,823.64	$447,823.64
Grant	1	$370,916.78	$0.00	$370,916.78	$370,916.78
Franklin	2	$200,936.79	$0.00	$200,936.79	$200,936.79
Arthur	1	$128,327.96	$0.00	$128,327.96	$128,327.96
Blaine	0	$0.00	$0.00	$0.00	$0.00
McPherson	0	$0.00	$0.00	$0.00	$0.00
Thurston	0	$0.00	$0.00	$0.00	$0.00
Stanton	0	$0.00	$0.00	$0.00	$0.00
Total	**2578**	**$3,679,556,799.06**	**$124,250,823.00**	**$3,803,807,622.06**	**$3,801,505,150.58**

Source: Nebraska Department of Administration, Risk Management

3.0.6 – Local Hazard Mitigation Planning Regions

Nebraska's Local Hazard Mitigation Plans (LHMP) are organized by regions under the structure of the Natural Resource Districts. The LHMPs are referenced throughout this plan. **Figure 3.0-g** provides a visual representation of these regions.

Figure 3.0-f: Local Mitigation Planning Areas

Source: NEMA

3.0.7 – Vulnerability of Local Assets

Local plan risk assessments were reviewed during the plan update process to determine whether information on the population and built environment vulnerable to various natural hazards could be used in the state's determination of jurisdictions most vulnerable to various hazards. The evaluation indicated that although most plans identified potential loss in dollars of local assets to flood, only a few of the plans included projected loss estimates for other hazards and that the information provided was not standardized. The state believes that the sample is insufficient in size, and the information provided too inconsistent to include in decisions that determine jurisdictions most vulnerable to hazards or to use to calculate a statewide loss estimate. Instead, each hazard section includes an analysis of how local loss data is, or is not, applicable to the individual hazard. Where local loss data is available and applicable to that hazard, the data is included in the hazard profile.

3.0.8 – Data Sources

- Centers for Disease Control and Prevention

    - Social Vulnerability Index, 2016. Retrieved June 2020 at: https://svi.cdc.gov/map.html

- Federal Emergency Management Agency
    - Data Visualization Tool. Retrieved June 2020 at: https://www.fema.gov/data-visualization/disaster-declarations-states-and-counties

- Nebraska Department of Administration, Risk Management Office

- Nebraska Emergency Management Agency

- NOAA/National Center for Environmental Information
    - Storm Events Database. Available at: https://www.ncdc.noaa.gov/stormevents/

- State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis, October 15, 2020

SECTION 3.1 ANIMAL DISEASE

2021 SHMP Update
• Reformatted Profile • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Animal Disease	An impairment of the normal state of an animal that interrupts or modifies its vital functions. Animal disease that people can catch are called zoonoses. Many diseases affecting humans can be traced to animals or animal products; however, because of the significant contribution to the state's people and economy from agricultural operations, the focus within this section is on those diseases that impact farm animals, and to a limited extent, wild game.

3.1.1 – Hazard Characteristics

Ninety-one percent of Nebraska's land area is devoted to agricultural uses, with 44.9 million acres of land in farms scattered throughout the state (Nebraska Department of Agriculture, 2020), which is unchanged from the 2019 SHMP. Nebraska's total agricultural output reached more than $21 billion in 2018, a slight decline from the 2019 SHMP. Livestock and farm animals contributed to the bulk of this amount, with $12.17 billion (USDA ERS, 2018). In addition, Nebraska leads the nation in beef and veal exports, with more than $1.3 billion (USDA, February 2020). An outbreak of animal-to-animal disease would have significant economic implications that could result in a serious a public health risk. Some diseases may be easily contained geographically, while others, due to longer incubation times, may spread due to transfer and sale of livestock between facilities. Response and recovery operations in response to a contagious animal disease event could be long-lasting. Impacts from some potential diseases could be substantial enough that individual producers may be unable to recover financially.

In Nebraska there are an estimated 6.8 million head of cattle (Nebraska Department of Agriculture, 2020); 3.7 million head of swine (Nebraska Department of Agriculture, 2020); 78,000 head of sheep (USDA, 2019); 2.96 million poultry animals (USDA, 2018); and a domestic livestock industry consisting of approximately 160,000 horses, elk, bison, and other animals across the state. The state also has a free- ranging animal population consisting of 300,000 deer; 5,000 pronghorn antelope; 300 elk; and 120 bighorn sheep. Domesticated and wild animals are all susceptible to disease. The State's Emergency Operations Plan includes an Emergency Support Function in the Agriculture and Natural Resources Annex to the Plan. It provides guidance to state and local governments to meet the challenges arising from a contagious animal disease outbreak.

Producers are required by state law (Title 23 – Nebraska Administrative Code Chapter 1, April, 2016) to report certain animal disease occurrences to the Nebraska Department of Agriculture

(NDA). Livestock diseases are reported using a downloadable form that is completed by a veterinarian and sent in to the Nebraska Department of Agriculture via e-mail (Nebraska Department of Agriculture). The website of the Nebraska Department of Agriculture (https://nda.nebraska.gov/animal/reporting/index.html) provides information regarding disease outbreaks, broken down by number of reports of each disease in each county (Nebraska Department of Agriculture). The NDA is the lead coordinating agency for livestock emergency, disease response, monitoring, and diagnostic information. The Nebraska Game & Parks Commission (NG&PC) is the lead agency for monitoring and surveillance of wild animal species and game throughout the state.

In response to concerns about biosecurity and agro-terrorism, the Nebraska Department of Agriculture developed the Nebraska Livestock Emergency Disease Response System (LEDRS) in 2002. LEDRS includes a corps of veterinarians committed to efforts surrounding livestock disease monitoring and emergency response. (Nebraska Department of Agriculture, 2017; https://nda.nebraska.gov/animal/ledrs/index.html).

Table 3.1-1: Animal Disease Impacts/Consequences Summary

Animal Disease Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing: If the disease is widespread, many rural homes and farms may be quarantined. Casualties/Fatalities: Little to no impact. Most animal diseases are not readily spread to humans. Work: If the disease is widespread, there will be a cascading effect in the meat and/or poultry supply chain from the farm to market. Food/Water: If the disease is in multiple states, the meat/poultry supply could be interrupted. Crop transportation and prices would be affected due to restrictions on crop movement out of quarantined areas and change in demand as livestock are culled, producers are not able to sell healthy market animals, and producers instate a moratorium on feeding new livestock.
Responders: Fire, Police, Medical, Public Works	Some responders will need to be specialized, but local responders and/or farmers and ranchers may be used for activities like animal movement, decontamination, and depopulation. Safety, through proper use of personal protective equipment (PPE), and decontamination will draw on the resource pool. Increased demand will be placed on the health care industry as a result of the potential for illness spreading to humans and behavioral health issues following potentially significant losses of livelihood.
Continuity of Operations	State agencies involved in response will divert staff away from normal activities and will need to prioritize operations per Continuity of Operations (COOP) plans. Perishable product may need to be disposed of.
Property: Destroyed, Major, Isolated	Most of property that will be destroyed in a widespread animal disease are the animals, through depopulation. Farms, ranches, and processors may be isolated by quarantine. Some property (structures) that cannot be cleaned and disinfected may need to be destroyed, but that would be a very rare need.
Infrastructure: Electricity,	Although little physical/structural damage to infrastructure is anticipated, infrastructure systems will be impacted. The food supply chain and overall transportation system will be disrupted in and around quarantine areas.

Water, Roads, Bridges	
Environment	Impact on the environment will need to be mitigated by proper disposal and decontamination methods.
Economic Conditions	An animal disease outbreak in Nebraska could have catastrophic economic consequences. For both the state and the nation, ripple effects will have a negative consequence on mortgage payments, employment, banking institutions, markets, and international trade. A serious animal disease outbreak would have a negative impact on the stability of whole farming communities.
Public Confidence in the Governance	Will be affected by public perception of the speed and efficiency of the response to the outbreak combined with perception of whether the government did enough to prevent or protect against the outbreak. Additionally, if an animal disease spreads to workers, the public will look to government for guidance on occupational safety and health measures.

3.1.2 – Location

All counties in the state of Nebraska are home to either potentially affected livestock operations or to wild game that could transmit animal diseases. A sufficiently virulent strain of disease could easily affect 50 percent or more of the state of Nebraska's counties, leading animal disease to be a wide-ranging hazard geographically and financially.

3.1.3 – Previous Occurrences and Extent

Because of Nebraska's extensive agricultural industry and its contribution to the food supply chain and economy, animal disease is an ongoing threat that is continuously tracked by the Nebraska Department of Agriculture. Between January 2019 and March 2020, there were a total of 1,724 cases of animal disease reported in the state. The largest incidence of cases was linked to Porcine Epidemic Diarrhea (403 cases), with Bovine Viral Diarrhea (291) and Bovine Paratuberculosis (267) also exhibiting significant numbers of cases. **Table 3.1-2** presents the total animal disease cases reported, by County, for the period January 1, 2019 to March 31, 2020.

Table 3.1-2: Nebraska Reportable Animal Diseases and Numbers of Cases, by County, 2019-2020

County	Anaplasmosis (Bovine)	Avian Infectious Bronchitis	Bluetongue (Bovine)	Bovine Genital Campylobacteriosis	Bovine Viral Diarrhea	Caprine Arthritis/Encephalitis	Enzootic Bovine Leukosis	Epizootic Hemorrhagic Disease (Cervid)	Equine Herpesvirus and Herpesvirus 4	Equine Influenza	Equine Rhonpenumonitis	Infectious Bovine Rhinotracheitis/Infect.	Infectious Bursal Disease (Avian)	Leptospirosis (Bovine)	Mycoplasmosis (M. Gallisepticum)	Mycoplasmosis (M. synoviae)	Paratuberculosis (Bovine)	Porcine Circovirus & Circovirus 2	Porcine Delta Coronavirus	Porcine Epidemic Diarrhea Virus	Porcine Reproductive & Respriatory	Salmonellosis (Bovine)	Seneca Valley Virus	Vesicular Stomatitis (Equine)	West Nile Virus	County Totals
Adams	0												2				7									9
Antelope					2															1						3
Boone	6		1		5									2			4		2	1						21
Box Butte					25		1							1			3									30
Boyd												1					2									3
Brown	1																2									3
Buffalo	3				4		1										7	1								16
Burt					1												4		2	1						8
Butler	7				1		1										3						1			13
Cass	1									2																3
Cedar	1	1													1	1	3		2							9
Chase	1											1														2
Cherry					2												12									14
Clay			1														12				3					16
Colfax	1				1												3				1		1			7
Cuming	1																				1					2
Custer	5		1	1							3			2			17									29
Dawes																	3							1		4
Dawson					5												8				2					15
Dixon					4												2									6
Dodge																	4									4
Douglas									18	18	1														1	38
Dundy																	4									4
Fillmore	3		1																							4
Franklin																	2									2
Furnas			2		1												2									5

Gage	3					1	1																		5
Garden	3		20		7																				30
Garfield								1								3									4
Grant													1			2									3
Greeley	2						2									3									7
Hall	2						1					1				1									5
Hamilton																	2			2					4
Harlan					1																				1
Holt	15						4						28			37			400			1			485
Hooker	2		15		4											1									22
Howard							1				2					2									5
Jefferson							69									3				3					75
Johnson	1						5									1									7
Kearney																1									1
Keya Paha							1									3									4
Knox			1													4				39					44
Lancaster	46	1			1	50			1							1									100
Lincoln	2		1				3		1														1		8
Madison							3									7									10
McPherson																1									1
Merrick	1						4									3									8
Morrill			3																						3
Nance											1					13									14
Nemaha	1															1				2					4
Pawnee					5		1																		6
Perkins																2									2
Pierce																4									4
Platte	5												1			5					2	1			15
Polk																				1					1
Red Willow			1				4						1												6
Richardson	9		1				13						2			2	12			6					45
Rock																2									2
Saline				2												40									42
Sarpy												1													1
Saund-ers	1																								1

Scotts Bluff																	2							5		7
Seward	2				30		4										3									39
Sheridan	17		108		191		11	45					24				4									400
Sherman					1												1				5					7
Stanton																			1		8					9
Thayer																	2									2
Thurston																	1				1					2
Valley							1										4				1					6
Washington																		2			1					3
Webster																	2									2
Wheeler													1				1									2
York	0																1				1					2
TOTAL (by Type)	**141**	**2**	**156**	**3**	**291**	**51**	**131**	**46**	**20**	**20**	**4**	**5**	**4**	**63**	**1**	**1**	**267**	**17**	**7**	**403**	**77**	**2**	**4**	**7**	**1**	**1724**

Source: Nebraska Reportable Disease 01/01/2019 – 12/31/2019; Nebraska Department of Agriculture; https://nda.nebraska.gov/animal/reporting/index.html, date accessed 05/11/2020

The most widespread animal disease outbreak across the state noted during the reporting period in Table 3.1-2 was Bovine Paratuberculosis. Of additional note is the extremely high number of cases of Porcine Epidemic Diarrhea Virus (PEDv) in one county (Holt) in the one-year timeframe. The current *Tri-County Hazard Mitigation Plan*, of which Holt County is a participating jurisdiction, does not address animal disease as a hazard. Further research provided no additional details about the virus outbreak in Holt County. A detailed summary of the disease characteristics and its potential impact in the swine population is provided in further detail below. Mitigation of these diseases is conducted at the herd level with individualized treatment programs at farms and ranches were outbreaks are identified.

The following animal diseases present a risk for the state's agricultural industry and economy.

Cattle

Anaplasmosis: There were 121 cases statewide between January 2019 and March 2020, a significant decrease in the number of cases reported in the 2019 plan, with the largest number of cases (46) reported in Lancaster County. Anaplasmosis, also known as yellow-bag or yellow-fever, is an infectious blood disease that typically impacts cattle and causes severe anemia. It is caused by parasites, and is usually spread by ticks. Anaplasmosis has different impacts on different age groups of cattle. Research from Texas and California suggests that the costs of a clinical case of Anaplasmosis average over $400 per animal, and that if Anaplasmosis infects a previously uninfected herd, the following effects are expected: calf crop reduced by 3.6%, 30% increase in cull rate, and 30% of the adults showing signs will die (North Carolina Department of Agriculture, n.d.).

Cases of anaplasmosis typically increase in late summer and fall as insect vectors increase, so vector control is key to preventing the disease. Ranchers and farmers may take prevention steps to include various methods to control biting insects, sterilization of surgical instruments, medicated feed, and vaccination. While vaccination has been shown to reduce losses related to death in a herd and decrease the severity of symptoms of the disease, use of the vaccine has a high potential for adverse side effects and death in vaccinated calves as well as an inability to discern infected animals from vaccinated animals (North Carolina Department of Agriculture, Agricultural Review, n.d.; http://www.ncagr.gov/paffairs/AgReview/articles/2013/12-13-anaplasmosis.htm, date accessed 05/11/20).

Bovine Viral Diarrhea: 291 cases statewide in 2019, 191 in Sheridan County, 191 in Sheridan County. Bovine viral diarrhea (BVD) is a viral disease of cattle and other ruminants that potentially causes diarrhea, fever, decreased milk production, pneumonia, and reproductive issues. Animals with severe infections of BVD may also develop secondary infections, as well. As with most viral infections, there is no cure for the disease, and treatment is typically limited to supportive therapy. Current best practices call for the culling of infected animals (The Cattle Site, https://www.thecattlesite.com/diseaseinfo/200/bovine-viral-diarrhoea-bvd/; date accessed 05/11/20).

Economic impacts from BVD can be significant. According to the USDA, losses can be estimated to be $50 to $100 per cow during outbreaks of acute BVD.

Bovine Tuberculosis: There are no recorded cases of this animal disease in Nebraska since the 2019 SHMP update. This disease most frequently affects cattle, but deer and humans are also susceptible, as it can be transmitted to any warm-blooded animal. Bovine Tuberculosis, a bacterial disease, is typically a respiratory disease leading to pneumonia with a chronic cough, but infected animals may also show signs of disease through emaciation, lethargy, weakness, anorexia, and enlarged lymph nodes (Nebraska One Health Initiative, 2018).

Bovine TB may take years to develop, and is spread through the exchange of respiratory secretions from an infected animal to an uninfected animal, but can also be spread through ingesting bacteria that may have been left behind in shared water and feed. Animal population density plays a significant role in the spread of this disease among livestock. Spread to humans is rare, but thought to be a result of the consumption of raw milk from infected cows. Most human tuberculosis cases are caused by a similar bacterium that spreads easily among humans, but rarely infects animals (Nebraska Game and Parks, 2018).

In late 2017, Nebraska Department of Agriculture announced that a cow in a herd in Wheeler County tested positive for Bovine Tuberculosis. That herd was quickly placed under quarantine in order to reduce the risk of spread of disease (https://kvsh.com/archives/3339).

Paratuberculosis (Johne's Disease): 267 cases statewide between January 2019 and March 2020, 40 cases in Saline County, 37 in Holt County. Paratuberculosis is a chronic and contagious bacterial disease of the digestive system. The disease usually targets ruminants, like cattle, sheep and goats, but it has also been reported in many other mammals. It is caused by a bacterium similar to that which causes Bovine Tuberculosis and Human Tuberculosis (OIE, 2018).

Progression of the disease is slow. Many of the infected animals will acquire the disease early in life, but not show signs for years. As cattle age, resistance to the infection increases. Since there is no successful treatment currently available, control of the disease is dependent upon biosecurity measures and sanitation practices. In order to reduce the spread of this disease, herd managers are encouraged to send animals that test positive to slaughter as soon as economically feasible. Control may also be attempted through vaccination programs, but that can lead to false positive results to future testing for the disease as well as tests for Bovine Tuberculosis. Because of the high potential for unintended consequences, vaccines for this disease are to be used under strict regulatory control and only in certain, well-defined situations (OIE, 2018).

Poultry/Fowl

Avian Influenza: While there were no reported outbreaks of Avian Influenza in Nebraska in 2019 or the first four months of 2020, Nebraska has been impacted by the disease in the recent past. Avian influenza (AI) is a viral disease that mainly infects birds. It affects wild birds and domestic poultry, including chickens, turkeys, pheasants, quail, waterfowl, swans, peafowl and guinea fowl (Nebraska Department of Agriculture, 2017).

Nebraska was impacted by a significant outbreak of Highly Pathogenic Avian Influenza (HPAI) in May, 2015. As the infection spread, flocks of chickens at six farms in Dixon County eventually tested positive for the disease, and nearly 5 million chickens were depopulated (Bergin, 2015). One of the businesses impacted by the infection was Post Holdings, owner of Michael Foods, Nebraska's biggest egg producer. They estimated a loss of $20 million to their operations in Nebraska and Iowa, and further reported that their egg production was at 25 percent of their commitments (Bergin, 2015).

There is currently no known treatment for Avian Influenza, and while poultry vaccines are available, there is no vaccine that protects against all 15 known strains of AI. Because there is no way of accurately predicting which strain may infect a flock, vaccines are not a practical method of prevention. The most effective methods of prevention are through the implementation of strict biosecurity measures, including avoidance of potentially infected birds, proper personal hygiene, isolation of any new animals prior to introduction into the flock, and ensuring footwear is cleaned and disinfected after leaving animal areas (Nebraska Department of Agriculture, n.d.).

Avian Influenza infection in poultry can result in decreased egg production, soft-shelled or misshapen eggs, respiratory distress, unstable coordination, and sudden death (Nebraska Department of Agriculture, 2017). A single case of AI in Nebraska could quickly spread to affect the livelihood of all Nebraska poultry producers. Testing sick birds for AI will help identify if the disease is present and will allow an immediate response that will minimize the impact to human health and the economy (Nebraska Department of Agriculture, 2017). Avian Influenza can transmit from infected birds to humans through direct contact with infected animals or infected surfaces, or through breathing in aerosolized fluids or dust from infected animals. Symptoms in humans include basic flu-like symptoms of fever, cough, sore throat, and muscle aches. Severe infection in humans may lead to pneumonia (Nebraska One Health, 2018).

Looking forward, Nebraska is seeing tremendous growth in the poultry industry. In June, 2017, Costco broke ground on a poultry processing plant in Fremont that will, once completed, process in excess of 100 billion chickens annually. To support Costco's plan for vertical integration of the operation, more than 500 additional barns will be needed within 100 miles of the plant to raise the chickens that will be processed (Greenaway, 2018). As of March 2020, the Costco facility was approaching full operational capacity with 700 workers to process more than 2 million birds per week (Lincoln, Journal Star, 03/20/2020). However, by April 29, 2020, the facility had been impacted by reduction in chickens from surrounding suppliers due to reported cases of the human coronavirus, COVID-19, resulting in a reduction of the available work force at multiple suppliers (Nebraska's PBS and NPR Stations, April 29, 2020). Growth in the industry, especially in a concentrated geographic area, will allow for greater potential for epidemic spread of Avian Influenza.

Swine

Porcine Epidemic Diarrhea (PED): 403 cases statewide between January 2019 and March 2020, 400 in Holt County. This disease is caused by a coronavirus that causes severe diarrhea in pigs that quickly spreads. It was first recognized in 1971 in the United Kingdom, and had spread throughout much of Europe and Asia by 2013. The first diagnosed cases in the United States were in May, 2013 in Iowa (USDA). Once the disease has entered a herd of swine, it will quickly spread to infect almost the entire herd. (USDA). Death in infected piglets is 50 to 100 percent. Adult pigs may also be infected, but generally do not have mortality.

Porcine Epidemic Diarrhea is caused by a virus and there is no treatment available to cure the disease. As the illness runs its course, survivability is improved through ensuring enough water and electrolytes to combat dehydration and alternative nutrition. The disease is best controlled through biosecurity measures and sanitation procedures. The virus has been found in slaughter facilities, transport vehicles, and collection points.

Porcine Reproductive and Respiratory Syndrome (PRRS): 77 cases statewide between January 2019 and March 2020, 39 in Knox County. Porcine reproductive and respiratory syndrome (PRRS) is a viral disease that was first reported in the United States in 1987. Since that initial report, it has been confirmed throughout North America and Europe (Dee, 2018).

PRRS has been shown to have two phases. In the first, the reproductive phase, the disease leads to increased numbers of stillbirths, premature births, and weak-born pigs. Prior to weening, infected pigs develop pneumonia which may become chronic and will drastically reduce daily gain and increase mortality up to 25%. In addition to the problems caused by the PRRS Virus, secondary viral and bacterial infections are common, and may lead to more potential losses in the herd (Dee, 2018). Because of the problems caused by the PRRS Virus compounded by the secondary infections, PRRS is considered by some to be "the most economically significant disease to affect US swine production since the eradication of classical swine fever (CSF) (Iowa State University, 2018)."

While many herds are exposed to PRRS, not all will show signs of the disease. "As a guide, for every three herds that are exposed to PRRS for the first time one will show no recognizable disease, the second would show mild disease and the third moderate to severe disease (The

Pig Site, 2014).” This difference may be due to the initial health of the herds, or it may be as a result of the virus mutating as it multiplies, occasionally creating strains that are less virulent than others (The Pig Site, 2014).

Porcine Circovirus (PCV): 17 Porcine cases statewide between January 2019 and March 2020, the largest number in Richardson County (12). Porcine Circovirus type 1 (PCV1) has been present in swine since it was first identified in 1974 as a non-disease-causing agent that was frequently found in laboratory tissue cultures. In 1991, Canadian veterinarians began reporting cases of young pigs developing a previously unknown disease that caused wasting, enlarged lymph nodes, respiratory distress, and in some cases diarrhea, pale skin and jaundice. This disease was called “postweaning multisystemic wasting syndrome” (PMWS).

While PCV1 is common throughout the world, it has not been associated with any clinical disease. PCV2, however, has been shown to be associated with PMWS, as well as reproductive failure, respiratory disease in older pigs, and a skin and kidney disease known as porcine dermatitis and nephropathy syndrome (PDNS). Research has shown that PCV2 is seldom the only infecting agent that impacts diseased pigs.

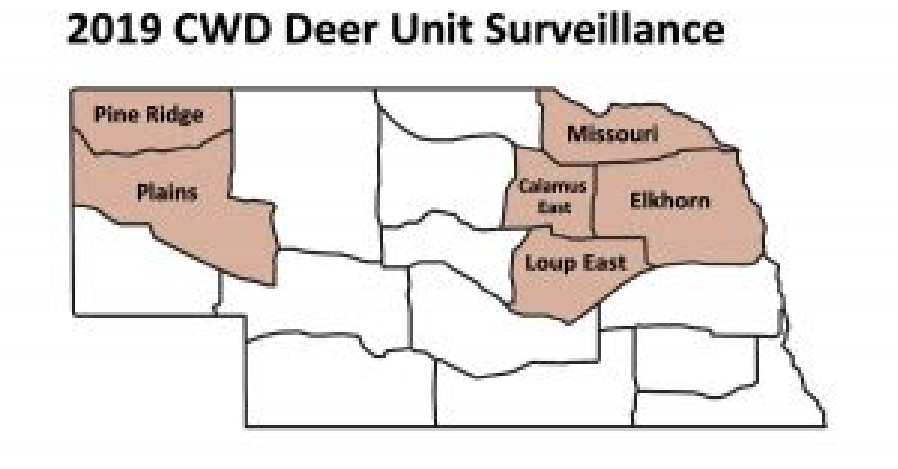
African Swine Fever (ASF): African Swine Fever is an extremely contagious hemorrhagic disease of all pigs, including domestic pigs, warthogs, and wild boar. Animals infected with ASF typically have a high fever and loss of appetite, hemorrhages in the skin and internal organs, and typically die 2 – 10 days after infection. ASF has not yet been detected in the United States, but outbreaks have been recently reported in China, Russia, Eastern Europe and Africa. As the disease can be spread through direct physical contact, shared feed, and parasitic insects, prevention of the disease relies mainly on strict biosecurity measures. There are currently no treatments or vaccines available for ASF.

ASF can also survive many months in processed meat and years in frozen carcasses. As a result, there are concerns that the disease may enter previously uninfected countries through meat products. In Japan, a traveler from China had a package of sausages confiscated that were shown to contain the virus, and similar discoveries have been made in South Korea. At least 19 countries have reported cases of African swine fever, with more than 360,000 wild and domestic animals infected. When considering the ramifications of the virus taking hold in major pork producing countries in western Europe and the United States, the potential disruption in the industry and profit losses as a result of market shutdown could be staggering.

Deer and Other Wild Game

Chronic Wasting Disease (CWD): Chronic wasting disease is a prion disease that impacts the brain of infected cervids (deer, elk, and moose). Chronic Wasting disease was first discovered in Nebraska in 2000 (Nebraska Game and Parks, 2018). Since 1997, nearly 55,000 deer have been tested for CWD in Nebraska and 1,109 tested positive. As of April, 2020, Chronic Wasting Disease has been found in 49 counties across Nebraska (Nebraska Game and Parks, 2020); however, no animal population declines attributable to the disease have yet occurred.

Figure 3.1-a: 2019 CWD Deer Unit Surveillance, Nebraska Game and Parks Commission



Source: Nebraska Game and Parks Commission

Transmission of the disease is generally thought to be from animal to animal, but the exact method of transmission is, as yet, unknown. Long-term effects of CWD on the deer population are still being researched, but no significant population declines have been determined, yet, as a result of the disease. Forward looking computer modeling does suggest that CWD could lead to decreased adult survival (CWD-INFO, 2018). One of the greatest factors in the spread of this disease is the natural movements of infected animals throughout the regions they inhabit. Chronic Wasting Disease is spread by infectious proteins, called prions. Those prions can remain viable for months or even years in the soil, making proper field dressing of animals and disposing of potentially contaminated carcasses key to limiting the spread of the disease (Nebraska Game and Parks, 2018). The disease causes many symptoms including loss of appetite and weight loss, excessive salivation, thirst, and urination, and is always fatal to the infected animal (Nebraska Game and Parks, 2018).

For those that consume the meat of harvested deer, no decisive evidence shows a risk of CWD to humans, but hunters and commercial deer processors are urged to exercise caution to ensure that spinal cord and brain tissue are not spread to the meat or to the environment. Additionally, the U.S. Centers for Disease Control recommend avoiding consumption of meat from deer and elk that look sick or that test positive for CWD (Nebraska Game and Parks, 2018).

3.1.4 – Probability of Future Events

There is a high likelihood that animal disease will be present in Nebraska in the near future. As higher demands for production are placed on farmers and ranchers, population densities of livestock will likely increase. As a species population density increases, the potential for epidemic increases as well.

Additionally, the perceived trend toward higher average temperatures and increased periods of severe drought increases the stress levels on animal populations, increasing the risk of disease taking hold. Additionally, uncommon diseases may return at higher amounts as changes in the

environment cause the release of previously contained diseases or promotes the mutation of diseases.

3.1.5 – Local Plan Data

Most Local Hazard Mitigation Plans in Nebraska address animal disease in some way, as most counties in Nebraska contain livestock farming operations. The Lower Elkhorn NRD Local Hazard Mitigation Plan, 2014 update, includes a hazard identification and risk assessment of Agricultural Disease including many of the above-mentioned animal diseases and indicating a 100% probability of future impact of Agricultural Diseases. The 2017 Central Platte NRD Hazard Mitigation Plan similarly indicates an approximate annual probability of 100% for Agricultural Animal Disease.

Table 3.1-3: Highest Animal Disease Cases Reported in Counties, by Type

Animal Disease Type	County/NRD	Number of Cases	Is Animal Disease addressed in the LHMP?
Anaplasmosis (Bovine)	Lancaster	46	Yes
Avian Infectious Bronchitis	Cedar & Lancaster	1 (each)	Yes
Bluetongue (Bovine)	Sheridan	108	Yes
Bovine Genital Campylobacteriosis	Saline	2	Yes
Bovine Viral Diarrhea	Sheridan	191	Yes
Caprine Arthritis/Encephalitis	Lancaster	50	Yes
Enzootic Bovine Leukosis	Jefferson	69	Yes
Epizootic Hemorrhagic Disease (Cervid)	Sheridan	45	Yes
Equine Herpesvirus and Herpesvirus 4	Douglas	18	Yes
Equine Influenza	Douglas	18	Yes
Equine Rhonpenumonitis	Custer	3	Yes
Infectious Bovine Rhinotracheitis/Infect. Pustul	Howard	2	Yes
Infectious Bursal Disease (Avian)	Adams	2	Yes
Leptospirosis (Bovine)	Holt	28	No
Mycoplasmosis (M. Gallisepticum)	Cass	1	Yes
Mycoplasmosis (M. Synoviae)	Cass	1	Yes
Paratuberculosis (Bovine)	Saline	40	Yes
Porcine Circovirus & Circovirus 2	Richardson	12	Yes
Porcine Delta Coronavirus	Boone, Buffalo, Cedar	2 (each)	Yes
Porcine Epidemic Diarrhea Virus	Holt	400	No
Porcine Reproductive & Respiratory Syndrome	Knox	39	No
Salmonellosis (Bovine)	Platte	2	Yes
Seneca Valley Virus	Butler, Colfax, Holt, Platte	1 (each)	Yes (excluding Holt)
Vesicular Stomatitis (Equine)	Scottsbluff	5	Yes
West Nile Virus	Douglas	1	Yes

Source: Nebraska Reportable Disease 01/01/2019 – 12/31/2019; Nebraska Department of Agriculture; https://nda.nebraska.gov/animal/reporting/index.html, date accessed 05/11/2020

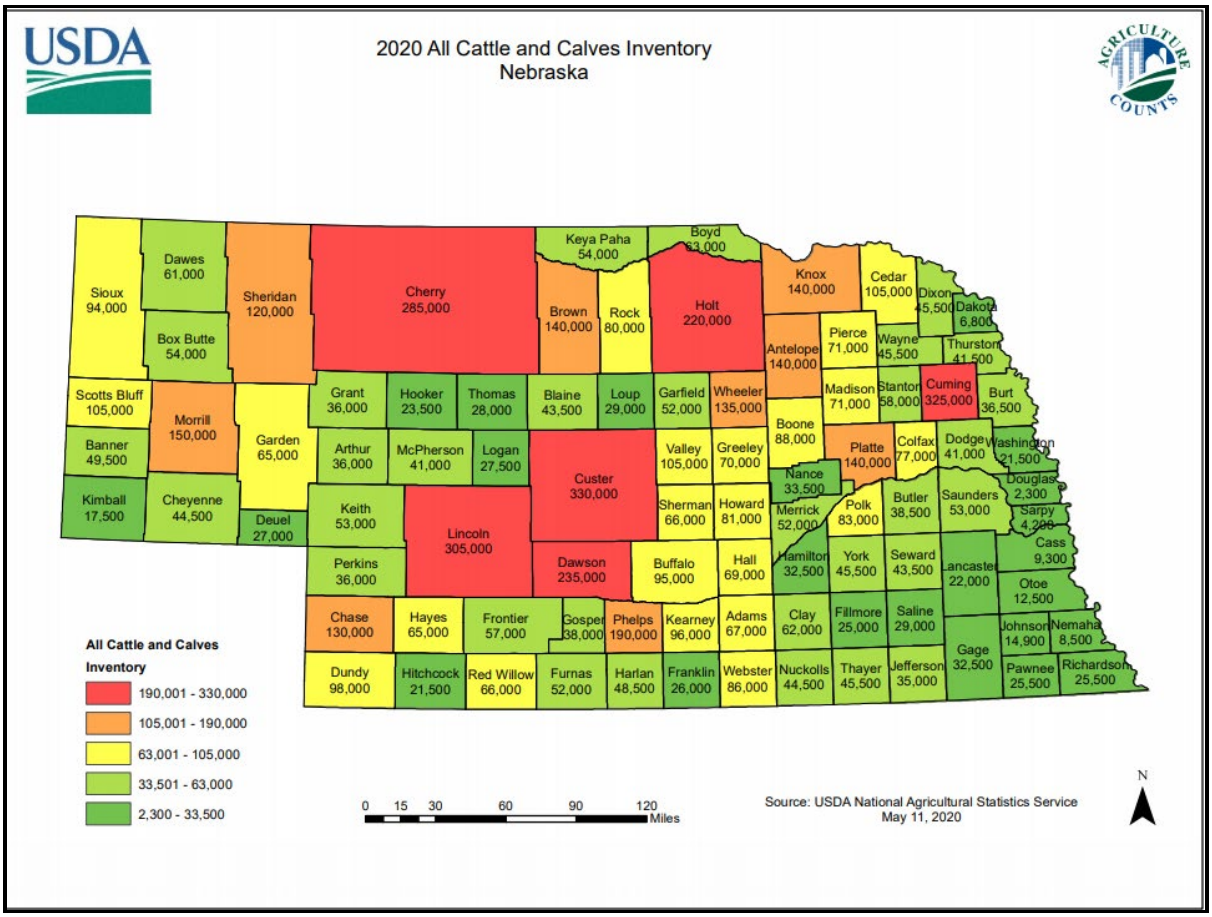
3.1.6 – Jurisdictional Vulnerability and Potential Losses

As evidenced through the Avian Flu outbreak in 2015, a significant disease, even if only present in a small geographic portion of the state, could lead to long-lasting and costly consequences for the producers involved and the state as a whole.

All farms that raise animals are, by nature, areas that are prone to the hazard of animal diseases. Modern farming and ranching practices help decrease likelihood of disease spread through the active use of biosecurity measures, but the increased number of animals moving through individual operations from other places can lead to a higher risk of introducing disease that may not be defensible by those measures. Several diseases are known to be, or thought to be, spread via insect bite or through encounters with wild animals.

Figure 3.1-b depicts the vulnerability and potential losses to the cattle industry across the state, noting the total numbers of all cattle and calves, by county. Should a high-mortality animal disease outbreak occur in one or more counties with the highest cattle inventory – Cherry, Cuming, Custer, Dawson, Holt or Lincoln – the impact to the state's agricultural economy would be significant.

Figure 3.1-b: All Cattle and Calves Inventory, as of May 11, 2020



Source: USDA, National Agricultural Statistics Services, May11,2020

Although the total number of cases of some types of animal diseases have declined since the 2019 SHMP, large outbreaks of some diseases, such as Bovine Viral Diarrhea and Porcine Epidemic Diarrhea Virus still occur, the level of extent and vulnerability has not changed in relation to the state's animal-related agricultural base. State assets would not be directly impacted by this hazard. However, indirectly the economic impacts from a severe incident could cause impacts to state funding abilities and stress to state government. Farms and ranches cover approximately 91% of the state's land. In 2018, cash receipts from farm marketing contributed more than $21 billion to Nebraska's economy (Nebraska Agriculture Fact Card, Nebraska Department of Agriculture).

3.1.7- Vulnerability of State Facilities and Potential Dollar Losses

There is little or no risk of substantial dollar loss to state buildings due to animal disease conditions. However, significant dollar losses to the government could occur in the event of a widespread disease outbreak that impacts the state's agricultural economy. Public infrastructure is not vulnerable to damage or loss from this hazard.

3.1.8 - Future Population and Development Trends

Because animal disease is not limited to geographic boundaries or population groups, it is difficult to identify development and population trends that may be impacted by this hazard. Current land use and zoning codes incorporate standards that address and mitigate locations where agricultural operations may take place. Future large-scale zoning changes that return lands to agricultural usage could increase the potential for increased animal disease outbreaks.

The potential for impacts of future growth and development on animal disease will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed, and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future.

3.1.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to animal disease as well as other information from the Local Hazard Mitigation Plan updates:

- Have any animal disease events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict animal disease events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to animal disease?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to animal disease?

3.1.10 - Data Sources

The following data sources referenced in this section were utilized to collect the most recent data and information available at the time of plan revision:

- Bergin, N. (2015, July 22). Nebraska bird flu quarantine lifted. Lincoln Journal-Star. Retrieved from https://journalstar.com/business/agriculture/nebraska-bird-flu-quarantinelifted/article_1f880805-6994-5bd0-ad89-8a9f8765784a.html

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- KVSH 940 AM, Bovine Tuberculosis in Wheeler County, Dec. 27, 2017. https://kvsh.com/archives/3339

- Amid controversy, $4.99 Costco chickens translate to big boost for Nebraska Economy, Lincoln Journal Star March 20, 2020. https://journalstar.com/special-section/new-directions/amid-controversy-4-99-costco-chickens-translate-to-big-boost-for-nebraska-economy/article_9e49fc5c-f639-52f8-ad2c-3e8a3e71f2ac.html

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    - Agricultural Review, n.d.; http://www.ncagr.gov/paffairs/AgReview/articles/2013/12-13-anaplasmosis.htm
- OIE. (2018). Paratuberculosis. Retrieved from World Organization for Animal Health, OIE: http://www.oie.int/en/animal-health-in-the-world/animal-diseases/paratuberculosis/

- The Cattle Site - https://www.thecattlesite.com/diseaseinfo/200/bovine-viral-diarrhoea-bvd/

- U.S. Department of Agriculture - (Numbers of cases mentioned are based on 2019 numbers drawn from Nebraska Department of Agriculture reports)

- Nebraska Agricultural Statistics Services: https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NEBRASKA
    - USDA, National Agricultural Statistics Services, May 11, 2020. Retrieved at: https://www.nass.usda.gov/Statistics_by_State/Nebraska/Publications/County_Estimates/20NEcattle.pdf

SECTION 3.2: DAM FAILURE

2021 SHMP Update
• Hazard sections reformatted for consistency with planning guidance • Risk assessment and vulnerability analysis was conducted with new data and information from the 2019 DR-4420 flooding event • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Dam Failure	A **Dam** is a barrier constructed across flowing water to obstruct, direct or slow down the flow, typically creating a lake or reservoir. A Dam Failure is a catastrophic type of failure characterized by the sudden, rapid and uncontrolled release of impounded water or the likelihood of such an uncontrolled release. Primary causes of dam failure include: overtopping (approximately 34% of all U.S. Dam Failures) caused by water spilling over the top of the dam frequently due to inadequate spillway design or debris blockage of spillways; foundation failure; piping (water escaping through narrow channels under the dam); and poor maintenance.

3.2.1 - Hazard Characteristics

Dam failure is a structural collapse or breach of the dam. A dam failure can result in severe loss of life, economic disaster, and extensive environmental damage. Most dams store small volumes causing failures to have small consequences, but dams with large storage volumes can cause significant flooding downstream. The average age of Nebraska dams is 44 years old. Dam failures are often a rapid onset and first signs may go unnoticed. However, proper design, continual maintenance and inspection of dams provide the opportunity to identify possible deficiencies to prevent a possible failure.

The 2005 Nebraska Safety of Dams and Reservoirs act gives the Nebraska Department of Natural Resources (NeDNR) the authority to conduct routine inspection of dams, review the design and construction of dams, and require dam owners to develop emergency action plans for their dam.

The Nebraska Department of Natural Resources (NeDNR) classifies dams by the potential hazard each poses to human life and economic loss as well as regulates dam safety. The following table is classifications and descriptions for each hazard class:

Table 3.2-1: Dam Classifications

Dam Hazard Level	Hazard Potential
High	Failure of the dam expected to result in loss of human life is probable. Failure may cause serious damage to homes, industrial or commercial buildings, four-lane highways, or major railroads. Failure may cause shallow flooding of hospitals, nursing homes, or schools.
Significant	Failure of the dam expected to result in no probable loss of human life but could result in major economic loss, environmental damage, or disruption of lifeline facilities. Failure may result in shallow flooding of homes and commercial buildings or damage to main highways, minor railroads, or important public utilities.
Low	Failure of the dam expected to result in no probable loss of human life and in low economic loss. Failure may damage storage buildings, agricultural land, and county roads.
Minimal	Failure of the dam expected to result in no economic loss beyond the cost of the structure itself and losses principally limited to the owner's property.

Dams classified as high hazard potential require 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 of 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 proper action can be taken to prevent the loss of life and property. **Table 3.2-2** summarizes the potential impacts and consequences of dam failure.

As of January 2020, the owner of every high hazard potential dam in the State has an emergency action plan for their dam. These plans address what actions the dam owner will take to prevent dam failure, who will be contacted in case of an emergency, and the downstream area that will be evacuated if failure of the dam is imminent.

There are limited funding opportunities available for reconstructing or removing dams that are in poor condition. Public dam owners can apply for funding assistance through the State's Water Sustainability Fund, but funds are limited and to date only one dam rehabilitation project has received funding through the program. Opportunities for private dam owners are either non-existent or extremely limited. There are two local natural resources districts that have developed local cost-share programs to help private owners rehabilitate their dams. The **High Hazard Potential Dam Rehabilitation Grant Program**, administered by FEMA, is a new federal grant program for eligible non-Federal governmental organizations or nonprofit organizations for rehabilitation of dams that fail to meet minimum dam safety standards and

pose unacceptable risk to life and property. **Figure 3.2-a** provides detailed information on the grant objectives, potential mitigation actions, and criteria for eligibility.

Table 3.2-2: Dam Failure Impact/Consequence Summary

Dam Failure Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – Structures within inundation areas could be destroyed depending on the amount of water held by the dam and how far downstream from the dam the structures are located. Casualties/Fatalities – Dependent on warning time and how far downstream of the structure they are located. People living and/or working in areas with less than 30 minutes of warning of a complete failure are the most at risk. Work – Dependent on location in relationship with the failing structure. Food/Water – Limited impact
Responders: Fire, Police, Medical, Public Works	Unless the responders live or their facilities are located within inundation areas there should be no impact. During the response, care needs to be given to the possibility of pollution, disease, and potential hazardous materials in the flood waters. Medical – Would be dependent on if the facilities are in the inundation areas. Some medical facilities could become quickly overwhelmed with victims if the inundation area includes a large population. In that event, medical surge plans will be activated.
Continuity of Operations	If major governmental facilities (courthouse, city/county offices) are in the inundation area failure of the structure could cause extreme damage to buildings and contents including electronic and paper records. If the jurisdiction does not have adequate COOP planning, the impact will be very high.
Property: Destroyed, Major, Isolated	Property within the inundation areas can expect impacts from major and destroyed to minor depending on the relationship of the structure to the dam and the amount of water released.
Infrastructure: Electricity, Water, Roads, Bridges	As with property damages, infrastructure can be seriously damaged. Water and waste water systems contaminated, electrical structures damaged, roads and bridges destroyed or isolated. Repairs could be delayed until water levels recede.
Environment	The environment in the inundated areas will be severely impacted with contaminates, erosion, and debris.
Economic Conditions	In Nebraska, economic impacts could be anywhere from catastrophic to none depending on which structures fail and the amount of water the structure holds.
Public Confidence in the Governance	Public confidence will be dependent on the perception of whether or not the failure could have been avoided by any governmental action either taken or not taken.

3.2.2 – Location

Table 3.2-3 shows the dam hazard level count per jurisdiction. According to Tim Gokie, NeDNR Chief of Dam Safety, on August 26, 2020, *"The correct number of existing dams in Nebraska is*

2,930 as of today. Our online inventory includes 15 dams that are currently under construction; bringing our online inventory number for today to 2,945."

Table 3.2-3: Dam Hazard Level Count by Jurisdiction

Juridictions	High	Significant	Low	Minimal	Undetermined	Under Construction
Cedar Dixon	3	6	48	0		
Central Platte NRD	8	15	135	18		1
City of Beatrice*	1	1	3	0		
Hayes, Hitchcock & Frontier	4	6	72	21		
Little Blue-Lower Big Blue NRD	13	49	478	30		3
Lower Elkhorn NRF	6	8	63	2		
Lower Loup NRD	5	5	122	10		3
Lower Platte North NRD	5	12	101	3		
Lower Platte South NRD	30	36	136	6		
Nemaha NRD	5	14	370	9		
North Platte NRD	8	13	49	2	1	
Papio-Missouri River NRD	35	11	105	2	1	4
Perkins County HMP	1	1	14	4		1
Quad Counties	2	4	171	36		
Region 23	4	10	106	27		
Region 24	1	2	66	22		
South Platte NRD	7	6	26	8		
Tri-Basin NRD	1	1	63	26		1
Tri-County NRD	0	3	94	13		1
Twin Platte NRD	8	2	19	5		
Upper Big Blue NRD	2	3	79	4		1
Upper Loup NRD	0	0	2	1		
TOTALS	**149**	**208**	**2322**	**249**	**2**	**15**
*Gage County-Subtracted from Little Blue-Lower Big Blue NRD dam count (2019 City of Beatrice HMP)						

Source: Nebraska Department of Natural Resources, Dam Safety Office

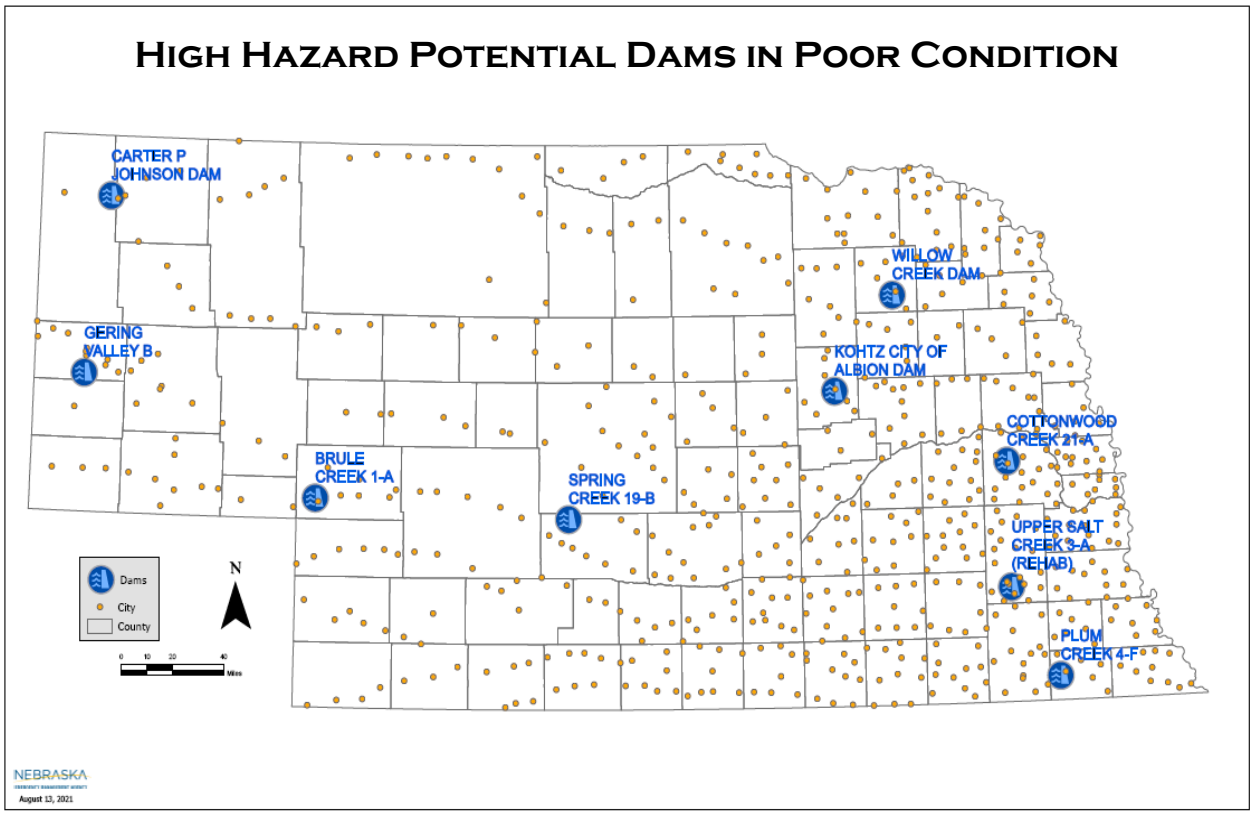
Table 3.2-4 displays the high hazard dams in the state in poor condition. There is a total of nine dams that need corrective action taken or an engineering evaluation. The dams in poor condition were constructed between the years 1955 and 1983, making the oldest dam in this table 66 years old and the youngest 38 years old.

Table 3.2-4 High Hazard Dams in Poor Condition

ND ID	Dam name	Hazard level	Current Condition Assessment	Year Completed	County
NE00211	BRULE CREEK 1-A	High	Poor-- corrective action needed	1970	Keith
NE00505	UPPER SALT CREEK 3-A (REHAB)	High	Poor-- corrective action needed	1955	Lancaster
NE00659	GERING VALLEY B	High	Poor-- corrective action needed	1964	Scotts Bluff
NE00775	PLUM CREEK 4-F	High	Poor-- corrective action needed	1969	Pawnee
NE01124	CARTER P JOHNSON DAM	High	Poor-- corrective action needed	1935	Sioux
NE01734	SPRING CREEK 19-B	High	Poor-- corrective action needed	1979	Dawson
NE01887	COTTONWOOD CREEK 21-A	High	Poor-- corrective action needed	1983	Saunders
NE02134	WILLOW CREEK DAM	High	Poor-- corrective action needed	1983	Pierce
NE00153	KOHTZ CITY OF ALBION DAM	High	Poor-- engineering evaluation needed	1968	Boone

Figure 3.2-a Shows a map of the high hazard potential dams in poor condition in correlation to towns in Nebraska.

Figure 3.2-a High Hazard Potential Dams in Poor Condition



Papio-Missouri NRD has the most high hazard dams, whereas Little Blue-Lower Big Blue NRD has the highest number of low hazard dams. The fifteen dams under construction are listed below in **Table 3.2-5.**

Table 3.2-5: Dams Under Construction

Dam ID	NID ID	Dam Name	Hazard Level	Plan No.	County
5064	NE05064	JAMIE CARSTENS DAM (MODIFIED)	Low	P-19271	Gage
5073	NE05073	KLINGINSMITH HOLDING LAGOON 1	Low	P-17848	Howard
8446	NE08446	BIXBY DAM (MODIFIED)	Low	P-20206	Fillmore
8447	NE08447	MARSHLAND HOLDING LAGOON 1	Low	P-20214	Chase
8459	NE08459	BAKER HOLDING LAGOON 2 DAM	Low	P-20235	Sherman
8466	NE08466	PIGEON JONES CREEK 12A	High	P-20327	Dakota
8469	NE08469	SHACK RANCH LAGOON DAM	Low	P-20323	Valley
8473	NE08473	KLABENES FEEDLOT RUNOFF LAGOON DAM	Low	P-20404	Antelope
8476	NE08476	GOTTSCH - JUNIATA LAGOON 10 DAM	Low	P-20420	Adams
8491	NE08491	GRIESS TRUCK WASH DAM	Low	P-20444	Hamilton
8506	NE08506	ROBERTS CATTLE COMPANY LAGOON 2 DAM	Low	P-20477	Dawson
8530	NE08530	ROWE HOLDING LAGOON 2	Low	P-18258	Gosper
8588	NE08588	ZORINSKY BASIN 2	High	P-20112	Douglas
9746	NE09746	PAPIO CREEK WP-6	High	P-20198	Sarpy
9785	NE09785	PAPIO CREEK WP-7	High	P-20199	Sarpy

Source: Nebraska Department of Natural Resources, Dam Safety Office

Figure 3.2-b describes the National Dam Safety Program/High Hazard Potential Dam Grant Program that may be utilized for eligible mitigation projects.

Figure 3.2-b: National Dam Safety Program/High Hazard Potential Dam Grant Program

National Dam Safety Program/High Hazard Potential Dam Grant Program

The Nebraska Department of Natural Resources (NeDNR) serves as the state's Dam Safety Agency, working in partnership with federal agencies and other stakeholders under the National Dam Safety Program to encourage and promote the establishment and maintenance of effective federal and state dam safety programs to reduce the risk to human life, property and the environment.

For the purposes of the HHPD program, all dam risk includes the incremental risk, non-breach risk, and residual risk associated with each eligible high hazard potential dam, as well as the reason(s) the state has determined the dam is an eligible high hazard potential dam.

High Hazard Potential is a classification standard for any dam whose failure or mis-operation will cause loss of human life and significant property destruction. There are 149 High Hazard Potential dams in the state.

For the purpose of the HHPD program, all dam risk includes the incremental risk, non-breach risk, and residual risk associated with each eligible high hazard potential dam, as well as the reason(s) the state has determined the dam is an eligible high hazard potential dam. To be eligible for the HHPD grant, the high hazard dam must have an emergency action plan approved by NeDNR, and the dam must fail to meet minimum dam safety standards of the state and pose an unacceptable risk to the public.

Funding *from the HHPD program provides technical, planning, design and construction assistance for eligible rehabilitation activities that reduce dam risk and increase community preparedness.*

Objectives *of the program include:*

1. Provide financial assistance for repair, removal, or rehabilitation of eligible high hazard potential dams.
2. Protect the federal investment by requiring operation and maintenance of the project for the 50-year period following completion of rehabilitation.
3. Encourage state, local, and territorial governments to consider all dam risk in state and local mitigation planning.
4. Promote community preparedness by requiring recipients to develop and implement floodplain management plans that address potential measures, practices, and policies to reduce loss of life, injuries, damage to property and facilities, public expenditures, and other adverse effects of flooding in the area impacted by the project; plans for flood fighting and evacuation; and public education and awareness of flood risks.
5. Reduce the potential consequences to life and property of high hazard potential dam incidents.
6. Incentivize states to incorporate risk-informed analysis and decision making into their dam safety practice.
7. Reduce the overall number of high hazard potential dams that pose an unacceptable risk to the public.
8. Promote a program of Emergency Action Plan (EAP) implementation, compliance, and exercise for high hazard potential dams.
9. Reduce costs associated with dam rehabilitation through the deployment of innovative solutions and technologies.

Eligible activities *include the repair, removal, or rehabilitation of eligible high hazard potential dams. For the purposes of the HHPD Grant Program, rehabilitation means the repair, replacement, reconstruction, or removal of a dam that is carried out to meet applicable state dam safety and security standards.*

The HHPD grant ***period of performance*** *is 36 months from the date of the award.*

Specific Criteria for the HHPD grant program are provided in the publication FEMA Policy 104-008-7

3.2.3 – Previous Occurrences and Extent

A detailed record of all historic dam failures in Nebraska is not available. However, based on records kept since 1970, there have been 99 dam failures, of which, four were classified as minimal hazard, 90 low hazard, and six significant hazard potential. To date, there has not been a failure of a dam classified as high hazard potential in Nebraska.

The most notable dam failures in Nebraska history include the 1895 failure of the Curtis Lake Dam in Frontier County which resulted in damage to a downstream railroad and a train derailment; the 1999 failure of the Tyson Lagoon Cell #3 Dam in Madison County which also resulted in damage to a downstream railroad; the 2010 failure of the Bredthauer Dam in Valley

County which reportedly increased ongoing flooding through the Village of North Loup; and the 2019 failure of Spencer Dam on the Niobrara River in Holt County. Three previous dam failure events are described below:

- June 2010 Heavy Rain- A stagnant line of thunderstorms led to historic flooding, which caused six dam failures across Nebraska. Of these six dams, five were classified as low hazard and one as significant hazard. Several other dams across the state were overtopped but did not fail. No major property damages or loss of life occurred due to these dam failures. DR-1924 was declared involving 64 counties and $66 million in public assistance grants as a result of the shallow flooding of several homes, damage to a state highway, and the flooding of several county roads.

- May 2015-Heavy Rain- According to the 2019 Nebraska SHMP, heavy rain producing storms caused large amounts of water runoff across the southeastern parts of the state. Several dams reached capacity and emergency spillways were activated. Two low hazard dams failed and contributed to the damage of several county roads and agricultural ground. This event resulted in federal disaster declaration DR-4225 with over $18 million in public assistance grants. Data from this event is not documented in the NOAA/NCEI Storm Events Database.

- March 14, 2019-Spencer Dam (Niobrara River) Failure: Heavy rain on top of frozen ground, rivers, and streams led to historic runoff on the Niobrara River, downstream of the Norden River crossing. A series of ice jams developed upstream broke loose, which lead to a wall of water, large blocks of ice and debris moving downstream and destroyed the dam structure. The flood waters from the dam failure destroyed the south bridge abutment on US Highway 281, a campground, bar, and a home immediately downstream. The flood caused one fatality.

***Spencer Dam Failure – March 2019 (*Information extracted from the *Spencer Dam Failure Investigation Report,* Association of State Dam Safety Officials, April 2020)**

The failure of the Spencer Dam in March 2019 led to an independent investigation by the Association of State Dam Safety Officials, *Spencer Dam Failure Investigation Report,* dated April 2020. This investigation, requested by the Nebraska Department of Natural Resources, the state regulator, and the Nebraska Public Power District (the dam owner), examined the causes of the dam's failure and provided lessons learned to prevent such failures from happening again.

The combination of meteorological conditions which included frozen ground, substantial thicknesses of river ice cover and snowpack impacted by a "bomb cyclone" winter storm resulting in heavy rainfall on the snowpack and frozen ground. This storm caused flooding and breakup of the river's ice cover. Although all four of the dam's radial gates were opened to maximum width on the spillway crest, additional attempts to increase outflow through stoplog bays were not successful due to ice. When one or more ice jams upstream from the

dam backed up flood waters and then burst a great amount of ice rubble and flood water was released toward the dam, likely clogging the opened gates and stoplogs and increasing the reservoir to the dike crest.

The overtopped embankment dike breached in two locations, sweeping through a house and other structures immediately downstream. The structures were destroyed and the single resident disappeared and was later declared dead by drowning. Further downstream of the dam, the flow breached a highway embankment, forming a major new channel through the breach. Ice and debris continued downstream, damaging or destroying several other bridges. A hydraulic modeling of the river downstream determined that the failure of the dam did not exacerbate flooding more than a few miles downstream or in the village of Niobrara, which was 39 miles downstream.

The investigation concluded that the flood of water and ice greatly exceeded the capacity of the dam and its spillways and nothing the operators at the dam could have done would have prevented the dam from failing given the magnitude of the flood and ice run. The investigation also concluded that if the dam had not been present, the structures immediately downstream would have not been safe during these flood conditions. Additional conclusions included:

- There was a notable lack of knowledge about ice-run-related failure modes generally in the dam safety industry; and, in fact Spencer Dam had previously failed and was damaged in ice run events in 1935, 1960 and 1966. Current dam safety best practices do not include evaluating run-of-the river dams for stability.
- The potential of the dam to cause life-threatening flooding at the downstream property in the event of dam failure was underestimated. The Downstream Hazard Potential Classification (DHC) at the time of the 2019 incident was “significant”. The investigative panel believe it should have been “high” which would have required an Emergency Action Plan and might have required modification of the dam to increase flood handling capacity.

Key Lessons Learned

- More research is needed on the dynamic nature of rivers in cold weather regions, including ice run formation, frequency, movement, damage, and how infrastructure like dams should be designed, maintained and operated to withstand ice run loading.
- Downstream areas of low and significant hazard dams should be periodically assessed by dam safety regulators to evaluated whether the hazard classification is appropriate.
- Emergency Action Plans should be developed and exercises for dams with people at risk downstream.
- Dam operation plans should include extreme events.

In addition to the Spencer Dam failure, which was a significant hazard dam, several privately-owned dams failed in the 2019 event. The failure of these private dams contributed to additional overland flooding and most likely exacerbated the flooding in localized areas leading to community evacuations. Large ice chunks on several rivers destroyed or damaged river bridges, including state, county, and private owned bridges in several counties.

3.2.4 - Probability of Future Events and Impacts of Climate Change

Dams in Nebraska are aging with an average age of over 44 years. Many dams have exceeded their original 50-year design life. Without significant investment in repair, reconstruction, and removal of aging dams, dam failures in Nebraska will become more common. Currently, 680 dams or 23% of dams in the State are rated in poor condition due to problems such as inadequate spillway capacity, deteriorated spillway conduits, excessive seepage, or damage due to tree roots. The following statement from Tim Gokie, Chief, Dam Safety Section, NeDNR, summarizes the probability issue related to dams:

> *The probability of failure of a well-maintained, well-designed dam is low. Nevertheless, with over 2,900 dams in Nebraska of varying age and condition, there is typically at least one dam failure in the State each year. Large storm systems that result in regional flooding, like the widespread flood events of 2010 and 2019, often result in several dam failures. The majority of the dams that fail are small, low hazard potential dams located in rural areas where the resulting damage is mostly limited to the dam itself and the dam owners' property. Low and minimal hazard potential dams are typically designed to safely pass either a 50-year or 100-year design flood event, so larger events will overtop the dam, which can result in dam failure. Dams that are classified as significant and high hazard potential are required to meet higher standards and failure of these dams is rare.*

Multiple factors create difficulty in calculating a quantitative recurrence level for dam failure:

- Many dams are privately owned or managed and are located on private land, leading to unreported dam failure incidents
- Dam failure does not always result in flood-type impacts to people, property or the environment
- Dam failure is not reported through the NOAA/NCEI Storm Events Database

Based on the historical record, climate is inherently variable making it difficult for climate scientists to predict long-term conditions that could lead to excessive rainfall events that have the potential to impact dams. In addition, anomalies of precipitation and temperature may last from several months to several decades. Under a higher emissions pathway, historically unprecedented warming is projected by the end of the 21st century (CICS-NC, NOAA NCEI, 2019), which could increase the number of excessive rainfall events.

3.2.5 – Local Plan Data

Local plans estimate dam failure as a low probability. There is very limited data from previous regional and local plans on dam failure. From the *2016 Papio-Missouri River NRD Multi-Jurisdictional Hazard Mitigation Plan*, the probability of dam failure is stated as one percent annually and the *Little Blue-Lower Big Blue NRD Multi-Jurisdictional Hazard Mitigation Plan* stated a lack of information regarding dam failure in the planning area. The probability for this event is difficult to calculate and there is not a comprehensive source for historical dam failure in the planning area.

The local mitigation actions previously taken are evacuation plans, land use regulations, public education, encourage citizens to purchase flood insurance, and natural open space preservation in floodplains.

3.2.6 – Jurisdictional Vulnerability and Potential Losses

Cities, especially metropolitan areas, downstream from dams are vulnerable to flood. The larger urban areas are mainly protected by high hazard dams. High hazard dams are maintained and inspected annually by NeDNR. Low hazard dams are older but maintained and inspected every five years. Even minor dam failures can cause the loss of life and property.

People

- The lives of the people downstream from a dam are at risk, especially the disabled or elderly because of mobility issues. Evacuation plans are in place, but the rapid onset may make evacuating before a dam fails not feasible.

Economy

- Businesses in the inundation areas are at risk for damage and would be closed for an extended period of time. As an effect of business closures, employees will be out of work.

Built Environment

- Inundation areas from dam failure would have damage to homes and buildings.

Infrastructure

- Transportation infrastructure including roads and bridges are at risk for inundation and damage.

Critical infrastructure

- Critical infrastructure could be damaged or destroyed.

3.2.7- Vulnerability of State Assets and Potential Dollar Losses

Nebraska Department of Natural Resources policy and public safety concerns prohibit the disseminating dam breach inundation maps for use in local or state mitigation plans. The NeDNR considers special requests for this information on a case-by-case basis. Any information released must be viewed at a NeDNR office. Additionally, dam inundation mapping is not available through the National Dam Inventory. Therefore, neither jurisdiction specific inundation data nor maps will be included in this revision of the plan. Should this information become available to the public in the future, this risk assessment will be updated accordingly.

Table 3.2-5: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.2.8 - Future Population and Development Trends

Dams are classified in four hazard potential categories based on the potential downstream damages if the dam were to fail. The hazard classification sets the design, construction, and inspection criteria for the dam. As the hazard classification increases, so do the standards for design, construction, and inspection. Dams constructed in rural areas are usually classified and constructed to low hazard standards. However, in most areas, there is nothing that prevents a home from being built downstream of a low hazard dam that could be flooded if the dam fails. This is especially a problem around cities seeing rapid growth into rural farm land. The construction of just one home can result in a change in a dam's hazard potential classification. This results in dam owners having to make costly upgrades to their dams. Downstream homes are especially at risk until upgrades to the dam can be completed. These upgrades can take several years to complete and some dam owners do not have the resources to make the required changes to their dam.

Although, the Nebraska Department of Natural Resources does not have authority to prevent development downstream of dams, it is continually monitoring potential development

downstream of dams and revaluating the hazard potential classification of dams. A few local communities and jurisdictions have implemented zoning restrictions that restrict development in dam breach inundation areas.

Potential development downstream of dams will be monitored over the next planning cycle to determine if development trends change.

3.2.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to dam failure as well as other information from the Local Hazard Mitigation Plan updates:

- Have any dam failure events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict dam failure events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to dam failure?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to dam failure?
- Have any projects been funded, initiated or completed under the High Hazard Potential Dam Grant Program?

3.2.10 - Data Sources

- *2019 Nebraska Hazard Mitigation Plan*

- Little Blue-Lower Big Blue NRD Multi-Jurisdictional Hazard Mitigation Plan, 2016

- Nebraska Department of Natural Resources
    - Dam Safety Office

- FEMA
    - High Hazard Potential Dam Rehabilitation Grant Program, FEMA Policy 104-008-7. Accessed at: https://www.fema.gov/sites/default/files/2020-08/fema_hhpd_policy_FP_104-008-7.pdf

- Papio-Missouri River NRD Multi-Jurisdictional Hazard Mitigation Plan, 2016

SECTION 3.3: DROUGHT

2021 SHMP Update
• Reformatted Drought Profile • Enhanced Drought characteristics • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Drought	A prolonged period with no rain, particularly during the planting and growing season in agricultural areas. Limited winter precipitation accompanied by moderately long periods during the Spring and Summer months can also lead to drought conditions.

3.3.1 - Hazard Characteristics

Drought is a normal, recurrent feature of climate, although at times considered a random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate.

Drought is an insidious hazard of nature. Although it has scores of definitions, it originates from a deficiency of precipitation over an extended period of time, usually one season or more. Drought can have a widespread impact on the environment and the economy, depending upon its severity, although it typically does not directly result in loss of life or damage to property, as do other natural disasters. Drought can have indirect long-term life safety impacts; however, especially on livelihoods and well-being that can result in death.

Drought should be considered relative to some long-term average conditions of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as “normal.” It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events, antecedent moisture conditions, etc.) of the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with drought in many regions of the world and can significantly affect its severity.

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human activity often exacerbates the impact of drought. According to the National Weather Service, Climate Prediction Center there are four identified drought types: Meteorological/ Climatological, Socioeconomic, Agricultural, and Hydrological, illustrated in **Figure 3.3-a**.

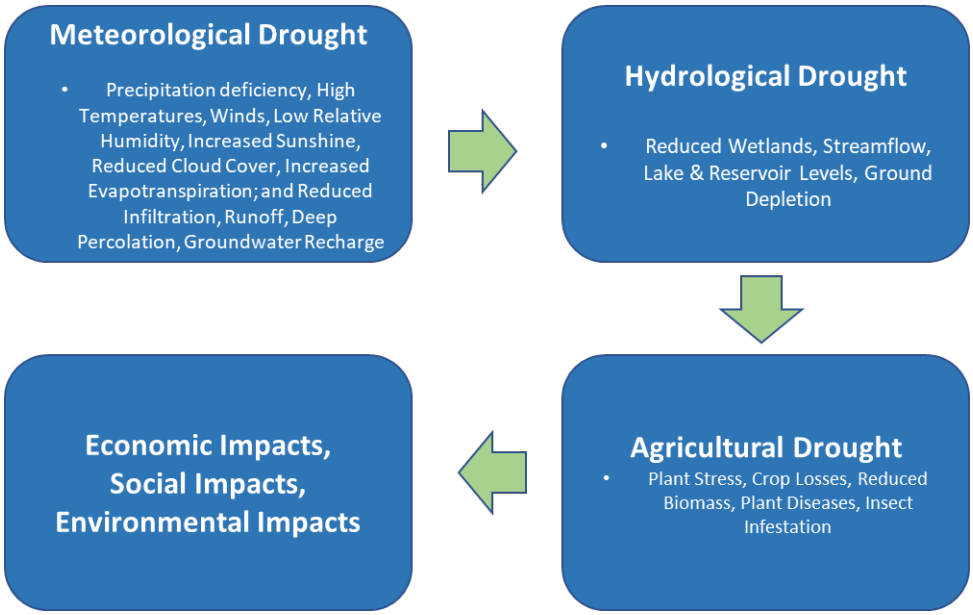
- *Meteorological/Climatological Drought* is defined in terms of the departure from a normal precipitation pattern and the duration of the drought hazard and has a slow-onset that usually takes at least three months to develop and may last for several seasons or years.
- *Agricultural Drought* links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, differences between actual and potential evapotranspiration, soil water deficits, and reduced ground water or reservoir levels. Crop water demand depends on prevailing weather conditions, biological characteristics of the specific crops, its stage of growth, and the physical and biological properties of the soil.

- *Hydrological Drought* is associated with the effects of substandard periods of precipitation (including snowfall) shortfalls on surface or subsurface water supply (i.e., stream flow, reservoir and lake levels, groundwater). The frequency and severity of hydrological drought is often defined on a watershed or river basin scale. Although all droughts originate with a deficiency of precipitation, hydrologists are more concerned with how this deficiency plays out through the hydrologic system. Hydrological droughts are usually out of phase with, or lag the occurrence of, meteorological and agricultural droughts. It takes longer for precipitation deficiencies to show up in components of the hydrological system such as soil moisture, stream flow, and ground water and reservoir levels.

- *Socioeconomic Droughts* occur when physical water shortage begins to affect the population, individually and collectively. Most socioeconomic definitions of drought associate it with supply, demand, and economic good.

Although climate is a primary contributor to hydrological drought, other factors such as changes in land use (e.g., deforestation, increases in impervious area), land degradation and the construction of dams all affect the hydrological characteristics of the basin. Because regions are interconnected by hydrologic systems, the impact of meteorological drought may extend well beyond the borders of the precipitation-deficient area. For example, meteorological drought may severely affect western portions of the state; however, since a number of rivers and their tributaries drain this region to the east, there may be significant hydrologic impacts downstream. Similarly, changes in land use upstream may alter hydrologic characteristics such as infiltration and runoff rates, resulting in more variable streamflow and a higher incidence of hydrologic drought downstream. Land use change is one of the way human actions alter the frequency of water shortage even when no change in the frequency of meteorological drought has been observed.

Figure 3.3-a: Interrelationship of the Hydrological Cycle



Drought affects more people than any other natural hazard owing to their large scale and long-lasting nature and differs from other natural hazards in several ways. It is a slow-onset natural hazard often referred to as a creeping phenomenon. Because of the creeping nature of drought, its effects accumulate slowly over a substantial period of time.

Drought conditions during certain parts of the crop growth cycles can be particularly impactful as growth can be stunted or plants die off resulting in lower yields. Impacts on agriculture vary depending on the time of year, period of precipitation, amount of stored soil moisture, type of crop, stage of growth, and meteorological measures (i.e., temperature, humidity, and wind). Precipitation scarcities as little as four to six inches can be the foundation of an agricultural drought condition.

Impacts from drought are spread over a larger geographical area more than those that result from other natural hazards. Quantifying the impacts and providing disaster relief are far more difficult tasks for drought than for other natural hazards since these impacts can filter through economies and the environment for months, years, and even decades. These characteristics of drought have hindered development of accurate, reliable, and timely estimates of severity and impacts (i.e., drought early warning and information systems) and, ultimately, the formulation of drought preparedness plans and drought policies. It is difficult for emergency managers who are tasked with the assignment of responding to drought to deal with the impacts because droughts often have large spatial coverage in comparison to floods, tropical storms, earthquakes, and other natural hazards, and impacts vary by type and magnitude within the drought affected area because of different economic, social, and environmental system vulnerabilities.

The State of Nebraska uses the University of Nebraska's National Drought Mitigation Center's, U.S. Drought Monitor system, illustrated in **Table 3.3-1**, to help identify areas of drought and

potential drought, labeling them by intensity with D1 as the least intense level and D4 the most intense. The D0 [zero] areas are not in drought, but are experiencing abnormally dry conditions that could transition to drought conditions, or are recovering from drought and are not yet back to normal.

Primary physical effects are further indicated in relation to short- or long-term drought:

S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

L = Long-Term, typically more than 6 months (e.g. hydrology, ecology)

Table 3.3-1: US Drought Monitor Classifications

U.S. Drought Monitor Classifications		
Category	**Description**	**Possible Impacts in Nebraska**
D0	**Abnormally Dry**	• Going into drought: Short-term dryness slowing planting, growth of crops or pastures • During drought condition – rangeland conditions decline • Coming out of drought: Some lingering water deficits and pastures or crops not fully recovered
D1	**Moderate Drought**	• Pasture and crop growth are stunted • Surface water levels in streams, reservoirs, or lakes decline, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	**Severe Drought**	• Crop yields are low; ethanol production decreases and plants begin to close • Fires increase; firework restrictions are possible • Well levels are dropping • Mandatory surface water irrigation restrictions are implements • Water use is high
D3	**Extreme Drought**	• Hay is scarce and expensive; producers are selling cattle early and culling; horses are abandoned • Pavement is cracking • Fish kills claim thousands of fish; drought-tolerant trees are dying • Water temperatures are high; Platte River is dry in sections; water recreation is limited • Groundwater use increases; new irrigation wells are drilled.

D4	**Exceptional Drought**	• Crop germination is stunted; high levels of nitrate are found in corn • Auctions have record number cattle • Wildfire season is destructive and costly • Severe case of EHD is observed in deer population; deer hunting is down • Municipal water supplies are low; trade navigation is hindered on major rivers due to low flow and obstructions • Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

Source: United States Drought Monitor, Drought Impacts by State; https://droughtmonitor.unl.edu/Data/StateImpacts.aspx

Table 3.3-2 presents a summary of the impacts and consequences of drought.

Table 3.3-2: Drought Impact/Consequence Summary

Drought Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – In the event of severe drought, foundations of structures could be impacted by contracting soils. Casualties/Fatalities – Could result if the drought is accompanied by severe and lingering heat. Food/Water – a result of extended drought is lower ground water levels that can lead to water supply impact
Responders: Fire, Police, Medical, Public Works	Due to dry conditions grasslands, CRP croplands and forested area are fire prone increasing demand on fire department resources.
Continuity of Operations	No impact on COOP.
Property: Destroyed, Major, Isolated	Property may not be physically destroyed but rural home water wells may go dry. May cause long-term reduction of grazing for a year and replacement of fence posts. Well pumps may need to be lowered if groundwater levels decline drastically.
Infrastructure: Electricity, Water, Roads, Bridges	Water systems may be strained by low levels of ground water potentially causing water shortages. Roads and bridges may experience cracking or foundations shifting due to extreme heat and drought conditions.
Environment	Animals are impacted by loss of food and nesting when grasses die. Streams, creeks, and river levels can lower to the point of fish kills and loss of habitat for water fowl.
Economic Conditions	Loss of crops, hay, and animals due to high feed costs can make a large impact on the local and state economies. Animal and plant diseases would be expected to increase as animal and plant populations are stressed. Widespread disease would cut sales and hit the state's economic hard. May need hay to feed cows.

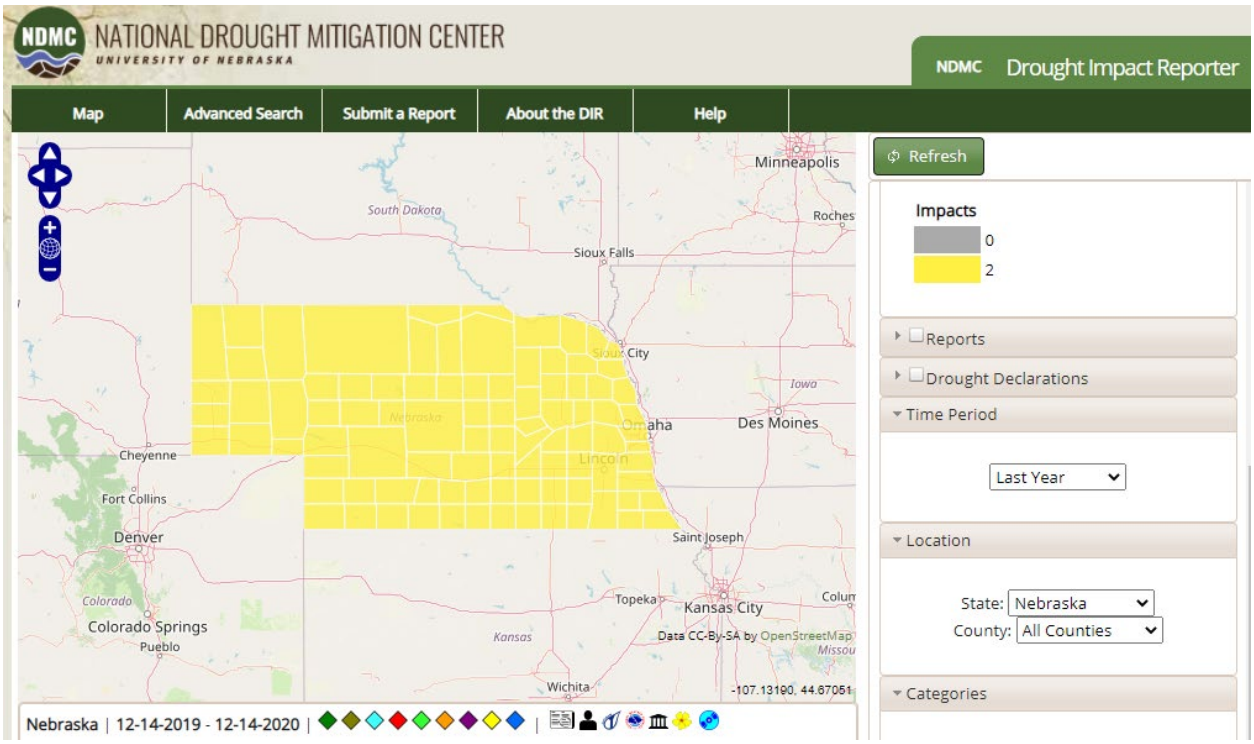
Public Confidence in the Governance	Depends on the efficiency of governments to handle the resulting impacts, and the level of trust between the affected jurisdictions and the government.

3.3.2 – Location

Based on past occurrences, the entire state of Nebraska is susceptible to drought impacts. The precipitation rates in various locations are highly variable from year to year, with historic statewide annual averages ranging from a low of 13.36 inches (2012 – Nebraska's driest year on record) to a high of 35.50 inches (1915). Most recently, the wettest five-year period was from 2007-2011; however, by 2012 the state was experiencing widespread drought conditions (NOAA, NCEI, 2019 State Summary).

Because precipitation also varies in the state, with the eastern portion typically gaining almost twice as much rainfall annually, the western portion of the state is more likely to be impacted by drought. **Table 3.3-3** documents specific locations, by county, where previous significant droughts have occurred. One data source for documenting locations where drought has previously occurred (or is occurring) is the National Drought Mitigation Center at the University of Nebraska. Its online impact reporter can map drought impacts by county, time period, and impact category. An example of this product, illustrating the widespread location of drought impacts between December 14, 2019 and December 14, 2020 is displayed in **Figure 3.3-b**.

Figure 3.3-c: Example of Drought Impact Reporter, 2020



Source: National Drought Mitigation Center, University of Nebraska, accessed at: https://droughtreporter.unl.edu/map/

3.3.3 – Previous Occurrences and Extent

Drought, including multiple-year drought, is a normal part of the state's diverse climate. Severe drought hit this semi-arid region in the 1890s, 1950s, 1980s and 2012-2013. **Table 3.3-3** is an overview of drought occurrences in Nebraska from 2000 to March 2020.

Table 3.3-3: Past Occurrences of Drought in Nebraska, 2000-2020

Date(s)	County/Area Effected	Types of Damage	Total Dollar Amount of Crop Damages (by year)
March – September 2000	Adams, Buffalo, Clay, Dakota, Dawson, Dixon, Dundy, Franklin, Furnas, Gosper, Greeley, Hall, Hamilton, Harlan, Hitchcock, Howard, Kearney, Merrick, Nance, Nuckolls, Phelps, Polk, Red Willow, Thayer, Valley, Webster, York	A combination of above-normal temperatures and significantly lower than normal rainfall reduced crop yields, placing stress on livestock and affectively drying up pastures for grazing. Dry land crops were hardest hit, but irrigated fields also sustained yield loss along with increased cost of irrigation. The per-farm loss was estimated at about $10,000, mostly from lower corn and soybean yields. The governor estimated the total effect on the Nebraska economy to be around 1 billion dollars.	$24,000,000
May – December 2002	Adams, Buffalo, Clay, Dawson, Dundy, Fillmore, Franklin, Furnas, Gosper, Greeley, Hall, Hamilton, Harlan, Hitchcock, Howard, Kearney, Merrick, Nance, Nuckolls, Polk, Phelps, Red Willow, Sherman, Thayer, Webster, Valley, York	The prolonged drought across central and south-central Nebraska occasionally was classified in the "extreme to exceptional" category through the summer and fall. Most dry land crops were near total loss and there was some decreased yield with irrigated crops.	$24,000,000

Date(s)	County/Area Effected	Types of Damage	Total Dollar Amount of Crop Damages (by year)
June – November 2012	86 Counties	The drought that began in late June continued into August with extreme (D3) drought conditions. Weather patterns trended toward strong high pressure aloft that sustained dry and hot weather. Temperatures were above average with spotty rainfall at best. Lightning ignited the multi-state Wellnitz Fire, burning more than 48,681 acres in Nebraska. The Drought Monitor continued to reflect short-term impacts, which the drought intensified into September 2012 and ultimately into 2013. **Property damage totaled $215,050,000**	$196,260,000
January – November 2013	86 Counties	The drought that began in June and expanded to become an Exceptional (D4) Drought in 2012 continued into January 2013. There was little relief or recharge to depleted soil moisture. Short term impacts were expected to hit agriculture and grasslands, while the long-term impacts to hydrological and ecological interests were expected to linger. Rainfall departures remained over four inches, keeping fire dangers and potential impacts at the forefront and in the news.	$30,000,000
January – June 2014	40 Counties	According to the U.S. Drought Monitor, January 2013 marked the 20th consecutive month of drought of at least category D2 (Severe) intensity over a 24-county portion of south-central Nebraska, prolonging one of the most notable droughts in decades. Eventually, 16 additional counties registered drought conditions from D1 (Moderate) to D2 (Severe).	$0

Date(s)	County/Area Effected	Types of Damage	Total Dollar Amount of Crop Damages (by year)
July 2017	Brown, Cherry, Keya Paha	A very dry June and sparse rainfall through much of July led to worsening drought conditions across north-central Nebraska. As of July 25, 2017, severe drought (D2) covered eastern Cherry, western Keya Paha, and most of Brown counties.	$0

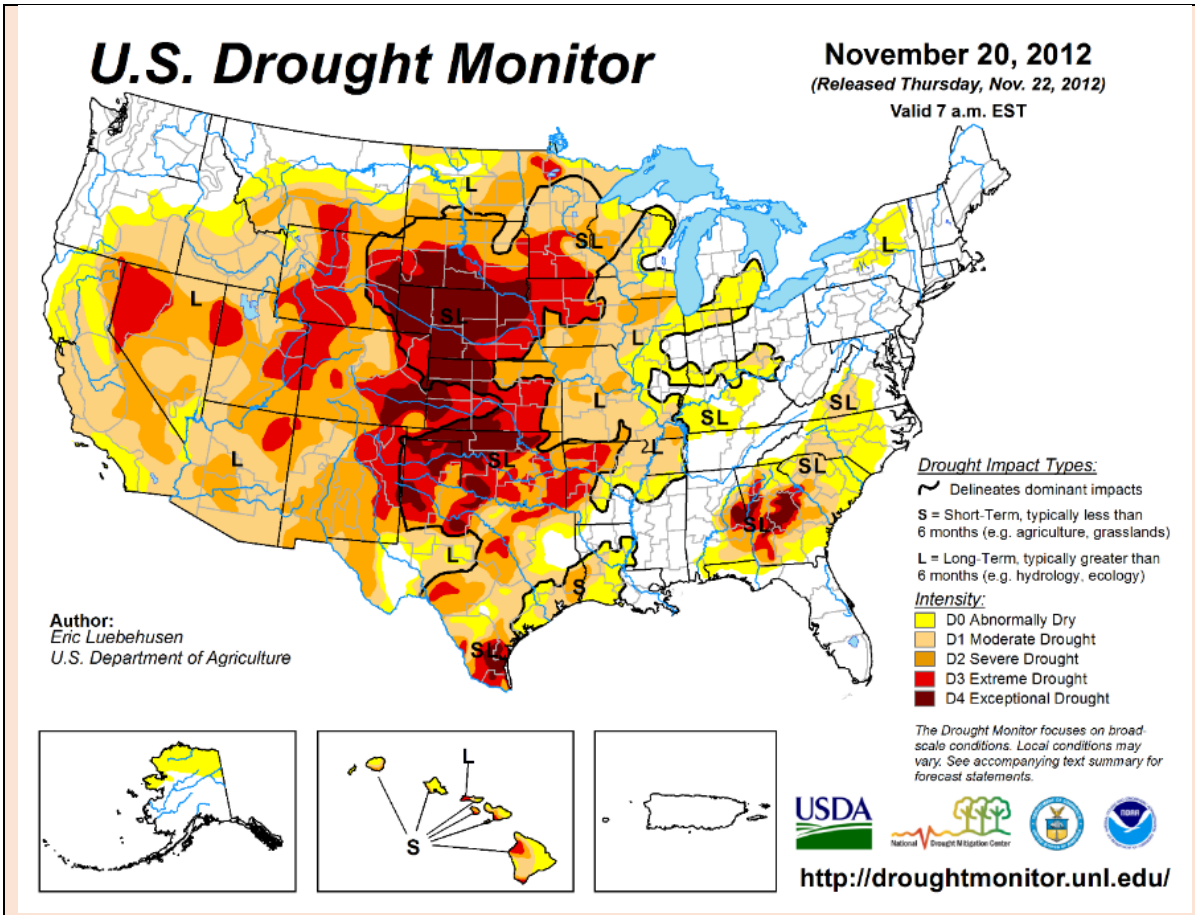
Source: NOAA, NCEI-Storm Events Database, as of March 31, 2020

The Drought of 2012 provides a well-documented example of the impacts that an exceptional drought can have in Nebraska.

Drought of 2012

At the beginning of 2012, there was little indication that an extensive drought would develop and emerge as a significant natural disaster. However, by the end of the year Nebraska was impacted significantly by drought, with 100% of the state in drought and a little more than 96% in extreme drought or worse according to the U.S. Drought Monitor, illustrated in **Figure 3.3-c**. The following map from the National Drought Mitigation Center illustrates the extent of drought in the U.S. and Nebraska in November 2012.

Figure 3.3-c: U.S. Drought Monitor, November 20, 2012



Source: U.S. Drought Monitor; https://droughtmonitor.unl.edu/Maps/MapArchive.aspx

Development of Drought Conditions in 2012

The warmth of the 2011-2012 winter season in Nebraska was influenced by many climate factors, including strong southerly winds, a lack of snowpack to the north, a jet stream pattern that kept the cold Arctic air to the north of the state, and a positive Arctic Oscillation (AO). These dry conditions allowed drought to develop in the eastern part of the state in the fall of 2011. By early 2012, about 14 percent of the state was in drought, mainly the eastern third of the state. The majority of this area was in moderate drought (D1) and less than 1 percent was in the severe category (D2).

By the end of July, the entire state was in drought conditions, with 83 percent in extreme or exceptional drought (D3-D4), and southeast Nebraska in severe drought (D2). By the end of August, the drought conditions in Nebraska were rapidly deteriorating; 97 percent of the state was in extreme to exceptional drought (D3-D4) and almost a quarter of Nebraska (23.33 percent) was in exceptional drought (D4), which is considered a 1-in-50-year drought event.

Impacts on Agriculture

- Agriculture, on all scales - from neighborhood plots and small organic farms to large-scale corn and soybean production and ranches were impacted
- Total indemnity payments in Nebraska totaled $1.49 billion (Farm Credit Services of America, Inc. report, March 2013)
- Cattle ranchers were forced to cull herds by 25-60 percent as forage production was only about 28-64 percent of normal in western Nebraska.
- Increased costs for cattle feedlots due to the price of corn and forage, resulting in losses of $200 a head (or more) based on taking cattle to market earlier than normal and added finishing expenses
- With the corn crop being damaged, commodity prices increased and production of ethanol was not cost effective, resulting in reduced production or even closure of several ethanol plants
- Worst wildfire season since 1919 with more than $12 million in damages and more than 400,000 acres burned in more than 1,200 fire events (Nebraska Forest Service)
- Widespread tree loss, with evergreens particularly impacted, including white pines, arborvitae, spruces, red cedars, and junipers (700 pine trees removed in Pioneers Park, Lincoln – *Omaha World-Herald*)
- Significant tree loss in wind breaks affected western Nebraska
- Combination of drought and an outbreak of epizootic hemorrhagic disease (EHD) was estimated to have killed about a third of the whitetail deer population in Nebraska (Norfolk Daily News)
- Lower Platte River experienced record low flows, with many areas running completely dry (Lower Platte River Corridor Alliance). Low flows combined with high water temperatures ranging from 92 F to 97 F led to considerable fish kills, including the endangered pallid sturgeon, catfish, carp, minnows, and others
- Most water-based recreation was suspended

Impacts on Infrastructure

The 2012 drought caused significant damage to building foundations, private and municipal wells, water mains, and even trails.

- As soils dry, they shift and sink, causing damage to a building's foundation. One estimate indicated the drought damage to houses would reach $1 billion or more (*U.S. News & World Report*)
- From May to July 2012, 178 water main breaks were reported in Omaha
- Metropolitan Utility District officials believed that the combination of extreme heat, drought, and increased water usage caused increased pressure on the city's water lines, causing some to crack.
- As many as 81 municipal water systems in the state experienced drought-related water supply issues in 2012, according to the Department of Health and Human Services.

- Omaha and its surrounding areas broke a record for water use with 224 million gallons on July 23, 2012 (Omaha World-Herald)

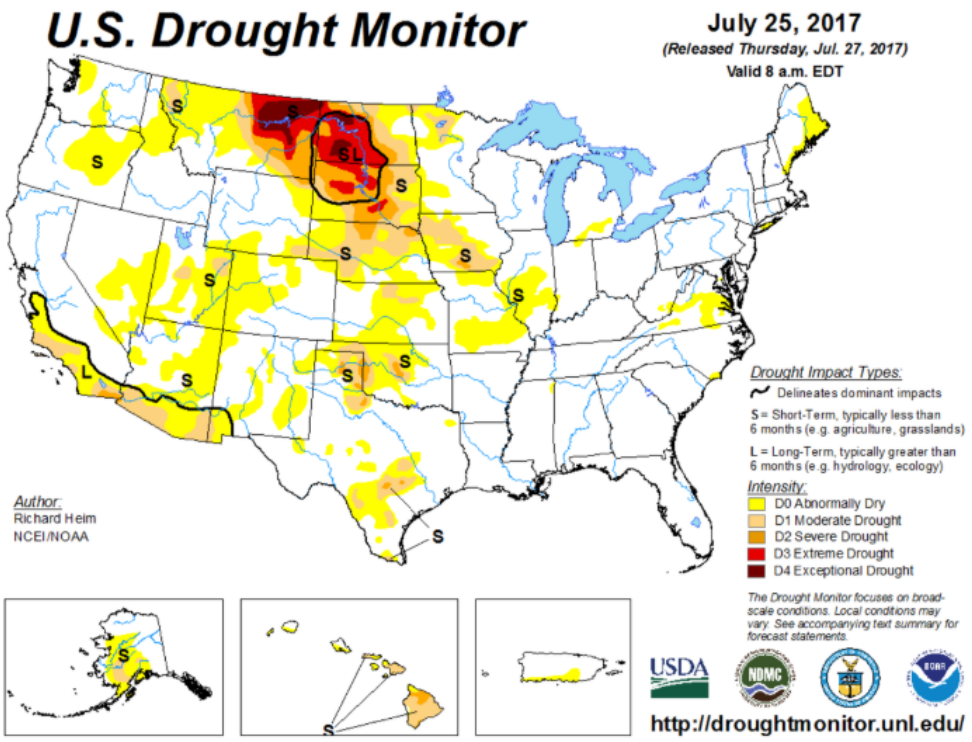
Impacts from other Natural Hazards

The combination of high winds and ongoing drought conditions caused a large dust storm to form across the panhandle and surrounding areas of Colorado, Wyoming, and Kansas in mid-October. The dust storm reduced visibilities and many roads were forced to close, including I-80 in western Nebraska. In addition, lightning caused a multi-state grassland fire that burned more than 48,000 acres in the northern part of the state.

Drought Events – 2016-2020

Based on review of NOAA's National Centers for Environmental Information (NCEI) data for the period between 2016 and 2020, a single event was documented on July 25, 2017, with three county reports – Eastern Cherry, Keya Paha, and Brown. No deaths or injuries or property or crop damage associated with this incident were reported. While the NCEI data establishes a record of this drought event on July 25, 2017, it does not provide a complete picture of the weather pattern consisting of an upper-level ridge of high pressure combined with high temperatures that resulted in this event, or the impacts felt in multiple regions of the state. **Figure 3.3-d** illustrates the intensity of the July 2017 drought, with the north central and northeast portions of the state in severe drought, and much of the north and central regions in moderate drought.

Figure 3.3-d: U.S. Drought Monitor, July 25, 2017



Source: NOAA, NCEI; retrieved on 6/26/20 from https://www.ncei.noaa.gov/news/us-drought-monitor-update-july-25-2017

Most recently, three Nebraska counties – Burt, Douglas and Washington – suffered losses caused by recent drought conditions and were designated on September 17, 2020 as primary natural disaster areas by the Secretary of the U.S. Department of Agriculture (USDA). This designation made Farm Service Agency (FSA) emergency loans available to these counties, as well as contiguous counties Cuming, Dodge, Sarpy, Saunders and Thurston.

3.3.4 – Probability of Future Events and Impacts of Climate Change

Based on the historic occurrence of drought in Nebraska, it can be estimated that the recurrence interval for drought is 3.33 years[3], indicating that on average a drought event will be equaled or exceeded within that time period.

Predicting drought depends on the ability to forecast two fundamental meteorological surface parameters, precipitation and temperature. Based on the historical record, climate is inherently variable making it difficult for climate scientists to predict drought for more than a few months in advance for most locations. In addition, anomalies of precipitation and temperature may last from several months to several decades. Duration of drought-causing climate events depends on air–sea interactions, soil moisture and land surface processes, topography, internal

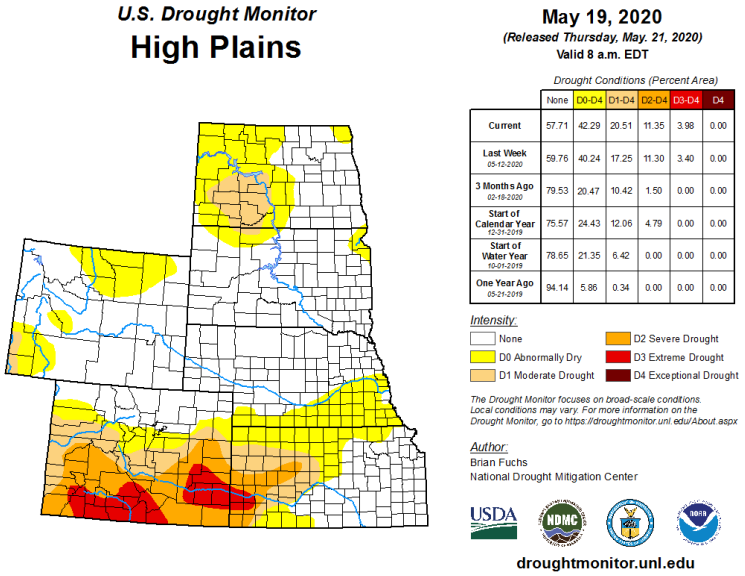
[3] Statistical calculation based on 20 years of record with six events during this time period.

dynamics, and the accumulated influence of dynamically unstable synoptic weather systems at the global scale.

Although drought cannot be prevented, certain measures can be taken to limit or reduce the effects of drought.

The U.S. Drought Monitor, provides a method to project potential development of drought conditions over a short-term period. The Drought Monitor, illustrated in **Figure 3.3-e,** produced by the National Integrated Drought Information System (NIDIS), is released weekly to show the location and intensity of drought across the country and its territories. The most current model, released on May 21, 2020, indicates approximately 30 counties in the south-southeast part of the state with abnormally dry conditions. Surveillance of this model over time can provide a trend-based indicator that aligns with the stages of drought conditions as they develop.

Figure 3.3-e: U.S. Drought Monitor (High Plains), May 19, 2020



Source: U.S. Drought monitor; https://droughtmonitor.unl.edu/Maps/MapArchive.aspx

According to the October 2013 Issue of NebGuide (a publication of the University of Nebraska – Lincoln Extension of the Institute of Agriculture and Natural Resources), a composite of the various climate models projects a warming in Nebraska of about 4 degrees Fahrenheit (F) for the annual average by 2050 and 8 degrees F or higher by 2090. Each season shows a warming trend, with the greatest amount occurring in summer and the least amount in spring. There are expected to be changes in the frequency and severity of extreme events in a warmer climate, such as heat waves and heavy precipitation. Often, it is the extremes that have a significant influence on people, animals, and the environment. The number of days per year with daytime high temperatures greater than 95 degrees F are expected to increase by about 15 days by the middle of this century, along with more consecutive days with highs above this threshold.

Conversely, the number of days with nighttime low temperatures less than 10 degrees F is expected to decrease by about 10 days by 2050.

A large percentage of the land in Nebraska is used for agricultural or rangeland purposes. An increase in temperature, especially in the summer months, can lead to an increase in evapotranspiration that can impact soil moisture. Both of these result in an increase in irrigation demands, which could put a strain on the water resources in the region. Extreme warmth in summer is expected to increase, and this may cause more stress for human and animal comfort, as well as influence crop production with a higher frequency of hot days. However, with a decreased frequency of extremely low temperatures during winter, there will likely be less stress on humans and animals due to exposure to cold conditions.

Model projections of changes in precipitation have less confidence than temperature. Precipitation can be highly variable from place to place and is generally more difficult to predict than temperature. Nebraska is situated around the dividing line in the North American continent between wetter conditions that are predicted for the north and east, and drier conditions that are predicted for the south and west. There is thought to be seasonal variability in this dividing line, with a general drying in summer and wetter conditions in winter. The summer drying trend is compounded by increased evaporation rates due to the projected warming. River systems having source areas in the Rocky Mountains may experience changes in flow rates due to declining snowpack.

The NOAA, NCEI, State Summary (2019) provides an additional description of the impacts of climate change in future years:

> *Although projections of overall precipitation are uncertain, and droughts are a natural part of the climate system, higher temperatures will increase evaporation rates and decrease soil moisture, leading to more intense future droughts. This would have negative impacts on dryland farming, although the impacts could be mitigated where irrigation is possible.*

3.3.5 – Local Plan Data

Estimations by local plans vary widely due to the inherent challenges in predicting climate changes and weather patterns. Some estimations are upwards of a 14% chance of drought in any given year.

The uncertainty of climate patterns is projected to increase as the global average temperature rises. Local plans are inconsistent with mitigation efforts, varying between no planned actions to several analytical and preparatory actions that could reduce the negative consequences of a severe drought. Such actions include assessing drought vulnerability, establishing monitoring boards and reporting procedures, establishing conservation and agricultural policies, enhancing building codes, and participating in national programs such as Tree City USA among other mitigation efforts. Local plans have identified that their entire populations are vulnerable to droughts and may suffer directly due to heat concerns and water limitations, or indirectly. Losses to drought events are comprehensive and cross-cut health, environment, economy, livestock, food stocks, and potable water stores as well as manufacturing and energy resources.

Secondarily, it impacts local and regional stability due to decreased availability of water, limiting economic production. It is widely recognized as a global goal to reduce drought stress by mitigating climate disruptions at large.

3.3.6 – Jurisdictional Vulnerability and Potential Losses

Nebraska's agricultural-based economy makes it especially vulnerable to drought. Losses in the agricultural sector are somewhat easier to determine than losses in other sectors because the direct agricultural losses are more obvious and are part of some statistics already being gathered. The most vulnerable portions of the state in terms of economic impact are cropland, pasture land for animals, recreational areas, and businesses that depend on agricultural industries for the bulk of their business. However, all areas of the state can be impacted by drought events.

Although agriculture is the main sector affected by drought in Nebraska, drought has a major impact on other sectors as well, including infrastructure. In 2012, Nebraska Public Power District set a new billable peak (with load management in effect) 7 percent higher than 2011 electrical loads and a new anytime peak (without load management) more than 16 percent higher than in 2011. This record energy use leads to increased costs for energy producers and consumers. The people of Nebraska are vulnerable economically, not only through higher costs in energy, but also, due to job and income losses in the agricultural sector. One example of local vulnerability to drought is presented in **Figure 3.3-f,** illustrating drought impacts to various sectors reported in the *Region 24 Emergency Management Multi-Jurisdictional Hazard Mitigation Plan*, dated April 2015.

Figure 3.3-f: Region 24 Drought Impacts Tables, January 2003-January 2014)

Table 31: Reported Drought Impacts (January 2003 - January 2014)

Agricultural	Business and Industry	Energy	Fire	Plant and Wildlife	Relief, Response, and Restrictions	Society and Public Health	Tourism and Recreation	Water Supply and Quality
138	35	7	9	24	50	35	3	33

Source: National Drought Mitigation Center – Drought Impact Reporter

Table 32: Drought Loss Estimation

Hazard Type	Number of Month of Drought / Total Months of Record[1]	Annual Probability[1]	Total Property Loss[1]	Annual Property Loss[1]	Total Crop Loss[2]	Annual Crop Loss[2]
Drought	19 / 225	~10%	$11,000,000	$51,643	$102,161,584	$7,297,256

Source 1: NCDC Data 1996-2014, Source 2: USDA RMA Data, 2000-2013

In a more direct way, people are vulnerable to shortages in the water system. In Nebraska, about 80 percent of the population consumes drinking water that is pumped from groundwater sources. The remaining 20 percent of the population, mostly in Omaha, obtains water from surface water sources such as rivers or lakes that have been properly treated for human consumption. As many as 81 municipal water systems in the state experienced drought-related water supply issues in 2012, according to the Department of Health and Human Services. The

Omaha World-Herald also reported that the intense heat and drought caused Omaha and its surrounding areas to break a record for water use with 224 million gallons on July 23, 2012.

3.3.7- Vulnerability of State Facilities and Potential Dollar Losses

There is little or no risk of substantial dollar loss to state buildings due to drought conditions. However, significant dollar losses to the government could occur in the event of a drought-induced economic failure. Public infrastructure is vulnerable to damage to underground water pipelines, stressed electrical systems and damaged roadways. Buildings are vulnerable to cracked foundations and other drought related problems.

State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in **Table 3.11-4.**

Table 3.11-4: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.3.8 - Future Population and Development Trends

Because drought is not limited to geographic boundaries or population groups, it is difficult to identify development and population trends that may be impacted by this hazard. Current land use and building codes incorporate standards that address and mitigate water supply and resources.

The potential for impacts of future growth and development on drought will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed, and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future.

3.3.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to drought as well as other information from the Local Hazard Mitigation Plan updates:

- Have any drought events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict drought events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to drought?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to drought?

3.3.10 - Data Sources

- 2019 Nebraska Hazard Mitigation Plan
- NOAA, NCEI
    - https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=31%2CNEBRASKA
    - https://statesummaries.ncics.org/downloads/NE-screen-hi.pdf
- Omaha World-Herald
    - July 24, 2012
- US Drought Monitor –
    - *Drought Impacts by State; https://droughtmonitor.unl.edu/Data/StateImpacts.aspx*
    - Drought Impact Reporter*; https://droughtreporter.unl.edu/map/*
    - Map Archive 11/20/2012, and High Plains Current 05/19/2020; https://droughtmonitor.unl.edu/Maps/MapArchive.aspx
    - https://www.ncei.noaa.gov/news/us-drought-monitor-update-july-25-2017

SECTION 3.4: FLOOD/FLASH FLOOD

2021 SHMP Update
• Hazard sections reformatted for consistency with planning guidance • Risk assessment and vulnerability analysis was conducted with new data and information from the 2019 DR-4420 flood event • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Flood/ Flash Flood	*Flood:* • A flood is a general and temporary overflow of water onto normally dry land • The inundation of a normally dry area caused by rising water in an existing waterway, such as a river, stream, or drainage ditch • Ponding of water at or near the point where rain fell. • Flooding is a longer-term event than flash flooding, lasting days or weeks *Flash Flood:* • A flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours • Usually characterized by raging torrents after heavy rains that rib through river beds, urban streets, or mountain canyons sweeping everything before them • They can occur within minutes or a few hours of excessive rainfall • They can occur even if no rain has fallen, for instance after a levee or dam has failed, or after a sudden release of water by a debris or ice jam

3.4.1 - Hazard Characteristics

Nebraska has a diverse environment and a broad range of topography, geology, and weather variations from east to west. Nebraska experiences on average 34 inches of rain annually in the east and 16 inches of rain annually in the west. Due to the range of conditions, there are also different types of flooding along Nebraska's rivers. The type of flooding which takes place on a river is typically a function of watershed characteristics such as soils, slope, and level of development.

Flooding of normally dry land areas typically results when a stream channel overflows due to excess runoff that exceeds channel capacity. These normally dry land areas adjacent to stream channels that have potential for flooding are floodplains. Every creek and river has a floodplain no matter how long it has been in existence. Simply put, the floodplain is the area inundated by water during a flooding event. The characteristics of the flooding such as rate of rise, overall magnitude (peak flow), duration, and frequency are a result of the climate and geographic characteristics of the area. Floods are typically measured in terms of magnitude and the probability that they will occur. FEMA floodplain maps and floodplain management regulations

are currently based on the 1 percent annual chance flood, which is the flood that has a 1% chance of being equaled or exceeded in any year.

Types of floods and overall flooding characteristics vary depending on the type and the source of the runoff. Flooding characteristics are also impacted by the presence of dams or levees. Riverine floods, flash floods, ice jams, dam failure, and levee failure are all possible types of potential flooding in Nebraska.

- Riverine flooding happens as a result of heavy precipitation or snow melt runoff occurring over a watershed for a period of several days to even weeks. This type of flooding most commonly impacts medium to large channels including but not limited to the Big Blue River, Elkhorn River, Loup River, Platte River, and Missouri River. The National Weather Service (NWS), USGS, and Nebraska Department of Natural Resources (NeDNR) work together to track stream gage heights to estimate future crests and stage heights. This allows for a timely dissemination of advance flood warning.

  Geology also has a unique impact on the nature of riverine flooding for some rivers in Nebraska. Sandhills rivers, located in certain areas of the central and western part of the State, are primarily fed through groundwater and flooding in general is rare. In addition, the sandhills act as a reservoir by quickly absorbing rainfall and adding to groundwater supplies, which then release water to sandhills rivers and streams in controlled amounts.

- Flash floods develop very quickly following an extreme precipitation event, such as heavy thunderstorms, rapid springtime snowmelt, or breaks in dams, levees, or ice jams. This type of flooding is most commonly associated with smaller channels and watersheds that have steeper slopes. Urban areas are also more prone to flash flooding due to impervious surfaces that do not allow water to infiltrate the ground. Typically, flash flooding cannot be accurately tracked and anticipated with estimates of crests and stage heights. This limitation hinders the potential for dissemination of advanced flood warning. The National Weather Service (NWS) provides flash flood watches, advisories, and warnings as this specific information is gathered and modeled prior and during an event.

- Ice jam flooding occurs throughout the state, with the most significant events being on the Loup and Platte Rivers. Ice jam events occur during the shifting temperature periods between winter and spring, but can occur throughout the winter season, being the result of fluctuating above and below freezing air temperatures. It is during the below-freezing days that river ice sheets will develop, and during the above-freezing days that ice starts to thaw, causing it to break up and begin flowing downstream. Ice jams are caused by the broken-up ice sheets getting caught on an obstacle, like a shallow river bend or bridge, where these floating ice sheets begin to pile up or stack upon each other, eventually creating an increase in water surface elevation upstream. Depending on the size of the blockage, amount of additional floating ice sheets, and the amount of water flowing down the river, this can become a serious flooding issue for miles upstream.

Additionally, depending on the amount of water being held back, a sudden breakup of the ice jam can create a serious flash flood issue downstream. Periods of rapid snowmelt and/or heavy rainfall can increase the severity of flooding if accompanying the formation of an ice jam.

- Flooding as a result of a dam or levee failure is covered in their respective hazard profiles.

Table 3.4-1: Flood Impacts and Consequences Summary

Flood Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing - Structures within inundation areas could be substantially damaged or destroyed depending on proximity to the flooding source, velocity of the inundation water, amount of debris, longevity of the flood, and total depth of flood waters. Casualties and fatalities – Casualties and fatalities would be dependent on warning and how quickly a flash flood moves through an area. High potential for injury and illness will be present for those evacuating through floodwaters as well as those involved in response and recovery efforts due to hazards in and left behind by the flood waters. Individuals attempting to drive through flood waters are at risk of being swept away in flood waters. Work – Impacts to workplaces dependent on proximity to the flooding source, velocity of the inundation water, the amounts of debris, longevity of the flood, and the total depth of flood waters. The impact on worker housing will also impact the ability of businesses to function. Food and Water - Water systems could be contaminated by flood water and people may need to boil or purchase bottled water. Substantial flooding could limit or eliminate access routes to affected areas.
Responders: Fire, Police, Medical, Public Works	A significant amount of responder facilities is located in areas that may flood during an event. These facilities could suffer major damage to both building and responder equipment significantly reducing responder capabilities. Additionally, flooding can hinder responders' ability to perform rescues and other emergency functions. Large numbers of victims could quickly overwhelm medical and community capabilities.
Continuity of Operations	If significant government facilities (courthouse, city/county offices) are in the flooded area, extreme damage to buildings and contents including electronic and paper records can occur. If the jurisdiction does not have adequate COOP Planning, the impact will be very high.
Property: Destroyed, Major, Isolated	Properties within flooded areas may experience major impacts or possibly be destroyed. This is dependent on the structure type, proximity to the flooding source, the velocity of the inundation water, amounts of debris in the floodwater, longevity of the flood, and total depth of the flood.
Infrastructure: Electricity, Water, Roads, Bridges	As with property damages, infrastructure can be seriously damaged. Water and waste water systems contaminated, electrical structures damaged, roads and bridges destroyed or isolated. Repairs typically delayed are until water levels recede.
Environment	The environment in the flooded areas will be severely impacted with contaminants, erosion from rushing water, and debris.

Economic Conditions	Impacts to local and statewide economies will depend on the area flooded, the size of the flooded area, and the length of time before the waters recede. This could range from small local impacts to large scale economic loss.
Public Confidence in the Governance	Public confidence in government will be dependent on the perception of governmental action either taken or not taken, the accuracy of warnings, and response and recovery activities.

3.4.2 – Location

Nebraska has a number of major watersheds and rivers including over 5,000 wetlands, 2,000 natural lakes, and over a 1,000 reservoirs and sandpit lakes. Like most states, many flood problems in Nebraska have their roots in the initial development of communities along watercourses within the state. With its location on the Missouri River, Nebraska played a major role in the westward expansion of the nation. During this time, water was vital for transportation, running mills, and creating power; thus, development took place in close proximity to these water sources. As a result, historical infrastructure and new development near rivers is subject to flood risk. Flooding in Nebraska has the potential to affect both urban areas and rural agricultural areas.

3.4.3 – Previous Occurrences and Extent

This section provides a historical summary of major flooding events in Nebraska along with a summary of the mitigation actions taken to limit future impacts. It should be noted that this summary does not include all locations subject to potential flooding or all flood events. It is intended to show that the risk of flooding is present statewide and has occurred previously in a wide variety of watersheds and stream types.

The NOAA, NCEI database provides a summary of impacts from all flood events between 1996 and June 2020, as presented in **Table 3.4-2**, by local hazard mitigation planning area.**Property Damage and Crop Damage** Data is highlighted in green to illustrate specific impacts between 2018 and 2020, as a comparison to the time period between 1996 – 2017, which is highlighted in light blue. The last two columns, highlighted in orange represent total impacts to the population during the overall time period.

Table 3.4-2: Total Flood Event Impacts, 1996-2020

Total Flood-Related Damages, Deaths, and Injuries, 1996-2020					
LHMP Planning Area	***Total Property Damage (1996-2017)***	***Total Property Damage (2018-2020)***	***Total Crop Damage* (2018-2020)***	***Total Deaths (1996-2020)***	***Total Injuries (1996-2020)***
Blues Plan	$198,080,900	$29,450,000	$16,225,000	1	2
Cedar-Dixon	$53,13	$3,515,000	$2,300,000	0	0
Central Platte NRD	$71,244,000	$50,145,000	$32,975	1	1
Hayes, Frontier, Hitchcock	$4,380,000	$167,000	0	0	0
Lower Elkhorn NRD	$10,635,000	$7,662,000	$238,000	4	0

Lower Loup NRD	$16,424,200	$48,246,000	$17,150,000	0	0
Lower Platte North NRD	$122,175,500	$53,251,000	$3,000	0	0
Nemaha NRD	$15,631,000	0	0	1	1
North Platte NRD	$2,428,000	$3,500,000	$57,000	0	2
Papio-Missouri NRD	$32,566,000	$422,527,000	$354,000	4	1
Perkins, Chase, Dundy	$3,200,000	$445,000	$25,000	0	0
Quad Counties	$7,468,000	$3,724,000	$13,600	0	0
Region 24	$3,454,000	$22,041,000	0	1	0
South Platte NRD	$4,274,000	$244,000	0	0	0
Tri-Basin NRD	$14,683,000	$3,127,000	$26,300,000	0	0
Tri-County	$6,222,000	0	0	0	0
Twin Platte NRD	$4,005,000	$1,009,000	0	1	3
Upper Big Blue NRD	$22,587,000.00	$3,602,000	$27,775,000	0	4
Upper Loup NRD	$795,000	$358,000	0	0	0
TOTALS	***$543,243,6000***	***$623,043,000***	***$90,473,575***	***13***	***14***

** Crop Damage data not collected prior to 2018.*

Source: NOAA/NCEI

The summary data presented in **Table 3.4-2** illustrates the significant impacts from previous flood events in Nebraska, indicating especially the threat to public health and safety. In addition, the significant increase in losses related to property between 2018 and 2020 compared to 1996-2017 emphasizes the increase in the number of flood events impacting the state in recent years as well as the increased vulnerability of property and the agricultural economy.

Table 3.4-3 presents a list of flood events from 1999 to 2020 that have resulted in Federal Disaster Declarations

Table 3.4-3: Nebraska Major Disaster Declarations -Flood (1960-2019)

Event Description	Disaster No.	Year of Declaration
Floods	DR-98	1960
Floods	DR-131	1962
Floods	DR-134	1962
Heavy Rains & Flooding	DR-156	1963
Severe Storms and Flooding	DR-174	1964
Heavy Rains & Flooding	DR-221	1966
Severe Storms and Flooding	DR-228	1967
Floods	DR-303	1971
Floods	DR-308	1971
Severe Storms & Flooding	DR-406	1973
Storms, Ice Jams, Snowmelt & Flooding	DR-552	1978

Severe Storms & Flooding	DR-908	1991
Severe Storms & Flooding	DR-954	1992
Ice Jams & Flooding	DR-983	1993
Severe Storms & Flooding	DR-998	1993
Severe Storms, Ice Jams & Flooding	DR-1902	2010
Flooding	DR-4013	2011
Severe Winter Storm, Straight-Line Winds & Flooding	DR-4420	2019
Severe Storms & Flooding [Ponca Tribe]	DR-4446	2019

Source: 2019 SHMP & FEMA, Disaster Declarations (July 2020)

Table 3.4-4: Summary of Federal Major Disaster Declarations for Flood (DR), 1999-2020

Disaster	Year	Type	# of Counties	PA Funds Obligated
1286	1999	Severe Storm(s)	3	$2,083,481.55
1373	2001	Severe Storm(s)	28	$2,980,398.88
1394	2001	Severe Storm(s)	1	$1,412,395.20
1480	2003	Severe Storm(s)	19	$3,885,476.77
1517	2004	Severe Storm(s)	39	$13,346,024.52
1590	2005	Severe Storm(s)	11	$1,688,473.78
1627	2006	Severe Storm(s)	29	$5,444,137.27
1706	2007	Severe Storm(s)	19	$6,080,866.27
1714	2007	Severe Storm(s)	15	$2,299,628.10
1721	2007	Severe Storm(s)	6	$1,312,491.56
1765	2008	Severe Storm(s)	5	$492,125.86
1770	2008	Severe Storm(s)	62	$36,096,137.77
1779	2008	Severe Storm(s)	4	$12,046,925.54
1853	2009	Severe Storm(s)	17	$4,457,575.56
1864	2010	Severe Storm(s)	7	$5,106,763.94
1878	2010	Severe Storm(s)	58	$6,473,921.01
1902	2010	Flood	37	$3,065,081.07
1924	2010	Severe Storm(s)	61	$49,445,680.57
1945	2010	Severe Storm(s)	7	$2,130,597.69
3323	2011	Flood	18	$ -
4013	2011	Flood	16	$62,444,842.87
4014	2011	Severe Storm(s)	12	$3,344,622.68
4156	2014	Severe Storm(s)	10	$2,635,144.54
4183	2014	Severe Storm(s)	12	$12,068,631.73
4185	2014	Severe Storm(s)	12	$3,782,612.09
4225	2015	Severe Storm(s)	28	$14,048,389.09
4420	2019	Severe Winter Storm, Straight-line Winds & Flooding	83	$143,431,008.01

Source: 2019 SHMP & FEMA Disaster Declarations (August 2020)

Table 3.4-5 provides a summary of historic flood events within each sub-region, including a description of the location, types and causes of flooding, years of significant events and a brief description of a single significant event.

Table 3.4-5: Nebraska River Sub-Regions Summary

Sub-Region	River Information	Flood Types/Causes	Historic Flood Years	Historic Incidents
Missouri River	Flows 384 miles along the northeastern and eastern borders of Nebraska, draining 73,672 square miles within the state	Riverine flooding conditions resulting from high snow pack levels and runoff in the river basin inside and outside Nebraska	1881, 1943, 1952, 1984, 1993, 1996, 2007, 2008, 2010, 2011, 2014, 2018	Record snow pack in the river basin along with record rainfalls in the basin filled the reservoir system resulting in high water releases. Communities experienced record flooding between May and August with over $65 Million in PA grants. Areas along the river such as Nebraska City and Rulo face flooding issues during high water events that occur frequently during spring runoff periods.
Platte River	Flows 318 Miles across the entirety of the state from West to East and drains 30,299 square miles. Connects with the Missouri River near Plattsmouth.	Riverine flooding due to snowpack and runoff in Nebraska, Wyoming, and Colorado. Shallow and winding nature also can result in ice jam flooding.	1935, 1971, 1983, 1993, 1995, 1997, 1998, 2008, 2010, 2011, 2016, 2019	Heavy snowpack and rainfall caused significant flooding along the north branch of the Platte River from Scottsbluff to North Platte in 2011. A record crest of 7.69 feet was measured at North Platte.
Loup River	A major tributary to the Platte River, the Loup River drains 15,094 square miles.	Riverine flooding Flash Flooding Ice jam flooding	1947, 1966, 1969, 1978, 1981, 1993, 1994, 1197, 2010, 2019	Ice jams near Columbus in March of 1993 is estimated as causing $2 million to building not protected by the city's levee system. This levee system was at risk of overtopping and

				evacuations were necessary.
Elkhorn	A major tributary of the Platte River along the northeastern side of the state, the Elkhorn River drains 6,988 square miles. Several communities reside along the river including Norfolk, Pilger, West Point, and Valley before meeting the Platte near Omaha.	Riverine flooding Flash Flooding Ice Jam Flooding	1944, 1947, 1949, 1960, 1962, 1969, 1971, 1978, 1982, 1984, 1993, 1995, 1996, 2008, 2010	Heavy, widespread rain across the Elkhorn watershed caused flooding of the Elkhorn River and its tributaries. From Clearwater down to the confluence with the Platter River flooding set new record crests resulting in millions of dollars in damages to public and private properties.
Big Blue River	The Big Blue River drains 6,146 square miles in the south-central parts of the state.	Riverine flooding Flash Flooding Some Ice Jam Flooding	1973, 1984, 1993, 1998, 2007, 2008, 2013, 2015	The city of Beatrice is the largest populated area along the Big Blue River and several flood events have caused significant damages to the community. Flooding in 1993 damaged or destroyed several city blocks and split the community in half. The May 2015 storm produced damage across several communities were extremely impacted including 4 feet of water through the town of DeWitt
Salt Creek	The Salt Creek Watershed lies nearly all within the boundaries of Lancaster and Saunders Counties and drains around 1,647 square miles. The urban area of Lincoln is primarily drained by the Salt	Riverine Flooding Flash Flooding	1950, 1951, 1958, 1963, 1973, 1984, 1987, 1993, 2004, 2007, 2008, 2010, 2014, 2015, 2017	In May of 2015, record rainfall fell across the watershed. Levees came within one foot of overtopping and evacuations occurred. During this storm two individuals died due to flood waters.

	Creek and its tributaries.			
Other Watersheds	There are numerous other smaller channels and tributaries across the state that are vulnerable to flooding.	Riverine Flooding Flash Flooding		

In 2019, precipitation and flooding in the state reached historic levels, especially in the Missouri River Basin. The publication, "Extreme Wetness of 2019 – A Retrospective", produced by the High Plains Regional Climate Center, University of Nebraska-Lincoln, dated April 2020, provides substantial details about the record-setting events on the Missouri River and its tributaries. The report indicates that trends show Basin-wide precipitation has increased by about 8 percent since 1895 and is primarily linked to seasonal increases of 14% in both the spring and autumn. Another trend noted the greatest increases to be in the eastern areas.

Numerous precipitation records were set in 2019, on daily, monthly, seasonal and annual time scales. In some areas, records were set for consecutive days above flood stage, including these Nebraska locations:

- Rulo - 272 days
- Brownville and Napolean - 271 days
- Nebraska City – 270 days

The multiple flood events of 2019 resulted in a total of 300 days in flood throughout multiple states.

March 2019 Flood Event - Nebraska

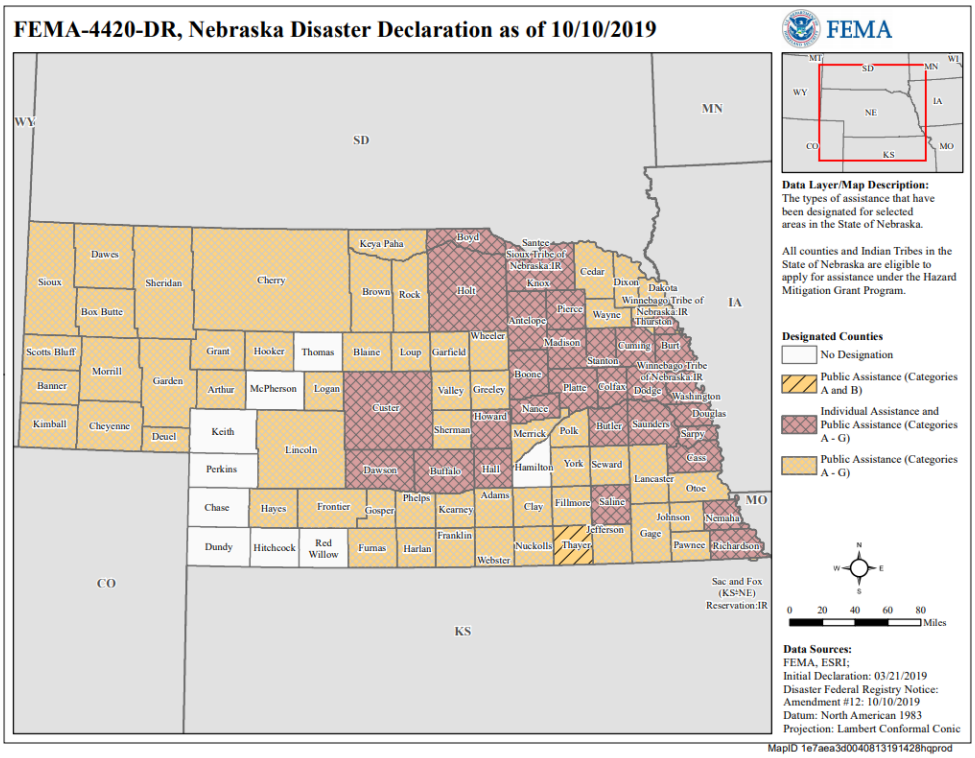
Federal Disaster Declaration DR-4420 – Nebraska, declared March 21, 2019
One of the most recent significant weather events that resulted in major flooding state-wide occurred between March 9 and April 1, 2019 and resulted in two Federal Disaster Declarations, one for the State of Nebraska and one for the Ponca Tribe. Starting in March with a "bomb cyclone" event, rapid snow melt as temperatures warmed and rain falling over a 48-hour period initiated the flood event. Due to the frozen ground and one to two feet of thick ice remaining in area rivers, catastrophic flooding occurred. The devastating floods caused numerous levee breaches over more than 350 miles of levees along the Missouri, Elkhorn and Platte Rivers, and failure of the Spencer Dam along with privately owned dams. The flood damage devasted communities. Four individuals lost their lives, several hundred people had to be rescued by air or boat, and tens of thousands were evacuated. Over the multi-day

event, more than 50 record river crests were documented, along with more than 125 precipitation records.

Nebraska Governor Pete Ricketts presented US$1.3 billion preliminary damage estimates for the entire state, including specific sector losses of:

- *$439 million infrastructure (including roads and bridges)*
- *$85 million private homes and business losses*
- *$400 million livestock losses*
- *$440 million crop losses*
- *About 2,000 miles of state roads including 15 Nebraska state highway bridges and numerous local bridges, roughly 20 percent of the entire state road system were impacted.*
- *U.S. Interstate 29, extending north-south along the Missouri River, was inundated and partially destroyed, as was the Interstate 680 bypass around Council Bluffs-Omaha metropolitan area*
- *Also noteworthy was damage to Offutt Air Force Base located near Bellevue, Nebraska. One-third of the base's main runway was inundated, along with one-third of Offutt's buildings, with several hundred employees, and several families displaced. Preliminary damage estimates released by the Department of Defense are on the order of $450 million.*
- *Nebraska and Iowa severe flooding impacts culminated in Federal Disaster Declaration DR-4420.*

The map below depicts the statewide impact from the March 2019 flood event, including the types of assistance that were designated for selected areas within the state. All counties and tribes in the State were eligible to apply for assistance under the Hazard Mitigation Grant Program.



As of October 10, 2019, a total of $143,355,177.16 in total Public Assistance Grants Dollars had been obligated, with $17,339,006.61 for Emergency Work, and $115,723,455,40 for Permanent Work. In addition, 3,428 Individual and Households Program applications had been approved, totaling $27, 274,186.25.

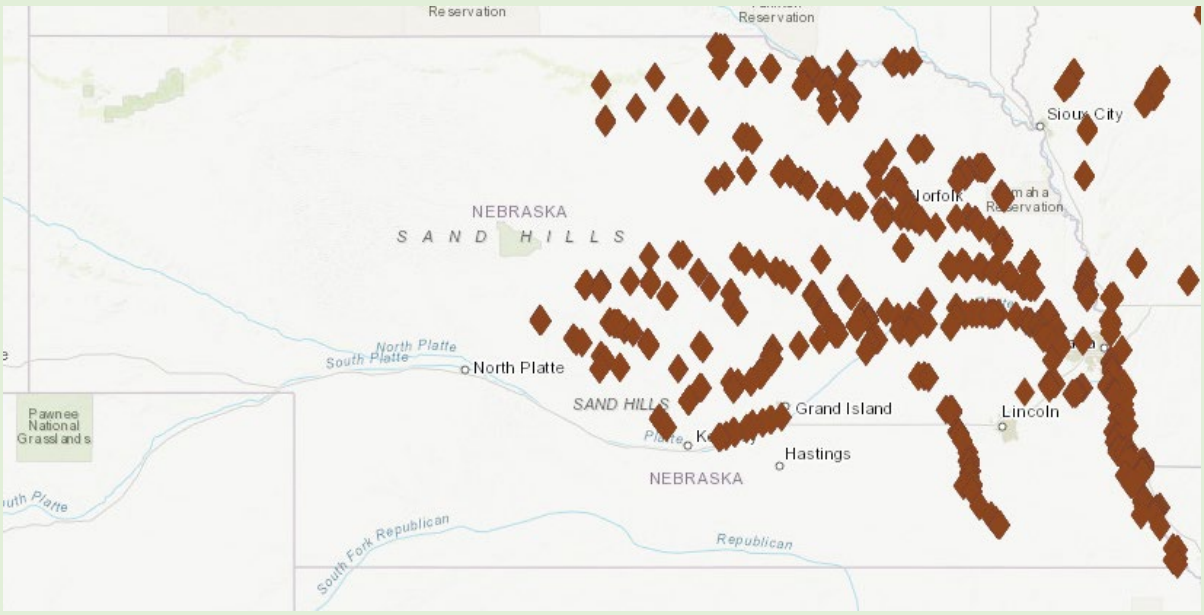
High Water Marks

High water marks represent a point of maximum rise of a body of water over land. Federal regulations (33 CFR 328.3e)) define the “orginary high water mark” (OHWM) as “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line imprint on the bank, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. An ordinary or “average” high water mark is one that can be expected in non-flood conditions. In the case of flood conditions, a high water mark is not necessarily an actual physical mark, but it is possible for water that rises to a high point to leave a physical impression, or “staining”. In many places, the U.S. Geological Survey (USGS) maintains a network of real-time stream stage monitoring gages to continuously monitor stream heights under various conditions. In places where the USGS does not have real-time stream monitoring equipment, it uses high water marks to measure the maximum height (stream stage) of a flood or high water event. This information can be used to estimate how much land alongside a stream will be inundated at various

stream levels, informtion that is critical in developing maps and data concerning the impact of floods on the adjacent landscape, structures and people.

The USGS-produced map in Figure 3.4 indicates the number of high water marks established during and immediately following the 2019 flood event in Nebraska.

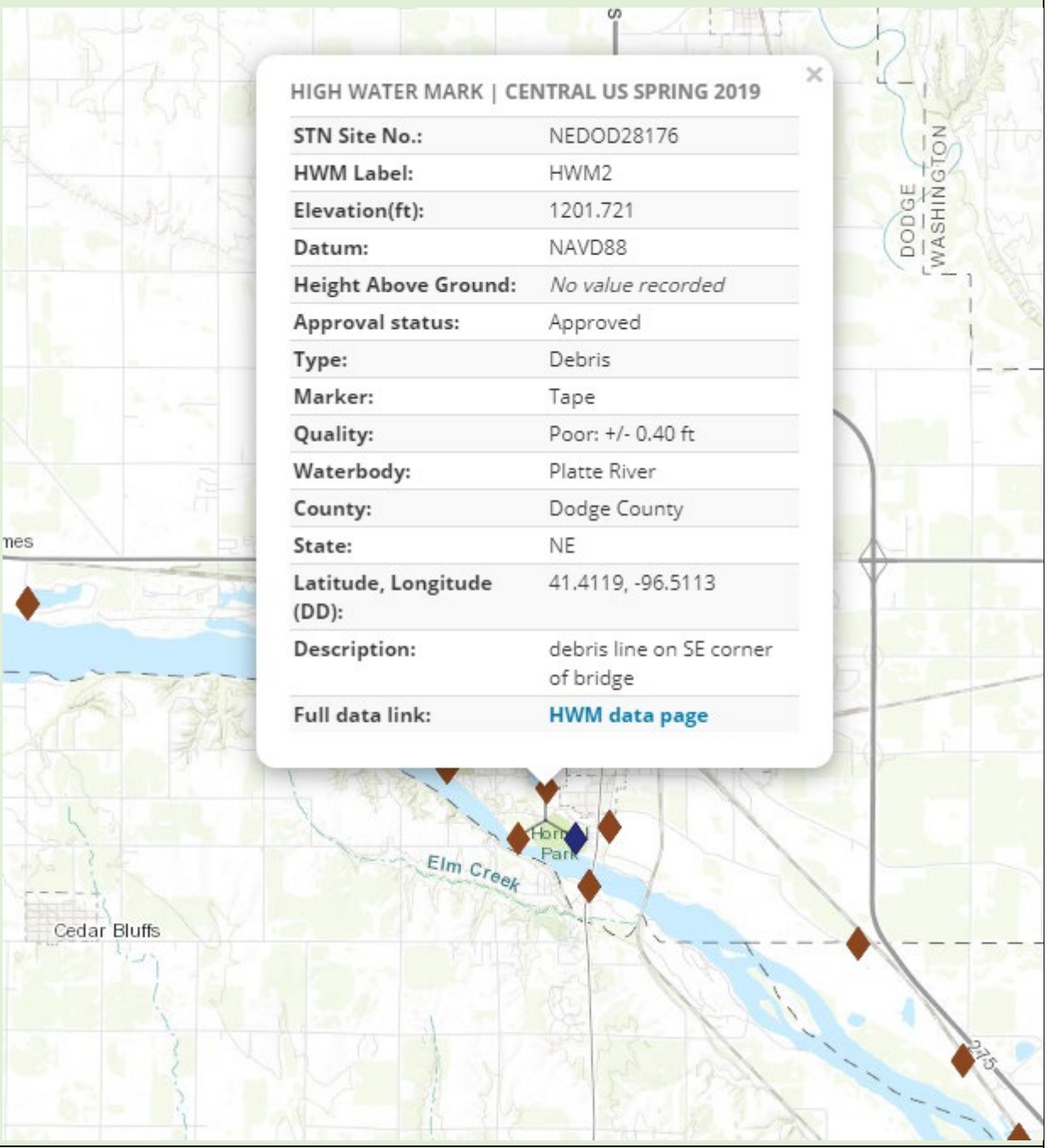
Figure 3.4-a: Nebraska High Water Marks, Central US Spring Flood 2019



Source: USGS Flood Event Viewer. https://stn.wim.usgs.gov/FEV/#CentralUSSpring2019

Each map symbol presents the high water mark data at that point. By zooming and clicking on the point, a summary of the location is described along with a link that provides the high water mark information. Additional information is available by clicking on the "HWM data page" link.

Figure 3.4-b: Random Selection of High Water Mark Data on Platte River, May 22, 2019, Dodge County, NE



Source: USGS, available at: https://stn.wim.usgs.gov/FEV/#CentralUSSpring2019

After-Action Summary

On April 24, 2019, the Nebraska Emergency Management Agency (NEMA) and FEMA Region VII hosted a multi-jurisdictional and multi-agency conference to review preparedness, response, recovery and mitigation actions related to the March flood event.[4] Additional meeting objectives included: sharing information on how the disaster changed statewide risk and vulnerability; addressing and prioritizing identified issues; establishing a framework to align recovery and mitigation efforts; and identifying opportunities for inter-agency cooperation to support statewide mitigation efforts. More than 65 representatives from 23 Federal, State and local agencies and organizations participated in the meeting. Key issues identified during the meeting have been evaluated as potential state-level mitigation actions in developing the mitigation strategy for this plan update.

Key Issues

- Widespread and record levels of flooding have significantly altered river channels and floodplains, resulting in existing floodplain maps likely being incorrect and needing revision.
- Jurisidction previously protected by levees that failed as a result of flooding may be unable to re-build and re-accredit levees, placing significant portions of cities and towns in floodplains.
- Many jurisdictions lack adequate flood control structures, or their flood risk has changed, resulting in the need for new flood control structures.
- Comprehensive information about dam failures, dams at risk of failure, and downstream impacts is not widely available.
- Flooding impacted existing natural, cultural and historic (NCH) properties and archeological sites. Also, recovery activities that include ground disturbance could unearth or disturb other NCH sites.
- State law prohibits the repair/reconstruction of substantially damaged structures for human habitation in mapped floodway. Homeowners in this category will be significantly impacted as they will not be able to use Individual Assistance (IA) or insurance claims to repair their homes.
- A central repository or clearing house of risk assessment information is needed. Geocoding data when possible allows it to be shared and consumed by a variety of agencies and can achiev emultiple benefits. This includes all information gathered to dat for disaster response (e.g., Public and Individual Assistance Preliminary Damage Assessment (PDA) survey, IA inspections, NFIP Claims data, PA Project locations, etc.)

[4] *2019 Nebraska State Hazard Mitigation Stakeholder Meeting: After Action Report* (DRAFT), undated.

- Opportunities exist to incorporate risk assessment information into PA projects to support benefit-cost analyses (BCA) for 406 projects, maximizing mitigation and resiliency for infrastructure restoration.
- The opportunity for the Nebraska Department of Economic Development to partner with other agencies to make best use of existing CDBG grant funds was noted as a means to psotiion future funds to support recovery and mitigation.

Key Themes

- Importance of public outreach to inform citizens of risk
- Collaboration and partnerships
  - Data Sharing
  - Leveraging funding and resources
- Historial data related to locations of past investments and expenditures

Additional information related to local impacts from the March 2019 event is included in Section 3.4.6 (below).

3.4.4 - Probability of Future Events and Impacts of Climate Change

The probability of floods occurring in Nebraska on an annual basis are extremely high and it is virtually guaranteed at least some counties will experience flooding in a given year. Historically, Nebraska has experienced multiple flood events per year, as portrayed in the data from 1996 – 2020 presented in **Table 3.4-4.** However, it should be noted that flooding in Nebraska typically affects small geographic areas and is often associated with a particular body of water and low-lying lands. It is not typically widespread across large areas of land.

Based on the historic occurrence of flooding in Nebraska, it can be estimated the recurrence interval for flood/flash flood is annually, indicating a 100 percent chance an event will be equaled or exceeded within that time period.

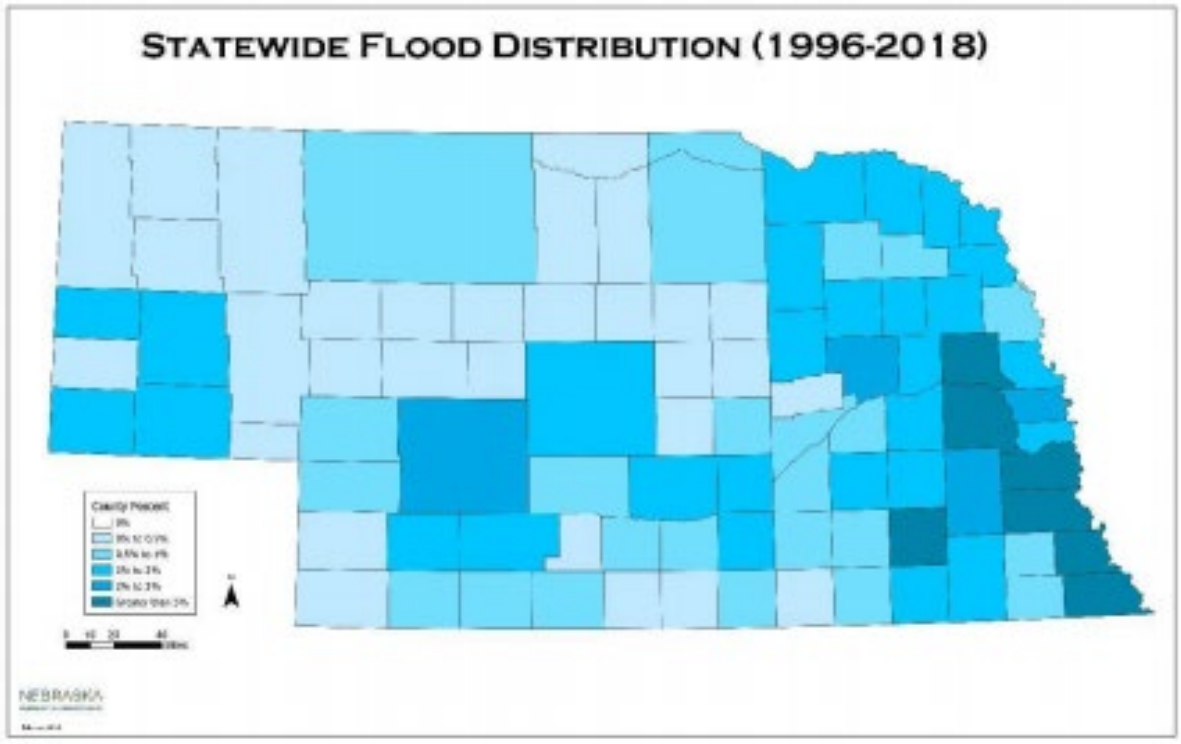
Predicting flooding depends on the ability to forecast fundamental meteorological surface parameters. Based on the historical record, climate is inherently variable making it difficult for climate scientists to predict long-term precipitation models. The publication, Understanding and Assessing Climate Change: Implications for Nebraska (University of Nebraska-Lincoln), dated September 2014, state that there is a large degree of uncertainty related to impacts of climate change to precipitation for regional and smaller; however, agreement among modeling studies along with the understanding of the temperature-atmospheric moisture relationship leads to the conclusion that there is virtual certainty the global mean precipitation will increase in the long term. There have already been observed changes in precipitation, and projected changes are expected to vary considerably across the globe and by season. General consensus is that wet areas will become wetter with some regional and seasonal deviations. In addition, the publication provides the following statement related to the potential for more extreme events:

> *Scientists predict that it is likely that heavy precipitation events will increase in frequency, intensity, and amount in response to warmer temperatures. Additionally, El Niño is expected (with high confidence) to remain the dominant mode of climate variability, and associated precipitation variability is expected to intensify, though specific regional responses may vary.* (Understanding and Assessing Climate Change, p. 27)

As storms become more frequent or severe the risk of flooding also increases depending on the location of storms.

Figure 3.4-c illustrates the proportion of flood and flash flood events statewide that have occurred in a given county. This map was not updated for the 2021 SHMP as the proportion of events by county has not significantly changed since 2018.

Figure 3.4-c: Statewide Flood Distribution (1996-2018)



Source: 2019 Nebraska State Hazard Mitigation Plan

Figure 3.4-c shows that every county in Nebraska has experienced flooding between 1996 and 2018, and more importantly, has incurred some amount of damage as a result (NOAA, NCEI). From this map, and additional data from the 2019 flooding, it is evident that the eastern third of the state experiences the most flood disasters and has the highest population concentrations. With the disaster history and population trends, it is reasonable to expect that the eastern third of Nebraska will continue to experience a disproportionately higher frequency of flood events and disasters than the rest of the state. These counties and communities also tend to be exposed to the greatest potential economic losses due to higher concentrations of critical

infrastructure and housing developments. With changes in climate, heavy rain events are likely to increase. As storms become more frequent the risk of flooding also increases depending on the location of storms.

3.4.5 – Local Plan Data

Flooding is a highly damaging event with a high probability of occurrence across all districts. For this reason, flooding is identified as a priority consideration for mitigation. Review of all LHMPs indicate support for actions that include evacuation plans and promoting flood insurance for residents and business owners. Vulnerable populations vary in proportion to overall populations; however, they are consistently identified within the categories of low-income, minority, low mobility, elderly, and those outdoors during a flooding event. Additionally, residents with homes inside of flood zones must be accounted for. Special considerations should be made in all mitigation actions to ensure equitable access to assistance and protection for these residents as they make up the majority of affected population during all types of flooding disasters.

Additionally, agriculture is a large portion of Nebraska economy. Flooding events that may not impact a community directly can cause severe impacts to farm operations including the loss of livestock, crops, buildings, and equipment. Areas along creeks and rivers are vulnerable to low land flooding. Other indicators of potential vulnerability include NFIP flood insurance policy and claims data and repetitive loss data. Analysis of this data provides insight into the loss trends of higher population areas in Nebraska that also correlate with areas of increasing development pressure as noted in previous sections.

Examples of local mitigation actions previously taken are evacuation plans, land use regulations, public education programs, encouraging citizens and business owners to purchase flood insurance, participation in NFIP, removal of structures in flood prone areas, elevation or retrofit of structures, and preservation natural open space in floodplains.

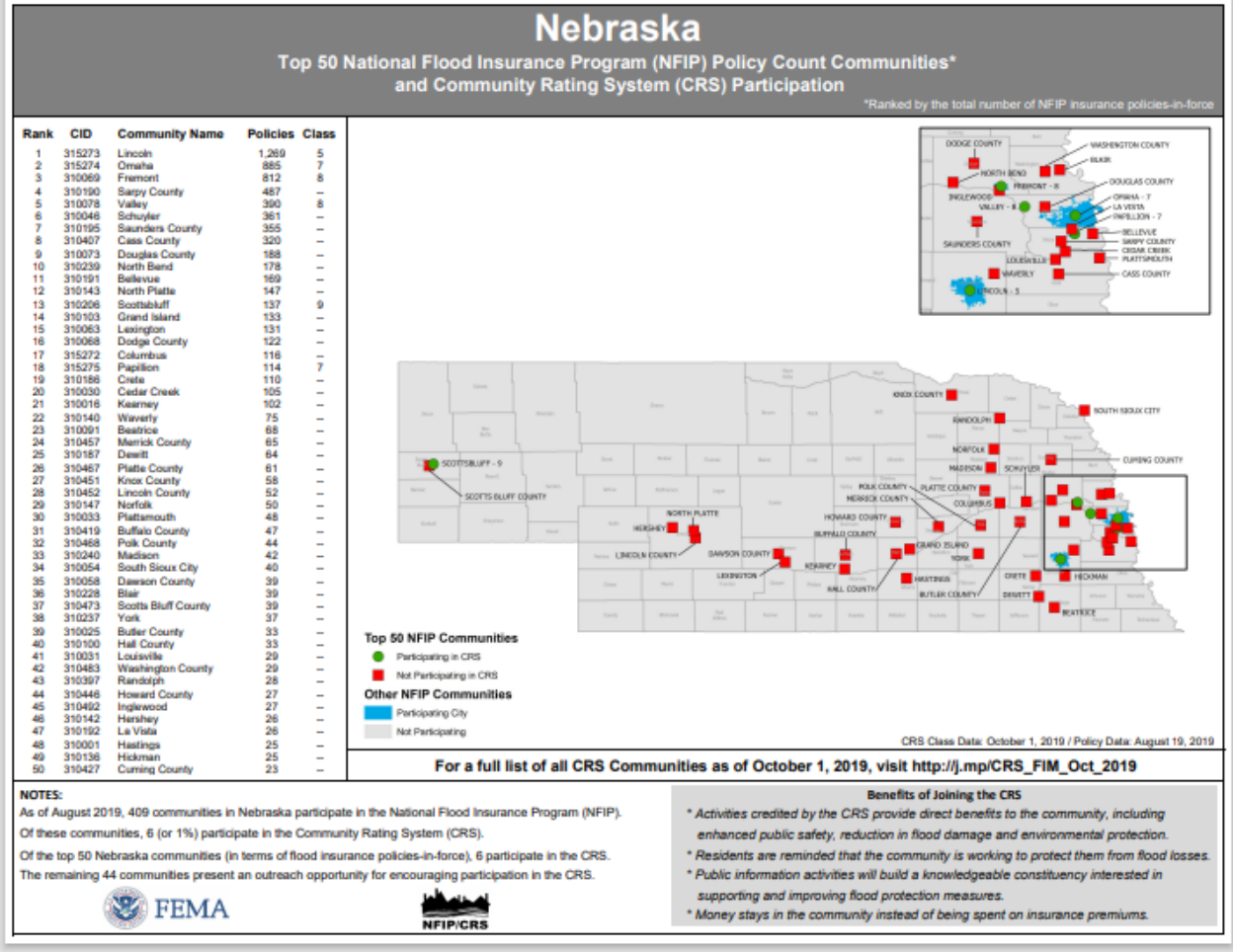
Local Participation in the National Flood Insurance Program

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to provide a means for property owners to financially protect themselves from flood damage, since standard homeowner's insurance does not cover flooding. The Nebraska Department of Natural Resources (NeDNR) manages the NFIP program for the state and provides the following statistical data related to current NFIP coverage in the state:

- 409 Nebraska communities (counties and municipalities) participate in the NFIP
- There are 10, 582 policies covering structures and contents for residential homes and businesses
- There is $2 billion in coverage of structures and contents for residential homes and businesses
- Nearly $43 million in payouts for flood insurance claims have been made since 1978
- Of the top 50 communities in terms of policies-in force, 6 (1%) participate in the Community Rating System (CRS) saving policyholders $700,000 annually.
- The remaining 44 of the top 50 communities present an outreach opportunity for encouraging participation in the CRS.

Figure 3.4-d depicts the top 50 communities in the state with the largest number of policies in force. Six of these communities already participate in the CRS program and their citizens are already enjoying a discount on their NFIP flood insurance premium. The City of Lincoln is a Class 5 with over 1200 policies in force, each of those policyholders are enjoying a 25% discount on their flood insurance premium. The City of Omaha has over 800 policies and enjoys a 15% discount. The majority of communities with a high number of policies do not participate in the CRS program.

Figure 3.4-d: Top 50 NFIP Policy Count Communities and CRS Participation, as of October 2019



Source: FEMA, https://crsresources.org/files/100/maps/states/nebraska_crs_map_october_2019.pdf

3.4.6 – Jurisdictional Vulnerability and Potential Losses

All jurisdictions are vulnerable to flood. Flooding can cause the loss of life and property. As a component of the 2021 SHMP update, potential dollar losses for vulnerable structures documented in each Local Hazard Mitigation Plan (LHMP was captured during the plan reviews. The following five LHMPs demonstrate the highest potential dollar losses from flood for vulnerable structures:

- Lower Platte South Natural Resources District - $107,091,000
- Papio-Missouri River Natural Resources District - $29,334,000
- Little Big Blue-Lower Big Blue Natural Resources District - $21,295,900
- Central Platte Natural Resources District - $20,224,000
- Lower Elkhorn Natural Resources District - $10,504,000

The LHMPs identify vulnerabilities in relation to the following categories. Specific vulnerability data related to each category is located within the LHMPs.

People

The people at greatest risk are the disabled and elderly because of mobility issues, low income, minority, residents in low lying areas, and residents in floodplains.

Economy

Businesses in the inundation areas are at risk for damages and would be closed for an extended period of time. As an effect of business closures, employees would be out of work. Additionally, agricultural losses due to flooded fields may cause long-term economic impacts.

Built Environment

Homes and businesses are both at risk for damage from flooding.

Infrastructure

Transportation Routes, including road and rail segments and bridges, are at risk for inundation and damage.

Critical infrastructure

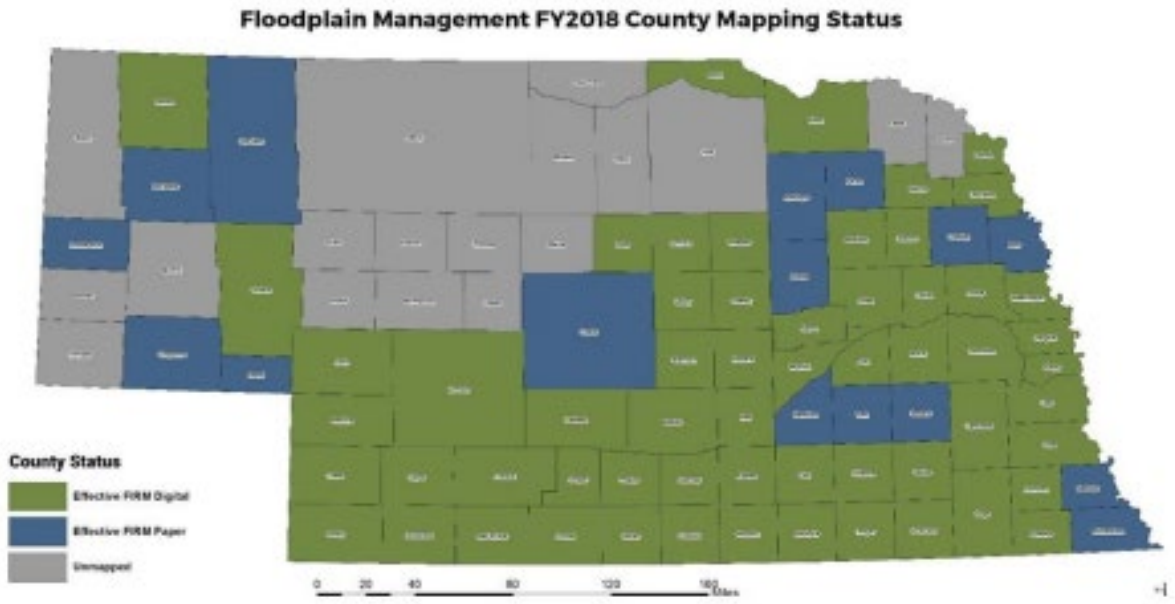
Critical facilities are at risk to be damaged or destroyed.

National Flood Insurance Program

As of August 2019, 409 communities in Nebraska were participating in the National Flood Insurance Program (NFIP). Of these, six (6) communities, or 1 (one) percent, participated in the Community Rating System (CRS). This represents an outreach opportunity for State and Local hazard mitigation planners.

Figure 3.4-e illustrates the Flood Insurance Rate Map status, by County. The FY2018 data is still current as of 2020.

Figure 3.4-e: County FIRM Mapping Status, 2020



Tables 3.4-6 and 3.4-7 provide a summary of the top ten counties for NFIP coverage and NFIP claims from 1978-2020.

Table 3.4-6: Top Ten Counties for Flood Insurance Coverage in Dollars, 1978-2020

County	Number of Policies	Total Coverage
Douglas	1,471	$352,306,800
Lancaster	1,268	$291,715,70
Sarpy	813	$212,729,900
Dodge	1,186	$194,666,200
Cass	543	$125,141,700
Saunders	424	$109,633,100
Buffalo	235	$65,093,800
Platte	242	$64,614,700
Lincoln	224	$48,696,900
Dawson	204	$42,433,500

Source: NeDNR

Table 3.4-7: Top Ten Counties for Flood Insurance Claims, 1978-2020

County	Number of Claims	Total Claims
Sarpy	1,271	$23,343,695
Douglas	896	$12,394,724
Dodge	873	$11,619,9938

Cass	493	$9,319,457
Buffalo	64	$6,262,796
Saunders	315	$4,564,107
Madison	71	$3,411,238
Washington	168	$3,304,614
Lancaster	298	$2,890,964
Richardson	98	$2,520,928

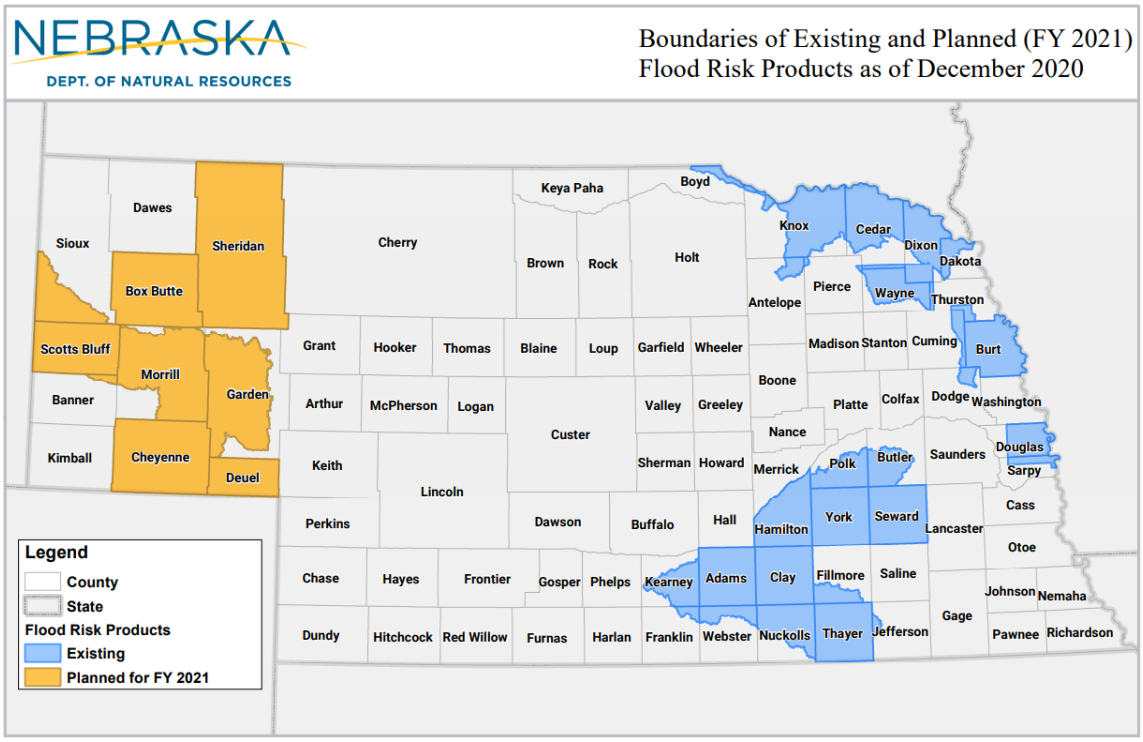
Source: NeDNR

Flood Risk Products

Since the 2019 flood event, the state has initiated additional flood risk activities to assist in identifying areas at risk to future floods. The Nebraska Department of Natural Resources maps the status of existing Flood Risk Products to document progress towards this goal. Information gained from this project will help communities to visualize and convey their local flood risk to property owners, community planners and developers, real estate and insurance specialists and other community decision-makers.

The status of this project will be reviewed and updated during annual plan maintenance activities.

Figure 3.4-f: Boundaries of Existing and Planned (FY 2021) Flood Risk Products, as of December 2020



Source: Nebraska Department of Natural Resources. Floodplain Management; accessed at:

https://dnr.nebraska.gov/floodplain/interactive-maps *[Existing map only - FY 2021 Map is not yet published.]*

3.4.7- Vulnerability of State Assets and Potential Dollar Losses

Several state-owned and operated structures are known to be in NFIP designated floodplains. The replacement dollar value of these structures is estimated to be over $300 Million. This does not include the cost of the relocation of employees and equipment and the use of alternate sites. These additional costs would depend on the individual factors of each site but could be significant.

Most of the state's bridges are located in floodplains. The Nebraska Department of Transportation maintains information on bridges including inspection records, maintenance, and plans for alternate routing of traffic.

Table 3.4-8: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.4.8 – Flood Mitigation

Mitigation projects and programs occur at the local and state levels, which means that an analysis of mitigation programs and measures must be conducted via flood mitigation planning in order to show that effective flood mitigation programs are maintained in Nebraska. A comprehensive statewide flood mitigation strategy is vital for reducing or eliminating the impacts of flood disasters in Nebraska.

FEMA defines flood mitigation as "any sustained action that reduces or eliminates long-term risk to people and property from the effects of floods." While most mitigation measures are put in place after a dramatic disaster experience captures public attention, the most effective flood mitigation activities seek to address a jurisdiction's flood problem before a flood occurs. Mitigation is a cost-effective way to reduce or eliminate flood losses and the recovery costs individuals, businesses, and government must pay. Besides reducing the direct costs associated with natural hazards, mitigation reduces important indirect costs, such as the

disruption of daily routines, community services, commerce, and industry. Mitigation has gained in popularity because it ends up saving money over the long-term since mitigation projects are a one-time expense compared to potentially multiple future disaster assistance payments.

There are two types of basic flood mitigation projects: ***structural*** and ***nonstructural***. As the name implies, structural techniques seek to build structures in order to change or "control" the physical environment; thus, common techniques are dams, levees, or floodwalls.

Throughout the last century, national flood losses continued to increase despite the expenditure of billions of dollars for structural flood control. As a result, nonstructural solutions became preferred alternatives. Instead of modifying the physical landscape, nonstructural solutions encourage approaches that adapt development to the characteristics of the flood rather than modifying the flood. Examples of nonstructural flood mitigation activities are stricter floodplain zoning ordinances, flood warning systems, flood insurance, acquiring or elevating vulnerable structures, and flood proofing.

In recent years, successful mitigation projects across the state and upstream of the state have reduced losses to the state's communities. Several partners including local governments, state agencies, and federal agencies have been critical to these successes.

Dams and levees along the Missouri River, Platte River, and several others have been successfully in place for decades. Dams store runoff and regulate flows. The Missouri River dam and reservoir system provides flood control as the Kingsley dam and other smaller dams in Wyoming operate on the Platte River. Countless other dams regulate floods across many of Nebraska's streams and rivers.

One of the ultimate mitigation measures successfully used across the state is acquisition and removal of flood prone structures. Local governments and NRDs have completed acquisition projects in communities including Bellevue, Blair, Norfolk, Beatrice, and Seward. The removal of such properties significantly reduces the costs and resource requirements on governments by providing open space that allows water to move through with creating damage.

The City of Beatrice, located along the Big Blue River, is a chief example of flood mitigation. After the 1973 flood that split the city in two, the community came together to address flood risk. Over the next 45 years, Beatrice secured mitigation funding from several sources including HMGP, FMA, and HUD along with private contributions. Mitigation included property acquisition and the creation of open green space. An analysis using HAZUS and a 2015 flooding event estimated a flood loss avoided of $12.9 million and resulting in a 263% return on investment.

Several projects have been completed or are in progress to improve the drainage ways of creeks. Along the Antelope Creek corridor, which drains a large area of the state capital, a large number of buildings were placed in an area that was in a floodplain along with being listed as an impaired stream. Mitigation came in the form of a comprehensive solution. The channel was

reshaped and improved to allow higher flows to remain within the creek area. Flood resistant landscaping and hardscaping allowed for trains and park space thereby beautifying the community. The end result is a source of community pride and the removal of over 1000 homes and 330 businesses from the floodplain. Additionally, water conditions improved to the level that it was removed from impaired stream status in 2017.

The U.S. Army Corps of Engineers awarded a contract for $58 million in December 2019 to complete final repairs for the Missouri River Levee System, allowing the Corps to meet its Congressionally authorized level and reducing the flood risk along the levee system (https://www.nwo.usace.army.mil/Media/News-Releases/Year/2019/).

Similar flood control projects are also under way in Lincoln. Deadman's run is undergoing the initial phases of a channel reconstruction project to reduce flooding and shirk the floodplain surrounding it. The 56th and Morton street flood reduction project pairs the city, NEMA, and local businesses owners together to clean and reshape the drainage corridor in an industrial area. Utility and road improvement projects are being conducted in time with the project to increase the effectiveness of mitigation.

The Nebraska Silver Jackets Program acts as an interagency work group for planning and implementing projects addressing flood risk. Each state and federal agency contributes a piece to a complete solution leveraging resources, technical skills, and data. Some Silver Jackets activities have included:

- Workshops and outreach
- High water mark fact signs placed to highlight significant floods in various locations
- Systems modeling
- Nonstructural flood risk mitigation assessments for communities

NeDNR is engaged in several ongoing mitigation activities related to flood mitigation, repetitive loss structures, and severe repetitive loss structures. These include:

- Verifying information on properties identified as repetitive loss and severe repetitive loss Lists
- Providing technical assistance to communities related to the Community Rating System (CRS). This includes requirements addressing RL and SRL properties.
- Joint projects to survey properties and updating NFIP RL databases as applicable.
- Participating in local hazard mitigation plan development.

Recent completed flood mitigation projects (Flood Mitigation Assistance grants) include:

- Arlington Buyouts – Total Project $208,686.22
- Parcel Level Flood Risk Assessment and Mitigation Plan for Deshler, NE – Total Project $32,788.75)

3.4.9 - Future Population and Development Trends

One of the primary indicators of vulnerability for a particular part of a state is an analysis of population growth trends and population density. Typically, in areas of rapid increases in population increases there are related increases in development. The majority of Nebraska counties are seeing a decrease in population with the counties with the largest populations seeing slight increases.

As noted in the *Papio-Missouri River Natural Resources District Multi-Jurisdictional Hazard Mitigation Plan,* dated February 2016, the State of Nebraska has adopted floodplain regulations that are more restrictive than the NFIP minimum standards. Further, the plan states:

> *"Nebraska's minimum standards for floodplain management require that all new construction and substantial improvements of residential structures shall have the lowest floor (including basements) elevated to or above one foot above the base flood elevation. The national standard is that new or substantially improved structures shall have the lowest floor elevated to or above the base flood elevation. Additionally, Nebraska does not allow new structures for human habitation to be built in the floodway. The more stringent requirements for the State of Nebraska will help reduce flood impacts and damages by requiring a one foot "freeboard" to allow for known flood hazards. This requirement for Nebraska will also result in lower premiums for those participating in the NFIP."* (Papio-Missouri River NRD Hazard Mitigation Plan)

3.4.10 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to flood/flash flood as well as other information from the Local Hazard Mitigation Plan updates:

- Have any flood/flash flood events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict flood/flash flood events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to flood/flash flood?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to flood/flash flood?

3.4.11 - Data Sources

- 2019 Nebraska Hazard Mitigation Plan
- *2019 Nebraska State Hazard Mitigation Stakeholder Meeting, After-Action Report* (DRAFT), April 2019
- FEMA
    - Community Rating System, https://crsresources.org/files/100/maps/states/nebraska_crs_map_october_2019.pdf

  - Declarations Website, https://www.fema.gov/disasters/disaster-declarations
- Nebraska Department of Administration, Risk Management
- *Papio-Missouri River Natural Resources District Multi-Jurisdictional Hazard Mitigation Plan,* February 2016
- U.S. Army Corps of Engineers,
  - High Water Marks,
  - (https://www.nwo.usace.army.mil/Media/News-Releases/Year/2019/).
- United States Geological Survey
  - High Water Marks, Central US Spring 2019. Retrieved at: https://stn.wim.usgs.gov/FEV/#CentralUSSpring2019

SECTION 3.5 HUMAN INFECTIOUS DISEASE

2021 Plan Update

Due to the worldwide "COVID-19" outbreak of a novel coronavirus and the statewide impacts experienced in Nebraska, the Governor's Task Force for Disaster Recovery (GTFDR) added this hazard section to this plan update. Data related to the COVID-19 outbreak is dynamic; consequently, statistical information within this section related to this outbreak is based on a set timeframe. It will not be updated on any pre-determined schedule. Updates during the planning cycle will be considered during the scheduled monitoring, evaluation, and update process outlined in **Section 5.**

The intent of this section is not to supplant any previous, current, or future planning efforts by state and local public health officials and other agencies but to provide context to support those efforts with a mitigation focus.

Hazard	Definition and Key Terms
Human Infectious Disease	A disease that is caused by a microorganism, such as a bacterium, virus, or protozoan, that is not normally found in the body and is capable of causing infection. Some, but not all, infectious diseases are contagious, meaning they can spread from person to person. Other infectious diseases can spread from animals or insects to humans, but not from person to person. *(National Institutes of Health)*

3.5.1 - Hazard Characteristics

Humans are susceptible to various types of infection, most of which can be successfully managed through appropriate and timely medical surveillance, evaluation, and private care.

Infectious disease outbreaks occur worldwide and are one of the leading global causes of death. The cause, nature, and treatment of each disease differ. Still, all create increased demand on health and medical resources and other government services that could potentially impact citizens' safety and security in every community in the State.

The 1918 Spanish Flu infected 28% of all Americans. An estimated 675,000 Americans died of influenza, ten times as many as in World War 1. (The Influenza Pandemic of 1918, Stanford University, https://virus.stanford.edu/uda/)

Over twenty well-known diseases – including tuberculosis (TB), malaria, and cholera – have reemerged or broadened geographically since 1973, sometimes in more potent and drug-resistant forms. At least 30 previously unknown disease agents have been identified since 1973, including HIV/AIDS, Ebola, and Nipah virus, for which no cures are currently available. Of the seven (7) prevalent killers worldwide, TB, malaria, and hepatitis continue to surge, with TB and HIV/AIDS likely to account for the overwhelming majority of deaths from infectious diseases in developing countries by 2020.

Zoonotic diseases originate with animals but are transmitted to humans. Examples are the Ebola virus, influenza (bird or swine flu), coronavirus (possibly bats), bacteria, fungi, and parasites. Of 1,415 pathogens known to infect humans, 61 percent are zoonotic.

Emerging diseases may be transmitted by an infectious agent or microbial toxin. These include but are not limited to the Ebola virus, enterovirus D68, Middle East Respiratory Syndrome (MERS), legionella, and Zika virus. Transmission of infectious diseases occurs by the following primary modes:

- Airborne (Aerosol/droplet) transmission (inhalation)
- Biological transmission (ingestion)
- Contact transmission (through skin/fluids)

The spread of infectious disease is affected by changes in human behavior, including land-use patterns, increased trade and travel, and inappropriate use of antibiotics.

Viral Diseases

Understandably, human infectious disease outbreaks routinely occur in any human population. Fortunately, most viral outbreaks are limited in their spread through surveillance and monitoring systems and procedures that immediately identify the virus and initiate containment measures. Outbreaks are more likely to occur when a novel (new) virus appears in a population and may result in widespread infection that reaches epidemic or even pandemic proportions.

One such event, the influenza pandemic of 1918 to 1919 (known as the Spanish Flu or "La Grippe"), resulted in an estimated 20 to 40 million fatalities worldwide. It also killed more people than the bubonic plague (Black Death) between 1347 and 1351. Although studies of the Spanish Flu provide great insight into how influenza viruses spread and how they can be controlled, the potential for epidemics and pandemics is greater today than in past years given the extent of world travel and novel or new viruses that emerge over time.

Studies of the transmission patterns of the Spanish Flu of 1918 and 1919 linked outbreaks to returning soldiers who brought the initial wave of influenza to military camps throughout the U.S. The path of the infection followed trade routes and shipping lanes. It was thought to be more severe in humid climates, such as those found in southern port cities. Studies of the Spanish Flu and other epidemics prompted the development of the preventive health methods integral to the current public health system.

Public health and medical systems track the emergence of many infectious diseases, as well as chronic conditions that may lead to mortality, such as tobacco use and obesity.

Emerging diseases create new challenges for and demands on the country's healthcare system. This has never been more evident than in the ongoing “**COVID-19**” coronavirus disease

outbreak caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) first documented in December 2019 in Wuhan, China. While the first case was traced to December 1, 2019, in Wuhan[5], it wasn't until December 31 that China reported a cluster of cases to the World Health Organization (WHO). Resulting conditions attributed to the COVID-19 outbreak include a severe global socioeconomic disruption. Countries around the world have experienced:

- Widespread shortage of medical supplies and equipment (personal protective equipment, ventilators, medications, etc.)
- Implementation of "social distancing" measures leading to canceling or postponing public events such as religious services and sports, political and cultural events.
- Temporary closure of "nonessential" businesses (resulting in more than 16 percent[6] unemployment in the U.S.)
- Closure of schools, universities, and colleges, affecting 98.5 percent of the world's students
- Widespread reports of unreliable or conflicting scientific guidance and information provided to the public

As of June 12, 2020 – just six months since the first cluster of cases was reported to WHO – the United States reported a total of 2,016,027 cases, resulting in 113,914 deaths (Centers for Disease Control and Prevention, https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html). By this date, the death toll in the United States had already exceeded that of the entire Vietnam War in the 1960s and 70s.

As of the same date in June 2020, Nebraska, while reporting slightly lower case numbers and fatalities (16,315 cases and 212 deaths) when compared with many other states, was experiencing significant spot outbreaks at group residential facilities, as well as specific types of businesses, such as meat processing plants (CDC Cases & Deaths by Jurisdiction, https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.htm).

By September 28, 2020, Nebraska had reported 45,044 cases and 493 deaths related to COVID-19[7]. By comparison, the total cases reported in the United States on the same date was more than 7.2 million, with more than 200,000 deaths. The overall statistical trend in new cases reported daily in Nebraska showed a gradual increase since June 2020.

Human infectious disease outbreaks can impact widespread areas, straining the healthcare system, and resulting in limited access to medical care, reduced inventories of critical

[5] First reported case of December 1, 2019 is based on World Health Organization estimates as of May 2020. As additional research is conducted, case evidence of the outbreak may change.
[6] Estimated unemployment rate by July 2020, as released by the Economic Policy Institute, is higher than at any point since the Great Depression.
[7] By February 2, 2021, at the time of approval of this plan update, more than 191, 437 cases had been reported in the state of Nebraska. Vaccinations for the outbreak were being offered, with 3.47% of the population 16 and older having completed the two-dose vaccination program.

medications, medical supplies and equipment, and the need for monitored or controlled countermeasures, such as isolation, quarantine, and vaccination. The medical community may be challenged by the need to provide adequate care for many people simultaneously while conducting public education campaigns to share timely preventative information. The following definitions guide public health officials in planning prevention/preparedness, response, recovery, and mitigation measures for human infectious disease:

Table 3.5-1: Human Infectious Disease Outbreak Levels

Disease Level	Definition
Sporadic	When a disease occurs infrequently and irregularly
Endemic	The baseline level of disease, marked by constant presence or usual prevalence of a disease or infectious agent in a population within a geographic area
Hyperendemic	Persistent, high levels of disease occurrence
Epidemic (or ***Outbreak***, used for a more limited geographic area)	An increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area
Pandemic	An Epidemic that has spread over several countries or continents, usually affecting a large number of people

Source: CDC

Epidemic

An epidemic can result from illnesses including, but not limited to, influenza, meningitis, measles, and tuberculosis. An epidemic does not have to be a contagious disease. Conditions such as cancer, West Nile fever, and obesity are epidemic if they affect many of the population at the same time. There are two main sources of infectious disease epidemics, and some epidemics have characteristics that are common to both:

- **Common Source Outbreak:** Affected individuals are exposed to a common agent. The exposure can be singular, meaning that all affected individuals develop a disease following a single exposure and incubation course (also called a point source outbreak), or exposure may be continuous and variable with multiple, intermittent exposures to the source.

- **Propagated outbreak:** Disease is spread person-to-person, and affected individuals may become independent reservoirs that lead to further exposure.

Pandemic

This plan addresses human infectious disease outbreaks that result in a pandemic. Other disease levels, including epidemic, are generally considered manageable within the capacity and capabilities of local resources, including mutual aid. For planning purposes, pandemic outbreaks are considered as "worst-case scenarios," and appropriate mitigation actions that address pandemic conditions would also support outbreaks of lesser magnitudes.

The Centers for Disease Control and Prevention (CDC) defines a pandemic as an epidemic occurring worldwide or over a very wide area, crossing international boundaries and usually affecting a large number of people. A pandemic event represents a public health emergency impacting all sectors of society. Its occurrence is also unique because, although it has been rare in the past, it is considered inevitable. A pandemic event occurs when a significant antigenic drift, or shift, occurs in a virus, resulting in a new or "novel" strain spreading efficiently from person-to-person, to which the population has not been exposed, and there is no underlying immunity. The severity of the outbreak event is generally variable and unpredictable.

Many infectious disease cases will increase the burden to hospitals and other healthcare system resources and infrastructure. Morbidity and mortality may disproportionately impact younger and healthier people (as was experienced with the influenza pandemic in 1918) or may impact older and medically-at-risk people (as initially occurring in the coronavirus outbreak in 2020). This may reduce the availability of workers due to worker illness, isolation/quarantine, or workers caring for those who are ill. It may also restrict normal activities of the population and result in shortages or unavailability of commodities. Mitigation strategies, such as "stay-at-home" orders and closure of nonessential businesses, may decrease opportunities for disease transmission but will also likely create additional burdens upon the productivity of the workforce and availability of essential goods and services.

Potential Disease Outbreaks

Human infectious disease threats and outbreaks stemming from viruses have resulted in epidemics or pandemics throughout the world, sometimes impacting the United States. The following viral disease types have either threatened or been experienced by communities within Nebraska include:

Influenza

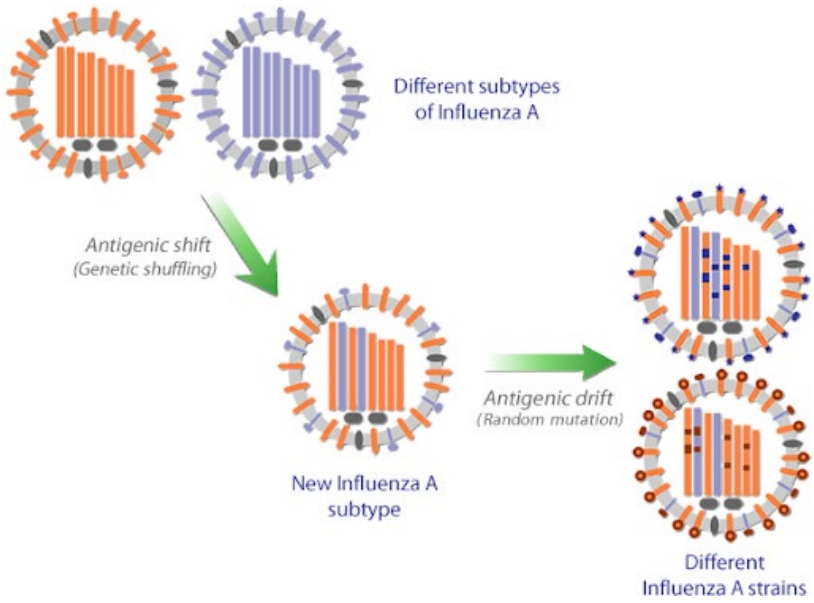
Influenza, or flu, is a contagious respiratory infection that can be caused by several flu viruses. These viruses generally infect the nose, throat, and lungs and typically occur seasonally. Symptoms include fever, chills, muscle aches, coughing, congestion, headache, and fatigue experienced for a week or so. Most people infected with the flu improve within two weeks; however, some may develop serious complications, such as pneumonia. The U.S. Department of Health and Human Services defines pandemic influenza as a new virulent flu strain, for which most people have no immunity, that spreads easily from person-to-person, causing a global

outbreak or pandemic. Because there is little natural immunity, the disease can spread easily from person to person. Various strains of influenza often mutate from animal populations to humans, such as the H1N1 virus or "Swine Flu," which is a respiratory disease of pigs caused by type A influenza virus. Vaccines are typically developed annually, based on the primary type of virus currently impacting large populations. Most outbreaks occur seasonally, beginning in the late fall and winter months, with a lessening of cases by spring.

The influenza virus can infect humans of any age and medical condition; however, depending on the influenza strain and other conditions, the most vulnerable populations are the very young, the elderly, those with compromised immune systems, or underlying health conditions. There were four pandemic influenza events in the past century: 1918 ("Spanish Flu"), 1957 (H2N2 or "Asian Flu"), 1968 (H3N2 or "Hong Kong flu"), and 2009 (H1N1). The flu pandemic of 1918 has been considered one of the most severe disease events in known history.

Some forms of previous viruses continue to circulate worldwide as seasonal influenza viruses that have undergone mutation or *antigenic shift,* which changes the virus's genes. Viruses that have undergone *antigenic drift* result in small changes in the virus, which is why people can get the flu more than one time. It is also the primary reason why flu vaccine composition must be reviewed and updated annually (or as needed) to keep up with evolving influenza viruses.

Figure 3.5-a: Antigenic Shift and Antigenic Drift



Source: World Health Organization

Coronavirus

Coronaviruses are a large family of viruses that are common in people and many different species of animals, including camels, cattle, cats, and bats. Rarely do animal coronaviruses infect people and then spread person-to-person; however, they can mutate to human spread,

causing respiratory illness (like the flu) with symptoms such as a cough, fever, and in more severe cases, difficulty breathing and pneumonia.

Previous pandemics involving coronaviruses include the severe acute respiratory syndrome (SARS) outbreak, which appeared in China in 2003 and spread to over 8,000 people worldwide and killed almost 800. In addition, the Middle East Respiratory Syndrome (MERS) was another coronavirus (MERS-CoV) that developed in 2012, with the first cases reported in Jordan. Most reported cases were linked through travel to, or residence in, countries in and near the Arabian Peninsula. However, the largest known MERS outbreak outside of that area was in the Republic of Korea in 2015. Transmission was noted to be from those having close contact, such as caring for or living with an infected person. MERS patients ranged in age from younger than one year to 99 years old. Public Health agencies continue to investigate clusters of MERS in several countries.

In late 2019, the new SARS-CoV-2 coronavirus, named "COVID-19", caused a quickly-spreading, widespread outbreak that has resulted in a pandemic. Within four months, the virus spread worldwide with close to one million cases and more than 50,000 deaths. Because of the dynamic situation related to this virus, the complete clinical picture with COVID-19 is not fully known at this time.

Ebola Virus Disease (EVD)

- Ebola is a rare but severe and sometimes deadly hemorrhagic fever virus most commonly affecting people and nonhuman primates (gorillas, monkeys, and chimpanzees), primarily in the sub-Saharan region of Africa. Ebola is spread through direct contact with body fluids or people infected with it or by touching things that have been contaminated with these fluids. Case fatality rates have varied from 25 to 90 percent in past outbreaks, with an average fatality rate of about 50 percent.
- No licensed treatment or vaccine is currently available for use in people. However, there are experimental treatments/vaccines in use.
- During the 2014 Ebola outbreak, three patients were treated for the virus in the Nebraska Medical Center Biocontainment Unit. Several others were monitored in 2015 after possible exposure.

Measles, Mumps, and Smallpox

- While measles, mumps, and smallpox have generally been eradicated in the U.S. population through mass immunization measures, there are still episodes of local outbreaks that have the potential to lead to an epidemic scale, especially if community immunity levels decline in future years.
- Although no new cases of measles were reported in Nebraska in 2019, the number of cases of measles in the U.S. has been increasing over the past ten years, with 63 cases reported in 2010 and 1,282 cases in 2019, the highest number of cases reported in the U.S. since 1994 and since measles was declared eliminated in 2000. The majority of

cases were among people who were not vaccinated against measles. Measles is more likely to spread and cause outbreaks in U.S. communities where groups of people are unvaccinated (CDC, 2020).

- In August-October 2019, approximately 62 people attending a social event in Nebraska, or who were in contact with those attending the event, developed mumps after being exposed to one asymptomatic patient who had been vaccinated, resulting in a multi-state outbreak.
- Although there are still pockets of outbreaks in some countries, smallpox has been almost eradicated worldwide.

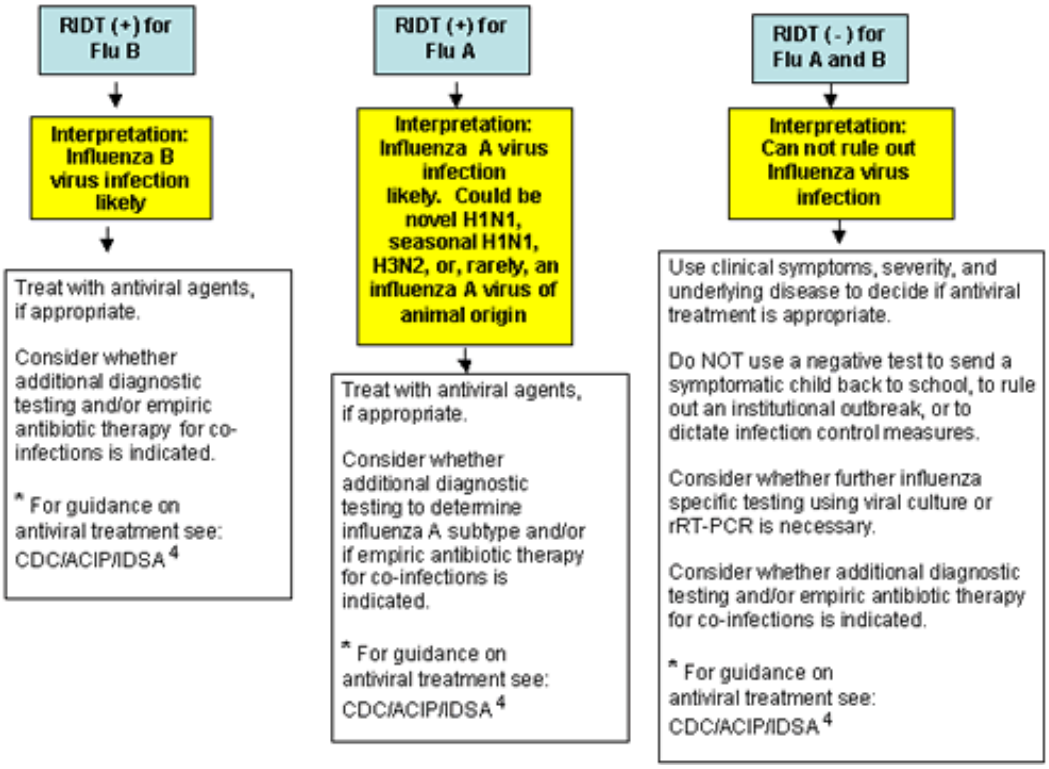
Foodborne and Waterborne Diseases

Foodborne and waterborne diseases may be caused by food or beverages that contain harmful bacteria, parasites, viruses, or chemicals. In general, responses to these types of illnesses are components of a robust, multi-level surveillance system that integrates State and local medical systems and public health agency tracking in coordination with the Centers for Disease Control and Prevention's monitoring systems. Some of these systems have been used extensively for decades, and frequent updates in the surveillance methods continue to improve the quality, quantity, and timeliness of their data. Because of this well-coordinated system and the low potential for widespread outbreaks related to bacterial and parasitic pathogens, foodborne and waterborne diseases are not addressed further in this plan as a potential pandemic event.

Public Health Monitoring and Prevention Measures

Outbreaks may erupt at any time in pockets of the population. Public health and medical systems have established monitoring thresholds, surveillance procedures, and treatment regimens based on each infectious disease's characteristics. These approaches incorporate the most recent medical evidence around etiology (how they start) and transmission (how they spread). They are specific to geography, climate, availability of medical care, and social practices. **Figure 3.6-A** illustrates one type of model that is in use for the rapid detection of influenza.

Figure 3.5-b: Algorithm to Assist in Interpretation of Rapid Influenza Diagnostic Test (RIDT)3



Source: Interim Guidance for the Detection of Novel Influenza a Virus Using Rapid Influenza Diagnostic Tests, CDC, August 10, 2009 https://www.cdc.gov/h1n1flu/guidance/rapid_testing.htm; accessed 05/07/20

Measures to contain or prevent human infectious disease outbreaks are *non-pharmaceutical* and *pharmaceutical*. In general, *non-pharmaceutical* measures are most effective in preventing the spread of a viral outbreak unless a vaccine has been developed and is found to be effective in preventing infection. *Non-pharmaceutical* interventions include:

- Social Distancing (limiting public gatherings, restricting travel, instituting isolation or quarantine)
- Contact Tracing (investigating chains of exposure and potential transmission through individual and group contacts)
- Aggressive testing (confirming cases so that social distancing or medical treatment can limit or prevent transmission to additional people)

Medical countermeasures, or *pharmaceutical intervention*, emphasize the prevention of influenza and corona-type viruses through immunization and targeted use of appropriate antivirals as treatment. Limited use of prophylaxis may be carried out for specific, exposed, high-risk populations. The expected time required to develop effective vaccines for specific viruses may take six months or longer. Additional lag times associated with the vaccine's development and availability in sufficient quantities for the total population must also be

anticipated. The challenge to this measure is the almost certainty that a virus will mutate or undergo antigenic changes requiring the development of new vaccines that effectively address these changes. In addition, antivirals may be of limited value as resistance to these drugs has been noted in many previous seasonal and novel virus causes.

Table 3.5-2: Human Infectious Disease Impacts and Consequences

Human Infectious Disease Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing - depending on the scale and magnitude of the outbreak conditions, residents could be quarantined within their homes, requiring support for food, medical care, and other essentials. Transient residents may require temporary housing for health and security. Casualties/Fatalities – may be significant, especially with at-risk and vulnerable populations and healthcare workers. Additional resources for medical care and mortuary services may be required. Food/water – impact could be high if significant sectors of the economy are reduced or shut down temporarily. Support may be needed to produce or deliver commodities to the population. Those individuals experiencing food insecurity during a non-pandemic event may face increased challenges in obtaining food/water.
Responders: Fire, Police, Medical, Public Works	Depending on the scale of the event, response agencies are highly likely to be severely impacted, requiring additional workforce, mutual aid, security, and other resources to continue essential services. High impacts on community health and medical systems, including residential medical facilities, can be expected along with increased demand for personal protective equipment (PPE).
Continuity of Operations	Impacts on operational continuity are likely to be related to insufficient personnel to carry out mission essential functions, resulting in the need for mutual aid, volunteers, or other personnel support. Operational continuity may be impacted for multiple short-term periods or may occur over an extended time.
Property: Destroyed, Major, Isolated	Residential and commercial properties are unlikely to be impacted by a human infectious disease outbreak.
Infrastructure: Electricity, Water, Roads, Bridges	Transportation may be indirectly impacted due to the limitation of personnel, restricted operations, or prioritization of other transportation missions. Electricity, water, roads, and bridges are less likely to be impacted unless personnel are unable to fulfill essential functions and services due to illness or other restrictions.
Environment	Limited to no impact expected.
Economic Conditions	Depending on the outbreak's scale and magnitude, there could be high impacts on the local, national, and global economies. The productivity of industrial and commercial entities may be limited or redirected to support essential functions or

	services. Agriculture production may be reduced based on personnel impacts on operations and a decline in marketable goods. Restrictions on business operations will also create significant impacts on the economy, potentially resulting in permanent closure of many large and small businesses leading to high levels of unemployment. Every sector of the economy will most likely experience the negative effects of a pandemic.
Public Confidence in the Governance	Confidence is likely to be highly impacted as citizens will expect the government to effectively conduct disaster operations and return the community to a normal state within a reasonable time. Failure to do so may lead to cascading events such as incidents of civil unrest.

3.5.2 – Location

All areas of the State of Nebraska are susceptible to infectious disease outbreaks. Variability in types of viruses, exposure, and social and environmental conditions make it difficult to predict specific locations of disease occurrences; however, in person-to-person transmission of an infectious disease, locations where humans are in close contact are more likely to be sites that lead to multiple cases, especially if airborne transmission is the primary means of exposure. Densely populated communities are typically more likely to have higher case numbers than rural areas. Some of the most significant outbreaks in Nebraska during the 2020 coronavirus outbreak have been noted within residential healthcare facilities, such as long-term care/assisted living facilities and meat processing facilities where workers are in close proximity to each other.

3.5.3 - Previous Occurrences and Extent

There are legal limitations on the availability of information related to cases of human infectious disease. The state and local public health and medical system closely monitor and coordinate specific reportable diseases that indicate current cases. However, laws that protect private medical information, such as the Health Insurance Portability and Accountability Act (HIPAA), constrain all disease-related data-sharing. During a public health emergency, the HIPAA privacy rules are not suspended. However, the Secretary of the U.S. Department of Health and Human Services (HHS) may waive certain provisions, sanctions, or penalties during the emergency. Local and state health officials who maintain records documenting outbreaks and the prevention and containment actions taken must continue to consider the HIPAA provisions related to an individual patients' right to privacy during the emergency.

Trends in specific disease outbreaks are coordinated through public health agencies. They may rise to the level of public health alerts, warnings, or emergencies. State and local health officials continuously coordinate with other government agencies to maintain the highest level of preparedness and response possible.

For mitigation planning, three human-infectious disease outbreaks of a pandemic or widespread level are considered:

- 1918 Spanish Influenza
- 2009-2010 H1N1 Influenza
- 2020 COVID-19 (coronavirus) Pandemic

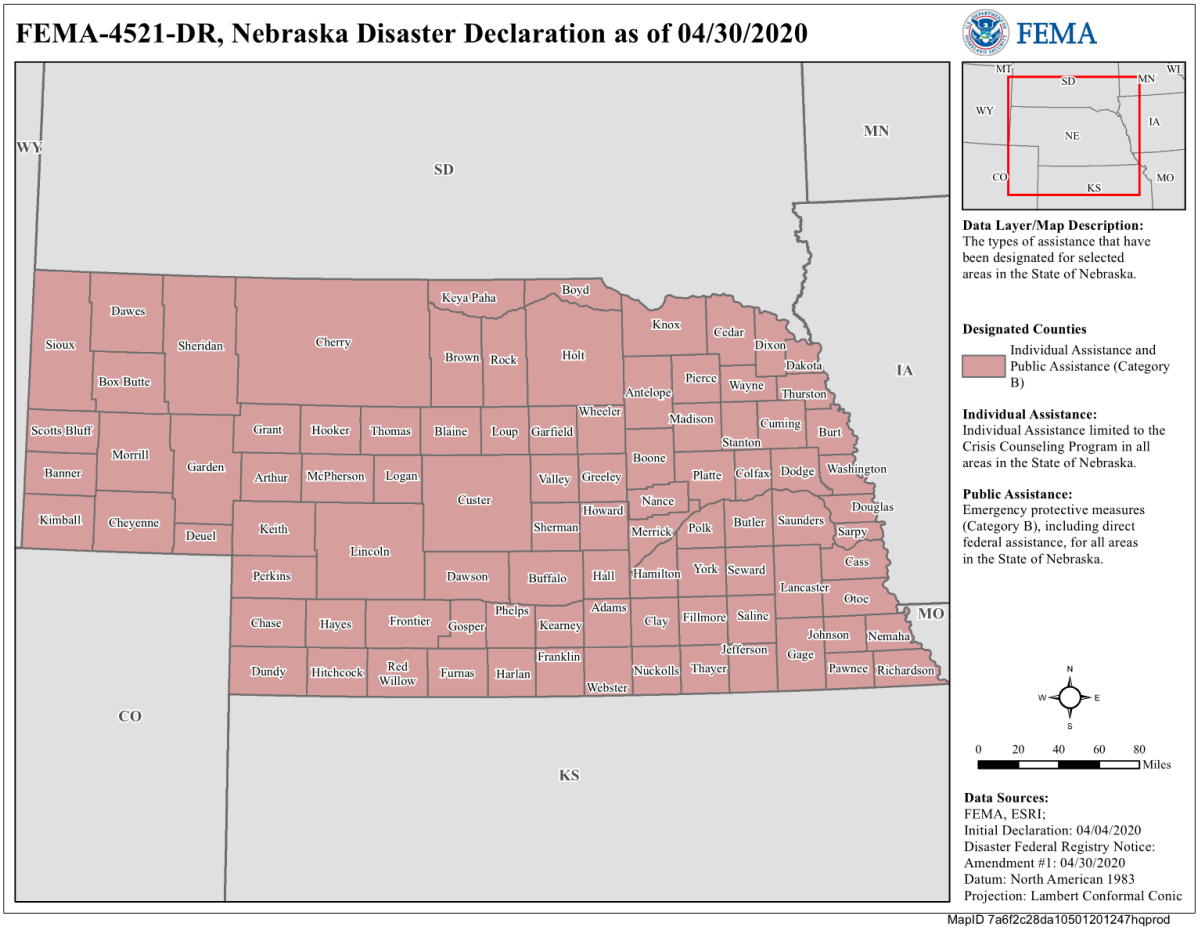
The State of Nebraska has received two (2) Federal Disaster Declarations related to human infectious disease since 1960, both related to the current COVID-19 outbreak. This event is the only widespread human infectious disease outbreak since the 2019 Plan.

Table 3.5-4: Nebraska COVID-19 Pandemic (DR-4521) Declarations in Nebraska

Declaration Number	Event	Incident Period	Declaration Date	Number of Counties
EM-3483	COVID-19	January 20, 2020	March 13, 2020	All
DR-4521	COVID-19 Pandemic	January 20, 2020	April 4, 2020	All

Source: FEMA

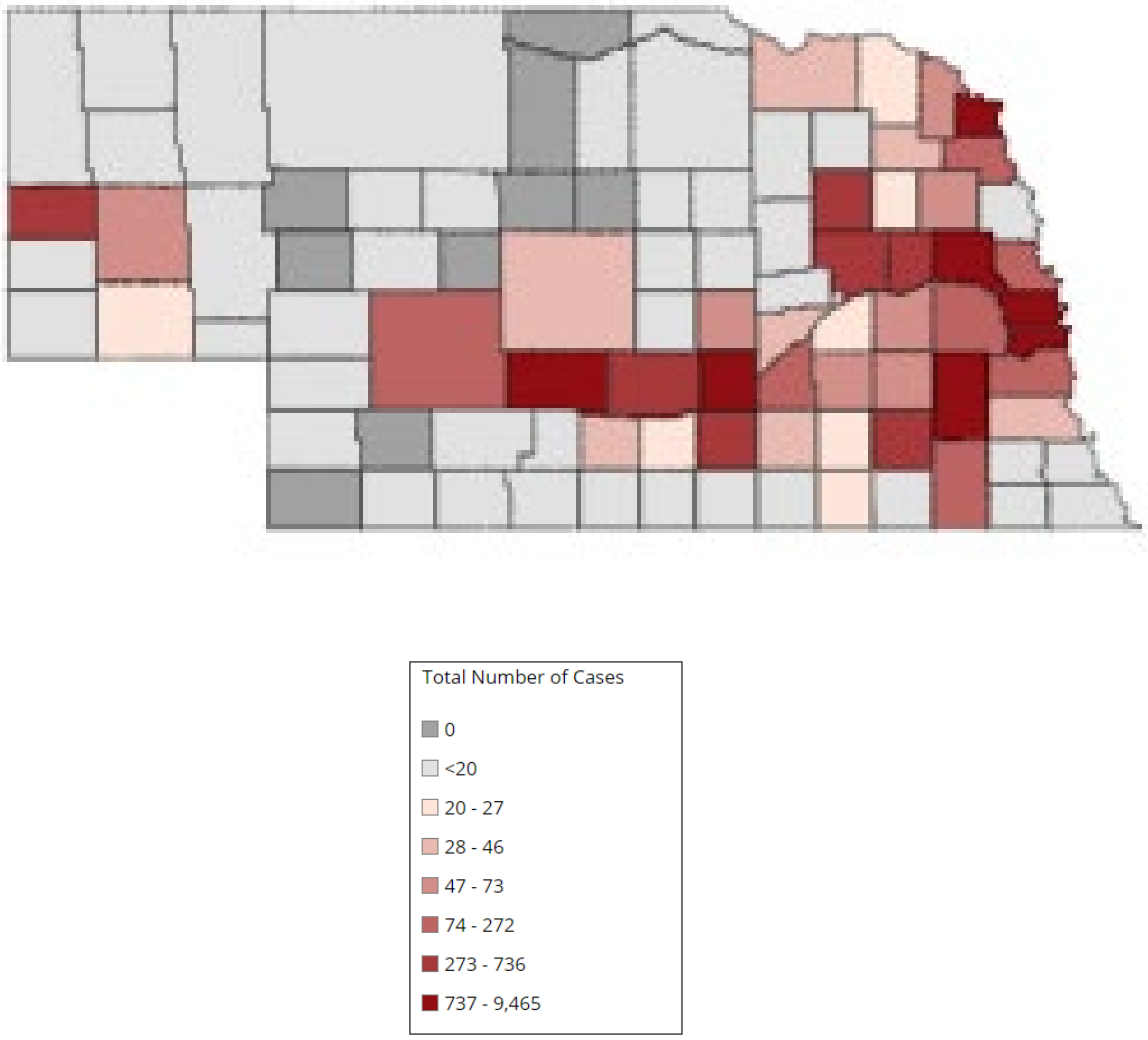
Figure 3.5-d: Nebraska COVID-19 DR 4521 Declared Counties, April 30, 2020



Source: FEMA

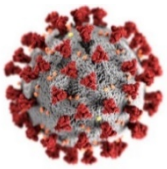
As of July 26, 2020, Douglas County had the highest impact of any Nebraska county, with 9,465 total cases and 120 deaths, representing 39 percent of the State's COVID-19 cases (CDC, July 27, 2020). Additionally, Lancaster, Dakota, Sarpy, and Hall Counties all had more than 1,000 cases. Combined, case totals in these five counties represented more than 72 percent of the State's COVID-19 cases.

Figure 3.5-e: Nebraska COVID-19 Cases, as of July 26, 2020



Source: CDC; Retrieved at: https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/county-map.html

Coronavirus Outbreak – 2019 - 2020



In early 2020, COVID-19 was determined by the World Health Organization (WHO) to be a "pandemic" and was in progress during the 2021 SHMP update process. The timeliness of this outbreak has provided an opportunity to experience, first-hand, the impacts and consequences of what has developed into a worldwide, catastrophic disease outbreak. The full magnitude of the impacts and consequences of this pandemic are as yet unknown; the full scope of preventative measures and mitigation steps that will prove to significantly slow the spread and severity of the virus or lower the risk are lessons yet to be learned.

Timeline of the COVID-19 Outbreak

December 31, 2019 – A pneumonia of unknown cause is detected in Wuhan, China and first reported to the WHO Country Office in China.

January 30, 2020 – The outbreak is declared a Public Health Emergency of International Concern

February 11, 2020 – WHO announces a name for the new coronavirus disease: COVID-19.

March 11, 2020 – WHO announces that COVID-19 is now officially a "pandemic," the first to be caused by a coronavirus, and the first pandemic since the H1N1 "swine flu" in 2009. By this date, COVID-19 has swept into at least 114 countries, infecting more than 118,000 people and killing more than 4,000.

March 13, 2020 – The Governor of Nebraska declares a state of emergency to control the spread of COVID-19.

March 17, 2020 – The Governor of Nebraska issues social distancing guidance to avoid social gatherings of more than ten people and visits to nursing homes or long-term care facilities, which was eventually extended into April.

March 24, 2020 – The Centers for Disease Control (CDC) reports 54,443 cases of COVID-19 in the U.S.

March 31, 2020 – More than 186,000 cases in the U.S. are reported by the CDC. Much of the increase is contributed to increased testing around the country; however, the sharp increase in cases during this one-week period also reflects the aggressive rate of transmission of the virus and the delay in initiating social distancing measures during the two-to-three-week period prior to March 24.

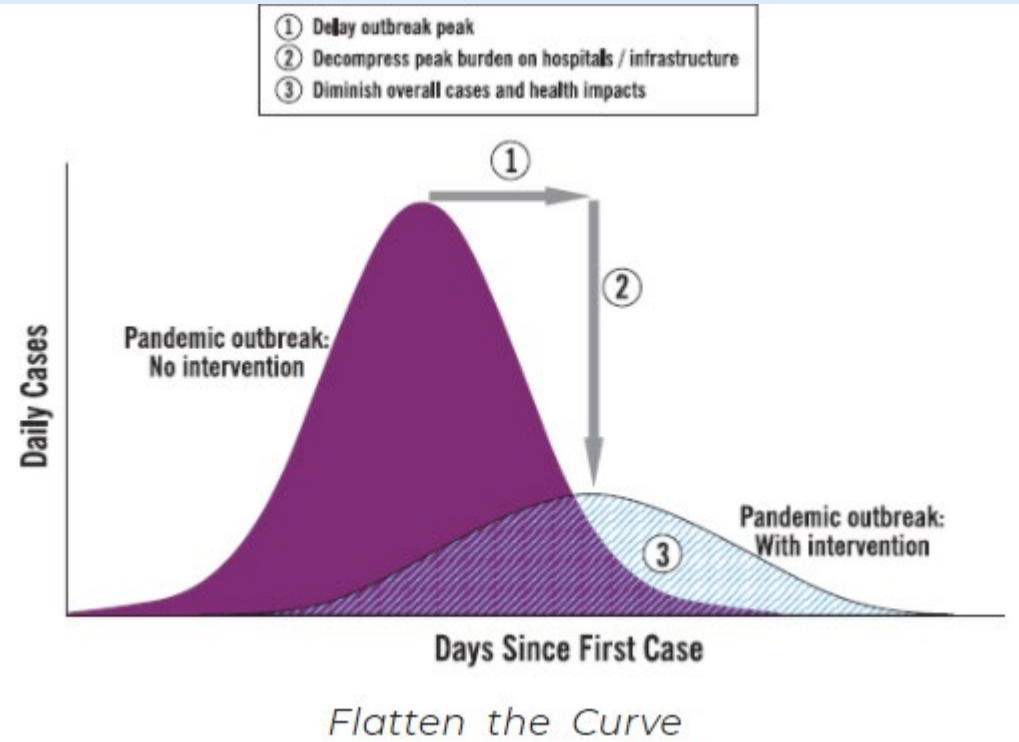
July 26, 2020 – With more than 24,618 positive cases in Nebraska, to date, the largest concentration of current cases is reported in Douglas County (1,511), Lancaster County (662), and Sarpy County (396). The **current number of cases per 100,000 people in the U.S. is 1,270.4.**

Measures to Limit the Spread of COVID-19

Various methods to contain the spread can "flatten the curve" of the outbreak to reduce the number of patients that would threaten to overwhelm health and medical resources. Health officials have continually warned that measures are "urgent and aggressive" if there is hope of limiting the virus' spread. Current containment measures focus on preventing illness by "social distancing" that prevents close contact from individual-to-individual, thereby reducing the potential for infection through respiratory droplets produced when an infected person coughs or sneezes.

Figure 3.5-f illustrates the projected effectiveness of community mitigation measures to reduce the number of the COVID-19 cases.

Figure 3.5-f: Goals of Community Mitigation for COVID-19



Source: Nebraska Department of Health and Human Services, accessed at: http://dhhs.ne.gov/Pages/COVID-19-State-Overview.aspx

Some viruses are able to be contained through the development of vaccines and mass vaccination of the population; however, the development of effective vaccines normally takes months and is frequently a post-outbreak measure to prevent further development or "waves" of the outbreak. In addition, many state and local governments are issuing "stay-at-home" orders for a specified period of time, along with the cancellation of mass gatherings and closure of schools and nonessential businesses. Many workers have transitioned to work from home locations that rely on access to internet and communication services.

Early "Lessons Learned"

- The spread of the COVID-19 virus could have been limited through early widespread access to accurate testing, and implementation of early social distancing measures, including travel restrictions

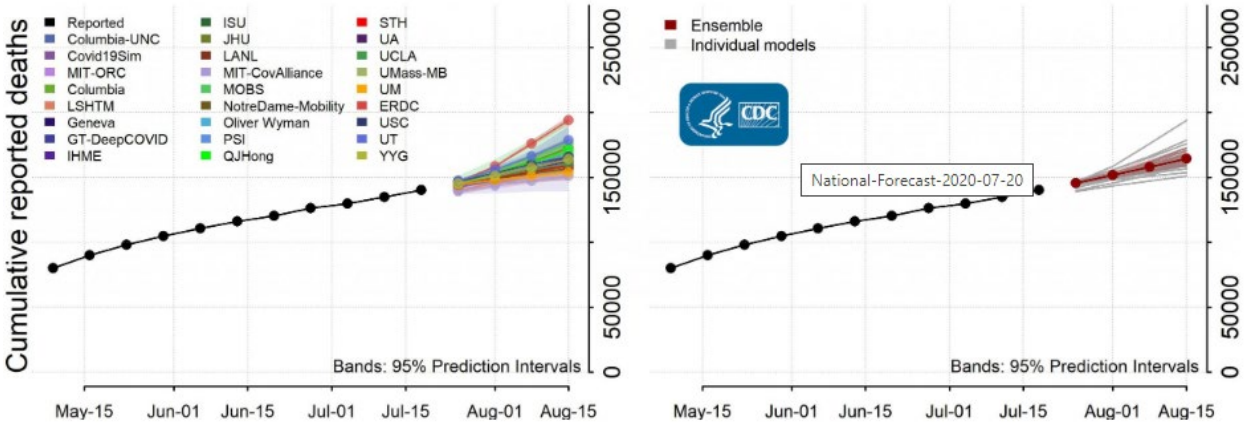
- Health and medical systems are quickly overburdened and lack vital equipment to respond to the number of critical patients
- Coordination between multiple levels of government and agencies is essential to address the care capacities and availability of critical staff and other resources needed by hospitals and care centers.
- "Stay-at-home" orders have a significant impact on the economy, increasing unemployment and the need for government support for workers and businesses.
- Schools and businesses must rely on alternative methods for continued operations and services.

Nebraska COVID-19 By the Numbers* (as of July 26, 2020)					
Total Cases Worldwide	***Total Deaths Worldwide***	***Total Cases in the U.S.***	***Total Deaths in the U.S.***	***Total Positive Cases in Nebraska***	***Deaths in Nebraska***
16,492,946	653,4258,000	4,163,892	145,982	24,618	316
PROJECTED Total Deaths in the U.S. from COVID-19 (as of March 31, 2020)			**160,00** to **175,000** by **August 15, 2020**		

Source: Centers for Disease Control; https://coronavirus.jhu.edu/map.html; dated accessed 07/27/20
**Because of limited testing capacity in some areas, the actual number of cases is believed to be higher. Hospitalized data is only collected for certain U.S. states.*

Forecast models for the COVID-19 pandemic, as of July 27, 2020, suggested that the number of deaths over the upcoming four weeks would likely exceed the number reported over the previous four weeks for the U.S. overall, as well as in 25 states and one territory.

Figure 3.5-g: National Forecast – Cumulative Death Totals due to COVID-19, July 26, 2020



Source: CDC; Retrieved 7/27/20 at: https://www.cdc.gov/coronavirus/2019-ncov/covid-data/forecasting-us.html

As of July 2020, there were no widely proven medications that effectively treat COVID-19 in all patients; however, antivirals such as Remdesivir have shown to decrease the duration of COVID-19 in some hospitalized patients. In addition, while scientists and medical researchers around the world seek to develop an effective vaccine for this virus quickly, it is anticipated that it will take months or years before a vaccine is widely available to the public.[8]

Efforts to monitor and contain the initial and ongoing COVID-19 outbreak and progression of the virus have led to substantial impacts on state and local health systems, in part due to the need for personal protective equipment, medical supplies, and services to monitor and support quarantined individuals. In addition, the demand of on-going long-term patient care and high rate of fatalities has taken a tole on human resources in the health and medical profession.

Although it did not reach epidemic proportions in the United States, the Ebola outbreak in 2014 illustrates how an infectious disease outbreak on another continent can impact the United States' health and medical system.

Initial Outbreak	**The Centers for Disease Control (CDC) issued an initial announcement in March 2014 on the Ebola outbreak originating in Guinea, Liberia, and Sierra Leone in West Africa. The first American, a government official in Liberia, died in July 2014. Several additional American healthcare and aid workers contracted the virus in this period. The CDC elevated its warning level, recommending that U.S. residents avoid nonessential travel to the impacted countries. In early August 2014, an American doctor overseeing an Ebola patient at a hospital in Sierra Leone was flown to a military base in Georgia and driven by ambulance to Emory Hospital in Atlanta. Within days, the World Health Organization declared the Ebola epidemic an international health emergency that required a coordinated global approach, describing it as the worst outbreak in the four-decade history of tracking the disease.** [9]
Method of Infection	Ebola is extremely infectious but not extremely contagious as the virus is not transmitted through the air. Humans can be infected by other humans if they come in contact with body fluids from an infected person or contaminated objects. Unprotected health care workers are susceptible to infection because of their close contact with patients during treatment.
1st Person to Contract Ebola on American Soil	In October 2014, a nurse who cared for the Ebola patient hospitalized in Texas tests positive for the virus, followed closely by a second nurse at the hospital.

[8] As of January, 2021, two vaccines have received emergency approval from the Federal Drug Administration to be available to states and phased vaccination programs have been initiated.

[9] Ebola Fast Facts , CNN Library, https://www.cnn.com/2014/04/11/health/ebola-fast-facts/index.html

New Medical Care Guidelines Issued	In late October 2014, the CDC updated medical care guidance for Ebola patients that stressed the use of personal protective equipment as well as training and supervision around "donning and doffing" procedures. In addition, new protocols mandated quarantine for any individual, including medical personnel, who traveled to the U.S. after having direct contact with individuals infected with Ebola in West Africa. This protocol shifted the responsibility for monitoring quarantine up to 21 days to state and local health departments.
2015	Additional Ebola cases in the U.S. are monitored, treated, and released. The Nebraska Medicine Biocontainment Unit serves as a central location to monitor several individuals exposed to Ebola. The World Health Organization declares an end to the Ebola outbreak in Liberia. More than 4,000 died from the virus. In November 2015, three newly-confirmed cases emerge in Liberia.
January 14, 2016	The United Nations releases a statement declaring that all known chains of transmission in West Africa have been stopped and no new cases reported since November 2015. The following day, a new Ebola case, in which the patient died, was confirmed in Sierra Leone.
December 22, 2016	A British medical journal publishes a story about a new Ebola vaccine that tested 100% effective during the drug trials in Guinea with more than 11,000 people.
May 2018	The Democratic Republic of Congo (DRC) declares an Ebola outbreak, with 58 cases and 27 deaths.
February 2019	As of February 2019, the DRC reports more than 500 deaths related to the outbreak but notes that additional deaths have been averted because of mass vaccine distribution.

Although there were only a few confirmed Ebola cases within the U.S. in 2014, Nebraska Medicine and the University of Nebraska Medical Center (UNMC) in Omaha played a key role in that event by treating Americans returning from West Africa with confirmed cases. The hospital has a 20-bed National Quarantine Center and a six-bed simulated biocontainment unit. In the COVID-19 outbreak, the hospital unit was again put into use as the only federal quarantine unit in the country when thirteen (13) Americans who tested positive or were exposed to the virus on a contaminated cruise ship in Japan were transported there for evaluation (UNMC, Global Center for Health Security, https://www.unmc.edu/healthsecurity/education/capabilities/index.html).

3.5.4 - Probability of Future Events and Impacts of Climate Change

Based on the historical occurrence of human infectious disease outbreaks of a pandemic level in Nebraska, it can be estimated that the recurrence interval is 34 years[10], indicating that, on average, a human infectious disease event will occur within that time period.

[10] Statistical calculation based on 102 years of record with three events between 1918 and 2020.

Intervention and Prevention

A number of Human Infectious Diseases that have been pandemics in the past or had the potential to be a pandemic, such as smallpox and measles, have been successfully controlled by comprehensive vaccination programs. Other diseases, such as Ebola and other hemorrhagic fever diseases, remain a threat monitored through international, national, and local surveillance systems.

The public health system functions at all government levels and in collaboration with private-sector partnerships. Federal, State, and county-level public health agencies continually communicate and coordinate efforts to identify health threats. They also share information about outbreaks, new practices and protocols, and preventative measures.

The public health system uses multiple control activities to reduce the transmission of infectious diseases. **Table 3.6-1** provides a general overview of the steps involved in identifying an outbreak, preventing additional exposure, and providing treatment. Other steps may be incorporated into this process, depending on the type of disease and available resources.

Table 3.5-3: Communicable Disease Monitoring and Containment

Measure	Description
Disease Surveillance Systems	• Maintained by health epidemiology officials and staff, supported by healthcare facilities and providers • Require reporting of specific communicable diseases by medical providers, schools, healthcare facilities, residential facilities, and sometimes the general public • Aid in quickly identifying potential outbreaks and establishing medical countermeasures to prevent widespread transmission • Implement contact tracing and investigation to identify paths of transmission
Protective Actions, including Public Education and Information	• Public notification or alert, when appropriate • Dissemination of appropriate measures to prevent exposure/illness • Expedited public information to manage perceptions and reduce fear • Isolation (separation from other persons when an individual may have the infectious disease) • Quarantine (prohibiting non-medical staff from entering or leaving premises where a case of a communicable disease is receiving treatment or contained for "social distancing" purposes)
Medical Countermeasures	• Mass prophylaxis (medication/vaccination to large numbers of prioritized groups, such as responders or the public) • Mass distribution of personal protective equipment (PPE) • Deployment of mass patient care system/Alternate care sites to reduce medical surge • Deployment of Strategic National Stockpile (SNS) assets as needed.

The Strategic National Stockpile (SNS) is a Federal repository of medical supplies maintained by the U.S. Department of Health and Human Services to supplement State and local medical response operations during public health emergencies. Supplies include personal protective equipment, antibiotics, vaccines, chemical antidotes, antitoxins, and other critical medical equipment and supplies. The SNS is designed to be a short-term stopgap buffer when state or local supplies of these materials are not immediately available. The SNS is activated upon request by a state and approval by the U.S. Department of Health and Human Services.

Figure 3.5-h: Strategic National Stockpile Warehouse

Source: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services: Accessed at www.cdc.gov/phpr/stockpile/index.htm

Nebraska Department of Health and Human Services is the State's lead agency for preparedness, response, recovery, and mitigation of events that affect community health or medical needs. The Nebraska Health and Human Services policy, Title 173 Communicable Disease, Chapter 6, *Directed Health Measures to Prevent or Limit the Spread of Communicable Disease, Illness, or Poisoning*, dated February 21, 2017, establishes the policy for the State's authority to prevent, limit, or slow the spread of communicable diseases. This regulatory document includes criteria and procedures for ordering quarantine or isolation as a Directed Health Measure, which may be targeted to "an individual, group of individuals, or a population, or directed to the public at large in regard to identified premises or activities, and public and private property including animals."

The *Nebraska State Emergency Operations Plan (SEOP)*, dated March 2017 [plan update in progress, July 2020], outlines the role of Emergency Support Function 8 – Health and Medical, including surveillance/detection, activation, response operations, and recovery.

The SEOP outlines the mitigation function in relation to public health incidents as the following activities:

- Identify mitigation measures to reduce the impact of the emergency on the State's population, and critical infrastructure, and key resources.

- Assess the impact of the emergency on the ability of the state and local jurisdictions to perform required services and the extent of damage to community health and medical infrastructure and population

- Develop an After-Action Report (AAR) to identify actions taken and lessons learned, or how preventive measures and response measures could be improved in the next emergency.

The Nebraska DHHS and local public health officials and partners collect information on infectious diseases to assess trends in disease occurrence, prioritize control efforts, and evaluate prevention strategies. Prompt reporting allows outbreaks to be recognized in a timely fashion when control measures are most likely to be effective in preventing additional cases. [11]

Studies and reports on climate change indicate a relationship between changing climate conditions and the potential for increased human disease activity. Scientific projections indicate an increase in many extreme events in response to a warming climate, such as heavy precipitation events, which could occur within increasingly severe thunderstorm events that include tornadoes. Because models are not in full agreement on the type or amount of change, this is still an active area of research that should be monitored in the next planning cycle. (Bathke et al., 2014).

Special interest in key health concerns was addressed in the study, *Understanding and Assessing Climate Change: Implications for Nebraska*, led by Bathke, D., Oglesby, R., Rowe, C., Wilhite, D.; University of Nebraska – Lincoln, January 2016. This study notes that health effects, commonly divided into direct (such as deaths from heat waves and storms), indirect (mediated by culture, architecture, economics, etc.), and interactive (where climate change aggravates other environmental hazards) effects from climate and weather. The study references multiple articles by health professionals and scientists that link a wide range of health effects already resulting from climate change and likely to increase in future decades. Vector-borne and other infectious diseases, such as West Nile Virus, are increasing in incidence. In addition, milder winters could allow certain infectious diseases and vectors not previously endemic to Nebraska to survive. If group sheltering from future severe weather events is required during the presence of an infectious disease this type of operation could be impacted due to public health requirements for social distancing, isolation and other conditions requiring a higher level of resources such as personnel, equipment and supplies.

Health and Medical Surveillance, Monitoring and Warning Systems

Multiple methodologies are used to attempt to predict and control future human infectious disease outbreaks. The World Health Organization (WHO) monitors disease events globally, coordinating closely with the United Nations. The CDC oversees monitoring potential public health outbreaks in the U.S. and also participates in global health security by monitoring and responding to disease outbreaks around the world. The Nebraska Department of Health and Human Services coordinates with local and federal, as well as other states' health and medical resources to monitor outbreaks and initiate preparedness, prevention, response, and mitigation measures should they occur.

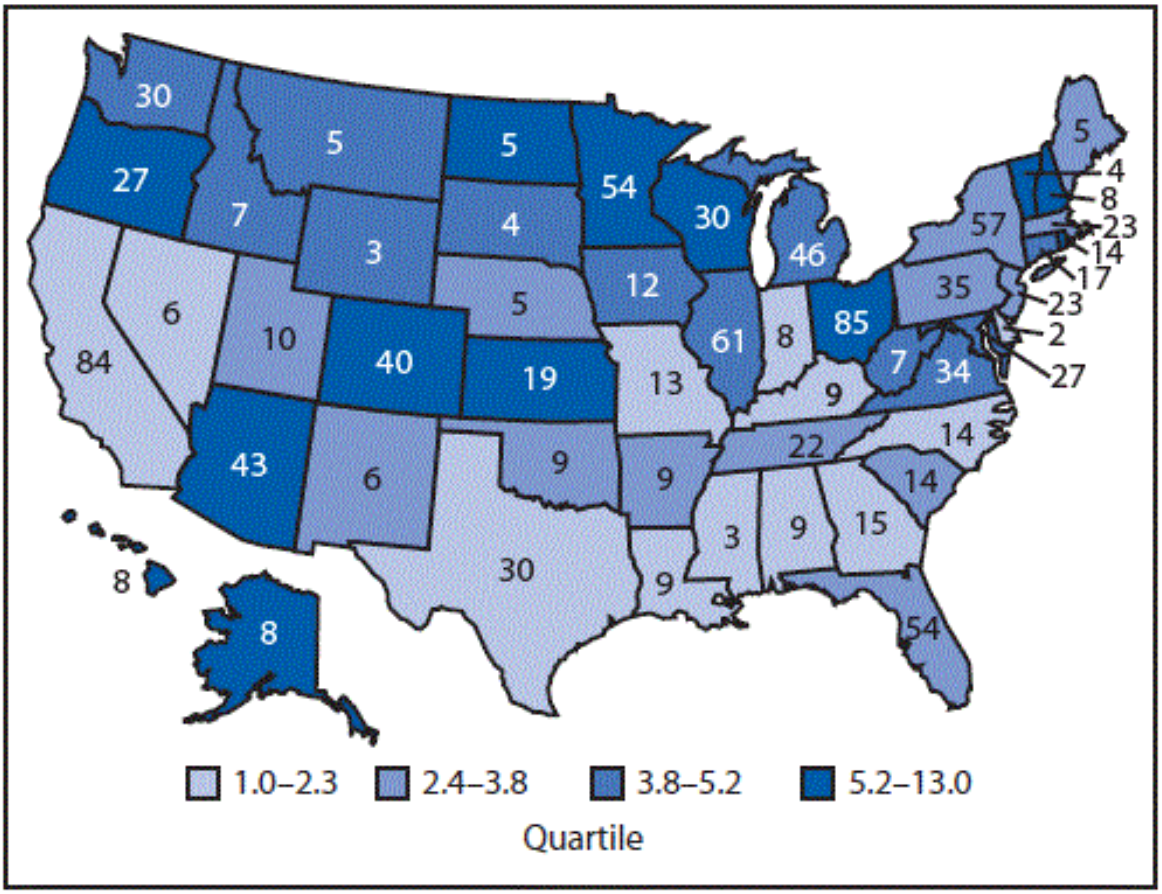
[11] http://dhhs.ne.gov/Pages/Disease-Reporting.aspx

The Nebraska DHHS monitors diseases using a variety of surveillance systems and methods, including:

- Nebraska Electronic Disease Surveillance System (NEDSS) is a web-based application used by state and local public health staff for communicable disease surveillance and case management. More information on the Communicable Disease reporting is available at http://dhhs.ne.gov/Pages/Disease-Reporting.aspx.
- The State's Health Alert Network (HAN) disseminates messages related to health threats across state and local health departments to local healthcare facilities and hospital systems.
- The University of Nebraska Public Health lab provides testing to detect sexually transmitted diseases, enteric diseases (such as salmonellosis), respiratory diseases (such as influenza), and bio-threat and chemical agents.
- The federal BioWatch Program actively monitors the air for specific Category A bioagents.

An example of CDC's disease surveillance activities is illustrated in **Figure 3.5.i**, which shows a low incidence of foodborne and waterborne disease outbreaks in Nebraska with only five (5) reports between 1971 and 2012, the most recent data available.

Figure 3.5-i: Foodborne and Waterborne Disease Outbreaks*



The number of outbreaks by state are represented by the numbers indicated within the state border on the map. The color-based quartiles separately indicate the incidence of outbreaks per 1 million population based on the 2012 U.S. census estimates. Cutpoints for outbreak rate categories are determined by using quartiles.

Source: Foodborne and Waterborne Disease Outbreaks – United States, 1971 – 2012, October 23, 2015; https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6254a7.htm

3.5.5 – Local Plan Data

At the time of this update, only one local hazard mitigation plan, the *Lower Loup Natural Resource District Multi-Jurisdictional Hazard Mitigation Plan*, dated 2017, includes pandemic or public health epidemic as a hazard of concern; however, the range of infectious diseases included in this category includes hepatitis A, hepatitis B, pneumonia, influenza, West Nile Virus, tuberculosis, sexually transmitted diseases/infections and shingles as the "most likely infectious diseases to occur in the area." (p. 95) The previous occurrences reported in the plan does include another Coronavirus outbreak in 2014, the Middle East Respiratory Syndrome (MERS), which did not reach significant epidemic proportions within the United States.

3.5.6 – Jurisdictional Vulnerability and Potential Losses

Due to the lack of local plans that identify human infectious disease or pandemic as a hazard, there is inadequate jurisdictional vulnerability and potential loss data available to evaluate.

As the COVID-19 pandemic has progressed in the United States, it is impacting individual states in different ways. Despite the disparity in impacts, the public health recommendations for social distancing and periodic closure of designated businesses has caused widespread economic loss and hardships for individuals and families. Some assistance from the federal government has provided intermittent relief; however, the longer the pandemic lasts the worse the economic losses will be. In this situation, assistance for food, shelter and other expenses may be required to sustain vulnerable populations due to business closure, loss of jobs and long-term medical care.

3.5.7 – Vulnerability of State Facilities and Potential Dollar Losses

Although the entire population of Nebraska is potentially susceptible to human infectious disease, it is unlikely that the hazard would impact state physical property or facilities.

3.5.8 - Future Population and Development Trends

Human infectious disease is not limited to geographic boundaries or the built environment. Still, it may be influenced by changes in population density or demographics. For that reason, it is difficult to identify development and population trends that may be impacted by this hazard. Current public health and medical systems incorporate standards that address and mitigate human infectious disease outbreaks to some extent; however, contagion between agricultural animals and humans is considered to be problematic with potential changes in the climate, and human-to-human infections such as HIV, TB, and measles is also expected to change with population shifts. Other factors that may increase exposure to infectious diseases include:

- Venues and locations where individuals are in close contact with large numbers of people. Examples include public buildings, businesses, schools, churches, sports events, concerts, and special events.
- Presence of at-risk populations such as those with specific medical conditions. Examples include residential medical facilities such as nursing homes or assisted living residences.
- Presence of vulnerable populations, such as those living in densely populated conditions. Examples include multi-generational and multi-family residences, housing with common heat, or air conditioning systems such as university or college dormitories, or populations without access to healthcare services.

The potential for impacts on future growth and development of human infectious disease will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future will be considered.

3.5.9 - Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation, and update of this plan should consider the following factors related to human infectious disease as well as other information from the SHMP updates:

- Monitor and update COVID-19 impacts and consequences to local jurisdictions and State assets.
- Have any new human infectious disease events occurred since the adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict/control human infectious disease events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment, or economy that could affect the risk or vulnerability to human infectious disease?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to human infectious disease?

3.5.10 – Data Sources

- Bathke, D., Oglesby, R., Rowe, C., Wilhite, D. Understanding and Assessing Climate Change: Implications for Nebraska, University of Nebraska – Lincoln, January 2016.
- Centers for Disease Control and Prevention – http://www.cdc.gov
    - COVID-19 – https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html)
    - Foodborne and Waterborne Disease: *https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6254a7.htm*
    - *Interim Guidance for the Detection of Novel Influenza a Virus Using Rapid Influenza Diagnostic Tests,* CDC, August 10, 2009 *https://www.cdc.gov/h1n1flu/guidance/rapid_testing.htm*;
    - National Institutes of Health – http://www.nih.gov
    - Strategic National Stockpile – http://www.phe.gov
- FEMA – Federal Disaster Declarations in Nebraska; https://www.fema.gov/disasters/state-tribal-government/0/NE
- Local Hazard Mitigation Plans
- *Lower Loup Natural Resource District Multi-Jurisdictional Hazard Mitigation Plan*, 2017
- Nebraska State Emergency Operations Plan, March 2017
- Nebraska Department of Health and Human Services – Disease Reporting: http://dhhs.ne.gov/Pages/Disease-Reporting.aspx
- *Interim Guidance for the Detection of Novel Influenza a Virus Using Rapid Influenza Diagnostic Tests,* CDC, August 10, 2009 https://www.cdc.gov/h1n1flu/guidance/rapid_testing.htm;

- *The Influenza Pandemic of 1918*, Stanford University. Website: https://virus.stanford.edu/uda/
- University of Nebraska Medical Center, Global Center for Health Security, https://www.unmc.edu/healthsecurity/education/capabilities/index.html
- Wilhite, D.A. and K. Morrow. 2016. The Implications of Climate Change for Nebraska: Summary Report of Sector-Based Roundtable Discussions. School of Natural Resources, University of Nebraska, Lincoln, Nebraska. Retrieved at: https://digitalcommons.unl.edu/droughtfacpub/114/
- World Health Organization – http://www.who.int

SECTION 3.6: LEVEE FAILURE

2021 SHMP Update
• Hazard sections reformatted for consistency with planning guidance • Risk assessment and vulnerability analysis was conducted with new data and information from the 2019 DR-4420 flooding event • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Levee Failure	A structure to reduce the risk and impact of flooding, meeting specific engineering design, construction, operations and maintenance criteria. Levees, such as a pile of sandbags or mounded dirt, may also be a temporary emergency measure that forms a wall to prevent or ward off approaching floodwaters. A highway or railroad embankment running parallel to a river may also be an integral part of a flood damage reduction system. Levees are not subject to consistent standards for design, construction, operations and maintenance and it is sometimes difficult to tell how a levee will perform in a flood by observation alone. Some levees, as in rural agricultural areas, may be designed to overtop in order to release floodwaters before reaching a larger population area. An estimated 15 percent of total levees in the United States are under the authority of the U.S. Army Corps of Engineers, which performs regular inspections and assessments of the level of protection. A levee failure, or "breach" may have some or little warning.

3.6.1 - Hazard Characteristics

The failure of a levee can be attributed to the loss of structural integrity of a wall, dike, berm, or elevated soil by erosion, piping, saturation, or under seepage. Levee failures cause water to inundate a normally dry area protected by the levee. The overtopping of a levee may occur when flood levels raise about the top of the levee causing water to flow down into areas normally dry. This would likely cause the levee to experience additional stress or weakening of an area leading to failure of the structure

Although most levee systems are maintained and closely monitored during potential events such as excessive rainfall that could result in breaches, levees sometimes fail for different reasons. Occasionally, levee systems are compromised due to record inflows of water that surpass their designed protection levels.

Table 3.6-1: Summary of Levee Failure Impacts/Consequences

Levee Failure Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – Structures within inundation areas could be destroyed depending on the amount of water held by the levee and how far downstream from the dam the structures are located. Casualties/Fatalities – Dependent on warning time and how far downstream of the structure they are located. People living and/or working in areas with less than 30 minutes of warning of a complete failure are the most at risk. Work – Dependent on location in relationship with the failing structure. Food/Water – Limited impact
Responders: Fire, Police,	Unless the responders live or their facilities are located within inundation areas there should be no impact. During the response, care needs to be given to the

Medical, Public Works	possibility of pollution, disease, and potential hazardous materials in the flood waters. Medical – Would be dependent on if the facilities are in the inundation areas. Some medical facilities could become quickly overwhelmed with victims if the inundation area includes a large population. In that event, medical surge plans will be activated.
Continuity of Operations	If major governmental facilities (courthouse, city/county offices) are in the inundation area failure of the structure could cause extreme damage to buildings and contents including electronic and paper records. If the jurisdiction does not have adequate COOP planning, the impact will be very high.
Property: Destroyed, Major, Isolated	Property within the inundation areas can expect impacts from major and destroyed to minor depending on the relationship of the structure to the levee and the amount of water released. Agricultural properties, including crops and livestock will be impacted at various levels.
Infrastructure: Electricity, Water, Roads, Bridges	As with property damages, infrastructure can be seriously damaged. Water and waste water systems contaminated, electrical structures damaged, roads and bridges destroyed or isolated. Repairs could be delayed until water levels recede.
Environment	The environment in the inundated areas will be severely impacted with contaminates, erosion, and debris. It is highly likely that levee failure will create agricultural losses.
Economic Conditions	In Nebraska, economic impacts could be anywhere from catastrophic to none depending on which structures fail and the amount of water the structure holds.
Public Confidence in the Governance	Public confidence will be dependent on the perception of whether or not the failure could have been avoided by any governmental action either taken or not taken.

3.6.2 – Location

Levees are found across the state, primarily along the Platte River, Elkhorn River, Missouri River and their tributaries. Levees protect land with various uses from agriculture to large parts of major metro areas.

Nebraska's levee data, according to USACE, is shown in **Table 3.6.2**. The Missouri River, Platte River, Elkhorn River, and their tributaries make up the state's primary levee system. Figure 3.6-1 displays the levee systems in Nebraska.

Table 3.6-2: Nebraska Levee Data

Nebraska Levee Data	
Levee Systems	132
Miles of Levee	346
Levee Structures	304
Average Levee Age	52

Source: USACE

Agricultural lands protected by levees are especially vulnerable to levee failure, since many of the levees are privately constructed and maintained to provide water for crop irrigation and

livestock. The widespread flooding of March 2019 pointed out how high water levels caused overtopping, breaching or erosion of some agricultural levees, leading to costly repairs that might not be within the means of private land owners to repair or replace. Aging levee infrastructure also presents concerns of failure in high water events.

Analysis of the National Levee Database provides a breakdown of the USACE estimated people, structures, and property values protected by levees per county in **Table 3.6-3**.

Table 3.6-3: Nebraska Counties with Levees

Counties with Levees			
County	**People**	**Structures**	**Protected Value**
Boone	0	0	$ -
Burt	586	323	$ 112,170,000
Butler	21	9	$ 3,150,000
Cass	540	208	$ 47,749,800
Cheyenne	2	1406	$ 781,000,000
Colfax	1086	690	$ 172,960,000
Cuming	688	382	$ 149,000,000
Custer	1706	565	$ 279,130,000
Dakota	736	299	$ 105,479,000
Dixon	1665	776	$ 159,000,000
Dodge	7255	2339	$ 869,060,000
Douglas	10001	4185	$ 2,051,900,000
Furnas	138	60	$ 21,900,000
Gage	5	6	$ 1,550,000
Hall	9428	3833	$ 936,100,000
Jefferson	645	581	$ 90,600,000
Lancaster	5192	1130	$ 928,210,000
Madison	15713	6501	$ 2,590,360,000
Nemaha	1265	982	$ 179,888,000
Otoe	124	4	$ 1,400,000,000
Pierce	1255	566	$ 250,109,000
Platte	3873	1687	$ 346,940,000
Red Willow	848	390	$ 191,220,000
Richardson	15	21	$ 490,996,000
Sarpy	3568	917	$ 524,378,000
Saunders	511	382	$ 157,948,000
Scotts Bluff	2332	906	$ 427,630,000
Seward	334	69	$ 21,830,000
Thurston	1121	760	$ 203,420,000
Washington	0	0	$ -
	70,653	**29,977**	**$ 13,493,677,800**

Source: U.S. Army Corps of Engineers

Figure 3.6-1: Nebraska Levee Map

Source: U.S. Army Corps of Engineers

3.6.3 – Previous Occurrences and Extent

Levees and dams along the Missouri River were tested by the 1952, 1993, 2010, 2011, and 2019 floods. Although the flood passed Omaha without causing a levee breach during the 1952 flood, other areas were not as fortunate. Estimated damages from the storm by the Army Corps of Engineers stand at $11.9 million (1952 dollars).

In 1993, 52 counties were declared under DR-993 due to tornadoes and flooding from severe storms. During the month of July, statewide precipitation reached 8.35 inches. The Missouri River set record crests at Plattsmouth and Brownville. A U.S. Army Corps of Engineers levee near Brownville breached and flood waters threatened but did not damage the Cooper Nuclear Power Plant. During the 1993 floods, 32 levees were overtopped. Five of those levees were located along the Missouri River. A Government Accounting Office report identified three primary reasons for overtopping: "(1) decline from the levee's design flow capacity, which attributed to a change in the relationship between the flood level and the flow rate at the levee, resulting in higher flood levels for the same flow rate; (2) the distance between the levee and the gauge used to measure the flood flow resulted in an inaccurate flood flow estimate for the levee location; and (3) the location of the overtopping."

Spring-Summer 2011: Record rain combined with high water levels to the Missouri River chain of reservoirs from snow melts and previous rain caused levees to breach. During this time, USACE spent significant resources for maintenance and operations of the levees. They spent an estimated a little over $2 million on levee repair/work in Omaha alone and close to $1 million on levee repair/work in Sarpy county. USACE had to also do post flood rehabilitation on levees.

2015- According to the 2019 NE SHMP, heavy rains over a large part of south central and south east Nebraska lead to extensive flooding throughout the region. Levees within the City of Lincoln were near overtopping and subject to notable ponding of water on the interior side of the levee. Levees in this area are to protect to a 50-year event level and no levees failed. Following

the flooding, extensive rehab efforts were necessary to repair issues related to subsurface soil loss.

March 2019 Snow Melt/Flooding- Snow rapidly melted as temperatures warmed and rain fell over a 48-hour period. Due to the frozen ground and one to two feet of thick ice remaining in area rivers, catastrophic flooding occurred. The devastating floods caused significant levee breaches over more than 350 miles along the Missouri, Elkhorn and Platte Rivers. Among more than 47 confirmed breaches reported in multiple states during this event, at least six were documented in Nebraska:

- R-613 – Sarpy County
- R-562 – Nemaha County
- Western Sarpy – Ashland, Nebraska
- Clear Creek – Ashland, Nebraska
- Union Levee – Valley, Nebraska
- R-573 – Otoe County

Due to the levee breaches, flood damage devasted communities. Four individuals lost their lives, several hundred people had to be rescued by air or boat, and tens of thousands were evacuated. In addition, levee breaches added to flooding over widespread agricultural lands, compounding the economic losses related to the 2019 event.

Significant repairs of the state's levee systems have been undertaken since the 2019 flood event. The repair status of each system is described in **Table 3.6-4.**

Table 3.6-4: Status of Active Levee System Repairs in Nebraska

Levee System	Stream	2019 Impact	Last Update	Status	Contract Amount
Ames Diking	Platte River	Damaged – repair levee system to authorized level of flood risk management	9/8/20	Repair completed 8/14/2020	$1,260,000
Broken Bow	Mud Creek	Damaged – repair levee system to authorized level of flood risk management	11/8/2019	Repair completed 10/24/2019	$165,000
Cedar Creek	Platte River	Damaged in 3 locations	01/10/2020	Repair completed 12/18/2019	$1,343,000
Clear Creek	Platte River	4 breaches and substantial damages	O9/08/2020	Substantially complete 08/09/2020	$1,370,000
Columbus	Loup River	Damaged - repair gabion wall	09/08/2020	Repair completed 08/28/2020	$2,200,000
Lake Wa Con-Da	Missouri River	Damaged – repair levee system to	09/08/2020	Project design complete. Pending	Undetermined

Levee System	Stream	2019 Impact	Last Update	Status	Contract Amount
		authorized level of flood risk management		real estate acquisition with construction expected in mid-spring 2021	
Norfolk	Elkhorn River	Damaged – repair levee system to authorized level of flood risk management	09/08/2020	80% complete, pending removal of sediment deposited in the channel	$2,690,000
Omaha	Missouri River	Damaged – repair levee system to authorized level of flood risk management	09/08/2020	73% complete; contract modified to include additional damage locations	$1,255,879
Papillion Creek System	Papillion Creek	Many of 13 levee systems damaged	09/08/2020	95% complete; pending assessment of one repair to ensure it will not impact channel conveyance	$7,300,000
Pender	Logan Creek	Damaged – repair levee system to authorized level of flood risk management	09/08/202	60% complete; driving sheet pile and placing riprap	$7,000,000
Pierce	North Branch Elkhorn	Damaged – repair levee system to authorized level of flood risk management	09/08/2020	Repair Complete 11/08/2019	$183,000
R616-613	Missouri River & Big Papillion Creek	Damaged – repair levee system to authorized level of flood risk management	03/16/2020	Repair complete	$10,300,000
Salt Creek System	Salt Creek	Channel bank erosion	09/08/2020	78% complete	$4,700,000
Scribner	Pebble Creek & Elk Horn River	Debris & sedimentation damage – repair levee system to authorized level of flood risk management	11/22/2019	Repair Complete	$94,000
Union Dike & No Name Dike	Platte River	Damaged – repair levee system to authorized level of flood risk management	09/08/2020	Initial breach repair complete 06/20/2019; Final repair substantially complete	$2,675,000 (initial breach repair & final repair)

Levee System	Stream	2019 Impact	Last Update	Status	Contract Amount
Wakefield	Logan Creek	Damaged – significant erosion; repair levee system to authorized level of flood risk management	09/08/2020	32% complete; pending efforts	$3,100,000
Waterloo	Elkhorn River	Damaged – sand boils; repair levee system to authorized level of flood risk management	09/08/2020	Ready to advertise pending finalization of real estate and access documentation: delayed during design phase	Design funding approved
Western Sarpy	Platte	Damaged – repair levee system to authorized level of flood risk management	05/08/2020	Repair complete	$4,200,000
West Point	Elkhorn River	Damaged – repair levee system to authorized level of flood risk management	09/08/2020	Engineering & Design in progress	Design funding approved

Source: U.S. Army Corps of Engineers, Omaha District Website; https://www.nwo.usace.army.mil/Omaha-District-System-Restoration-Team/

At the time of publication of this plan, the Nebraska Department of Natural Resources was conducting a survey of all government-owned and -controlled levees to determine the current level of flood risk. In addition, the Nebraska Department of Economic Development was initiating a Community Development Block Grant (CDBG) project for disaster relief to address privately-owned levees that failed or were damaged in the 2019 flood. The status of these initiatives will be reviewed during annual plan maintenance activities.

3.6.4 - Probability of Future Events and Impacts of Climate Change

The levees in Nebraska are exposed annually to risk during the flood season. Historical data suggests that storms will impact the state each season covering areas from a few counties to the entire state. While any individual levee is not likely to fail in any given year, the combined probability of failure of any levee is notable. It is also notable that wide spread events such as the 1993 flood would likely lead to loading and possibly failure of many levee systems simultaneously.

A quantitative probability for Levee Failure is difficult to predict. Historically, it is likely to occur but the location and frequency is dependent on a variety of conditions such as levee design and maintenance. According to the NCEI database, in the past 20 years there have been 19 levee failures over 7 events. Based on this historic occurrence, it can be estimated that the

recurrence interval for levee failure is .35 years, indicating that on average an event will be equaled or exceeded within that time period.

Climate change affects weather events, which in turn would determine levee failure events. Based on the historical record, climate is inherently variable making it difficult for climate scientists to predict short-term temperature extremes for more than a few months in advance for most locations. In addition, anomalies of precipitation and temperature may last from several months to several decades. Under a higher emissions pathway, historically unprecedented warming is projected by the end of the 21st century (CICS-NC, NOAA NCEI, 2019), which could result in more excessive rainfall events.

3.6.5 – Local Plan Data

The majority of the 132 levee systems in Nebraska are located in the Eastern half of the state. As such, the mitigation strategies are adopted by counties and districts that contain levees and remain simple, yet effective. Local plans consider this a low hazard. The Local Hazard Mitigation Plans (LHMPs) reviewed for this update acknowledge dam and levee risks and what might overwhelm their respective hydraulic capacities. It is also heavily recognized in the plans that the probability of a levee overtopping remains low. In the event that levees do overtop, the risk is considered minimal by most districts who consider their levees well designed and effective flood mitigation systems. The pursued mitigation strategies in the case of levee failures are typically centered around public education of flood insurance, limiting development in flood prone areas, and redesigning land use in hazard areas to incorporate permeable surfaces and other green infrastructure components into municipal designs. Additionally, local plans often contain an evacuation plan in case levee or dam failure does occur.

Though the local plans have levee failure as a low probability hazard, they recognize the potential of an occurrence. Douglas and Sarpy Counties have high concentrations of levee systems and the *2016 Papio-Missouri NRD Multi-Jurisdictional Hazard Mitigation Plan* states the probability of levee failure is one percent annually. Most local plans with levee failure noted as a hazard have the same probability of one percent.

The local mitigation actions noted in LHMPs are evacuation plans, encouraging flood insurance, public education awareness of potential impacts, and implementing land use regulations.

3.6.6 – Jurisdictional Vulnerability and Potential Losses

Cities, especially metropolitan areas, protected by levees are vulnerable to flood. Federal levees are maintained and inspected periodically by USACE, while other levees are maintained by other entities such as the state and private land owners, especially owners of agricultural lands. Levee failures can cause the loss of life and property, including impacts to crops and livestock.

People

The people living in levee-protected areas are at risk, especially the disabled or elderly because of mobility issues or limited access to transportation resources.

Economy

Businesses in levee-protected areas are at risk for damage and would be closed for an extended period of time. As an effect of business closures, employees will be out of work.

Built Environment

All buildings and homes in down-stream areas of levees are at risk for damage.

Infrastructure

Transportation routes are at risk for inundation and damage.

Critical infrastructure

Critical facilities could be damaged or destroyed.

3.6.7- Vulnerability of State Assets and Potential Dollar Losses

Given the limited information on the location of state assets in relation to levees, analysis of state assets protected by levees is currently not available.

Local Flood Insurance Rate Maps (FIRMs) document flood zones that may contain state assets; however, not all levee structures are in designated 100- or 500- year flood zones and FIRMs should not be relied on to provide an accurate picture of the level of vulnerability of state assets.

Mapping of state assets vulnerable to levee failure has not been developed at this time, but is identified as a future mitigation activity and should be re-evaluated in the next planning cycle to determine if current data is available for this purpose.

Table 3.6-5: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.6.8 - Future Population and Development Trends

Future population and additional development in the areas protected by federal levees would increase the vulnerability of this hazard. Development in the watershed can raise flood levels and make a levee designed and constructed under previous characteristics inadequate for current runoff conditions. NeDNR and NEMA, as part of the Silver Jackets program in coordination with the U.S. Army Corps of Engineers, participate in breach inundation mapping and risk assessments in levee communities.

3.6.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to levee failure as well as other information from the Local Hazard Mitigation Plan updates:

- Have any levee failure events occurred since adoption of this plan?
- Have any levee failure events impacted agricultural lands since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict levee failure events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to levee failure?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to levee failure?

3.6.10 - Data Sources

- 2019 Nebraska Hazard Mitigation Plan
- U.S Army Corps of Engineers
- NOAA, National Center for Environmental Information

SECTION 3.7: PLANT DISEASE AND PESTS

2021 SHMP Update
• Reformatted Plant Disease and Pests Profile • Enhanced hazard characteristics • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Plant Disease and Pests	A diseased plant is one that has been continuously disturbed by a causal agent that results in an abnormal physiological process that disrupts its normal structure, growth, function, or other activities. Plant diseases are broadly classified according to the nature of their primary causal agent, either infectious or noninfectious. Infectious plant diseases are caused by pathogenic organisms; noninfectious plant diseases are caused by unfavorable growing conditions, including extreme temperatures, imbalance of moisture and oxygen, toxic substances in the soil or atmosphere, and an excess or deficiency of an essential mineral.

3.7.1 - Hazard Characteristics

Ninety-one percent of Nebraska's land area is devoted to agricultural uses, with 44.9 million acres of land in farms scattered throughout the state (Nebraska Department of Agriculture, 2020), which is very minimally changed from the 2019 SHMP. Nebraska's total agricultural output reached more than $21 billion in 2018, a decline from the 2019 SHMP. At that time, livestock and farm animals contributed to the bulk of this amount, with $12.17 billion. Crops contributed $8.3 billion and services/forestry contributed $1.57 billion (USDA ERS, 2019). In 2019 – 2020, the U.S. experienced trade tensions with China and weather-related planting difficulties that somewhat offset price impacts during that period. China continued to emphasize soybean purchases from Brazil over U.S. purchases, but U.S. production fell 20 percent from the prior year. (USDA Long-term Projections to 2029, 2020)

Nebraska cropland is vulnerable to disease and other agricultural pests. An estimated 1.75 billion bushels of corn, 283 million bushels of soybeans, 55.3 million bushels of wheat, 472 thousand tons of potatoes, 397 thousand tons of dry beans were grown in Nebraska, according to the 2019 State Agriculture Overview produced by the USDA (USDA, May 13, 2020). In 2018, cash receipts from all farm commodities reached over $21 billion, with crops bringing in $8.3 billion of that total (Nebraska Department of Agriculture, 2019).

Climate conditions have a significant impact on the growing season. Wet weather occurring during the growing season in 2019 favored development of numerous corn diseases, such as Physoderma brown spot, bacterial leaf streak, stalk rot diseases and ear rot diseases. In addition, the University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources

publication (IANR), “Crop Watch”, dated January 8, 2020, introduced the disease tar spot, which was expected to develop in the state during 2020.

Table 3.7-1: Plant Disease and Pests Impacts/Consequences

Plant Disease and Pests Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Low impact on the population in general until or unless the disease becomes long term, and then the impacts will be mostly economic. Widespread impact of plant disease or pests that affect food or livestock feed crops could affect availability of specific foods. If corn is impacted, it would greatly impact the beef industry because of the lack of foodstuff.
Responders: Fire, Police, Medical, Public Works	Plants killed or weakened due to disease or pests may provide additional fuel for fast spreading wildfires requiring fire response.
Continuity of Operations	No Impact
Property: Destroyed, Major, Isolated	Duration of infestation and type of disease or pest may leave some farmland unusable for a considerable amount of time.
Infrastructure: Electricity, Water, Roads, Bridges	Minimal Impact
Environment	Infections and/or infestations may lead to widespread die-off of trees, shrubs, and other vegetation used as windbreaks and erosion control. These losses could allow for considerable environmental impact
Economic Conditions	If the disease is invasive and long term, there will be severe impacts on the local and statewide economies. Although property may not be destroyed, it may be unavailable for tillage for some time, potentially quite a long time. As with animals, a large percentage of the State's economy is dependent on agriculture. Local rural economy depends on the income and purchasing power of farmers and ranchers.
Public Confidence in the Governance	Depends on how effectively and efficiently governmental agencies respond to the situation.

3.7.2 – Location

In 2018 there were 45,900 farms with over $100,000 in agricultural sales in Nebraska, covering more than 45 million acres (USDA, 2019). Although the number of farms declined slightly in 2019, to 45,700 farms (USDA, 2020), farms are located in every county and some diseases and pests affect residential and community plants and trees, as well as agricultural products. One method of tracking crop diseases is coordinated by the University of Nebraska-Lincoln’s (UNL) Plant and Pest Diagnostic Lab which collects disease reports by geographic districts, depicted in the map in **Figure 3.7-a**. Data is reported for known plant diseases and pests in Nebraska.

Figure 3.7-a: Crop Disease Reports, UNL Plant and Pest Diagnostic Lab, August 21 – September 11, 2019

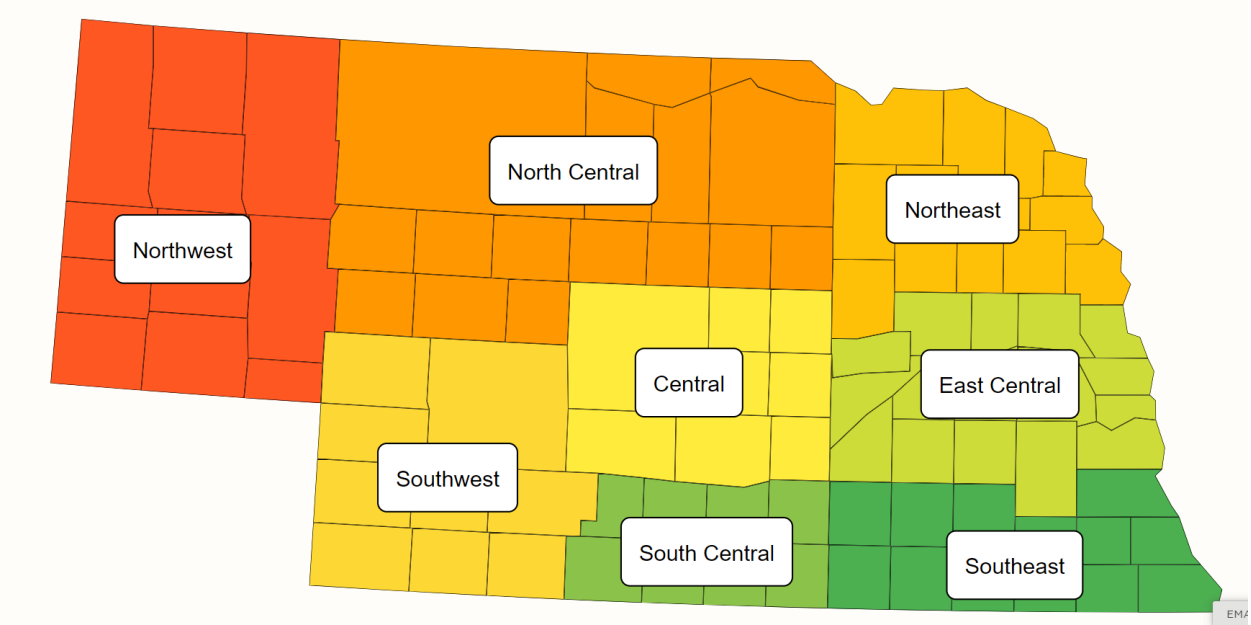


Table 3.7-2: Crop Diseases Reported between August 21 – September 11, 2019, by District*

	District	NORTHWEST	NORTH CENTRAL	NORTHEAST	SOUTHWEST	CENTRAL	EAST CENTRAL	SOUTH CENTRAL	SOUTHEAST
SOYBEAN	Anthracnose	[No data reported]			[No data reported]	x		[No data reported]	
	Bacterial blight			x		x	x		
	Bacterial pustule						x		x
	Brown spot		x			x	x		x
	Brown stem rot		x	x					
	Cercospora leaf blight					x	x		x
	Charcoal rot						x		
	Frogeye leaf spot		x	x			x		x
	Phyllosticta leaf spot						x		
	Phytophthora root and stem rot						x		x
	Soybean Mosaic Virus					x			x
	Stem canker		x	x			x		
	Sudden death of soybeans		x			x	x		x
	White mold		x	x					

	District	NORTHWEST	NORTH CENTRAL	NORTHEAST	SOUTHWEST	CENTRAL	EAST CENTRAL	SOUTH CENTRAL	SOUTHEAST
CORN	Anthracnose stalk rot					x			
	Bacterial leaf streak			x			x		x
	Bacterial stalk rot		x						
	Common rust		x	x			x		x
	Crown rot								
	Fusarium stalk and cross rot			x		x			x
	Gibberella stalk rot						x		
	Gray leaf Spot		x	x			x		x
	Goss's Wilt						x		
	Holcus spot		x						
	Northern corn left blight						x		
	Northern corn leaf spot						x		
	Smut								
	Southern rust		x	x			x		x
Sorghum	Anthracnose						x		
	Fusarium root rot						x		
	Gray leaf spot						x		
	Leaf blight						x		
	Rust						x		
	Sooty stripe						x		
	Target sport						x		
Alfalfa	Summer black stem						x		

Source: University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, https://cropwatch.unl.edu/2019/crop-disease-reports-unl-diagnostic-clinic

[*Data for the Southwest District and South-Central District was unavailable.]

3.7.3 – Previous Occurrences and Extent

Due to uncalculated variables and lack of consistent reporting and data gathering mechanisms, it is not possible to determine the total net losses caused by specific pests and other plant diseases within the state in a given year. Each farm has its own history of damages, level of severity, duration of each event, and dates of occurrence for each agricultural disease or pest

outbreak. However, below are some common plant pests and diseases in Nebraska (UNL-IANR, 2020).

Corn Diseases and Pests

More acres are devoted to growing corn in Nebraska than any other crop, and Nebraska ranks third in the nation in overall corn production. If considered as its own industry, Nebraska's popcorn industry is first in the nation in production (UNL-IANR, 2018). Additionally, Nebraska ranks second nationally in ethanol production, using 36% of the state's corn crop (Nebraska Department of Agriculture, 2020).

Among the diseases that have been affecting corn in Nebraska recently are anthracnose stalk rot; charcoal rot; diplodia stalk rot; eyespot; fusarium root, crown, and stalk rot; northern and southern corn leaf blight; physoderma brown spot; bacterial stalk rot; bacterial leaf streak; southern rust; and common rust. Discussion in this plan will be limited to diseases that impact corn in Nebraska, including those that may lead to yield decreases.

Insect pests are also a significant concern for corn farmers. Nebraska is home to many species of insects that can damage corn at various points in the plant life cycle. Among them are the seed corn maggot and seed corn beetle that feed inside corn seed, causing failure to germinate, white grubs that feed on roots, cutworms that feed on early foliage, flea beetles and chinch bugs that feed on leaves, and several other insects that can cause significant crop loss. Control of many of these pests is possible with varying degrees of success with targeted chemical insecticides. Some, like those that feed inside of seeds, do the bulk of their damage before they can be detected and subsequently treated.

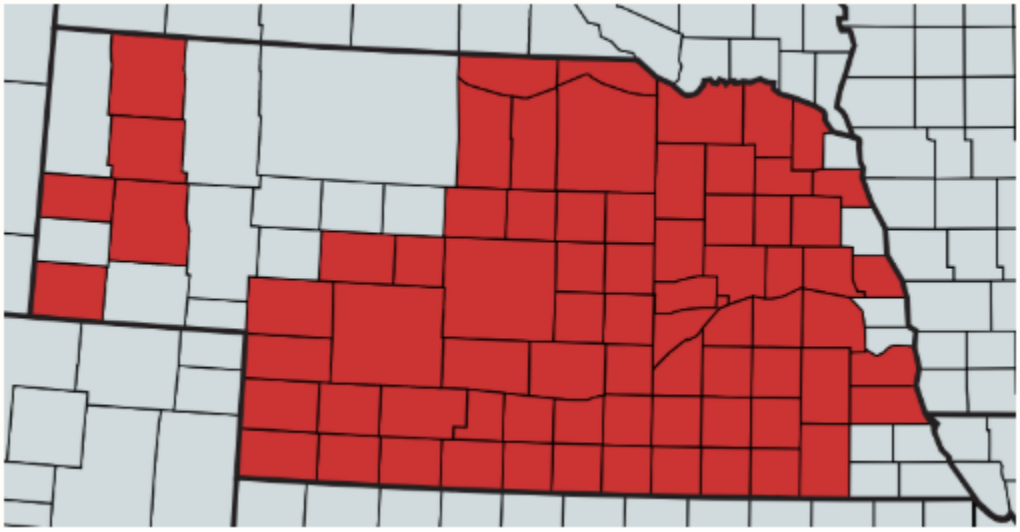
- Southern Rust: Caused by a fungus, southern rust can rapidly develop under proper weather conditions in certain susceptible hybrids. Severe instances of this disease may cause considerable loss of yield, but if it does not become widespread, it may not require treatment. The fungus that causes southern rust does not survive the winter, so any infection comes to Nebraska when wind carries spores from the south. It also requires warmer temperatures and high humidity, rainfall, or irrigation to develop. Under optimal conditions, leaves can be completely covered, leading to a leaf blight and potentially crop loss (Stack & Jackson-Ziems, Cropwatch: Southern Rust, 2018). Spread of the disease is slowed by cooler, drier conditions (Jackson-Ziems & Broderick, Southern Rust of Corn Confirmed in Nebraska, 2018). Southern corn rust was confirmed on leaf samples from Fillmore, Nuckolls and Thayer counties in southern Nebraska in July 2019 (Jackson-Ziems & Rees, Southern Rust of Corn Confirmed in Nebraska, July 25, 2019)). Although it was at very low incidence in those areas at that time, warm, humid conditions favored disease development. The use of resistant varieties and fungicide applications provide successful management options.

- Anthracnose: This is a fungal disease that impacts corn with three distinct phases: leaf blight, top dieback, and stalk rot. When the leaf blight phase begins, the lesions on the leaf can easily be confused with gray leaf spot or eye spot. As the disease progresses, the lesions expand to cover large portions of the leaf surface. The top die-back phase

typically starts about one to three weeks after tasseling. Fields that are affected by this phase appear as though there is a green band across the middle of the plants. Under the sheath, on the stalk surface, there is black discoloration. Stalk rot symptoms can begin soon after tasseling, but the more easily visible surface discoloration typically appears later (Stack & Jackson-Ziems, Cropwatch: Anthracnose, 2018). Anthracnose is a common secondary disease, but crop rotation and crop residue incorporation reduce the potential for infestation.
High temperature and long periods of wet weather favor the leaf blight and top die-back phases. High temperature and plant stress following pollination favor the stalk rot phase. Tillage can reduce the risk when the residue is incorporated into the soil and decomposition results. Rotation to crops other than corn for at least one year may minimize early season anthracnose, but have little impact on late season disease (Stack & Jackson-Ziems, Cropwatch: Anthracnose, 2018).

- Bacterial Leaf Streak: Confirmed for the first time in the United States in Nebraska in 2016 and has now been confirmed in Colorado, Kansas, Minnesota, South Dakota, Texas, Oklahoma, Illinois and Nebraska. The disease has been confirmed in corn across many Nebraska counties. Bacterial leaf streak has been observed on field (dent) corn, seed corn, popcorn, and sweet corn in Nebraska. Symptoms on infected plants may look similar to other common diseases, sometimes causing confusion and misdiagnoses. Narrow stripes between leaf veins may initially look like the common fungal disease, gray leaf spot. Lesions can be brown, orange, and/or yellow and are often yellow when backlit. Lesions usually have slightly wavy edges in contrast to the smooth, linear lesion margins of gray leaf spot (Ortiz-Castro, M., Hartman, T. et al, 2020).
  Sanitation practices such as cleaning debris from combines and other equipment between fields can help slow its spread to unaffected fields. In some cropping systems use of crop rotation or tillage may help degrade infected corn debris and reduce the surviving bacteria. However, neither practice will eradicate the bacterium and eliminate the risk of disease (Jackson-Ziems, Cropwatch: Bacterial Leaf Streak, 2018). Bacterial leaf streak of corn was on the rise in the state after several days of cool, wet weather in 2019. Since 2016, this disease has been confirmed in 74 Nebraska counties (Sivits & Jackson-Ziems, Cropwatch: Bacterial Leaf Streak of Corn in Nebraska, June 27, 2019). **Figure 3.7-b** illustrates the distribution of bacterial leaf streak from corn samples from the impacted counties.

Figure 3.7-b: County Distribution of Bacterial Leaf Streak, as of January 9, 2019



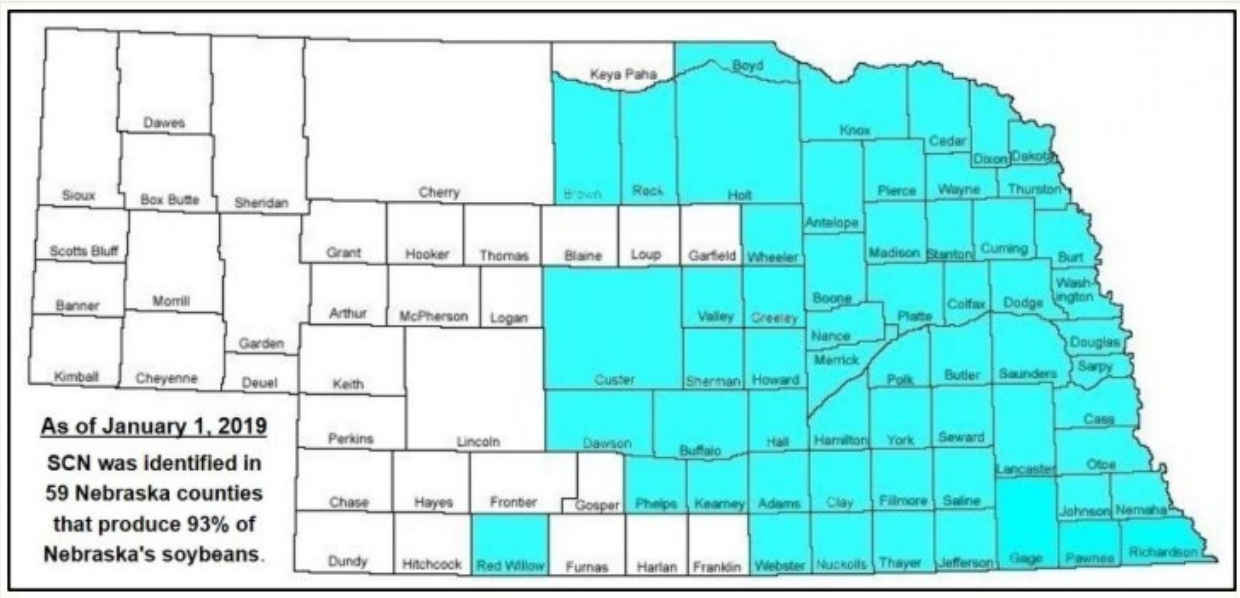
Source: Terra Hartman, University of Nebraska-Lincoln, https://cropwatch.unl.edu/2019/corn-disease-update

No research has yet shown what impact this disease may have on crop yield, but initial observations suggest that it may be widely distributed throughout the corn belt in the United States. As this disease is relatively new to Nebraska, and this country as a whole, further research is being carried out and producers should be closely monitoring their fields to watch for development (Jackson-Ziems, Korus, Adesemoye, & Van Meter, 2016).

- Fusarium: Several species of the Fusarium fungus cause stalk rot, root rot, and crown rot. Fusarium stalk rot may cause premature plant death as the tissue that gives the stalk its support disintegrates and the stalk breaks below the ears (Sparks, Cropwatch: Fusarium Stalk Rot, 2018). The Fusarium fungus may cause root rot in some situations in the soil or on stubble of host crops such as corn, wheat and grasses. Plants become more susceptible to root rot following injury or other stress. Infection and damage become more likely as the plant matures and the roots grow. In certain circumstances the disease will start in the roots, but move up the plant to cause stalk rot and crown rot (Sparks, Cropwatch: Fusarium Root Rot, 2018).
  Whatever type of rot is caused, infections of the Fusarium fungus are typically seed borne. Some insects may also be a portion of the vector process by causing wounds to the plant that serve as a pathway for entry of the fungus. Currently, there are no hybrids that are resistant to the Fusarium fungus. Fungicide applications may be beneficial in reducing the severity of disease in infected fields, but the best method of prevention is to reduce the stress on plants (Sparks, Cropwatch: Fusarium Stalk Rot, 2018).

  As of January 1, 2019, nematodes had been identified in 59 counties that produce 93 percent of the state's soybeans (Wilson, Cropwatch: Fall Sampling for SCN, October 29, 2019)

Figure 3.7-c: Counties Reporting Soybean Cyst Nematodes, as of January 1, 2019



Source: University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Crop Watch: October 29, 2019, https://cropwatch.unl.edu/2019/sampling-scn-fall

Most of the damage caused by the nematodes is to the roots. Damage caused to the root system may prevent water from getting to the rest of the plant or the parasitic feeding may draw nutrients away from developing grain. Either way, harvested yield will decrease (Jackson-Ziems, Cropwatch: Nematodes, 2018).

Controlling nematodes is potentially difficult, as they are a chronic problem. Crop rotation may be effective, but only if certain types of nematodes are involved. There are some nematicide chemicals available on the market, but until recently their use was limited because of the tight margins on crops (Jackson-Ziems, Cropwatch: Nematodes, 2018).

Wheat Diseases and Pests

In 2019, Nebraska was eighth in the United States for winter wheat production with just over 55 million bushels and a production value of over $210 million (USDA, 2019). In Nebraska, diseases are a significant cause of yield loss in winter wheat. According to the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources, the disease of winter wheat that causes the most damage in Nebraska is wheat streak mosaic, caused by wheat streak mosaic virus. Other diseases commonly observed on winter wheat in Nebraska are leaf rust, and various leaf spots including tan spot (IANR, n.d.).

Insects are a potential cause of significant crop loss either directly by insects feeding on the plants, or indirectly as carriers of disease. There are several insects that may damage crops. Infestations may be limited to a field, or they may grow to be statewide in magnitude. Some of the significant wheat damaging insects in Nebraska include aphids, chinch bugs, wheat stem sawflies, and grasshoppers. Controls against damaging insect infestations can include physical

barriers, horticultural barriers, and chemical insecticides. These techniques all have varying levels of effectiveness, dependent upon the targeted insect, weather conditions, and degree of infestation (IANR, 2018).

- Wheat Streak Mosaic: This disease is caused by the wheat streak mosaic virus (WSMV), and is carried to plants by the wheat curl mite. The mite feeds on young growth of wheat and infects the plant. Wheat that has been infected with the virus will initially show a yellow pattern of streaks, turning into mottled yellow leaves as the disease progresses (Watkins & Wegulo, 2018).
  Early damage to leaves typically leads to reduced yield at harvest. As this disease and the pest that vectors it typically impact winter wheat, the key to prevention is the elimination of places the mites may inhabit through the summer. (Watkins & Wegulo, 2018). The key for WSMV management is preventing a green bridge for the wheat curl mite; thus, management of volunteer wheat and other grass hosts in surrounding fields that will be planted to wheat, and the incorporation of resistant varieties when available. are critical.

Figure 3.7-d: Wheat Streak Mosaic, Furnas County, May 29, 2020

Source: University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Crop Watch; https://cropwatch.unl.edu/2020/wheat-disease-update-barley-yellow-dwarf-and-fungal-leaf-spots-increasing

- Leaf Rust: Rust diseases are fungal diseases that are some of the most important fungal diseases of wheat around the world. They have a near global distribution, the potential to develop quickly under the proper environmental conditions, the ability to travel long distances, and the ability to develop into new races that can attack cultivars that were previously resistant. Leaf rust causes the most loss when the leaves of infected plants become covered in rust before the wheat flowers. Protection of the flag leaf-up is critical to assure maximum yield potential. This can result in smaller kernel size, thus reducing yield. The spores of this fungus are spread by wind and splashing water, typically spreading northward from southern states in April and May (Wegulo & Byamukama, Rust Diseases of Wheat, 2012).
  In 2007, the Great Plains were stricken by severe epidemics of leaf rust, causing yield losses across the region of up to 14%. Locally, losses may exceed 50% if the environmental conditions are favorable for disease development (Wegulo & Byamukama, Rust Diseases of Wheat, 2012). Other rusts are also capable of causing significant crop loss. Early disease onset of stem rust can cause up to 100% loss. In 1953 and 1954, an estimated 169 million bushels of wheat were lost to stem rust over the two years, with the loss valued at $2.6 billion. Stripe rust has been reported to cause up to 40% loss in certain types of wheat, while experimental fields have shown losses of up to 74% (Wegulo & Byamukama, Rust Diseases of Wheat, 2012).

Figure 3.7-e: Stripe Rust, Kimball County, January 27, 2019

Source: University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Crop Watch, January 27, 2020. https://cropwatch.unl.edu/2020/wheat-disease-update

Although planting resistant types of wheat may offer some protection, rust fungi have a track record of developing new races that are able to attack previously resistant types. Fungicides are effective if applied properly (Wegulo & Byamukama, Rust Diseases of Wheat, 2012).

- Tan Spot: Tan spot is a fungal disease that typically first appears in early April as small, tan to brown spots on leaves. As the disease develops, the spots grow, merge together, and produce large areas of dead tissue. Spores are carried by wind or blowing rain, and the disease progresses more quickly in rainy or otherwise high humidity weather that lasts longer than 24 hours (Wegulo, Klein, & Harveson, Tan Spot of Wheat, 2012). The threat of tan spot can be reduced by using a three-year crop rotation system known as ecofarming, or ecofallow. This method can break cycles of many diseases that may involve pathogens that survive in crop residue. Tan spot has been shown to cause yield losses of up to 50%, with highest losses in fields where no management methods are practiced (Wegulo, Klein, & Harveson, Tan Spot of Wheat, 2012).

Soybean Diseases and Pests

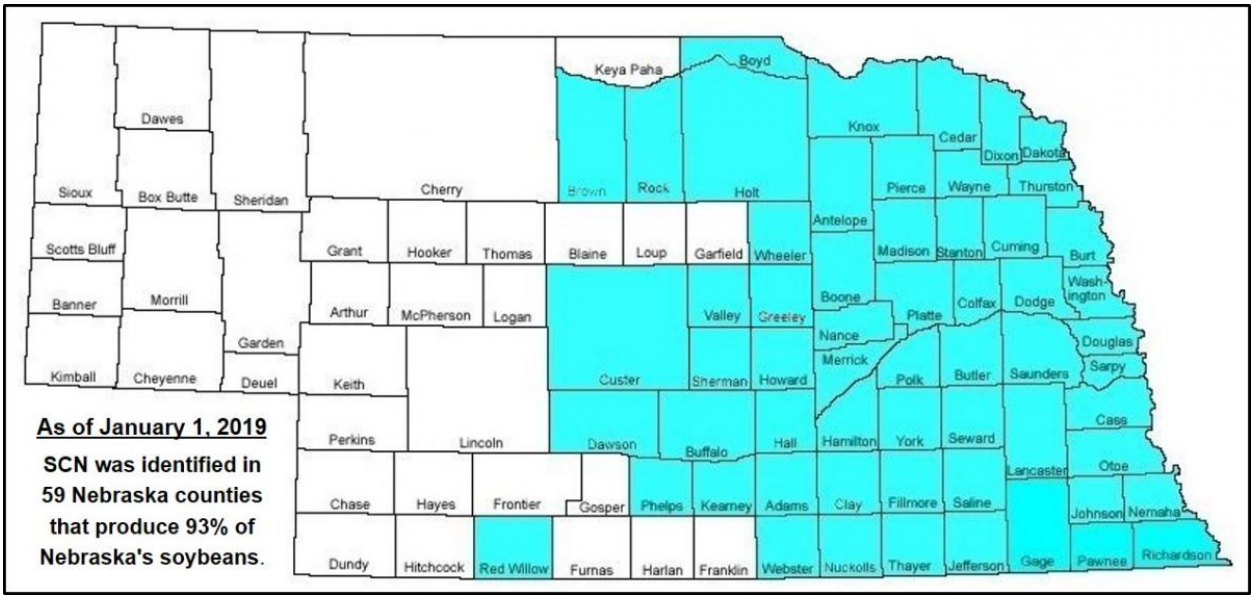
In 2019, Nebraska farmers produced more than 283 million bushels of soybeans for a production value of almost $2.4 billion (USDA, 2020). Exports of soybeans had a value of $3 billion in 2017 and 1.6 billion in 2016 (Nebraska Department of Agriculture, 2018). Soybeans are susceptible to diseases and pests, the most common of which include phytophthora root and stem rot and soybean cyst nematode (IANR, 2018).

- Phytophthora Root Rot: Phytophthora root and stem rot (PRR) is a persistent pathogen that is considered to be one of the most yield-limiting diseases to impact soybeans in the United States. Phytophthora is a fungus with many different races, or biotypes. The number of cases found in Nebraska has increased considerably over the last few decades. PRR is persistent in that it cannot be eradicated.

  Management is accomplished with a combination of integrated pest management tools. Selecting soybean varieties that have high disease tolerance and a minimum of one resistant gene. Incorporation of seed treatment fungicides which include increased rates of mefenoxam and metalaxyl. Finally avoiding planting fields with a history of PRR when soil temperatures are below 60°F.

- Soybean Cyst Nematode: Soybean Cyst Nematode (SCN) is a parasitic roundworm that preys on plants causing the most yield loss of soybean in the United States. As of January 1, 2019, SCN has been found in 59 counties throughout eastern and central Nebraska, seven more than noted in the 2019 SHMP (Fall Sampling for SCN, Institute of Agriculture and Natural Resources, University of Nebraska, October 29, 2019).

Figure 3.7-f: Soybean Cyst Nematodes identified in Nebraska Counties, as of January 1, 2019



Source: Fall Sampling for SCN, Institute of Agriculture and Natural Resources, University of Nebraska, October 29, 2019; https://cropwatch.unl.edu/2019/sampling-scn-fall

Low levels of SCN infestation may be undetectable above ground, not being indicated until yields are lower than anticipated. High levels of SCN infestation may be confused with damage from several other issues or diseases in that it will cause plant yellowing and stunting. One significant concern for SCN is that the nematodes, especially in the egg-filled cyst, easily move with anything that moves soil. Field equipment, vehicles, footwear, wildlife, water, and wind can all move nematodes to other sections of fields or even to previously uninfected areas (Giesler & Wilson, Soybean Cyst Nematode: Identification and Management, 2011).

Research has shown that SCN cannot be eradicated from a field once it has been infested, but population growth can be managed. Management can be done through the use of resistant varieties of seed, crop rotation, or chemical nematicides (Giesler & Wilson, Soybean Cyst Nematode: Identification and Management, 2011).

Diseases and Pests of Dry Beans

In 2019, dry bean production in Nebraska had a value just over $101 million on 155,000 harvested acres (USDA, 2020). Most of the dry bean production is centered in western Nebraska. In 2019, Nebraska was top producer in the nation of Great Northern beans, second in production of pinto and light red kidney beans, and fourth in all dry edible bean production (USDA/NASS, February 2020).

Diseases in dry beans are often a factor in reduction of yield. Root rots, especially fusarium root rot, are widely distributed throughout Nebraska, but there has been little research to determine how much yield reduction is due to the root rots. The most consistent damage is done by four

major bacterial diseases that typically occur simultaneously. Those are bacterial wilt, bacterial brown spot, bacterial blight, and halo blight (IANR, 2018).

There are many insects in the Central High Plains, the primary growing region for dry edible beans. Only a few of them are consistently responsible for significant crop damage. The most prevalent pest species are the western bean cutworm and the Mexican bean beetle. Other pests, like grasshoppers, seedcorn maggot, and thrips can also cause damage, but only do so occasionally (Hein & Peairs, 2018).

- Fusarium: Infections of the fusarium fungi can cause either root rot, wilt, or a combination. Fusarium root rot typically first presents as red to reddish-brown spots on the stems and primary root within a few weeks of planting. As the disease progresses, the spots may grow and merge. Symptoms above the ground may include yellowing and stunting of leaves (Harveson R., Cropwatch: Fusarium Root Rot, 2018). The earlier infection occurs during the growth of the bean plant, the more likely the plant is to suffer from stunting and premature leaf loss (Harveson R., Cropwatch: Fusarium Yellows Wilt, 2018). Fusarium wilt has a higher probability of causing plant death, but both diseases can cause early plant maturation by two to three weeks (Harveson R., Cropwatch: Fusarium Yellows Wilt, 2018).

  There are currently few types of bean that are resistant to Fusarium infections. Fungicide treatment of the seeds may provide early protection, but will not help as the season continues. Control options include planting in warmer soil, reducing plant stress, and crop rotation (Harveson R., Cropwatch: Fusarium Root Rot, 2018).

- Bacterial Wilt: This disease was first encountered in Nebraska in the 1950's and was a significant problem through the early 1970's. In 2003 the disease re-emerged in western Nebraska for the first time in a quarter century. Since its re-emergence, it has been found in hundreds of fields. Initial symptoms of the disease include leaf wilting during warm, dry weather. The wilting comes as a result of the damage the pathogen does to the plant's vascular system. Younger plants will usually have a higher rate of mortality. If the infected plants survive and produce mature seeds, those seeds are frequently stained (Harveson, Urrea, & Schwartz, Bacterial Wilt of Dry Beans in Western Nebraska, 2011).
  Management of this disease is done most effectively through use of genetically resistant types of plants. Chemical management options have not been sufficiently studied to determine effectiveness. The recent re-emergence of this disease has likely occurred as a result of changing agricultural practices. Producers have reduced the amount of tillage in their fields between growing seasons and increased the usage of center pivot irrigation in bean fields. Both of these practices improve the conditions for the survival and spread of certain diseases (Harveson, Urrea, & Schwartz, Bacterial Wilt of Dry Beans in Western Nebraska, 2011).

- Bacterial Brown Spot: Bacterial brown spot was first seen in Nebraska on the late 1960's in western Nebraska dry bean fields. Varieties of beans that were resistant to this

disease were first reported in 1969, but a lack of resistance in modern varieties has led to increased incidence of and damage from bacterial brown spot in recent years (Harveson R. M., Bacterial Brown Spot of Dry Beans in Nebraska, 2009).
This disease, like bacterial blight, causes most damage in warmer weather, when temperatures are between 80°F and 85°F. These bacteria are able to survive in bean residue and seeds from previous years. Its spread through and between fields, aided by wet weather, hail, and violent storms. Some copper-based sprays have been shown to decrease the impact of brown spot infections, but success depends on weather and type and amount of disease present. Prevention methods include using seed from sources that are verified to have not been infected previously, treatment of seeds before planting with antibiotics, and the use of a multi-year crop rotation system (Harveson R. M., Bacterial Brown Spot of Dry Beans in Nebraska, 2009).

- Bacterial Blight: Common bacterial blight of dry beans has been seen in Nebraska since dry beans were first introduced as a crop to the state in the 1920's. It is the most commonly observed bacterial disease of beans in the Central High Plains. It leads to reduced yield and seed quality, and is most destructive during extended periods of warm, humid weather. (Harveson R. M., NebGuide, 2009).
  Losses have been lessened through the use of bean types that are more resistant to the bacteria as well as by using seed stock produced in the western United States, where the conditions are drier. While some bacterial infections may be controlled with copper-based sprays, control has not been consistently achieved through that course of action for common bacterial blight. Other steps to control the disease include crop rotation, use of resistant types of beans, and basic biosecurity measures (Harveson R. M., NebGuide, 2009).

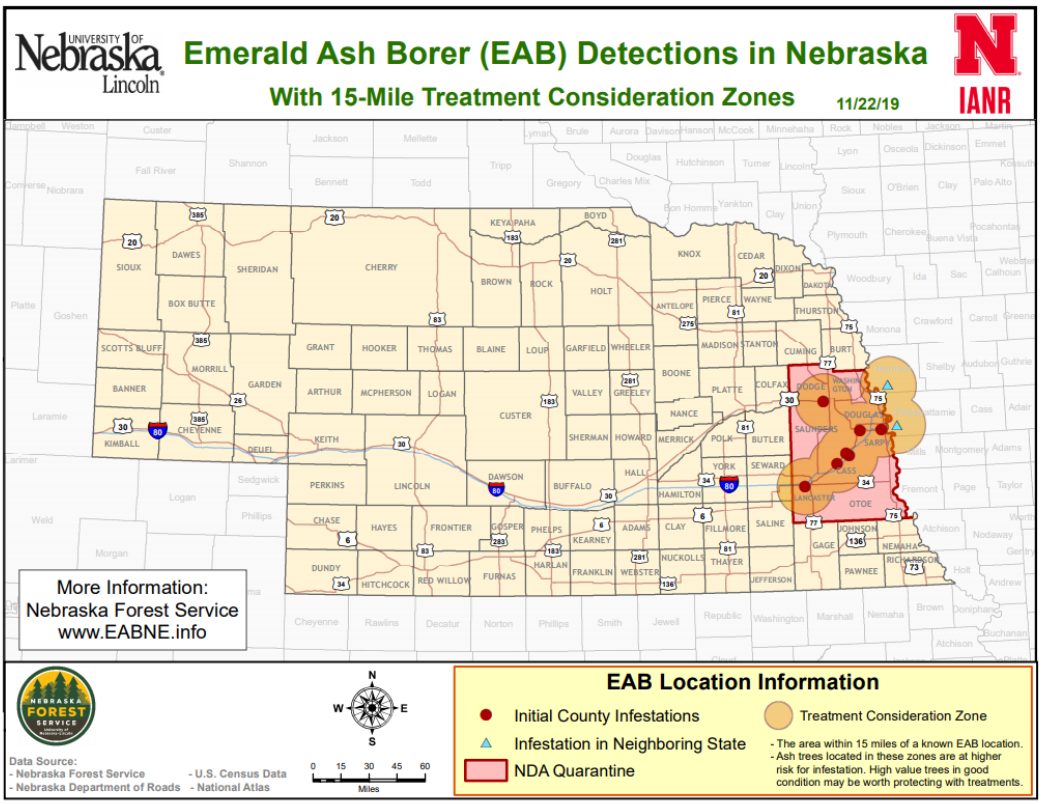
- Halo Blight: Halo blight has been found on Nebraska farms for over three-quarters of a century. Losses due to halo blight have been reduced by using varieties of seed that are resistant to the disease. This disease is considered to be a major problem wherever bean production is marked by more moderate temperatures, 68F° to 72°F. This disease may lead to shriveled seeds and considerable loss of yield (Harveson R. M., Halo Blight of Dry Beans in Nebraska, 2009).
  Management methods are similar to any of the bacterial diseases of dry beans: some copper-based chemicals will help, if applied at the right time, and prevention techniques include using disease-free seed, crop rotation, and basic biosecurity measures (Harveson R. M., Halo Blight of Dry Beans in Nebraska, 2009).

Non-agricultural plant diseases and pests

Not all plant diseases and pests in Nebraska target agricultural resources. There are several diseases and pests that impact landscape plants in communities throughout the state. One of the pests of most immediate concern is emerald ash borer.

- Emerald Ash Borer: One of the costliest pests to affect non-agricultural property in Nebraska is the Emerald Ash Borer (EAB). EAB was introduced to the United States in Detroit, Michigan in 2002. It is a beetle that is native to Asia. EAB is able to kill ash trees, regardless of age, size, or health. So far, EAB infestations have destroyed ash trees in 25 states. Nebraska Forest Service predictions are that some 44 million trees in Nebraska will be lost, such as forests, windbreaks, and urban trees. As of November 22, 2019, EAB have been found in several eastern Nebraska counties, with Dodge, Washington, Douglas, Sarpy, Saunders, Cass, Otoe, and Lancaster counties in a Nebraska Department of Agriculture quarantine to prevent movement of ash lumber out of potentially infested areas (Nebraska Forest Service, 2020).

Figure 3.7-g: Emerald Ash Borer Detections in Nebraska, November 2019



Source: Nebraska Forest Service; https://nfs.unl.edu/pictures/ForestHealth/EABmap_2019-11-22.pdf

The Emerald Ash Borer attacks and kills all North American species of true ash trees. While treatments are available to prevent tree death from EAB, they are not inexpensive (approximately $100 per treatment, per tree) and require repeated, regular treatment by tree care professionals (every year or two throughout the life of the tree) in order to be

effective. Unfortunately, treating the tree to prevent emerald ash borer causes other damage to the tree that leaves it susceptible to other diseases and pests. EAB is thought to be in an area for 3-4 years before detection. Once it is detected, observations show that in four years, 10% of the ash trees in the area will be killed, and another 70% in the next four years (Nebraska Emerald Ash Borer Working Group, 2017).

In order to be proactive in the battle against the Emerald Ash Borer, the State of Nebraska has established the Nebraska Emerald Ash Borer Working Group to create a response plan and to lead the execution of that plan, when needed. In 2015, the working group estimated that there are one million ash trees publicly and privately owned in communities across Nebraska, and that the emerald ash borer will have an economic impact statewide of $961 million (Nebraska Emerald Ash Borer Working Group, 2015). Nebraska Forest Service (NFS) estimates that Nebraska communities will be forced to commit over $275 million to protect themselves from infested, publicly-owned ash trees (Nebraska Forest Service, 2020, https://nfs.unl.edu/community-planning-eab).

- Japanese Beetle: Japanese beetles are invasive pests first found in the United States in New Jersey in 1916. Japanese beetles are currently found in 41 counties: Adams, Buffalo, Burt, Butler, Cass, Clay, Colfax, Cuming, Dakota, Dawson, Dodge, Douglas, Fillmore, Gage, Hall, Hamilton, Howard, Jefferson, Johnson, Lancaster, Lincoln, Madison, Merrick, Nance, Nemaha, Otoe, Pawnee, Phelps, Pierce, Platte, Polk, Richardson, Saline, Sarpy, Saunders, Seward, Thayer, Thurston, Washington, Wayne, and York Counties (NDA, 2018). This scarab-type beetle is a pest throughout its entire life. As a larva, the grubs will feed on turf roots, killing large areas of grass. As an adult, its sharp mouth will eat leaves, flowers, and fruit on over 300 different kinds of plants, including linden trees, soybeans, grapes and more. Chemical pesticides are available, but protection usually only lasts a few days when treating for the adults of the species. Chemicals are available to treat for the grubs, but that is no guarantee that adults will stay away, as they fly to find a place to feed (Larson, 2018).

3.7.4 – Probability of Future Events and Impacts of Climate Change

In one way, or another, crop farming in Nebraska is impacted by diseases and pests every year. Several of the diseases have shown a tendency to change over time, allowing for the infection of previously resistant cultivars. If observed meteorological trends hold out, climatological conditions will lead to situations of greater stress on the plants, leading to easier paths of infection and higher yield losses. Similarly, if the trend continues of rising temperatures, the number and appetite of insects is predicted by some to rise, as well (Carrington, 2018). Not only will the loss increase due to consumption by insects, more pests will lead to greater amounts of insect-borne plant diseases being spread to previously uninfected fields.

With shifting climate zones, insects native to other climates may now be able to survive within the state of Nebraska where as previously they could not. Many native plants do not have a defense against these insects.

3.7.5 – Local Plan Data

Twenty of the state's local plans discuss plant diseases. The *Papio-Missouri Natural Resources District 2016 Hazard Mitigation Plan* indicates an approximate annual probability of plant disease of 100%. Similarly, the *Central Platte NRD Hazard Mitigation Plan,* dated 2017 shows a probability of plant disease of 100% annually. Due to the unpredictability of the potential source and spread of plant diseases, neither of those plans, nor any of the other local hazard mitigation plans, give an indication of the likely extent of the risk.

3.7.6 – Jurisdictional Vulnerability and Potential Economic Losses

All jurisdictions within Nebraska would be impacted if a large-scale plant disease or pest infestation caused greatly reduced yield in Nebraska's bigger cash crops. A loss in production would lead to losses in farm revenue as well as state and local tax revenue. Rural communities could see further population losses as farmers, unable to meet financial demands, lose their land to creditors. Prices of impacted commodities would rise at the markets, leading to increased costs being passed on to the consumers. Wherever a farm is located, that area is prone to the hazards of plant diseases. Most of the fungal diseases are carried on the wind for hundreds of miles, and many of the bacterial diseases are pest-borne and/or survive in debris from previous crop cycles.

3.7.7- Vulnerability of State Facilities and Potential Dollar Losses

State assets would not be directly impacted by this hazard. However, indirect economic consequences from a severe incident could cause impacts to state funding abilities and stress to state government. Nebraska's $6.8 billion in total agricultural exports in 2018 translates to $8.7 billion in additional economic activity (USDA/NASS, 2020). In addition, every dollar in agricultural exports generates $1.28 in economic activities such as transportation, financing, warehousing and production (USDA/NASS, 2020). Plant disease outbreak or pest infestation could negatively impact crop production and agriculturally dependent businesses. Nebraska's crop products are among some of the top five agricultural production rankings in the U.S, as described in **Table 3.7-3**.

Table 3.7-3: Top Five U.S. Agricultural Production Rankings of Nebraska Crops

Rank	Crop/Product
1st	Great Northern bean production, 2019
	Popcorn production, 2017
2nd	Pinto bean production, 2019
	Light Red Kidney bean production, 2019
3rd	Corn for grain production, 2019
	Corn exports. 2018
4th	Soybean production, 2019
	All dry edible bean production, 2019
5th	Soybean exports, 2018
	Alfalfa hay production, 2019
	Harvested acres of principal crops, 2019
	Cash receipts from all crops, 2018

An extreme outbreak or infestation could potentially result in millions of dollars in production losses. The cascading negative economic effects could result in wide-spread business failures, reduction of tax revenues, harm to economies in other states, and diminished capability for this country to compete in the global market.

3.7.8 - Future Population and Development Trends

Because plant disease and pests are not limited to geographic boundaries, it is difficult to identify development and population trends that may be impacted by this hazard unless there is a significant increase in agricultural land use for crop production.

The potential for impacts of future growth and development on plant disease and pests will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed, and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future.

3.7.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to plant disease and pests as well as other information from the Local Hazard Mitigation Plan updates:

- Have any plant disease and pest events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict plant disease and pest events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to plant disease and pests?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to plant disease and pests?

3.7.10 - Data Sources

Data sources referenced in this section were utilized to collect the most recent data and information available at the time of plan revision. In some cases, the numbers of cases mentioned are based on 2019 numbers drawn from Nebraska Department of Agriculture reports.

- 2019 Nebraska Hazard Mitigation Plan
- Japanese Beetle, Larson, 2018
- Nebraska Department of Agriculture - https://nda.nebraska.gov/plant/entomology/pest_survey/index.html
- Nebraska Forest Service:

    - Emerald Ash Borer Detections in Nebraska. Retrieved at: https://nfs.unl.edu/pictures/ForestHealth/EABmap_2019-11-22.pdf
    - Nebraska Emerald Ash Borer Working Group, 2015
- University of Nebraska-Lincoln - https://cropwatch.unl.edu/tags/plant-disease
- University of Nebraska-Lincoln - https://cropwatch.unl.edu/plantdisease/corn
- National Agricultural Statistics Service, U.S. Department of Agriculture (2019 and 2020). Retrieved at: https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NEBRASKA and https://omaha.com/money/number-of-farms-in-nebraska-fell-by-200-last-year-continuing-decline/article_98f433be-c4ef-539f-adc4-2181a6d4445e.html
    - "USDA Agricultural Projections to 2020", USDA Economic Research Service. Retrieved at: https://www.ers.usda.gov/publications/pub-details/?pubid=37719
    - "USDA Agricultural Projections to 2029", February 2020. Retrieved at: https://www.ers.usda.gov/webdocs/outlooks/95912/oce-2020-1.pdf?v=2136.6
- University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources publication (IANR), "Crop Watch" (January 8, 2020)
    - Giesler & Wilson, Soybean Cyst Nematode: Identification and Management, 201
    - Harveson R., Cropwatch: Fusarium Root Rot, 2018
    - Harveson R., Cropwatch: Fusarium Yellows Wilt, 2018
    - Harveson, Urrea, & Schwartz, Bacterial Wilt of Dry Beans in Western Nebraska, 2011
    - Harveson R. M., Bacterial Brown Spot of Dry Beans in Nebraska, 2009
    - Harveson R. M., Halo Blight of Dry Beans in Nebraska, 2009
    - Hein & Peairs, 2018
    -
    - Jackson-Ziems, Korus, Adesemoye, & Van Meter, 2016
    - Jackson-Ziems & Broderick, Southern Rust of Corn Confirmed in Nebraska, 2018)
    - Ortiz-Castro, M., Hartman, T., Coutinho, T., Lang, J.M., Korus, K., Leach, J.E., Jackson-Ziems, T., and Borders, K.; Current Understanding of the History, Global Spread, Ecology, Evolution, and Management of the Corn Bacterial Leaf Streak Pathogen, Xanthomonas vasicola pv. Vasculorum. Phytopathology published online May 4 2020: https://doi.org/10.1094/PHYTO-01-20-0018-PERStack & Jackson-Ziems, Cropwatch: Anthracnose, 2018
    - Sivits & Jackson-Ziems, Cropwatch: Bacterial Leaf Streak of Corn in Nebraska, June 27, 2019
    - Sparks, Cropwatch: Fusarium Stalk Rot, 2018
    - Sparks, Cropwatch: Fusarium Root Rot, 2018
    - Stack & Jackson-Ziems, Cropwatch: Southern Rust, 2018
    - Terra Hartman, University of Nebraska-Lincoln, https://cropwatch.unl.edu/2019/corn-disease-update
    - Watkins & Wegulo, 2018
    - Wegulo & Byamukama, Rust Diseases of Wheat, 2012
    - Wegulo, Klein, & Harveson, Tan Spot of Wheat, 2012)

- Wilson, Cropwatch: Fall Sampling for SCN, October 29, 2019
- Fall Sampling for SCN, Institute of Agriculture and Natural Resources, University of Nebraska, October 29, 2019. Retrieved at: https://cropwatch.unl.edu/2019/sampling-scn-fall

SECTION 3.8: SEVERE THUNDERSTORM (HAIL AND HIGH WIND)

2021 SHMP Update
• Reformatted Severe Thunderstorm Profile • Enhanced Severe Thunderstorm characteristics • Added factors for consideration in the next planning cycle • Added Data Sources at the end of the section

Hazard	Definition and Key Terms
Severe Thunderstorm	The National Weather Service (NWS) considers a thunderstorm as severe if at least one out of two events start to occur: **hail** that is one inch in diameter or larger, or **wind gusts of** 58 miles per hour (mph) or greater. In addition, a tornado might be a component of a severe thunderstorm. Severe thunderstorms also produce lightning, which can cause a substantial amount of damage during an event but is not included in the NWS definition of a severe thunderstorm.

3.8.1 – Hazard Description

Hazardous weather is defined as a dangerous meteorological event with the potential to cause damage, serious social disruption, or loss of life. The potential for hazardous weather exists almost any time and in any place. The impacts of these events depend on latitude, altitude, topography, and atmospheric conditions.

Hazardous weather events in Nebraska in 2019 resulted in five (5) fatalities, seven (7) injuries, more than $640.5 million in property damage, and $27.7 million in crop damage. Total damages of $668.2 million in 2019 placed Nebraska in fourth place of all states in the cost of these events. (NWS, 2019)

Severe thunderstorms with high winds and hail are a hazard associated with severe weather conditions that can affect any region of the state at any time of the year; however, severe weather conditions are most prevalent in the early spring and throughout the summer.

Lightning is the third product that can be produced by a severe thunderstorm. According to the National Weather Service, lightning is the occurrence of a natural electrical discharge of very short duration and high voltage between a cloud and the ground or within a cloud, accompanied by a bright flash and typically also thunder. Although lightning is a product of a severe thunderstorm, it doesn't constitute a severe thunderstorm because all thunderstorms have lightning. If a citizen can hear thunder but cannot see a flash of lightning, that doesn't mean someone can't still be struck. Whenever thunder is present, it is recommended that shelter should be taken.

Hail

Hail is produced by a severe thunderstorm that forms small ice particles and supercooled water droplets when lifted into a thunderstorm by its updraft. These

particles can combine, fall into the downdraft of the storm, and then, if the updraft is strong enough, be recycled back up above the freezing level in the storm (NOAA, 2019). Once this process repeats several times, the hail grows and becomes heavier, thus falling to Earth.

By scientific agreement, an icy conglomeration is called a hailstone when it reaches a diameter of 1/5 inch (5 mm). Hailstones can grow as big as a grapefruit in diameter, which would cause heavy damage, but only needs to be an inch to be considered severe. In all its forms, hail usually occurs in relatively short episodes rather than as steady precipitation. In Nebraska, expected hail damage could affect people, homes, businesses, crops, and utility infrastructure.

The National Weather Service (NWS) classifies hail by diameter and corresponding everyday objects to help relay scope and severity to the population.

Table 3.8-1: Hailstone Measurements

Estimated Size	Average Diameter (inches)	Estimated Size	Average Diameter (inches)
Pea	¼	Golf Ball	1 ¾
Marble/mothball	½	Tennis Ball	2 ½
Dime/Penny	¾	Baseball	2 ¾
Nickel	7/8	Tea Cup	3
Quarter	1	Grapefruit	4
Ping-Pong	1 ½	Softball	4 ½

Source: NWS

High Winds

The types of damaging winds defined in this section are straight-line wind, downdraft, downburst, microburst, gust front, and derecho. Windstorms in Nebraska are usually of fairly short duration, very intense, and hard to predict. Straight-line winds often impact a wider area than tornadoes.

Table 3.8-2: Damaging Wind Definitions

Type of High Wind	Definition
Straight-line Winds	Wind that comes out of a thunderstorm, but is not associated with rotation
Downdraft	Small-scale column of air that rapidly sinks toward the ground.
Downburst	Strong downdraft with horizontal dimensions larger than 2.5 miles resulting in an outward burst of damaging winds on or near the ground.

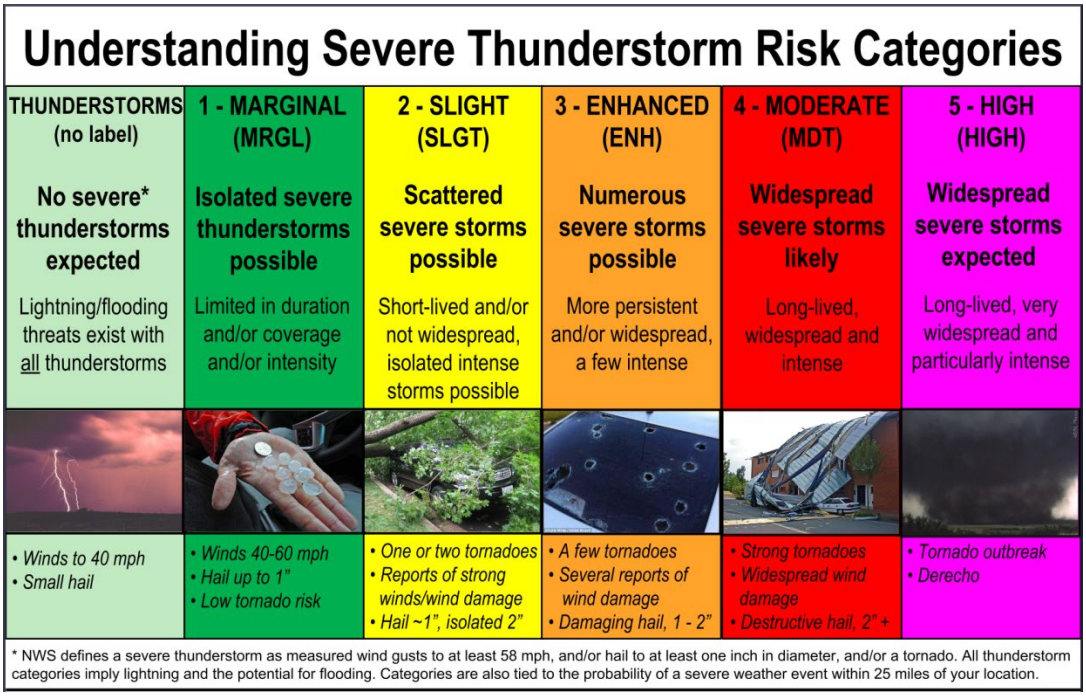
Type of High Wind	Definition
Microburst	Small, short-lived, concentrated downburst that produces an outward burst of damaging winds at the surface.
Gust Front	A wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Sometimes the winds push up the air above them, forming a shelf cloud or detached roll cloud.
Derecho	Widespread wind storm that is associated with a band of rapidly moving showers or thunderstorms, it consists of numerous microbursts, downbursts, and downburst clusters.

Source: NWS

The primary effect on buildings is structural damage due to the lifting or suction force of the wind from the exterior, as well as the blowout force of the wind if it penetrates the interior. The results can be loss of roofs, walls, porches, lifting the building off the foundation, or complete destruction. Other sources of wind damage are from trees and wind-born objects and debris. Rain during or after a windstorm is also a threat due to the damaged buildings being left exposed and water infiltration causing additional damage.

Figure 3.8-a provides a graphical representation of severe thunderstorm risk categories and their potential magnitude. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of an individual's location.

Figure 3.8-a: Severe Thunderstorm Risk Categories



Source: http://www.spc.noaa.gov/misc/about.html

Table 3.8-3: Severe Thunderstorm Impact/Consequence Summary

Severe Thunderstorm Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing - depending on the wind and the size of hail, most damages are roofs, siding, and windows from wind and hail. If there are extreme straight-line winds, homes and buildings may incur major damage or be destroyed Casualties/Fatalities – may occur with individuals lacking shelter during the storm Work - Business and industrial buildings can incur similar damages or can be shut down temporarily due to loss of electrical power Food/water - little impact
Responders: Fire, Police, Medical, Public Works	Depending on the strength of the wind and size of hail, responders need to be aware of the possibility of downed electrical lines as they move debris from roadways. Some search and rescue may be needed but is unusual unless the storm spawns tornadoes.
Continuity of Operations	Unless governmental facilities are severely damaged, which is rare, or there is a prolonged loss of power where some electronic records are destroyed or damaged, there is little impact.
Property: Destroyed, Major, Isolated	Homes and businesses may have minor damages similar to housing (above). There may be some properties isolated due to flash flooding.
Infrastructure: Electricity, Water, Roads, Bridges	Electricity can be the most impacted by a severe thunderstorm. High winds can affect structures and lines, causing outages. Water and wastewater systems can be impacted if an electrical outage is prolonged
Environment	Limited impact except that due to flash flooding
Economic Conditions	Depending on the level and coverage of the storm, businesses may experience large amounts of damage. Farms may experience damage to crops, buildings, and livestock.
Public Confidence in the Governance	The public will expect the government to effectively conduct disaster operations and return the community back to a normal state within a reasonable time. Failure to do so may lead to a lack of confidence in governance.

3.8.2 – Location

Thunderstorms can be isolated events covering a relatively small geographical area or can develop into squall lines that traverse the entire state. The risk of thunderstorms is generally equal throughout the state, with random variations in frequency from county to county and the risk of somewhat higher wind speeds in the eastern and southeastern portions of the state. (See Section 3.11, **Figure 3.11-b** Wind Zones in the United States.) The extreme eastern and southeastern regions of the state are located within Zone IV, indicating potential wind speeds of up to 250 miles per hour. The central and western regions of the state are located within Zone III, with the potential for wind speeds of up to 200 miles per hour.

In conclusion, the whole state can be affected by severe thunderstorms, including all rural terrain, as well as all urban areas.

3.8.3 – Previous Occurrences and Extent

In the past 12.5 years (2008 - June 2020), there have been 979 event days of severe thunderstorms that include thunderstorm wind or hail. During that same period, Nebraska experienced 15 declared disasters related to severe thunderstorms, the most recent declared in August 2018. Overall, these 15 disasters have affected 302 counties (multiple counties have been affected more than once). Of Nebraska's 93 counties, only four (Grant, Hitchcock, Keith, and Kimball) have not been involved in declared severe storm disasters since 2008 (FEMA.gov/disasters). The total cost of Public Assistance from these disasters is more than $203 million when P.A. dollars obligated for each disaster are adjusted for inflation.

Table 3.8-4: Federal Declared Disasters: Severe Thunderstorms

DR#	Type	Incident Period	Declaration Date	P.A. Obligated	Dollars Adjusted for Inflation (to May 2020)	# Counties Effected
DR-4387	Severe Storms, Tornadoes, Straight-line winds, Flooding	June 17-July 1, 2018	August 27, 2018	$713,719.21	N/A	11
DR-4325	Severe Storms, Tornadoes, Straight-line winds	June 12-17, 2017	August 1, 2017	$19,768,675.81	$20,101,726.24	18
DR-4225	Severe Storms, Tornadoes, Straight-line winds, Flooding	May 6-June 17, 2015	June 25, 2015	$14,235,509.29	$15,294,710.69	28
DR-4185	Severe Storms, Tornadoes, Straight-line winds, Flooding	June 1-4, 2014	July 28, 2014	$3,937,963.86	$4,525,180.92	12
DR-4183	Severe Storms, Tornadoes, Straight-line	June 14-21, 2014	July 24, 2014	$12,420,716.97	$13,336,620.38	12

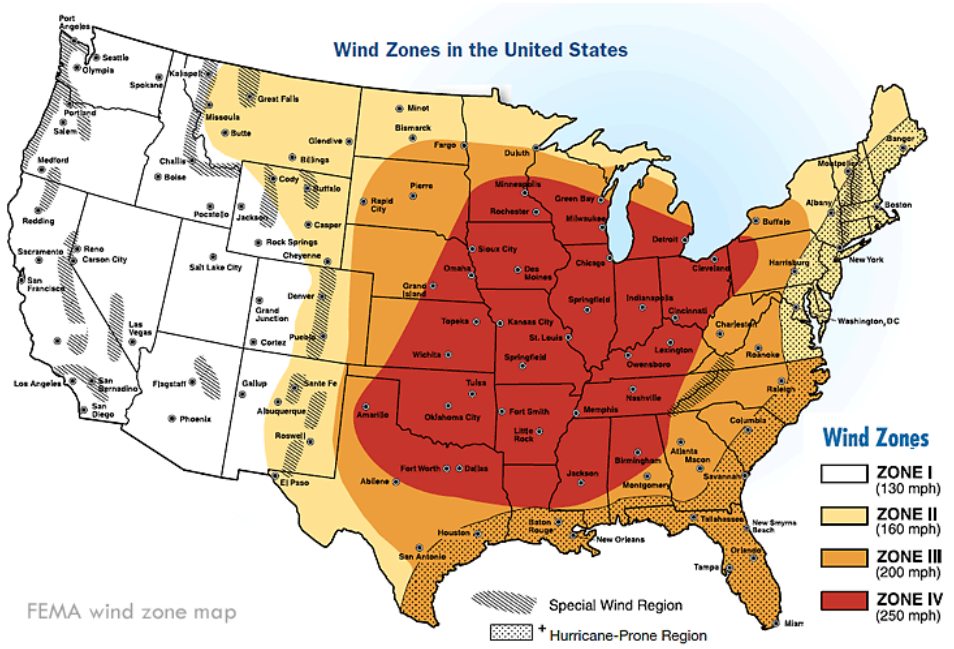
	winds, Flooding					
DR-4179	Severe Storms, Tornadoes, Straight-line winds, Flooding	May 11-12, 2014	June 17, 2014	$10,125,817.92	$10,892,700.69	6
DR-4156	Severe Storms, Tornadoes, Straight-line winds, Flooding	October 2-6, 2013	November 26, 2013	$2,670,513.58	$2,937,772.33	10
DR-4014	Severe Storms, Tornadoes, Straight-line winds	June 19-21, 2011	August 12, 2011	$3,362,468.45	$3,805,498.84	12
DR-1945	Severe Storms, Tornadoes, Straight-line winds, Flooding	September 13-14, 2010	October 21, 2010	$2,138,551.99	$2,907,448.78	7
DR-1924	Severe Storms, Flooding, Tornadoes	June 1-August 29, 2010	July 15, 2010	$49,926,354.50	$58,716,384.67	61
DR-1902	Severe Storms, Ice Jams, Flooding	March 6-April 3, 2010	April 21, 2010	$3,112,391.72	$3,660,392.75	37
DR-1853	Severe Storms, Tornadoes, Flooding	June 5-June 26, 2009	July 31, 2009	$4,491,366.48	$5,347,360.44	17
DR-1779	Severe Storms, Straight-line winds, Flooding	June 27, 2008	July 18, 2008	$12,058,393.64	$14,055,480.80	4
DR-1770	Severe Storms, Tornadoes, Flooding	May 22-June 24, 2008	June 20, 2008	$36,258,650.19	$42,485,663.02	62

DR-1765	Severe Storms, Tornadoes, Flooding	April 23-26, 2008	May 30, 2008	$499,319.42	$590,967.65	5
TOTAL PUBLIC ASSISTANCE DOLLARS FOR DECLARED DISASTERS, 2008-2020 (ADJUSTED FOR INFLATION to MAY 2020) - $203,326,735.94						

Source: FEMA. Retrieved at: https://www.fema.gov/disaster/4387

While the frequency of occurrence is relatively equal across the state, the extent of wind speed based on scientific models indicates that the magnitude may be slightly higher in the east-southeast portions of the state. **Figure 3.8-b** illustrates the wind zone in the southeast portion of the state as Zone IV, with a wind speed potential of 250 miles per hour, while the remainder of the state is in Zone III, which is 200 miles per hour.

Figure 3.8-b: Wind Zones in the United States



Source: "Taking Shelter from the Storm: Building a Safe Room Inside Your House", FEMA. Retrieved at: https://www.fema.gov/pdf/library/ism2_s1.pdf

Although the wind map indicates this slight difference in potential wind speed across the state, actual damage costs from previous events reveal that there is similar potential for impacts and loss throughout the state. As an example, the NOAA, NCEI Storm Events Database, between 1950 and February 2020, documents in relation to severe thunderstorms $1.961 million in property damages, and $149,000 in crop damages for Custer County, located in the central part of Nebraska. In the same time period, Lancaster County, located in the southeast part of the state, incurred $1.505 million in property damages and no crop damages.

The strength or magnitude of severe thunderstorms varies greatly depending on multiple meteorological, environmental, and geological factors such as latitude, altitude, topography, and atmospheric conditions. In addition, there is seasonal variation in severe weather events, which influence a storm's characteristics, warning time, speed of onset, and duration. Most thunderstorms are preceded by a warning period of variable length, which allows for some level of preparedness. The duration can last for minutes, hours, or even multiple days in extreme weather events.

3.8.4 – Probability of Future Events and Impacts of Climate Change

In the period 2008 to June 2020, the state experienced an average of 78.3 event days annually. For the purpose of providing a quantifiable probability for future events for this plan, data was retrieved from the NOAA/NCEI Storm Events Database for the period January 1, 2008, to June 30, 2020. This period (12.5 years) captures data (under the categories: thunderstorm wind and hail) that are statistically similar to other storm seasons. Using this methodology, there were 979 severe winter storm events over this 12.5-year period.

Based on the historic occurrence of severe thunderstorms over this period, it can be estimated that the recurrence interval for this hazard is 0.013 years[12], indicating that, on average, a severe thunderstorm event will be equaled or exceeded within that time period.

Due to the geographic location of the state within the continent and the event history, it is highly likely that multiple severe thunderstorm events will occur each year. Climate studies support the fact that extreme events have increased since 1980, with the United States experiencing more than 150 weather events with damages of $1 billion or more. During 2011 and 2012, 25 severe storms, floods, droughts, heatwaves, and wildfires occurred, with a combined total loss of $188 billion. (Bathke, et al, 2014). This study presents data that also supports a 16% increase in the annual amount of precipitation falling in very heavy events from 1901 to 2012.

Projected changes in the climate should be considered in relation to the probability of future severe thunderstorm events. Nebraska has experienced general warming of about 1 degree since 1895 (Bathke, et al, 2014), with the majority of this warming occurring during the winter months. Minimum temperatures are rising 2.0-4.0° degrees F per century and maximum temperatures increase 1.0-2.5° F per century. The precipitation trend shows an increase in the northern Great Plains, which is projected to become more pronounced. In addition, future changes in the climate also indicate a continued increasing trend in the number of heavy precipitation events, which could include hail and high winds, and could occur two to five times as often as they do currently depending on future greenhouse gas emissions (Union of Concerned Scientists, www.ucsusa.org).

3.8.5 – Local Plan Data

[12] Statistical calculation based on 1.5 years of record with 38 events during this time period.

All local plans assess this hazard as a high risk. In the Statewide Hazard Identification and Risk Assessment Survey conducted in all counties in June 2020, Severe Thunderstorm was the second-highest hazard of concern. All local plans provide mitigation techniques for severe thunderstorms such as installing and maintaining surge protection for critical facilities, burying overhead power lines, incorporating text messaging into severe weather messaging programs as well as establishing mutual aid agreements with neighboring communities and privately owned businesses. The severe thunderstorm hazard will continue to be a high-profile hazard, which will be addressed with local plan integration.

3.8.6 – Jurisdictional Vulnerability and Potential Losses

The whole population of the state is vulnerable since all of Nebraska is highly likely to be affected. “Vulnerable populations related to severe thunderstorms include the elderly, those living in mobile homes, and those caught outside during storm events. During severe thunderstorms, it is not uncommon for residents and towns to lose power for a temporary or prolonged period of time. These power outages may prove deadly for elderly citizens that are reliant upon machines to remain alive. The elderly are generally less mobile than many other members of the community, making them more vulnerable to a wide range of threats. Unanchored or improperly anchored mobile homes are at high risk during thunderstorms because they can be turned over by winds of 60 to 70 mph” (Twin Platte Plan, 2016).

The state realizes that a threat exists from severe thunderstorms and encourages local entities to apply for saferoom and warning siren funding. Entities are also encouraged to apply for both 404 and 406 hazard mitigation funding. Business owners are also encouraged to apply for applicable USDA and SBA funds.

3.8.7: Vulnerability of State Assets and Potential Dollar Losses

Due to the geographic location of the state, the probability of future events is very high. The number of thunderstorms expected to affect the state depends on yearly global weather patterns, making long-range prediction difficult. The entire state and all state assets are susceptible to thunderstorms/high winds/hail/lightning and experience hazard impacts on a regular basis; consequently, all state assets are vulnerable to severe thunderstorms.

State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in **Table 3.8-5.**

Table 3.8-5: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10

Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.8.8 - Future Population and Development Trends

Because severe thunderstorms are not generally limited to specific geographic locations or population groups, it is difficult to identify development and population trends that may be impacted by this hazard. Current land use and building codes incorporate standards that address and mitigate wind loads for buildings. In addition, pre-engineered designs for safe rooms are available for residences and commercial buildings.

The potential for impacts of future growth and development on severe thunderstorms will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future will be considered.

3.8.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation, and updating, this plan should consider the following factors related to severe thunderstorms as well as other information from the Local Hazard Mitigation Plan updates:

- Have any severe thunderstorm events occurred since the adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict severe thunderstorm events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment, or economy that could affect the risk or vulnerability to a severe thunderstorm?
- Is there any new evidence related to the impact of climate change that could affect the level of risk or vulnerability to a severe thunderstorm?

3.8.10: Data Sources

- FEMA
  - Federal Disaster Declarations. Retrieved at: https://www.fema.gov/disaster/4387
  - "Taking Shelter from the Storm: Building a Safe Room Inside Your House," FEMA. Retrieved at: https://www.fema.gov/pdf/library/ism2_s1.pdf
- Nebraska Department of Administration, Risk Management
- NOAA/National Weather Service:
  - 2019 Summary of Hazardous Weather Fatalities, Injuries, and Damage Costs by State. Retrieved at: https://www.weather.gov/media/hazstat/state19.pdf

    - NCEI Storm Events Database. Retrieved at: https://www.ncdc.noaa.gov/stormevents/
    - Severe Thunderstorm Risk Categories. Retrieved at: http://www.spc.noaa.gov/misc/about.html
- *Twin Platte Multi-Jurisdictional Hazard Mitigation Plan Update,* 2016
- *Understanding and Assessing Climate Change*; Bathke, Oglesby, Rowe and Wilhite, UNL, 2014
- Union of Concerned Scientists, www.ucsusa.org

SECTION 3.9 SEVERE WINTER STORM

2021 SHMP Update
• Reformatted Severe Winter Storm Profile • Enhanced Severe Winter Storm characteristics • Added factors for consideration in the next planning cycle • Added Data Sources at the end of the section

Hazard	Definition and Key Terms
Severe Winter Storm	An event that occurs during the winter season and includes one or more of the following conditions: snow, ice, high winds, blizzard conditions, and other wintry conditions; causing potential health and safety impacts as well as physical damage or loss to improved property (National Weather Service, 2013). It can range from a moderate snow over a few hours to a blizzard with blinding wind-driven snow that can last for multiple days.

3.9.1 – Hazard Description

A Severe Winter Storm is the second most common event in the state of Nebraska behind Severe Thunderstorms. The NOAA/NCEI Storm Events Database includes 456 individual reports of severe winter weather (reported as either blizzard, heavy snow, ice storm, winter storm, winter weather, or a combination of these) between January 1, 2019 and March 1, 2020. These events result from the collision of high-pressure systems with moderate temperatures and low-pressure systems having lower temperatures. The storms may contain freezing rain, sleet, significant snowfall, and high winds. The complex mixture of moisture, temperature, high pressure, and low-pressure systems creating winter storms is generally unique for each storm. Some severe winter storms can be defined as blizzards and ice storms.

During late October through mid-April, temperatures can range between 0 degrees Fahrenheit and 32 degrees Fahrenheit with February having the greatest average snowfall.

The most extreme conditions related to severe winter weather are ***blizzard*** and ***ice storm:***

- **Blizzard**

  Blizzards are the most spectacular and vicious of all winter storms. They are characterized by strong winds bearing large amounts of snow. They have the capacity to completely immobilize large areas. Ground blizzards can also occur when snow that has already fallen gets picked up and blown around from heavy winds causing limited visibility. Blizzards occur most frequently in the northern Great Plains and upper Mississippi Valley. They can occur from the first of October to the end of April, but most often occur from early November to the end of March.

  According to the National Weather Service (NWS), a blizzard occurs when the following conditions last for three hours or longer:

- Wind speeds of 35 miles per hour (mph) or more
- Considerable falling and/or blowing snow (reducing visibility frequently to less than 1/4 mile)
- Generally, temperatures of 20 degrees Fahrenheit (F) or lower

To be considered a *severe* blizzard, the system must have:

- Wind speeds of 45 mph or more
- A great density of falling and/or blowing snow (reducing visibility frequently to near zero)
- Temperatures of 10 degrees F or lower

- **Ice Storm**

Ice storms are a type of winter storm characterized by freezing rain which occurs when raindrops move into a thin layer of below-freezing air near the surface of the earth, allowing them to freeze on contact to the ground, trees, overhead utility lines, cars and other objects. The U.S. National Weather Service defines an ice storm as a storm which results in the accumulation of at least 0.25 inch of ice on exposed surfaces. Impacts from ice storms are most commonly vehicle accidents and damage to utility infrastructure. Ice accumulation can also collapse roofs on buildings.

- Impacts can include hazardous driving and walking conditions, and significant damage and/or injury from tree branches and power lines snapping under the weight of the ice
- Black ice presents a deadly driving hazard when ice on surfaces cannot be seen
- Ice jams can occur when bodies of water have long periods of frozen spells which cause a rise in the water level or a thaw breaks the ice into large chunks which become jammed at manmade and natural obstructions in the waterway

Table 3.9-1 describes the most common impacts and consequences from severe winter storms, which include life safety concerns and disruption of critical functions and their related services to the public.

Table 3.9-1: Severe Winter Storm Impact/Consequence Summary

Severe Winter Storm Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – Roofs can collapse from heavy wet snow. Pipes can break from cold if there is a prolonged electrical outage causing water damage. Casualties/Fatalities – There are chances for frostbite on exposed skin, hypothermia for people caught outdoors which can cause death, and heart attacks for people shoveling snow. Work – Employees will likely have a difficult time traveling to and from places of employment. Buildings can also have roof damage or fail due to heavy snow, and there can be prolonged power outages that stop work.

	Food/Water – On an individual basis, an individual or family can be caught with low or no food and unable to leave the house or travel to a store due to winter storm conditions.
Responders: Fire, Police, Medical, Public Works	Conditions are very hard and dangerous for rescuers in severe winter storms. Low temperatures, strong winds, and heavy snow make traveling dangerous for the general public and responders. Loss of power may hinder the ability for facilities without generators or limited generator capacity to operate as needed.
Continuity of Operations	Government can struggle for a few days with limited staff able to get to work. Plans for working from home may not be feasible if electrical power is also affected by the storm.
Property: Destroyed, Major, Isolated	Property damage is usually limited to some roof damage or failure. There can be isolation of large areas due to the inability to maneuver on snow packed or icy roads.
Infrastructure: Electricity, Water, Roads, Bridges	All infrastructure is impacted in a severe winter storm: electrical systems are brought down by winds and ice; water systems and waste-water systems can be affected by the temperatures; inability of operators to reach the facilities and prolonged electrical outages; roads and bridges become impassable and require large amounts of effort, time, and money to clear.
Environment	Limited impact, there may be larger than normal loss of wildlife due to a lack of food during prolonged winter storms.
Economic Conditions	Plowing snow and repairing major electrical systems can greatly exceed current budgets, causing stress on local and state government finances. The ability for businesses to return to normal operations may experience short-term delays.
Public Confidence in the Governance	Depends on the existing relationship between affected communities and the government, and how quickly and efficiently governments open roads, restore power, and brings things back to normal.

3.9.2 – Location

Storms and blizzard conditions may impact anywhere from one to two counties to the extent of the entire state. Due to the geographic location and climate makeup of the state of Nebraska, the whole region is likely to experience severe winter storms including blizzards and ice storms. Large-sized ice storms have historically caused large power outages across multiple counties. Table 3.9-2 demonstrates the geographic areas affected by recent severe winter weather events between January 2019 and March 2020, and storm-related impacts.

Table 3.9-2: Severe Winter Storm/Weather Events, 2019 – 2020*

Date	Type	Location	Deaths	Injuries	Total Prop Damage	Total Crop Damage
Jan 2019	Winter Storm, Winter Weather	Banner, Buffalo, Cass, Clay, Dawson, Douglas, Fillmore, Franklin, Furnas, Gage, Gosper, Jefferson, Johnson, Lancaster, Nemaha, Nuckolls, Otoe, Pawnee, Phelps, Richardson, Saline, Thayer	0	0	0	0

Date	Type	Location	Deaths	Injuries	Total Prop Damage	Total Crop Damage
Feb 2019	Heavy Snow, Winter Storm, Winter Weather	Adams, Antelope, Boone, Buffalo, Butler, Cass, Cedar, Clay, Colfax, Cuming, Dakota, Dawson, Dixon, Dodge, Douglas, Gage, Fillmore, Franklin, Furnas, Gosper, Greeley, Hall, Hamilton, Harlan, Howard, Jefferson, Kearney, Knox, Lancaster, Madison, Merrick, Nance, Nemaha, Nuckolls, Phelps, Pierce, Platte, Polk, Saline, Sarpy, Saunders, Seward, Sherman, Stanton, Thayer, Thurston, Valley, Washington, Wayne, Webster, York	0	4 (York)	0	0
March 2019	Blizzard, Heavy Snow, Winter Weather	Adams, Arthur, Banner, Boone, Box Butte, Buffalo, Burt, Butler, Cass, Cherry, Cheyenne, Clay, Colfax, Cuming, Dawes, Deuel, Dawson, Dodge, Douglas, Franklin, Furnas, Gage, Garden, Gosper, Grant, Greeley, Hall, Hamilton, Harlan, Hooker, Howard, Jefferson, Johnson, Kearney, Keith, Kimball, Lancaster, Logan, McPherson, Merrick, Morrill, Nance, Nemaha, Nuckolls, Otoe, Pawnee, Phelps, Platte, Polk, Saline, Sarpy, Saunders, Scotts Bluff, Seward, Sheridan, Sherman, Sioux, Saunders, Thayer, Thomas, Thurston, Valley, Webster, York	0	0	0	0
April 2019	Blizzard, Winter Storm, Winter Weather	Antelope, Arthur, Banner, Blaine, Box Butte, Boyd, Brown, Cedar, Chase, Cherry, Cheyenne, Dawes, Dawson, Deuel, Furnas, Garden, Gosper, Greeley, Grant, Hitchcock, Holt, Hooker, Keith, Keya Paha, Kimball, Knox, Lincoln, Logan, Loup, McPherson, Morrill, Perkins, Red Willow, Rock, Scotts Bluff, Sheridan, Sioux, Thomas, Valley	0	0	0	0
May 2019	Heavy Snow	Banner, Dawes, Sioux	0	0	0	0

Date	Type	Location	Deaths	Injuries	Total Prop Damage	Total Crop Damage
Oct 2019	Heavy Snow	Box Butte, Dawes, Sioux	0	0	0	0
Nov 2019	Blizzard, Heavy Snow, Winter Storm, Winter Weather	Adams, Antelope, Banner, Blaine, Boone, Box Butte, Boyd, Buffalo, Burt, Butler, Cedar, Chase, Cherry, Cheyenne, Clay, Colfax, Cuming, Custer, Dakota, Dawes, Dawson, Deuel, Dixon, Dodge, Dundy, Franklin, Frontier, Furnas, Hall, Hamilton, Harlan, Hitchcock, Holt, Hooker, Howard, Garden, Garfield, Gosper, Grant, Greeley, Hayes, Hooker, Kearney, Keith, Keya Paha, Kimball, Knox, Lincoln, Logan, Loup, Madison, McPherson, Merrick, Morrill, Nance, Perkins, Pierce, Phelps, Platte, Polk, Red Willow, Rock, Saunders, Scotts Bluff, Seward, Sheridan, Sherman, Sioux, Stanton, Thomas, Thurston, Valley, Washington, Wayne, Webster, York	0	0	$60,000 (Grant, Hooker, Thomas)	0
Dec 2019	Blizzard, Winter Storm, Winter Weather	Adams, Antelope, Banner, Blaine, Box Butte, Boyd, Brown, Buffalo, Cherry, Custer, Dakota, Dawes, Dawson, Dixon, Franklin, Frontier, Furnas, Hall, Hamilton, Harlan, Holt, Hooker, Howard, Garfield, Gosper, Greeley, Kearney, Keya Paha, Knox, Lincoln, Logan, Loup, McPherson, Merrick, Morrill, Nance, Phelps, Pierce, Scotts Bluff, Sherman, Sioux, Rock, Sheridan, Thomas, Valley, Webster, Wheeler	0	0	$50,000 (Hooker, Rock, Thomas)	0
Jan 2020	Blizzard, Winter Weather	Dakota, Dixon, Red Willow	0	0	0	0
Feb 2020	Blizzard, Heavy Snow, Winter Weather	Dakota, Dawes, Dixon, Furnas, Gosper, Harlan, North Sioux	0	0	0	0
TOTAL			**0**	**4**	**$110,000**	**0**

Source: NOAA, NCEI

*At the time of this update, NCEI data was current through February 29, 2020.

The summary of severe winter storm events described in **Table 3.9-2** represents 456 individual storm reports by 95 counties or zones, indicating the high frequency and widespread nature of severe winter storm events in Nebraska. The data also shows relatively low impacts associated with these events, most likely due to the high level of preparedness of state and local governments; the adequacy of resources to respond to these events; and the advanced warning provided to residents and visitors.

3.9.3 – Previous Occurrences and Extent

In the past two (2) years (2019-2020), there have been more than 42 days of severe winter weather-related events (blizzard, heavy snow, winter storm and winter weather), including one (1) Federal Disaster Declaration related to winter storms (NCEI, FEMA). **Table 3.9-3** demonstrates Public Assistance costs related to Disaster Declarations for Severe Winter Storm events between 2009 and 2020.

Table 3.9-3: Federally Declared Disasters for Severe Winter Storms, 2009-2020

Federally Declared Disasters: Severe Winter Storms (Federal Share)				
DR#	**Year**	**PA Obligated**	**Emergency Work (Cat. A, B)**	**Permanent Work (Cat. C-G)**
4420	2019	$67,077,671.39	$13,687,020.17	$44,910,712.13
4375	2018	$2,936,202.37	$138,931.64	$3,797,270.73
4321	2017	$2,674,036.90	$3,249.79	$1,402,159.36
4156	2013	$2,670,513.58	$913,403.65	$1,721,740.89
1878	2010	$6,577,021.37	$3,133,357.82	$3,340,563.19
1864	2009	$5,125,804.16	$161,232.94	$4,945,531.00
TOTALS		**$ 20,983578.38**	**$ 4,350,175.84**	**$ 15,207,265.17**

Source: FEMA

The most recent impacts from severe winter weather occurred on February 23, 2019, when near whiteout conditions on Interstate 80 led to several large multi-vehicle accidents, two, coincidentally involving rescue units responding to the scenes. One accident in York County resulted in four injured rescue personnel, two seriously, when their unit was struck by a semi-truck.

According to NOAA/NCEI, there have been four (4) recorded fatalities from winter storms between 2009 to February 29, 2020. Three occurred in 2009 in Douglas County, which included one directly related, and two indirectly related to the storm event. There was also one death that occurred in Box Butte in 2013 which was directly related to the storm. For ice storms, NCEI lists 14 events since 1950 with four deaths, five injuries, and $77.5 Million estimated property damage.

3.9.4 – Probability of Future Events and Impacts of Climate Change

It is somewhat difficult to calculate recurrence intervals for severe winter storm due to the likelihood that the event occurs over multiple days. For the purpose of providing a quantifiable probability for future events for this plan, data was retrieved from the NOAA/NCEI Storm Events

Database for the period November 1, 2018 to April 30, 2020. This period (18 months) covers two winter seasons and captures data (under the categories: blizzard, heavy snow, ice storm, winter storm and winter weather) that are statistically similar to other storm seasons. Where "events" reported in the NOAA/NCEI database covered two (or three) consecutive days, this was counted as one "event". Using this methodology, there were 38 severe winter storm events over this 18-month period.

Based on the historic occurrence of severe winter storms over this period, it can be estimated that the recurrence interval for this hazard is 0.39 years[13], indicating that on average a severe winter storm event will be equaled or exceeded within that time period.

With Nebraska's climate location, winter storms are highly likely each winter with varying degrees of severity. Historical data indicates that several severe storms will impact the state each season with storms covering areas from a few counties to the entire state.
Projected changes in the climate should be considered in relation to the probability of future events. Nebraska has experienced general warming of about 1 degree since 1895 (Bathke, et al, 2014), with the majority of this warming occurring during the winter months. Minimum temperatures are rising 2.0-4.0° degrees F per century and maximum temperatures increase 1.0-2.5° F per century. Although, trends for winter storms show an increase in frequency and intensity since 1950 as well as a poleward shift in the storm tracks, it is anticipated that the extent of snow cover will decrease in future years in part because of warmer temperatures causing earlier melt and increasing amounts of precipitation that falls as rain rather than snow. (Bathke, et. al., 2014). In addition, snowfall amounts show regional variability, with general increases in the northern Great Plains and Great Lakes regions. The UNL report further addresses future impacts from winter events:

> "Snow cover extent changes in direct response to projected increased temperatures and in response to more variable changes in precipitation. Temperature changes reduce the amount of time that snow remains on the ground and affect the fraction of precipitation that falls as snow rather than rain. Given the consistency among model studies, scientists conclude that it is virtually certain that Northern Hemisphere snow cover extent will decrease in the future."
>
> "A major concern for Nebraska and other central Great Plains states is the current and continued large projected reduction in snowpack for the central and northern Rocky Mountains. This is due to both a reduction in overall precipitation (rain and snow) and warmer conditions, meaning more rain and **less snow, even in winter**. Flows in the Platte and Missouri rivers during the summer months critically depend on the slow release of water as the snowpack melts." (Bathke, et. al., 2014, p. xii)

In conclusion, with the meteorological trend of the weather becoming warmer due to global warming, and climate change projections that indicate less snow in the winter, there is a slightly

[13] Statistical calculation based on 1.5 years of record with 38 events during this time period.

lower potential for large/record amounts of snowfall. Essentially this makes the future winter storm events highly likely, but with the potential for decreased impacts.

3.9.5 – Local Plan Data

A review of local hazard mitigation plans (LHMPs) was conducted to examine their discussions of severe winter storms. All plans listed severe winter storms as a common hazard and this hazard ranked as the number one hazard of concern in the Statewide Hazard Identification and Risk Assessment survey conducted with all counties in June 2020.

The *Twin Platte Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)*, dated 2016, was reviewed. That plan indicated an annual probability of 100% with 163 events in the last 19 planning years for the planning area. Some mitigation strategies that the Twin Platte Plan is using for a severe winter storm include purchasing additional snowplows, providing adequate fire protection, promoting first aid training to all staff, improving/providing adequate backup and emergency generators, reducing tree damage and damage from trees, windbreak improvements, improving and revising snow/ice removal program and to ensure there is an adequate emergency fuel supply plan. Lastly, there are a few practices that Twin Platte uses for all hazards such as keeping up with exercises, emergency operations and other basic emergency management practices which would also be used for a severe winter storm. (Twin Platte MJHMP, 2017)

The *Papio-Missouri River Natural Resources District Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)*, dated February 2016, was also reviewed and noted to state that the multi-jurisdictional area also has an annual probability of 100% with 372 events that have occurred in the last 19.6 years. Their key mitigation strategies practices for a severe winter storm include the use of snow fences to protect vulnerable transportation routes, burying power lines and electrical services, maintaining back up power generators, review and improve snow/ice removal protocols, the installation of windbreaks and living snow fences, as well as increasing community awareness. The Papio-Missouri River MJHMP also describes the use of practices such as incorporating cable TV interruption warning systems and establishing road closure policies and procedures necessary to protect the public. (Papio-Missouri River NRD Plan, 2016)

Additionally, the *Emergency Management Region 23 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) Update*, dated March 2015, from the northwest part of the state was reviewed and also noted an annual probability of 100% with 83 events occurring within the last 18 years. Region 23 mitigation practices include improving building codes to eliminate flat roofs in areas that expect heavy snow loads, retrofit buildings and infrastructure to withstand snow loads, increase weather monitoring procedures, incorporate cable TV interruption warning systems, develop a database of “vulnerable populations”, establish public education programs to increase awareness of the dangers posed by severe winter storm, and also establish a Tree Board to assist in the development of a tree management program. (Region 23 MJHMP, 2015)

In conclusion, the Twin Platte Natural Resources District (NRD), the Papio-Missouri River NRD and the Region 23 multi-jurisdictional plans all assess severe winter storm as having a 100% chance of an event occurring annually. The three samples reviewed also represent various geographical areas of the state. This verifies that the state of Nebraska as a whole is likely

going to be affected by a severe winter storm event. In relation to mitigation practices and local plan integration, the local HMPs have similar mitigation techniques and practices for a severe winter storm and also look at the state plan as guidance for additional needs.

3.9.6 – Jurisdictional Vulnerability and Potential Losses

The Twin Platte MJHMP provides a comprehensive statement about jurisdictional vulnerability and potential losses in relation to people, property, and critical infrastructure:

> *"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 include residents of nursing homes, young children, the elderly, and those living in less than adequate environments. Critical facilities and infrastructure including 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 during severe winter storm events due to potential power outages and other damages"* (Twin Platte 2015 update).
>
> *"Individuals and families below the poverty line and those isolated from social interactions may lack resources or access to resources that could mitigate the impacts of severe winter storms. Needed resources include sufficient food supplies when snowed in, and alternative heating sources during prolonged power outages. Severe winter storms often result in closed or impassable roadways. This increases the vulnerability among segments of the population that already have decreased mobility, making it important that they have a social network that can check on them and ensure they have access to heat and food. Finally, people who are new to the area may not know what to expect from a severe winter storm and what actions are appropriate in preparing for the event. Threat communication is imperative for informing and educating this portion of the population"* (Twin Platte 2015 update).

Functional needs populations may be at risk of being snowed which limits access and emergency response. Hospitals, nursing homes, and other critical facilities may require generator power and support for several hours or days during recovery operations.

Impact on Population Growth and Future Development

The entire state of Nebraska is vulnerable to winter storms, with the nature of vulnerability varying across the state. In populated areas, travel difficulties along with power outages can be significant. Rural areas also experience travel difficulties along with drifting snow. Power outages can range from several hours to several days depending on the location and ability of responders to conduct repairs. Livestock experience increases in stress along with shortages of water and feed that can lead to increased death rates. All development in the state is vulnerable to these types of storms.

3.9.7 – Vulnerability of State Assets and Potential Dollar Losses

State assets have a high vulnerability to severe winter storms. Buildings can experience damage from heavy snow, power failure, and wind. Additionally, winter storms require large numbers of state staff to respond when clearing state highways. Given the wide range of vulnerability, determining estimates of potential loss cannot be accurately determined. State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in **Table 3.9-4.**

Table 3-9-4: State Property Replacement Values Top Ten Counties

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.9.8 - Future Population and Development Trends

Because severe winter storms are not limited to geographic boundaries or population groups, it is difficult to identify development and population trends that may impact this hazard. Current land use and building codes incorporate standards that address and mitigate snow loads on roofs and other conditions related to extreme cold and freezing weather.

A prime consideration in future population trends within communities is the level of social vulnerability that my limit resources available to individuals to prepare for severe winter storms. Changing levels of social vulnerability within a community are likely to result in an increased level of vulnerability to the hazard. Understanding changes in social vulnerability across the state or in certain regions would help in preparing for and mitigating against potential impacts of severe winter storms.

The potential for impacts of future growth and development on severe winter storm will be monitored and evaluated in the next planning cycle to determine whether the level of risk and vulnerability has changed, and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future.

3.9.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to severe winter storm as well as other information from the Local Hazard Mitigation Plan updates:

- Have any severe winter storm events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict severe winter storm events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to severe winter storm?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk and/or vulnerability to severe winter storm?

3.9.10 – Data Sources

- Bathke, D., Oglesby, R., Rowe, C., Wilhite, D. Understanding and Assessing Climate Change: Implications for Nebraska, University of Nebraska – Lincoln.
- FEMA
  - Federal Disaster Declarations. Retrieved at: https://www.fema.gov/disaster/4387
- Nebraska Department of Administration, Risk Management
- NOAA/National Weather Service:
  - 2019 Summary of Hazardous Weather Fatalities, Injuries, and Damage Costs by State. Retrieved at: https://www.weather.gov/media/hazstat/state19.pdf
  - NCEI Storm Events Database. Retrieved at: https://www.ncdc.noaa.gov/stormevents/
  - Severe Thunderstorm Risk Categories. Retrieved at: http://www.spc.noaa.gov/misc/about.html
- *Papio-Missouri River Natural Resources District Multi-Jurisdictional Hazard Mitigation Plan*, February 2016,
- *Emergency Management Region 23 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) Update*, March 2015
- *Twin Platte Multi-Jurisdictional Hazard Mitigation Plan*, 2016
- Union of Concerned Scientists, www.ucsusa.org

SECTION 3.10: TERRORISM

2021 SHMP Update
• Reformatted Terrorism Profile • Enhanced Terrorism characteristics • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Terrorism	Title 22, Chapter 38 U.S. Code of Federal Regulations, § 2656f defines terrorism as, "premeditated, politically motivated violence perpetrated against noncombatant targets by subnational groups or clandestine agents" (GOVINFO, n.d.).

3.10.1 – Hazard Description

The definition of terrorism changes slightly according to the source and the purpose of the definition. As of 2018, the Federal Bureau of Investigation (FBI) uses two definitions of terrorism: **international** and **domestic**:

- ***International terrorism*** - Violent, criminal acts committed by individuals and/or groups who are inspired by, or associated with, designated foreign terrorist organizations or nations (state-sponsored). (FBI, 2020)
- ***Domestic Terrorism*** – Violent, criminal acts committed by individuals and/or groups to further ideological goals stemming from domestic influences, such as those of a political, religious, social, racial, or environmental nature. (FBI, 2020)

Potential Threat Elements and Methods

Acts and threats of terrorism can be classified into these potential threat categories:

1. Insider Threat
2. Criminal Threats (Unsophisticated, Sophisticated, and Organized)
3. Vandals
4. Extremist Protest Groups
5. Foreign Intelligence Services
6. Natural Disasters (flood, tornado, severe winter weather, wildfire, etc.)
7. Epidemic/Pandemic Disasters

Acts of Terrorism may be carried out through a wide varied of methods, including:

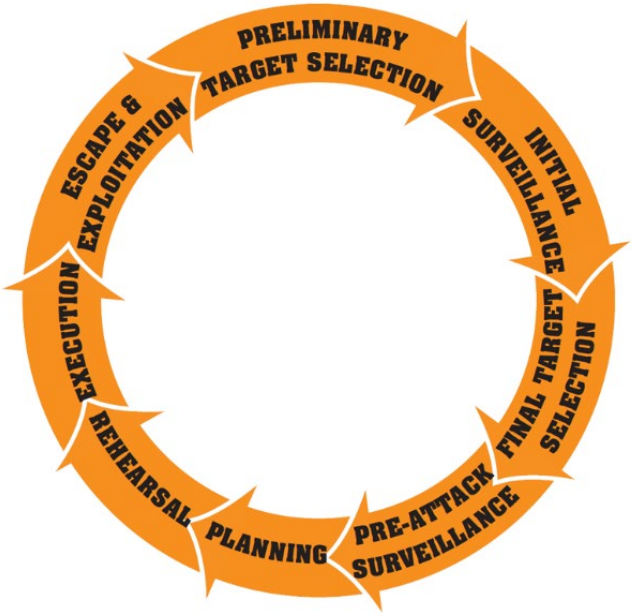
- Chemical, Biological, Radiological or Nuclear (CBRN)
- Improvised Explosive Device (IED)
- Vehicle-borne Improvised Explosive Device (VBIED)
- Mail Bomb
- Active Shooter
- Hostage Situation
- Kidnapping

- Theft
- Vandalism
- Espionage
- Sabotage
- Identity Theft
- Unmanned Aircraft Systems (UAS)/Unmanned Aerial Vehicle (UAV)

The formation of a terrorist is a complicated process with many potential patterns. This makes predicting the radicalization of an individual difficult, as well as whom or what they will choose to target. However, psychology and neuro-imaging techniques have helped to identify certain commonalities such as cultural perspectives, a self-perception of victimhood, and vicinity to other disenfranchised peoples with similar angsts and plights. Terrorism in America is typically witnessed as domestic terrorism that is committed against minorities. Since 2001, biased crimes against Middle Eastern/Muslim populations and Jewish populations have increased steadily (FBI Crime Statistics, 2018). By and large, most acts of terrorism in the United States, and specifically Nebraska, are committed by white nationalists, white supremacists, Neo-Nazis, and other far-rightwing organizations (McGarrity, 2019). However, terrorist crimes have been committed by Muslim-based extremists, leftwing extremists such as eco-terrorists, and other independently associated activists. It should be well understood that of all terrorist activities in the United States only a fraction of a percent of them have been committed by foreign actors or immigrants of legal or illegal status (Nowrasteh, 2016).

Understanding the terrorist attack planning cycle can help first responders and public safety personnel recognize preoperational activities. Terrorists generally plan attacks in observable stages, although specific details, sequencing, and timing can vary greatly and change over time. Preattack surveillance, training, and rehearsals are the stages of the planning cycle that are often observable and can offer opportunities to identify plots and prevent attacks (*Counter Terrorism Guide*, U.S. Office of the Director of National Intelligence, 2020). Whereas most people remain at the lowest level and never become radicalized, some follow a path illustrated by this model after experiencing hardship.

Figure 3.10-a: Terrorist Attack Planning Cycle



Source: Counter Terrorism Guide, U.S. Office of the Director of National Intelligence, 2020

Special considerations need to be made at every level of managing terrorism events. A simple focus on the threat of terrorism can lead to a diminishment of resources and preparedness that may impact the government's ability to manage terrorism and other hazards (Chung, 2013). Due to the inherent unpredictability of terrorism, some mitigation efforts may be more focused on making a place less of a target overall through spatial planning and physical designs. Plans to do so may include physical decentralization of key functions, recognition of non-mitigatable vulnerabilities, strong information security, and strong communication plans and redundancies which exceed perceivable thresholds that would be overwhelmed in the chaotic incidence of a terrorist attack. Other efforts may be considered as well, however all mitigation strategies ought to be vetted by both local knowledge experts and experts in counterterrorism prior to utilization.

A rapidly developing area of terrorism is the use of connections of the internet to commit crimes and terror across electronic networks. The National Conference of State Legislatures defines ***cyberterrorism*** as:

- *the use of information technology by terrorist groups and individuals to further their agenda. This can include use of information technology to organize and execute attacks against networks, computer systems and telecommunications infrastructures, or for exchanging information or making threats electronically. Examples are hacking into computer systems, introducing viruses to vulnerable networks, web site defacing, denial of service attacks, or terroristic threats made via electronic communication.*

Nebraska has experienced several cyber-attack incidents that may qualify as cyber terrorism; however, the sensitive nature of these attacks limits the amount of discussion within this plan.

Coordination of Terrorism Surveillance, Preparedness and Response

Following the terrorist attack of September 11, 2001, coordination of terrorist threats and activities were enhanced within government agencies to develop multi-level governmental preparedness and response capabilities. In addition to numerous programs that funded law enforcement resources for local and state governments, multi-agency and multi-discipline coordination efforts were developed, including:

- ***Joint Terrorism Task Forces (JTTFs)*** – serve as the coordination action arms for federal, state, and local government response to terrorism threats in specific U.S. geographic regions. The JTTFs leverage collective resources of the member agencies for the prevention, pre-emption, deterrence, and investigation of terrorist acts that affect U.S. interests, to disrupt and prevent terrorist acts, and to apprehend individuals who may commit or plan to commit such acts. The Federal Bureau of Investigation (FBI) is the lead agency that oversees JTTFs, which provide "one-stop shopping" for law enforcement information or investigation of suspected or real terrorist activities.

- ***Nebraska Information Analysis Center (NIAC)*** – is a collaborative effort of two or more agencies that was designated by the Governor as the state's Fusion Center and is housed within the Nebraska State Patrol, supported by U.S. Department of Homeland Security resources. The NIAC provides resources, expertise, and information to the center with the goal of maximizing the ability to detect, prevent, investigate and respond to criminal and terrorism activity (*Fusion Center Guidelines*, August 2006). In addition, the NIAC promotes resiliency of Nebraska's critical infrastructure from an all-crimes and all-hazards basis. To accomplish its mission, NIAC collects, evaluates, analyzes, and disseminates information and intelligence regarding criminal terrorist activity to federal, state, local and tribal law enforcement agencies, other Fusion Centers, and to the public and private entities, as appropriate. Although fusion centers predate the 9/11 terrorist attacks, the concept gained momentum following that event and was promoted by state and local law enforcement and homeland security officials as a more efficient and effective way to protect communities through information sharing among law enforcement and other government agencies such as emergency management, fire/emergency medical services, public health, education, and others.

- ***Nebraska Military Department Protection Team*** – members of this team participate in both the JTTF and the NIAC as Points of Contact. In addition, the Protection Department hosts protection working groups that include members and guests from across the Nebraska Military Department on a semi-annual basis.

Table 3.10-1: Terrorism Impacts and Consequences

Terrorism Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – impact on housing should be small to non-existent as residential areas are not highly rated as targets. Housing adjacent to more probable targets have a higher likelihood of suffering damage. Mortality and Morbidity – dependent on the target and if there is warning to the facility impacted. High fatality could be the goal of the perpetrator. Work – dependent on the target and medium of attack. Food and Water – impact on food and water should be limited unless food and water is the intended target of the attack. Identify theft – individuals may be targeted for exploitation by terrorists for the purpose of espionage, sabotage, etc.
Responders: Fire, Police, Medical, Public Works	Responders should be aware and vigilant while on scene. Secondary devices may be present and intended to cause the public or themselves more harm. All precautionary measures should be heeded during a terrorism event to prevent additional casualties. If a scene is deemed a potential terrorist event, it must be treated with the care of a crime scene.
Continuity of Operations	If the target is government property, a strong Continuity of Operations (COOP) plan will hasten the recovery of essential services.
Property: Destroyed, Major, Isolated	The target of the attack may suffer major damage or be destroyed. Other properties in the vicinity of the target may also suffer damage.
Infrastructure: Electricity, Water, Roads, Bridges	If targeted, infrastructure could be destroyed. If not targeted, there should be little to no impact on the services outside of the immediate targeted area.
Environment	Environmental impact is dependent on the size, target, and surroundings of a terrorist attack.
Economic Conditions	Impact on the economy can vary greatly in both extent and severity. The damage may affect anything between the local economy and the global economy, depending on the target and severity of the attack.
Public Confidence in the Governance	The ability of the government to return life to normal conditions quickly and efficiently will play a major role in public confidence. Thorough investigations will be conducted and the following questions will need to be answered: Was enough done to prevent the attack? How quickly were the offenders identified and captured? Did the government orchestrate the recovery of the disaster adequately?

3.10.2 – Location

Due to the inherently unpredictable nature of terrorism, virtually all areas of the state are potential targets of terrorism and vulnerable to casualties and property damage. However, areas of particular concern are heavily populated areas; areas with known racial, ethnic, or other demographic factions and those important to daily economic or governmental activity. **Figure**

3.10-a depicts multiple locations in the Nebraska where terrorist events have taken place between 1975 and 2017.

Figure 3.10-a: Location of Terrorist Events in Nebraska, 1970-2020

Source: SPLC, 2020

Currently, there are eight (8) established hate groups in Nebraska. Although these groups pose a low risk statewide, they are known for their recruiting efforts, especially towards military personnel. These groups pose increased risks to their immediate vicinity as well as ethno-cultural centers of peoples they may target. The groups are primarily tracked through the Nebraska Military Department and the Southern Poverty Law Center's Hate Map (SPLC, 2020)

Table 3.10-2: Location of Hate Groups in Nebraska

Location of Hate Groups in Nebraska		
Group	***Focus***	***Location(s)***
AC Skins	Racist Skinhead	Statewide
American Vanguard organization	White Nationalist	Statewide
Global Faith Institute	Anti-Muslim	Omaha
Great Millstone	Black Separatist	Omaha
Israelite Church of God in Jesus Christ	Black Separatist	Omaha
National Socialist German Workers Party	Neo-Nazi	Lincoln, Fairbury
Patriot Front	White Nationalist	Statewide
Third Reich Books	Neo-Nazi	Fairbury

Terrorists typically seek highly visible physical targets such as government or public buildings and symbolic sites selected to create disruption, chaos or fear among citizens. However, it should be noted that the advent of the internet and the intercommunication of electronics has given a new avenue for terrorism to occur. Cyberterrorism is a rising threat and allows actors to remotely commit crimes with anonymity. The body of research on cyberterrorism is still growing, but finds consensus in the thought that institutions must reduce vulnerability to such attacks and constantly evolve to meet new threats. The ten highest locations of hate crimes in the U.S. in 2018, reported to the FBI, are described in Table 3.10-3. This information is provided as planning guidance only.

Table 3.10-3: Highest Ten Locations of Hate Crime Incidents reported in the U.S., 2018*

Location	Percentage of Incidents
In or near residences/homes	25.7
Highways/roads/alleys/streets/sidewalks	18.7
Other/Unknown	11.2
Schools/colleges	9.2
Multiple locations	5.8
Parking/drop lots/garages	5.2
Churches/synagogues/temples/mosques	3.7
Restaurants	2.7
Government/public buildings	2.3
Commercial office buildings/convenience stores	2.0

*Data collected are not yet representative of all location designations. The location type "cyberspace" is collected in the National Incident-Based Reporting System only.

Source: FBI, 2018 Hate Crime Statistics

Cyberterrorism is an increasing threat that is not specific to any geographical location. Though the extent to which cyberterrorism can be applied is not fully understood, cyberterrorism allows for new, creative, opportunistic, and inexpensive methods of disrupting governmental activities. It is a real threat with potentially devastating consequences. State electronic networks are at risk of cyberterrorism attacks. Mitigation techniques include smart cyber security and information security, information sharing networks that extend protection and create redundancies, adopting stronger offensive/defensive software to protect networks, and adopting strong people-process interface controls that minimize threats to virtual information.

3.10.3 – Previous Occurrences and Extent

Nebraska has experienced nineteen (19) targets from twelve (12) incidents since 1970. Most recently, Neo-Nazis were the perpetrator group. This is consistent with national trends which point out the radicalization to violence leading to homegrown violent extremists. (McGarrity, FBI,

2019). Although there have been cases of cyberattacks on local governments in Nebraska, these have not been reported within the FBI's 2018 Hate Crime Statistics.

Table 3.10-4: Terrorist Events Across Nebraska, 1970 - 2020

Terrorist Events in Nebraska, 1970-2020				
Date	***Fatalities***	***Injuries***	***Property Damage***	***Target***
10/22/2017	0	0	No	Transportation (rail)
10/3/2016	0	0	Yes	Religious Institution
4/18/2013	0	0	Yes	Airports and Aircraft
5/4/2002	0	0	Yes	Private Citizens & Property
9/6/1991	0	0	Yes	Private Citizens affiliated with abortion
6/3/1979	0	0	Yes	Private Citizens & Property
8/18/1977	0	0	Yes	Private Citizens affiliated with abortion
10/13/1975	0	0	Yes	Utilities
8/17/1970	1	7	Yes	Private Citizens & Property
7/2/1970	0	0	Yes	Business
6/11/1970	0	0	Yes	Police
2/23/1970	0	0	Yes	Utilities

Source: FBI, 2018 Hate Crime Statistics (most recent data available as of June 2020)

3.10.4 – Probability of Future Events and Impacts of Climate Change

Due to the subjective nature of human behavior, a quantitative probability of a terrorist attack occurring is nearly impossible to predict with accuracy; however, it is considered significantly low. All areas of Nebraska have an annual chance of terrorist attack far below 1% based on current predictive models – and an even lower chance of attacks being successful. According to the most current research, odds (% chance) of a refugee terrorist causing the death of an American citizen are 1 in 3,638,587,094 (.00000003); illegal immigrant terrorists are 1 in 10,915,761,281 (.00000001); and Visa Waiver Program entrant are 0 in 1 (~ 0.00). The probability of any foreign-born terrorists causing death is 1 in 3,609,709 (.00003), (Nowrasteh, 2016). Currently, figures representative or estimative of the life and property value saved by mitigation efforts are unavailable.

As climate and weather patterns shift in the future, resulting environmental issues may be leveraged as a tool for terror and political violence, especially in nations with weak governance. This emerging threat is not related to "eco-terrorism", but is rather related to a growing potential for vulnerable ecosystems to be exploited or destroyed as a means to "intimidate or provoke a state of terror in the general public for a political, ideological, or philosophical agenda (Somers, 2019).

Although incidents of terrorism related to climate change have not been felt in the United States or Nebraska, the potential for incidents of this type does exist and has occurred in other countries. One study theorizes that "detrimental climate change implications that particularly affect natural resources, such as floods and droughts, create civil unrest and eventually a vacuum for terrorist events to occur. This would most likely occur in conjunction with poor governance and/or political terror, which would result in a poor distribution of resources for the population." (Lytle, 2017) This specific study found a relationship between climate trends and agriculture in Nigeria as a threat multiplier for conflict. As an example, severe drought as a result of climatic weather shifts raises vulnerability of water systems, restricting water supplies. In this situation, extremist groups have stepped up attacks as a strategic tactic of coercion to manipulate water supply, especially in countries under extreme, long-term drought conditions.

By focusing on sound scientific data, delivered with consistent messaging across multiple government agencies, the potential for violent and/or criminal acts related to climate change appropriate measures to prevent or mitigate actions could be identified.

3.10.5 – Local Plan Data

Local mitigation plans should be considered on an individual basis. Eighteen local plans currently identify terrorism as a hazard of concern, but terrorism ranked low as number 15 of 20 hazards in the Statewide Hazard Identification and Risk Assessment Survey of June 2020. As Terrorism is a highly unlikely event, unique circumstances may present challenges that are not consistent with established figures and warrant increased measures beyond the initial design of buildings, roadways, power and infrastructure, or public safety assets. Due to the nature of terrorist attacks, mitigation efforts are site specific and should not be looked at on too broad a basis.

3.10.6 – Jurisdictional Vulnerability and Potential Losses

Vulnerable populations consist of any and all persons; however, special considerations need to be made for people who would be more likely to be targeted. The FBI Crime Statistics Database (https://www.fbi.gov/investigate/civil-rights/hate-crimes#Hate-Crime%20Statistics) can cross reference local demographics with terrorism and biased crime data to determine heightened vulnerability in geo-cultural blocks within Nebraska.

3.10.7- Vulnerability of State Facilities and Potential Dollar Losses

Any state facility could be the target of terrorism along with facilities owned by other government or private entities. Vulnerability assessments of state-owned and managed facilities are conducted by the appropriate agency, and consider proximity to local threats and the criticality of that facility and the personnel who work there. Analysis of the most vulnerable state facilities is classified.

In order to elevate the level of awareness related to potential terrorist threats and targets, the Nebraska Military Department, in coordination with other law enforcement agencies, offers annual training courses, and produces an Annual Threat Statement and Antiterrorism Plan, also

published annually. In addition, multiple exercises are conducted with multiple agencies and jurisdictions, covering a variety of potential threats.

Large concentrations of infrastructure in communities across the state could result in a sizable loss of state assets if it were to be a direct target of a terrorism attack. State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in **Table 3.11-4.**

Table 3.11-4: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.10.8 - Future Population and Development Trends

Because terrorism is not limited to geographic boundaries or population groups, it is difficult to identify development and population trends that may be impacted by this hazard. Current processes and entities that monitor, track and prevent terrorist activities should be consulted in relation to potential threats to the population, specific geographical locations, and appropriate security measures prior to development.

The potential for impacts of future growth and development on terrorism will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed, and opportunities for mitigation related to development that could reduce hazard impacts in the future will be considered.

3.10.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to terrorism as well as other information from the Local Hazard Mitigation Plan updates:

- Have any terrorism events occurred since adoption of this plan?

- Has any new scientific research or methodology changed the ability to predict terrorism events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to terrorism?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to terrorism?

3.10.10 - Data Sources

- 2019 Nebraska Hazard Mitigation Plan
- Chung, J. "Counter-Terrorism and Emergency Management: Keeping a Proper Balance", (2013). Retrieved at: https://www.brookings.edu/opinions/counter-terrorism-and-emergency-managementkeeping-a-proper-balance/
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SECTION 3.11: TORNADO

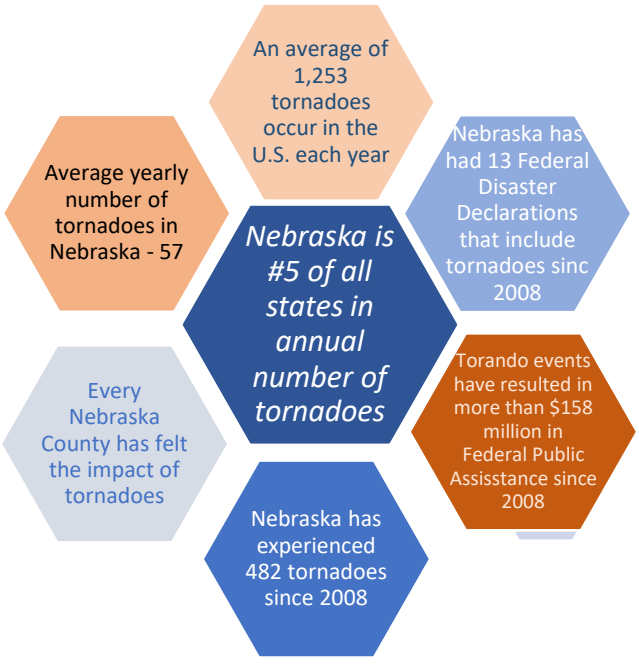
2021 SHMP Update
• Reformatted Tornado Profile • Enhanced Tornado characteristics • Added factors for consideration in the next planning cycle • Added Data Sources at the end of the section

Hazard	Definition and Key Terms
Tornado	The National Weather Service (NWS) defines a tornado as a violently rotating column of air extending from a cumulonimbus cloud, or in rare cases, the base of a cumulus cloud, within a thunderstorm to the ground. Wind speeds can exceed 250 miles per hour and damage paths can be more than one-mile-wide and 50 miles long.

3.11.1 - Hazard Characteristics

Tornadoes are one of the most frequent severe weather events in Nebraska and pose a significant threat to the lives and safety of all citizens in the state. They are the most violent of all atmospheric storms and are capable of tremendous destruction. In an average year, more than 900 tornadoes are reported in the United States, resulting in approximately 80 deaths and more than 1,500 injuries.

Figure 3.11-a: Nebraska Tornado Statistics



Source: NOAA, National Centers for Environmental Information (NCEI)

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 tornadoes. The magnitude of tornadoes has, historically, been measured by intensity on the Fujita-Pearson Tornado Scale, or simply the Fujita Scale, or F-Scale. The Fujita Scale does not measure tornadoes by their size or width, but rather the amount of damage it causes on human-built structures and trees. The scale ranges from F0 for the weakest, to F6 for the most powerful, although an F6 has never been recorded. The Fujita Scale was updated in 2007 with the Enhanced F-Scale. The enhanced scale classifies EF0-EF5 damage as determined by engineers and meteorologists across 28 different types of damage indicators, including different types of buildings and trees. 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 video-grammetry. Based on the most severe damage to any well-built frame house, or any comparable damage as determined by an engineer, an EF-Scale number is assigned to the tornado. The table below compares the new EF Scale with the old F-Scale, and summarizes typical damage for tornadoes.

Table 3.11-1: Comparison between the Fujita Scale (F-Scale) and Enhanced Fujita (EF) Scale

Fujita Scale Developed in 1971 and Used Until 2007			Enhanced Fujita Scale (EF) Used as Measure of Magnitude in the U.S. Since 2007		
F Category	Wind Speed (mph)	Potential Damage	EF Categor	Wind Speed (mph)	Potential Damage
F0	< 73	**Light damage.** Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.	EF0	65-85	**Light damage.** Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees toppled.
F1	73-112	**Moderate damage.** Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.	EF1	86-110	**Moderate damage.** Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; broken window/other glass broken.
F2	113-157	**Considerable damage.** Roofs torn from frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	EF2	111-135	**Considerable damage.** Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	**Severe damage.** Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.	EF3	136-165	**Severe damage.** Entire stories of well-constructed homes destroyed; severe damage to large buildings, (e.g., shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
F4	207-260	**Devastating damage.** Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.	EF4	166-200	**Devastating damage.** Well-constructed houses and whole frame houses completely leveled; cars thrown, and small missiles generated.
F5	261-318	**Incredible damage.** Strong framed houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.	EF5	>200	**Incredible damage.** Strong frame houses leveled off foundations and swept away; automobile- sized missiles fly through the air in excess of 100 m (109 yd.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Source: NOAA

Table 3.11-2: Tornado Impact/Consequence Summary

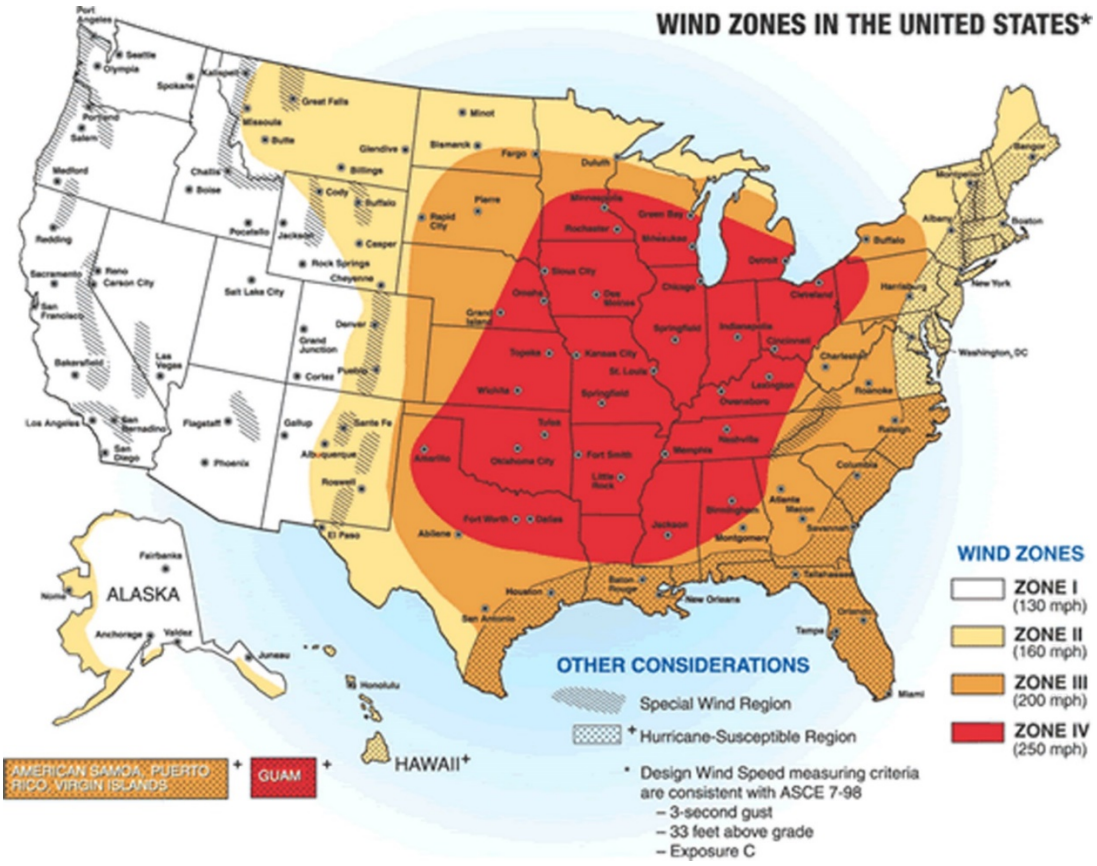
Tornado Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing: Residences directly in the path of a tornado are expected to sustain major damages and/or be destroyed. Those nearby are expected to sustain significant damage from winds around the tornado as well as from debris moved by the tornado. Casualties/fatalities - Nebraska has experienced very low numbers of injured or dead because storms usually occur during the time people are awake, aware of weather conditions, and hear warning sirens and weather radio; however, the potential for casualties/fatalities exists. Work - will depend on whether major employing entities are impacted. Roads leading to and from impacted areas may be operating under limited traffic restrictions, potentially impacting commute times for workers. Food/Water - may need to be brought into an area for the initial response. Food supplies can be replenished with perishables replenished as temperature-controlled storage is available. Water systems will have to be inspected to ensure health and safety
Responders: Fire, Police, Medical, Public Works	Nebraska responders exercise and have actual experience on these storms. If a medium to small municipality is hit, responding organizations could experience loss of volunteers who are personally impacted by the storm and not available for response duties, so there will be a greater reliance on mutual aid. Responders will also need to be aware of secondary events such as hazardous materials present in the impacted area. Mutual aid agreements are in place throughout the state to enable impacted communities to efficiently and effectively request help from neighboring communities that were not impacted.
Continuity of Operations	Depending on the extent of damages to governmental facilities and critical infrastructure the impact could be extreme to negligible. If governmental facilities have major damages or are destroyed, the time to return to normal operations may stress their systems. The COOP plans will be severely tested.
Property: Destroyed, Major, Isolated	For the area immediately in the path of a tornado property will be expected to have major damages or destroyed buildings. Tornadoes can cause isolated property due to debris covered roads and from flash flooding from the storm that connected to the tornado.
Infrastructure: Electricity, Water, Roads, Bridges	Electricity in the path of the storm will suffer damages up to destruction of transmission structures, sub-stations, maintenance yards and buildings. Some areas may lose power for days, or even weeks. Water - systems may be contaminated due to loss of power and back-flow, structures and buildings in the system may suffer damages or be destroyed. Roads and bridges - will be covered with debris and may be flooded or washed out by accompanying storms and flash flooding. Roads and bridges may face further strain as volume of traffic will likely increase due to responders and observers.
Environment	A large volume of trees may be destroyed during a tornado; streams and creeks can be clogged with debris and contaminated by secondary spills. Economic
Economic Conditions	The economy of a municipality severely damaged by a tornado can be debilitating. Destroyed businesses, especially small business may recover slowly or not at all. If the storm causes major damage to one of the larger municipalities the entire state may feel the impact.

Public Confidence in the Governance	The ability of the jurisdiction to rapidly clean up, rebuild, and return to normal will be the measure of public confidence.

3.11.2 – Location

While certain locales have historically experienced greater tornado activity, the entire state is vulnerable to tornado damage. **Figure 3.11-b** shows the wind zones across Nebraska. The extreme eastern and southeastern regions of the state are located within Zone IV, indicating potential wind speeds of up to 250 miles per hour. The central and western regions of the state are located within Zone III, with the potential for wind speeds of up to 200 miles per hour.

Figure 3.11-b: Wind Zones in the United States



Source: FEMA.gov

3.11.3 – Previous Occurrences and Extent

Between 2008 and March 2020, Nebraska has been hit by 482 reported tornadoes, an average of over 42 tornadoes per year. The 482 tornadoes resulted in 6 fatalities and 103 injuries. (NOAA/NCEI, Storm Events Database, 2020). Since 1990, every county in Nebraska has been impacted by tornadoes (NOAA/NCEI Storm Events Database, 2020). The most dangerous months for tornadoes in Nebraska are in April, May and June.

While the majority of tornadoes reported to NOAA/NCEI were determined to be between EF0 and EF2, 17 tornadoes reported on seven (7) different days were rated as magnitude EF3 and EF4. **Table 3.11-3** describes the location and extent of the higher magnitude events between 2008 and 2020. Based on the number of tornadoes reported during this time period, approximately 28 percent were of magnitude EF3 or higher.

Table 3.11-3: EF3 and EF4 Tornado Impacts, 2008-2020

Date	Magnitude	Location	Deaths	Injuries	Property Damage	Crop Damage
6/20/2011	EF3	Elm Creek, Buffalo County	0	0	$6,000,000	$2,000,000
6/20/2011	EF3	Durant, Polk County	0	0	$4,000,000	$500,000
8/11/2011	EF3	Wood Lake, Cherry County	0	0	$15,000	0
3/18/2012	EF3	North Platte, Lincoln County	0	2	$750,000	0
10/4/2013	EF4	Altona, Wayne County	0	15	0	0
10/4/2013	EF3	Creighton, Knox County	0	0	0	0
5/11/2014	EF3	Fairfield, Clay County	0	0	$12,500,000	0
5/11/2014	EF3	Grafton, Fillmore County	0	0	$1,500,000	0
5/11/2014	EF3	Exeter, Fillmore County	0	0	$7,500,000	0
5/11/2014	EF3	McCool Jct., York County	0	0	$1,500,000	0
5/11/2014	EF3	Cordova, Seward County	0	0	0	0
6/16/2014	EF4	Stanton, Stanton County	1	20	$12,000,000	$250,000
6/16/2014	EF4	Wisner, Cuming County	1	0	$1,000,000	$250,000
6/16/2014	EF3	Tilden, Cuming County	0	0	$500,000	0
6/16/2014	EF4	Altona, Wayne County	0	0	$3,000,000	0
6/17/2014	EF3	Coleridge, Cedar County	0	0	$2,000,000	0
5/17/2019	EF3	Stockville, Frontier County	0	0	$100,000	0
TOTAL			**2**	**37**	**$52,365,000**	**$3,000,000**

Federal Disaster Declarations in Nebraska from tornadoes occurring between the years 2008 and 2020 resulted in a total in excess of $158 million in FEMA Public Assistance, alone. Below is a table of the Federal Disaster Declarations as a result of tornadic activity. The disasters depicted all had tornado-related damage, but also included other hazards such as severe storms, straight-line winds, and flooding. **Table 3.11-4** highlights the last twelve years of federal

declarations involving tornadoes. There have been no federally declared disasters involving tornado events since 2018.

Table 3.11-4: Federal Disaster Declarations for Tornadoes, 2008 - 2020

Federal Disaster Number	Year	Description/Location	Incident Date(s)	Public Assistance Awarded
DR-4387	2018	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 11 declared counties in Nebraska	June 17-July 1, 2018	$2,729,190.78
DR-4325	2017	Severe Storms, Tornadoes, And Straight-line Winds resulted in 18 declared counties in Nebraska	June 12-17, 2017	$15,572,545.62
DR-4225	2015	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 28 declared counties in Nebraska	May 6-June 17, 2015	$14,235,509.29
DR-4185	2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 12 declared counties in Nebraska	June 1-4, 2014	$3,937,963.86
DR-4183	2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 12 declared counties in Nebraska	June 14-21, 2014	$12,420,716.97
DR-4179	2014	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 6 declared counties in Nebraska	May 11-12, 2014	$10,125,817.92
DR-4156	2013	Severe Storms, Winter Storms, Tornadoes, and Flooding resulted in 10 declared counties in Nebraska	October 2-6, 2013	$2,670,513.58
DR-4014	2011	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 12 declared counties in Nebraska	June 19-21, 2011	$3,362,468.45
DR-1945	2010	Severe Storms, Flooding, Tornado, and Straight-line Winds resulted in 7 declared counties in Nebraska	September 13-14, 2010	$2,138,551.99
DR-1924	2010	Severe Storms, Tornadoes, and Flooding resulted in 61 declared counties in Nebraska	June 1-August 29, 2010	$49,926,354.50
DR-1853	2009	Severe Storms, Tornadoes, and Flooding resulted in 17declared counties in Nebraska	June 5-26, 2009	$4,491,366.48
DR-1770	2008	Severe Storms, Tornadoes, and Flooding resulted in 62 declared counties in Nebraska	May 22-June 24, 2008	$36,258,650.19
DR-1765	2008	Severe Storms, Tornadoes, and Flooding resulted in five declared counties in Nebraska	April 23-26, 2008	$499,319.42

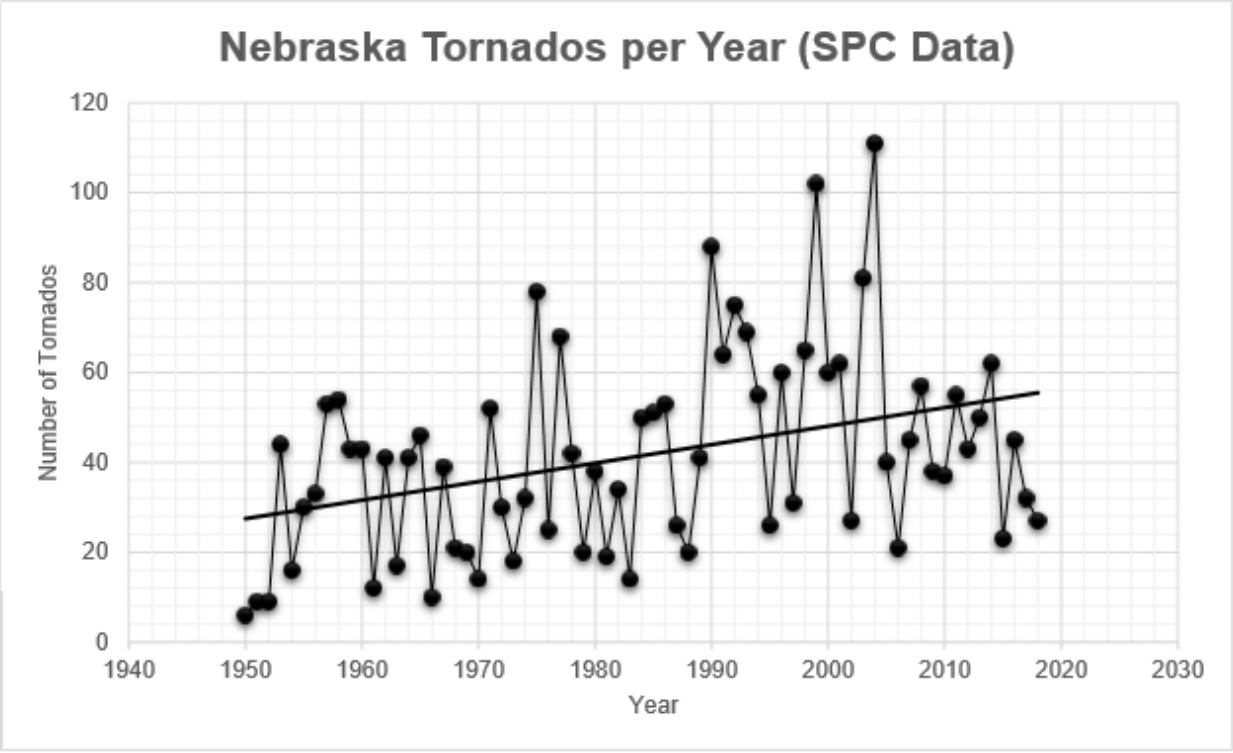
Recent tornado events have caused severe damage. In June 2014, Pilger was hit by twin tornadoes destroying the majority of the community. Two individuals were killed including a five-year-old girl. In 2017, small tornadoes hit parts of the Lincoln and Omaha metro areas leaving minor damage but highlighting the risk to all areas of the state.

3.11.4 - Probability of Future Occurrences and Impacts of Climate Change

Nebraska will experience tornadoes each year, and with continued growth of communities, the likelihood of deadly tornadoes has and will continue to increase.

Based on the historic occurrence of tornadoes in Nebraska, it can be estimated that the recurrence interval for tornadoes is 0.025[14] years, indicate that on average a tornado event will be equaled or exceeded within that time period. Nebraska averages 42 tornadoes a year. As shown in **Figure 3.11-c** this general trend has been increasing over the past 70 years with some years being more active than others. Within the past decade, the number of tornadoes has declined slightly, compared with the previous decade.

Figure 3.11-c: Nebraska Tornadoes per Year



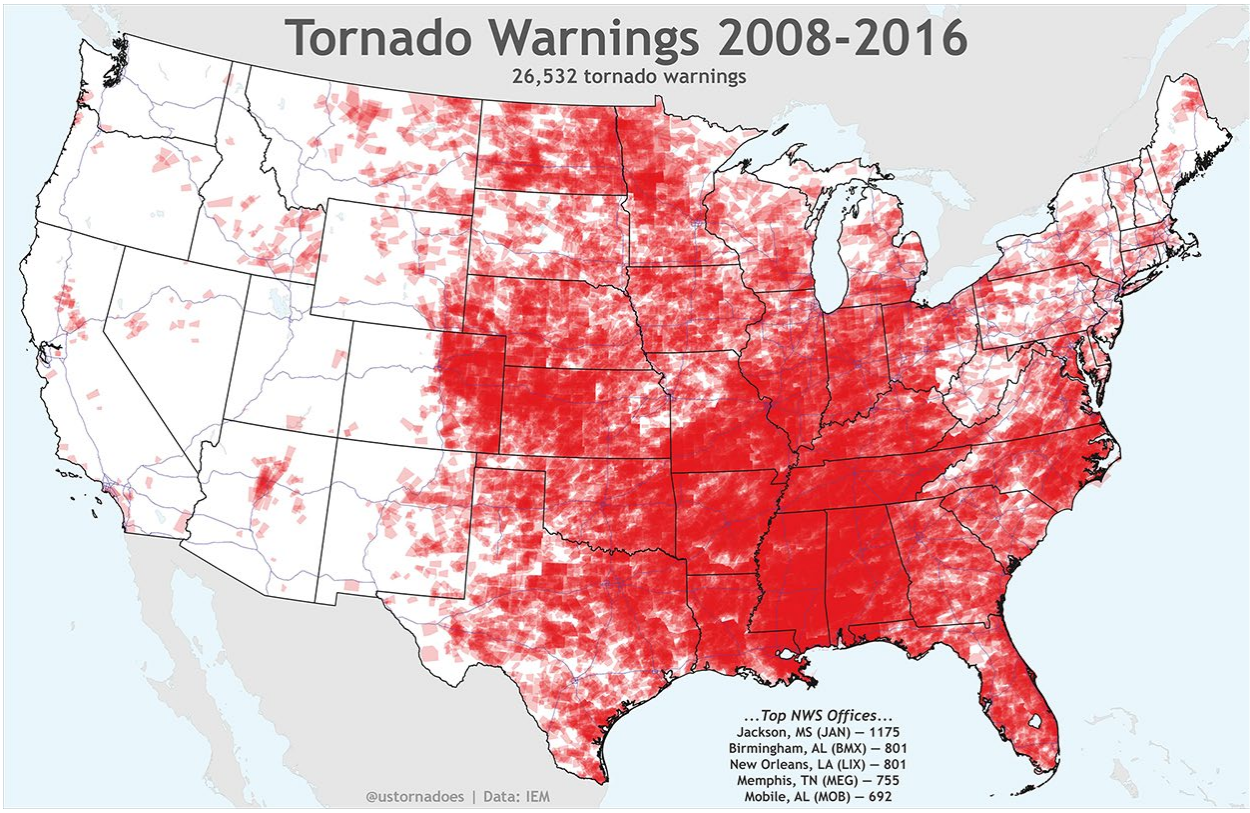
Source: NOAA, Storm Prediction Center (2019 SHMP)

Other statistical indicators support the continuing threat to Nebraska from tornado events. **Figure 3.11-d** provides a graphic description of the number of tornado warnings between 2008

[14] Statistical calculation based on 12 years of record with 482 events during this time period.

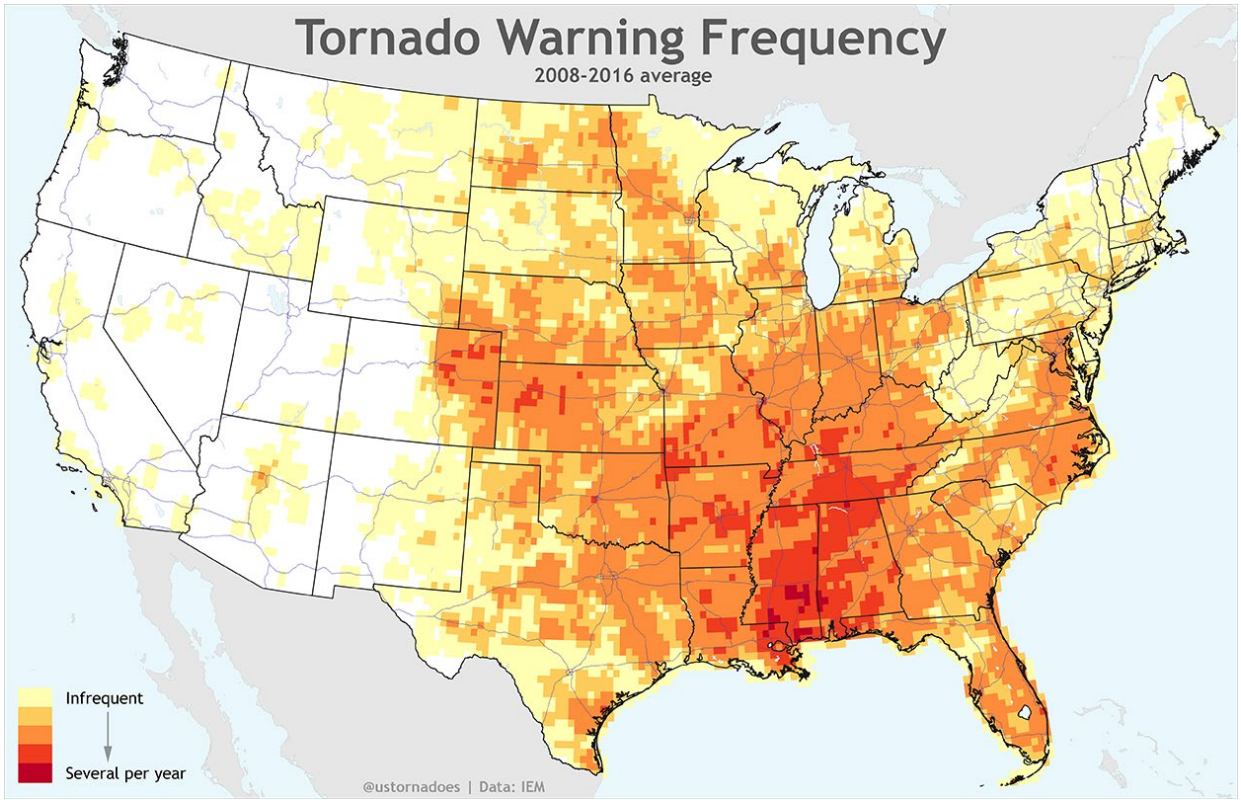
and 2016. **Figure 3.11-e** illustrates the annual average for tornado warning frequency in the same time period. Both representations show the widespread nature of tornado threat in Nebraska, indicating a slight concentration of a larger number of tornado warnings and frequency of warnings in a north-south pattern in the west-central region of the state, as well broadly spread across the southern and southwest regions of the state.

Figure 3.11-d: Total U.S. Tornado Warnings, 2008-2016



Source: U.S. Tornadoes, www.ustornadoes.com

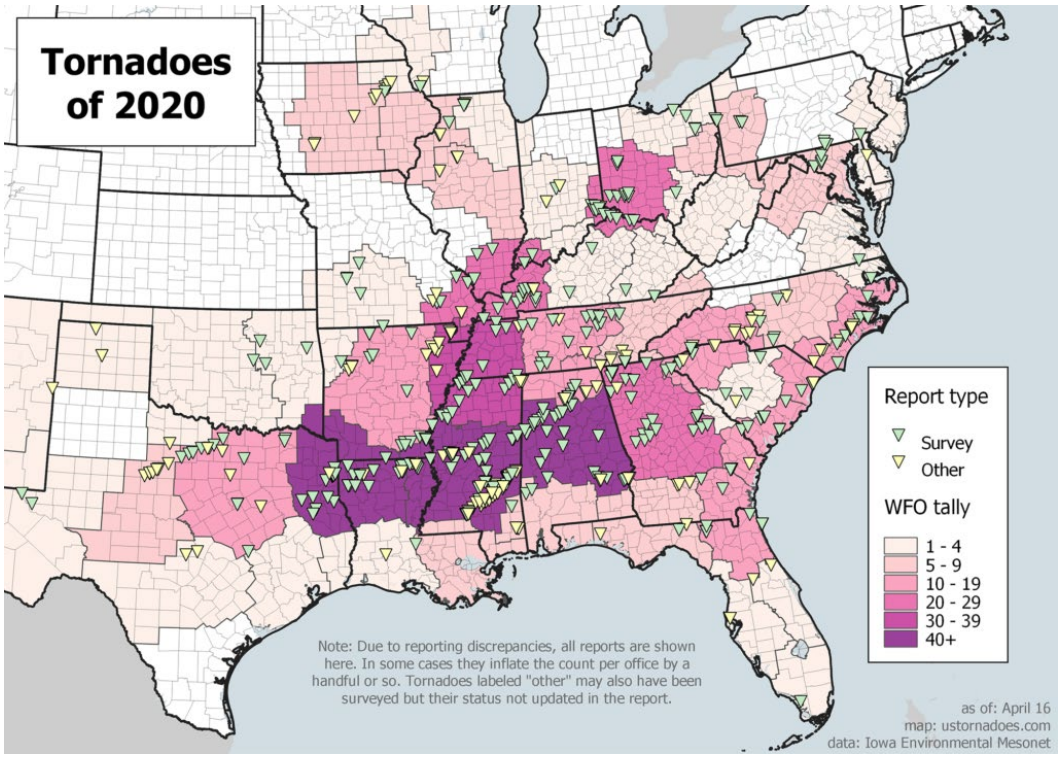
Figure 3.11-e: Annual Average Tornado Warning Frequency, 2008-2016



Source: U.S. Tornadoes, www.ustornadoes.com

Figure 3.11-f provides a summary illustration of the geographic areas for tornadoes reported between January and April 2020, indicating a higher number of events within the southcentral Gulf States. While the most recent statistics indicate a potential shift in areas threatened or impacted by tornadoes, there is insufficient evidence to substantiate a long-term shift in this recent trend, or whether changes in climate are factors in this trend.

Figure 3.11-f: Geographic Tornado Reports, January - April, 2020



Source: U.S. Tornadoes, www.ustornadoes.com

Scientific projections indicate an increase in many extreme events in response to a warming climate, such as heavy precipitation events which could occur within increasingly severe thunderstorm events that include tornadoes. Because models are not in full agreement on the type or amount of change, this is still an active area of research that should be monitored in the next planning cycle. (Bathke, et.al., 2014)

While it is important to study and understand historical weather patterns, future planning must address and adapt to the impacts of climate change. Regional climate models that incorporate smaller-scale detail of terrain and atmospheric processes can assist with projecting potential impacts of climate change in the state.

3.11.5 – Local Plan Data

Tornadoes are considered a top hazard in all local hazard mitigation plans. All 23 Local Hazard Mitigation Plans reviewed for this update identify tornadoes as a hazard of concern, with eight plans noting them to be high, and two plans ranking them as medium. This widespread focus highlights that past historical events have impacted all areas of the state. Common mitigation discussion outlined in the plans includes installation and maintenance of outdoor warning sirens, residential safe rooms, and community safe rooms.

3.11.6 – Jurisdictional Vulnerability and Potential Losses

There is significant risk of substantial dollar loss to public and private property if a jurisdiction is impacted by a tornado. Public infrastructure is vulnerable to damage to above ground systems such as electrical grids, communications towers and lines, and damaged roadways. Buildings are vulnerable to damaged roofs and walls, and potentially, buildings removed from their foundations. In extreme events, buildings and other structures may be destroyed.

3.11.7- Vulnerability of State Facilities and Potential Dollar Losses

The entire state is vulnerable to tornadoes and any state assets could be impacted. Large concentrations of infrastructure in communities across the state could result in a large loss of state assets if it were to take a direct hit from a strong tornado. State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in **Table 3.11-5.**

Table 3.11-5: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	**$32,724,944.00**	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.11.8 - Future Population and Development Trends

Because tornadoes are not limited to specific geographic locations or population groups, it is difficult to identify development and population trends that may be impacted by this hazard. Current land use and building codes incorporate standards that address and mitigate wind loads for buildings. In addition, pre-engineered designs for safe rooms are available for residences and commercial buildings.

The potential for impacts of future growth and development on tornadoes will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed, and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future.

3.11.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to tornadoes as well as other information from the Local Hazard Mitigation Plan updates:

- Have any tornado events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict tornado events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to tornado?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to tornado?

3.11.10 – Data Sources

- 2019 Nebraska Hazard Mitigation Plan
- Bathke, D., Oglesby, R., Rowe, C., Wilhite, D. Understanding and Assessing Climate Change: Implications for Nebraska, University of Nebraska – Lincoln.
- FEMA.gov
    - Federal Disaster Declarations. Retrieved at: https://www.fema.gov/disasters/disaster-declarations
    - "Taking Shelter from the Storm", FEMA, (Map of Wind Zones in the United States). Retrieved at: https://www.fema.gov/pdf/library/ism2_s1.pdf
- Nebraska Department of Administration, Risk Management
- NOAA, National Centers for Environmental Information (NCEI)
    - Storm Events Database. Retrieved at: https://www.ncdc.noaa.gov/stormevents/
- U.S. Tornadoes. Retrieved at: www.ustornadoes.com

SECTION 3.12: WILDFIRE

2021 SHMP Update
• Reformatted Wildfire Profile • Enhanced Wildfire characteristics • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

Hazard	Definition and Key Terms
Wildfire	Also called a wildland fire, uncontrolled fire in a forest, grassland, brushland, or land sown to crops. The terms forest fire, brush fire, etc., may be used to describe specific types of wildfires; their usage varies according to the characteristics of the fire and the region in which it occurs.

3.12.1 - Hazard Characteristics

Wildland fire incidents that occur in forests and grasslands may result from naturally occurring events, such as unauthorized human-caused events, and escaped prescribed burns that occur in the wildland. States are responsible for responding to fires on nonfederal (state-owned, local and private) lands, except for land that is protected by federal agencies under cooperative agreements. Although a small percentage of fires account for the majority of acres burned, most wildland fires cannot be classified as catastrophic. Only about 1 percent of fires become conflagrations, or raging, destructive fires, and predicting which ones will turn into conflagrations is dependent upon multiple factors including geography and weather conditions.

Nebraska's landscape is dominated mostly by grasslands and prairie. The forested areas are comprised of ponderosa pine, riparian deciduous forest, and red cedar. The trees and forests provide many benefits including cleaning water and air, helping to conserve energy, creating jobs and generating economic growth, and providing recreational opportunities. Historically, Nebraska has experienced wildfire in both its forested areas and rangeland prairie areas. Wildfire remains a real and ever-present hazard to the state and its growing population.

Table 3.12-1: Wildfire Impacts and Consequences

Wildfire Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – If the wildfire spreads to a populated area the impact would be the same as an urban fire with damages from water and smoke to property being destroyed. Casualties/Fatalities – With good warning and citizen evacuation, casualties and/or fatalities will be mitigated. With good adherence to safety and the proper use of PPE responder casualties and fatalities can be prevented or minimized. Work – If the fire is contained to the wildland area, there should be little to no impact on work. Food/Water – If a wildfire burns agricultural fields, there could be an impact on food and pollute water supplies. Supplies of food and water may need to be

	brought in for firefighters. Consideration should be made for additional water resources for fire-fighting.
Responders: Fire, Police, Medical, Public Works	Fighting wildfire is dangerous, and extreme caution and strict adherence to safety measures and the use of incident management is important for responder safety and accountability. Evacuation may be necessary for vulnerable populations, requiring multiple agency support and resources.
Continuity of Operations	If the wildfire is contained outside of municipalities, there should be no impact on COOP.
Property: Destroyed, Major, Isolated	Wildfire is destructive and moves very quickly. Homes and businesses in an area adjacent to a wilderness area are vulnerable to destruction from fire. Field crops and rangeland for livestock and other animals may be destroyed.
Infrastructure: Electricity, Water, Roads, Bridges	Infrastructure in the wilderness area is vulnerable to fire especially electrical structures including transmission and distribution lines, poles, and towers. Run off from the suppression activities can pollute streams and rivers that provide drinking water. Roads and bridges may become isolated during the fire and could need to be repaired due to the fire or due to the large amounts of heavy equipment used to fight the fire.
Environment	Wildfire is a natural occurrence in wilderness areas, and although not all wildfires start from natural causes, forests and grasslands do replenish themselves over time. Streams and rivers can become temporarily polluted from fire but the natural dilution factor helps clean the waterway over time. Wildlife is displaced and lost but also comes back to the area as it returns to normal.
Economic Conditions	There is not a large logging industry in Nebraska so wildfire does not disrupt the economy of an area. Tourism can be temporarily disrupted for the season of the fire.
Public Confidence in the Governance	Public confidence is dependent on the existing relationship between the affected communities and the government. If there is a weak relationship, it is likely that the community will have less confidence in the government's response to the situation. and will depend on proper management of the firefighting operation and the activities taken to return the area to normal.

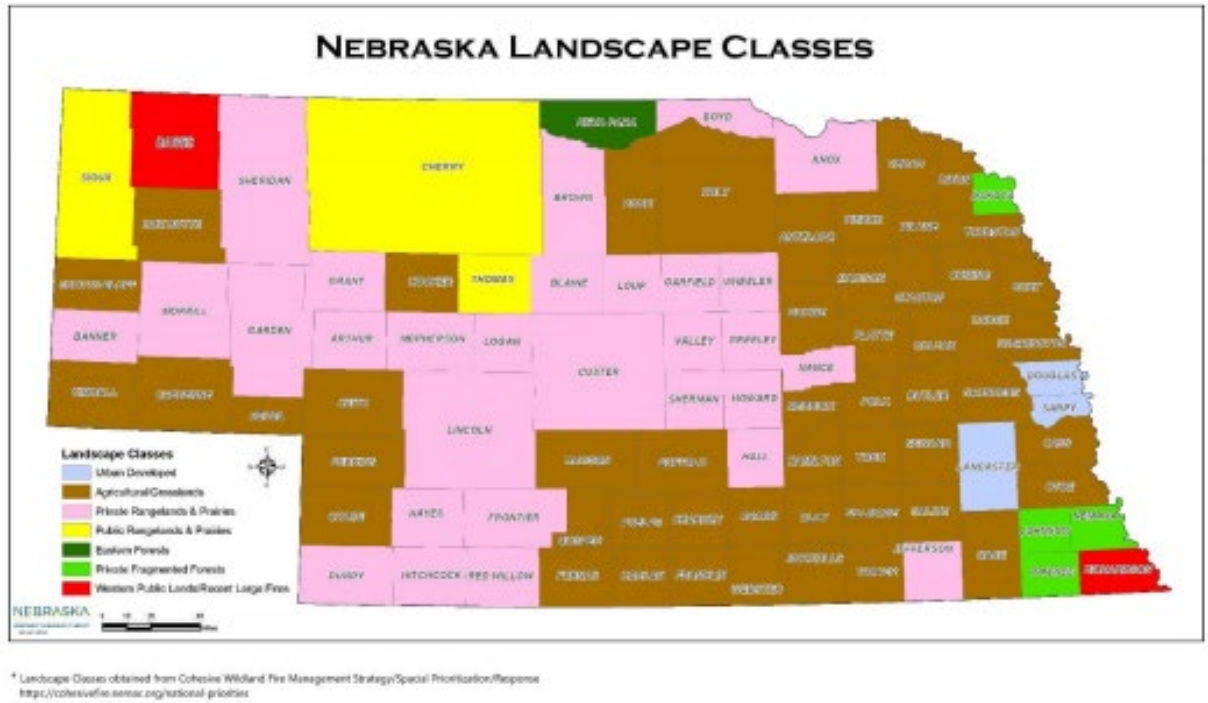
3.12.2 - Location

The State of Nebraska is comprised of 93 ecologically diverse counties. Data regarding fuel models, gathered from the USGS Landscape Fire and Resource Management Planning Tools (LANDFIRE) and the National Cohesive Wildland Fire Management Strategy Landscape Classes, illustrates 20 national geospatial layers of data that support regional and landscape scale projects. This is used in hazardous fuel reduction and conservation planning, Community Wildfire Protection Plans and other initiatives. The majority of the state - 50 counties - falls under landscape classes characterized as agricultural and grassland areas that have relatively little forested area or federal ownership and have historically experienced very high levels of natural fire. The second most common landscape classification (30 counties) is areas characterized as private rangelands and prairies with no federal ownership, that have had recent fires between 2002-2020, and have historically experienced high levels of natural fire, and have a high natural landscape and high natural mixed landscape. The remainder of the

counties are a mix of eastern forest, western public lands, highly forested areas, areas with very high urban value, private fragmented forests, public rangelands and prairies.

Figure 3.12-a depicts Nebraska's landscape classifications.

Figure 3.12-a: Nebraska Landscape Classes

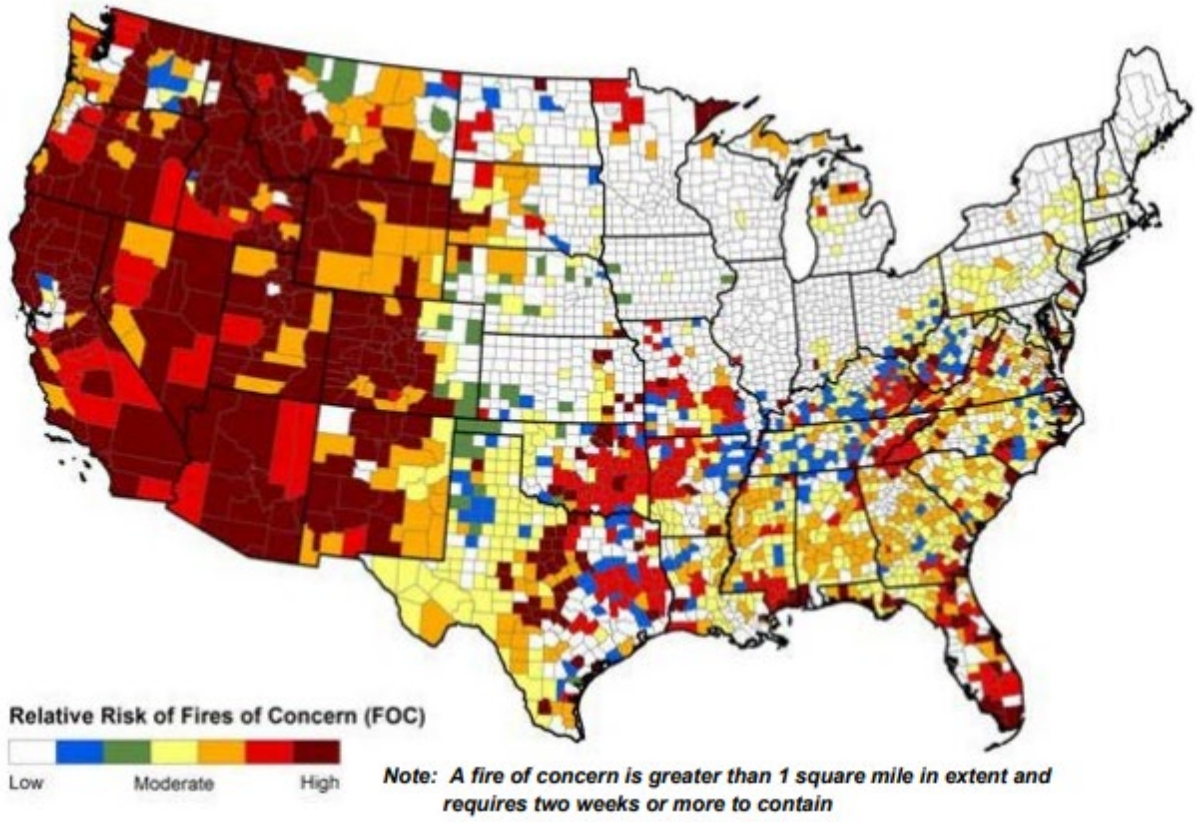


* Landscape Classes obtained from Cohesive Wildland Fire Management Strategy/Special Prioritization/Response https://cohesivefire.wemac.org/national-priorities

Source: 2019 State Hazard Mitigation Plan

Figure 3.12-b illustrates the areas of the state at highest risk for large, long-duration wildland fires. The study conducted for the National Cohesive Wildland Fire Management Strategy, dated April 2014, indicates the relationship between areas burned and structures lost. The four-color map reflects the intersection of areas burned (as reported in Federal and State records) and structures lost (as reported in the nationwide ICS-209 incident reporting system). The combination of high rates of structure loss with low area burned is dominant in the Central Plains and Eastern regions. It is recommended in this report that response resources towards structure protection be prioritized in these areas. Based on this assessment, Dawes County is at the highest risk, with Sioux, Scotts Bluff, Cherry, and Thomas Counties at moderate risk.

Figure 3.12-b: Relative Risk of Large, Long-Duration Wildfire in Nebraska[15]

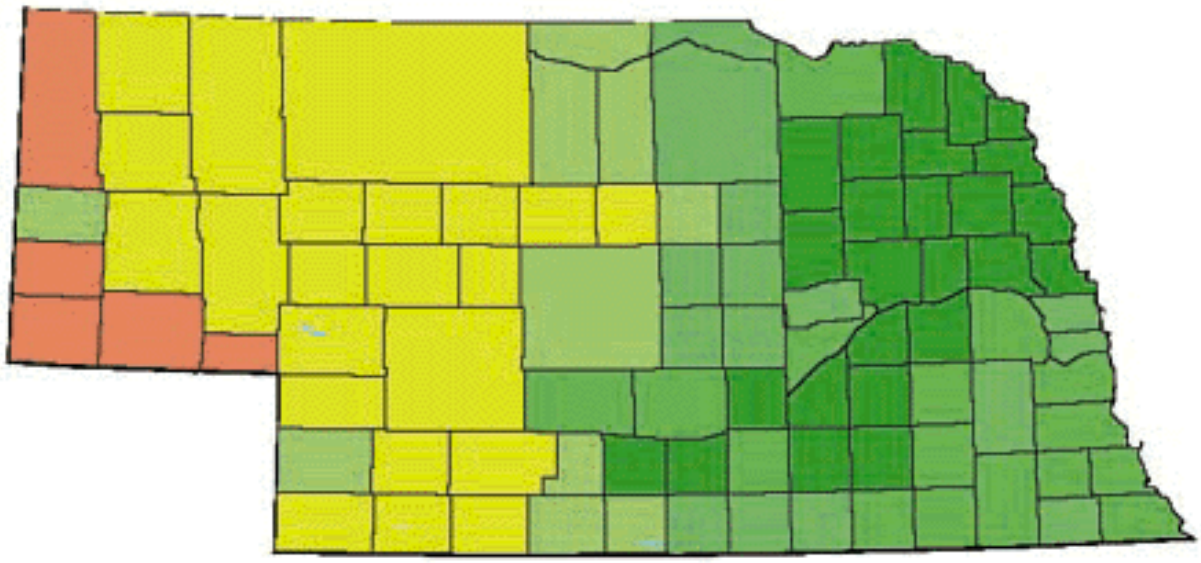


Source: National Cohesive Wildland Fire Management Strategy National Priorities, 2014. Available at https://www.forestsandrangelands.gov/strategy/thestrategy.shtml#alignment

Figure 3.12-c, below, illustrates an example of a weekly vegetation conditions map which illustrates potential grassland fire threat areas, based on satellite data to the Nebraska Forestry Service (USGS, website). Hot, dry and windy weather conditions can ignite grassland fires which pose a serious threat to agricultural and urban areas. Vegetation conditions can vary from high (green tones) to low (yellow to red) county to county for grassland fire danger. Where vegetation conditions are in the low category, the potential for grassland fire can reach the severe and extreme level of risk. This "greenness" information is provided to the National Weather Service (NWS) in Omaha, where it is used in combination with other daily weather data to forecast fire danger conditions. When conditions reach the severe category, the NWS provides information to emergency monitoring centers and the news media for broadcast to the public.

[15] The National Risk Analysis Report is the third report of the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy). The intent of this report is to develop a comprehensive, science-based cohesive strategy that addresses the significant, long-standing challenges to managing the ever-growing wildfire situation facing this nation.

Figure 3.12-c: Sample Weekly Vegetation Conditions for Grassland Fire Danger Assessment



Source: USGS Publications Repository, https://pubs.usgs.gov/fs/FS-025-96/; map accessed at: https://pubs.usgs.gov/fs/FS-025-96/images/fig1.gif

3.12.3 – Previous Occurrences and Extent

More than 1,100 fires were reported to the Nebraska Forest Service by volunteer fire departments between January 2019 and June 2020. Most were quickly extinguished and relatively small. However, catastrophic fires, like the 2012 Region 23 Complex fire remain a real threat.

The 2012 wildfire season was, in many ways, a cascading consequence of the widespread drought that persisted across the state into 2013. **Table 3.12-2** and **Table 3.12-3** provide a summary of significant fires that impacted areas of the state between 2006 and 2020.

Table 3.12-2: Estimated Losses from Region 23 Complex Fire, 2012

Region 23 Complex Fire Estimated Losses			
	Loss in value per unit	**Acres Burned**	**Estimated Losses**
Timber	$75	138,000	$10, 350,000
Forest Rehab	$275	138,000	$37,950,000
Reforestation	$175	20,000	$3,500,000
Buildings	$50,000	65	$3,250,000
Fence	$57,000	781	$44,517,000

Lost Grazing	$15	500,000	$7,500,000
Tourism	$10	500,000	$5,000,000
TOTAL			**$112,067,000**

Source: 2019 SHMP

The Region Complex 23 fire in 2012 prompted the Nebraska legislature and the Nebraska Forest Service to take action, resulting in the passage of The Nebraska Wildlife Control Act of 2013. The Nebraska Wildlife Control Act of 2013 (LB 634) set goals to improve the protective measures for life and property by increasing the capacity of volunteer fire districts. As of2020, 95.3 percent of fire departments in Nebraska are volunteer based and supporting their efforts is a high priority. The bill aimed to reduce wildfire size and intensity through use of initial aerial attacks, improving firefighter training, improving suppression equipment, and expanding forest fuels reduction. The actions and components of LB 634 were in place and operational by 2019.

Table 3.12-3: Impact Summary of Selected Nebraska Wildfires, 2006-2012

Fire Name/Location	Key Impacts
Region 23 Complex (Douthit, West Ash Creek, and Wellnitz; impacting Dawes, Sioux and Sheridan Counties)	The fires affected an estimated 86,201 acres, $7 million dollars in suppression costs, and estimated $112 million in economic losses. The fires burned on privately owned, State owned, and Federally owned lands. State agencies involved included Nebraska Emergency Management Agency, Nebraska National Guard, Nebraska Forest Service, Nebraska Department of Roads, Nebraska State Fire Marshall, Nebraska State Patrol, Nebraska Department of Health & Human Services, and multiple local fire departments from Nebraska, Colorado, South Dakota, Georgia and Florida. The West Ash Fire prompted evacuation of the town of Whitney, which is 10 miles north of the forested area.
Region 24 Wildfire Complex	The fire destroyed the town of Nordon and burned more than 75,000 acres in Keya Paha, Brown, and Cherry Counties.
Town of Merriman	The 2012 fire south of the town threatened several ranch homes and burned more than 3,200 acres.
Cherry County	The more than 6,717acre fire in 2012 burned into Cherry County from South Dakota, prompting the evacuation of the town of Crookston.
Pine Ridge and Niobrara River Valley	These areas experienced extreme fire behavior in 2006 and 2012.
Spotted Tail	This 2006 fire threatened the city of Chadron and most of its residents had to be evacuated.
Big Rock Fire	More than 1,720 acres were charred in this 2006 fire, which also burned into the city of Valentine, resulting in a partial evacuation of the city and destruction of many homes and other structures.

In addition to the catastrophic fire season of 2012, five federal Fire Management Assistance Declarations occurred in Nebraska between 2006 and 2012 with nearly $9 million FEMA public assistance grants dollars obligated. Economic losses for the fires between 2006 to 2011 are estimated at $5.6 million dollars. During this time period 895,147 acres were burned. **Table**

3.12-4 provides the statistical summary for total fires and acres burned in Nebraska between 2002 and 2020.

Table 3.12-4: Fires Across Nebraska, 2002-2020

YEAR	TOTAL FIRES	ACRES BURNED
2019*	1,110	27,067
2018	956	12,975
2017	1414	22,466
2016	873	32,689
2015	907	47,164
2014	1132	26,005
2013	525	11,333
2012	1625	520,326
2011	1019	36,582
2010	759	24,163
2009	901	12,611
2008	751	8,456
2007	801	20,301
2006	1858	120,076
2005	1375	25,289
2004	1010	17,654
2003	1017	19,068
2002	1935	90,531

Source: 2019 SHMP, and Nebraska Forest Service

*Statistic includes January-June 2020

There have been no Federal Disaster Declarations for fire incidents since 2012. Between January 2019 and June 2020, the state experienced 1,110 fires, covering 27,067 acres. Four of these fires were documented in the NOAA NCEI database, as shown in Table 3.12-5.

Table 3.12-5: Wildfire Events Reported to NOAA/NCEI, January 2019 to March 2020*

DATE	LOCATION/COUNTY	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
10/26/2019	Chase	0	0	$30,000	$15,000
11/1/2019	Garden	0	0	0	$50,000
11/16/2019	Thomas	0	0	0	0
03/05/2020	Sarpy	0	0	0	0
TOTAL		**0**	**0**	**$30,000**	**$65,000**

Source: NOAA, NCEI-Storm Events Database, as of June 22, 2020

* NCEI data is not yet available beyond March 31, 2020.

3.12.4 – Probability of Future Events and Impacts of Climate Change

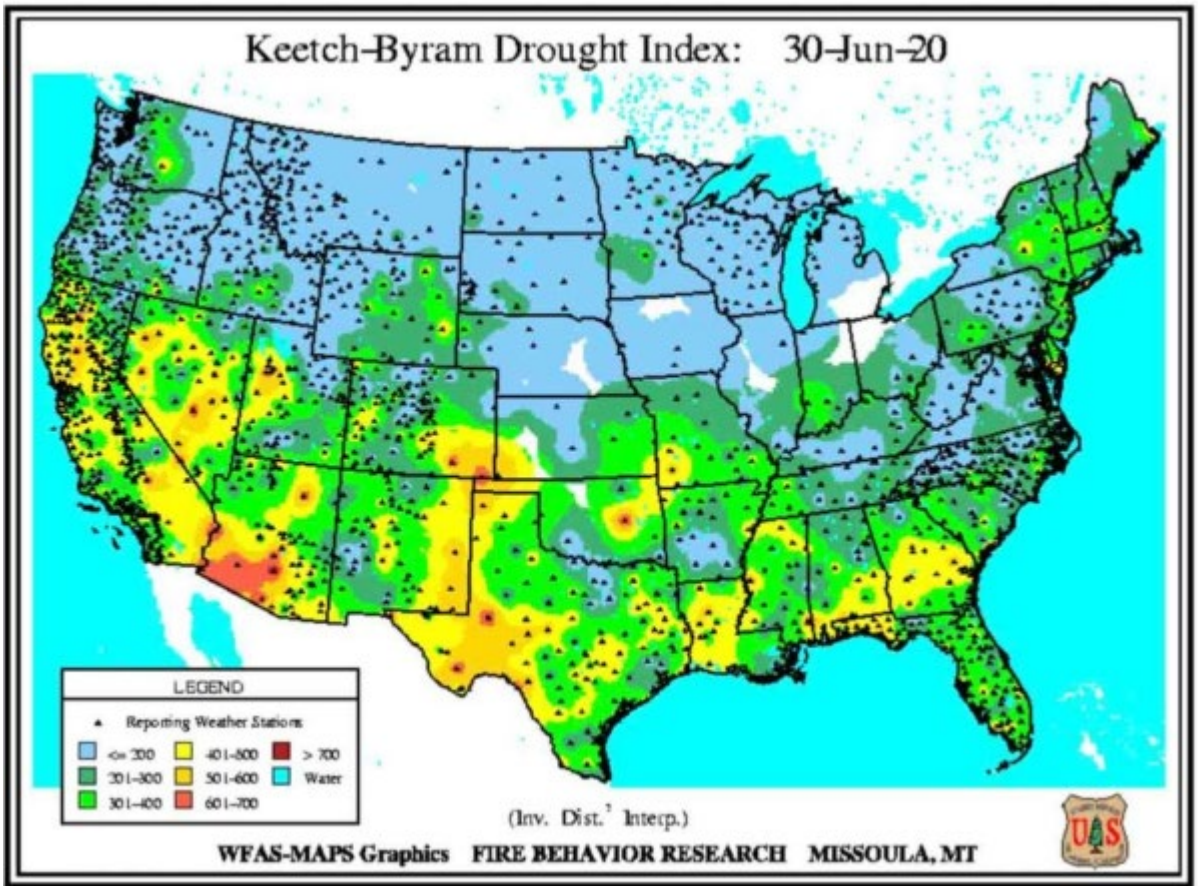
Because Nebraska experiences hundreds of wildfires each year, calculation of a recurrence interval is not applicable, but it is more beneficial to calculate the average number of wildfires

that can be anticipated in a given year. Based on the historic occurrence of wildfire in Nebraska between 2002 and 2020, an average of 1,109 fires could be expected annually. Most of these occur during the late summer and fall as periods of dry weather increase fuel loads. The size and intensity of an individual fire or fire season is highly dependent on environmental conditions related to excessive heat, moisture levels, and short- or long-term drought conditions. With the historical record pointing to many wildfires every year, there is a 100% probability that a wildfire will impact an area of the state in a given year.

Wildfire characteristics are highly dependent on vegetation as a fuel source. Increases in temperatures and longer periods of drought or dry period can lead to an increase in wildfires and contribute to faster growth. Prolonged drought can lead to dead or dying vegetation providing additional fuel for fires. Meteorological surface parameters can influence the extent of wildfire when conditions include low amounts of precipitation, low soil moisture, wind, relative humidity and high temperature. Climate is inherently variable, making it difficult for climate scientists to predict these conditions for more than a few months in advance for most locations. In addition, anomalies of precipitation and temperature may last from several months to several decades. Duration of drought-causing climate events depends on air–sea interactions, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of dynamically unstable synoptic weather systems at the global scale.

Although the impacts and consequences of human-caused wildfires may be mitigated with aggressive public education and rapid response operations, all wildfires cannot be prevented. Specific monitoring systems can help to lower the number of fires or reduce the volume once started. The Keetch-Byram Drought Index (KBDI) is just one type of forecasting tool frequently used by fire service organizations to monitor potential fire conditions. The KBDI, introduced in 2013, is generally used to determine potential wildfire hazard levels based on a scale that ranges from less than 200 to 800, with the lower number representing wetter conditions and the higher representing drier conditions. Areas showing a KBDI range between 600 and 800 represent the most severe drought conditions within the index levels, and are closely associated with increased wildfire occurrence. Many counties begin more intensive monitoring of potential wildfire areas, initiate public information, and issue burn bans when the KBDI is within this range. **Figure 3.12-d** provides a graphic representation of the KBDI map for June 30, 2020. At that time, most of the state was in the lowest KBDI category, indicating extremely low risk for wildfire.

Figure 3.12-d: Keetch-Byram Drought Index, June 30, 2020



Source: Wildfire Today, KBDI, June 30, 2020. https://wildfiretoday.com/2020/07/01/above-normal-wildfire-activity-predicted-to-expand-from-the-great-basin-into-the-northwest-and-northern-rockies/kbdi-june-30-2020/

The U.S. Drought Monitor (exhibited in **Section 3.3)** also provides information that can assist in anticipating potential wildfire conditions.

3.12.5 – Local Plan Data

Nineteen of 23 local hazard mitigation plans reviewed for this update identify wildfire as a hazard of concern, and two identify them as high hazards. An example of high risk from wildfire is described in the *Region 24 Emergency Management Agency Multi-Jurisdictional Hazard Mitigation Plan*, dated July 2014, which includes Cherry County's measures as of 2014 to address this high-risk hazard. Mitigation measures include education and outreach initiatives by the county's 14 fire departments, and improved emergency communication and warning sirens. The plan also notes that Valentine is a FireWise Community "that regularly conducts wildfire mitigation measures such as debris removal and other educational initiatives in coordination with the Nebraska Forest Service." (Region 24 MJHMP, p. 375) The Community Wildfire Protection Plan in this region is still current as of 2020, but scheduled for update by 2022.

The 2008 Farm Bill (Public Law 110-246) required each state to conduct an inclusive analysis of its forests. The Nebraska Forest Service (NFS) and its partners completed an analysis of the state's forests and created what came to be known as the Forest Action Plan (FAP). The plan

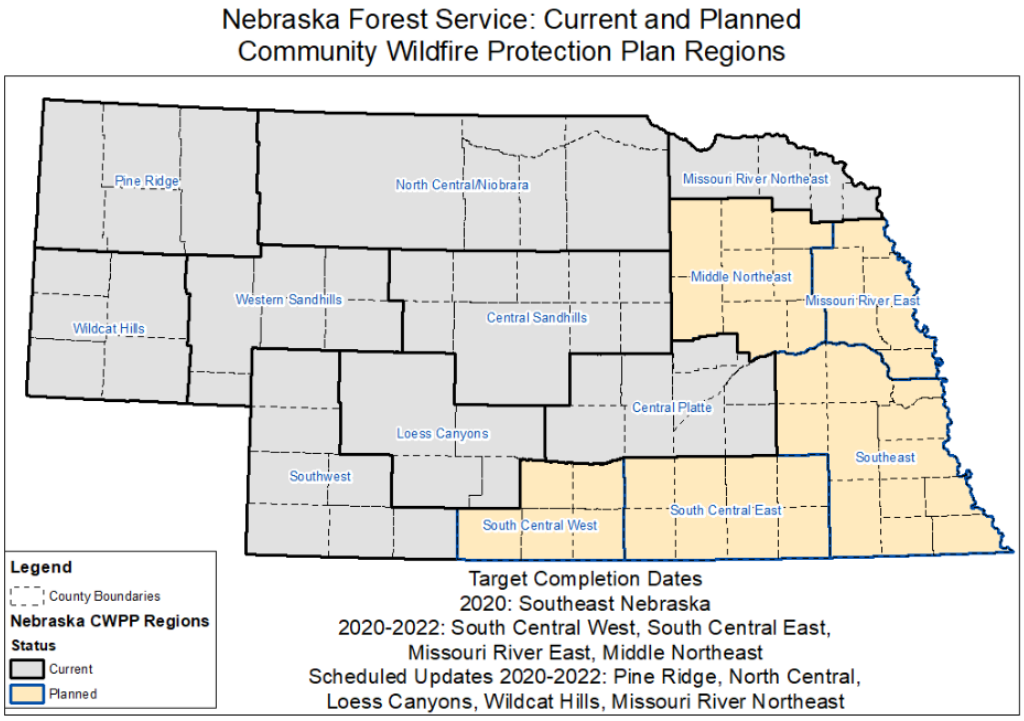
collected data that helped identify priority forest areas throughout the state using the National Land Cover Dataset (NLCD). The NLCD represents 15 land cover and land use types covering open water, development, crops, shrubs, pasture, wetlands and forest types.

The Nebraska Forest Service currently has five Community Wildlife Protection Plan (CWPP) areas and nine proposed plan areas. The purpose of the plans is to provide a tool for effectively managing fire and hazardous vegetative fuels and to bolster collaboration and communication between the various agencies and organizations who manage fire. The area boundaries were based on timber types and mutual aid association boundaries.

The CWPP opens the door for the Nebraska Forest Service to apply for federal grants for cost-sharing forest fuels reduction treatments in at-risk areas within the boundaries of the planning areas. The CWPP may also increase opportunities for counties, municipalities, and rural fire districts to seek grant funding for activities related to fire protection.

At the time this plan was written, nine (9) NFS CWPP Areas had completed plans: Pine Ridge Area, Wildcat Hills area, North Central/Niobrara Area, Western Sandhills, Central Sandhills, Southwest, Loess Canyons, Central Platte and Missouri River Northeast areas. These areas have recently experienced large fires and historically experience high levels of wildfire. Five (5) additional areas – Middle Northeast, Missouri River East, South Central West, South Central East, and Southeast CWPPs are scheduled for completion by 2022. **Figure 3.12-e** illustrates the current and planned status of Community Wildfire Protection Plans in Nebraska.

Figure 3.12-e: Nebraska Community Wildfire Protection Plan Status, as of June 2020



Source: Nebraska Forest Service

3.12.6 - Jurisdictional Vulnerability and Potential Losses

One plan that identified wildfire as a high hazard, the *Lower Platte South Natural Resource District Multi-Jurisdictional Hazard Mitigation Plan,* dated 2020 provides a qualitative description of jurisdictional vulnerabilities and potential losses from this hazard, including:

- Risk of injury or death for resident and firefighting personnel
- Displacement of people and loss of homes
- Transportation routes that may be blocked by fire, preventing evacuation
- Damage to buildings and property with significant losses to business owners
- Damage to critical infrastructure such as power lines and utility structures
- Increased chance of landslides and erosion
- Post fire, flash flooding events may be exacerbated

3.12.7 – Vulnerability of State Facilities and Potential Dollar Losses

As described in **Section 3.12.2,** large areas of the state are vulnerable to wildfires and state assets within those regions could be impacted. State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in **Table 3.11-4.**

Table 3.11-4: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

There are 401 critical infrastructure sites located in High Vulnerability areas, with a total replacement value of more than $364 million dollars. Nebraska State Risk Management does not insure all of the buildings or require the contents of the buildings to be insured. The 3 Thomas county properties are operated and insured by Nebraska Department of Transportation and the 8 Sioux county properties are operated and insured by Nebraska Game & Parks Commission and Nebraska Department of Transportation. There are 442 state-owned structures at Moderate Risk, totaling nearly $520 million dollars in replacement value.

3.12.8 - Future Population and Development Trends

Because wildfire is not limited to geographic boundaries or population groups, it is difficult to identify development and population trends that may be impacted by this hazard. Current land use and building codes incorporate standards that address and mitigate to some degree development that occurs within forested land. There is an opportunity for communities to address future development through participation in the FireWise program or through development of Community Wildfire Protection Plans.

Additional consideration in relation to future development should be given to the level of social vulnerability of a community. Populations with less access to social programs tend to have fewer resources that would support them in a wildfire event, especially if evacuation and sheltering was required, and the residents were dependent on assistance for transportation to move them from threatened areas.

The potential for impacts of future growth and development on wildfire-prone areas will be monitored and evaluated in the next planning cycle to determine whether the level of risk has changed, and whether there are opportunities for mitigation related to development that could reduce hazard impacts in the future.

3.12.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to wildfire as well as other information from the Local Hazard Mitigation Plan updates:

- Have any wildfire events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict wildfire events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to wildfire?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to wildfire?

3.12.10 - Data Sources

- 2019 Nebraska Hazard Mitigation Plan
- *National Cohesive Wildland Fire Management Strategy National Priorities, 2014.* Available at https://www.forestsandrangelands.gov/strategy/thestrategy.shtml#alignment
- Nebraska Department of Administration, Risk Management
- Nebraska Forest Service
- USGS
    - Publications Repository, https://pubs.usgs.gov/fs/FS-025-96/; map accessed at: https://pubs.usgs.gov/fs/FS-025-96/images/fig1.gif

Wildfire Today, Keetch-Byram Drought Index, June 30, 2020. https://wildfiretoday.com/2020/07/01/above-normal-wildfire-activity-predicted-to-expand-from-the-great-basin-into-the-northwest-and-northern-rockies/kbdi-june-30-2020/

SECTION 3.13: OTHER HAZARDS OF CONCERN

2021 SHMP Update
• Hazard sections reformatted to add Chemical Fixed Sites and Transportation, Extreme Temperature and Power Failure to Hazard Profiles • Hazards are minimally profiled to provide context for Local Hazard Mitigation Plans and Public Power District Annexes • Factors for consideration in the next planning cycle are added • Data Sources are added at the end of the section

3.13.1 – Chemical and Radiological Fixed Sites and Transportation

Hazard	Definition and Key Terms
Chemical and Radiological Fixed Sites and Transportation	Incidents involving extremely hazardous chemicals and radiological materials, either at fixed sites or during transportation, are typically referred to as hazardous material (HAZMAT) incidents. Chemicals that are used, stored or transported, mostly by industrial users, vary in their compound or substance, and have varying levels of combustion or flammability. In addition, there is no one response accepted response protocol to HAZMAT incidents due to the variability of a chemical's makeup. Each HAZMAT incident demands response in proportion to the level of threat and potential impact. Facilities that use, store or transport extremely hazardous chemicals fall under federal regulatory requirements.

3.13.1.1 - Hazard Characteristics

Nebraska has approximately 3,624 facilities that report under the Emergency Planning and Community Right to Know Act (EPCRA) §311 & 312 and the Clean Air Act §112(r)(7) identifies the development of a Risk Management Program (RMP). Facilities that fall under this act, facilities must report hazardous and extremely hazardous chemicals that are stored in their facility at any given time. Facilities are expected to submit reports to the local emergency planning committee, the local fire jurisdiction and the State Emergency Response Commission (SERC).

Under section 112 of the Clean Air Act, facilities that have an identified amount of toxic chemicals report through the RMP. The RMP plan assists the facilities with the development of a plan that outlines the worst-case scenarios dealing specifically with seventy-seven toxic chemicals and sixty-three highly flammable substances. Facilities using the RMP submit plans to the Environmental Protection Agency (EPA) with information sharing at the State and local level.

In addition to the federal guidelines that have been enacted; the Nebraska Emergency Management Agency has signed agreements with ten fire jurisdictions that can be called upon to respond to a large chemical response. The ten hazmat jurisdictions maintain the training and equipment needed to assist with a large transportation spill or fixed site release. In addition to

state-level response teams, many local jurisdictions and some private industrial companies train, equip, and maintain hazardous materials response teams.

Radiological Hazard

There is a low potential for a release of radiological materials within the state, as there is one decommissioned nuclear power plant and one operational nuclear power plant. In addition to these fixed sites, nuclear material has been transported through Nebraska's highways.

Numerous federal regulations managed by the U.S. Nuclear Regulatory Commission (NRC) control safety requirements for nuclear power plants. Nuclear power facilities must maintain Emergency Plans and coordinate with state and local governments for preparedness, response and recovery measures. Specific policies that protect people, property and the environment in relation to emergency management, include:

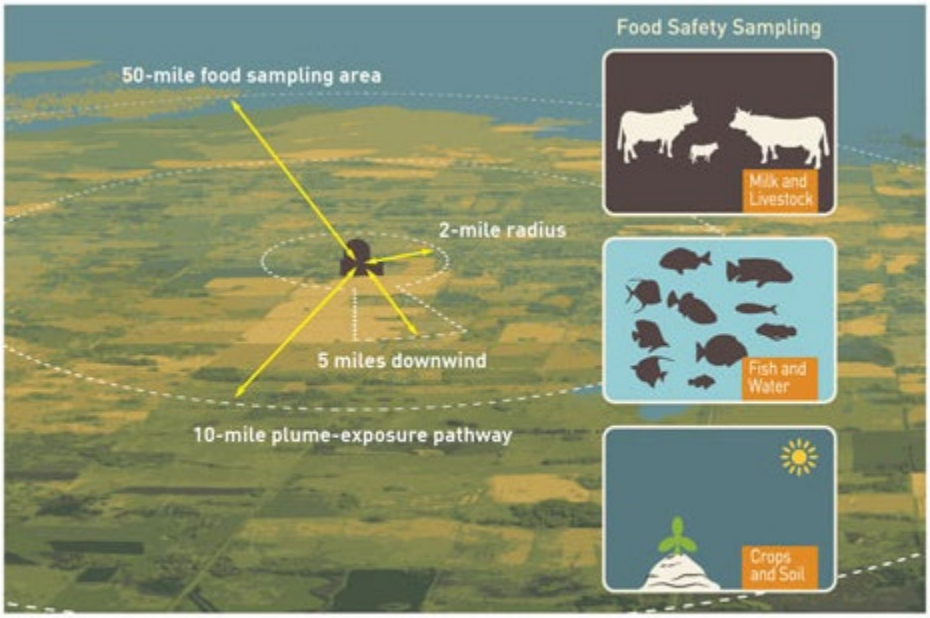
- Title 10 CFR, Part 50.72 – outlines the conditions and requirements for immediate and phased notification to impacted populations for operating nuclear power reactors
- Title 10 CFR 50.47 – outlines provisions for Emergency Plans

Key to any nuclear power plant's preplanned protective action strategy is two emergency planning zones (EPZ's) established around the plan. The EPZ size and shape varies for each plant due to specific site conditions and unique geographical features, as well as demographic information. The two EPZ zones are:

1. Plume Exposure Pathway EPZ, which extends about 10 miles in radius around the reactor site. Protective actions plan within this area are designed to avoid or reduce potential exposures and include sheltering, evacuation, and the use of appropriate medications for prophylaxis.

2. Ingestion Exposure Pathway EPZ, which extends about 50 miles in radius around the reactor site. Protective actions for this area are instituted to avoid or reduce the dosage of radioactive exposure from eating or drinking. Action might include a ban of contaminated food or water.

Figure 3.13.a: Emergency Planning Zones



Note: A 2-mile ring around the plant is identified for evacuation, along with a 5-mile zone downwind of the projected release path.

Source: U.S. Nuclear Regulatory Commission; https://www.nrc.gov/about-nrc/emerg-preparedness/about-emerg-preparedness/planning-zones.html

Table 3.13.1 describes the potential impacts and consequences from chemical or radiological fixes sites and transportation incidents.

Table 3.13-1:

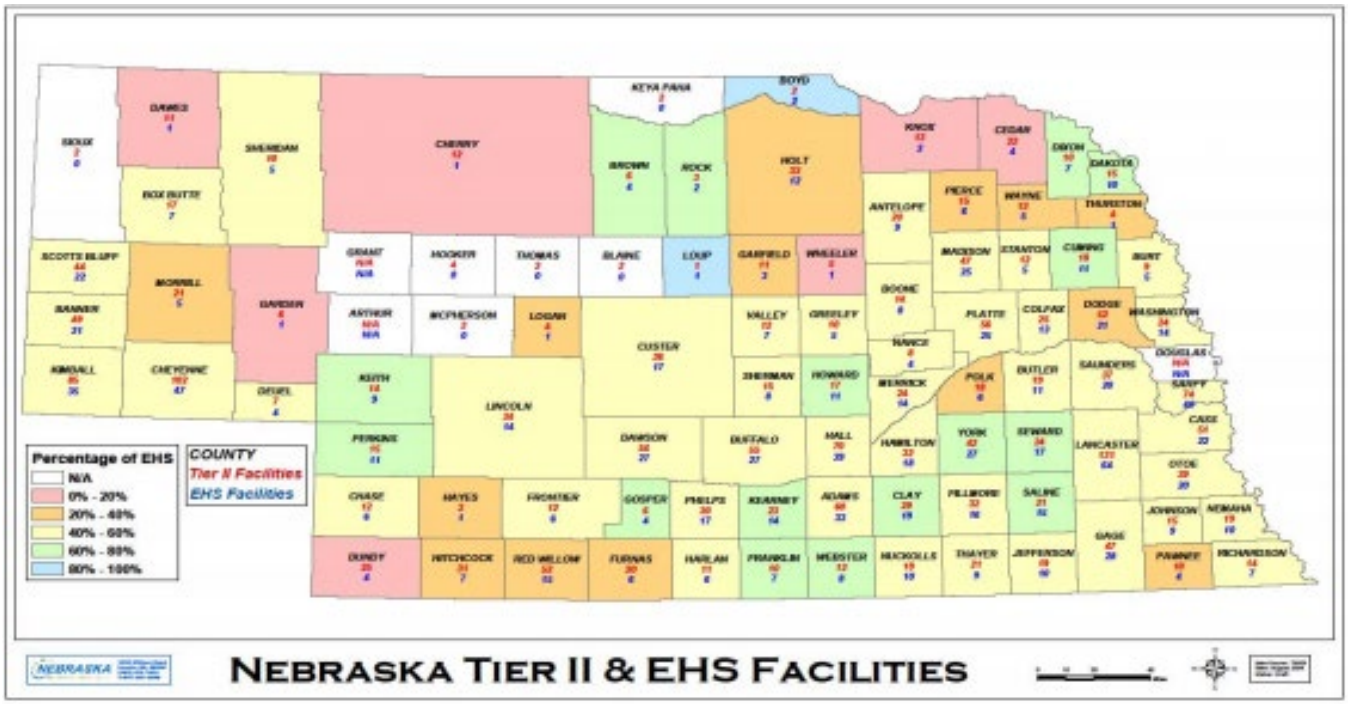
Chemical and Radiological Fixed Sites and Transportation Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – If chemical spill or release occurs in a populated area the impact may cause property damages or destruction from fire or explosion. Casualties/Fatalities – With sufficient warning and if citizens will evacuate when asked, casualties and/or fatalities will be mitigated. With good adherence to safety and the proper use of PPE responder casualties and fatalities can be prevented or minimized. Work – If the incident is contained within a rural area, there should be little to no impact on work. Food/Water – Depending on the type, characteristics and location of a spill or release, food and water may become exposed or contaminated. Consideration should be made for additional resources if this occurs.
Responders: Fire, Police, Medical, Public Works	Containing chemical spills and releases is dangerous, and extreme caution and strict adherence to safety measures, appropriate personal protective equipment and the use of incident management is important for responder safety and accountability. Evacuation may be necessary for vulnerable populations, requiring multiple agency support and resources.

Continuity of Operations	If the incident is contained outside of municipalities, there should be no impact on COOP.
Property: Destroyed, Major, Isolated	Chemical spills and releases may be destructive, if explosion or fire is involved, and moves very quickly. Homes and businesses in an area adjacent to a spill or release are vulnerable to destruction from fire or explosion. In rural areas, field crops and rangeland for livestock and other animals could potentially be impacted.
Infrastructure: Electricity, Water, Roads, Bridges	Infrastructure in vicinity of a chemical spill or release is vulnerable to explosion, fire or contamination, especially electrical structures including transmission and distribution lines, poles, and towers. Run off from suppression activities can pollute streams and rivers that provide drinking water. Roads and bridges may become isolated during the incident and could need to be repaired due to an explosion or fire or due to the large amounts of heavy equipment used to contain the incident.
Environment	There are significant federal and state regulations and processes that address chemical use, storage and transport. These controls provide for significant coordination between state and local responders and Chemical spills and releases are typically not expected to impact the environment on a long-term basis. However, it is possible that streams and rivers can become temporarily polluted from chemicals but the natural dilution factor helps clean the waterway over time. Wildlife may be temporarily displaced and lost but also comes back to the area as it returns to normal.
Economic Conditions	A short-term chemical spill or release is not expected to disrupt the economy of an area. Tourism can be temporarily disrupted for the length of the incident, or if there is any long-term property damage or environmental contamination involved.
Public Confidence in the Governance	Public confidence will depend on proper management of the incident, including safety measures for the public, timely and periodic updates, and the activities taken to return the area to normal.

3.13.1.2 – Location

The following map (**Figure 3.13-b**) identifies the counties in which facilities reporting chemicals reside.

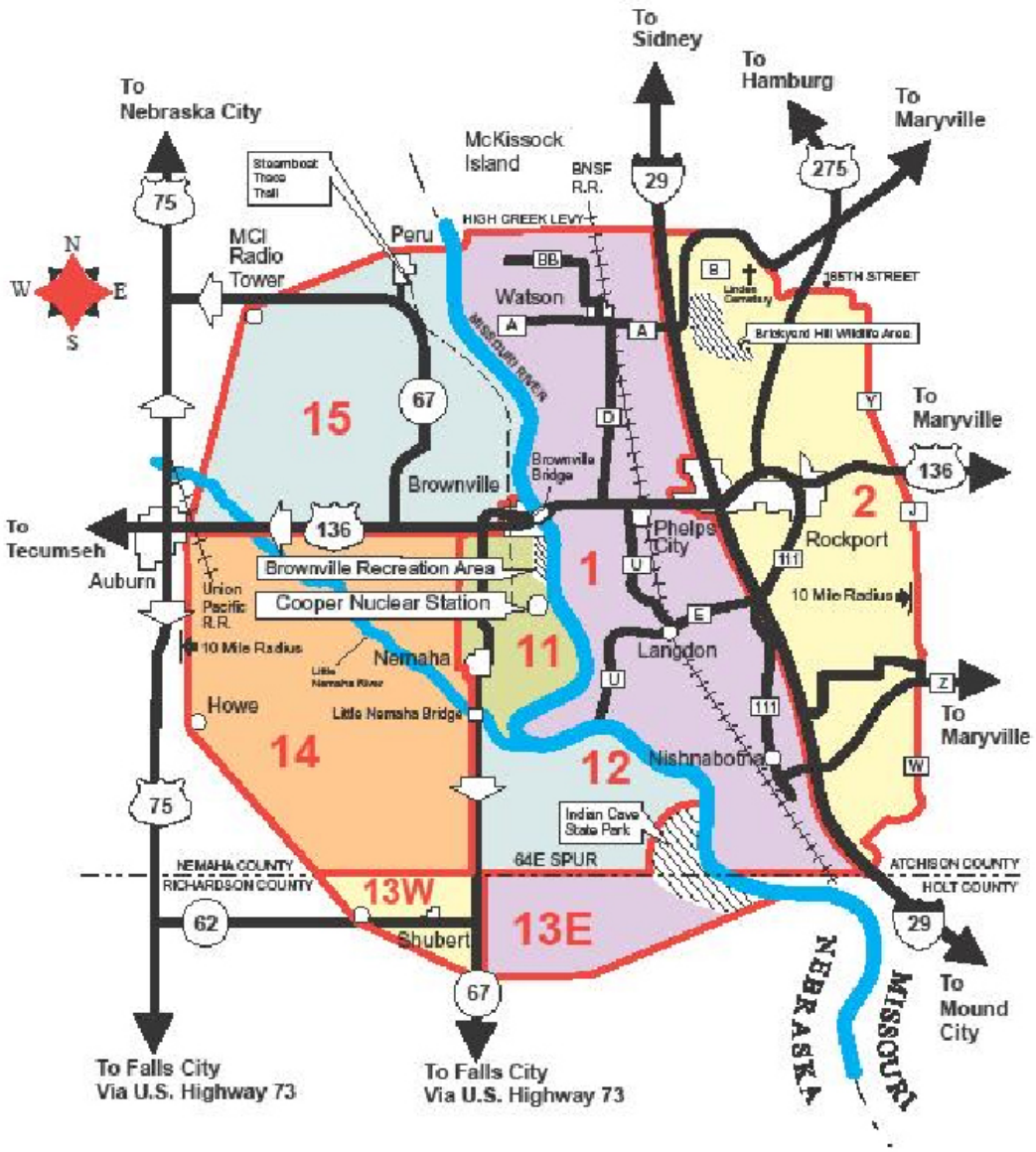
Figure 3.13-b: Nebraska Tier II and EHS Facilities Map



Source: 2019 Nebraska Hazard Mitigation Plan

Figure 3.13-c illustrates the evacuation routes for the Cooper Nuclear Station near Brownville.

Figure 3.13-c: Cooper Nuclear Station Evacuation Route Map



3.13.1.3 – Previous Occurrences and Extent

Because this hazard is being minimally profiled for this plan update, information related to previous occurrences was not identified.

3.13.1.4 - Probability of Future Events and Impacts of Climate Change

Predicting chemical spills or releases is an inexact process due to the volatility of specific chemicals, safety measures for the use, storage and transport of the chemical, and operational response conditions, timing and containment.

Because this hazard is being minimally profiled for this plan update, information related to the probability of future events was not identified.

3.13.1.5 – Local Plan Data

Twenty local plans consider chemical and radiological fixed sites and/or transportation as a hazard of concern, although they are not ranked as a high hazard.

3.13.1.6 – Jurisdictional Vulnerability and Potential Losses

As an example, the Twin Platte Natural Resource District Hazard Mitigation Plan, dated 2016 ranked "chemical release" as a high hazard and noted that there have been 69 previous events over the past 32 years, with a 100% approximate annual probability of occurring.[16] Despite the high ranking of this hazard, the overall impacts of property and crop loss were noted as "unknown" in the plan. Overall, this hazard was linked to 329 chemical spills from transporting in the period from August 1, 1980 to March 21, 2015, with "no fatalities, 12 minor injuries and $436.289 in damages from spills."

3.13.1.7- Vulnerability of State Assets and Potential Dollar Losses

Based on the low potential for impact to state assets from this hazard, the potential vulnerability of state assets and dollar losses in relation to chemical and radiological fixed sites and transportation has not been calculated. **Table 3.13-3** indicates the general state asset replacement values in the top ten counties.

[16] 2016 Twin Platte Natural Resource District Hazard Mitigation Plan, pp. iv-vi

Table 3.13-3: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.13.1.8 - Future Population and Development Trends

Because this hazard is being minimally profiled for this plan update, information related to future population and development trends was not identified.

3.13.1.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to chemical and radiological fixed sites and transportation as well as other information from the Local Hazard Mitigation Plan updates:

- Have any chemical and radiological fixed sites and transportation events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict chemical and radiological fixed sites and transportation events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to chemical and radiological fixed sites and transportation?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to chemical and radiological fixed sites and transportation?

3.13.1.10 - Data Sources

- *2019 Nebraska Hazard Mitigation Plan*
- Cooper Nuclear Station
    - Evacuation Map. Retrieved at: https://nema.nebraska.gov/tech-hazard/evacuation-routes-map-cooper-nuclear-station-area

- Nebraska Department of Administration, Risk Management, July 22, 2020
- *Twin Platte Natural Resource District Hazard Mitigation Plan,* 2016
- U.S. Nuclear Regulatory Commission

3.13.2 – Extreme Temperature

Hazard	Definition and Key Terms
Extreme Temperature	• *Extreme Heat* – Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. • *Extreme Cold* – Although no specific definition exists for Extreme Cold, the following are characteristics of an Extreme Cold event in Nebraska: temperatures at or below zero degrees for an extended period of time. Note that Extreme Cold events are usually part of winter storms but can occur during anytime of the year and have devastating effect on the state's agricultural production.

3.13.2.1 - Hazard Characteristics

Heat is one of the leading weather-related killers in the United States, despite the ability to prevent or reduce the risk of heat exhaustion and heat stroke through outreach and intervention[17].

Other natural hazards such as floods and severe winter weather occur more frequently in Nebraska and serve to overshadow extreme temperature in consideration for hazard mitigation planning; however, its effects can have devastating consequences, especially to people. Based on previous occurrences and the threat to the population, this section profiles the hazard and provides justification for a minimal vulnerability assessment. This section also emphasizes the role of preparedness education and early warning in reducing the threat to humans from extreme temperature.

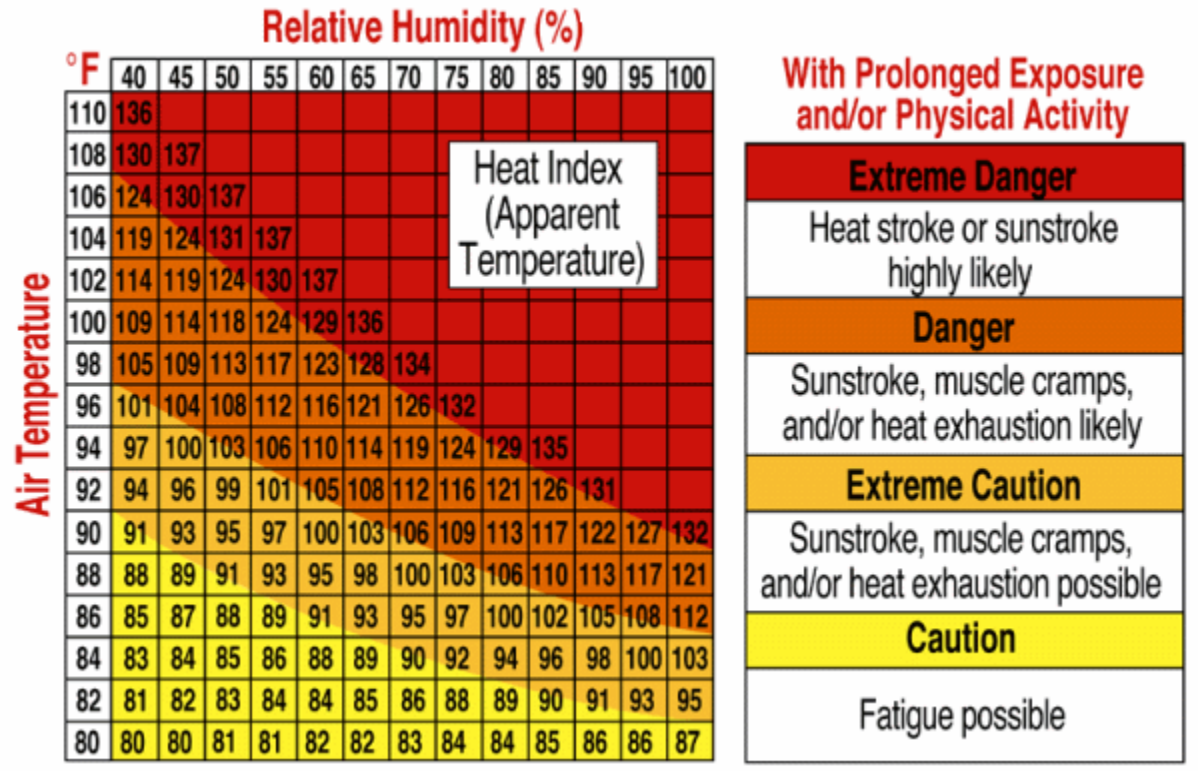
Extreme Heat

Atmospheric variables can affect the impacts of extreme heat. Humid conditions add to human discomfort with high temperatures and can increase the adverse effects of prolonged exposure to extreme heat. Additionally, extended periods of hot weather in combination with lack of rainfall and dry conditions can lead to drought and resulting impacts to crops and livestock, and indirectly, the economy.

The relationship between heat and humidity is best explained through the Heat Index Chart (**Figure 3.13-d**), developed by the National Weather Service (NWS) as a means of portraying how the combined threat of heat and humidity impact people.

[17] EPA's *Excessive Heat Events Guidebook* at: www.epa.gov/heatisland/about/pdf/EHEguide_final.pdf).

Figure 3.13- d: Heat Index and Relative Humidity, Effects on People



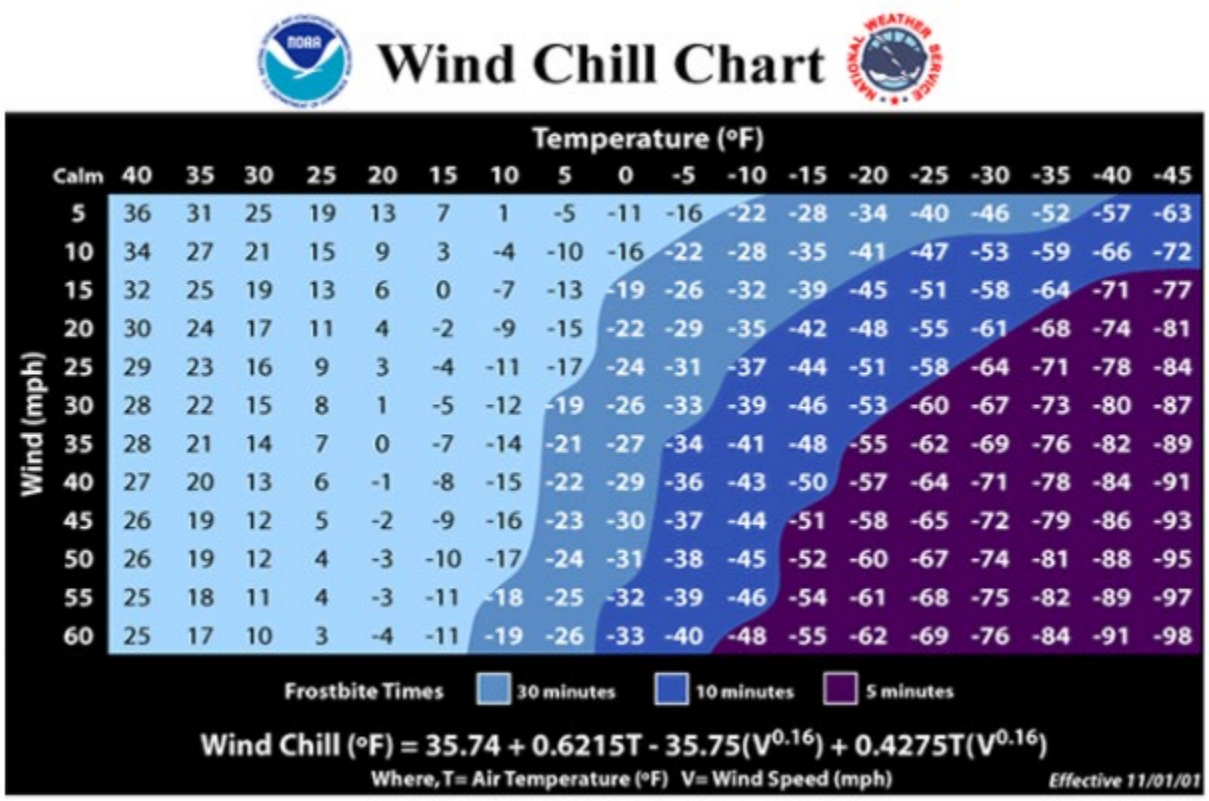
Source: National Weather Service, NOAA

Extreme Cold

Every winter, extremely cold air affects multiple parts of the country and affects millions of people. Cold arctic air joining together with brisk winds, leads to dangerously cold wind chill values. People exposed to extreme cold are susceptible to frostbite in a matter of minutes. Areas most prone to frostbite are uncovered skin and the extremities, such as hands and feet. Hypothermia is another threat during extreme cold, occurring when the body loses heat faster than it can produce.

Cold weather can also affect crops, especially in late spring or early fall, when cold air outbreaks can damage or kill produce for farmers, as well as residential plants and flowers. A freeze occurs when the temperature drops below 32°F. Freezes and their effects are significant during the growing season. Plant species have different tolerances to cold temperatures.

Figure 3.13-e: NOAA Wind Chill Chart



Source: NOAA, https://www.weather.gov/safety/cold-wind-chill-chart

Table 3.13-4: Summary of Impacts/Consequences Summary

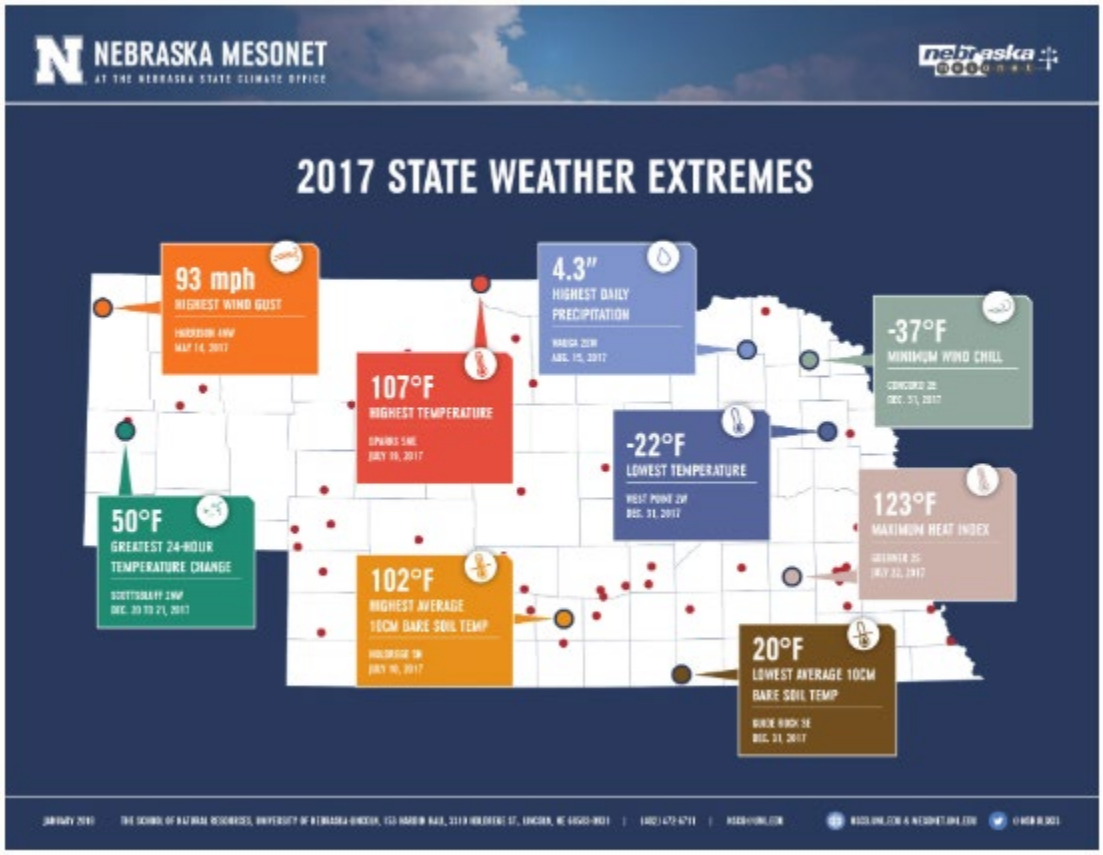
Extreme Temperature Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – Extreme temperatures are not expected to have direct impacts on housing; however, extreme variations could cause mechanical systems, such as exposed water pipes in extreme cold, to malfunction or become damaged. Temporary public shelters (cooling centers or cold-weather shelters) may need to be provided. Casualties/Fatalities – With good warning and if citizens will heed preparedness and safety measures when issued, casualties and/or fatalities will be mitigated. With good adherence to safety and the proper use of protective clothing and equipment potential casualties and fatalities to responders or outdoor workers can be prevented or minimized. Work – No direct impact is expected to work properties. Food/Water –No direct impact on food and water supplies is expected; however, if extreme cold leads to temporary unavailability of water, supplies may need to be brought in for those affected. Consideration should be made for additional water resources for fire-fighting in extreme cold.
Responders: Fire, Police, Medical, Public Works	Response operations may be affected by extreme temperatures. Strict adherence to safety measures and the use of incident management is important for responder safety and accountability. Temporary sheltering may be necessary for vulnerable populations, requiring multiple agency support and resources.

Continuity of Operations	Unless the extreme temperature event is long-term, there is no expected need to active COOP plans.
Property: Destroyed, Major, Isolated	No direct impact to homes and businesses are expected. Field crops, rangeland, livestock and other animals may be affected.
Infrastructure: Electricity, Water, Roads, Bridges	Critical infrastructure especially electrical structures including transmission and distribution lines, poles, and towers may be susceptible to temporary failure and/or damage. If power failure results from the incident, support for critical facilities such as hospitals, nursing homes and residential care facilities may be required.
Environment	Temperature extremes are naturally occurring, and although not all incidents lead to environment impacts or consequences, long term conditions that lead to drought and severe winter weather may cause short- or long-term impacts.
Economic Conditions	No direct impact to the economy is expected from extreme temperatures.
Public Confidence in the Governance	No direct impact to public confidence is anticipated from extreme temperatures, unless support of local residents and critical infrastructure is not provided.

3.13.2.2 – Location

All of the State of Nebraska Planning Area is susceptible to the effects of extreme temperature; although temperatures at the northern areas of the state tend to be a few degrees cooler, on average, than the lower elevations. In one typical year, 2017, there was a 129-degree spread between the highest temperature and the lowest recorded by a Nebraska Mesonet weather station. In addition, there are a 52 degree 24-hour temperature change and a -37-degree wind chill, all recorded by one weather station.

Figure 3.13-f: Map of 2017 Nebraska Weather Extremes



Source: University of Nebraska-Lincoln, School of Natural Resources, "Extremes list highlights Nebraska's variable climate, January 30, 2018. Retrieved at: https://newsroom.unl.edu/announce/snr/7583/43184

3.13.2.3 – Previous Occurrences and Extent

The NOAA/NCEI Storm Events Database tracks reports of "excessive heat". Based on the records from January 2020 through June 2020, a total of 53 zones (counties) reported a total of 14 days of excessive heat events. There were no deaths, injuries, property or crop damages associated with these events.

Table 3.13-5: Excessive Heat Events, 2000-2020

Date(s)	Total Number of Zone (County) Reports
6/22/09	16
8/8/2010	13
7/15-16/2011	52
8/1/2011	16
6/27/12	2
7/2-18/2012	11
8/1/2012	2
6/10/2016	2

Date(s)	Total Number of Zone (County) Reports
7/20/2016	2
6/29/2019	2

Source: NOAA, NCEI

The NOAA/NCEI Storm Events Database also tracks "extreme cold/wind chill events. Over the same time period from January 2000 through June 2020, more than 96 zones were affected with a total of 36 days of events. There was one death reported in relation to the excessive cold on January 22-23, 2003, when a homeless man in the Omaha area suffered severe frostbites because of the extreme cold, passing away several days later. Table 3.13-6 summarizes the total events (some lasting multiple days) and total number of zone or county reports for each event.

Table 3.13-6: Extreme Cold/Wind Chill Events, 2000-2020

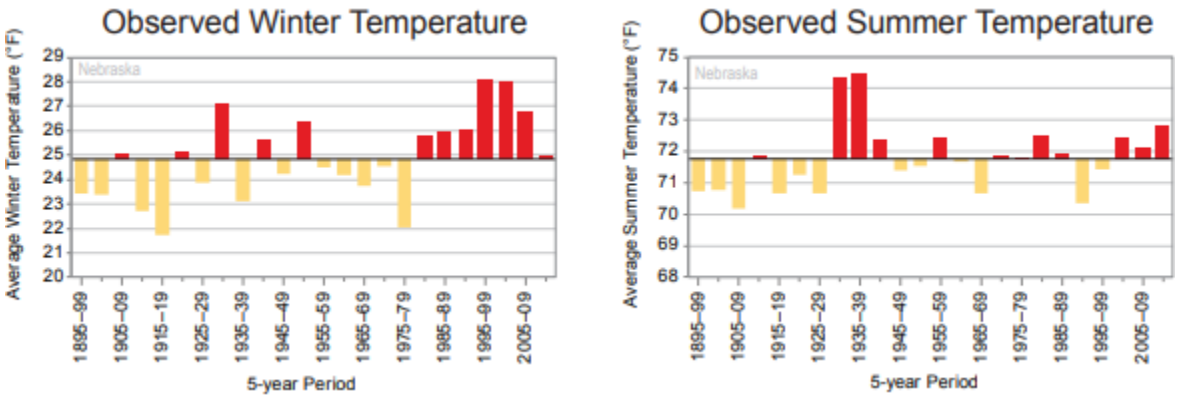
Date(s)	Total Number of Zone (County) Reports
10/8/2000	24
12/16-18/2000	60
1/22/2003	30
2/20/2008	4
12/14-21/2008	51
12/09-10/2009	6
1/7/2010	33
1/31- 2/1/2011	58
12/4-9/2013	24
1/5/2014	53
2/5/2014	6
12/29-31/2014	20
12/17/2016	33
1/5/2017	9
12/24/2017	24
12/31/2017 0 1/1/2018	17
1/15/2018	5
2/20/2018	3
1/1/2019	3
1/29/2019	3
2/7-8/2019	13
3/3-4/2019	20

Source: NOAA, NCEI

The NOAA/NCEI Nebraska State Summary (#149-NE) for 2019, provides a statistical overview of temperature extremes compared with the long-term averages over five-year periods. From 1995 to 2004, Nebraska experienced the warmest winter temperatures in the historical record.

Since 2000, summer temperatures have been above average, although they have remained below the extreme heat of the 1930s Dust Bowl era (North Carolina Institute for Climate Studies/NOAA NCEI).

Figure 3.13-g: Statistical Comparison of Weather Extremes with Long-Term Averages



Source: CICS-NC/NOAA NCEI

3.13.2.4 - Probability of Future Events and Impacts of Climate Change

Based on the historical occurrence of extreme temperatures, it is likely that the state will experience extreme heat and extreme cold in any given year. Using the NCEI data as a calculating factor, the state experienced 10 extreme heat events over a 20-year period, resulting in a recurrence interval of 0.5 percent in any given year. Using the same data to calculate the probability of extreme cold, this event can be expected at an interval of 1.1 percent in any year.

Predicting extreme temperatures depends on the ability to forecast two fundamental meteorological surface parameters, precipitation and temperature. Based on the historical record, climate is inherently variable making it difficult for climate scientists to predict. In addition, anomalies of precipitation and temperature may last from several months to several decades. Duration of drought-causing climate events depends on air–sea interactions, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of dynamically unstable synoptic weather systems at the global scale.

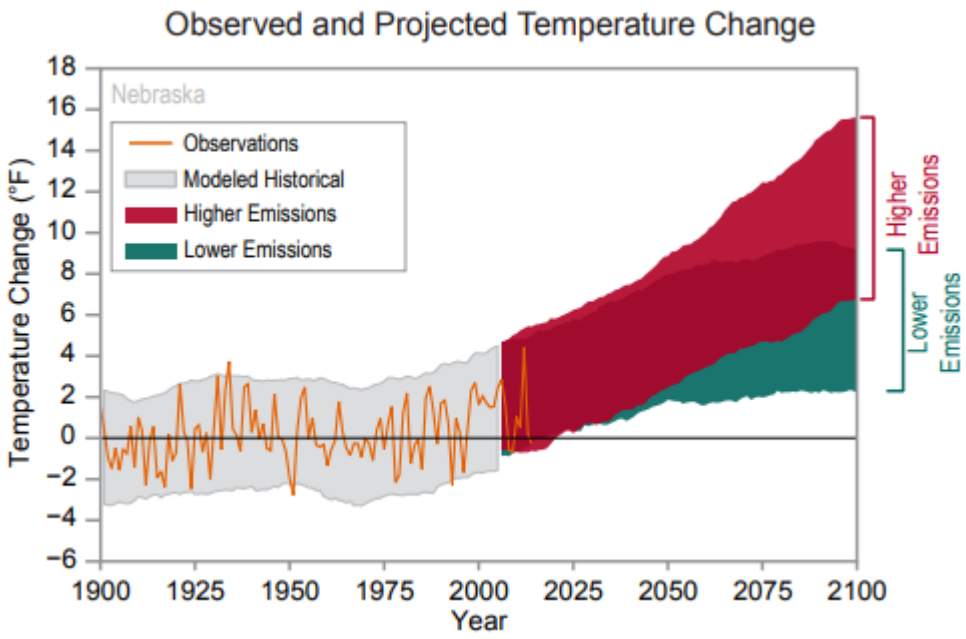
Observed and projected temperature changes (compared to the 1901-1960 average) in near-surface air temperature for Nebraska) are presented in **Figure 3.13-h**. The NOAA NCEI State Summary for Nebraska (2019) provides a summary for these observations:

> *Observed data are for 1900-2014; projected changes for 2006-2100 are from global climate models for two possible futures: one in which greenhouse gas emissions continue to increase (higher emissions) and another in which greenhouse gas emissions increase at a slower rate (lower emissions). Temperatures in Nebraska (orange line) have risen about 1degree F since the beginning of the 20th century. Shading indicates*

the range of annual temperatures from the set of models. Observed temperatures are generally within the envelope of model simulations of the historical period (gray shading).

Historically unprecedented warming is projected during the 21st century. Less warming is expected a lower emissions future with the coldest years being about as warm as the warmest years in the historical record (green shading) and more warming under a higher emissions future (the hottest years being about 11 degrees F warmer than the hottest year in the historical record (red shading)

Figure 3.13-h: Observed and Projected Temperature Change in Nebraska, 1900 – 2100



Source: CICS-NC/NOAA NCEI

3.13.2.5 – Local Plan Data

Twenty-one local hazard mitigation plans identified extreme heat as a hazard of concern. No plans identified extreme cold as a hazard of concern

3.13.2.6 – Jurisdictional Vulnerability and Potential Losses

Two local plans – the *City of Beatrice Hazard Mitigation Plan*, dated April 2019; and the *Hayes, Frontier, and Hitchcock Counties Multi-Jurisdictional Hazard Mitigation Plan*, dated May 2018 - extreme heat as a hazard of high concern.

- The City of Beatrice plan states that the jurisdiction experiences seven days per year of 100 degrees or greater with average annual crop losses of approximately $153,000 (pp.

77-78). Additional vulnerabilities identified by the City are loss of electricity (with assumed damages), and impacts to public health and infrastructure.

- The *Hayes, Frontier and Hitchcock* plan identify extreme heat as an extensive hazard, with severe probable extent and high overall significance (p. 3-13).

3.13.2.7- Vulnerability of State Assets and Potential Dollar Losses

The State does not identify potential vulnerability of state assets linked to extreme temperatures. Table 3.13-7 indicates the general state asset replacement values in the top ten counties.

Table 3.11-7: State Asset Replacement Values in Top Ten Counties, as of July 2020

State Asset Replacement Values – Top Ten Counties					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Brown	28	$1,382,042,573.95	$0.00	$1,382,042,573.95	$1,382,042,573.95
Lancaster	329	$870,504,722.50	$83, 437,739.00	$953,942,461.50	$953,942,461.50
Douglas	107	$171,456,671.81	$12,935,048.00	$184,391,719.81	$184,391,719.81
Buffalo	76	$159,468,253.50	$4,409,237.00	$161,677,490.50	$161,677,490.50
Johnson	26	$136,335,543.90	$12,996,000.00	$149,331,543.90	$149,331,543.90
Hall	81	$113,640,178.10	$2,290,428.00	$115,930,606.10	$115,930,606.10
Cass	225	$83,346,707.73	$94,231.00	$83,440,938.73	$83,440,938.73
Dawes	146	$83,378,225.93	$0.00	$83,378,225.93	$83,378,225.93
Gage	63	$73,554,930.08	$0.00	$73,554,930.08	$73,554,930.08
Adams	29	$71,043,195.25	$0.00	$71,043,195.25	$71,043,195.25
TOTAL	**1,110**	**$3,144,771,002.75**	$32,724,944.00	**$3,258,733,685.75**	**$3,258,733,685.75**

Source: Nebraska Department of Administration, Risk Management, July 22, 2020

3.13.2.8 - Future Population and Development Trends

Future population growth and development is unlikely to have any impact on the level of risk and vulnerability to extreme temperatures.

3.13.2.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to chemical fixed sites and transportation as well as other information from the Local Hazard Mitigation Plan updates:

- Have any extreme temperature events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict extreme temperature events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to extreme temperature?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to extreme temperature?

3.13.2.10 - Data Sources

- *2019 Nebraska Hazard Mitigation Plan*
- *City of Beatrice Hazard Mitigation Plan*, April 2019
- *Hayes, Frontier, and Hitchcock Counties Multi-Jurisdictional Hazard Mitigation Plan*, May 2018
- Nebraska Department of Administration, Risk Management

3.13.3 – Power Failure

Hazard	Definition and Key Terms
Power Failure	A power failure is a period of time when the electrical supply to a particular building, area or system is interrupted. Power failures are particularly critical if essential infrastructure, services or public safety is at risk. For the purpose of this plan, power failure may result as a cascading affect from a natural or technological hazard and may be an accidental or intentional cause. Example: A lightning strike at a critical service area results in a temporary outage

Although power failure was omitted as a hazard of concern in the 2019 SHMP, it was within the top six highest hazards ranked by Emergency Management regions for the 2014 SHMP. This intensity of concern at the local level at that time indicated that this hazard had some relevance for mitigation planning purposes; however, because it is most frequently a cascading affect or consequence of another hazard, such as a severe winter storm, it is not considered individually for the 2021 SHMP update.

For the purpose of this plan, power failure will be further considered within the Public Power District Annexes.

3.13.3.1 Hazard Characteristics

Power Failure may result from many causes, including impacts from natural hazard events, technological failures or human-caused intentional events. Looking beyond the cause, the end result is a temporary loss of electrical power within a system or systems that cover a widespread area. Power failure may occur without warning and may last minutes, hours or days.

Table 3.13-8: Power Failure Impact/Consequence Summary

Power Failure Impact/Consequence Summary	
Public: Housing, Casualties, Fatalities, Work, Food, Water	Housing – Power Failure may have direct impacts on housing with short- or long-term failure. Temporary public shelters may need to be provided if the Casualties/Fatalities –Periodic preparedness and safety messages to citizens will allow citizens to identify personal and family needs prior to a power failure and make appropriate plans. In the event of citizens dependent on life-sustaining equipment, arrangements for alternate or battery power should be made for backup. In extreme instances, citizens may be dependent on transport by Rescue to alternate facilities for power. Work – Loss of power at a work place could result in loss of critical resources or public safety issues. Food/Water –Loss of power for extended periods of time will result in contaminated food which could endanger public health. For short-term power failure, the public should receive preparedness messages to assist in protecting food. In extreme events, food supplies may need to be brought in for those affected.

Responders: Fire, Police, Medical, Public Works	Response operations may be affected by power failure and loss of functional infrastructure such as traffic signals, railroad crossing gates, and communications. Strict adherence to alternate protocols and the use of incident management is important for responder safety and accountability. Temporary sheltering may be necessary for vulnerable populations, requiring multiple agency support and resources.
Continuity of Operations	In a long-term event, COOP plans should be activated to identify mission essential functions, vital records, communication and computer networks, and other resources, and potential alternate operating facilities.
Property: Destroyed, Major, Isolated	Although property loss and destruction are not anticipated with a power failure, long-term outages could impact operational systems within buildings and other facilities.
Infrastructure: Electricity, Water, Roads, Bridges	Critical infrastructure may be susceptible to loss of function or services with a temporary or long-term power failure. If power failure results as a cascading impact from another incident, support for critical facilities such as hospitals, nursing homes and residential care facilities may be required.
Environment	Power failure is unlikely to have an impact on the environment; although long term conditions could impact accessibility to agricultural systems and equipment dependent on electric power.
Economic Conditions	Depending on the cause of the power failure, economic impacts could affect local residents and businesses as well as public infrastructure. Indirect impacts of long-term power failure could include loss of specific industries and large employers.
Public Confidence in the Governance	If the incident extends beyond a few hours, it is vital that the public be kept informed about the current status of the event, what is being done by the authorities to correct the situation and what personal or family measures will mitigate the event. Timely and frequent public messaging is required.

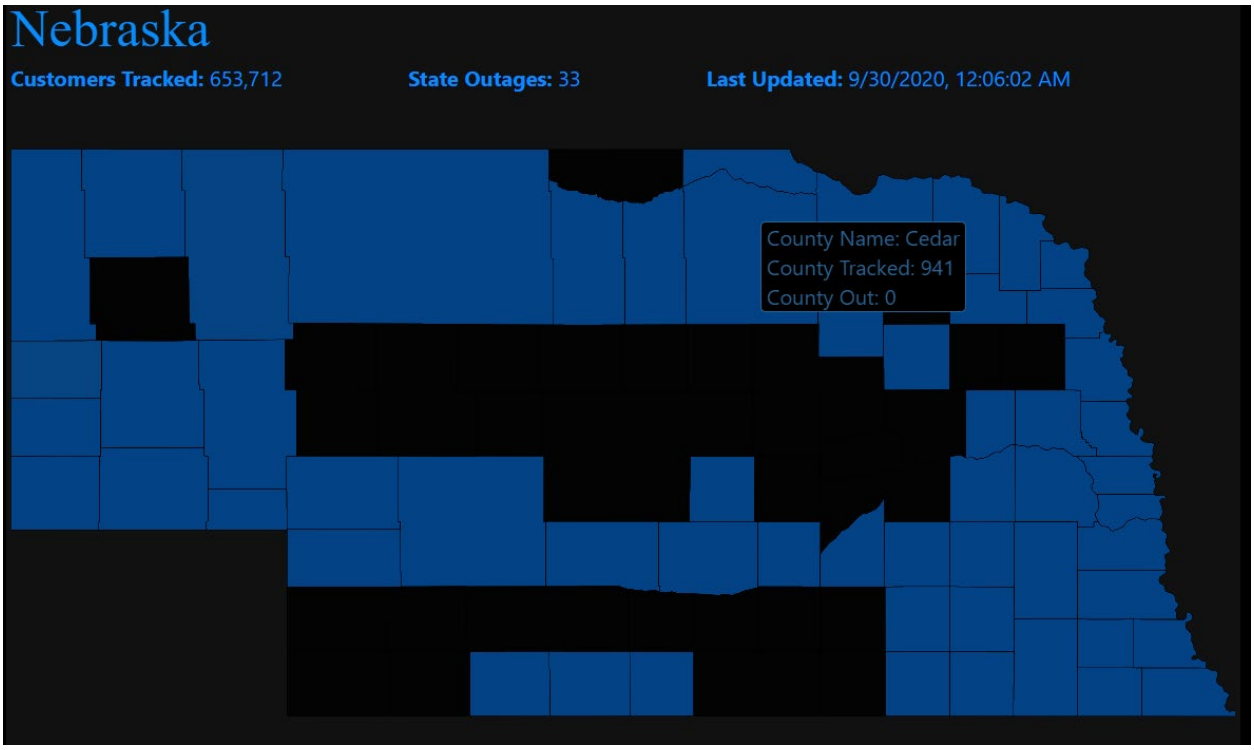
3.13.3.2 – Location

Because this hazard is being minimally profiled for this plan update, additional information related to location was not identified.

3.13.3.3 – Previous Occurrences and Extent

It is difficult to develop a comprehensive process to track and document power failure events by year, location or individual power provider. While some online systems maintain current status updates, documentation of previous events is typically not maintained. One source of online data that reports current status is illustrated in **Figure 3.13-i**. In this map, the counties represented in black are untracked locations and only a few providers are tracked in the system.

Figure 3.13-i: Current Power Outages in Nebraska as of September 30, 2020 12:06:02 AM



Outage Scale: 0% 10% 30% 60% 100%

Electric Providers for Nebraska

Provider	Customers Tracked	Customers Out	Last Updated
Black Hills Energy	136	0	9/1/2020, 11:40:08 PM
High West Energy	2,871	0	9/30/2020, 12:01:00 AM
Lincoln Electric System	135,167	0	9/28/2020, 05:17:31 PM
Nebraska Public Power District	116,394	33	9/30/2020, 12:06:00 AM
Norris PPD	24,313	0	9/30/2020, 12:06:00 AM
Omaha PPD	374,831	0	9/30/2020, 12:06:02 AM

3.13.3.4 - Probability of Future Events and Impacts of Climate Change

Because of the lack of combined data tracking and reporting, it is not possible to identify the probability of future events are the statewide system as a whole. Individual public power districts do maintain records of outages and can provide system-specific data.

3.13.3.5 – Local Plan Data

Based on review of 23 current Local Hazard Mitigation Plans, no plans identify power failure as a hazard of concern.

3.13.3.6 – Jurisdictional Vulnerability and Potential Losses

Based on review of 23 current Local Hazard Mitigation Plans, no plans identify jurisdictional vulnerabilities or potential losses related to power failure.

3.13.3.7- Vulnerability of State Assets and Potential Dollar Losses

Under current data collection criteria, there is no record of direct impacts or dollar losses to state assets from power failure. It is possible that long-term power failure might impact continuity of services within state facilities, but property damage is not likely.

3.13.3.8 - Future Population and Development Trends

Although it is unlikely, future development if intense could potentially have an impact on the frequency of power failure if heavy usage loads cannot be managed. At this time, there is no planned development of this nature.

3.13.3.9 – Factors for Consideration in the Next Planning Cycle

Future monitoring, evaluation and updating of this plan should consider the following factors related to power failure as well as other information from the Local Hazard Mitigation Plan updates:

- Have any power failure events occurred since adoption of this plan?
- Has any new scientific research or methodology changed the ability to predict power failure events or assess risk and vulnerability?
- Has there been any significant change in the population, built environment, natural environment or economy that could affect the risk or vulnerability to power failure?
- Is there any new evidence related to the impacts of climate change that could affect the level of risk or vulnerability to power failure?

3.13.3.10 - Data Sources

- 2014 State Hazard Mitigation Plan
- 2019 State Hazard Mitigation Plan
- Nebraska State Summary, 2019, Cooperative Institute for Climate Studies – North Carolina/ NOAA National Center Environmental Information (CICS-NC, NOAA NCEI), 2019. Retrieved at: https://statesummaries.ncics.org/chapter/ne/

SECTION 4: MITIGATION STRATEGY

Requirements

S8. Does the mitigation strategy include goals to reduce long-term vulnerabilities from the identified hazards? [44 C.F.R. §201.4(c)(3)(i)

S9. Does the plan prioritize mitigation actions to reduce vulnerabilities identified in the risk assessment? [44 C.F.R. §201.4(c)(3)(iii) and (iv)]

S10. Does the plan identify current and potential sources of funding to implement mitigation actions and activities? [44 C.F.R. §201.4(c)(3)(iv)]

S11. Was the plan updated to reflect progress in statewide mitigation efforts and changes in priorities? [44 C.F.R. §201.4(d)]

S12. Does the plan discuss the evaluation of the state's hazard management policies, programs, capabilities, and funding sources to mitigate the hazards identified in the risk assessment? [44 C.F.R.§201.4(c)(3)(ii)]

RL. Did the state develop a Repetitive Loss Strategy? [44 C.F.R. §201.4(c)(3)(v)]

S15. Does the plan describe the Criteria for prioritizing funding? [44 C.F.R. §201.4(c)(4)(iii)]

a. The plan must describe the process and timeframe used by the state to review and submit approvable local and tribal, as applicable, mitigation plans to FEMA.
b. The plan must describe the process and timeframe used by the state to coordinate and link risk assessments and mitigation strategy information from local and tribal, as applicable, mitigation plans into the state mitigation plan. EMAP 4.2.2: The Emergency Management Program documents project ranking based upon the greatest opportunity for loss reduction and documents how specific mitigation actions contribute to overall risk reduction.

EMAP STANDARDS (2019)

4.2.1 *The Emergency Management Program has a plan to implement mitigation projects and sets priorities based upon loss reduction. The plan:*
(1) is based on the natural and human-caused hazards identified in Standard 4.1.1 and the risk and consequences of those hazards;
(2) is developed through formal planning processes involving Emergency Management Program stakeholders; and
(3) establishes short and long-term strategies, actions, goals, and objectives.
4.2.2 *The Emergency Management Program documents project ranking based upon the greatest opportunity for loss reduction and documents how specific mitigation actions contribute to overall risk reduction.*
4.2.3 *The Emergency Management Program has a process to monitor overall progress of the mitigation activities and documents completed initiatives and their resulting reduction or limitation of hazard impact on the jurisdiction.*
4.2.4 *The Emergency Management Program, consistent with the scope of the mitigation program, does the following:*
(1) identifies ongoing mitigation opportunities and tracks repetitive loss;
(2) provides technical assistance in implementing mitigation codes and ordinances; and
(3) participates in jurisdictional and multi-jurisdictional mitigation efforts.

2021 SHMP Update

- The goals and objectives were revised to more closely align the mitigation strategy to the current hazard risk and vulnerability levels and FEMA's mitigation action categories. The goals and objectives were also assessed to correlate with the state's 22 Local Hazard Mitigation Plans (LHMPs) to ensure consistency.
- Additional information related to state and local mitigation capabilities was combined with information from the 2019 SHMP.
- Mitigation Actions from the 2014 and 2019 SHMPs were reviewed and updates provided.
- The list of funding sources in the 2019 SHMP was researched, expanded, and updated.

4.1 - Overview

This section provides the mitigation strategy for the State of Nebraska, beginning with a discussion of the vision, mission and guiding principles and how the strategy will be achieved through goals and objectives. Mitigation actions that support the goals and objectives are described, analyzed and prioritized, and a list of potential funding sources is provided. In addition, this section discusses the current mitigation capabilities of state and local agencies and organizations, demonstrating an ongoing history of mitigation in Nebraska.

Operationally, mitigation is defined as "any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects." This definition distinguishes actions that have a long-term impact from those that are more closely associated with interim preparedness, response and recovery activities. Routine maintenance activities are also distinguished from mitigation in that they maintain structures without increasing the level of protection.

This section describes the goals, objectives, and strategies of the 2021 Hazard Mitigation Pan, and the state's current capabilities, which establishes a standardized measurement in line with other state readiness activities. In order to be effective, the state's capability measurements must be achievable. Results of the mitigation efforts by state and local governments along with the efforts of private non-profits and citizens are important to the well-being of the general public.

The Nebraska Emergency Management Agency (NEMA) is guided as a whole by its vision statement, mission statement, and guiding principles.

Vision Statement

The State of Nebraska will reduce the vulnerability of people and communities of the state to damage, injury, and loss of life and property resulting from terrorism, natural disasters, and major emergencies, authorize and provide for cooperation and coordination of activities relating to mitigation of, protection of, prevention of, preparedness for and response to terrorism, natural disasters, and major emergencies by agencies and officers of this state and its political subdivisions and similar state, local/regional, tribal, interstate, federal-state and foreign activities in which the state and its political subdivisions may participate; and assist in mitigation and prevention of terrorism, natural disasters, and major emergencies.

Mission Statement

Our mission is to coordinate, support and serve Nebraska through an effective and relevant emergency management agency.

Guiding Principles for Operations

1. All emergencies begin at the local level. NEMA shall collaborate with local, state, tribal and national officials to provide coordinated assistance to Nebraska communities to augment local capabilities when appropriate.

2. NEMA activities are grounded in principles of emergency management. Emergency management must be comprehensive, progressive, risk-driven, cost-effective and flexible.

3. Respectful and collaborative relationships coupled with professional leadership are integral to an effective emergency management program. Activities must be inclusive and engage the whole community.

4.2 – Goals and Objectives

The 2014 SHMP created a framework for the state's mitigation strategy that was carried into the 2019 Plan. The framework involved three parts: goals, objectives, and actions, defined as follows:

- The goals describe the overall direction that the state will take to reach their mission.
- The objectives link the goals and actions and help organize the plan for efficient implementation and evaluation.
- The actions describe the activities or projects used to support the accomplishment of the goals and mission.

During the 2021 plan update process, the overall goals presented in the 2019 Plan were reviewed and re-evaluated based on current FEMA guidance and to more closely align with eligible project criteria for hazard mitigation and other funding. Objectives were then reviewed and redefined to align with appropriate goals and feasible mitigation actions based on risk and vulnerability updates since the 2019 Plan, as well as feedback from the Governor's Task Force for Disaster Recovery (GTFDR) members, the *State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis*, dated October 15, 2020, and local mitigation plan reviews.

Table 4-1: Explanation of Revision and Resolution of 2019 Goals

2019 GOAL	2021 Revision/Resolution
GOAL 1: Reduce or eliminate long term risk to human life.	Redefined and integrated into all goals.
GOAL 2: Reduce or eliminate long term risk to property and/or the environment	Redefined and integrated into **Goals 2** and **5**
GOAL 3: Promote public awareness of hazards and associated response	Redefined as **Goal 3**; response focus eliminated from mitigation goals and included as the supplemental "***Emergency Management Goal***"

4.2.1 - 2021 Goals and Objectives

The **goals** presented in this plan are framed around five broad mitigation themes, which also serve as the foundation for defining the objectives and developing related mitigation actions that support the goals:

- **Prevention**: Government ***administrative or regulatory actions or processes that influence the way land and buildings are developed and built***. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation and storm water management regulations.

- **Property Protection**: Actions that involve the ***modification of existing buildings or structures*** to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness**: Actions to ***inform and educate citizens, elected officials, and property owners about the hazards and potential measures to mitigate them***. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection**: Actions that, in addition to minimizing hazard losses, also ***preserve or restore the functions of natural systems***. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Structural Projects**: Actions that involve the ***construction of structures to reduce the impact of a hazard***. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

The Goals, Objectives and Actions, as a combined strategy, address short, interim and long-term targets to reduce the level of risk to the people, property, infrastructure, environment and economy of the state.

It should be stated that the revision of the 2021 Goals and Objectives to be in closer alignment with FEMA's general types of hazard mitigation is not intended to redirect the strategy development away from other types of non-federal resources or funding that might be available to implement specific mitigation actions. In fact, the revised 2021 Goals and Objectives should serve to provide clearer guidance on development of appropriate mitigation actions that address hazard risks and vulnerabilities and are positioned to access multiple public and private funding resources.

Table 4-2: 2021 Hazard Mitigation Goals and Objectives

GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.	
[Objective] 1.1	Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
1.2	Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.
1.3	Promote and support policy-making that excludes new human habitation and new infrastructure/building development in flood zones.
1.4	Promote and support policy-making that reduces vulnerability to other (i.e. non-flood) hazards.
1.5	Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.
GOAL 2: Reduce or eliminate long-term risk to property, including critical facilities and infrastructure, historic, and private property.	
2.1	Promote hazard insurance opportunities for homeowners, renters, and businesses, including flood coverage under the National Flood Insurance Program (NFIP).
2.2	Provide counties/communities with technical assistance on acquisition, retrofit, or relocation of repetitive loss properties from flood-prone areas in the state.
2.3	Promote resilient and sustainable building to reduce vulnerabilities, encouraging the use of green and natural infrastructure, when appropriate.
2.4	Identify opportunities to mitigate vulnerable critical infrastructure, such as utilities, roads and bridges, and other Lifeline-related facilities.
2.5	Reduce long-term vulnerabilities from eligible high hazard potential dams that pose an unacceptable risk to the public, property and infrastructure.
GOAL 3: Promote public awareness of hazards and how to reduce their impacts.	
3.1	Offer trainings about hazard awareness, mitigation planning and grants, and how to incorporate mitigation into ongoing program functions.

3.2	Reduce the impact of hazards on at-risk and vulnerable populations through education and awareness programs.
3.3	Improve systems that provide warning, awareness, and emergency communication.
3.4	Conduct education and awareness programs for flood mitigation planning and funding assistance.
GOAL 4: Encourage the development and implementation of long-term, cost effective, and resilient mitigation projects that preserve or restore the functions of natural systems.	
4.1	Encourage the use of green and natural infrastructure for mitigation projects, when applicable.
4.2	Provide technical assistance to communities and stakeholders in the application and implementation of mitigation projects that preserve or restore natural systems.
4.3	Maintain and encourage ongoing relationships between state and local agencies and federal partners to play an active and vital role in identifying appropriate preservation and restoration of vulnerable natural systems.
4.4	Promote the continued use of natural systems and features, and open space preservation, in land use planning and development by local jurisdictions.
GOAL 5: Build stronger by promoting mitigation actions that emphasize sustainable construction and design measures to reduce or eliminate the impacts of natural hazards.	
5.1	Encourage building and rebuilding practices that address resiliency through higher standards and sustainable design to resist impacts of natural hazards.
5.2	Enhance coordination with state and local agencies that promote resiliency and sustainability.
5.3	Identify sustainable flood and erosion control projects and activities that demonstrate resiliency practices.
5.4	Promote and support the building of safe rooms in areas highly vulnerable to wind damages.
5.5	Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.

Supplemental Goal

In addition to the hazard mitigation goals defined above, the State acknowledges the importance of its emergency management responsibilities in additional phases – prevention, preparedness, response, and recovery. For that reason, an all-hazard goal to support these emergency management phases has been added to this plan. This goal, although it does not support specific hazard mitigation funding criteria, and is not considered as a requirement for this plan, provides the opportunity for local emergency management planners to incorporate specific objectives and actions to enhance all phases of emergency management preparedness and operations in their jurisdictions.

EMERGENCY MANAGEMENT GOAL: Improve Emergency Management Capabilities
• Promote public awareness of hazards and associated response

Summary – Analysis of Goals and Objectives

Since the 2019 SHMP, Nebraska has aggressively sought to reduce the impact of hazards on life and property across the state. Beginning with the 2014 SHMP, numerous projects were noted to have been conducted or supported by state agencies and at the local levels. Programs such as RiskMAP assisted communities in understanding their updated risk. Outreach programs about flood insurance, mitigation after disasters, and planning reached citizens across the state. Partnerships between various communities tackled concerns of water shortages during drought and began developing interagency plans and agreements. These efforts have begun to come to fruition, as exhibited by completion of the *Lower Elkhorn Natural Resource District Drought Mitigation Plan*, and the *Upper Loup Natural Resource District Drought Mitigation Plan* in development.

Between 2014 and 2019, ten (10) community safe rooms were completed across the state including several in public schools. One such safe room was constructed at Minatare Public Schools and community wide drills were conducted upon completion. Those efforts were put to the test just a few months later as a tornado touched down just outside the town. The safe room was activated and protected the community until danger passed. While the State values Safe Rooms, as tornadoes are frequent, flooding is also a top concern. Since 2019, the State has partnered with the City of Lincoln, through the Hazard Mitigation Grant Program (HMGP) to complete a multi-million-dollar streambed restoration project with the hopes to eliminate flooding impacts to the City.

Continuing to pursue these goals and objectives will assist in achieving the ideals described in the State's hazard mitigation vision and mission statements.

4.3 - State Capability Assessment

The State of Nebraska has a broad capacity to manage mitigation efforts and capabilities in both the pre- and post-disaster phases of any incident. State agencies and organizations manager, coordinate, and develop various policies, programs, initiatives and projects that support mitigation.

The preferred methodology for implementing mitigation is to initiate actions before a disaster impacts Nebraska, and this pre-disaster approach is the cornerstone of the State's mitigation strategy, planning, and project activities.

The Nebraska Emergency Management Agency and the Department of Natural Resources have a joint primary responsibility for the coordination, technical, and administrative support, education, and provision of oversight of the GTFDR/Planning Team. These functions are critical for providing a mitigation program for the state. NEMA and NeDNR primarily promote and oversee projects sponsored by political subdivisions, agencies, and local governments; however, several broad-based initiatives have been developed for the 2021 SHMP to support local hazard risk and vulnerability issues, as well as specific mitigation needs that were identified after the widespread flooding in 2019.

4.3.1 – Pre-Disaster Capabilities

Compliance/Enforcement Programs

Preventing disasters is nearly impossible; however, disasters can be mitigated by the regulatory functions of state agencies. For example: the inspection of food prevents consumption of unwholesome food; the inspection of buildings, bridges, and dams prevents potential collapse, breach or death, or provides warning. State regulatory oversight is a key element in mitigating disasters.

In addition to applicable laws and regulations that provide the authorities and responsibilities for state agencies, additional thought and consideration is given to the impacts on disaster prevention and mitigation which may be included in, or result from, any and all actions of the agency. Agency attention to disaster prevention and mitigation activities is a highly desirable goal for all state agencies, which includes such considerations in its actions wherever they are reasonable and compatible with its program purposes and goals. Actions that would have a negative impact on the prevention or mitigation of disasters will be avoided or modified to preclude the negative impact. A survey of state agencies has identified activities conducted by state agencies that contribute to disaster prevention/mitigation and indicates they may be conducted by direction of law, rule, or agency discretion, as part of agency budgets, or as normal functions of the individual agency's rules, programs, or projects. Agencies will continue to perform the activities identified and described. Additions to agency activity listings should occur as the relationship of various state programs to disaster prevention/mitigation is more fully realized, as programs develop and, most particularly, as state programs are added or amended under the influence of increased state interest in comprehensive emergency management and mitigation as a life-saving and cost-saving philosophy.

Plans/Planning

Planning and the dissemination of plans allows all participants to operate based upon the same guidelines thus reducing confusion. In addition to state agencies preparing plans for response and mitigation covering their own activities, these plans and their implementing procedures support and encourage the development of local plans that can address hazard mitigation and other emergency management functions.

Risk/Vulnerability Assessment

When the records of past disasters are compiled and studied, the evaluation may predict future vulnerability and frequency of such events. State agencies have a formalized program of reporting information relating to specific types of disasters that may have impacted their areas of responsibility and authority. This information can be used to determine the threat or likelihood of future disasters. Information is captured in the *State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis*, maintained by NEMA.

Education/Public Awareness

State agencies provide information to the public that allows them to take actions to reduce the effects of disasters. Examples include the use of webpages, Facebook, Twitter and YouTube to provide emergency information. Experience has shown that a well-informed public contributes significantly in many ways and can be relied upon to play a major role in disaster prevention/mitigation. Awareness activities can result in private individuals and/or agencies taking actions that reduce their impact from disasters.

Zoning/Land Use Programs

When the history of disasters in Nebraska is reviewed, it is apparent that they often occur repetitively in the same locations. Therefore, wise land use management can be used to help avoid or reduce the impact of disasters. Because Nebraska has a home rule policy and the regulation of land development has been delegated to local governments, this Plan and other mitigation efforts encourage counties and municipalities to use land use regulatory authority to support mitigation efforts.

Monitor Potential Disasters

State agencies have the responsibility to monitor potential disaster conditions, to identify specific sites, and to anticipate situations that could develop into a disaster. A reporting and warning system, utilizing field staff, relays the information through state agency liaisons to NEMA, which then notifies the chair of the GTFDR. In times of increased threat, this reporting/warning system is expanded in order to provide the GTFDR with the best possible information.

Prevention/Mitigation Projects

At the core of the State's hazard mitigation program is State agency projects, policies and programs that influence local government activities and also prevent or reduce the effects of disasters. Facilities can be designed, constructed, and maintained to withstand the effects of severe weather and other hazards. Policies can be implemented, and emphasis can be adjusted to influence and advocate prevention/mitigation activities at the state and local levels. State agency programs can be carried out that will have a direct effect on preventing or reducing disasters. As an example, the NeDNR will be undertaking the Inundation Mapping Project to update potential areas where flood risk has changed.

Resource Management

The management and mobilization of available resources can influence how severely disasters will affect a community. When allocating resources, state agencies consider the impact on a communities' ability to cope with disasters. When local resources are clearly unable to handle situations, mutual aid assistance, if properly planned, will mitigate disaster effects.

Equipment and Supplies

State agencies have equipment and supplies that can be used to respond to disasters. The identification, acquisition, and deployment of such equipment are both preventive and mitigation activities. Radio systems, emergency generators, monitoring equipment, sensors, detection

equipment and vehicles are examples of activities that are frequently employed in the emergency services components of hazard mitigation.

Technical Assistance

Many state agencies have specialized capabilities (i.e., engineering, scientific), which can be provided for guidance and support to communities faced with disasters. Due to the cost of these services and capabilities, localities cannot always provide or achieve them independently. Providing technical assistance from State agencies to communities and citizens can prevent/mitigate disasters.

Training and Exercises

Disaster plans require trained personnel to implement their policies and procedures. The State's formalized training and exercise evaluation program provides the method to ensure that State and Local agencies receive appropriate training for their employees, emergency workers, public officials, and others with a role in disaster response, recovery and mitigation. After-action conferences and reports serve to identify strengths and areas for improvement learned through exercises as well as real-world events.

Analysis of Pre-Disaster Capabilities

An evaluation of the State's capabilities in a pre-disaster operational phase reveals both strengths and weaknesses. The responsibility of pre-disaster actions rests with NEMA, NeDNR, and the GTFDR agencies. Through a coordinated level of preparedness, NEMA and its coordinating agencies and the GTFDR can assure that resources and manpower are available to assist local jurisdictions and /or State facilities that may experience damage or loss from a disaster. Each "code" agency is required to have in place a Continuity of Operations Plan (COOP) for each facility to assure that essential services and functions can continue. Several levels of contingency plans are in place for State agencies and each agency is required to designate a manager to perform the necessary planning and exercises that will assure that the essential functions of the agency and facility can continue.

State Code Agencies required to have Continuity of Operations Plans	
Administrative Services	Labor
Agriculture	Law Enforcement & Criminal Justice
Banking and Finance	Military/Emergency Management
Correctional Services	Motor Vehicles
Economic Development	Natural Resources
Energy Office	State Patrol
Environmental Quality	Revenue
Fire Marshal	Transportation
Health and Human Services	Veteran's Affairs
Insurance	

State government efforts are best served through cooperative networking with the Natural Resource Districts (NRDs), Public Power Districts (PPDs), state agencies, and local governments in proposing and undertaking mitigation projects within the state. Both NEMA and NeDNR work closely with local governments to promote and support mitigation efforts within their jurisdictions.

This concept has worked well within the state since agencies, commissions, districts, and local governments are best suited to know the benefits of a proposed project in their jurisdiction. NEMA and NeDNR have knowledge of the areas where repetitive losses occur and take measures to promote mitigation projects in these areas. NEMA and NeDNR are not regulatory agencies and do not have the legislative authority to prevent, regulate, or preclude development in hazard-prone areas. NEMA and NeDNR have the power to advise and advocate the need for sound hazard mitigation planning and project development.

During the 2021 plan revision, the planning team evaluated the state's plan review capabilities of the 2019 and previous 2014 version of the plan. From 2014 -2019, Nebraska had **23 hazard mitigation plans approved**. This does not include the state plan that was approved in early 2019 that is currently being update by IEM, and it does not include any PPD annexes. Of these 23 plans, five are no longer individual plans. The Seward HMP, Hamilton HMP, and York HMP all combined to form the *Upper Big Blue Natural Resources District Hazard Mitigation Plan* that was approved in early 2020. Hall County's HMP was integrated with the last *Central Platte Natural Resources District Hazard Mitigation Plan* revision in 2017, and Wahoo's HMP was absorbed into *Lower Platte North Natural Resources District Hazard Mitigation Plan* in 2020.

Several meetings of the GTFDR occurred to prioritize funding requests. It must be noted that the amount of funds requested by communities has continually outweighed the amount of funds available for mitigation purposes, leaving hundreds of projects unfunded. The assessment for this 2021 update will:

- Identify statewide entities that have hazard mitigation capabilities or programs that should be directed to participants in the statewide mitigation planning process;
- Incorporate all suitable state agency programs and capabilities into the state's hazard mitigation planning and identify programs with complementary purposes or funding sources, permitting coordinated use to resolve specific mitigation-related problems;
- Identify state statutes, agency regulations, and agency policies that are related to hazard mitigation and land development in hazard-prone areas;
- Assess state funding capabilities for hazard mitigation projects;
- Assess strengths and weaknesses in the state's mitigation capabilities, identifying obstacles to improving state capabilities, and defining possible corrective action

4.3.2 – All-Phase Capabilities

The State of Nebraska maintains certain capabilities that support hazard mitigation before, during and after disasters. These capabilities range from State policies and programs to multi-agency and multi-jurisdictional coordination groups.

The following state laws, regulations, and policies govern emergency management, hazard mitigation, and project selection in Nebraska.

Table 4-3: State Policies and Programs that Support Hazard Mitigation

POLICY/PROGRAM	AGENCY/ENTITY	DESCRIPTION
Article XI-5, Nebraska State Constitution	**Cities**	Allows for cities of more than 100,000 to adopt home rule charters, by majority vote of qualified electors. This permits a city to be independent of state legislation where strictly municipal matters are concerned. As an example, cities and counties are the entities responsible for the prevention of development in hazard-prone areas.
Nebraska Revised Statute 81-829	Nebraska Emergency Management Agency	Establishes the authorities and responsibilities of the state's emergency management agency, maintained in the office of the Adjutant General. Responsibilities that include: assisting local governments, and cooperating with federal government and any public or private agency or entity in achieving any purpose of the act and in implementing programs that include disaster mitigation.
RRS §81-829.31 to §81.829.73 Nebraska Emergency Management Act	Nebraska Emergency Management Agency	The Nebraska Emergency Management Act is the foundation of the Nebraska Emergency Management Agency. Effective July 19, 1996; the purpose of the Emergency Management Act is to reduce vulnerabilities pertaining to people and the community in the state of life by providing an emergency management system which includes all aspects of preparedness, response, recovery, and mitigation. The Nebraska Emergency Management Act authorizes the coordination of mitigation activities within the state and assistance in mitigation and prevention of disasters. The Nebraska Emergency Management Act addresses pre-disaster mitigation, post-disaster mitigation, and development in hazard prone areas. For pre-disaster mitigation, "the governor shall consider, on a continuing basis, steps that could be taken to prevent or reduce the harmful consequences of disasters, emergencies, and civil defense emergencies" (§81-0829.43). It also provides the governor with the power to make recommendations for mitigation projects. This Act also gives power to NEMA and other state agencies to study and monitor vulnerable areas and then pursue appropriate mitigation actions. Section 81- 0829.42 of the Nebraska Emergency Management Act lists appropriate post-disaster mitigation actions such as clearing debris and provides for "other measures as are customarily necessary to furnish adequate relief in cases of disaster, emergency, or civil defense emergency."

Title 173 Communicable Disease, Chapter 6, *Directed Health Measures to Prevent or Limit the Spread of Communicable Disease, Illness, or Poisoning*, dated February 21, 2017	Nebraska Department of Health and Human Services	Policy for the State's authority to prevent, limit, or slow the spread of communicable diseases. This regulatory document includes criteria and procedures to mitigate spread by ordering quarantine or isolation as a Directed Health Measure which may be targeted to "an individual, group of individuals, or a population, or directed to the public at large in regard to identified premises or activities, and public and private property including animals."
RRS §2-1501 to §2-15,106 Operation of the Department of Natural Resources	Nebraska Department of Natural Resources	The statutes identify the goals, rules, regulations, policies, and procedures pertaining to the protection and conservation of the state's land and water resources. Included within the literature is the assistance provided by the state for soil and water conservation and flood control needs as well as the conditions to the available assistance. The statues of the Nebraska Natural Resources Commission (§2-1504.) list the creation, functions, membership, selection, number of terms, and vacancies of the Commission. The existences of such statues are important to the capabilities of the state to protect its valuable resources that cannot otherwise protect themselves. Protecting these resources in turn leads to the protection of Nebraska's population from disaster damages and the impact they have on communities
RRS §31-1001 to §31-1023 State Floodplain Management Program	Nebraska Department of Natural Resources	(1) The Legislature finds that recurrent flooding in various areas of the state presents serious hazards to the health, safety, welfare, and property of the people of the state, both within and outside such areas. The hazards include loss of life, loss of and damage to private and public property, disruption of lives and of livelihoods, interruption of commerce, transportation, communication, and governmental services, and unsanitary and unhealthy living and environmental conditions. The wise use of land subject to flooding is a matter of state concern. The Legislature further finds that the establishment of improved flood plain management practices and the availability of financial assistance to citizens of the state whose property is damaged during times of flooding are essential to the health, safety, and general welfare of the people of Nebraska. (2) The purposes of sections 31-1001 to 31-1023 shall be to: (a) Accelerate the mapping of flood-prone areas; (b) Assist local governments in the promulgation and implementation of effective flood plain

		management regulations and other flood plain management practices; (c) Assure that when state lands are used and state-owned and state-financed facilities are located and constructed, flood hazards are prevented, flood losses are minimized, and the state's eligibility for flood insurance is maintained; and (d) Encourage local governments with flood-prone areas to qualify for participation in the national flood insurance program.
RRS §2-3201 to §2-3281 Operations of the Natural Resources District		The statutes discuss the essentiality of natural resources protection within the state and therefore created Natural Resource Districts as the most efficient way of managing these resources. There are 23 Natural Resource Districts in Nebraska and by state statute they are responsible for the conservation, protection, development, and management of the state's natural resources. The state's NRD's have been taken the lead in creating multi-jurisdictional hazard mitigation plans in their areas of the state.
RRS §19-901 and §23-114 Municipal Zoning	**Municipalities**	Section §19-901 gives the legislative bodies in cities of the first and second class and in villages the power to adopt zoning regulations. The powers can only be exercised after a planning commission has been established by the municipal legislative body and a recommended comprehensive development plan has been received. The purpose of such is to promote the health, safety, morals, or the general welfare of the community. The zoning regulations adopted by legislative bodies may: regulate and restrict the height, number of storied, and size of buildings and other structures, the percent of a lot that may be occupied, the size of yards, courts, and other open spaces, the density of population, and the location and use of buildings, structures, and land for trade, industry, residence, or other purposes. Again, this can only be done after the planning commission has been created and a comprehensive development plan completed. §19-903 regulates what must be included in said comprehensive development plan. Regulations for the plan are designed to "lessen congestion in the streets; to secure safety from fire, panic and other dangers; promote the health and general welfare; to provide adequate light and air; to prevent the overcrowding of land; to secure safety from flood; to avoid undue concentration of population; to facilitate the adequate provision of transportation, water, sewage, schools, parks, and other public requirements;

		to protect property against blight and depreciation; to protect tax base; to secure economy in governmental expenditures, and to preserve, protect, and enhance historic buildings, places, and districts8." The existence of these statutes enhances the ability of local communities to prevent building in hazardous areas and relates to the goals and objectives of this plan. Section §23- 114. Gives the county board powers to create a planning commission and implement a county comprehensive development plan with regulations and restrictions.
Nebraska Hazard Mitigation Administrative Plan	Nebraska Emergency Management Agency	The Administrative plan serves to outline the processes and standards the state will use to administer the Hazard Mitigation Grant Program for a major disaster declaration as mandated by 44 C.F.R. part 206.437.

State Multi-Agency/Multi-Jurisdictional Coordination

Effective hazard mitigation brings together various organizations at all levels of government. All organizations need to function as a cohesive body to properly plan for disaster preparedness, response, and recovery. No one organization acting alone would be able to provide the resources to implement the Nebraska Hazard Mitigation Plan. There are many organizations that contribute to hazard mitigation efforts in Nebraska.

As stated previously, NEMA and NeDNR have the power to advise and advocate the need for sound hazard mitigation planning and project development, but are not regulatory agencies with the legislative authority to prevent, regulate, or preclude development in hazard-prone areas. Mitigation strategies are most successfully coordinated through cooperative networking within multi-agency and multi-jurisdictional organizations and implemented through the Natural Resource Districts (NRDs), Public Power Districts (PPDs), state agencies, and local governments. The organizations described in **Table 4-4** highlight the three (3) primary state-level coordination bodies that oversee hazard mitigation planning and ensure that appropriate mitigation actions serve to lower hazard risks and vulnerabilities.

Table 4-4: Multi-Agency/Multi-Jurisdictional Coordination Organizations

ORGANIZATION	FUNCTIONS/GOALS & PARTICIPATING AGENCIES
GOVERNOR'S TASK FORCE FOR DISASTER RESPONSE (GTFDR)	**GOALS/FUNCTIONS:** • Ensure disaster relief and recovery operations are efficiently coordinated between all agencies. • Make a detailed examination of all features of state recovery efforts including hazard mitigation grant projects with emphasis on the efficient utilization of the resources made available by federal grant programs. Established by Governor's Executive Order 94-3 on January 19, 1994, the GTFDR is composed of the following state agencies: • Nebraska Emergency Management Agency (NEMA) • Department of Natural Resources (NeDNR)

ORGANIZATION	FUNCTIONS/GOALS & PARTICIPATING AGENCIES
	• Department of Health and Human Services (DHHS) • Department of Economic Development (DED) • Department of Environmental Quality (DEQ) • Department of Agriculture • Department of Labor • Department of Administrative Services (DAS) • Game and Parks Commission (NGPC) • Department of Transportation (NDOT) Select federal agencies are invited to participate in the taskforce: • U.S. Army Corps of Engineers (USACE) • U.S. Department of Agriculture (USDA) • U.S. Department of Housing and Urban Development (US HUD) • National Weather Service (NWS) • Environmental Protection Agency (EPA)
NEBRASKA SILVER JACKETS	**GOALS:** The **Silver Jackets** are a collaborative group that designs plans and solutions for statewide issues in flood risk management. Functions include: • Facilitate strategic life-cycle flood risk reduction • Create or supplement a continuous mechanism to collaboratively solve state-prioritized issues and implement or recommend those solutions • Improve processes, identifying and resolving gaps and counteractive programs • Leverage and optimize resources • Improve and increase flood risk communication and present a unified interagency message • Establish close relationships to facilitate integrated post-disaster recovery solutions The **Silver Jackets** is made up of the following federal and state agencies: • Nebraska Department of Natural Resources (NeDNR) • Nebraska Emergency Management Agency (NEMA) • U.S. Army Corps of Engineers, Omaha District (USACE) • U.S. Army Corps of Engineers, Kansas City District (USACE) • Federal Emergency Management Agency (FEMA Region VII) • United States Geological Services (Nebraska Water Science Center) • National Weather Service (NWS) • Bureau of Reclamation (Great Plains Region)

ORGANIZATION	FUNCTIONS/GOALS & PARTICIPATING AGENCIES
Nebraska State Emergency Response Commission (SERC)	• **Title III of the Superfund Amendments and Reauthorization Act (SARA)**, known as the **Emergency Planning & Community Right-to-Know Act (EPCRA)** is national legislation that establishes requirements for federal, state and local governments, tribes and industry in an effort to protect public health, safety, and the environment from a hazardous materials disaster. The Nebraska SERC was created in accordance with this law and **Nebraska Revised Statute 81-15.210**. SERC responsibilities include: ○ Establishing procedures for receiving and processing public requests for information collected under EPCRA ○ Reviewing local emergency response plans ○ Designating local emergency planning districts ○ Appoint a Local Emergency Planning Committee (LEPC) for each district ○ Supervising the activities of the LEPC ○ Planning for chemical emergencies • The SERC is comprised of 19 members representing state and local government, private and public sector, including: fire, law, public health, school, industry, transportation and military.

The agencies described in **Table 4-5** highlight the primary state-level capabilities that support and implement hazard mitigation plans and initiatives, ensuring that appropriate mitigation actions serve to lower hazard risks and vulnerabilities.

Table 4-5: Capabilities of State Agencies and Quasi-State Entities

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Emergency Management Agency (NEMA)	• NEMA is ***charged by state statute to reduce the vulnerabilities of the people and communities of Nebraska from the damage, injury, loss of life, and loss of property resulting from natural, technological, or manmade emergencies and disasters***. NEMA is the lead agency, along with NeDNR, for the agencies in the GTFDR, who work together to pursue appropriate mitigation actions. • The recovery section of NEMA serves as the focal point for state recovery and mitigation efforts by reviewing and monitoring mitigation projects across the state. It also manages the **Public Assistance Grant Program (PA), Hazard Mitigation Grant Program (HMGP)**, and **Pre-Disaster Mitigation Grant (PDM).**

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Department of Natural Resrouces (NeDNR)	• Under **Article 10, Section 31 of the Floodplain Management Statute**, NeDNR has authority for all matters pertaining to floodplain management, including the coordination of the National Flood Insurance Program. • The NeDNR administers the flood mitigation programs authorized by the National Flood Insurance Reform Act of 1994 and by the Flood Insurance Reform Act of 2004 including the **Flood Mitigation Assistance (FMA) Grant.** NeDNR receives and approves planning grant applications, recommends projects for FEMA approval, coordinates and participates in all activities concerning flood mitigation plans, and completes all required financial and performance reports for all FMA grants. • NeDNR contributes to state mitigation planning efforts by researching past flooding disasters, recognizing areas of high vulnerability, making informed predictions of potential flooding issues, and providing **technical assistance to communities** on flood hazard mitigation. • The NeDNR also works closely with Nebraska's NRDs, the entities that sponsor or assist with the funding of many mitigation projects and plans across the state. NeDNR receives federal funding and can help local jurisdictions with mitigation planning and floodplain mapping. NeDNR has been in FEMA's **Coordinating Technical Partnership (CTP) program** since August 1999. Through this agreement, the NDNR has been able to map unstudied areas in the State of Nebraska, providing flood hazard data that was not available before. As of January 2019, 54 counties have effective digital maps, 16 counties have effective paper maps, 4 counties have preliminary maps, and 7 HUC-8 watersheds have NDNR flood awareness areas that are non-regulatory floodplain maps. 16 counties remain unmapped. See NeDNR's CTP Business Plan for the State of Nebraska Floodplain Mapping Strategy: https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/floodplain/Floodplain-Mapping/FY2019_Business_Plan.pdf • NeDNR provides State coordination for the **National Flood Insurance Program**. NeDNR is required by State Statute to encourage participation in the NFIP, and promote safe building in floodplains. NeDNR also promotes the Community Rating System (CRS) program to communities so they can be rewarded for the floodplain management activities they do in their communities. The **Community Rating System (CRS)** program rewards participating jurisdictions with reduced flood insurance premiums in exchange for going above and beyond the minimum NFIP requirements. Participating in CRS promotes economic resiliency by making flood insurance more affordable, while restricting development within regulatory floodplains limits actual flood damages. As of October 2019, the Cities of Fremont, Omaha, Valley, Lincoln, Papillion, and Scottsbluff are currently enrolled in the CRS program. • NeDNR manages the state Dam Safety Program which regulates the construction, operation and maintenance of dams statewide. NeDNR maintains an online interactive map that can be utilized to locate any dams in the state by name, National Inventory of Dams ID number, county or downstream town (https://gis.ne.gov/portal/apps/webappviewer/index.html?id=2aab04a13817421992dc5398ad462e22). NeDNR is the administrative agency for the High Hazard Potential Dam Grant Program.
Nebraska Department of Administrative Services – Risk Management	• NDAS manages **insurance purchase/self-insurance of State-owned property**, maintaining a database of State-owned properties for State agencies and insured assets. This allows agencies to see how many insured resources are vulnerable to specific hazards, such as flood. • During disasters, the agency captures losses to State-owned and managed properties.

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Department of Agriculture	• The Department of Agriculture provides disaster support that includes connecting producers with the Farm Service Agency and the U.S. Department of Agriculture's (USDA) **Natural Resources Conservation Service (NRCS).** The NRCS provides financial and technical assistance to farmers, ranchers and forest landowners, and other private landowners and managers. • The agency **protects critical infrastructure, preserving natural resources and reducing vulnerabilities**. • The agency conducts internal **tracking of agriculture-related damages and losses** during disasters.
Nebraska Department of Economic Development (NDED)	• The Nebraska Department of Economic Development administers the **Community Development Block Grant (CDBG)** which provides grants to the state for communities to use in revitalizing neighborhoods, expanding housing, economic opportunities, and community facilities. These funds can be used to incorporate pre-disaster mitigation activities into communities as they address needs and issues creating a more resilient community. Additionally, CDBG funds may be used for the local match on HMA projects. • The State receives funds as a Participating Jurisdiction from the National Housing Trust Fund (HTF) and the NDED is the administering agency
Nebraska Department of Environment and Energy (NDEE)	• Formerly the Nebraska Department of Environmental Quality and the Nebraska Energy Office, the two agencies were merged in July 2019. The NDEE coordinates with the U.S. Environmental Protection Agency to **regulate, monitor, protect, preserve and enhance the state's air, land, water and energy resources**. • The agency has broad mitigation capabilities related to its authorities, including oversight of hazardous materials mitigation; water and wastewater facilities; monitoring/permitting related to air quality; disaster debris management implementation of local weatherization programs with low-interest loans to upgrade and improve utility energy efficiency.
Nebraska Forest Service (NFS)	• As a component of the University of Nebraska, the Nebraska Forest Service **provides education, resources**, and **funding** to Nebraskans. This includes mitigation activities involving **fuel reduction** and the **fire wise management program**. Engaging in such activities can reduce the loss of life and property in the event of a fire. NFS provides assistance to fire departments during incidents. Planning efforts include addressing fire hazards in each region of the state through **Community Wildfire Protection Plans**.
Nebraska Game and Parks Commission (NeG&PC)	• The Nebraska Game and Parks Commission (NGPC) is responsible for disaster operations, including damage assessment and mitigation in state-owned parks, recreation, and wildlife management areas. **Environmental clearance** for mitigation projects is coordinated between NEMA and NGPC. Additionally, NGPC administers the **Environmental Trust Grants** that can be used for mitigation grants.
Nebraska Department of Health and Human Services (NDHHS)	• NDHHS is assigned the responsibility for all **public health-related and protection and safety programs**, which includes oversight of public health surveillance systems, hospital and medical care facilities licensure; behavioral health; and **resources and support to children and families**. • During a disaster, NDHHS **monitors the capacities of state and local health and medical services, and continuity of support and assistance to children and families**. • NDHHS has the lead role in health and medical preparedness, response, recover and mitigation. Most recently, the agency, in coordination with other State agencies, has a key role in **COVID-19 response and recovery actions** and **programs**.

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Department of Insurance (NDOI)	• The agency provides **technical assistance related to homeowner's insurance** and other types of insurance coverage. In addition, it monitors incidents of potential fraud and serves as a consumer advocate for the public with insurance providers.
Nebraska State Historic Preservation Office (SHPO)	• **Section 106 of the National Historic Preservation Act of 1966 (NHPA)** requires federal agencies to consider the effects on historic properties of projects they carry out, assist, fund, permit, license, or approve. The SHPO reviews all mitigation projects to ensure respect of all historic properties across the state when undertaking any project that might affect these sites. Additionally, the relationship between NEMA and the SHPO allows for the development of mitigation activities to reduce risk to the state's historic properties. • The SHPO manages state and National Register data on historical structures and archaeological sites, much of which are privately-owned properties.
Nebraska Department of Transportation (NDOT)	• The Nebraska Department of Transportation assists in disaster operations during recovery including the **reduction of hazards that may cause drainage or flooding issues.**
University of Nebraska	UNL has various academic and research centers that support mitigation-related fields, including: • The Nebraska Public Policy Center focuses on research and projects to support policy-related initiatives, in coordination with partners in a wide variety of topics such as plans, studies, white papers and briefing papers. A current project in 2020 is, "Drought Planning Using Community Threat and Hazard Identification and Risk Assessment" which is utilizing "climate data from the Platte River basin to develop and implement a decision-support model for drought planning." See: http://ppc.unl.edu/projects/drought-planning-using-community-threat-hazard-identification-risk-assessment/ • The **School of Natural Resources** acts as a provider of natural resources information for stakeholders across Nebraska. **Information on natural resources, ecosystems, climate, soils, air, plants, wildlife**, and their interaction with citizens helps guide development of mitigation projects that are a positive impact on the surrounding environment. • **Nebraska State Climate Office** compiles, synthesizes and translates climate information for dissemination, providing near-term and long-term climate forecasts to the media, agriculture and educational audiences, government agencies and the public. • **Nebraska Extension Service** serves as a resource center to technical information to families, businesses and communities prepare for and recover from a disaster. UNL has a **statewide disaster coordinator** and **83 extension offices** to support local communication and education. • **National Drought Mitigation Center** monitors conditions that contribute to drought, providing planning and technical assistance. Capabilities include climatology and social science. The NDMC prepares the U.S. Drought Monitor Map • Other centers focus on **transportation, virology, energy, agriculture, business resiliency,** and more.

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Public Power Districts (PPDs)	• The public power districts in Nebraska have historically played a significant role in **mitigation projects** across the state. Hundreds of miles of power lines have been rebuilt or added using the latest in mitigation techniques. One power district estimated that several million dollars in savings have occurred over the past several years because of mitigation actions. Additionally, PPDs provide communities information on outages to **assist in calculating benefit cost analysis on potential projects**.
Natural Resources Districts (NRDs)	• The Natural Resources Districts across the state act as the champions of the majority of the **regional multi-jurisdictional hazard mitigation plans**. As such, they provide guidance and assistance to communities who would otherwise be unable to engage in such planning efforts. Additionally, NRDs have engaged in **placing outdoor warning sirens** and **community safe rooms** in their recreational areas and **sponsoring regional mitigation activities.**

Table 4-6: State Coordination Capabilities with Federal Agencies

AGENCY	PURPOSE/POLICIES/PROGRAMS
U.S. Department of Agriculture,	• The **Farm Service Agency (FSA)** maintains an Emergency Conservation Program that provides technical assistance and allows for cost-share for damaged farms and ranches (fences, equipment, etc.) and rehabilitation of crop land, terraces and permitted farm dams, as well as a Livestock Indemnity Program. • The **National Resources Conservation Service (NRCS**) protects natural resources and critical infrastrucutre, also assisting in helping property owners achieve a highly level of resilience on landscape to protect from future disasters. Project types include streambank stabilization, removing debris from stream, repairing severely damage and eroding stream banks (stabilization) that threantens C/I and other assets, and acquisition and relocation of C/I if unable to restore. Through participation in the Nebraska Healthy Soil Task Force, opportunities are sought to promote soil health, and reduce water runoff/flooding and drough impacts. • The **Risk Management Division** maintains high risk maps of areas along the Missouri River (including Richardson, Nemaha, Sarpy and Cass Counties) available to the public at: www.rma.usda.gov. ○ The agency establishes policy rates using a risk assessment model (high risk areas identified along the Missouri River based on historic losses/events). Coverage for future planting losses is typically available within a specific timeframe. Provides the opportunity to reduce the loss of products in storage through rebuilding with consideration of future flood risk. • **Rural Development** provides services that include Emergency Community Water Assistance Grants; direct loans for disaster losses to single-family housing; and potential cost share for recovery of Waste Water Treatment Plants.

AGENCY	PURPOSE/POLICIES/PROGRAMS
U.S. Geological Survey (USGS)	• The USGS **provides geospatial data** that is publicly available for hazard research and analysis. The agency has the capability to **do real-time Flood Inundation mapping** that has included two flood inundation libraries for Papillion Creek watershed in Omaha and North Platte River in Scottsbluff. The Flood Event Viewer provides easy public access to data collected (at gauge locations) during large, short-term floods to help document high water mark events and scour during flooding; this data is also uploaded to the USGS Short-Term Network for archival purposes. • The agency's flood frequency analysis uses actual data from past 1 and 0.2% floods to redefine what the accurate 1% annual change flood. • The agency supports USACE in **levee breach work**.

U.S. Department of Homeland Security, Cybersecurity and Infrastructure Security Agency (CISA)	• The CISA has **physical security, cybersecurity** and **emergency communication** experts who can be deployed to support state and local incidents, as requested and pending availability.
	• CISA conducts **Risk Assessments for Critical Infrastructure** (C/I), focusing on dependencies, interdependencies and cascading impacts for Lifeline functions:
	  ○ Water Management
	  ○ Energy
	  ○ Communications
	  ○ Transportation
	  ○ Healthcare/Public Health
	• The CISA provides **data support** to inform response, recovery and mitigation planning, including a static C/I list of Tier I and II assets whose disruption could cause national/regional catastrophic effects; and a "dynamic" C/I list produced during an incident that analyzes threats and vulnerabilities and potential consequences of disruption to C/I in impact areas.
	• The CISA maintains **a list of C/I in the 100- and 500-year floodplain**. In addition, the Protective Security Advisor assigned to the State can advise C/I owners/operators on potential mitigation strategies to reduce facility vulnerability, and works with the State **to identify C/I sites that have sustained damage** and that could benefit from HMA programs.

United States Army Corps of Engineers (USACE)	• The United States Army Corps of Engineers assists the state in reducing risk to the public, property, and the environment by providing **direct and technical assistance to communities**. USACE studies provide information on flooding hazards and assists in identifying projects that address hazards. Various **trainings** such as sandbagging and flood operations are also available via USACE. The Nebraska Silver Jackets program is supported by the Flood Risk Management Program. Two **funding programs** of note include:
	  ○ **Section 22:** study-level program that can be used for the development of flood mitigation plans with a 50% cost share from a non-federal sponsor.
	  ○ **Section 205**: Flood Damage Reduction program that can be used to study flooding problems in urban areas, towns, and villages. If a federal interest is found, this program can assist in designing and building flood reduction mitigation projects.

United States Fish and Wildlife Service (USFWS)	• The U.S. Fish and Wildlife Service ensures that **mitigation projects meet federal requirements for the protection of wildlife and their habitat**. This includes providing guidelines for mitigation project requirements such as bird diverters.

AGENCY	PURPOSE/POLICIES/PROGRAMS
U.S. Department of Housing and Urban Development (USHUD)	• The USHUD works with the NeDED to adapt programs to meet post-disaster needs and coordinates with the agency for the Community Development Block Grant-Disaster Recovery (**CDBG-DR**), **CDBG-MIT** (Mitigation), and the Building Resilient Infrastructure and Communities (**BRIC**) programs, which provide flexible grants to help cities, counties and sates recovery from presidentially-declared disasters, especially in low income areas.
Federal Emergency Management Agency	• The Federal Emergency Management Agency supports the mitigation efforts of Nebraska in several ways. **FEMA conducts a thorough review** of all **Local Hazard Mitigation Plans (LHMPs)** before approval. Additionally, **FEMA Hazard Mitigation Assistance grants** provide funding for mitigation projects across the state. The **National Flood Insurance Program (NFIP)** assists in protecting local property owners financially from flooding by providing insurance for participating communities and encouraging smart floodplain management decisions.
NOAA/National Weather Service (NWS)	• The NWS provides **site-specific weather forecasting and data** with a focus on weather, water and climate. The NOAA National Center for Environmental Information (NCEI) provides a national clearinghouse for all natural weather events reported through NWS, which provides data from 1950 to March 2020 (current as of June 2020). Data reports include a summary of the incident (by county and zone); number of deaths and/or injuries; and the amount of property and/or crop damage resulting from the event. • NWS data supports hazard risk and vulnerability analysis, and provides site-specific data that can assists in developing mitigation action applications for grant funding.

4.3.3 - Challenges and Changes of State Capabilities - 2021

Staffing Issues

Historically, the state plan has identified staffing issues as a challenge to the state capability to implement hazard mitigation projects. The state continues to take steps to address staffing shortages and training levels to meet the needs of the Hazard Mitigation and Public Assistance programs. Additionally, an active training program is cross training recovery staff to give all staff skills in hazard mitigation.

Recent Disasters

Prior to the adoption of the 2019 plan, the number of open disasters with mitigation funding has been reduced as staff have worked to closeout past disasters. Current disasters have provided funding that have shifted during the course of hazard mitigation project application periods causing issues with determining funding levels. For 2021, it remains a challenge to maximize the amount of funding being used in each disaster. The state has begun developing and implementing a strategy to reduce excess funds in disaster grants.

Local Mitigation Planning

Past state plans identified that the limited number of approved plans has been a challenge. This no longer remains a challenge as all counties except one have adopted a mitigation plan. As previously described in this plan, the structure of using Natural Resource Districts (NRDs) and

regions for plans has allowed for plans to be revised in a timely manner and the planning structure has increased local participation.

Opportunities for Improvement

The Nebraska Hazard Mitigation Program continues to evolve in order to meet the challenges facing mitigation in Nebraska. Continued improvements to coordination, along with evaluating possible changes to project selection and funding play a role in developing future mitigation projects.

4.3.4 - Flood Mitigation Capabilities

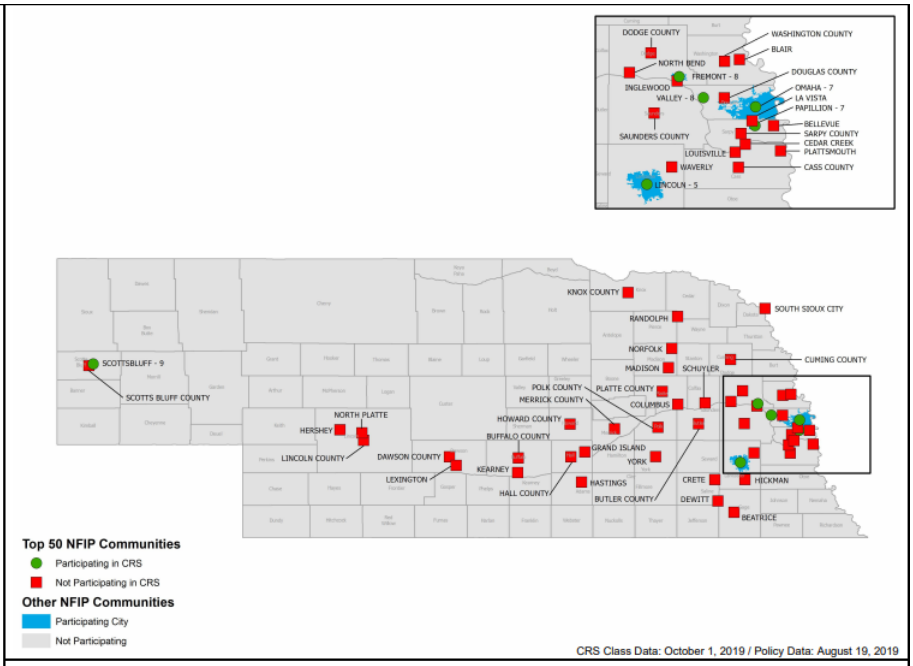
Local capabilities for flood mitigation vary widely across the state largely due to population levels and funding levels. Larger cities such as Lincoln, Omaha, Norfolk, Columbus, Fremont, and Grand Island have large resources. Smaller communities and counties share limited resources for floodplain management and emergency management in general. Implementation of mitigation projects in these areas is often difficult.

The majority of flood hazard mapped communities implement some floodplain management of NFIP participation and adherence to state minimum standards. Zoning and building codes are also implemented by some counties.

As of October 1, 2019, 409 communities participate in the National Flood Insurance Program (NFIP). Of these, six jurisdictions (1%) - Lincoln, Papillion, Omaha, Fremont, Valley, and DeWitt participate in the Community Rating System (CRS) by meeting higher standards of floodplain management. This scale rates 1-10 with 1 being the best. Lincoln rates at class 5 with Omaha and Papillion at class 7. Fremont and Valley are at class 8 and DeWitt is class 9. Since the 2019 SHMP, Omaha has elevated its CRS rating from class 9 to class 7. Forty-four of the top 50 communities (in terms of flood insurance policies-in-force) present an outreach opportunity for encouraging participation in the CRS.

Figure 4-a: Top 50 NFIP Policy Count Communities and CRS Participation in Nebraska, as of October 1, 2019.

Rank	CID	Community Name	Policies	Class
1	315273	Lincoln	1,269	5
2	315274	Omaha	885	7
3	310069	Fremont	812	8
4	310190	Sarpy County	487	--
5	310078	Valley	390	8
6	310046	Schuyler	361	--
7	310195	Saunders County	355	--
8	310407	Cass County	320	--
9	310073	Douglas County	188	--
10	310239	North Bend	178	--
11	310191	Bellevue	169	--
12	310143	North Platte	147	--
13	310206	Scottsbluff	137	9
14	310103	Grand Island	133	--
15	310063	Lexington	131	--
16	310068	Dodge County	122	--
17	315272	Columbus	116	--
18	315275	Papillion	114	7
19	310186	Crete	110	--
20	310030	Cedar Creek	105	--
21	310016	Kearney	102	--
22	310140	Waverly	75	--
23	310091	Beatrice	68	--
24	310457	Merrick County	65	--
25	310187	Dewitt	64	--
26	310467	Platte County	61	--
27	310451	Knox County	58	--
28	310452	Lincoln County	52	--
29	310147	Norfolk	50	--
30	310033	Plattsmouth	48	--
31	310419	Buffalo County	47	--
32	310468	Polk County	44	--
33	310240	Madison	42	--
34	310054	South Sioux City	40	--
35	310058	Dawson County	39	--
36	310228	Blair	39	--
37	310473	Scotts Bluff County	39	--
38	310237	York	37	--
39	310025	Butler County	33	--
40	310100	Hall County	33	--
41	310031	Louisville	29	--
42	310483	Washington County	29	--
43	310397	Randolph	28	--
44	310446	Howard County	27	--
45	310492	Inglewood	27	--
46	310142	Hershey	26	--
47	310192	La Vista	26	--
48	310001	Hastings	25	--
49	310136	Hickman	25	--
50	310427	Cuming County	23	--



For a full list of all CRS Communities as of October 1, 2019, visit http://j.mp/CRS_FIM_Oct_2019

4.4 - Documenting Progress in Mitigation

Local mitigation projects in Nebraska have been effective in reducing risk from a range of hazards. Between 2014 and 2019, a total of 423 mitigation actions across all plans were completed. Following multiple severe floods, several buyout projects were completed using HMGP, FMA, and local funding sources. Other projects moved properties, businesses, and utilities out of hazard-prone areas. Dozens of communities have upgraded or replaced obsolete warning sirens allowing for timely notice without requiring individuals to place themselves at risk to activate.

Over the last decade, three school districts have built multi-use safe rooms for their students, staff, and local residents use during severe weather. As of 2019, an additional school district is currently building a hardened gym to meet FEMA safe room standards. During 2018, one recently completed school safe room was put to the test as the community of Minatare sought shelter from a tornadic storm. These safe rooms not only provide a place of shelter but also provide usable space to improve the education and health of some of Nebraska's most vulnerable populations.

The following three tables document the state's progress in implementing projects funded through Hazard Mitigation Assistance (HMA) Programs.

Table 4-7: Project Status - Hazard Mitigation Grant Program (HMGP), 2014 – 2020

Disaster	Project Title	100%	75%	25%
4179	Arnold Generator	$ 42,790.00	$ 32,092.00	$ 10,698.00
4179	Ayr Warning Siren	$ 17,934.37	$ 13,450.78	$ 4,483.59
4179	Dalton Warning Siren	$ 14,956.77	$ 11,224.33	$ 3,741.44
4179	Funk Warning Siren	$ 23,156.00	$ 17,367.00	$ 5,789.00
4179	Gosper County Generator	$ 44,350.00	$ 33,262.50	$ 11,087.50
4179	High West Energy HM Plan	$ 7,500.00	$ 5,625.00	$ 1,875.00
4179	Laurel Warning Siren	$ 74,090.00	$ 55,567.50	$ 18,522.50
4179	Lawerence Warning Siren	$ 23,770.23	$ 17,827.67	$ 5,942.56
4179	NPPD Annex to State Plan	$ 19,483.00	$ 14,612.25	$ 4,870.75
4179	NPPD Storm Mitigation Structures	$ 278,181.83	$ 208,636.37	$ 69,545.46
4179	Perennial PPD to South PPD Tie Line	$ 1,066,257.32	$ 769,415.00	$ 296,842.32
4179	Phelps County Generator	$ 113,090.00	$ 84,817.50	$ 28,272.50
4179	Taylor Warning Siren	$ 20,675.16	$ 15,506.37	$ 5,168.79
4179	Upland Warning Siren	$ 21,130.58	$ 15,847.94	$ 5,282.64
4183	Hastings-Laird Warning Siren	$ 18,573.00	$ 13,929.75	$ 4,643.25
4183	Cambridge Siren	$58,377.15	$43,782.86	$ 14,594.29
4183	Holstein Siren	$ 4,899.00	$ 3,674.25	$ 1,224.75
4183	Loup City Siren	$ 43,450.00	$ 32,587.50	$ 10,862.50
4183	Richardson County Sirens	$ 119,586.00	$ 89,690.00	$ 29,869.00
4183	Beaver City to Stamford Transmission Line	$ 1,652,334.83	$ 1,239,251.12	$ 413,083.71
4185	Ainsworth Warning Siren	$ 20,868.00	$ 15,323.00	$ 5,545.00
4185	Auburn Warning Siren	$ 54,460.00	$ 40,845.00	$ 13,615.00
4185	Beatrice Reiff Property Acquisition	$ 74,574.32	$ 55,930.74	$ 18,643.58
4185	Merdian High School Generator	$ 65,145.00	$ 48,858.75	$ 16,286.25
4185	Pilger Safe Room	$ 13,837.98	$ 10,378.49	$ 3,459.50
4185	Sherman County Culverts	$ 18,882.56	$ 14,161.92	$ 4,720.64
4185	Wilber Siren	$ 22,975.00	$ 17,231.25	$ 5,743.75
4225	Arthur County Warning Siren	$ 17,699.39	$ 13,274.54	$ 4,424.85
4225	Banner County Warning Siren	$ 22,650.00	$ 16,987.50	$ 5,662.50
4225	Herny Siren	$ 19,850.00	$ 14,887.50	$ 4,962.50
4225	Morrill Warning Siren	$ 21,790.00	$ 16,342.50	$ 5,447.50
4225	Nebraska City Generator	$ 43,497.00	$ 32,622.75	$ 10,874.25
4225	Northwest Rural PPD HM Plan Annex to State Plan	$ 44,085.00	$ 33,064.00	$ 11,021.00
4225	Platte County Warning Siren	$ 46,285.05	$ 33,071.00	$ 13,214.05
4225	Prosser Warning Siren	$ 19,848.00	$ 14,886.00	$ 4,962.00
4225	Roseland Warning Siren	$ 19,848.00	$ 14,886.00	$ 4,962.00
4225	Scottsbluff Siren Project	$ 49,989.85	$ 37,492.39	$ 12,497.46
4225	Southern PPD Annex to State Plan	$ 9,890.00	$ 7,418.00	$ 2,472.00
4225	Willow Creek Recreation Area Warning Siren	$ 24,593.00	$ 18,444.00	$ 6,149.00
4225	Winside Warning Siren	$ 45,270.00	$ 33,952.00	$ 11,318.00
4225	York County Safe Room Project	$ 44,057.00	$ 33,042.75	$ 11,014.25
4321	Boone County Weather Radios	$ 450.12	$ 337.59	$ 112.53
4321	McPherson County Warning Siren	$ 2,825.00	$ 2,119.00	$ 706.00
4325	City of Beatrice HM Plan	$ 49,990.00	$ 37,492.51	$ 12,497.49
4325	Cheyenne County Siren	$ 17,549.21	$ 12,411.91	$ 5,137.30
4325	Hall County Warning Siren	$ 15,088.00	$ 11,316.00	$ 3,772.00
TOTAL		$ 4,450,582.72	$ 3,304,944.78	$ 1,145,619.95

HMGP Codes

4179 = 2014
4183 = 2014
4185 = 2014
4225 = 2015
4321 = 2017
4325 = 2017
4375 = 2018 No Closed Projects
4387 = 2018 No Closed Projects
4420 = 2019 No Closed Projects

Source: NEMA

Table 4-8: Project Status - Pre-Disaster Mitigation

Year	Project Title	100%	75%	25%
2014	Cedar/Dixon Counties Hazard Mitigation Plan	$ 75,000.00	$ 56,250.00	$ 18,750.00
2014	Lower Big Blue/Little Blue NRD Multi-Hazard Mitigation Plan	$214,399.00	$160,799.25	$ 53,599.75
2014	North Platte NRD Multi-Jurisdictional Hazard Mitigation Plan Update	$ 90,000.00	$ 67,500.00	$ 22,500.00
2014	P-MRNRD Multi-Hazard Mitigation Plan	$149,998.00	$112,498.50	$ 37,499.50
2014	Quad Counties Multi-Jurisdictional Hazard Mitigation Plan Update	$ 70,000.00	$ 52,500.00	$ 17,500.00
2014	Tri-County Hazard Mitigation Plan	$ 52,650.00	$ 39,487.50	$ 13,162.50
2014	Twin Platte NRD Multi-Hazard Mitigation Plan Update	$ 98,500.00	$ 73,875.00	$ 24,625.00
2015	Central Platte NRD Multi-Jurisdictional Hazard Mitigation Plan	$120,000.00	$ 90,000.00	$ 30,000.00
2015	Lower Elkhorn NRD Drought Mitigation Plan	$ 30,000.00	$ 22,500.00	$ 7,500.00
2015	Lower Loup NRD Multi-Jurisdictional Hazard Mitigation Plan	$140,000.00	$105,000.00	$ 35,000.00
2015	South Platte NRD Multijurisdicational Hazard Mitigaiton Plan	$ 77,500.00	$ 58,125.00	$ 19,375.00
2016	Elkhorn RPPD Mutlihazard Mitigation Project	$925,518.96	$693,198.92	$232,320.04
2016	Nebraska City Station Multihazard Mitigation Plan	$ 22,500.00	$ 16,875.00	$ 5,625.00
2016	Tri-Basin NRD All-Hazard Mitigation Plan Removal	$ 65,210.00	$ 48,907.51	$ 16,302.49

Source: NEMA

PDM 2014
PDM 2015
PDM 2016
PDM 2017 No projects closed out at this time
PDM 2018 No projects closed out at this time
PDM 2019 No projects closed out at this time

Table 4-9: Flood Mitigation Assistance

Year	Project Title	Total Project	Federal	Match
FY2016	Arlington Buyouts	$ 208,686.22	$196,595.45	$12,090.77
FY2016	Parcel Level Flood risk Assessment and Mitigation Plan for Deshler, Nebraska	$ 32,788.75	$ 24,591.57	$ 8,197.18
FY2016	Management Costs	$ 8,750.73	$ 6,498.46	$ 2,252.27

Source: NEMA

Although many mitigation projects have been successfully completed, the average local capacity for mitigation is low. The majority of the state is of rural demographics and most counties and communities have seen a decrease in population over the last decade. Shrinking populations along with tougher economic conditions has led to reduced ability to fund mitigation. Additionally, local emergency management officials serve several positions with limited time to seek funding for projects.

Since the 2019 plan revision, NEMA has increased outreach to communities about the availability of disaster recovery funding and mitigation funding. These outreach efforts center around informing locals on how grants function, grant requirements, and how to apply funds.

Cities and counties in Nebraska are given the planning and zoning authority to control all aspects of land use development within their jurisdictions along with selecting a building code that meets or exceeds the current state building code. Nebraska State Statutes §19-903; §19-925; § 23-114.01 and §23-114.02 require zoning to be consistent with a municipal or county comprehensive plan. Comprehensive plans are not required to address specific hazards and seldom do, but are to be designed to promote health and general welfare.

4.5 - Mitigation Actions

The State of Nebraska focuses primarily on reducing risk from all hazards through supporting implementation of mitigation actions identified in Local Hazard Mitigation Plans. **Table 4-10** describes types of mitigation actions that may be eligible for hazard mitigation and other types of funding.

Table 4-10: Types of Mitigation Actions

Local Plans and Regulations	
Mitigation Measure	***Examples***
These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	• Comprehensive plans • Land use ordinances • Subdivision regulations • Development Review • Building codes and enforcement • NFIP Community Rating System

	• Capital improvement programs • Open space preservation • Stormwater management regulations and master plans • Community wildfire protection plans, fuels Management & Fire Breaks
Structure and Infrastructure Projects	
Mitigation Measure	***Examples***
These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program.	• Acquisitions and elevations of structures in flood prone areas • Utility undergrounding • Structural retrofits (e.g., shelters) • Floodwalls and retaining walls • Detention and retention structures • Culverts • Safe rooms
Natural Systems Protection	
Mitigation Measure	***Examples***
These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	• Sediment and erosion control • Stream corridor restoration • Forest management • Conservation easements • Wetland restoration and preservation
Education and Awareness Programs	
Mitigation Measure	***Examples***
These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady, or FireWise	• Radio or television spots • Websites with maps and information • Social media • Real Estate disclosure • Presentations to school groups or neighborhood organizations

Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation to sustaining mitigation planning and implementation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	• Mailings to at-risk populations and residents in hazard-prone areas • StormReady • FireWise Communities

For 2021, the State has developed five state-level Mitigation Actions that address broad local initiatives as well as problem areas identified after the 2019 flooding event. These projects are described in the Action Worksheets in **Appendix C**.

The 2021 Mitigation Actions address the state's hazards of highest concern as determined by the SHMP risk and vulnerability assessment, as well as the *State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis (HIRA)*, dated October 15, 2020. **Table 4-11** presents the highest ten hazards (by rank) for risk, vulnerability and consequences from the most recent HIRA update of October 2020. Although the SHMP does not rank hazards, all hazards addressed within the plan are considered of high concern and are included in one or more of the top ten ranked assessment/analysis HIRA lists. This focus results in Mitigation Actions that address overall risk from multiple hazards, as shown in **Appendix C**.

Table 4-11: Hazards of Highest Concern, identified in the HIRA, October 2020.

Risk Assessment	Vulnerability Assessment	Consequence Analysis
Severe Thunderstorm	Flood/Flash Flood	Radiological Fixed Facility
Severe Winter Storm	Drought	Public Health Emergency
Flood/Flash Flood	Ag Animal Disease	Flood/Flash Flood
Power Failure	Ag Plant Disease	Urban Fire
Urban Fire	Chemical Fixed Facility	Civil Disorder
Wildfire	Chemical Transportation	Tornado
Public Health Emergency	Dam/Levee Failure	Chemical Fixed Facility
Tornado	Public Health Emergency	Chemical Transportation
Transportation	Severe Thunderstorm	Dam/Levee Failure
Drought	Severe Winter Storm	Terrorism

Source: State of Nebraska HIRA, October 15, 2020

Mitigation Actions presented in the 2021 SHMP, and the hazards they address, include:

1. Central Repository for Risk Assessment Data – All Hazards
2. Statewide Acquisition Strategy for Repetitive Loss and Severe Repetitive Loss Properties – Flood

3. Promote Participation in Hazard Reduction Community Programs -Severe Weather, Wildfire, Flood)
4. Establish Floodplain Management Program for Channel Migration – Flood/Flash Flood, Dam Failure, Levee Failure
5. Establish Program to Promote Building Code Updates and Enforcement - Severe Thunderstorm (high wind and hail), Tornado, Flood, Wildfire

Additional Mitigation Actions are presented within the Public Power District annexes to address Power Failure and other hazards.

4.5.1 – Prioritization of Mitigation Actions

The State of Nebraska adopted a single prioritization methodology that will be utilized to evaluate and rank all state-level Mitigation Actions. Each department or agency submitting an action will evaluate their mitigation actions separately from the other entities, which will result in a department/agency-specific list of prioritized actions presented within the state's comprehensive list of Mitigation Actions.

The Mitigation Ranking System described in **Table 4-11** is to be utilized by each department/agency to determine the priority of every mitigation action proposed in the plan.

The process for prioritization begins with the development of an action at the department, agency or organization level. An Action Worksheet should be completed for each action, which provides the planning-level data necessary to determine the priority.

Once the data for the proposed action is collected and an Action Worksheet is completed, the following criteria is utilized to determine the priority. The Mitigation Ranking System is organized in seven (7) categories that link to the importance and timing for implementation.

Table 4-12: Mitigation Ranking System

Category	Points	Criteria
(1) Life Safety/Property Protection	4	Likely to protect more than 50% of the population and/or critical infrastructure and community assets.
	3	Likely to protect between 25 and 50 % of the population and/or critical infrastructure and community assets.
	2	Could potentially protect up to 25 % of the population and could potentially protect critical infrastructure and community assets
	1	Could potentially protect up to 10 % of the population and could potentially protect critical infrastructure and community assets
	0	Potential for protecting lives and critical infrastructure and/or community assets cannot be determined at this time.
(2) Funding Availability	4	Little to no direct expenses
	3	Can be funded by operating budget

	2	Grant funding identified
	1	Grant funding needed
	0	Potential funding source unknown
(3) Probability of Matching Funds	4	Funding match is available or funding match not required
	-	N/A
	2	Partial funding match available
	-	N/A
	0	No funding match available or funding match unknown
(4) Benefit Cost Review	4	Likely to meet Benefit Cost Review
	-	N/A
	2	Benefit Cost Review not required
	-	N/A
	0	Benefit Cost Review unknown
(5) Environmental Benefit	4	Environmentally sound and relatively easy to implement; or no adverse impact on environment.
	3	Environmentally acceptable and not anticipated to be difficult to implement
	2	Environmental concerns are somewhat difficult to implement because of complex requirements
	1	Difficult to implement because of significantly complex requirements and environmental permitting
	0	Very difficult to implement due to extremely complex requirements and environmental permitting problems
(6) Technical Feasibility	4	Proven to be technically feasible
	-	N/A
	2	Expected to be technically feasible
	-	N/A
	0	Technical feasibility unknown or additional information needed
(7) Timeframe of implementation	4	1 year or less (Short Term)
	-	N/A
	2	2 – 5 years (Long-Term)
	-	N/A
	0	More than 5 years (Long-Term)
Minimum = 0 Maximum = 28	**Ranking Level: Low: 0-10 Medium: 11-20 High: 21-28**	

The five projects presented in this 2021 SHMP update are prioritized in **Appendix C**.

4.6 - Funding Sources

The Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance grants have funded hundreds of projects across the state. Various agencies and departments also provide funding opportunities across the state and are noted in the previous section, as well as **Table 4-13**. The following list identifies the core mitigation grant programs used by state along with potential other sources of funding. Additional information on applying for these grants can be found at the NEMA, NeDNR, and other agency websites.

Hazard Mitigation Grant Program (HMGP)

- The **Hazard Mitigation Grant Program (HMGP)** is authorized under section 404 of the Robert T. Stafford Act and 44 C.F.R. part 206. The purpose of HMGP is to provide funds to states, territories, Indian tribal governments, and communities to significantly reduce or permanently eliminate future risk to lives and property from natural hazards. Entities pursuant of HMPG funding must have fully patriated in a FEMA approved hazard migration plan.
    - HMGP funds are 15% of the federal share of a federally declared presidential disaster and are broken down into three categories:
        - 5% Initiative projects
        - 7% Plan development and revision
        - 88% Regular projects
    - The grant application period is open for 12 months after the declaration date. All applications are made through and reviewed by the state and approved by FEMA.
- **Pre-Disaster Mitigation (PDM) Program**
    - NEMA administers the Pre-Disaster Mitigation Program authorized under section 203 of the Stafford Act. PDM is a nationwide competitive grant program for planning and implementation of mitigation projects prior to a disaster event. The state of Nebraska generally uses this program for planning grants and large-scale projects.
- **Building Resilient Infrastructure and Communities (BRIC)**
    - The newest FEMA pre-disaster hazard mitigation program will replace the existing PDM program. FEMA opened the first application period for the FY20 Notices of Funding Opportunities that included BRIC.
    - BRIC supports communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.
    - FY2020 priorities are to incentivize public infrastructure projects and projects that mitigate risk to one or more lifelines; incentivize projects that incorporate nature-based solutions; and increase funding to Applicants that facilitate the adoption and enforcement of the latest published editions of building codes.
- **Flood Mitigation Assistance (FMA) Program**
    - NeDNR administers the Flood Mitigation Assistance program. Its purpose is to implement cost-effective measures that reduce or eliminate the long-term risk of

flood damage to buildings, manufactured homes, and other structures insured under the NFIP.

- The FMA funds planning activities that assess a community's flood risk and identify actions to reduce risk. Additionally, FMA funds property acquisitions, structure demolition, structure relocation, along with other flood mitigation activities.
- The repetitive and severe repetitive loss strategy outline in this plan serves to allow a cost share of 90% federal funds for repetitive and severe repetitive loss mitigation activities.

Public Assistance 406 Mitigation

- The Stafford Act established 406 mitigation activities for facilities requiring repair, restoration, or replacement as a result of a presidentially declared disaster. The goal of this funding is to reduce the number of facilities that are repeatedly involved in declared disasters thus reducing future costs.

Additional funding sources

- Nebraska Environmental Trust
- Nebraska Forest Service Surplus Generators
- NFIP Increased Cost of Compliance (ICC) coverage for policy owners
- Natural Resources Districts (NRDs)
- FEMA o U.S. Department of Commerce Economic Development Administration
- U.S. Small Business Administration Disaster Loans
- U.S. Department of Housing and Urban Development Disaster Block Grants
- U.S. Department of Agriculture Community Loans
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- Partnerships between various government agencies, non-profits, and private sector citizens/businesses

Table 4-13: Sources for Federal and State Mitigation Funding and Assistance

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
Grants.gov	**Searchable catalog of federal grant opportunities in health and human services**	**U.S. Department of Health and Human Services (HHS)**	**http://www.grants.gov/web/grants/home.html**	**x**	**x**	**x**
Federal Grant Programs for State and Local Governments	Web-site that lists types of FEMA grant programs, including policies, eligibility, agencies, and type of funding instrument.	FEMA	https://www.grants.gov/web/grants/search-grants.html?keywords=FEMA		x	x
National Earthquake Hazards Reduction Program	Program research to advance understanding earthquakes occurrence and impact	National Institute of Science and Technology (NIST)	http://www.nehrp.gov/index.htm		x	
Decision, Risk and Management Science Program	Scientific research directed at increasing the understanding and effectiveness of decision making by individuals, groups, organizations, and society	National Science Foundation (NSF)	http://www.nsf.gov/funding/pgm_summ.jsp?pims_id_5423		x	
Societal Dimensions of Engineering, Science, and Technology Program	Proposals benefiting the study of interactions of engineering, science, technology, and society	NSF	http://nsf.gov/funding/pgm_summ.jsp?pims_id=5323&org=SES		x	
Aquatic Ecosystem Restoration	Direct support for carrying out aquatic ecosystem restoration projects, such as wetlands, repairing and other floodplain and aquatic systems, that will improve the quality of the environment; Regulatory and adaptation planning initiatives for Climate Change	U.S. Army Corps of Engineers (USACE)	http://www.nae.usace.army.mil/Missions/Public-Services/Ecosystem-Restoration-Authorities/	x	x	x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
Beneficial Uses of Dredged Materials	Direct assistance for projects that protect, restore, and create aquatic and ecological habitats, including connection with dredging in authorized Federal wetlands, in navigation projects	Environmental Protection Agency (EPA)	https://www.epa.gov/cwa-404/beneficial-use-dredged-material	x	x	x
Water Grants	A variety of grants related to water and wastewater infrastructure projects, including a catalog of federal funding for watershed protection projects	EPA	https://www.epa.gov/nps/watershed-funding		x	x
Urban Waters Small Grants Program	Protect and restore urban waters by improving water quality through activities that also support community revitalization and other local priorities	EPA	http://www2.epa.gov/urbanwaters		x	x
Community Development Block Grant (CDBG)	Grants to states and local governments to develop viable communities (e.g., housing, suitable living environment, expanded economic opportunities) and recover from federally declared disasters; principally for low- and moderate-income areas	U.S. Department of Housing and Urban Development (HUD)	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs	x	x	x
Disaster Housing Assistance Program	Emergency assistance for housing, including minor repair of home to establish livable conditions, mortgage and rental assistance	U.S. Dept. of Housing and Urban Development (HUD)	https://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/publications/dhap			x
HOME Investment Partnerships Program	Grants to state and local government and consortia for permanent and transitional housing (including financial support for property acquisition and rehabilitation for low-income persons)	HUD	https://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing/programs/home/			x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
HUD Disaster Resources	Grants and a variety of disaster assistance related to housing, including mortgage assistance	HUD	https://portal.hud.gov/hudportal/HUD?src=/info/disasterresources			x
Section 108 Loan Guarantee	Offers states and local governments a source of financing for certain community development activities, such as housing rehabilitation, economic development, and large-scale physical development projects.	HUD	https://portal.hud.gov/hudportal/HUD?src=/hudprograms/section108			x
National Flood Insurance Program	Formula grants to States to assist FEMA communities to comply with NFIP floodplain management requirements (Community Assistance Program)	FEMA	https://www.fema.gov/national-flood-insurance-program	x		
Hazard Mitigation Assistance (HMA)	Grants to provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages – ***[includes FMA, HMGP, PDM, below]***	FEMA	http://www.fema.gov/hazard-mitigation-assistance		x	x
Flood Mitigation Assistance (FMA) Program	Grants to states and communities for pre-disaster mitigation planning and projects to help reduce or eliminate the long-term risk of flood damage to structures insurable under the National Flood Insurance Program	FEMA	http://www.fema.gov/flood-mitigation-assistance-program		x	x
Hazard Mitigation Grant Program (HMGP)	Grants to states and communities for planning and projects providing long-term hazard mitigation measures following a major disaster declaration	FEMA	http://www.fema.gov/hazard-mitigation-grant-program		x	x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
Pre-Disaster Mitigation (PDM) Competitive Grant Program	Grants to states and communities for planning and projects that provide long-term hazard pre-disaster mitigation measures. This program will be replaced by the Building Resilient Infrastructure and Communities (BRIC) grant program.	FEMA	http://www.fema.gov/pre-disaster-mitigation-grant-program		x	x
Public Assistance: Hazard Mitigation Funding under Section 406	9526.1 Hazard mitigation discretionary funding available under Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act following a federally-declared disaster	FEMA	https://www.fema.gov/95261-hazard-mitigation-funding-under-section-406-stafford-act			x
Assistance to Firefighters Grant Program	Assists in local funding for fire equipment, staffing, facility construction and emergency response costs	FEMA	https://www.fema.gov/welcome-assistance-firefighters-grant-program			x
Partners for Fish and Wildlife	Financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats	U.S. Fish and Wildlife Service (USFWS)	https://www.fws.gov/partners/resourceBenefits.html		x	x
National Trust Preservation Funds (NTPF)	Funding awarded to nonprofit organizations and public agencies for planning and education projects	National Trust for Historic Preservation (NTHP)	https://savingplaces.org/stories/how-to-apply-for-grants-from-the-national-trust-preservation-fund#.W3ifqtQrLs0		x	x
Historic Preservation Financial Assistance - General	Federal financial assistance specifically for historic preservation. Initiatives include sustainability and climate resilience, and	Advisory Council on Historic Preservation	https://www.achp.gov/initiatives		x	x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
	community revitalization and economic benefits.					
FHWA Emergency Relief Program	Funding for the repair or reconstruction of Federal-aid highways that have suffered serious damage as a result of (1) natural disasters, or (2) catastrophic failures from an external cause	U.S. Department of Transportation (USDOT)	http://www.fhwa.dot.gov/programadmin/erelief.cfm			x
Transportation Investment Generating Economic Recovery (BUILD)	Investing in surface transportation infrastructure for roads, bridges, transit, rail, ports or intermodal transportation. *[Replaces previous TIGER program]*	USDOT	https://www.transportation.gov/BUILDgrants		x	x
Emergency Loan Program	USDA's Farm Service Agency (FSA) provides emergency loans to help producers recovery from production and physical losses due to drought, flooding, other natural disasters or quarantine	USDA	https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/emergency-farm-loans/			x
Emergency Watershed Protection (EWP) Program	Provides assistance to relieve imminent hazards to life and property caused by floods, fires, drought, windstorms, and other natural occurrences	National Resources Conservation Service (NRCS)	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/landscape/ewpp/		x	x
Financial Assistance	Financial assistance to help plan and implement conservation practices that address natural resource concerns or opportunities to help save energy, improve soil, water, plant, air, animal and related resources on agricultural lands and non-industrial private forest land	NRCS	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/		x	x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
Homeland Security Grant Program	Supports efforts to build and sustain core capabilities across the five mission areas of Prevention, Protection, Mitigation, Response, and Recovery based on allowable costs.	U.S. Department of Homeland Security (DHS)	https://www.fema.gov/homeland-security-grant-program		x	x
Emergency Management Performance Grant (EMPG) Program	Assists local, tribal, territorial, and state governments in enhancing and sustaining all-hazards emergency management capabilities	DHS	https://www.fema.gov/emergency-management-performance-grant-program		x	x
Land & Water Conservation Fund	Funding allows 4 federal agencies to acquire and develop private lands for public outdoor recreation areas and facilities; and congressional appropriate for matching funds for state and local government land acquisition projects	U.S. Bureau of Land Management, Forestry Service, Fish & Wildlife Service and National Park Service	http://www.lwcfcoalition.org/		x	x
Missions and Appropriations	Federal budget and funding to support USACE missions including research, feasibility studies, construction and disaster relief	USACE	https://www.usace.army.mil/Missions/	x	x	x
Flood Risk Management Program	The program objective is to foster public understanding of the options for dealing with flood hazards and to promote prudent use and management of the Nation's flood plains. Types of assistance: 1) General Technical Services, and 2) General Planning Guidance	USACE	https://www.iwr.usace.army.mil/Missions/Flood-Risk-Management/Flood-Risk-Management-Program/		x	

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
Economic Injury Disaster Loans	Low-interest disaster loans to businesses of all sizes, private non-profit organizations, homeowners, and renters. SBA disaster loans can be used to repair or replace the following damaged property, equipment, inventory or other business assets.	Small Business Administration (SBA)	https://www.sba.gov/loans-grants/see-what-sba-offers/sba-loan-programs/disaster-loans			x
National Dam Safety Program/High Hazard Potential Dam Grant Program	The primary purpose of the National Dam Safety Program (NDSP) is to provide financial assistance to the States for strengthening their dam safety programs	FEMA	https://www.fema.gov/emergency-managers/risk-management/dam-safety/grants			x
Building Resilient Infrastructure and Communities (BRIC)	BRIC supports communities through capability-and capability-building; encouraging and enabling innovation; promoting partnerships; and enabling large projects. The first application period opened on 09/30/2020	FEMA	https://www.fema.gov/grants/mitigation/fy2020-nofo			x
Community Emergency Response Team (CERT)	Nine-week citizen training program for disaster preparedness and basic disaster response skills for individuals, families, neighborhoods, community organizations, and businesses	Nebraska Emergency Management Agency	https://nema.nebraska.gov/preparedness/citizen-corps-partner-programs		x	
Non-Profit Organizations (NPOs) Mitigation Funding and Assistance						
ARC Nebraska	Support services for vulnerable populations - assistance with social services, healthcare, housing, family support, education and government benefits.	The ARC of Nebraska	https://www.arc-nebraska.org/		x	x
American Red Cross	Shelter, food, support, supplies, and direct assistance	American Red Cross, Nebraska Region	https://www.redcross.org/local/nebraska.html		x	x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
	to populations impacted by disaster					
The Nature Conservancy	Conservation organization partnering with communities, business, government, and other non-profits to protect ecologically important lands and waters for nature and people	The Nature Conservancy	http://www.nature.org		x	x
The Trust for Public Land	Assistance to state and local governments including land conservation transactions, conservation finance, park design & development	The Trust for Public Land	http://www.tpl.org/services/conservation-finance		x	x
Public Health Programs	Provides funding, expertise, information, leadership and/or connections to specific groups of people for projects addressing priority public health challenges	CDC Foundation	http://www.cdcfoundation.org		x	X
State Mitigation Funding and Assistance						
Federal grants - Nebraska Government Grants	Federal funding distributed to various sectors with the majority in business, education, housing, veteran and personal grants.	Various	https://www.usgrants.org/nebraska			x
Grants and Contract Opportunities	Listing of various grants and contract opportunities that support public health objectives in the community. (COVID-19 CARES Act funding is available.)	Nebraska Department of Health and Human Services	http://dhhs.ne.gov/Pages/Grants-and-Contract-Opportunities.aspx			x
Homeland Security Grants	NEMA is the designated State Administrative Agency (SAA) for all homeland security	NEMA	https://nema.nebraska.gov/preparedness/grants		x	x

Federal and State Mitigation Funding and Assistance						
Program	**Description**	**Lead Agency**	**Link**	**Regulatory**	**Technical**	**Financial**
	grants coming into the State from the U.S. Department of Homeland Security.					

Table 4-11: Hazard Mitigation Assistance - Eligible Activities by Program

ELIGIBLE ACTIVITIES	HMGP	PDM	FMA
1. Mitigation Projects	√	√	√
Property Acquisition and Structure Demolition	√	√	√
Property Acquisition and Structure Relocation	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction	√	√	√
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-Residential Structures	√	√	√
Generators	√	√	
Localized Flood Risk Reduction Projects	√	√	√
Non-Localized Flood Risk Reduction Projects	√	√	
Structural Retrofitting of Existing Buildings	√	√	√
Non-Structural Retrofitting of Existing Buildings and Facilities	√	√	√
Safe Room Construction	√	√	
Wind Retrofit for One- and Two-Family Residences	√	√	
Infrastructure Retrofit	√	√	√
Soil Stabilization	√	√	√
Wildfire Mitigation	√	√	
Post-Disaster Code Enforcement	√		
Advance Assistance	√		
5 Percent Initiative Projects*	√		
Aquifer and Storage Recovery**	√	√	√
Flood Diversion and Storage**	√	√	√
Floodplain and Stream Restoration**	√	√	√
Green Infrastructure**	√	√	√
Miscellaneous/Other**	√	√	√
2. Hazard Mitigation Planning	√	√	√
3. Technical Assistance			√
4. Management Costs	√	√	√

*FEMA allows increasing the 5 percent initiative amount up to 10 percent for a Presidential Major Disaster Declaration under HMGP. The additional 5 percent initiative funding can be used for activities that promote disaster-resistant codes for all hazards. As a condition of the award, either a disaster-resident building code must be adopted or an improved Building Code Effectiveness Grading Schedule is required.

**Indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

Source: FEMA Hazard Mitigation Assistance Guidance, 2015

4.7 – Repetitive and Severe Repetitive Loss Strategy

The Nebraska Department of Natural Resources has developed a repetitive loss mitigation strategy that aims to reduce the number of repetitive loss and severe repetitive loss properties in Nebraska. This strategy serves to make local jurisdictions eligible for increased federal cost share for FEMA Flood Mitigation Assistance (FMA) grants. The strategy adheres to the requirements from 44 C.F.R. $201.4 (c)(3)(v).

Definitions

For properties to be eligible for an increased cost share in FMA, the definitions below must apply, as stipulated in the Flood Insurance Reform Act of 2012:

A ***severe repetitive loss property*** is a structure that:

1. Is covered under a contract for flood insurance made available under the NFIP; and,
2. Has incurred flood related damage
    a. For which four or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding $5,000 and with the cumulative amount of such claim payments exceeding $20,000; and
    b. For which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

A ***repetitive loss property*** is a structure covered by a contract for flood insurance made available under the NFIP that:

1. Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
2. At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

The NFIP's Flood Insurance Manual provides the following definitions for NFIP and CRS purposes:

The severe repetitive loss group consists of any NFIP insured property that has met at least one of the following paid flood loss criteria since 1978 regardless of ownership with two of the claim payments occurring within ten years of each other:

- Four or more separate claim payments of more than $5,000 each (including building and content payments); or
- Two or more separate claim payments (building payments only) where the total of the payments exceeds the current value of the property.

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

NeDNR uses the different definitions of repetitive and severe repetitive loss properties as determined by the FEMA program being leveraged for a community's situation and application.

Previous and Ongoing Flood Mitigation

The Nebraska Department of Natural Resources has a long and established history of coordinating with federal, state, and local entities to implement mitigation measures. This has included the following and other efforts:

- Targeted buy-outs and demolition of repetitive loss structures. This action includes the removal of all but one repetitive loss structures from the City of Beatrice. Several buyouts along the Missouri River completely removing neighborhoods from the floodplain.
- Flap gates on drainage structures along Highway 103 near DeWitt to reduce the potential for back flow flooding from the Turkey Creek. Four repetitive loss properties received benefits from this project.
- Coordinating projects to survey communities to provide information for updating AW501 "NFIP Repetitive Loss Worksheet" forms with the repetitive loss database.
- Verifying and revising information about properties listed on FEMA provided repetitive loss and severe repetitive loss lists.
- Providing technical assistance to communities looking at or currently participating in the Community Rating System (CRS).
- Participating in planning teams for local mitigation plan development. NeDNR provides floodplain management information, including non-private information related to a community's repetitive loss or severe repetitive loss properties. As local communities prepare mitigation strategies, NeDNR contributes information about and encourage including repetitive loss and severe repetitive loss property mitigation into local HMP strategies.

Repetitive Loss Mitigation Strategy

The following acts as the State of Nebraska's Repetitive Loss Mitigation Strategy.

- Provide technical assistance to communities on floodplain management including repetitive loss definitions, grant availability and eligibility, local mitigation strategies, and repetitive loss property information verification.
- Promote CRS to communities across the state, which requires communities to evaluate and analyze repetitive loss and severe repetitive loss properties and potential mitigation alternatives.
- Assist communities to verify correct information about the presence and location of repetitive loss and severe repetitive loss properties.

- Administer the Flood Mitigation Assistance Grant program including prioritizing projects that reduce repetitive loss and severe repetitive loss properties for funding.
- Promote the FMA grant program to communities that might be able to benefit from applying for funding.
- Promote the inclusion of projects addressing repetitive loss and severe repetitive loss mitigation activities in local hazard mitigation planning development and revisions.

SECTION 5: LOCAL COORDINATION AND MITIGATION CAPABILITIES

44 CFR, 201.4 Requirements

S13. Does the plan generally describe and analyze the effectiveness of local and tribal, as applicable, mitigation policies, programs and capabilities [44 C.F.R. §201.4(c)(3)(ii)]

S18. Does the plan describe the process to support the development of approvable local and tribal, as applicable, mitigation plans? [44 C.F.R. §201.3(c)(5) and 201.4(c)(4)(i)]

EMAP Standard (2019 Edition)

4.2.4 The Emergency Management Program, consistent with the scope of the mitigation program, does the following:
(1) identifies ongoing mitigation opportunities and tracks repetitive loss;
(2) provides technical assistance in implementing mitigation codes and ordinances; and
(3) participates in jurisdictional and multi-jurisdictional mitigation efforts.

2021 Plan Update

- Information related to local coordination and mitigation capabilities was moved into this NEW section to emphasize the state's ongoing support and progress.
- The section was formatted to provide focus on each step in the mitigation plan development process.

5.1 – Overview

The Nebraska Emergency Management Agency manages the program to coordinate local mitigation planning and project implementation. This oversight and management process is carried out through multiple methods, processes and funding streams. Key to the state's management of local mitigation efforts is identifying mitigation opportunities, providing technical assistance in implementing mitigation activities, and coordinating and participating in multi-jurisdictional mitigation planning, project development and administration.

5.2 - Local Planning Capability Assessment

Since the 2019 plan revision, the number of Local Hazard Mitigation Plans (LHMPs) has increased from 23 to 26. FEMA-approved hazard mitigation plans cover 92 of 93 counties and nearly 98% of the state's population. Currently, 13 of the state's 26 LHMPs are championed by a Natural Resources District (NRD). In addition to the plans coordinated by NRDs, several jurisdictions have multi-jurisdiction or single jurisdiction plans.

Of the 26 LHMPs, nine (9) of the state's 26 local plans are approved; seven (7) are in progress, and five (5) are beginning updates. Two LHMPs are expired, but the update is in progress, and one plan has expired, but is under FEMA final review. One LHMP is under NEMA review, and one plan has expired, but no update is in progress. A new mitigation plan that addresses the hazards facing the University of Nebraska - Lincoln is in progress.

Table 5-1: LHMP Status, as of August 4, 2020

Jurisdiction	Status	Date of Expiration
Beatrice	Approved - 2019	06/11/24
Cedar-Dixon	In Progress	06/02/21
Central Platte NRD	On Deck to Start - 2019 PDM	08/05/22
Hayes, Hitchcock, & Frontier	Approved - 2018	05/16/23
Little Blue-Lower Big Blue NRD	In Progress	05/06/21
Lower Elkhorn NRD	Approved - 2020	03/05/25
Lower Loup NRD	On Deck to Start - 2019 PDM	06/23/22
Lower Platte North NRD	Expired - FEMA Final Review	07/06/20
Lower Platte South NRD	Approved - 2020	05/20/25
Nemaha NRD	Expired - Update In Progress	07/14/20
North Platte NRD	On Deck to Start - 2019 PDM	09/23/21
Omaha Tribe of NE & Iowa	Expired - No Updates	9/15/2016
Papio-Missouri River NRD	In Progress	06/21/21
Perkins, Chase, & Dundy	Expired - Update In Progress	06/19/20
Quad Counties	In Progress	07/21/21
Region 23	NEMA Review	09/01/20
Region 24	In Progress	01/12/21
Sac and Fox Nation of Missouri	Approved 2017	01/03/22
South Platte NRD	On Deck to Start - 2019 PDM	07/30/22
State of Nebraska	Update In Progress	05/19/19
Tri-Basin NRD	Approved - 2018	05/07/23
Tri-County	Approved - 2017	11/21/22
Twin Platte NRD	On Deck to Start - 2018 PDM	09/08/21
University of Nebraska - Lincoln	In Progress	New Plan
Upper Big Blue NRD	Approved - 2020	1/10/2025
Upper Loup	Approved - 2020	01/09/25

Assistance for local hazard mitigation planning is provided in the form of grants, technical assistance, and reviews of plans and activities. While the majority of the state is covered under a local hazard mitigation plan, it still remains a challenge to engage local communities in participating in the planning process. A lack of resources, such as full-time local staff and funding, along with limited capacity sometimes constricts the ability for locals to participate. Educational outreach about the benefits of planning along with using planning methods that

meet the needs of locals can help increase plan participation. Future efforts to support local hazard mitigation planning should focus on providing more resources.

The state has a substantial role in ensuring mitigation measures of various types are implemented at the local level; that role can be divided into three broad functional levels of application:

- Direct Influence: Activities that will generally be carried out by private interests or local government but are directly influenced by state activity. These could be local assistance funding, standard setting, preparation of model statutes, codes and all similar activities where State authority encourages or enables Local actions that support mitigation.

- Indirect Influence: Activities that will be carried out exclusively by the private sector or local government. These may be promoted or encouraged by state efforts such as vulnerability reports, education activity, and similar indirect means.

- Implementation: Activities carried out by the state directly as program functions of the state agencies and authorities. These would include such things as state-conducted training, state regulatory programs, design and construction of state facilities, and the creation of new or amended (state) law.

Process to Support Development of Approvable Local and Tribal Mitigation Plans

Local plans are submitted to the Nebraska Emergency Management Agency (NEMA) for review before submission to FEMA. Using the local hazard mitigation review tool, NEMA Recovery Section staff reviews the plan and suggests revisions or forwards the plan on for FEMA review. NEMA's goal is to review plans within 30 days of submission and to process applications in a manner that reduces the number of plan revisions to meet eligibility requirements. The general outline of the planning review process is as follows:

1. Draft of plan is submitted to NEMA for review.
2. NEMA Recovery Section staff complete a formal review of the submitted plan.
3. After inclusion of required plan elements, NEMA sends plan to FEMA for approval pending adoption.
4. FEMA notifies NEMA of approval pending adoption of the plan by participating jurisdictions.
5. NEMA notifies the submitting jurisdiction of pending approval.
6. Participating jurisdictions adopt the plan and resolutions are sent to NEMA.
7. Adoption resolutions are forwarded on to FEMA.
8. FEMA grants final approval of plan.
9. NEMA notifies the jurisdictions of approval.
10. Plan revisions begin with approval being no later than five years after previous approval.

The State stands ready to support Tribal plan development and maintenance, if requested, which can include planning, training, funding assistance, and mitigation project administration. Tribes may participate in local mitigation plans, if desired.

As the activities of Local jurisdictions are considered under this process, it is important to note that the State's capabilities are sometimes diminished by a local jurisdiction's limitation to fully engage in pre-disaster planning activities, regardless of the cause. This restriction may have several causes, making it difficult for state agencies to work with jurisdictions under these circumstances. The educational outreach conducted across the state has increased jurisdictions' participation in pre-disaster mitigation efforts. It is important for state agencies to assure that their programs and funding sources remain user friendly. Through training and technical assistance, much can be accomplished.

Another challenge noted in the examination of local capabilities and planning, is non-participation of county, city, or state entities in the planning process. This would include entities such as local school districts, fire districts, irrigation districts, private non-profits, and groups operating camps and retreat centers across the state. These groups play an important role in the framework of our communities and face many of the same hazards. Efforts to engage and encourage participation would likely improve Nebraska's overall progress in hazard reduction.

During the 2021 revision of the state plan, 22 of the 26 local hazard mitigation plans were reviewed and data and other information was included in the various hazard profiles. This review included: identification of hazards and risk assessments; evaluations of at-risk and vulnerable populations and compilation of property value at risk from the different hazards; identification of locally important critical facilities and their vulnerability; identification of rapidly developing communities; evaluation of local mitigation goals, programs, policies, regulations, and authorities, such as land use regulations, comprehensive plans, zoning controls, etc.; compilation of the local costs of disasters and the demonstrated value of preexisting mitigation initiatives; identification of local proposals for mitigation initiatives; and implementation status of local mitigation initiatives. In addition, mitigation actions related to specific hazards were highlighted within hazard sections.

The large amount of data, along with constantly changing data presents a challenge for plan integration and analysis of local plans. NEMA is addressing this challenge by ensuring complete reviews of plans along with maintaining clear documentation on an ongoing basis. A comprehensive database has been developed for the 2021 SHMP update that will allow NEMA to collect and maintain information from LHMPs as they are submitted for review and approval from this point forward. The Excel spreadsheet allows data and information to be captured and documented during the NEMA plan review process, addressing hazards, risk and vulnerability, capabilities, and actions. The database can be updated during each plan review, allowing NEMA to track changes and progress in risk reduction as it is completed or reported. (See **Appendix D** for current LHMP database.)

Analysis of Local Coordination and Capabilities

Past state plans identified that the limited number of approved plans has been a challenge. This no longer remains a challenge as all counties except one have adopted a mitigation plan. As described in the 2019 SHMP, the structure of using NRDs and regions for plans has allowed for plans to be revised in a timely manner. For the 2021 SHMP update, 22 LHMPs were reviewed and data was collected in an Excel file format that can be used by NEMA to maintain current data as future plans are reviewed. (**See Appendix D**.) Data from these LHMPs was summarized for the analysis in **Table 5-2**.

Table 5-2: Local Capabilities Evaluation Summary

Coordination of Local Hazard Identification and Risk Assessment
- 10 LHMPs utilized some type of ranking system - All LHMPs identify dam failure, drought, flood, severe thunderstorm, severe winter storm as hazards of concern - No LHMPs address Expansive Soil, Extreme Cold, Hurricane, Ice (as a single hazard), Invasive Species or Power Failure
Vulnerability/Data Sets*
- 20 plans provide data for existing structures - 21 plans provide a building assets list - 21 plans - Potential identify a potential dollar amount for structural loss (flood) based on the data sets totaling $ 244,065,099
Capabilities
Plans
- 21 plans indicate some type of comprehensive or master plan - 21 plans identify evacuation and/or emergency operations plans - 20 plans identify economic development plans - 19 plans indicate jurisdictions have capital improvement plans - 18 plans indicate stormwater management plans - 8 plans identify natural resource protection plans - 3 LHMPs acknowledge having Drought Preparedness Plans - 1 plan notes having a Regional Sustainability Plan
Policies and Regulations
- 21 plans identify zoning ordinances or land use restrictions - 19 plans indicate building codes in place - 17 plans identify FIRM/DFIRMs - 1 plan identifies a land acquisition ordinance
Programs
- 21 plans indicate participation in the National Flood Insurance Program - 19 plans acknowledge public education/awareness programs - 14 plans identify mutual aid agreements - 14 plans identify participation in the Tree City USA Program - 8 plans identify snow/ice removal programs - 1 plan indicates a flood control program

- 0 plans indicate a dam safety program
Studies/Reports
- 21 plans identify the hazard analysis/ risk assessment process
Administration/Resources
- 21 plans identify emergency personnel - 20 plans identify a grant writer - 19 plans identify positions for an engineer, planner and GIS specialist - 17 plans identify a building code official - 8 plans identify a public works official - 1 plan identifies a public information officer
Actions/Projects
- 8 plans identified bank stabilization programs or projects
Funding
- 20 plans identified the capability for local tax/bond for mitigation - 19 plans identified Capital Improvement Projects funding for mitigation - 18 plans identified the U.S. Small Business Administration as a potential funding source - 10 plans identified FEMA HMGP funding as a potential source - 1 identified FEMA FMA funding as a potential source

*Future review and evaluation of LHMPs will also address issues related to social vulnerability of the population.

The state and local capabilities to fund and implement projects and actions are demonstrated in **Table 5-3**, **Table 5-4** and **Table 5-5**.

Table 5-3: HMGP Funding Projects, 2014-2020

Disaster	Project Title	100%	75%	25%
4179	Arnold Generator	$ 42,790.00	$ 32,092.00	$ 10,698.00
4179	Ayr Warning Siren	$ 17,934.37	$ 13,450.78	$ 4,483.59
4179	Dalton Warning Siren	$ 14,956.77	$ 11,224.33	$ 3,741.44
4179	Funk Warning Siren	$ 23,156.00	$ 17,367.00	$ 5,789.00
4179	Gosper County Generator	$ 44,350.00	$ 33,262.50	$ 11,087.50
4179	High West Energy HM Plan	$ 7,500.00	$ 5,625.00	$ 1,875.00
4179	Laurel Warning Siren	$ 74,090.00	$ 55,567.50	$ 18,522.50
4179	Lawerence Warning Siren	$ 23,770.23	$ 17,827.67	$ 5,942.56
4179	NPPD Annex to State Plan	$ 19,483.00	$ 14,612.25	$ 4,870.75
4179	NPPD Storm Mitigation Structures	$ 278,181.83	$ 208,636.37	$ 69,545.46
4179	Perennial PPD to South PPD Tie Line	$ 1,066,257.32	$ 769,415.00	$ 296,842.32
4179	Phelps County Generator	$ 113,090.00	$ 84,817.50	$ 28,272.50
4179	Taylor Warning Siren	$ 20,675.16	$ 15,506.37	$ 5,168.79
4179	Upland Warning Siren	$ 21,130.58	$ 15,847.94	$ 5,282.64
4183	Hastings-Laird Warning Siren	$ 18,573.00	$ 13,929.75	$ 4,643.25
4183	Cambridge Siren			
4183	Holstein Siren	$ 4,899.00	$ 3,674.25	$ 1,224.75
4183	Loup City Siren	$ 43,450.00	$ 32,587.50	$ 10,862.50
4183	Richardson County Sirens			
4183	Beaver City to Stamford Transmission Line	$ 1,652,334.83	$ 1,239,251.12	$ 413,083.71
4185	Ainsworth Warning Siren	$ 20,868.00	$ 15,323.00	$ 5,545.00
4185	Auburn Warning Siren	$ 54,460.00	$ 40,845.00	$ 13,615.00
4185	Beatrice Reiff Property Acquisition	$ 74,574.32	$ 55,930.74	$ 18,643.58
4185	Merdian High School Generator	$ 65,145.00	$ 48,858.75	$ 16,286.25
4185	Pilger Safe Room			
4185	Sherman County Culverts	$ 18,882.56	$ 14,161.92	$ 4,720.64
4185	Wilber Siren	$ 22,975.00	$ 17,231.25	$ 5,743.75
4225	Arthur County Warning Siren	$ 17,699.39	$ 13,274.54	$ 4,424.85
4225	Banner County Warning Siren	$ 22,650.00	$ 16,987.50	$ 5,662.50
4225	Herny Siren	$ 19,850.00	$ 14,887.50	$ 4,962.50
4225	Morrill Warning Siren	$ 21,790.00	$ 16,342.50	$ 5,447.50
4225	Nebraska City Generator	$ 43,497.00	$ 32,622.75	$ 10,874.25
4225	Northwest Rural PPD HM Plan Annex to State Plan	$ 44,085.00	$ 33,064.00	$ 11,021.00
4225	Platte County Warning Siren	$ 46,285.05	$ 33,071.00	$ 13,214.05
4225	Prosser Warning Siren	$ 19,848.00	$ 14,886.00	$ 4,962.00
4225	Roseland Warning Siren	$ 19,848.00	$ 14,886.00	$ 4,962.00
4225	Scottsbluff Siren Project	$ 49,989.85	$ 37,492.39	$ 12,497.46
4225	Southern PPD Annex to State Plan	$ 9,890.00	$ 7,418.00	$ 2,472.00
4225	Willow Creek Recreation Area Warning Siren	$ 24,593.00	$ 18,444.00	$ 6,149.00
4225	Winside Warning Siren	$ 45,270.00	$ 33,952.00	$ 11,318.00
4225	York County Safe Room Project	$ 44,057.00	$ 33,042.75	$ 11,014.25
4321	Boone County Weather Radios			
4321	McPherson County Warning Siren	$ 2,825.00	$ 2,119.00	$ 706.00
4325	City of Beatrice HM Plan	$ 49,990.00	$ 37,492.51	$ 12,497.49
4325	Cheyenne County Siren	$ 17,549.21	$ 12,411.91	$ 5,137.30
4325	Hall County Warning Siren	$ 15,088.00	$ 11,316.00	$ 3,772.00

HMGP Funding Code

4179 = 2014		
4183 = 2014		
4185 = 2014		
4225 = 2015		
4321 = 2017		
4325 = 2017		
4375 = 2018	No Closed Projects	
4387 = 2018	No Closed Projects	
4420 = 2019	No Closed Projects	

Table 5-4: Pre-Disaster Mitigation (PDM) Funded Projects, 2014-2020

Year	Project Title	100%	75%	25%
2014	Cedar/Dixon Counties Hazard Mitigation Plan	$ 75,000.00	$ 56,250.00	$ 18,750.00
2014	Lower Big Blue/Little Blue NRD Multi-Hazard Mitigation Plan	$214,399.00	$160,799.25	$ 53,599.75
2014	North Platte NRD Multi-Jurisdictional Hazard Mitigation Plan Update	$ 90,000.00	$ 67,500.00	$ 22,500.00
2014	P-MRNRD Multi-Hazard Mitigation Plan	$149,998.00	$112,498.50	$ 37,499.50
2014	Quad Counties Multi-Jurisdictional Hazard Mitigation Plan Update	$ 70,000.00	$ 52,500.00	$ 17,500.00
2014	Tri-County Hazard Mitigation Plan	$ 52,650.00	$ 39,487.50	$ 13,162.50
2014	Twin Platte NRD Multi-Hazard Mitigation Plan Update	$ 98,500.00	$ 73,875.00	$ 24,625.00
2015	Central Platte NRD Multi-Jurisdictional Hazard Mitigation Plan	$120,000.00	$ 90,000.00	$ 30,000.00
2015	Lower Elkhorn NRD Drought Mitigation Plan	$ 30,000.00	$ 22,500.00	$ 7,500.00
2015	Lower Loup NRD Multi-Jurisdictional Hazard Mitigation Plan	$140,000.00	$105,000.00	$ 35,000.00
2015	South Platte NRD Multijurisdicational Hazard Mitigaiton Plan	$ 77,500.00	$ 58,125.00	$ 19,375.00
2016	Elkhorn RPPD Mutlihazard Mitigation Project	$925,518.96	$693,198.92	$232,320.04
2016	Nebraska City Station Multihazard Mitigation Plan	$ 22,500.00	$ 16,875.00	$ 5,625.00
2016	Tri-Basin NRD All-Hazard Mitigation Plan Removal	$ 65,210.00	$ 48,907.51	$ 16,302.49

PDM Funding Code

PDM 2014				
PDM 2015				
PDM 2016				
PDM 2017	No projects closed out at this time			
PDM 2018	No projects closed out at this time			
PDM 2019	No projects closed out at this time			

Table 5-5: Flood Mitigation Assistance (FMA) Project Status

Year	Project Title	Total Project	Federal	Match
FY2016	Arlington Buyouts	$ 208,686.22	$196,595.45	$12,090.77
FY2016	Parcel Level Flood risk Assessment and Mitigation Plan for Deshler, Nebraska	$ 32,788.75	$ 24,591.57	$ 8,197.18
FY2016	Management Costs	$ 8,750.73	$ 6,498.46	$ 2,252.27

Local Project Prioritization Criteria and Process

In addition to the capabilities outlined in Section 4, the Governor's Task Force for Disaster Recovery (GTFDR) has the following criteria to determine the prioritization of projects requesting disaster funding:

1. The extent and nature of the hazard to be mitigated.
2. The extent to which the action/project will reduce damages in future natural disasters.
3. The extent to which the action/project is cost-effective and produces meaningful and definable outcomes that have been clearly identified by the jurisdiction.
4. The extent to which the action/project optimizes the net benefits to communities as a whole.
5. The extent to which the action/project funds mitigation activities in small and impoverished communities.
6. The extent to which the action/project will have a beneficial impact on the state as a whole, whether or not the project is located in a designated disaster area.
7. The extent to which the action/project addresses a problem that has been repetitive in nature or a problem that poses a significant risk if left unsolved.
8. The extent of the action/project will not cost more than the anticipated value of the reduction in direct damages and subsequent negative impacts to the area in event of a disaster.
9. The extent to which the action/project is the most practical, effective, and environmentally sound alternative after considering a range of options.
10. The extent to which the action/project contributes, to the largest extent practicable, to a long-term solution to the problem the project is intending to address.

The Nebraska Department of Natural Resources (NeDNR) uses three main criteria in prioritizing its RiskMAP resources.

1. Leverage data available for a watershed to see where limited FEMA resources can be expanded.
2. Work with communities to understand their flood risk reduction and floodplain management needs to evaluate the best possible implementation of RiskMAP projects.
3. Projects can be done with the staff capacity at NeDNR.

5.3 – Project Development and Implementation Process

The process for developing and implementing project ideas generally follows the process listed below. For a more detailed description, see the *Nebraska Hazard Mitigation Administration Plan*.

1. Local entity develops project ideas during planning process.
2. Entities submit a Notice of Intent (NOI) form with the recovery section of NEMA.
3. NOIs are reviewed for detail, compliance with plan participate requirements, and initial cost effectiveness.

4. NOIs are brought before the Governor's Task Force for Disaster Recovery for Prioritization based on the criteria listed in 5.2 when grant funds become available.
5. NEMA Recovery Section staff work with entities to complete the project application and if required benefit cost analysis for submission.
6. After FEMA approval of the project, work is initiated and monitored by the state.
7. Upon work completion, the grant is closed out.

Opportunities for Improvement

The Nebraska Hazard Mitigation Program continues to evolve to meet the challenges facing mitigation in Nebraska. Continued improvements to coordination and technical assistance, along with evaluating possible changes to project selection and funding play a role in developing future mitigation projects.

SECTION 6: PLAN MAINTENANCE AND IMPLEMENTATION

44 CFR, 201.4 Requirements

S17. Is there a description of the method and schedule for keeping the plan current? [44 C.F.R. §201.4(c)(5)(i) and §201.4(d)]

S18. Does the plan describe the systems for monitoring implementation and reviewing progress? [44 C.F.R. §201.4(c)(5)(ii) and 201.4(c)(5)(iii)]

EMAP Standard (2019 Edition)

4.1.3 The Emergency Management Program has a maintenance process for its Hazard Identification and Risk Assessment (HIRA) identified in Standard 4.1.1 and the Consequence Analysis identified in Standard 4.1.2, which includes a method and schedule for evaluation and revision.

4.2.3 The Emergency Management Program has a process to monitor overall progress of the mitigation activities and documents completed initiatives and their resulting reduction or limitation of hazard impact on the jurisdiction

4.2.5 The Emergency Management Program has a maintenance process for the plan identified in Standard 4.2.1, which includes a method and schedule for evaluation and revision.

2021 Plan Update

- Additional details were added to the monitoring, evaluation and update process, to include a defined method and schedule.
- The section was reformatted to provide focus on each step in the plan maintenance and implementation process.

6.1 - Overview

Hazard mitigation planning is a continuous process that documents the State's progress in reducing and eliminating vulnerabilities and losses as a result of natural and human-caused hazards. Policies and procedures described in this plan reflect the current emergency management and hazard mitigation perspective at both the state and national levels.

This section focuses on two aspects of the State's responsibility to maintain the 2021 State Hazard Mitigation Plan (SHMP):

6.2 Method and Schedule for Monitoring, Evaluating, and Updating the Plan

6.3 Implementation of the Plan

The state maintains responsibility for accountability of programs affecting the citizens of Nebraska. As a continuing and ongoing process, the Nebraska Emergency Management Agency (NEMA) is the lead agency for the development and review of the State Hazard Mitigation Plan. Changes in hazard mitigation policies and/or programs, funding availability, or a major disaster will prompt future evaluations and modifications to this plan.

6.2 Method and Schedule for Monitoring, Evaluating and Updating the Plan

The state's mitigation staff and planning team acknowledge that there have been challenges in the past to the process and schedule to monitor, evaluate and update the plan. First, the process was not well-defined with a specific method and established schedule, primarily because there were no substantive changes that required review and revision. Also, on-going turnover of staff made it difficult to maintain continuity and momentum. In addition, three major disaster declarations between 2018 and 2019 required mitigation staff to focus on post-disaster mitigation programs and projects. While efforts in response to the disasters supported and implemented the State's mitigation strategy and goals, these priorities overshadowed the plan monitoring, evaluation and update schedule.

As a result of these limitations, the State made the determination to focus efforts during the 2021 Plan update cycle to build on the strong engagement from State agencies in the planning process to actively identify, implement and monitor mitigation actions and activities that have occurred since the 2014 and 2019 plan updates. In addition, opportunities to improve the outcome for monitoring and evaluation were identified for this update:

- Integrate the tracking of mitigation activities with existing programs, plans, processes, timelines, and reports.
- Continue to underscore the value of mitigation to protect the State's investment in communities and infrastructure in the face of impacts from multiple disasters and diminishing tax revenues.

Integration with Other State Plan Maintenance Policies and Processes

During the 2021 plan update process, the Nebraska Emergency Management Agency (NEMA) adopted the *Essential Plan Maintenance Policy (POL-02-102)*, dated October 10, 2020. Although this policy establishes the method and schedule for evaluation and revision of plans identified as essential by NEMA, it recognizes that the State Hazard Mitigation Plan (SHMP) follows a federally-directed method and schedule for maintenance and does not include this plan in the policy. Consequently, the policy was reviewed during the planning process to ensure that the SHMP maintenance method and schedule were not in conflict with the policy.

In addition, the *State of Nebraska Risk Assessment, Vulnerability Assessment and Consequence Analysis (HIRA)*, dated October 15, 2020, was released during the SHMP planning process. This document was reviewed for the purpose of integration with the hazard risk methodology of the SHMP. As it relates to the maintenance of the SHMP, the HIRA document is used as a critical standalone research document for several of NEMA's Essential Plans (including the SHMP) and is evaluated through the maintenance process of those essential plans as addressed in the *Essential Plan Maintenance Policy (POL-02-102)*. The HIRA document is revised every five years through the methodology described in the HIRA document, and the results of future revisions to the HIRA will be reviewed during the annual SHMP monitoring and evaluation process, and during the plan update cycle.

As an example of the effort to integrate mitigation efforts with existing processes, the State conducted a comprehensive after-action meeting in April 2019 as a follow-up of Disaster

Declaration DR-4420 for flooding. This meeting, attended by well over 60 representatives of state, federal, local and other key stakeholders, jointly addressed after-action issues from the flood response, as well as hazard mitigation issues and opportunities that could be incorporated in the 2019 SHMP update that was in progress at that time. Information from that meeting also served to inform various sections of this 2021 SHMP update, including development of state-level mitigation actions.

During the monitoring, evaluation, and update process, NEMA, as the lead mitigation planning agency, will make every effort to identify implementation challenges (technical, political, legal or financial) as they appear and, as appropriate, to develop recommendations and strategies to overcome these obstacles.

Plan maintenance meetings will be coordinated by the State Hazard Mitigation Officer (SHMO), as the Plan Coordinator, through the Governor's Task Force for Disaster Recovery (GTFDR), as the Planning Committee, and additional stakeholders as identified by the Nebraska Emergency Management Agency (NEMA) or the Nebraska Department of Natural Resources (NeDNR). Details of the meetings may include the following:

- Meetings will be held at a minimum of once a year
- Meetings will be held within three months after the declaration of a federal disaster for plan review, revisions and/or project prioritization
- Meetings will be held when required or needed due to changes in federal or state legislation and/or regulations that impact hazard mitigation in Nebraska.

The following sub-sections describe the method and schedule for monitoring, evaluating and updating the plan, including processes and criteria used to evaluate effectiveness. In addition, responsibilities for these processes are described.

6.2.1 - Method and Schedule for Monitoring the 2021 Plan

This plan maintenance step tracks implementation of the plan over time.

In order to establish a more clearly defined system of plan maintenance that will continue in future planning cycles, the following tables provide the roles and responsibilities, monitoring procedure and schedule which includes the step-by-step actions and specific tasks associated with each action.

Plan Monitoring Roles and Responsibilities	
State Hazard Mitigation Officer (SHMO)/ Designee (Plan Coordinator)	• Coordinate and facilitate the monitoring process • Maintain schedule of monitoring activities • Collect data and disseminate reports • Maintain records and documentation of all monitoring activities
Governor's Task Force for Disaster Recovery (Planning Committee)	• Participate in the monitoring process as requested by the planning coordinator

	• Assist in collecting and analyzing data • Assist in disseminating reports to stakeholders and the public • Promote the mitigation planning process with the public and solicit public input, as appropriate
Stakeholder Representatives - Subject Matter Specialists	• Represent the agency/discipline during the monitoring process • Collect, analyze and report data to the GTFDR and Plan Coordinator • Maintain records and documentation of monitoring activities • Assist in disseminating reports to agency/discipline and the public, as appropriate

Monitoring Procedure and Schedule: The following steps describe how the state of Nebraska will monitor mitigation progress **annually and/or following major disaster(s)*** to monitor progress of mitigation actions.

Step 1: Planning Coordinator – Initiate Monitoring Process

- Notify GTFDR members of the annual/post-disaster review
  - Disseminate *Mitigation Action Progress Report Form**(**Section 6, Attachment A)** for mitigation action updates to Project Leads/Representatives, along with the current list of mitigation actions in the plan
  - Disseminate *Mitigation Action Implementation Worksheet (**Section 6, Attachment D**)* to representatives of agencies with potential new mitigation actions

Step 2: Planning Coordinator and GTFDR – Collect and assess status of Actions (current and new)

- Assess progress in current Mitigation Actions, including implemented and funded actions, and any new opportunities for Mitigation Actions:
  - Are there different or additional resources now available?
  - Are Mitigation Actions being implemented and monitored?
  - Have new Mitigation Actions been identified?
  - Have any Mitigation Actions been completed?

Step 3: Planning Coordinator and GTFDR – Assess New Opportunities for Mitigation

- Has a major disaster occurred that presents opportunities for mitigation?
- How have mitigation goals, objectives, and/or actions been incorporated into existing planning mechanisms or information?
- Is there a new initiative, agency priority, existing planning mechanism or information that is not represented in the current actions?

Step 4: Planning Coordinator and GTFDR – Prepare and Disseminate Status Report to All Plan stakeholders, including elected officials.

- Status of current and implemented actions
- Proposed new actions*
- Potential funding sources
- New opportunities for mitigation (actions in development, new programs, etc.)

The State may, **annually or following a major disaster, add new mitigation actions to the current list of prioritized actions by using the Action Worksheets and Ranking System for Prioritizing Actions.*

6.2.2: Method and Schedule for Evaluating the 2021 Plan

This plan maintenance step assesses the effectiveness of the plan at achieving its stated purpose and goals.

In order to establish a more clearly defined system of plan maintenance that will continue in future planning cycles, the following tables provide the roles and responsibilities, and the

evaluation procedure and schedule, which includes the step-by-step actions and specific tasks associated with each action.

Plan Evaluation Roles and Responsibilities	
State Hazard Mitigation Officer (SHMO)/ Designee (Plan Coordinator)	• Coordinate and facilitate the evaluation process • Maintain schedule of evaluation activities • Collect data and disseminate reports • Maintain records and documentation of all evaluation activities
Governor's Task Force for Disaster Recovery (Planning Committee)	• Participate in the evaluation process, as requested by the Planning Coordinator • Assist in collecting and disseminating information • Assist in disseminating reports to stakeholders and the public • Promote the mitigation planning process with the public and solicit public input
Stakeholder Representatives - Subject Matter Specialists	• Represent the agency/discipline during the evaluation process • Collect and report data to the Stakeholder Working Group and planning coordinator • Maintain records and documentation of all jurisdictional evaluation activities

Evaluation Procedure and Schedule: The following process describes the steps that the City of Saint Paul will take **annually and/or following major disaster(s)** to evaluate the effectiveness of the plan.

Action	Responsible Party	Tasks	Deliverable/Outcome
Initiate Annual Review	SHMO	Notify GTFDR members to facilitate annual evaluation Disseminate Plan Evaluation Checklist (**Section 6,** Attachment B) to GTFDR members and key stakeholders	Work plan, schedule, and assigned resources to implement plan review process
Stakeholder Working Group and Key Stakeholders	SHMO (or designee)	Invite GTFDR members and key stakeholders, and new agency representatives to participate in the plan monitoring and evaluation process	List of invited current and new stakeholders and other key planning partners invitation to participate
Review Policies and Regulations	SHMO (or designee)	Research new or updated laws, policies, regulations, initiatives, and studies that contribute to the hazard risk	Status report: current and new policies, regulations, initiatives and/or studies

		assessment or identified mitigation actions	
Review Programs	SHMO (or designee)	Assess changes in state and local programs, new grant programs or areas of focus, integration into existing planning mechanisms	Status report: current and new stakeholders, programs, grant programs, planning mechanisms, and/or new areas of focus
Hazards *[EMAP 4.1.3]*	SHMO (or designee)	Research new or updated data and information that contributes to the risk assessments, loss estimates, or vulnerabilities in assets, by jurisdiction	Status report: recent disasters, hazard impacts and losses, lessons learned, status of jurisdictional facilities and infrastructure; ***update Plan annually to reflect new risk assessment and capability data gathered from review of hazard events and impacts***
Mitigation Actions	SHMO (or designee)	Assess progress in previously implemented actions that reduce vulnerability and losses, and any new opportunities for mitigation actions	Status report: Completed actions, pending actions, implementation status of actions *[collected through monitoring procedure]*
Outcomes	SHMO (or designee)	Maintain and complete documentation of the plan review process, including any needed plan updates, and prepare summary report	Submit Summary Report: Mitigation Strategy Annual Update (incorporating results of annual monitoring and evaluation process)

A complete revision of the State Hazard Mitigation Plan will be submitted to FEMA in 2021, and will be based on the evaluation of changes to hazard risks and vulnerabilities from disasters that have occurred since 2019, and upon evaluation of the effectiveness of the 2019 plan.

6.2.3 –Method and Schedule for Updating the Plan

This plan maintenance step reviews and revises the plan on an established schedule to reflect changes in development, progress in local mitigation efforts, and changes in priorities.

The plan review and revision process will assist in maintaining currency of multiple components of the plan, such as the hazard identification and risk assessment, and mitigation actions and priorities.

The plan update process and schedule are designed to focus on various components of the plan throughout the five-year cycle. Based on the schedule described below, all parts of the plan will have been reviewed at the end of the five-year cycle, potentially reducing the time and resource burden in the final planning year. Adherence to the monitoring, evaluation and update process schedule will ensure that the plan is kept current throughout its five-year cycle.

The end date for completion of the current planning cycle will be five years from the date the plan is adopted by the State of Nebraska (See **Section 1 Introduction**.)

Plan Update Roles and Responsibilities	
State Hazard Mitigation Officer (SHMO)/ Designee (Plan Coordinator)	• Coordinate and facilitate the plan review, revision and update process • Maintain schedule of all plan update activities • Collect data and disseminate reports • Maintain records and documentation of all evaluation activities • Identify and implement opportunities for public participation and input in the planning process, including review of the revised draft plan
Governor's Task Force for Disaster Recovery (Planning Committee)	• Participate in the plan review, revision and update process, as requested by the SHMO • Assist in collecting and disseminating information • Assist in disseminating reports to stakeholders and the public • Promote the mitigation planning process with stakeholders and the public and solicit public input
Stakeholder Representatives - Subject Matter Specialists	• Represent the agency/discipline during the planning cycle, including plan review, revision and update process • Collect and report data to the GTFDR and SHMO • Maintain records and documentation of plan review and revision activities • Assist in disseminating information and reports to stakeholders and the public

Five-Year Plan Update Process and Schedule	
Monitoring and Evaluation Activities – *Ongoing throughout the five-year planning cycle*	• Monitoring and evaluation results, meeting documentation, and other pertinent documents will be collected throughout the five-year life cycle of the plan and used in the next plan update • Multiple meetings with elected officials, GTFSR, Stakeholders, local and federal agencies, and interested parties will be conducted

	• Activities, meetings, and interactions will be tracked and documented throughout the planning cycle • The annual evaluation review will be conducted using the most recent update of the plan as the basis.
Update Risk Assessment – *Conducted in the 1st Quarter of the fifth year of the planning cycle*	• SHMO/designee and GTFDR representatives will identify key stakeholders to contribute to the updated risk assessment • Monitoring and evaluation results will be incorporated • Changes since the previous plan approval will be identified • Each hazard will be assessed and updated to include new data since the date of plan adoption • New hazard occurrences and potential changes in low-ranked hazards will be identified and assessed • Any significant changes in the jurisdictional risk assessment will be noted during plan review and integrated into the updated Plan
Review and Update Goals and Objectives – *Conducted in the 2nd Quarter of the fifth year of the planning cycle*	• SHMO/designee will coordinate with GTFDR and key partners to assess the status of current Plan goals and objectives for potential revision • Assess how have mitigation goals and objectives been integrated with existing planning mechanisms • Any significant changes in mitigation goals, especially those that are not consistent with the current plan goals, will be assessed and incorporated as appropriate in the updated HMP • Monitoring and evaluation results will be utilized to modify the goals and objectives and describe achievements
Review and Update Mitigation Actions – *Conducted in the 3rd Quarter of the fifth year of the planning cycle*	• SHMO/designee will coordinate with GTFDR and key partners to obtain an update on the current status of actions • Monitoring and evaluation results will be utilized to assess the effectiveness of mitigation actions in meeting the goals and reducing risks • Assess jurisdictional mitigation actions implemented since the plan was last adopted and how they have contributed to the achievement of goals and objectives (**Section 6, Attachment C: Plan Implementation Worksheet**) • Management and maintenance data from the implemented activities will be used to describe progress in the previous five years
Compile and Review *Conducted in the 3rd Quarter of the fifth year of the planning cycle*	• SHMO/designee will coordinate with GTFDR to compile the data and develop the updated plan • Draft will be made available for stakeholder review and input • Draft will be made available for public review and comment • All comments and suggestions will be incorporated and the final draft completed
Review and Approval *Conducted in the 4th Quarter of the fifth year of the planning cycle*	• FEMA review and approval of plan update
Adopt Plan	• Updated plan will be adopted prior to the plan expiration date **(January 26, 2026)**

Conducted in 4th Quarter - Fifth year of planning cycle	

6.3 – Implementation of the Plan

The systems and procedures described in this section support the implementation of this plan through the following measures:

- Annual review method and schedule that monitors and evaluates all elements of the plan and tracks the implementation of the plan over time
- Incorporating the plan into existing planning mechanisms that support long-term resiliency planning
- Documenting progress in risk reduction through prioritizing and implementing state and local mitigation actions

To assist with the plan maintenance process, the following worksheets are provided as attachments at the end of this section as tools to monitor, evaluate and update the plan:

- Attachment A: Mitigation Action Progress Report Form
- Attachment B: Plan Evaluation Checklist
- Attachment C: Planning Considerations Worksheet
- Attachment D: Mitigation Action Implementation Worksheet

Annual reviews will involve plan evaluation in the context of the state's current hazard environment, vulnerabilities, funding availability and needs, and federal and state policy changes. The Planning Team/GTFDR will be responsible for the annual plan review, focusing on the following questions:

- Does the state have the resources it needs to continue implementing the plan as written?
- Are there new hazards that threaten the state or new vulnerabilities that require a shift in hazard priorities?
- Are the goals and objectives still relevant?
- Have there been any changes in state capabilities?
- Are the actions being implemented as planned?
- Are the actions helping to meet goals and objectives?
- Can action effectiveness be documented?
- Has the process to monitor and evaluate the plan been effective?

NEMA and NeDNR serve as the recipients for project management and accountability of funds under the Hazard Mitigation Assistance (HMA) grants in accordance to federal regulations and program guidance. As most mitigation projects are funded by these three grants, NEMA and NeDNR staff track mitigation projects, monitoring costs, progress, project modifications, and track project timelines. Using the 44 C.F.R. and the *Hazard Mitigation Assistance Unified*

Guidance, dated February 27, 2015, all HMA grants will be implemented accordingly. Detailed information on NEMA and NeDNR's management of HMA grants can be found in each grant's respective Administration Plan. The following is a general summary of project monitoring:

- Quarterly Progress Reports:
  - Quarterly progress reports are completed by each subrecipient at the end of each quarter. These reports detail progress, fiscal expenditures, project modifications, milestone completion, and any other data deemed necessary. Reports are required until the grant is closed out with FEMA.
- Audits:
  - Audits are conducted in accordance with state and federal regulations and can include the grant overall, individual projects, or payments. Any audit findings are reviewed to ensure that discrepancies are addressed. Complete documentation of all expenditures is required for all reimbursement requests.
- Benefit Cost Analysis (BCA):
  - Requires a review of the BCA of all regular projects for project development and any changes in scope or cost of a project.
- Closeout Process:
  - Upon completion of a grant or subgrant, all financials are reviewed and accounts reconciled. A final site inspection is conducted by state staff to determine that the project was completed according to the approved scope and location and any environmental and/or historic considerations have been evaluated and addressed. This is documented via photographs and a signed inspection form. After review, a completed closeout packet is sent to FEMA.
- Record Retention:
  - The state of Nebraska maintains files on each project containing the records of the project for the longest period of time identified by state or federal regulations or policy. Subrecipients are required to maintain files for three years after the complete of the final Financial State Report to FEMA.
- Project Database
  - The NEMA Recovery Section and NeDNR maintain databases of information on current and previous projects including dates approved, completed, financial amounts, location, and project types. As new data is identified, the database is updated accordingly.

The NEMA and NeDNR staff maintain monitoring oversight through the following activities:

- Review submitted hazard mitigation planning applications and multi-jurisdictional hazard mitigation plans.
- Assist local/regional jurisdictions and contractors with the development of hazard mitigation plans.
- Act as a liaison between FEMA and the local/regional jurisdictions during the review process.
- Conduct on-site visits and monitor projects to ensure applicants are implementing hazard mitigation plans and project development as planned.

- Review and revise the Nebraska State Hazard Mitigation Plan as needed.

Coordination of the process to monitor progress in plan implementation across the various stakeholders continues to improve the state's ability to address hazards statewide. As the hazards in this plan are unpredictable, the plan will continue to evolve and adapt to current conditions. The mitigation capabilities and implementation will continue to be enhanced through this process.

6.3.1 Incorporating the Plan into Existing Planning Mechanisms

An ongoing responsibility of GTFDR members is to identify additional stakeholders and existing planning mechanisms that can assist in integrating mitigation planning into short- and long-term community development and resiliency planning. This involves establishing hazard mitigation as a state and local planning priority that can be supported through the same capabilities defined in **Section 4.3**.

- Planning and Regulatory
- Administrative and Technical
- Smart Growth
- Fiscal and Resources
- Education and Outreach

Each step in the planning cycle includes ongoing opportunities to identify existing planning processes that provide a platform for integration of hazard mitigation planning. Each annual review of the plan will include an analysis of how the mitigation plan has been incorporated into existing planning mechanisms.

ATTACHMENT A: MITIGATION ACTION PROGRESS REPORT FORM

As a step in the monitoring process for the plan, the following form will be used to collect current information related to mitigation actions included in the current plan.

Mitigation Action Progress Report Form

Progress Report Period	**From Date:**	**To Date:**
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	□ Project Completed □ Project deleted □ Project in progress □ Anticipated completion date _____ □Project delayed Explain: _____	

Summary of Progress on Current Project for this Report Period

1. What was accomplished for this project during this reporting period?

2. What obstacles, problems or delays did the project encounter?

3. If uncompleted, is the project still relevant? Should the project be changed or revised?

4. Other comments

ATTACHMENT B: PLAN EVALUATION CHECKLIST

GOAL/OBJECTIVE	Address Current Needs?	
	Yes	No
GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.		
Objective 1.1 – Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.		
Objective 1.2 – Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.		
Objective 1.3 – Promote and support policy-making that protects or excludes human habitation in flood zones or other hazard-prone areas.		
Objective 1.4 – Provide backup power to critical facilities/infrastructure		
Objective 1.5 – Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.		
Goal 2: Reduce or eliminate long-term risk to property, including critical facilities and infrastructure, historic, and private property		
Objective 2.1 – Promote hazard insurance opportunities for homeowners, renters, and businesses, including flood coverage under the National Flood Insurance Program (NFIP).		
Objective 2.2 – Provide counties/communities with technical assistance on acquisition, retrofit, or relocation of repetitive loss properties from flood-prone areas in the state.		
Objective 2.3 – Promote resilient and sustainable building to reduce vulnerabilities, encouraging the use of green and natural infrastructure, when appropriate.		
Objective 2.4 – Identify opportunities to mitigate vulnerable critical infrastructure, such as utilities, roads and bridges, and other Lifeline-related facilities.		
GOAL 3 – Maintain public education and awareness activities		
Objective 3.1 – Offer trainings about hazard awareness, mitigation planning and grants, and how to incorporate mitigation into ongoing program functions.		
Objective 3.2 – Reduce the impact of hazards on at-risk and vulnerable populations through education and awareness programs.		

Objective 3.3 - Improve systems that provide warning, awareness, and emergency communication.		
Objective 3.4 - Conduct education and awareness programs for flood mitigation planning and funding assistance.		
GOAL 4: Encourage the development and implementation of long-term, cost effective, and resilient mitigation projects that preserve or restore the functions of natural systems.		
Objective 4.1 - Encourage the use of green and natural infrastructure for mitigation projects, when applicable.		
Objective 4.2 - Provide technical assistance to communities and stakeholders in the application and implementation of mitigation projects that preserve or restore natural systems.		
Objective 4.3 - Maintain and encourage ongoing relationships between state and local agencies and federal partners to play an active and vital role in identifying appropriate preservation and restoration of vulnerable natural systems.		
Objective 4.4 - Promote the continued use of natural systems and features, and open space preservation, in land use planning and development by local jurisdictions.		
GOAL 5: Build stronger by promoting mitigation actions that emphasize sustainable construction and design measures to reduce or eliminate the impacts of natural hazards.		
Objective 5.1 - Encourage building and rebuilding practices that address resiliency through higher standards and sustainable design to resist impacts of natural hazards.		
Objective 5.2 - Enhance coordination with state and local agencies that promote resiliency and sustainability.		
Objective 5.3 - Identify sustainable flood and erosion control projects and activities that demonstrate resiliency practices.		
Objective 5.4 - Promote and support the building of safe rooms in areas highly vulnerable to wind damages.		
Objective 5.5 - Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.		

ATTACHMENT C: PLANNING CONSIDERATIONS WORKSHEET

PLANNING CONSIDERATIONS	Address Current Needs?	
	Yes	No
Have the nature or magnitude of the risks identified in the plan changed? If yes, comment below.		
Are the resources adequate for implementing the plan? If no, comment below.		
Have there been any implementation problems such as technical, political, legal or coordination issues with other agencies for the mitigation actions identified? If yes, reference action by selecting "Delayed" on the Project Implementation Worksheet with a comment describing issue in implementation.		
Should personnel/agency changes be made to the MEMA 3 Regional Hazard Mitigation Committee? If yes, provide the name(s) and contact information below.		
Have there been changes to the participating communities' capabilities that improve or impair the progress of the mitigation strategies identified in the plan? If yes, please comment below.		

ATTACHMENT D: MITIGATION ACTION IMPLEMENTATION WORKSHEET

Jurisdiction Name: _____

ACTION (# and Title)	Project Status				Funding			Completion Date	*Comments (Insert comments to support delayed or no longer required.)
	In Progress	Delayed*	Completed	No Longer Required*	Budget	Apply for Grant	Grant Received		

APPENDIX A: Planning Process Documentation

A-1 Engagement Strategy

STATE OF NEBRASKA HAZARD MITIGATION PLAN – 2021 UPDATE

ENGAGEMENT STRATEGY

Purpose:

- Meet requirements of 44 CFR Part 201.4
- Develop ongoing support for the plan and its strategies
- Enhance "buy-in" from state and federal agencies, stakeholders, local jurisdictions, and organizations resulting in greater success in implementing mitigation actions and projects to reduce risk.
- Integrate mitigation planning into state planning and resiliency practices
- Provide an ongoing opportunity for public agencies, non-governmental and community-based organizations, the private sector, and residents to participate in and support mitigation planning, activities, and initiatives.

Participation Tiers:

Tier/Role	Responsibilities	Participation Level	Key Milestones
PlanningGroup (GTFDR) *Governor's Task Force for Disaster Response will make decisions, guide the planning process, and agree upon the final contents of the plan.* • *Designated Agency Representatives* • *NEMA*	Participate in all planning activities; assist in identifying and collecting information and data; identify and assist in the development of projects; coordinate with other agencies; review and approve plan drafts and final plan; participate in plan maintenance	Participation begins with the Kick-Off meeting and continues throughout the plan maintenance cycle.	• Hazard and Risk Analysis • Capabilities Assessment • Mitigation Strategy (goals, objectives, projects) • Draft Plan • Final Plan • Adoption of Plan

Tier/Role	Responsibilities	Participation Level	Key Milestones
Stakeholders/Technical Specialists: *Person, Group, or institution that can affect or be affected by a course of action identified in the mitigation plan:* • *State of Local elected officials and local agencies* • *Regional, State and Federal Agencies* • *Special Districts and Authorities* • *Non-Governmental Organizations* • *Educational Institutions* • *Major Employers* • *Land Use and Development Agencies* • *Professional Associations* • *Neighboring Jurisdictions* • *Historical and Cultural Institutions* • *Access and functional needs agencies or organizations*	Inform the GTFDR on specific topics or provide input from specific points of view • Provide technical assistance and expertise • Provide input on the draft mitigation plan	• Invited to Kick-Off Meeting • Engagement activities (requests for information or participation) • Project development and plan support (resources, partnerships, and technical expertise) • Plan review - comments and input • Plan Maintenance (provide updated information as requested)	• Hazard and Risk Analysis • Capabilities Assessment • Mitigation Strategy (goals, objectives, projects) • Draft Plans • Final Plan
Public: *Become informed about mitigation and community priorities, issues, and opportunities; provide support for the plan and its related activities*	Involvement in the planning process through information sharing and opportunities to provide input.	Respond to opportunities to review and provide input through multiple venues • Media releases • Surveys • Community meetings • Presentations	• Information/media releases • Educational Publications • Surveys • Draft Plans • Final Plan

Engagement Methods and Schedule

Topic/Activity	Method	Participants (1st listed is Lead)	Start Date	End Date	Phase
Kick-off meeting – April 14, 2020	Email invitation for virtual meeting	NEMA, Contractor	03/01/20	03/12/20	P1*
Statewide Risk Assessment	Contractor will coordinate with NEMA to identify and implement methodology	Contractor, NEMA	04/01/20	05/29/20	P2

Topic/Activity	Method	Participants (1st listed is Lead)	Start Date	End Date	Phase
Meeting 2 – Hazard Identification and Risk Assessment – June 23, 2020	(1) Email invitation for virtual meeting with plan section(s) (2) Meeting hosted by NEMA, Contractor presentation; Participant discussion input (3) Follow-up emails and phone calls to non-participating agencies and jurisdictions	Contractor NEMA GTFDR Stakeholders	06/01/20	06/15/20	P2
Agency Meetings	Contractor will coordinate directly with agency representatives to conduct one-on-one virtual meetings	Contractor, GTFDR	[Open]	[Open]	P2
Meeting 3– Strategy 1 July 21,2020	(1) Email invitation for virtual meeting (2) Meeting hosted by NEMA with Contractor presentation; Participant discussion input (3) Contractor Follow-up - emails and phone calls to non-participating agencies	Contractor NEMA GTFDR Stakeholders	06/15/20	06/30/20	P3
Agency Meetings	Contractor will coordinate directly with agency representatives to conduct one-on-one virtual meetings	Contractor, GTFDR	[Open]	[Open]	P2
Meeting 4 - Strategy 2 August 21, 2020	(1) Email invitation for virtual meeting with plan section(s) (2) Meeting hosted by NEMA, Contractor presentation; Participant discussion input (3) Contractor Follow-up - emails and phone calls to non-participating agencies	Contractor NEMA GTFDR Stakeholders	06/30/20	07/15/20	P3
Agency Meetings	Contractor will coordinate directly with agency representatives to conduct one-on-one virtual meetings	Contractor, GTFDR	[Open]	[Open]	P2
Meeting 5– Plan Review Process – October 1, 2020	Email invitation for virtual meeting with plan section(s) review comment sheets	Contractor NEMA GTFDR Stakeholders	7/15/20	8/15/20	P4
Agency Meetings	Contractor will coordinate directly with agency representatives to conduct one-on-one virtual meetings	Contractor, GTFDR	[Open]	[Open]	P2
Meeting 6 – Final Draft Plan Review October 2020	Email invitation for virtual meeting with plan section(s) and Review Comment Sheet	Contractor NEMA GTFDR Stakeholders	08/15/20	08/31/20	P5

Topic/Activity	Method	Participants (1st listed is Lead)	Start Date	End Date	Phase
Final Plan Review	Email distribution of Final Plan	Contractor NEMA GTFDR Stakeholders	08/31/20	09/30/20	P5
Adopted Plan	Email distribution of Executive Order Adopting the plan	NEMA GTFDR Stakeholders Contractor	10/01/20	12/31/20	P5
Plan Maintenance Cycle	Implement plan monitoring, evaluation and update process: (1) *Email SHMP updates, notification of funding availability* *(2) Conduct semi-annual meetings, at a minimum* *(3) Conduct annual hazard and project progress updates* *(4) Ensure participation and plan integration with other planning processes*	NEMA, [Contractor] GTFDR Stakeholders	[Upon FEMA final approval]	2026	O

Phase: P1 = Planning Process; P2 = Risk and Vulnerability Assessment; P3 = Mitigation Strategy; P4 = Plan Review, Maintenance, Adoption and Approval; P5 + Finalize the Plan; O= Outside scope of current contract

Documentation of Engagement [Template]

Planning Process Participation				Meeting 1	Agency Meeting	Meeting 2	Meeting 3	Meeting 4	Input – Initial Plan Review	[Other]	{Other]		
Role	**Agency**	**Representative**											
		Name	***Title***										
[GTFDR]													
[Stakeholder]													

GTFDR Virtual Meeting Format

Date: _____

Agency: _____

Participants: _____

Phase	Data/Information	Action	Date Completed
2	Risk Assessment -Impacts & Consequences	Survey - Review hazard list and provide input	
2	Data Needs and Analysis	1) Provide data and source 2) Review and verify data	
2	Vulnerability – state assets; jurisdictions at most risk	1) Provide data and source 2) Review and verify data 3) Define Problem Statement(s)	
3	Capability assessment (policies, plans, programs, projects) • Capabilities that support locals and tribes	Provide data and source	
3	Goals and Objectives	Review and provide input	
3	Mitigation Actions • State assets • Critical infrastructure	Identify actions/status (previous, existing or new) Assist in project scope development Potential cost Potential funding source(s)	
4	Plan Implementation	Discuss - how agency implements policies, plans, programs and projects	

Designated GTFDR Agencies[1]:

- Nebraska Natural Resources Commission [Department of Natural Resources]
- Nebraska Civil Defense Agency [Emergency Management Agency]
- Department of Health [and Human Services]
- ~~Department of Social Services~~ [merged into Department of Health and Human Services]
- Department of Economic Development [and Housing and Community Development Div.]
- ~~Department of Public Institutions~~ [Merged with Department of Health and Human Services]
- Department of Environmental Quality [Environment and Energy?]
- Department of Agriculture
- Department of Labor
- ~~Department on Aging~~ [Merged into Department of Health and Human Services]
- Department of Administrative Services
- Historical Society

[1] State of Nebraska, Executive Order 94-3

Requested GTFDR Agencies[2]:

- U.S. Army Corps of Engineers, Omaha District and Kansas City District
- U.S. Department of Agriculture State Emergency Board
- FEMA
- U.S. Department of Housing and Urban Development
- U.S. Environmental Protection Agency

Stakeholders:

- Nebraska Department of Education
- Nebraska Department of Transportation
- Nebraska Extension Service
- Nebraska Games and Parks Commission
- Nebraska Association of County Officials
- Public Power Districts
- University of Nebraska - Lincoln
- U.S. Department of Agriculture

[2] State of Nebraska, Executive Order 94-3

A-2: Record of Participation

Name	Title/Agency	Project Kick-Off Meeting	Plan Kick-Off Meeting	HIRA Meeting	Mitigation Strategy I Meeting	Core Planning Team - Update	Mitigation Strategy II Meeting	Plan Review/Approval Meeting	Technical Assistance/Data	Plan Section Review/Input	[Other]
Molly Bargmann	Recovery Section Manager, NEMA	√	√	√	√	√	√		√	√	
Samantha Bartz	Emergency Mgmt. Coordinator/USDOI, Bur. of Reclamation		√								
Scott Bell	Safety & Occu. Health Spec./U.S. DOI, Bureau of Reclamation		√								
John Cannon	Deputy Director/NACO		√	√	√						
Joe Chandler	Hazard Mitigation Planning Lead/FEMA Region VII		√				√				
Donny Christensen	Recovery Section Administrator/NEMA	√	√	√	√	√	√		√	√	
Patrick Conway	Public Assistance Officer/NEMA		√								
John Cook	Planning Specialist, Recovery Section/NEMA		√	√	√	√	√		√	√	
Chelsea Cramer	Program Manager of Emergencies & Investigations/USDA		√								
Neil Dominy	Assistant State Conservations/USDA NRCS		√							√	
James Dukesherer	Community Relations/NREA			√	√		√		√	√	
Leslie Durr	State Contract Manager/DAS	√		√	√						
Allen Dutcher	Climatologist/UNL, Nebraska Extension		√								
Jeffrey Edwards	Environ. Quality Div. Section Supervisor/NDEE				√						
Joe Francis	Environ. Quality Div. Administrator/NDEE				√		√				
John Gassmann	State Hazard Mitigation Officer/NEMA	√	√	√		√	√		√	√	
Joe Green	Hazard Mitigation Planning Specialist/NEMA		√	√	√	√			√	√	
Casey Hartline	Hazard Mitigation Grant Mgmt. Specialist/FEMA Region VII				√						
Emily Hatcher	Community Coordination Officer/FEMA	√	√								
Lexy Hindt	Deputy State Hazard Mitigation Officer/NEMA	√	√	√	√	√	√		√	√	
Matthew Holte	Nebraska Forestry Service								√		
Earl Imler	Ops & Preparedness Section Manager/NEMA				√						
Cory Knutson	National Drought Mitigation Center								√		

Name	Title/Agency	Project Kick-Off Meeting	Plan Kick-Off Meeting	HIRA Meeting	Mitigation Strategy I Meeting	Core Planning Team - Update	Mitigation Strategy II Meeting	Plan Review/Approval Meeting	Technical Assistance/Data	Plan Section Review/Input	[Other]
Tony Krause	Flood Risk & Floodplain Management/USACE		√		√						
TJ Kripal	Highway Emergency Program Specialist/NDOT		√								
Hannah Jones	Assistant Division Administrator/ NG&PC		√		√					√	
Jim Macy	Director/NDEQ		√		√						
Lynn Marienau	Communications Director/LNM										
Jenny Mason	Community Development Coordinator/NDED		√								
Terri Mayer	Hazard Mitigation Program/FEMA Region VII		√								
Denise Meeks	Community Program Manager, Rural Development/USDA		√								
Tom Morey	Project Manager/Stantec		√								
Mike Moritz	Warning Coordinator Meteorologist/NOAA/NWS		√								
Brandon Myers	Director, Region 51, EMA		√								
Collin Olsen	Director, Risk Management Agency, USDA		√								
Adele Phillips	Natural Resources Planner Coordinator /NeDNR	√	√	√							
Leah Pope	Hydrologist/NWS-MO Basin River Forecast Center		√								
Bruce Range	Director/Nebraska Department of Insurance		√								
Simone Rock	Hydraulic Engineer/USACE		√	√	√				√		
Earl Redrick	Field Office Director, USHUD		√								
Katie Ringland	Chief, Floodplain Management, NeDNR	√	√	√		√			√	√	
Mark Robertson	Emergency Management Director/University of Nebraska-Lincoln		√								
Tom Sands	Operations Division Manager/NDOT				√		√				
Jessica Scharf	Recovery Planning Specialist/NEMA			√							
Chris Schroeder	Long-Term Recovery Specialist/NEMA		√	√							
Allen Simpson	Risk Manager/NDAS								√		
McKenzie Slack	Hazard Mitigation Planning Specialist/NEMA		√		√						
Brian Smith	Warning Coordination Meteorologist/NOAA/NWS		√						√	√	

Name	Title/Agency	Project Kick-Off Meeting	Plan Kick-Off Meeting	HIRA Meeting	Mitigation Strategy I Meeting	Core Planning Team - Update	Mitigation Strategy II Meeting	Plan Review/Approval Meeting	Technical Assistance/Data	Plan Section Review/Input	[Other]
Kelly Smith	National Drought Mitigation Center								√		
Mike Sousek	General Manager/Lower Elkhorn NRD		√								
Heather Thole	Hazard Mitigation Planning Specialist/NEMA		√	√	√	√	√		√	√	
Brian Tuma	Assistant Director/NEMA	√	√	√							
David Varner	Associate Director/UNL Nebraska Extension		√						√		
Michael S. Wilson	Antiterrorism Program Coordinator/Nebraska National Guard								√	√	
Brian Woltz	Acting Hazard Mitigation Assistance Branch Chief /FEMA Region VII		√	√	√						
Michelle Wolf	Mitigation Planner/FEMA Region VII		√						√		
Russ Wren	Emergency Response Coordinator/NDHHS		√		√				√		

A-3 – Planning Meetings and Engagement Documentation

2021 Nebraska State Hazard Mitigation Plan Update
Project Team - Initial Meeting

Nebraska Emergency Management Agency
2:00 p.m., March 12, 2020

MEETING MINUTES

Project Team Participants:

Name (Last, First)	Title	Agency	Email
Program			
Bargmann, Molly	Section Manager	NEMA	Molly.bargmann@nebraska.gov
Christensen, Donny	Section Admin.	NEMA	Donny.christensen@nebraska.gov
Durr, Leslie	State Contract Manager	DAS	Leslie.durr@nebraska.gov
Hindt, Lexy	Deputy SHMO	NEMA	Lexy.hindt@nebraska.gov
Phillips, Adele	Mitigation Planner	NDNR	Adele.phillips@nebraska.gov
Ringland, Katie	Floodplain Management	NDNR	Katie.ringland@nebraska.gov
Tuma, Bryan	Asst. Director	NEMA	Bryan.tuma@nebraska.gov
Contractor			
Freeman, Nancy	Sr. Mitigation Planner	IEM	Nancy.Freeman@iem.com
Hascall, Sheila	Mgr., Mitigation Programs	IEM	Sheila.Hascall@iem.com
Rogers, Miranda	Deputy Project Manager	IEM	Miranda.Rogers@iem.com
Scronce, Gary	Executive Liaison	IEM	Gary.Scronce@iem.com

Following introductions, Nancy Freeman, Project Lead, facilitated a discussion of project details, which included the following:

1. **Roles and responsibilities**
    - Project Team/Contractor
        - The Project Team, consisting of NEMA and other agency representatives as designated by NEMA, and members of the Contractor Team (IEM) will jointly be the "Project Team" and will coordinate all aspects of the project, including oversight of all tasks defined and described in the approved Work Plan.
    - Planning Group - Governor's Disaster Response Task Force (GDRFT)
        - The GDRTF is designated as the Planning Group to support data and information collection, validation, and analysis, review of plan sections, development of the mitigation strategy and approval and adoption of the final plan.
    - Stakeholders (SME's, Technical Specialists, NGO's)
        - The stakeholder group will consist of subject matter experts and technical specialists who will assist in identifying data sources, providing contextual

information for the plan and supporting development of specific mitigation actions.
    - Specific SMEs referenced – Parks; Transportation; Buildings; Nebraska Investment Finance Authority (mostly affordable housing); education (University of Nebraska/Lincoln, Mid-America Transportation Center); Tribal Nations; Public Power Districts; and Nebraska Rural Electric; Climate Assessment & Resilience Committee
- Private Sector/NGO's
    - Nebraska Public Preparedness Partnership (PNP); special interest groups (environment, historic preservation, etc.)
- Contract Management
    - Leslie Durr, DAS, described her role as the Contract Manager to oversee the project funded under HMGP (#4420)
    - NEMA will send QPR's to Sheila Hascall

2. **Work Plan - Project Phases, Tasks and Milestones/Schedule**
    - Phase 1: Planning Process and Resources
        - Contacts
        - Integration with other state planning efforts
    - Phase 2: Hazard Risk and Vulnerability Assessment
        - Review and Update Asset Inventory
        - Data Sources/GIS
        - Vulnerability assessments
            1. Jurisdictions at highest risk
            2. State assets at highest risk
    - Phase 3: Hazard Mitigation Strategy
        - Capabilities Assessment
        - Mitigation Goals/Objectives
        - Mitigation Actions
        - Assessment of Local Plan status, hazards, capabilities, actions, etc.
    - Phase 4: Plan Review, Maintenance, Adoption and Approval
        - Plan Writing and Initial Draft
    - Phase 5 – Final Plan Review, Adoption, and Approval

Ms. Freeman asked for comments and suggested changes to the Work Plan. No additional adjustments to the plan were suggested, so the Work Plan will stand as the Final and she will disseminate it by March 17, 2020.

3. **Meeting Schedule and Formats**
    - Kick-Off Meeting
    - Hazard Identification, Risk Assessment and Vulnerability Analysis
    - Mitigation Strategy Workshop
        - Capabilities Assessment
        - Goals/Objectives, Actions/Priorities, Implementation & Progress
    - Initial Draft Review and Approval

Ms. Freeman presented the proposed meeting schedule. April 8, 2020 at 9:30 a.m., at NEMA, was selected as the date of the Kick-Off Meeting for the Planning Group and invited stakeholders; however, the format will be decided at a later date, pending development of the corona virus threat. As an option, a webinar may be presented. Formats for follow-up meetings will be determined at a later date.

4. **Admin/Logistics**
    - Discussion of reporting schedule and Points of Contact (POCs).
        - Donny Christensen, Molly Bargmann and Lexy Hindt will be the POCs for NEMA. (New SHMO will be added once in place.) Nancy Freeman will be the POC for the Contractor Team in relation to Work Plan progress and day-to-day tasks. Sheila Hascall will be the POC in relation to Contract status.
        - The Contractor Team will maintain Weekly Task Reports of team activities that will be shared with the NEMA POCs. *[Beginning the week of 3/23/2020]*
        - The Contractor Team will provide monthly reports to highlight tasks completed during the previous month.
        - IEM will provide a project SharePoint site that can be accessed by the Project Team.

2021 Nebraska State Hazard Mitigation Plan Update
Hazard Identification and Risk Assessment Meeting

Nebraska Emergency Management Agency
June 23, 2020, 1:00 p.m.

MEETING MINUTES

Planning Team Participants:

Name (Last, First)	Title	Agency	Email
Program			
Bargmann, Molly	Section Manager	NEMA	Molly.bargmann@nebraska.gov
Cannon, Jon	Deputy Director	NACO	jdukesherer@nrea.org
Christensen, Donny	Section Admin.	NEMA	Donny.christensen@nebraska.gov
Cook, John	Planning Specialist	NEMA	John.cook@nebraska.gov
Curran, Dan	Deputy Director	DED	Dan.curran@nebraska.gov
Dukesherer, James	Community Relations	NREA	jdukesherer@nrea.org
Durr, Leslie	State Contract Manager	DAS	Leslie.durr@nebraska.gov
Gassmann, John	SHMO	NEMA	John.glassmann@nebraska.gov
Green, Joseph	Planning Specialist	NEMA	Joseph.green@nebraska.gov
Hartline, Casey	HMA	FEMA-RVII	Casey.hartline@fema.dhs.gov
Hindt, Lexy	Deputy SHMO	NEMA	Lexy.hindt@nebraska.gov
Krause, Tony		USACE	Tony.d.krause@usace.army.mil
Phillips, Adele	Mitigation Planner	NDNR	Adele.phillips@nebraska.gov
Ringland, Katie	Floodplain Management	NDNR	Katie.ringland@nebraska.gov
Rock, Simone		USACE	Simone.a.rock@usace.army.mil
Scharf, Jessica	Recovery Planning Spec.	NEMA	Jessica.scharf@nebraska.gov
Schroeder, Chris	Long-Term Recovery Specialist	NEMA	Chris.schroeder@nebraska.gov
Thole, Heather	HM Planning Specialist	NEMA	Heather.thole@nebraska.gov
Tuma, Bryan	Asst. Director	NEMA	Bryan.tuma@nebraska.gov
Woltz, Brian		FEMA RVII	Brian.woltz@fema.dhs.gov
Contractor			
Freeman, Nancy	Sr. Mitigation Planner	IEM	Nancy.Freeman@iem.com
Hascall, Sheila	Mgr., Mitigation Programs	IEM	Sheila.Hascall@iem.com
Spaulding, Barbara	Sr. Mitigation Planner	IEM	Barbara.Spaulding@iem.com

AGENDA AND MEETING NOTES

Meeting Format: [INSTRUCTIONS FOR VIRTUAL MEETING]

1) Introductions & Comments - **John Gassmann, NEMA, opened the meeting and described the format for the virtual meeting, including the companion Word document that would be used in parallel with the PowerPoint slides.**

2) Project Status Update – John summarized what has been accomplished to date.

3) Hazard Identification and Risk Assessment - Nancy Freeman, IEM, initiated the HIRA presentation, explaining the Process and initial consideration of all hazards from the 2019 and 2014 SHMPs, as well as the Statewide Hazard/Risk Assessment conducted by NEMA in June 2020.

    a) Hazard Profiles – Nancy described how each hazard identified as a hazard of concern would be profiled in the plan, to include location, extent, previous occurrences, probability of future events, potential impacts of climate change and development, vulnerability of state assets and vulnerabilities identified in Local Hazard Mitigation Plans (LHMP)

    b) Risk Assessment – This will address the potential for impacts from each hazard in relation to people, property, program operations, continuity of services, environment, economy, and public confidence in governance.

    c) Hazards for Final Consideration – Nancy explained how the final proposed list of hazards was selected. The Planning Committee will approve this list at the end of today's meeting.

    d) Vulnerability Analysis – This covers the broad scope of state assets in addition to specific local vulnerabilities described in LHMPs.

    e) Problem Statements – The vulnerabilities identified for each hazard will provide the foundation for developing problem or issue statements for each hazard. These statements will be used to ensure that the mitigation strategy is inclusive for all hazards of concern.

4) Next Steps

    a. Complete outreach to Discipline-specific partners for reviews of hazard sections

        i. Incorporate feedback into Initial Draft for FEMA review – This is already underway and will continue until the Initial Draft of each hazard section is complete.

    b. Capability Assessment – This has been started and will continue through the mitigation strategy development.

    c. Public Power District Annexes – A template is in development for use by the PPDs to build their plans/annexes. Anticipated completion of the template is July.

5) Approval of 2021 Hazards – Several comments were received during the meeting that the GTFDR felt should be included in the list. The 2021 hazards list was approved as amended.
6) Questions, Issues, or Concerns – No additional comments or questions.

Attachments:

- HIRA PowerPoint and Companion Word Document (combined) for June 23, 2020 meeting

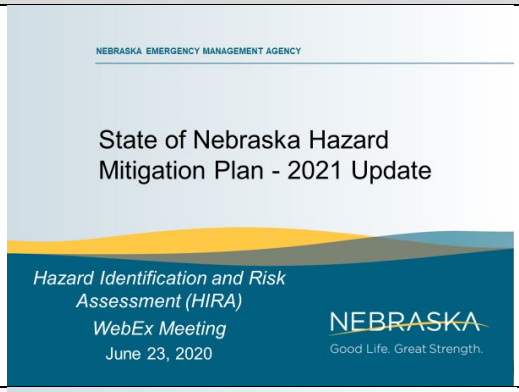
STATE OF NEBRASKA HAZARD MITIGATION PLAN – 2021 UPDATE

Hazard Identification and Risk Assessment (HIRA) Meeting/WebEx

Date: June 23, 2020

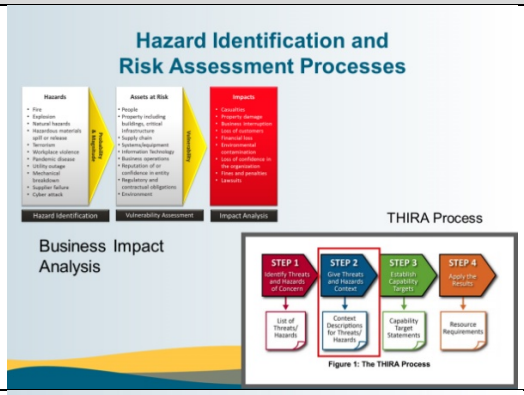
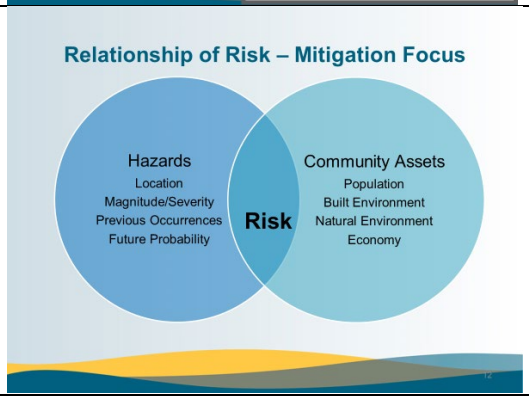
HIRA WORKSHEET

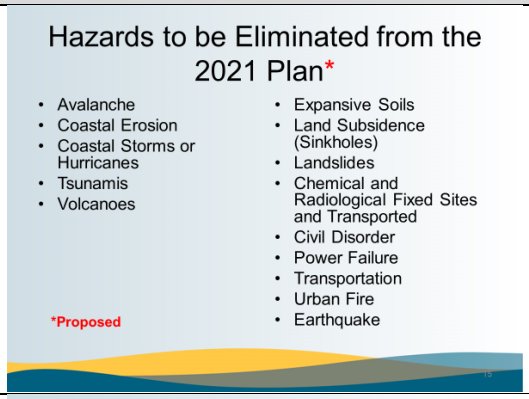
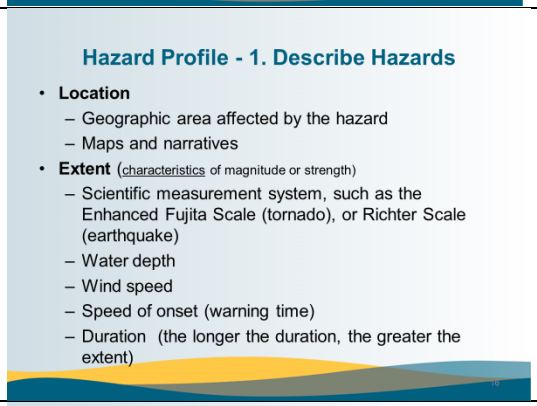
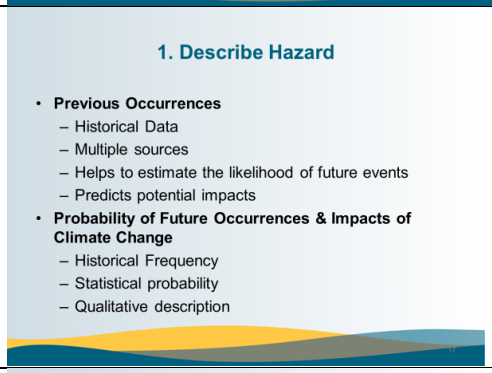
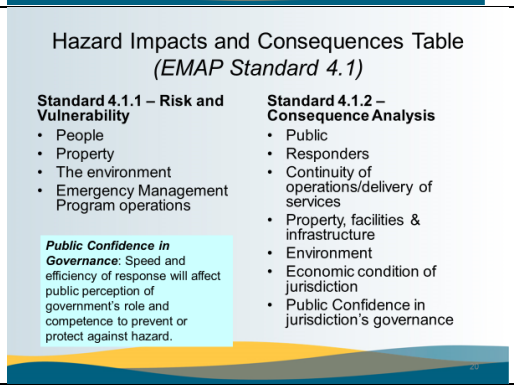
Instructions: The slides in this worksheet follow the WebEx presentation for this meeting. Some slides are provided as "Information Only" on the topics noted and require no response. Other slides will present information or data gathered during the 2021 risk assessment process and require your response. During the presentation, please answer the questions provided in the box to the right of the slides. You may request or provide additional information or ask questions during the online meeting if clarification is needed.

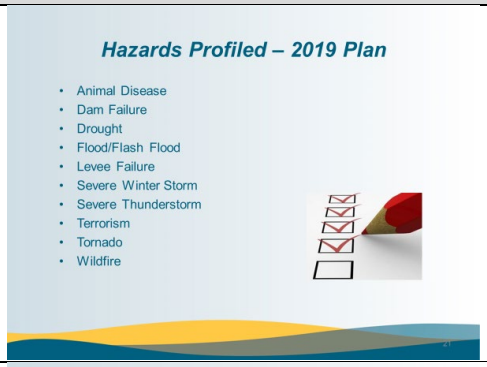
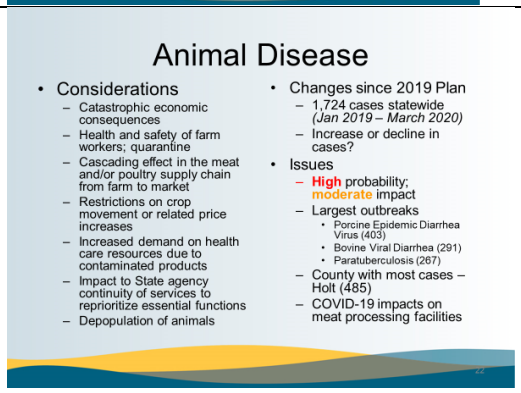
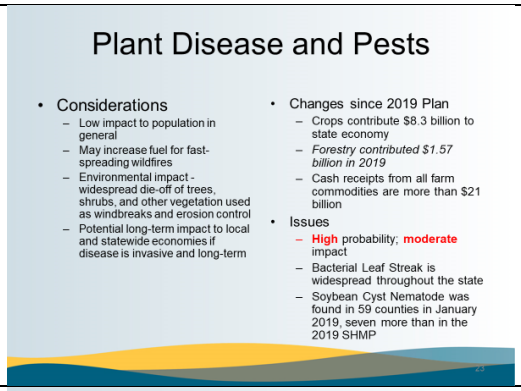
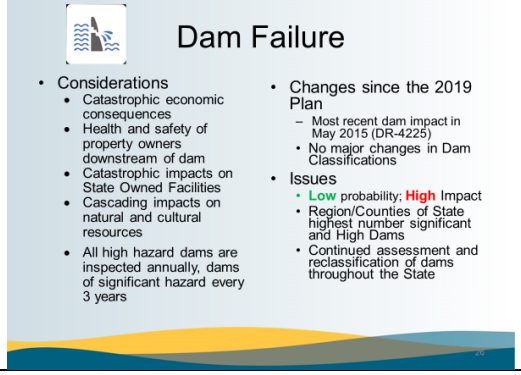
Slide #	Response Required
1 	*[Information only – Welcome and Introductions]*
2 	*[Information only - Agenda]*

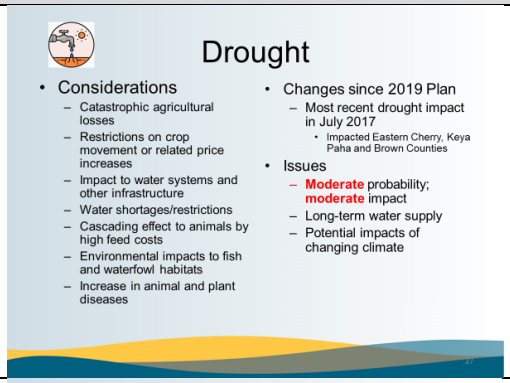
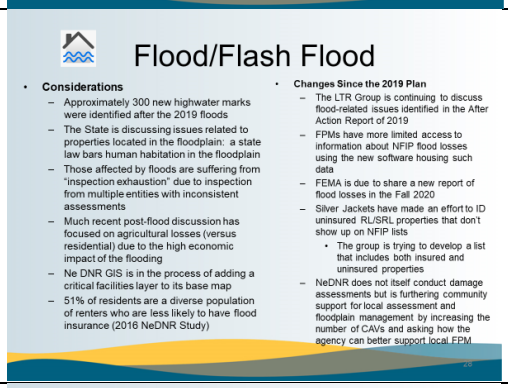
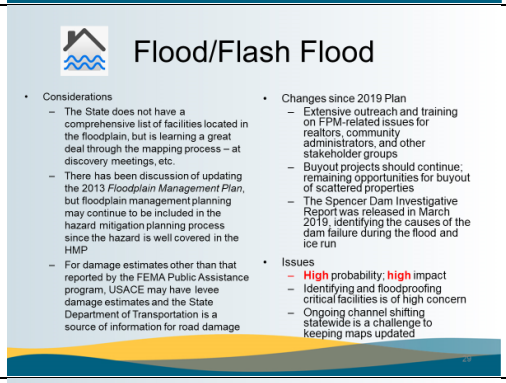
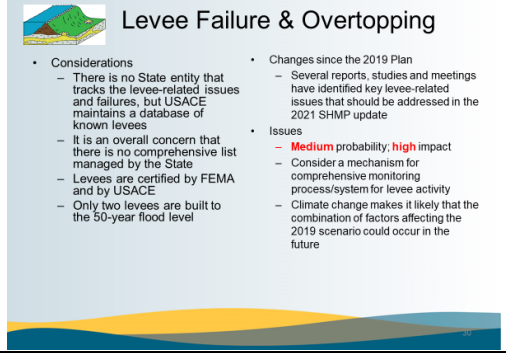
Slide #		Response Required
3	**Today's Outcome** 1. **Review the comprehensive list of hazards** • Review previous and current hazard occurrences and updated risk and vulnerability data 2. **Approve the list of hazards to be profiled in the 2021 SHMP** 3. **Identify additional sources for hazard and risk information** 4. **Incorporate feedback and validate Hazard Profiles**	*[Information only – Objectives]*
4	**Hazard Overview** • FEMA requirements and EMAP Standards • Natural, Technological and Human-caused • Statewide Risk Assessment 	*[Information only - Overview]*
5	**Definitions** • **Natural Hazard** - source of harm or difficulty created by a meteorological, environmental, or geological event • **Technological Hazard** – results from accident or the failure of systems and structures • **Human-Caused Incident or Threat** – results from intentional actions of an adversary • **Community assets** – the people, structures, facilities and systems that have value to the community	*[Information only - Overview]*
6	**Definitions** • **Impact** – The consequences or effects of the 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 – *Assets at Risk*: • People • Built Environment • Natural Environment • Economy	*[Information only - Overview]*

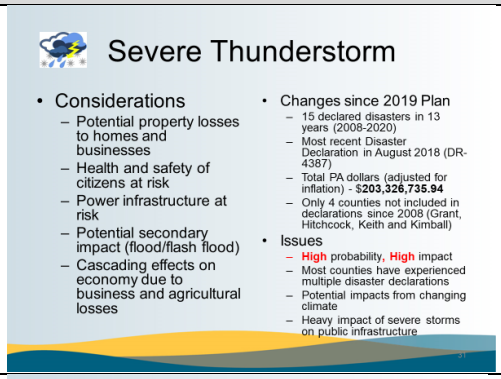
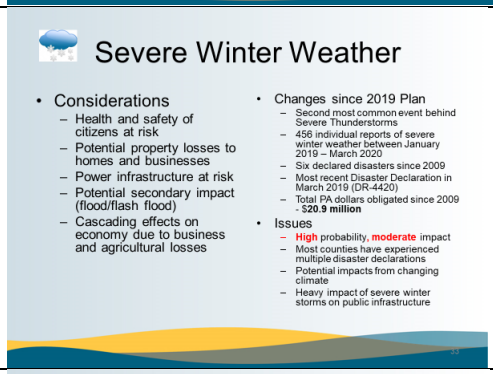
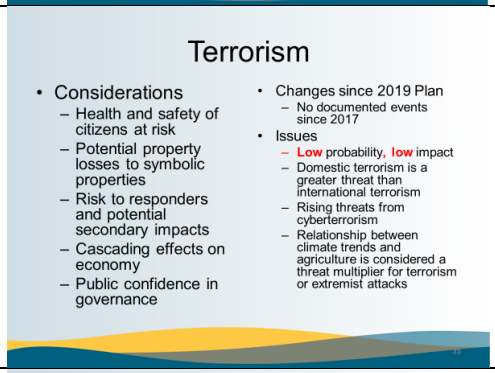
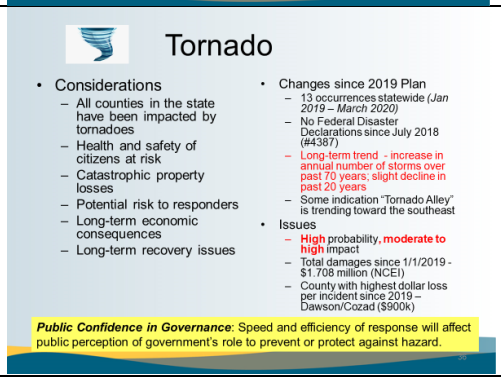
Slide #		Response Required
7	**Definitions** • **At-Risk Populations** – Individuals who may need additional assistance before, during or after a disaster in order to maintain or stabilize functional needs or activities of daily living (special medical needs, vision-impaired, dialysis-dependent, etc.) • **Vulnerable Populations** – Individuals who, due to increased risk based on their living situations may be more severely impacted by the effects of a disaster (residents in flood-zones, sub-standard housing, transient population, migrant workers, transportation-dependent, etc.)	*[Information only - Overview]*
8	**Definitions** • **Vulnerability** - characteristics of community assets that make them susceptible to damage or impact from a given hazard – ***Measures of vulnerability*** • ***Quantitative – assigns values to measure the potential losses to the assets at risk.*** *(i.e.,* types, number, and total value of existing buildings, infrastructure and critical facilities in a hazard area) • ***Qualitative*** – description of the types of impacts that might occur during a hazard event	*[Information only - Overview]*
9	 • Hazard, Type • Impact/ Consequence • Risk • Vulnerability **Example: Hazard Risk and Vulnerability Assessment**	*[Discussion]*
10	HIRA PROCESS Step 1 • Identify and Describe Hazards Step 2 • Identify Assets Step 3 • Analyze Risk Step 4 • Summarize Vulnerability	*[Information only - Process]*

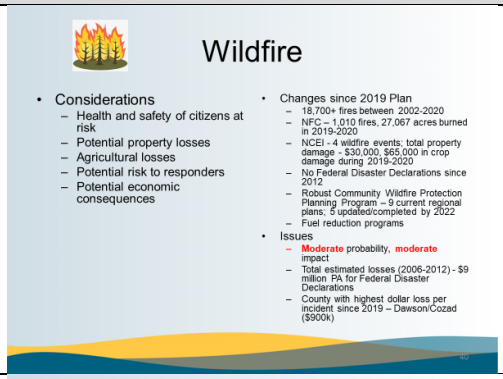
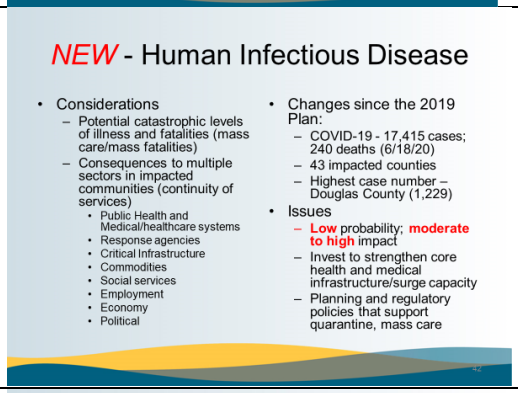
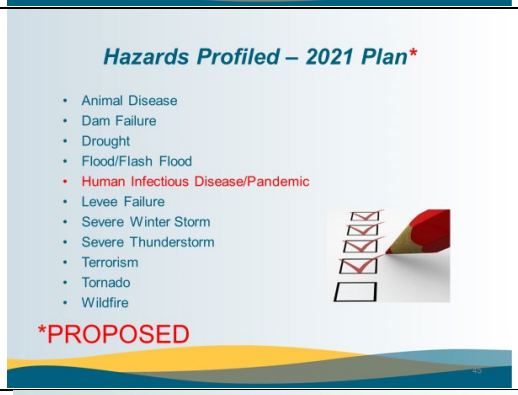
Slide #		Response Required
11		*[Information only – Sample All-Hazard HIRA processes]*
12		*[Information only – Description of HIRA process for mitigation planning]*
13		*[Information only]*
14		*[Information only – Initial Hazards List]*

Slide #		Response Required
15		1. Do you agree that the hazards in this list should **not** be included in the 2021 update? Yes_____ No _____ 2. If you disagree, which of these hazards should be considered for inclusion in the 2021 SHMP update? _____ Provide justification statement: _____
16		*[Information – Hazard profiles included in the 2019 plan]*
17-19		*[Information – Hazard profiles included in the 2019 plan]*
20		*[Information – EMAP compliance]*

Slide #		Response Required
21		*[Information – EMAP compliance]*
22		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
23-25		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
26		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?

Slide #		Response Required
27		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
28		[Questions on next slide.]
29		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
30		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?

Slide #		Response Required
31-32		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
33-34		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
35		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
36-39		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?

Slide #		Response Required
40-41		1. Does this information represent the current hazard risk level? Yes_____ No_____ 2. What additional data or information should be added? 3. What is the source for this information? 4. Are there other issues that should be considered?
42-44		1. Should the 2021 SHMP Update include Human Infectious Disease (Pandemic) as a hazard? YES _____ No_____ 2. What additional data or information should be added? _____ 3. What is the source for this information? _____ 4. Are there other issues that should be considered? _____
45		1. Do you concur with this list of hazards? 2. If not, provide an explanation.
46		*[Information only – Findings from Statewide Hazard Assessment.]*

Slide #		Response Required
47	**Local Plan Hazard Rankings** • Data Collection – Survey of hazards identified within Local Plans – Community Assets at Risk – Capabilities – Problem Statements (linked to hazard risk) • Priority Issues – Alignment with state's mitigation goals and objectives – Local project support	*[Information only]*
48	**Additional Vulnerability Analysis** • State Assets Data • GIS mapping • New Data • New Sources 	*[Information only.]*
49	**Summarize Vulnerability** • **Risk Problem Statements – Issues of Greatest Concern** – Each Priority Hazard – Specific location(s) – Based on analysis of past events, impacts, and losses • Population • Built Environment – Homes – Business and Industry – Critical facilities and infrastructure – Other Community assets • Natural Environment • Economy – Consider impacts from future development and climate change 	*[Information only.]*
50	**Problem Statements** • *What critical facilities are the state's top concerns?* • *What causes the most disruption to the state and it's communities?* • *What have been the most severe impacts to the economy?* • *Is there a specific or vulnerable population impacted by the hazard?* • Hazard-specific Area of Focus – Hazard impacts – Assets at risk – Location and extent – Previous Occurrences – Probability of future occurrences 	*[Information only.]*

Slide #		Response Required
51	Public Power District Annexes • Based on hazard risk assessment, goals and objectives in Basic Plan • Identify: – Assets at Risk – Level of Vulnerability – Capabilities • Develop Mitigation Actions applicable to PPD 	*[Information only – Follow-up will be with PPDs.]*
52	Next Meeting • **Mitigation Strategy Workshop** – **Goals and Objectives** –**Capabilities** –**Action Updates** – ***[TBD]*** 	*[Information only.]*
53	GTFDR Action Required - • **"Adopt the final list of hazards to be profiled in the 2021 SHMP."** 	**GTFDR Action Required:** **– Approve the final list of hazards of highest concern to be profiled in the 2021 State Hazard Mitigation Plan.**
54	Follow-up • Complete HIRA Webinar Worksheet and submit to: Nancy.freeman@iem.com • If you have updated statistical data or information that supports a hazard risk assessment or vulnerability analysis, please contact Nancy Freeman at the email above, or by phone at: 352-572-9325	**Participant Action Required:** Complete HIRA Worksheet and submit to: Nancy.Freeman@iem.com
55	Questions, Comments, Issues	[Wrap-Up]

Please provide Problem Statements (following the points in Slide 50 with as much detail as possible) that should be considered in the 2021 risk assessment:

1.

2.

3.

4.

Participant(s):

Last Name	First Name	Title	Agency	Email	Phone

Date Completed: _____

Submitted by: (Name and Title) _____

2021 Nebraska State Hazard Mitigation Plan Update
Mitigation Strategy 1 Meeting

Nebraska Emergency Management Agency
July 21, 2020, 1:00 p.m.

MEETING MINUTES

Planning Team Participants:

Name (Last, First)	Title	Agency	Email
Program			
Bargmann, Molly	Section Manager	NEMA	Molly.bargmann@nebraska.gov
Cannon, Jon	Deputy Director	NACO	jdukesherer@nrea.org
Christensen, Donny	Section Admin.	NEMA	Donny.christensen@nebraska.gov
Cook, John	Planning Specialist	NEMA	John.cook@nebraska.gov
Dukesherer, James	Community Relations	NREA	jdukesherer@nrea.org
Durr, Leslie	State Contract Manager	DAS	Leslie.durr@nebraska.gov
Edwards, Jeffery		DEE	Jeffery.edwards@nebraska.gov
Francis, Joe		DEE	Joe.francis@nebraska.gov
Gassmann, John	SHMO	NEMA	John.glassmann@nebraska.gov
Green, Joseph	Planning Specialist	NEMA	Joseph.green@nebraska.gov
Hartline, Casey	HMA	FEMA-RVII	Casey.Hartline@fema.dhs.gov
Hindt, Lexy	Deputy SHMO	NEMA	Lexy.hindt@nebraska.gov
Imler, Earl		NEMA	Earl.imler@nebraska.gov
Jones, Hannah	Deputy Director	NG&C	Hannah.jones@nebraska.gov
Macy, Jim		DEE	Casey.Hartline@fema.dhs.gov
Rock, Simone		USACE	Simone.a.rock@usace.army.mil
Sands, Tom		NDOT	Tom.sands@nebraska.gov
Slack, McKenzie		NEMA	Mckenzie.slack@nebraska.gov
Thole, Heather	HM Planning Specialist	NEMA	Heather.thole@nebraska.gov
Woltz, Brian		FEMA RVII	Brian.woltz@fema.dhs.gov
Wren, Russ		NHHS	Russ.Wren@nebraska.gov
(6 additional call-in users participated)			
Contractor			
Freeman, Nancy	Sr. Mitigation Planner	IEM	Nancy.Freeman@iem.com
Spaulding, Barbara	Sr. Mitigation Planner	IEM	Barbara.Spaulding@iem.com
Thompson, Leroy	Sr. Mitigation Planner	IEM	Leroy.Thompson@iem.com

AGENDA AND MEETING NOTES

Meeting Format: [INSTRUCTIONS FOR VIRTUAL MEETING]

7) **Welcome and Comments** – **Lexy Hindt, NEMA, opened the meeting and described the format for the virtual meeting, including the companion Word document that would be used in parallel with the PowerPoint slides.**

8) **Final List of 2021 Hazards** - Nancy Freeman, IEM, initiated the HIRA presentation, explaining the Process and initial consideration of all hazards from the 2019 and 2014 SHMPs, as well as the Statewide Hazard/Risk Assessment conducted by NEMA in June 2020.

   f) Hazard Profiles – Nancy described how each hazard identified as a hazard of concern would be profiled in the plan, to include location, extent, previous occurrences, probability of future events, potential impacts of climate change and development, vulnerability of state assets and vulnerabilities identified in Local Hazard Mitigation Plans (LHMP)

   g) Risk Assessment – This will address the potential for impacts from each hazard in relation to people, property, program operations, continuity of services, environment, economy, and public confidence in governance.

   h) Hazards for Final Consideration – Nancy explained how the final proposed list of hazards was selected. The Planning Committee will approve this list at the end of today's meeting.

   i) Vulnerability Analysis – This covers the broad scope of state assets in addition to specific local vulnerabilities described in LHMPs.

   j) Problem Statements – The vulnerabilities identified for each hazard will provide the foundation for developing problem or issue statements for each hazard. These statements will be used to ensure that the mitigation strategy is inclusive for all hazards of concern.

9) Mitigation Strategy

   a) Goals and Objectives – Nancy presented a revised set of goals and objectives for consideration for the 2021 SHMP update. Goals are structured around the potential type of mitigation actions and objectives are specific to hazard issues. Several comments were made and taken into consideration. Additional comments may be submitted after the meeting. The proposed goals and objectives are:

GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.	
[Objective] 1.1	Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
1.2	Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.
1.3	Promote and support policy-making that protects or excludes human habitation in flood zones or other hazard-prone areas.
1.4	Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.

GOAL 2: Reduce or eliminate long-term risk to property, including critical facilities and infrastructure, historic, and private property.	
2.1	Promote hazard insurance opportunities for homeowners, renters, and businesses, including flood coverage under the National Flood Insurance Program (NFIP).
2.2	Provide counties/communities with technical assistance on acquisition, retrofit, or relocation of repetitive loss properties from flood-prone areas in the state.
2.3	Promote resilient and sustainable building to reduce vulnerabilities, encouraging the use of green and natural infrastructure, when appropriate.
2.4	Identify opportunities to mitigate vulnerable critical infrastructure, such as utilities, roads and bridges, and other Lifeline-related facilities.
GOAL 3: Promote public awareness of hazards and how to reduce their impacts.	
3.1	Offer trainings about hazard awareness, mitigation planning and grants, and how to incorporate mitigation into ongoing program functions.
3.2	Reduce the impact of hazards on at-risk and vulnerable populations through education and awareness programs.
3.3	Improve systems that provide warning, awareness, and emergency communication.
3.4	Conduct education and awareness programs for flood mitigation planning and funding assistance.
GOAL 4: Encourage the development and implementation of long-term, cost effective, and resilient mitigation projects that preserve or restore the functions of natural systems.	
4.1	Encourage the use of green and natural infrastructure for mitigation projects, when applicable.
4.2	Provide technical assistance to communities and stakeholders in the application and implementation of mitigation projects that preserve or restore natural systems.
4.3	Maintain and encourage ongoing relationships between state and local agencies and federal partners to play an active and vital role in identifying appropriate preservation and restoration of vulnerable natural systems.
4.4	Promote the continued use of natural systems and features, and open space preservation, in land use planning and development by local jurisdictions.
GOAL 5: Build stronger by promoting mitigation actions that emphasize sustainable construction and design measures to reduce or eliminate the impacts of natural hazards.	
5.1	Encourage building and rebuilding practices that address resiliency through higher standards and sustainable design to resist impacts of natural hazards.
5.2	Enhance coordination with state and local agencies that promote resiliency and sustainability.
5.3	Identify sustainable flood and erosion control projects and activities that demonstrate resiliency practices.
5.4	Promote and support the building of safe rooms in areas highly vulnerable to wind damages.
5.5	Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.

b) State Capabilities – Nancy presented a summary that addressed capabilities of 15 state agencies and/or quasi-governmental units such as NRDs, PPDs, and UNL

10) Approval of the 2021 Goals and Objectives

a) The GTFDR generally agreed with the revised format and contact, but additional comments received after the meeting will be considered for final approval with amendments, as appropriate.

11) Next Steps

d. Continue review and identification of potential state mitigation actions

e. Continue outreach to Discipline-specific partners to solicit additional hazard problem statements and begin discussion about status of state-level mitigation actions.

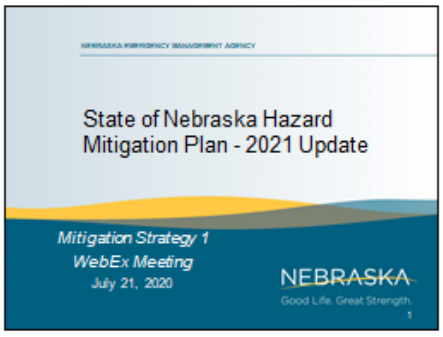
f. Local Capability Assessment – This has been started and will be presented at the Mitigation Strategy II meeting in August.

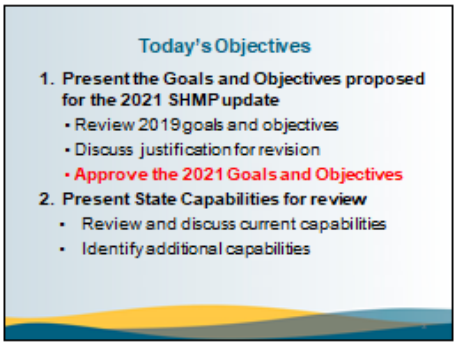
g. Public Power District Annexes – Template development has been delayed, but hopefully to be complete in August.

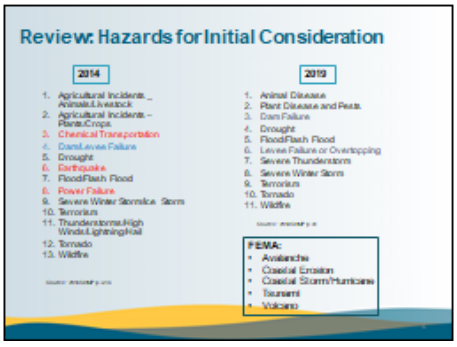
12) Questions, Issues, or Concerns

Attachments:

- Mitigation Strategy 1 PowerPoint for July 21, 2020 meeting
- Mitigation Strategy 1 Word Document Companion for July 21, 2020 meeting







Hazards to be Eliminated from the 2021 Plan*

- Avalanche
- Coastal Erosion
- Coastal Storms or Hurricanes
- Tsunamis
- Volcanoes
- Expansive Soils
- Land Subsidence (Sinkholes)
- Landslides
- ~~Chemical and Radiological Fixed Sites and Transported~~
- Civil Disorder
- ~~Power Failure~~
- Transportation
- Urban Fire
- Earthquake

*Amended following June 23 WebEx meeting

Problem Statements

- *What critical facilities are the state's top concerns?*
- *What causes the most disruption to the state and its communities?*
- *What have been the most severe impacts to the economy?*
- *Is there a specific or vulnerable population impacted by the hazard?*

- Hazard-specific Area of Focus
  - Hazard impacts
  - Assets at risk
  - Location and extent
  - Previous Occurrences
  - Probability of future occurrences

*Hazards Profiled – 2021 Plan**

- Animal Disease
- *Chemical and Radiological Fixed Sites and Transported (minimal profile)*
- Dam Failure
- Drought
- *Extreme Temperature (minimal profile)*
- Flood/Flash Flood
- Human Infectious Disease/Pandemic
- Levee Failure
- Plant Disease and Pests
- *Power Failure (minimal profile)*
- Severe Winter Storm
- Severe Thunderstorm
- Terrorism
- Tornado
- Wildfire

*Amended following June 23 WebEx Meeting

Mitigation Strategy - Definitions

- GOAL
  - General guideline that explain what the jurisdiction wants to achieve with the plan
  - Broad policy and vision statement that also explains what is to be achieved by implementing the mitigation strategy

  EXAMPLE: Minimize new development in hazard-prone areas.
- OBJECTIVE
  - Not required, but help to define or organize mitigation actions
  - Measurable (unlike goals)
  - Connect goals with Mitigation Actions

  EXAMPLE: Reduce the number of vulnerable structures in flood hazard areas.
- MITIGATION ACTION
  - Specific projects and activities that help to achieve the goals

  EXAMPLE: Amend zoning ordinance to permit only open space land uses within floodplains.

Mitigation Strategy Model

Goals – What long-term outcomes do you want to achieve?

Objectives – What measurable, specific actions will reduce risk to hazards?

Actions – What specific projects or initiatives will be taken to address identified hazard risk and vulnerabilities?

2019 Goals and Objectives

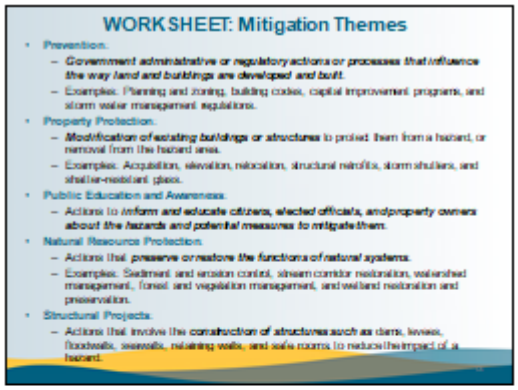
- Goal 2: Reduce or eliminate long term risk to **property** and/or the **environment**.
  - Objective 2.1: Use data from Climate Assessment and Response Committee (CARC) to predict future areas of concern from the ill effects of **drought and climate change**.
  - Objective 2.2: Collaborate with NeDNR to **utilize FEMA funding** to **mitigate against flooding hazards**.
  - Objective 2.3: Improve **transportation infrastructure** to ensure safe passage of people, goods, and services state-wide.
  - Objective 2.4: Provide counties/communities with **technical assistance on repetitive loss** areas and ways to mitigate future damages.
- Goal 3: Promote public awareness of hazards and associated response

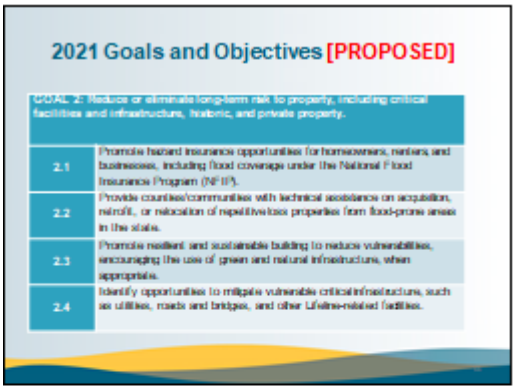
WORKSHEET: 2019 Goals and Objectives

- Goal 1: Reduce or eliminate long term risk to human life.
  - Objective 1.1: Promote and support the building of **safe rooms** in areas highly vulnerable to wind damages.
  - Objective 1.2: Promote and support projects that endeavor to protect or **exclude human habitation in flood zones or areas prone to other hazards**.
  - Objective 1.3: Promote and support **projects** that protect employees, occupants, patients, and students **in public places**.
  - Objective 1.4: Improve **public warning systems** for multiple hazards that may include floods, tornadoes, dam or levee breach/failure, and/or severe storms.
  - Objective 1.5: Reduction or elimination of **power outages** statewide.
  - Objective 1.6: Promote and support **installation of generators or generator connections** to provide back-up power for critical facilities.

Justification for Further Development of Goals and Objectives for 2021

- Provide a more precise framework to link state and local hazard mitigation goals, objectives and actions
- Build goals consistent with FEMA's four primary types of mitigation actions to help align projects and initiatives with federal hazard mitigation funding categories
- Provide specific objectives that address flood mitigation, resiliency of critical infrastructure, and natural systems.


WORKSHEET: Mitigation Themes
Prevention.
– Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
– Examples: Planning and zoning, building codes, capital improvement programs, and storm water management regulations.
Property Protection.
– Modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area.
– Examples: Acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
Public Education and Awareness.
– Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential measures to mitigate them.
Natural Resource Protection.
– Actions that preserve or restore the functions of natural systems.
– Examples: Sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
Structural Projects.
– Actions that involve the construction of structures such as dams, levees, floodwalls, seawalls, retaining walls, and safe rooms to reduce the impact of a hazard.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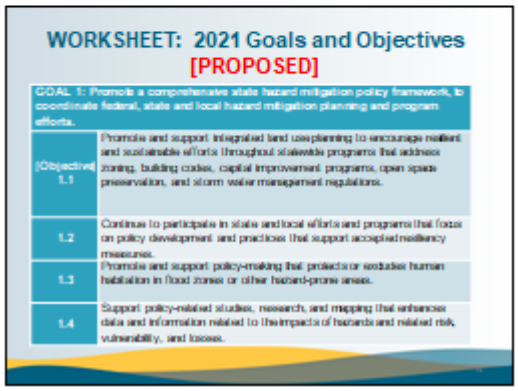
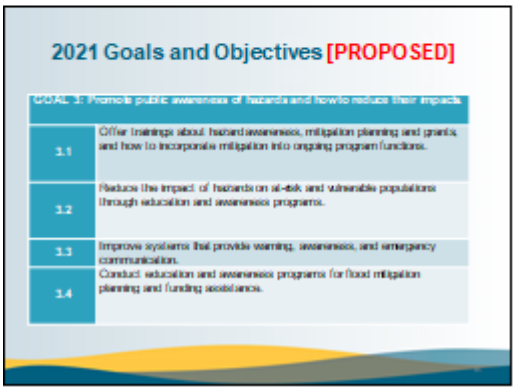

WORKSHEET: 2021 Goals and Objectives [PROPOSED]
GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.
(Objective) 1.1 Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
1.2 Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.
1.3 Promote and support policy-making that protects or excludes human habitation in flood zones or other hazard-prone areas.
1.4 Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.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3.3 Improve systems that provide warning, awareness, and emergency communication.
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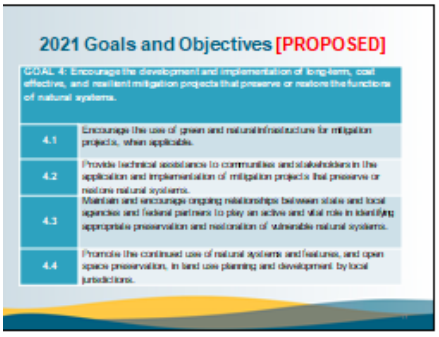
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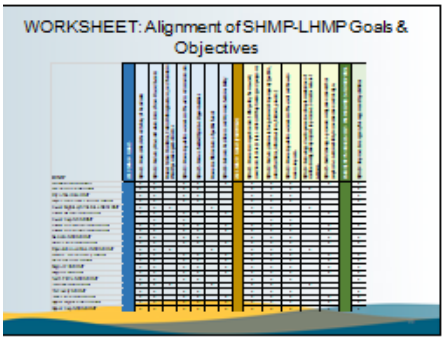
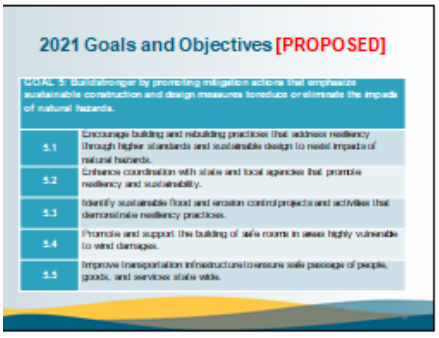

WORKSHEET: Alignment of SHMP-LHMP Goals & Objectives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GOAL 5: Build stronger by promoting mitigation actions that emphasize sustainable construction and design measures to reduce or eliminate the impacts of natural hazards.
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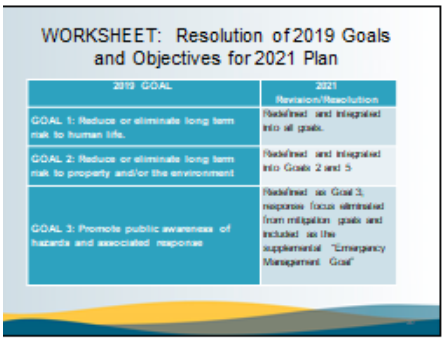
5.2 Enhance coordination with state and local agencies that promote resiliency and sustainability.
5.3 Identify sustainable flood and erosion control projects and activities that demonstrate resiliency practices.
5.4 Promote and support the building of safe rooms in areas highly vulnerable to wind damages.
5.5 Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.


WORKSHEET: Resolution of 2019 Goals and Objectives for 2021 Plan
2019 GOAL
2021 Revision/Resolution
GOAL 1: Reduce or eliminate long term risk to human life.
Redefined and integrated into all goals.
GOAL 2: Reduce or eliminate long term risk to property and/or the environment
Redefined and integrated into Goals 2 and 5
GOAL 3: Promote public awareness of hazards and associated response
Redefined as Goal 3, response focus eliminated from mitigation goals and included as the supplemental "Emergency Management Goal"

RESPONSE REQUESTED

WORKSHEET – Page 5:

RESPONSE REQUESTED: GOALS AND OBJECTIVES

1. **Do you agree** with the recommendation to accept the revised Goals and Objectives as proposed for the 2021 Plan Update?
   YES____ NO____

1. **If you disagree** with the revised Goals and Objectives, as presented, please provide revised text for the related goal/objective in the table below.

GOAL/ OBJECTIVE NUMBER	SUGGESTED REVISION

Pre-Disaster Capabilities

- Compliance/Enforcement Programs
- Education/Public Awareness
- Zoning/Land Use Programs
- Monitor Potential Disasters
- Plans/Planning
- Prevention/Mitigation Projects
- Resource Management
- Technical Assistance
- Training and Exercises
- Risk/Vulnerability Assessment

State Mitigation Capabilities

- Evaluation of:
  - State laws, regulations, policies
  - Programs related to hazard mitigation
  - Development in hazard-prone areas
  - Administration of NFIP, CRS and RiskMAP programs
- Discussion of:
  - State funding capabilities for hazard mitigation projects
    - How the state has used its own funds for HM projects
    - How the state has used FEMA mitigation programs and funding sources, including but not limited to:
      - HMGP, PDM and FAM
      - PA, Categories C-G
- Summary of:
  - Obstacles and challenges
  - Changes since the previous plan approval

Post-Disaster Capabilities

- Long-term recovery/ re-development programs
- Administration of grants and other recovery and/or funding programs
- Local/multi-jurisdictional coordination
- Risk and Vulnerability Assessments

WORKSHEET: Multi-Agency/Multi-Jurisdictional Coordination

- Governor's Task Force for Disaster Response
- Nebraska Silver Jackets
- Nebraska State Emergency Response Commission

WORKSHEET: Capability Support - Federal Agencies

- USDA
  - Farm Service Agency
  - NRCS, EWPP
  - Risk Management
  - Rural Development
- USGS
- DHS-CISA
- USACE
- USFWS
- USHUD
  - CDBG-DR, MIT
- FEMA
  - HMA & BRIC
  - HMP reviews
- NOAA/NWS

WORKSHEET: State Agency/State Entity Capabilities

- NEMA
- NeDNR
- DAS-Risk Management
- DOA
- DED
- DEE
- NFS
- NG&PC
- DHHS
- SHPO
- NDOT
- UNL
- PPDs
- NRDs

WORKSHEET: GTFDR Action Required -

"Confirm the 2021 Goals and Objectives"

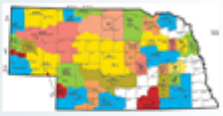
Local Mitigation Capabilities

- State's responsibility to support local and tribal, as applicable, governments with mitigation **planning** through:
  - Training
  - Technical assistance
  - Funding (where available)
- State's consideration of **local and tribal**, as applicable, mitigation **strategies and capabilities** that **inform** and **influence** the state's risk assessment and mitigation priorities
  - Summary of current local/tribal policies, programs and capabilities
  - Effectiveness of same
    - Challenges to implementing mitigation actions through local/tribal capabilities
    - Opportunities for implementing mitigation actions through local/tribal capabilities

Update - Public Power District Annexes

- Based on hazard risk assessment, goals and objectives in Basic Plan
- Identify:
  - Assets at Risk
  - Level of Vulnerability
  - Capabilities
- Develop Mitigation Actions applicable to PPD

- Two PPD Annexes have been submitted, one more in progress
- PDD Annex Template to be completed and distributed to PPDs (estimated July 31)



State's process to support development of approvable local/tribal mitigation plans

- Processes to support developing or updating plans, including:
  - Training
  - Technical assistance
  - Funding
- Summary of:
  - FEMA-approved local/tribal mitigation plan coverage
  - Barriers to developing or updating, adopting and implementing FEMA-approval local/tribal mitigation plans
  - Approach to remove barriers in order to advance local/tribal mitigation planning

Next Meeting

- **Mitigation Strategy II Workshop**
  - **Local Capability Assessment Summary**
  - **Mitigation Actions**
  - **Updates & Progress**
  - **Funding Sources**

Follow-up

- Complete Mitigation Strategy I Webinar Worksheet and submit to:

Nancy.freeman@iem.com

- If you have suggestions for additional objectives, please contact Nancy Freeman at the email above, or by phone at:

352-572-9325

Questions, Comments, Issues, Solutions?

- NEMA – John Gassmann
  John.gassmann@Nebraska.gov
  402-432-0563
- IEM - Nancy Freeman
  Nancy.Freeman@iem.com
  352-572-9325

Mitigation Strategy 1 Meeting/WebEx

Date: July 21, 2020

Mitigation Strategy 1 WORKSHEET

Instructions: The information in this worksheet align with the WebEx presentation for this meeting. Most of the PowerPoint slides are informational; however, you will see some slides that indicate a connection to a table or specific information within this Worksheet. **During the presentation, please answer the questions in red font provided in this worksheet.** You may suggest additional information, or ask questions during the online meeting if clarification is needed.

SECTION 1: GOALS AND OBJECTIVES

SLIDES 10-11: 2019 Goals and Objectives

- **Goal 1: Reduce or eliminate long term risk to human life.**
  - Objective 1.1: Promote and support the building of **safe rooms** in areas highly vulnerable to wind damages.
  - Objective 1.2: Promote and support projects that endeavor to protect or **exclude human habitation in flood zones or areas prone to other hazards.**
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  - Objective 1.5: Reduction or elimination of **power outages** statewide
  - Objective 1.6: Promote and support **installation of generators or generator connections to provide back-up power for critical facilities.**

- **Goal 2: Reduce or eliminate long term risk to property and/or the environment.**

  - Objective 2.1: Use data from Climate Assessment and Response Committee (CARC) to predict future areas of concern from the ill effects of **drought and climate change**.

  - Objective 2.2: Collaborate with NeDNR to **utilize FEMA funding** to **mitigate against flooding hazards**.

  - Objective 2.3: Improve transportation **infrastructure** to ensure safe passage of people, goods, and services state wide.

  - Objective 2.4: Provide counties/communities with **technical assistance on repetitive loss** areas and ways to mitigate future damages.

- **Goal 3: Promote public awareness of hazards and associated response**

SLIDE 13: Mitigation Themes

- **Prevention**: Government ***administrative or regulatory actions or processes that influence the way land and buildings are developed and built***. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation and storm water management regulations.

- **Property Protection**: Actions that involve the ***modification of existing buildings or structures*** to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness**: Actions to ***inform and educate citizens, elected officials, and property owners about the hazards and potential measures to mitigate them***. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection**: Actions that, in addition to minimizing hazard losses, also ***preserve or restore the functions of natural systems***. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Structural Projects**: Actions that involve the ***construction of structures to reduce the impact of a hazard***. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

SLIDES 14-18: 2021 Goals and Objectives [PROPOSED]

GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.	
[Objective] 1.1	Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
1.2	Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.
1.3	Promote and support policy-making that protects or excludes human habitation in flood zones or other hazard-prone areas.
1.4	Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.

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5.5	Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.

SLIDE 19: Alignment of State and Local Goals and Objectives

LHMP	2019 SHMP - GOALS	GOAL 1: Protect Health and Safety of Residents	GOAL 2: Reduce/Prevent Future Losses from Hazard Events	Protect Critical Facilities, Critical Infrasgtructure, and Maintain their Operation post-disaster	GOAL 3: Promote public awareness of hazrds and associated res	GOAL 5: Pursue Multi-Objecitve Opportunities	Promote efficient use of public funds	GOAL 6: Enhance Resilience and Promote Sustainability	2021 SHMP - GOALS (PROPOSED)	GOAL 1: Promote comprehensive SHM policy framework; coordinate federal, state and local HM planning and programs	GOAL 2: Reduce/eliminate long-term risk to property (public, critical facilities, infrastructure, historic, private)	GOAL 3: Promote public awareness of hazards and how to reduce impacts.	GOAL 4: Encourage development and implementation of resilient mitigation projects to preserve or restor natural systems.	GOAL 5: Build stronger - promote mitigation ctions that emphasize sustainability in construction and design.	EMERGENCY MANAGEMENT - PREPAREDNESS AND RESPONSE	GOAL 4: Improve Emergency Management Capabilities
CEDAR-DIXON MJHMP		x	x		x	x		x		x	x	x		x		x
Central Platte NRD HMP		x	x		x	x				x	x	x	x			x
City of Beatrice HMP		x	x		x	x				x	x	x				x
Hayes, Hitchcock, Frontier MJHMP		x	x		x	x				x	x	x				x
Lower Big Blue/Little Blue NRDs HMP		x	x	x			x			x	x		x			
Lower Elkhorn NRD MJHMP		x	x		x	x		x		x	x	x		x		x
Lower Loup NR MJHMP			x		x						x	x				
Lower Platte North NRD MJHMP		x	x		x	x		x		x	x	x		x		x
Lower Platte South NRD MJHMP		x	x		x	x		x		x	x	x		x		
Nemaha NRD MJHMP		x	x		x	x				x	x	x		x		x
North Platte NRD MJHMP		x	x		x	x		x		x	x	x		x		x
Papio-Missouri River NRD MJHMP		x	x	x			x			x	x	x	x			
Perkins, Chase, Dundy MJHMP		x	x		x	x		x		x	x	x		x		x
Quad Counties MJHMP		x	x		x	x		x		x	x	x		x		x
Region 23 MJHMP		x	x		x	x		x		x	x	x		x		x
Region 24 MJHMP		x	x		x	x		x		x	x	x		x		x
South Platte NRD MJHMP		x	x		x	x				x	x	x				x
Tri-Basin NRD MJHMP		x	x	x			x			x	x		x			
Tri-County MJHMP		x	x		x	x				x	x	x				x
Twin Platte NRD MJHMP		x	x		x	x		x		x	x	x		x		x
Upper Big Blue NRD MJHMP		x	x		x	x		x		x	x	x		x		x
Upper Loup NRD MJHMP		x	x		x	x		x		x	x	x		x		x

SLIDE 20: Resolution of 2019 Goals and Objectives for 2021 Plan

2019 GOAL	2021 Revision/Resolution
GOAL 1: Reduce or eliminate long term risk to human life.	Redefined and integrated into all goals.
GOAL 2: Reduce or eliminate long term risk to property and/or the environment	Redefined and integrated into **Goals 2** and **5**
GOAL 3: Promote public awareness of hazards and associated response	Redefined as **Goal 3**; response focus eliminated from mitigation goals and included as the supplemental "***Emergency Management Goal***"

SLIDE 21: Finalize Goals and Objectives

RESPONSE REQUESTED: GOALS AND OBJECTIVES

1. **Do you agree** with the recommendation to accept the revised Goals and Objectives as proposed for the 2021 Plan Update?
   YES_____ NO____

2. **If you disagree** with the revised Goals and Objectives, as presented, please provide revised text for the related goal/objective in the table below.

GOAL/ OBJECTIVE NUMBER	*SUGGESTED REVISION*

SECTION 2: STATE MITIGATION CAPABILITIES

SLIDE 25: Multi-Agency/Multi-Jurisdictional Coordination

ORGANIZATION	FUNCTIONS/GOALS & PARTICIPATING AGENCIES
GOVERNOR'S TASK FORCE FOR DISASTER RESPONSE (GTFDR)	**GOALS/FUNCTIONS:** • Ensure disaster relief and recovery operations are efficiently coordinated between all agencies. • Make a detailed examination of all features of state recovery efforts including hazard mitigation grant projects with emphasis on the efficient utilization of the resources made available by federal grant programs. Established by Governor's Executive Order 94-3 on January 19, 1994, the GTFDR is composed of the following state agencies: • Nebraska Emergency Management Agency (NEMA) • Department of Natural Resources (NeDNR) • Department of Health and Human Services (DHHS) • Department of Economic Development (DED) • Department of Environmental Quality (DEQ) • Department of Agriculture • Department of Labor • Department of Administrative Services (DAS) • Game and Parks Commission (NGPC) • Department of Transportation (NDOT) Select federal agencies are invited to participate in the taskforce: • U.S. Army Corps of Engineers (USACE) • U.S. Department of Agriculture (USDA) • U.S. Department of Housing and Urban Development (US HUD) • National Weather Service (NWS) • Environmental Protection Agency (EPA)

ORGANIZATION	FUNCTIONS/GOALS & PARTICIPATING AGENCIES
NEBRASKA SILVER JACKETS	**GOALS:** The **Silver Jackets** are a collaborative group that designs plans and solutions for statewide issues in flood risk management. Functions include: • Facilitate strategic life-cycle flood risk reduction • Create or supplement a continuous mechanism to collaboratively solve state-prioritized issues and implement or recommend those solutions • Improve processes, identifying and resolving gaps and counteractive programs • Leverage and optimize resources • Improve and increase flood risk communication and present a unified interagency message • Establish close relationships to facilitate integrated post-disaster recovery solutions The **Silver Jackets** is made up of the following federal and state agencies: • Nebraska Department of Natural Resources (NeDNR) • Nebraska Emergency Management Agency (NEMA) • U.S. Army Corps of Engineers, Omaha District (USACE) • U.S. Army Corps of Engineers, Kansas City District (USACE) • Federal Emergency Management Agency (FEMA Region VII) • United States Geological Services (Nebraska Water Science Center) • National Weather Service (NWS) • Bureau of Reclamation (Great Plains Region)

Nebraska State Emergency Response Commission (SERC)	• **Title III of the Superfund Amendments and Reauthorization Act (SARA)**, known as the **Emergency Planning & Community Right-to-Know Act (EPCRA)** is national legislation that establishes requirements for federal, state and local governments, tribes and industry in an effort to protect public health, safety, and the environment from a hazardous materials disaster. The Nebraska SERC was created in accordance with this law and **Nebraska Revised Statute 81-15.210**. SERC responsibilities include:
	  ○ Establishing procedures for receiving and processing public requests for information collected under EPCRA
	  ○ Reviewing local emergency response plans
	  ○ Designating local emergency planning districts
	  ○ Appoint a Local Emergency Planning Committee (LEPC) for each district
	  ○ Supervising the activities of the LEPC
	  ○ Planning for chemical emergencies
	• The SERC is comprised of 19 members representing state and local government, private and public sector, including: fire, law, public health, school, industry, transportation and military.

SLIDE 26: Capabilities of State of Nebraska Agencies and Quasi-State Entities

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Emergency Management Agency (NEMA)	• NEMA is ***charged by state statute to reduce the vulnerabilities of the people and communities of Nebraska from the damage, injury, loss of life, and loss of property resulting from natural, technological, or manmade emergencies and disasters***. NEMA is the lead agency, along with NeDNR, for the agencies in the GTFDR, who work together to pursue appropriate mitigation actions. • The recovery section of NEMA serves as the focal point for state recovery and mitigation efforts by reviewing and monitoring mitigation projects across the state. It also manages the **Public Assistance Grant Program (PA), Hazard Mitigation Grant Program (HMGP)**, and **Pre-Disaster Mitigation Grant (PDM).**

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Department of Natural Resrouces (NeDNR)	• Under **Article 10, Section 31 of the Floodplain Management Statute**, NeDNR has authority for all matters pertaining to floodplain management, including the coordination of the National Flood Insurance Program. • The NeDNR administers the flood mitigation programs authorized by the National Flood Insurance Reform Act of 1994 and by the Flood Insurance Reform Act of 2004 including the **Flood Mitigation Assistance (FMA) Grant.** NeDNR receives and approves planning grant applications, recommends projects for FEMA approval, coordinates and participates in all activities concerning flood mitigation plans, and completes all required financial and performance reports for all FMA grants. • NeDNR contributes to state mitigation planning efforts by researching past flooding disasters, recognizing areas of high vulnerability, making informed predictions of potential flooding issues, and providing **technical assistance to communities** on flood hazard mitigation. • The NeDNR also works closely with Nebraska's NRDs, the entities that sponsor or assist with the funding of many mitigation projects and plans across the state. NeDNR receives federal funding and can help local jurisdictions with mitigation planning and floodplain mapping. NeDNR has been in FEMA's **Coordinating Technical Partnership (CTP) program** since August 1999. Through this agreement, the NDNR has been able to map unstudied areas in the State of Nebraska, providing flood hazard data that was not available before. As of January 2019, 54 counties have effective digital maps, 16 counties have effective paper maps, 4 counties have preliminary maps, and 7 HUC-8 watersheds have NDNR flood awareness areas that are non-regulatory floodplain maps. 16 counties remain unmapped. See NeDNR's CTP Business Plan for the State of Nebraska Floodplain Mapping Strategy: https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/floodplain/Floodplain-Mapping/FY2019_Business_Plan.pdf • NeDNR provides State coordination for the **National Flood Insurance Program**. NeDNR is required by State Statute to encourage participation in the NFIP, and promote safe building in floodplains. NeDNR also promotes the Community Rating System (CRS) program to communities so they can be rewarded for the floodplain management activities they do in their communities. The **Community Rating System (CRS)** program rewards participating jurisdictions with reduced flood insurance premiums in exchange for going above and beyond the minimum NFIP requirements. Participating in CRS promotes economic resiliency by making flood insurance more affordable, while restricting development within regulatory floodplains limits actual flood damages. As of October 2019, the Cities of Fremont, Omaha, Valley, Lincoln, Papillion, and Scottsbluff are currently enrolled in the CRS program.
Nebraska Department of Administrative Services – Risk Management	• NDAS manages **insurance purchase/self-insurance of State-owned property**, maintaining a database of State-owned properties for State agencies and insured assets. This allows agencies to see how many insured resources are vulnerable to specific hazards, such as flood. • During disasters, the agency captures losses to State-owned and managed properties.
Nebraska Department of Agriculture	• The Department of Agriculture provides disaster support that includes connecting producers with the Farm Service Agency and the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS). The NRCS provides financial and technical assistance to farmers, ranchers and forest landowners, and other private landowners and managers. • The agency **protects critical infrastructure, preserving natural resources and reducing vulnerabilities**. • The agency conducts internal **tracking of agriculture-related damages and losses** during disasters.

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Department of Economic Development (NDED)	• The Nebraska Department of Economic Development administers the **Community Development Block Grant (CDBG)** which provides grants to the state for communities to use in revitalizing neighborhoods, expanding housing, economic opportunities, and community facilities. These funds can be used to incorporate pre-disaster mitigation activities into communities as they address needs and issues creating a more resilient community. Additionally, CDBG funds may be used for the local match on HMA projects. • The State receives funds as a Participating Jurisdiction from the National Housing Trust Fund (HTF) and the NDED is the administering agency
Nebraska Department of Environment and Energy (NDEE)	• Formerly the Nebraska Department of Environmental Quality and the Nebraska Energy Office, the two agencies were merged in July 2019. The NDEE coordinates with the U.S. Environmental Protection Agency to **regulate, monitor, protect, preserve and enhance the state's air, land, water and energy resources**. • The agency has broad mitigation capabilities related to its authorities, including oversight of hazardous materials mitigation; water and wastewater facilities; monitoring/permitting related to air quality; disaster debris management implementation of local weatherization programs with low-interest loans to upgrade and improve utility energy efficiency.
Nebraska Forest Service (NFS)	• As a component of the University of Nebraska, the Nebraska Forest Service **provides education, resources**, and **funding** to Nebraskans. This includes mitigation activities involving **fuel reduction** and the **fire wise management program**. Engaging in such activities can reduce the loss of life and property in the event of a fire. NFS provides assistance to fire departments during incidents. Planning efforts include addressing fire hazards in each region of the state through **Community Wildfire Protection Plans**.
Nebraska Game and Parks Commission (NeG&PC)	• The Nebraska Game and Parks Commission is responsible for disaster operations including damage assessment and mitigation in state-owned parks, recreation, and wildlife areas. **Environmental clearance** for mitigation projects is coordinated between NEMA and NeG&PC. Additional, NeG&PC administers the **Environmental Trust Grants** that can be used for mitigation grants.
Nebraska Department of Health and Human Services (NDHHS)	• NDHHS is assigned the responsibility for all **public health-related and protection and safety programs**, which includes oversight of public health surveillance systems, hospital and medical care facilities licensure; behavioral health; and **resources and support to children and families**. • During a disaster, NDHHS **monitors the capacities of state and local health and medical services, and continuity of support and assistance to children and families**. • NDHHS has the lead role in health and medical preparedness, response, recover and mitigation. Most recently, the agency, in coordination with other State agencies, has a key role in **COVID-19 response and recovery actions** and **programs**.
Nebraska Department of Insurance (NDOI)	• The agency provides **technical assistance related to homeowner's insurance** and other types of insurance coverage. In addition, it monitors incidents of potential fraud and serves as a consumer advocate for the public with insurance providers.
Nebraska State Historic Preservation Office (SHPO)	• **Section 106 of the National Historic Preservation Act of 1966 (NHPA)** requires federal agencies to consider the effects on historic properties of projects they carry out, assist, fund, permit, license, or approve. The SHPO reviews all mitigation projects to ensure respect of all historic properties across the state when undertaking any project that might affect these sites. Additionally, the relationship between NEMA and the SHPO allows for the development of mitigation activities to reduce risk to the state's historic properties. • The SHPO manages state and National Register data on historical structures and archaeological sites, much of which are privately-owned properties.

AGENCY/ ENTITY	PURPOSE/PROGRAMS
Nebraska Department of Transportation (NDOT)	• The Nebraska Department of Transportation assists in disaster operations during recovery including the **reduction of hazards that may cause drainage or flooding issues.**
University of Nebraska	UNL has various academic and research centers that support mitigation-related fields, including: • The Nebraska Public Policy Center focuses on research and projects to support policy-related initiatives, in coordination with partners in a wide variety of topics such as plans, studies, white papers and briefing papers. A current project in 2020 is, "Drought Planning Using Community Threat and Hazard Identification and Risk Assessment" which is utilizing "climate data from the Platte River basin to develop and implement a decision-support model for drought planning." See: http://ppc.unl.edu/projects/drought-planning-using-community-threat-hazard-identification-risk-assessment/ • The **School of Natural Resources** acts as a provider of natural resources information for stakeholders across Nebraska. **Information on natural resources, ecosystems, climate, soils, air, plants, wildlife**, and their interaction with citizens helps guide development of mitigation projects that are a positive impact on the surrounding environment. • **Nebraska State Climate Office** compiles, synthesizes and translates climate information for dissemination, providing near-term and long-term climate forecasts to the media, agriculture and educational audiences, government agencies and the public. • **Nebraska Extension Service** serves as a resource center to technical information to families, businesses and communities prepare for and recover from a disaster. UNL has a **statewide disaster coordinator** and **83 extension offices** to support local communication and education. • **National Drought Mitigation Center** monitors conditions that contribute to drought, providing planning and technical assistance. Capabilities include climatology and social science. The NDMC prepares the U.S. Drought Monitor Map • Other centers focus on **transportation, virology, energy, agriculture, business resiliency,** and more.
Public Power Districts (PPDs)	• The public power districts in Nebraska have historically played a significant role in **mitigation projects** across the state. Hundreds of miles of power lines have been rebuilt or added using the latest in mitigation techniques. One power district estimated that several million dollars in savings have occurred over the past several years because of mitigation actions. Additionally, PPDs provide communities information on outages to **assist in calculating benefit cost analysis on potential projects**.
Natural Resources Districts (NRDs)	• The Natural Resources Districts across the state act as the champions of the majority of the **regional multi-jurisdictional hazard mitigation plans**. As such, they provide guidance and assistance to communities who would otherwise be unable to engage in such planning efforts. Additionally, NRDs have engaged in **placing outdoor warning sirens** and **community safe rooms** in their recreational areas and **sponsoring regional mitigation activities.**

SLIDE 27: Capabilities of Federal Agencies

AGENCY	PURPOSE/POLICIES/PROGRAMS
U.S. Department of Agriculture (USDA)	• The **Farm Service Agency (FSA)** maintains an Emergency Conservation Program that provides technical assistance and allows for cost-share for damaged farms and ranches (fences, equipment, etc.) and rehabilitation of crop land, terraces and permitted farm dams, as well as a Livestock Indemnity Program. • The **National Resources Conservation Service (NRCS)** protects natural resources and critical infrastrucutre, also assisting in helping property owners achieve a highly level of resilience on landscape to protect from future disasters. Project types include streambank stabilization, removing debris from stream, repairing severely damage and eroding stream banks (stabilization) that threantens C/I and other assets, and acquisition and relocation of C/I if unable to restore. Through participation in the Nebraska Healthy Soil Task Force, opportunities are sought to promote soil health, and reduce water runoff/flooding and drough impacts. • The **Risk Management Division** maintains high risk maps of areas along the Missouri River (including Richardson, Nemaha, Sarpy and Cass Counties) available to the public at: www.rma.usda.gov. ○ The agency establishes policy rates using a risk assessment model (high risk areas identified along the Missouri River based on historic losses/events). Coverage for future planting losses is typically available within a specific timeframe. Provides the opportunity to reduce the loss of products in storage through rebuilding with consideration of future flood risk. • **Rural Development** provides services that include Emergency Community Water Assistance Grants; direct loans for disaster losses to single-family housing; and potential cost share for recovery of Waste Water Treatment Plants.
U.S. Geological Survey (USGS)	• The USGS provides geospatial data that is publicly available for hazard research and analysis. The agency has the capability to do real-time Flood Inundation mapping, that has included two flood inundation libraries for Papillion Creed watershed in Omaha and North Platte River in Scottsbluff. The Flood Event Viewer provides easy public access to data collected (at gauge locations) during large, short-term floods to help document high water mark events and scour during flooding; this data is also uploaded to the USGS Short-Term Network for archival purposes. • The agency's flood frequency analysis uses actual data from past 1 and 0.2% floods to redefine what the accurate 1% annual change flood. • The agency supports USACE in levee breach work.
U.S. Department of Homeland Security, Cybersecurity and Infrastructure Security Agency (CISA)	• The CISA has **physical security, cybersecurity** and **emergency communication** experts who can be deployed to support state and local incidents, as requested and pending availability. • CISA conducts **Risk Assessments for Critical Infrastructure** (C/I), focusing on dependencies, interdependencies and cascading impacts for Lifeline functions: ○ Water Management ○ Energy ○ Communications ○ Transportation ○ Healthcare/Public Health • The CISA provides **data support** to inform response, recovery and mitigation planning, including a static C/I list of Tier I and II assets whose disruption could cause national/regional catastrophic effects; and a "dynamic" C/I list produced during an incident that analyzes threats and vulnerabilities and potential consequences of disruption to C/I in impact areas. • The CISA maintains **a list of C/I in the 100- and 500-year floodplain**. In addition, the Protective Security Advisor assigned to the State can advise C/I owners/operators on potential mitigation strategies to reduce facility vulnerability, and works with the State **to identify C/I sites that have sustained damage** and that could benefit from HMA programs.

AGENCY	PURPOSE/POLICIES/PROGRAMS
United States Army Corps of Engineers (USACE)	• The United States Army Corps of Engineers assists the state in reducing risk to the public, property, and the environment by providing **direct and technical assistance to communities**. USACE studies provide information on flooding hazards and assists in identifying projects that address hazards. Various **trainings** such as sandbagging and flood operations are also available via USACE. The Nebraska Silver Jackets program is supported by the Flood Risk Management Program. Two **funding programs** of note include: ○ **Section 22:** study-level program that can be used for the development of flood mitigation plans with a 50% cost share from a non-federal sponsor. ○ **Section 205**: Flood Damage Reduction program that can be used to study flooding problems in urban areas, towns, and villages. If a federal interest is found, this program can assist in designing and building flood reduction mitigation projects.
United States Fish and Wildlife Service (USFWS)	• The U.S. Fish and Wildlife Service ensures that **mitigation projects meet federal requirements for the protection of wildlife and their habitat**. This includes providing guidelines for mitigation project requirements such as bird diverters.
U.S. Department of Housing and Urban Development (USHUD)	• The USHUD works with the NeDED to adapt programs to meet post-disaster needs and coordinates with the agency for the Community Development Block Grant-Disaster Recovery (**CDBG-DR**), **CDBG-MIT** (Mitigation) programs, which provide flexible grants to help cities, counties and states recover from presidentially-declared disasters, especially in low income areas.
Federal Emergency Management Agency	• The Federal Emergency Management Agency supports the mitigation efforts of Nebraska in several ways. FEMA conducts a thorough **review** of all **Local Hazard Mitigation Plans (LHMPs)** before approval. Additionally, **FEMA Hazard Mitigation Assistance grants** provide funding for mitigation projects across the state. The **National Flood Insurance Program (NFIP)** assists in protecting local property owners financially from flooding by providing insurance for participating communities and encouraging smart floodplain management decisions. The Hazard Mitigation Assistance (HMA) funding programs, and the new Building Resilient Infrastructure and Communities (BRIC) grant programs
NOAA/National Weather Service (NWS)	• The NWS provides **site-specific weather forecasting and data** with a focus on weather, water and climate. The NOAA National Center for Environmental Information (NCEI) provides a national clearinghouse for all natural weather events reported through NWS, which provides data from 1950 to March 2020 (current as of June 2020). Data reports include a summary of the incident (by county and zone); number of deaths and/or injuries; and the amount of property and/or crop damage resulting from the event. • NWS data supports hazard risk and vulnerability analysis, and provides site-specific data that can assists in developing mitigation action applications for grant funding.

SLIDE 28: GTFDR ACTION TO CONFIRM STATE CAPABILITIES

RESPONSE REQUESTED: STATE CAPABILITIES

1. **Are the State Capabilities, as presented, accurate and complete?**
   YES_____ NO____

2. If additional data is needed to present a complete picture of the State's hazard mitigation capabilities, please provide a short description in the table below, including agency/organization with responsibility and authority, and a description of the policy, program or capability.

AGENC/ ORGANIZATION	*DESCRIPTION OF CAPABILITY*

2021 Nebraska State Hazard Mitigation Plan Update
Core Planning Team Meeting

Nebraska Emergency Management Agency
Lincoln, NE
August 4, 2020, 1:00 p.m.

MEETING MINUTES

Planning Team Participants:

Name (Last, First)	Title	Agency	Email
Program			
Bargmann, Molly	Section Manager	NEMA	Molly.bargmann@nebraska.gov
Christensen, Donny	Section Admin.	NEMA	Donny.christensen@nebraska.gov
Cook, John	Planning Specialist	NEMA	John.cook@nebraska.gov
Gassmann, John	SHMO	NEMA	John.glassmann@nebraska.gov
Green, Joe	Planning Specialist	NEMA	Joseph. green@nebraska.gov
Hindt, Lexy	Deputy SHMO	NEMA	Lexy.hindt@nebraska.gov
Thole, Heather	HM Planning Specialist	NEMA	Heather.thole@nebraska.gov
Contractor			
Freeman, Nancy	Sr. Mitigation Planner	IEM	Nancy.Freeman@iem.com

AGENDA AND MEETING NOTES

Meeting Format: Onsite – NEMA office, Lincoln, NE

The meeting was held to review the status of initial draft sections of the plan.

Nancy Freeman presented copies of the plan to NEMA staff and went through each section to provide an update. **Discussion topics included:**

- Plan format
- Hazards profiled
- Data sources/verification
- Review of capabilities
- Status of Local Hazard Mitigation Plans
- Potential Mitigation Actions

Follow-up: NEMA staff will review and provide input to complete the initial draft of all sections for review in August-September.

2021 Nebraska State Hazard Mitigation Plan Update

Mitigation Strategy 11 Meeting

Nebraska Emergency Management Agency
August 21, 2020, 1:00 p.m.

MEETING MINUTES

Planning Team Participants:

Name (Last, First)	Title	Agency	Email
Program			
Bargmann, Molly	Section Manager	NEMA	Molly.bargmann@nebraska.gov
Chandler, Joe	Mitigation	FEMA – R VII	
Christensen, Donny	Section Admin.	NEMA	Donny.christensen@nebraska.gov
Cook, John	Planning Specialist	NEMA	John.cook@nebraska.gov
Dukesherer, James	Community Relations	NREA	
Gassmann, John	SHMO	NEMA	John.glassmann@nebraska.gov
Hindt, Lexy	Deputy SHMO	NEMA	Lexy.hindt@nebraska.gov
Sands, Tom		NDOT	
Thole, Heather	HM Planning Specialist	NEMA	Heather.thole@nebraska.gov
Contractor			
Freeman, Nancy	Sr. Mitigation Planner	IEM	Nancy.Freeman@iem.com
Spaulding, Barbara	Sr. Mitigation Planner	IEM	Barbara.Spaulding@iem.com

AGENDA AND MEETING NOTES

Meeting Format: [INSTRUCTIONS FOR VIRTUAL MEETING]

13) **Welcome and Comments** – John Gassmann, NEMA, opened the meeting and described the format for the virtual meeting, including the companion Word document that would be used in parallel with the PowerPoint slides.

14) **Review Risk and Vulnerability of 2021 Hazards** - Nancy Freeman, IEM, initiated the discussion, explaining that chemical fixed sites and transportation, extreme temperature and power failure were added as "other hazards of concern" to the FINAL list of hazards and will be minimally profiled in the 2021 plan.

   k) Problem Statements – The vulnerabilities identified for each hazard will provide the foundation for developing problem or issue statements for each hazard. These statements will be used to ensure that the mitigation strategy is inclusive for all hazards of concern.

15) Mitigation Strategy

a) Review approved final Goals and Objectives – Nancy presented a revised set of goals and objectives for consideration for the 2021 SHMP update. Goals are structured around the potential type of mitigation actions and objectives are specific to hazard issues. Several comments were made and taken into consideration. Additional comments may be submitted after the meeting.

b) Introduce Mitigation Action Worksheet – Nancy provided an overview of the approach to developing mitigation actions that address the hazard problem statements, including types of projects, and alternate actions and walked meeting participants through the worksheet.

c) Prioritization criteria for Actions – The following prioritization criteria was presented for consideration and approved without comment by the GTFDR:

Category	Points	Criteria
(1) Life Safety/Property Protection	4	Likely to protect more than 50% of the population and/or critical infrastructure and community assets.
	3	Likely to protect at least 50 % of the population and/or critical infrastructure and community assets.
	2	Could potentially protect up to 25 % of the population and could potentially protect critical infrastructure and community assets
	1	Could potentially protect up to 10 % of the population and could potentially protect critical infrastructure and community assets
	0	Potential for protecting lives and critical infrastructure and/or community assets cannot be determined at this time.
(2) Funding Availability	4	Little to no direct expenses
	3	Can be funded by operating budget
	2	Grant funding identified
	1	Grant funding needed
	0	Potential funding source unknown
(3) Probability of Matching Funds	4	Funding match is available or funding match not required
	-	N/A
	2	Partial funding match available
	-	N/A
	0	No funding match available or funding match unknown
(4) Benefit Cost Review	4	Likely to meet Benefit Cost Review
	-	N/A
	2	Benefit Cost Review not required
	-	N/A
	0	Benefit Cost Review unknown
(5) Environmental Benefit	4	Environmentally sound and relatively easy to implement; or no adverse impact on environment.
	3	Environmentally acceptable and not anticipated to be difficult to implement
	2	Environmental concerns are somewhat difficult to implement because of complex requirements
	1	Difficult to implement because of significantly complex requirements and environmental permitting

	0	Very difficult to implement due to extremely complex requirements and environmental permitting problems
(6) Technical Feasibility	4	Proven to be technically feasible
	-	N/A
	2	Expected to be technically feasible
	-	N/A
	0	Technical feasibility unknown or additional information needed
(7) Timeframe of implementation	4	1 year or less (Short Term)
	-	N/A
	2	2 – 5 years (Long-Term)
	-	N/A
	0	More than 5 years (Long-Term)
Minimum = 0 Maximum = 28	**Ranking Level: Low: 0-10 Medium: 11-20 High: 21-28**	

d) Funding Sources – Nancy described how a range of federal, state and other funding sources will be presented in the mitigation strategy section of the plan.

16) Summary of Local Capabilities

a) A brief summary of planning/regulatory, administrative, financial and educational capabilities gleaned from LHMPs was provided to meeting participants.

17) Next Steps

h. Continue review and development of potential state mitigation actions

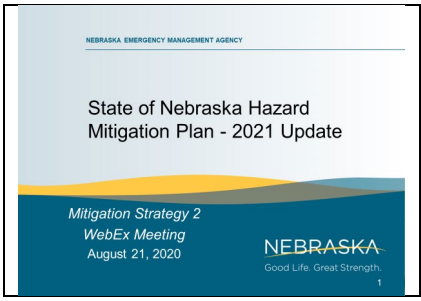
i. Continue outreach to Discipline-specific partners to solicit state-level mitigation actions.

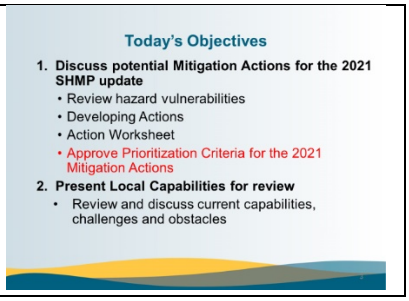
j. Public Power District Annexes – Template development has been delayed, but hopefully to be completed in August.

18) Questions, Issues, or Concerns

Attachments:

- Mitigation Strategy 11 PowerPoint for August 21, 2020 meeting
- Mitigation Strategy 11 Word Document Companion for August 21, 2020 meeting

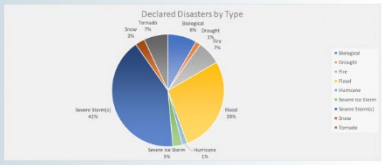




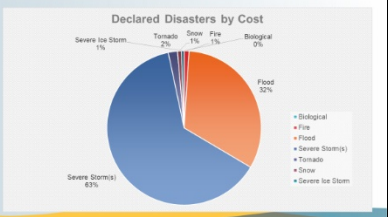
Hazards Profiled – 2021 Plan*

- Highest Hazards of Concern:
  - Animal Disease
  - Dam Failure
  - Drought
  - Flood/Flash Flood
  - Human Infectious Disease/Pandemic
  - Levee Failure
  - Plant Disease and Pests
  - Severe Winter Storm
  - Severe Thunderstorm
  - Terrorism
  - Tornado
  - Wildfire
- Other Hazards of Concern:
  - *Chemical and Radiological Fixed Sites and Transported*
  - *Extreme Temperature*
  - *Power Failure*

Additional Considerations –Types of Declared Disasters, by Number



Additional Considerations – Cost of Declared Disasters



*Obligated PA Funds 1999 - July 2020

Problem Statements

- *What critical facilities are the state's top concerns?*
- *What causes the most disruption to the state and its communities?*
- *What have been the most severe impacts to the economy?*
- *Is there a specific or vulnerable population impacted by the hazard?*
- Hazard-specific Area of Focus
  - Hazard impacts
  - Assets at risk
  - Location and extent
  - Previous Occurrences
  - Probability of future occurrences

Problem Statements - June 23 HIRA meeting

- The March 2019 storm took out 24 highway bridges, and required replacement of 12 bridges.
- During the same event, access to some communities was restricted by flooded roads.
- Additional information and data related to a flash drought and a long-term drought is needed to understand the different impacts from both scenarios.

2021 Goals and Objectives

GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.	
[Objective] 1.1	Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
1.2	Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.
1.3	Promote and support policy-making that protects or excludes human habitation in flood zones or other hazard-prone areas.
1.4	Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.

2021 Goals and Objectives

GOAL 2: Reduce or eliminate long-term risk to property, including critical facilities and infrastructure, historic, and private property.	
2.1	Promote hazard insurance opportunities for homeowners, renters, and businesses, including flood coverage under the National Flood Insurance Program (NFIP).
2.2	Provide counties/communities with technical assistance on acquisition, retrofit, or relocation of repetitive loss properties from flood-prone areas in the state.
2.3	Promote resilient and sustainable building to reduce vulnerabilities, encouraging the use of green and natural infrastructure, when appropriate.
2.4	Identify opportunities to mitigate vulnerable critical infrastructure, such as utilities, roads and bridges, and other Lifeline-related facilities.

2021 Goals and Objectives

GOAL 3: Promote public awareness of hazards and how to reduce their impacts	
3.1	Offer trainings about hazard awareness, mitigation planning and grants, and how to incorporate mitigation into ongoing program functions.
3.2	Reduce the impact of hazards on at-risk and vulnerable populations through education and awareness programs.
3.3	Improve systems that provide warning, awareness, and emergency communication.
3.4	Conduct education and awareness programs for flood mitigation planning and funding assistance.

2021 Goals and Objectives

GOAL 4: Encourage the development and implementation of long-term, cost effective, and resilient mitigation projects that preserve or restore the functions of natural systems.	
4.1	Encourage the use of green and natural infrastructure for mitigation projects, when applicable.
4.2	Provide technical assistance to communities and stakeholders in the application and implementation of mitigation projects that preserve or restore natural systems.
4.3	Maintain and encourage ongoing relationships between state and local agencies and federal partners to play an active and vital role in identifyin appropriate preservation and restoration of vulnerable natural systems.
4.4	Promote the continued use of natural systems and features, and open space preservation, in land use planning and development by local jurisdictions.

2021 Goals and Objectives

GOAL 5: Build stronger by promoting mitigation actions that emphasize sustainable construction and design measures to reduce or eliminate the impacts of natural hazards.	
5.1	Encourage building and rebuilding practices that address resiliency through higher standards and sustainable design to resist impacts of natural hazards.
5.2	Enhance coordination with state and local agencies that promote resiliency and sustainability.
5.3	Identify sustainable flood and erosion control projects and activities that demonstrate resiliency practices.
5.4	Promote and support the building of safe rooms in areas highly vulnerable to wind damages.
5.5	Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.

WORKSHEET: Mitigation Themes

- **Prevention**:
  - ***Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built.***
  - Examples: Planning and zoning, building codes, capital improvement programs, and storm water management regulations, hazard impact studies.
- **Property Protection**:
  - ***Modification of existing buildings or structures*** to protect them from a hazard, or removal from the hazard area.
  - Examples: Acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness**:
  - Actions to ***inform and educate citizens, elected officials, and property owners about the hazards and potential measures to mitigate them.***

WORKSHEET: Mitigation Themes

- **Natural Resource Protection**:
  - Actions that ***preserve or restore the functions of natural systems.***
  - Examples: Sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Structural Projects**:
  - Actions that involve the ***construction of structures such as*** dams, levees, floodwalls, seawalls, retaining walls, and safe rooms. to reduce the impact of a hazard.

Process to Develop Mitigation Actions

1. **Problem Statement: Wildfire**

   In wildland-urban interface areas, a state-owned critical facility (school and maintenance facility) is at risk, with a total property value of approximately $15 million. A previous wildfire caused evacuation of the school and there is increasing pressure to expand the school in an area identified as a wildland-urban interface.

2. **Identify Potential Actions**
   - Prevention
   - Property Protection
   - Public Education and Awareness
   - Natural Resource Protection
   - Structural Projects
3. **Identify and research three alternative measures to address the root problem.**

Identifying Actions to Address Problem Statements – Consider All Alternatives

Hazard Risk/Vulnerability: Wildfire

- **Prevention**
  - Coordinate with local jurisdictions to develop and adopt a wildfire mitigation ordinance with specific conditions for the use and development of wildfire hazard areas to mitigate risk to life and propert
  - Provide technical assistance to community to develop a Community Wildfire Protection Plan to reduce risk to essential infrastructure
- **Property Protection**
  - Retrofit the school and maintenance facility with fire-resistant construction materials and create a defensible space around the perimeters of the buildings.

Identifying Actions to Address Problem Statements – Consider All Alternatives

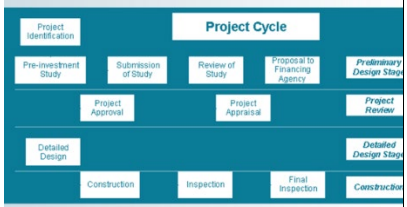
POTENTIAL ACTIONS: Wildfire

- **Education and Awareness Programs**
  - Implement a program using Firewise Communities materials to educate property managers in the wildland-urban interface area on actions they can take to reduce risk.
- **Natural Resource Protection**
  - Implement forest and vegetation management program to reduce risk of wildland fire
- **Structural Projects**
  - Establish construction standard for new development of state property in the wildland urban interface that will address fire-resistant materials.

Develop the appropriate Mitigation Action to address the problem…

Considering appropriate actions…

Consider the full scope of the action…structural projects



Action Worksheet

NEBRASKA STATE HAZARD MITIGATION PLAN - 2021 UPDATE

Action Worksheet	
Project Name:	
Project Number:	
Risk / Vulnerability	
Hazard of Concern:	
Description of the Problem:	

Action Worksheet

Action or Project Intended for Implementation			
Description of the Solution:			
Is this project related to a Critical Facility?		Yes	No
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:		Estimated Benefits (losses avoided):	
Useful Life:			
Estimated Cost:			

Action Worksheet

Plan for Implementation			
Prioritization:		Desired Timeframe for Implementation:	
Estimated Time Required for Project Implementation:		Potential Funding Sources:	
Responsible Organization:		Local Planning Mechanisms to be Used in Implementation, if any:	

Action Worksheet

Three Alternatives Considered (including No Action)			
	Action	Estimated Cost	Evaluation
Alternatives:	No Action	$0	

Action Worksheet

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

Implementing Actions

- Always consider the benefits and costs
- Other criterion might include:
  - Technical Feasibility
  - Political Support
  - Legal Authority
  - Environmental Impacts
  - Positive and Negative Social Impacts
  - Sponsor(s)
  - Support of Elected Officials
  - Administrative Capability to implement action

WORKSHEET: Prioritization Criteria

Category	Points	Criteria
(1) Life Safety/Property Protection	4	Likely to protect more than 50% of the population and/or critical infrastructure and community assets.
	3	Likely to protect at least 50 % of the population and/or critical infrastructure and community assets.
	2	Could potentially protect up to 25 % of the population and could potentially protect critical infrastructure and community assets
	1	Could potentially protect up to 10 % of the population and could potentially protect critical infrastructure and community assets
	0	Potential for protecting lives and critical infrastructure and/or community assets cannot be determined at this time.
(2) Funding Availability	4	Little to no direct expenses
	3	Can be funded by annual operating budget
	2	Grant funding identified
	1	Grant funding needed
	0	Potential funding source unknown
(3) Probability of Matching Funds	4	Funding match is available or funding match not required
	-	N/A
	2	Partial funding match available
	-	N/A
	0	No funding match available or funding match unknown

WORKSHEET: Identifying Potential Funding Sources

Federal and State Mitigation Funding and Assistance					
Program	Description	Lead Agency	Link	Regulatory	Technical
Grants.gov	Searchable catalog of federal grant opportunities in health and human services	U.S. Department of Health and Human Services (HHS)	http://www.grants.gov/web/grants/home.html		
Federal Grant Programs for State and Local Governments	Web-site that lists types of FEMA grant programs, including policies, eligibility, agencies, and type of funding instrument.	FEMA	https://www.grants.gov/web/grants/search-grants.html?keywords=FEMA		
National Earthquake Hazards Reduction Program	Program research to advance understanding earthquakes occurrence and impact	National Institute of Science and Technology (NIST)	http://www.nehrp.gov/index.htm		
Decision, Risk and Management Science Program	Scientific research directed at increasing the understanding and effectiveness of decision making by individuals, groups, organizations, and society	National Science Foundation (NSF)	http://www.nsf.gov/funding/pgm_summary.jsp?pims_id=5420		
Societal Dimensions of Engineering, Science, and Technology Program	Proposals benefiting the study of interactions of engineering, science, technology, and society	NSF	http://nsf.gov/funding/pgm_summary.jsp?pims_id=5323&org=SBE		
Aquatic Ecosystem Restoration	Direct support for carrying out aquatic ecosystem restoration projects, such as wetlands, repairing and other floodplain and aquatic systems, that will improve the quality of the environment. Regulatory and adaptation planning initiatives for Climate Change	U.S. Army Corps of Engineers (USACE)	http://www.usace.army.mil/CW/Missions/Public-Services/Ecosystem-Restoration-Authorities/	X	X

Summary of Local Mitigation Capabilities

22 Local Hazard Mitigation Plans reviewed

- **Plans - Strengths**
  - 19 have Capital Improvement Plans
  - 21 have Comprehensive/Master Plans
  - 20 have Economic Development Plans
  - 18 have Stormwater Management Plans
  - 17 have Flood Mitigation Plan
- **Plans – Challenges and Opportunities**
  - 5 plans note Community Wildfire Protection Plans
  - 3 have Drought Preparedness Plans
  - 1 has Regional Sustainability Plan

Summary of Local Mitigation Capabilities

- **Policies and Regulations - Strengths**
  - 21 have zoning ordinance/land use restrictions
  - 19 have a Building Code
  - 17 have FIRMs/DFIRMs
- **Policies and Regulations – Challenges and Opportunities**
  - 2 have Stormwater /Watershed Management Ordinance
  - 1 has a Wildfire Protection Ordinance
  - 1 has Land Acquisition Ordinance

Summary of Local Mitigation Capabilities

- **Programs and Studies - Strengths**
  - 21 are NFIP participants
  - 21 have Flood Insurance Studies
  - 19 have Public Education/Awareness programs
  - 14 have Mutual Aid Agreements
  - 14 have Tree City USA Programs
- **Programs and Studies – Challenges and Opportunities**
  - 1 has a Flood Control Program
  - 1 has an Ignition Resistant Building Materials Incentive Program

Summary of Local Mitigation Capabilities

- **Administrative and Technical – Strengths**
  - 20 have a Grant Writer
  - 19 have a Planner
  - 19 have an Engineer, Floodplain personnel, and GIS specialist
  - 17 have a Building Code Official
- **Administrative and Technical– Challenges and Opportunities**
  - 2 have an Environmental/Conservation Specialist
  - 8 have a Public Works Official
  - 1 has a Public Information Official

STATE OF NEBRASKA HAZARD MITIGATION PLAN – 2021 UPDATE

Mitigation Strategy 2 Meeting/WebEx

Date: August 21, 2020

Mitigation Strategy 2 WORKSHEET

Instructions: The information in this worksheet align with the WebEx presentation for this meeting. Most of the PowerPoint slides are informational; however, you will see some slides that indicate a connection to specific information within this Worksheet. **During the presentation, please answer the questions in red font provided in this worksheet.** You may suggest additional information, or ask questions during the online meeting if clarification is needed.

[Slides 4 – 8: Review of Hazard Vulnerabilities and Problem Statements]

Slides 9-13: 2021 Goals and Objectives

GOAL 1: Promote a comprehensive state hazard mitigation policy framework, to coordinate federal, state and local hazard mitigation planning and program efforts.	
[Objective] 1.1	Promote and support integrated land use planning to encourage resilient and sustainable efforts throughout statewide programs that address zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.
1.2	Continue to participate in state and local efforts and programs that focus on policy development and practices that support accepted resiliency measures.

1.3	Promote and support policy-making that protects or excludes human habitation in flood zones or other hazard-prone areas.
1.4	Support policy-related studies, research, and mapping that enhances data and information related to the impacts of hazards and related risk, vulnerability, and losses.
GOAL 2: Reduce or eliminate long-term risk to property, including critical facilities and infrastructure, historic, and private property.	
2.1	Promote hazard insurance opportunities for homeowners, renters, and businesses, including flood coverage under the National Flood Insurance Program (NFIP).
2.2	Provide counties/communities with technical assistance on acquisition, retrofit, or relocation of repetitive loss properties from flood-prone areas in the state.
2.3	Promote resilient and sustainable building to reduce vulnerabilities, encouraging the use of green and natural infrastructure, when appropriate.
2.4	Identify opportunities to mitigate vulnerable critical infrastructure, such as utilities, roads and bridges, and other Lifeline-related facilities.

GOAL 3: Promote public awareness of hazards and how to reduce their impacts.	
3.1	Offer trainings about hazard awareness, mitigation planning and grants, and how to incorporate mitigation into ongoing program functions.
3.2	Reduce the impact of hazards on at-risk and vulnerable populations through education and awareness programs.
3.3	Improve systems that provide warning, awareness, and emergency communication.
3.4	Conduct education and awareness programs for flood mitigation planning and funding assistance.
GOAL 4: Encourage the development and implementation of long-term, cost effective, and resilient mitigation projects that preserve or restore the functions of natural systems.	
4.1	Encourage the use of green and natural infrastructure for mitigation projects, when applicable.
4.2	Provide technical assistance to communities and stakeholders in the application and implementation of mitigation projects that preserve or restore natural systems.
4.3	Maintain and encourage ongoing relationships between state and local agencies and federal partners to play an active and vital role in identifying appropriate preservation and restoration of vulnerable natural systems.
4.4	Promote the continued use of natural systems and features, and open space preservation, in land use planning and development by local jurisdictions.
GOAL 5: Build stronger by promoting mitigation actions that emphasize sustainable construction and design measures to reduce or eliminate the impacts of natural hazards.	
5.1	Encourage building and rebuilding practices that address resiliency through higher standards and sustainable design to resist impacts of natural hazards.
5.2	Enhance coordination with state and local agencies that promote resiliency and sustainability.
5.3	Identify sustainable flood and erosion control projects and activities that demonstrate resiliency practices.
5.4	Promote and support the building of safe rooms in areas highly vulnerable to wind damages.
5.5	Improve transportation infrastructure to ensure safe passage of people, goods, and services state wide.

SECTION 1: Mitigation Actions

SLIDE 14: Mitigation Themes

- **Prevention**: Government ***administrative or regulatory actions or processes that influence the way land and buildings are developed and built***. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation and storm water management regulations.

- **Property Protection**: Actions that involve the ***modification of existing buildings or structures*** to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.

- **Public Education and Awareness**: Actions to ***inform and educate citizens, elected officials, and property owners about the hazards and potential measures to mitigate them***. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- **Natural Resource Protection**: Actions that, in addition to minimizing hazard losses, also ***preserve or restore the functions of natural systems***. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Structural Projects**: Actions that involve the ***construction of structures to reduce the impact of a hazard***. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

SLIDES 22 – 26: Action Worksheet

NEBRASKA STATE HAZARD MITIGATION PLAN - 2021 UPDATE

Action Worksheet			
Project Name:			
Project Number:			
Risk / Vulnerability			
Hazard of Concern:			
Description of the Problem:			
Action or Project Intended for Implementation			
Description of the Solution:			
Is this project related to a Critical Facility?		**Yes** ☐	**No** ☐
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:		**Estimated Benefits (losses avoided):**	
Useful Life:			
Estimated Cost:			
Plan for Implementation			
Prioritization:		**Desired Timeframe for Implemetation:**	
Estimated Time Required for Project Implementation:		**Potential Funding Sources:**	
Responsible Organization:		**Local Planning Mechanisms to be Used in Implementation, if any:**	
Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			

[1] Summarize the evaluation of potential actions and the action selected for implementation. Always consider the benefits and costs. Other criterion might include: Technical Feasibility, Political Support, Legal Authority, Environmental Impacts, positive and negative Social Impacts, and whether the jurisdiction has a person willing to be the Local Champion for implementation and is this person with the full support of the jurisdiction Administratively Capable of implementing the action selected for implementation.

SLIDE 28: Prioritization Criteria

Category	Points	Criteria
(1) Life Safety/Property Protection	4	Likely to protect more than 50% of the population and/or critical infrastructure
	3	Likely to protect at least 50 % of the population and/or critical infrastructure
	2	Could potentially protect up to 25 % of the population and could potentially
	1	Could potentially protect up to 10 % of the population and could potentially
	0	Potential for protecting lives and critical infrastructure and/or community
(2) Funding Availability	4	Little to no direct expenses
	3	Can be funded by annual operating budget
	2	Grant funding identified
	1	Grant funding needed
	0	Potential funding source unknown
(3) Probability of Matching Funds	4	Funding match is available or funding match not required
	-	N/A
	2	Partial funding match available
	-	N/A
	0	No funding match available or funding match unknown
(4) Benefit Cost Review	4	Likely to meet Benefit Cost Review
	-	N/A
	2	Benefit Cost Review not required
	-	N/A
	0	Benefit Cost Review unknown
(5) Environmental Benefit	4	Environmentally sound and relatively easy to implement; or no adverse impact on environment.
	3	Environmentally acceptable and not anticipated to be difficult to implement
	2	Environmental concerns and somewhat difficult to implement because of complex requirements
	1	Difficult to implement because of significantly complex requirements and environmental permitting
	0	Very difficult to implement due to extremely complex requirements and environmental permitting problems
(6) Technical Feasibility	4	Proven to be technically feasible
	-	N/A
	2	Expected to be technically feasible
	-	N/A
	0	Technical feasibility unknown or additional information needed
(7) Timeframe of implementation	4	1 year or less (Short Term)
	-	N/A
	2	2 – 5 years (Long-Term)
	-	N/A
	0	More than 5 years (Long-Term)

Minimum = 0 **Maximum = 28**	**Ranking Level:** **Low: 0-10** **Medium: 11-20** **High: 21-28**

SLIDE 29: Funding Sources

A table listing potential funding sources will be sent by email within the next two weeks. Please review the listing, adding additional funding sources that may be available. Sources can be from federal or state government, not-for-profit organizations or private sector.

For any sources you provide, include a short description of the program, lead agency or organization, web link and note whether the program provides regulatory, technical and/or financial assistance.

SLIDE 35: GTFDR ACTION TO CONFIRM PRIORITIZATION CRITERIA

RESPONSE REQUESTED: PRIORITIZATION CRITERIA

3. Is the Prioritization Criteria, as presented, sufficient to rank the State's Mitigation Actions?

   YES_____ NO_____

4. If additional criteria should be considered, or criteria presented in the table should be revised or eliminated, please provide a short description in the table below, including a short justification of why these criteria should be added/revised/eliminated.

Criteria	*Justification for Criteria*

APPENDIX B: Hazard and Risk Data

B-1 State Hazard Survey Summary – June 2020

The Nebraska Emergency Management Agency (NEMA) conducted an annual statewide hazard identification and risk assessment (HIRA) survey of all county Emergency Managers. Table B-1-1 provides the summary of hazards ranked in order of highest concern. The survey was conducted using SurveyMonkey.com in June 2020. The survey was sent out to every county emergency manager, and 91 of the 93 counties responded (missing Howard and Polk counties).

Each hazard was scored using four factors:

1. ***Potential Magnitude***: or the percentage of the county that could be affected by the hazard. This is an indication of the geographical area that could be impacted by a hazard. Other factors will indicate who could be affected.

2. ***Frequency of Occurrence***: or how often does/can this hazard affect the county**.**

3. ***Areas Likely to be Most Affected***: "Agricultural land," "residential," "business/retail," or "industrial."

4. ***Potential Speed of Onset***: or the time available to warn the citizens of the hazard so they can take protective actions for themselves and possibly their property from the hazard.

The 20 hazards evaluated were:

- Agricultural Animal Disease
- Agricultural Plant Disease
- Chemical Fixed Facility
- Chemical Transportation
- Civil Disorder
- Dam/Levee Failure
- Drought
- Earthquake
- Flood/Flash Flood
- Power Failure
- Public Health Emergency
- Radiological Fixed Facility
- Radiological Transportation
- Severe Thunderstorm
- Severe Winter Storm
- Terrorism
- Tornado
- Transportation
- Urban Fire
- Wildfire

Table B-1-1: Summary of Statewide Hazard Identification and Risk Assessment Survey, June 2020

Rank	Hazard	Reconciliation in Plan
1	Severe Winter Storm	Included
2	Severe Thunderstorm	Included
3	Tornado	Included
4	Power Failure	Included as other hazard of concern
5	Flood/Flash Flood	Included
6	Public Health Emergency	Included as “Human Infectious Disease”
7	Drought	Included
8	Wildfire	Included
9	Chemical Transportation	Included as other hazard of concern
10	Ag Animal Disease	Included
11	Ag Plant Disease	Included
12	Transportation	Not included
13	Chemical Fixed Facility	Included as other hazard of concern
14	Urban Fire	Not included
15	Terrorism	Included
16	Radiological Transportation	Included as other hazard of concern
17	Dam/Levee Failure	Included
18	Civil Disorder	Not included
19	Earthquake	Not included
20	Radiological Fixed Facility	Included as other hazard of concern

APPENDIX C: Mitigation Action Worksheets and Tables

C-1 Mitigation Action Worksheet - TEMPLATE

NEBRASKA STATE HAZARD MITIGATION PLAN - 2021 UPDATE

Action Worksheet			
Project Name:			
Project Number:			
Risk / Vulnerability			
Hazard of Concern:			
Description of the Problem:			
Action or Project Intended for Implementation			
Description of the Solution:			
Is this project related to a Critical Facility?	☐ **Yes**	☐ **No**	
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:		**Estimated Benefits (losses avoided):**	
Useful Life:			
Estimated Cost:			
Plan for Implementation			
Prioritization:		**Desired Timeframe for Implementation:**	
Estimated Time Required for		**Potential Funding Sources:**	

Project Implementation:			
Responsible Organization:		**Local Planning Mechanisms to be Used in Implementation, if any:**	

Three Alternatives Considered (including No Action)			
	Action	**Estimated Cost**	**Evaluation**
Alternatives:	No Action	$0	

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

[1] Summarize the evaluation of potential actions and the action selected for implementation. Always consider the benefits and costs. Other criterion might include: Technical Feasibility, Political Support, Legal Authority, Environmental Impacts, positive and negative Social Impacts, and whether the jurisdiction has a person willing to be the Local Champion for implementation and is this person with the full support of the jurisdiction Administratively Capable of implementing the action selected for implementation.

C-2 – 2021 Mitigation Action Worksheets

NEBRASKA STATE HAZARD MITIGATION PLAN - 2021 UPDATE

Action Worksheet			
Project Name:	Central Repository for Risk Assessment Data		
Project Number:	NE-001		
Risk / Vulnerability			
Hazard of Concern:	All hazards		
Description of the Problem:	The catastrophic flooding of 2019 accentuated the need for a single comprehensive system for gathering, recording, and managing risk assessment data. Currently, numerous federal, state and local entities collect and utilize a broad range of hazard impact and consequence information that is maintained within that entity, but not widely available to other entities that could benefit from the data and information.		
Action or Project Intended for Implementation			
Description of the Solution:	A central repository for risk assessment data would allow authorized agencies to access vital information related to hazard impacts to people, critical infrastructure, property, the environment and the economy, thereby increasing the efficiency and effectiveness of disaster preparedness, response, recovery and mitigation.		
Is this project related to a Critical Facility?	☐ **Yes**	☑ **No**	
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:	N/A	**Estimated Benefits (losses avoided):**	An exact estimate of losses avoided is difficult to calculate; however, by sharing risk assessment data multiple agencies may increase the efficiency and effectiveness of their disaster response, recovery and mitigation efforts.
Useful Life:	5 years		
Estimated Cost:	$5,000		
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	1-2 years
Estimated Time Required for Project Implementation:	2 Years	**Potential Funding Sources:**	General budget; shared resources
Responsible Organization:	Nebraska Emergency Management Agency	**Local Planning Mechanisms to be Used in**	State and Local Hazard Mitigation Planning Process

		Implementation, if any:	
Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Additional efforts and time required to gather and manage risk assessment data.
	Multiple databases	Unknown	This alternative would result in duplication of efforts and resources by multiple entities.
	Central Repository for Risk Assessment Data	$5,000	This solution would streamline data collection and sharing to increase efficient and effective use of resources.
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			

Action Worksheet			
Project Name:	Statewide Acquisition Strategy for Repetitive Loss and Severe Repetitive Loss Properties		
Project Number:	NE-002		
Risk / Vulnerability			
Hazard of Concern:	Flood		
Description of the Problem:	Currently, three primary agencies in the state - Nebraska Emergency Management Agency, Nebraska Department of Natural Resources, and Nebraska Game and Parks Commission - work separately to address flood mitigation through property acquisition, sometimes creating competing efforts for limited resources.		
Action or Project Intended for Implementation			
Description of the Solution:	Development of a statewide acquisition strategy would align the state's flood mitigation efforts and resources to work together toward a common goal. Acquisition projects could be applicable to critical facilities and infrastructure as well as private property.		
Is this project related to a Critical Facility?		**Yes** ☐	**No** ☐
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:	500-year flood	**Estimated Benefits (losses avoided):**	An exact estimate of losses avoided is difficult to calculate; however, by consolidating competing priorities more projects may potentially be implemented.
Useful Life:	25 years		
Estimated Cost:	None		
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implemetation:**	1 year
Estimated Time Required for Project Implementation:	2 years	**Potential Funding Sources:**	Department/agency budgets
Responsible Organization:	NeDNR	**Local Planning Mechanisms to be Used in Implementation, if any:**	Flood mitigation; comprehensive land use
Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Limited progress would be made in achieving flood mitigation goals.
	Maintain current method of separate agency acquisition projects.	$0	Some progress would be made, but competition for resources would limit progress in achieving goals.
	Implement Statewide flood mitigaiton acquisition strategy	$0	Streamline acquisition projects by combining efforts and resources; increase funded projects
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			

Action Worksheet			
Project Name:	Promote participation in Hazard Reduction Community Programs (StormReady, FireWise, CRS, Community Wildfire Protection Plans, etc.)		
Project Number:	NE-003		
Risk / Vulnerability			
Hazard of Concern:	Multiple		
Description of the Problem:	Many local communities are susceptible to specific hazards and have opportunities to enhance preparedness and mitigation measures to reduce the impacts of potential hazards. There are a number of hazard programs in which communities can participate to reduce hazard risk and vulnerability; however, not all communities are familire with the benefits and outcomes of these programs.		
Action or Project Intended for Implementation			
Description of the Solution:	These programs are conducted at the local level and encourage broad participation of elected officials, government staff, businesses and industries, and the general public. Some programs, such as the CRS, provide a method to reduce costs to property owners.		
Is this project related to a Critical Facility?	**Yes** ☐	**No** ☑	
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:	N/A	**Estimated Benefits (losses avoided):**	An exact estimate of losses avoided is difficult to calculate; however, by increasing community preparedness through mitigation actions, losses avoided from multiple hazards can be documented in the future.
Useful Life:	N/A		
Estimated Cost:	Variable		
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implemetation:**	5 years
Estimated Time Required for Project Implementation:	5 years	**Potential Funding Sources:**	HMA grants, local budgets, private partnerships
Responsible Organization:	NEMA	**Local Planning Mechanisms to be Used in Implementation, if any:**	State and local hazard mitigation; comprehensive land use;

Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Limited progress would be made in achieving hazard reduction goals.
	Maintain current process of promoting community hazard reduction programs.	$0	Some progress would be made, but implementation of community mitigation actions would limit progress in achieving goals.
	Enhance methods of promoting community hazard reduction programs.	$0	Increased community participation in hazard mitigation actions.

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	

Action Worksheet			
Project Name:	Establish Floodplain Management Program for Channel Migration		
Project Number:	NE-004		
Risk / Vulnerability			
Hazard of Concern:	Multiple		
Description of the Problem:	Widespread flooding in 2019 caused the relocation of a number of waterway channels, resulting in new unmapped floodplains that present increased levels of risk to population, property and existing infrastructure.		
Action or Project Intended for Implementation			
Description of the Solution:	A floodplain managment program for channel migration should be implemented with the philosphy that infrastructure should work with the natural hydrology instead of changing the waterways to meet existing infrastructure, and emphasize nature-based solutions.		
Is this project related to a Critical Facility?		**Yes** ☑	**No** ☑
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:	500-year flood	**Estimated Benefits (losses avoided):**	An exact estimate of losses avoided is difficult to calculate; however, by identifying locations of channel migration and instituting floodplain management practices in these areas, losses avoided from future flood events can be documented.
Useful Life:	Undetermined		
Estimated Cost:	Undetermined		
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implemetation:**	5 years
Estimated Time Required for Project Implementation:	5 years	**Potential Funding Sources:**	HMA grants, local budgets, private partnerships
Responsible Organization:	NEMA	**Local Planning Mechanisms to be Used in Implementation, if any:**	State and local hazard mitigation; comprehensive land use;
Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Limited progress would be made in achieving hazard reduction goals related to flood.
	Maintain current floodplain management practices, documenting channel migration when identified.	$0	Some progress would be made, but delayed implementation of flood mitigation actions could increase future impacts and limit progress in achieving goals.
	Develop a statewide initiative to implement floodplain management practices related to channel migration.	$0	Reduction of flood impacts and losses in future events.
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			

Action Worksheet			
Project Name:	Establish Program to Promote Building Code Updates and Enforcement		
Project Number:	NE-005		
Risk / Vulnerability			
Hazard of Concern:	Flood, Severe Thunderstorm, Tornado		
Description of the Problem:	Many local jurisdictions have building codes that are out of date or not fully enforced, leading to the vulnerability of structures in high wind, flood, hail or tornado events. This vulnerability could result in higher risk to people and cause tremendous dollar losses for property owners.		
Action or Project Intended for Implementation			
Description of the Solution:	A statewide initiative to promote and support enhancement of local building codes through updates, enforcement and adoption of higher standards would lower the risk of impacts to people and property, including critical infrastructure.		
Is this project related to a Critical Facility?		**Yes** ☑	**No** ☐
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:	500-year flood	**Estimated Benefits (losses avoided):**	An exact estimate of losses avoided is difficult to calculate for this action; however, by enhancing and enforcing building codes, losses from future hazard events may be reduced or avoided.
Useful Life:	Undetermined		
Estimated Cost:	Undetermined		
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implemetation:**	5 years
Estimated Time Required for Project Implementation:	5 years	**Potential Funding Sources:**	HMA grants, local budgets, private partnerships
Responsible Organization:	**TBD***	**Local Planning Mechanisms to be Used in Implementation, if any:**	State and local hazard mitigation; comprehensive land use;

Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Limited progress would be made in achieving hazard reduction goals related to protection of structures.
	Work with local governments in a "piecemeal" fashion to adopt and enforce higher building code standards.	$0	Some progress would be made, but delayed implementation of higher standards could increase future impacts and limit progress in achieving goals.
	Develop a statewide initiative in coordination with local jurisdictions to promote adoption of higher standards, and document improvement in enforcement.	$0	Achieve goals/objectives by reducing vulnerability of buildings and critical structures from future events.

Progress Report (for plan maintenance)	
Date of Status Report:	
Report of Progress:	
Update Evaluation of the Problem and/or Solution:	*** As of November 2014, no state agency is assigned with the authority or responsibility to provide state oversight for local implementation and enforcement of LB405-2019, which "adopts by reference" the State Building Code. The Responsible Aency for NE-005 will be determined upon funding availability.**

Action Worksheet			
Project Name	Establish State Residential Safe Room Program		
Project Number	NE-006		
Risk / Vulnerability			
Hazard of Concern:	Tornadoes, High Winds, Severe Thunderstorms		
Description of the Problem:	Tornadoes pose a significant threat to the lives and safety of all citizens in Nebraska. As one of the most frequent severe weather events to occur annually, tornadoes are capable of intense and significant destruction. Residential safe rooms are costly to build for property owners and can range from $8,000 to $17,000 depending on the size and design.		
Action or Project Intended for Implementation			
Description of the Solution:	Initiate a program to provide a rebate for the purchase and installation of a residential safe room for property owners in Nebraska.		
Is this project related to a Critical Facility?		**Yes** ☐	**No** ☑
(If yes, this project must intend to protect the Critical Facility to the 500-year flood event or the actual worst damage scenario, whichever is greater.)			
Level of Protection:	Near total	**Estimated Benefits (losses avoided):**	Avoiding loss of life and injury.
Useful Life:	50 year		
Estimated Cost:	$8,000 - $17,000 per unit		
Plan for Implementation			
Prioritization:	High	**Desired Timeframe for Implementation:**	2023
Estimated Time Required for Project Implementation:	2 years	**Potential Funding Sources:**	HMGP
Responsible Organization:	NEMA	**Local Planning Mechanisms to be used in Implementation, if any:**	Building Codes, Zoning Codes, State and Local Hazard Mitigation, Comprehensive Land Use
Three Alternatives Considered (including No Action)			
Alternatives:	**Action**	**Estimated Cost**	**Evaluation**
	No Action	$0	Property owners will pay their own cost. May be cost-prohibitive, preventing people from installing them.
	Encourage local jurisdictions to submit safe room applications under HMGP.	$0	Some progress would be made. Smaller, less affluent jurisdictions will have difficulty implementing this program.
	Encourage local jurisdictions to develop their own funding mechanisms.	$0	Smaller, less affluent jurisdictions will have difficulty implementing this program.
Progress Report (for plan maintenance)			
Date of Status Report:			
Report of Progress:			
Update Evaluation of the Problem and/or Solution:			

C-3 - 2021 Prioritized Mitigation Actions

[Use C-4 Mitigation Action Ranking Criteria to score and rank projects.]

Project #	Mitigation Action	Hazard/ Project Type*	Life, Safety & Property	Funding Availability	Matching Funds	Benefit Cost Review	Environ-mental Benefit	Technical Feasibility	Timeframe to Implement (ST or LT)	Goal/ Obj.	TOTAL SCORE
NE-001	**Central Risk Database**	**Multi-hazard**	4	1	2	2	3	2	2	1/1.5	16-M
NE-002	**Statewide Acquisition Strategy**	**Flood**	1	3	2	4	2	4	4	2/2.2	20-MH
NE-003	**Promote Hazard Reduction Programs**	**Multi-hazard**	1	1	2	2	2	4	2	3/3.1, 3.2, 3.4	14-M
NE-004	**Floodplain Mgmt. for Channel Migration**	**Flood**	0	2	2	0	0	0	2	4/(all) 5/(all)	6-L
NE-005	**Promote Building Code Updates and Enforcement**	**Multi-hazard**	4	0	0	0	1	4	3	1/1.1 5/5.1, 5.2	12-ML

C-4 Mitigation Action Ranking Criteria and Worksheet

Category	Points	Criteria
(1) Life Safety/Property Protection	4	Likely to protect more than 50% of the population and/or critical infrastructure and community assets.
	3	Likely to protect between 25 and 50 % of the population and/or critical infrastructure and community assets.
	2	Could potentially protect up to 25 % of the population and could potentially protect critical infrastructure and community assets
	1	Could potentially protect up to 10 % of the population and could potentially protect critical infrastructure and community assets
	0	Potential for protecting lives and critical infrastructure and/or community assets cannot be determined at this time.
(2) Funding Availability	4	Little to no direct expenses
	3	Can be funded by operating budget
	2	Grant funding identified
	1	Grant funding needed
	0	Potential funding source unknown
(3) Probability of Matching Funds	4	Funding match is available or funding match not required
	-	N/A
	2	Partial funding match available
	-	N/A
	0	No funding match available or funding match unknown
(4) Benefit Cost Review	4	Likely to meet Benefit Cost Review
	-	N/A
	2	Benefit Cost Review not required
	-	N/A
	0	Benefit Cost Review unknown
(5) Environmental Benefit	4	Environmentally sound and relatively easy to implement; or no adverse impact on environment.
	3	Environmentally acceptable and not anticipated to be difficult to implement
	2	Environmental concerns are somewhat difficult to implement because of complex requirements
	1	Difficult to implement because of significantly complex requirements and environmental permitting
	0	Very difficult to implement due to extremely complex requirements and environmental permitting problems
(6) Technical Feasibility	4	Proven to be technically feasible
	-	N/A
	2	Expected to be technically feasible
	-	N/A
	0	Technical feasibility unknown or additional information needed

(7) Timeframe of implementation	4	1 year or less (Short Term)
	-	N/A
	2	2 – 5 years (Long-Term)
	-	N/A
	0	More than 5 years (Long-Term)
Minimum = 0 **Maximum = 28**	**Ranking Level:** **Low: 0-10**	**Medium: 11-20** **High: 21-28**

C-5 - Mitigation Action Status Worksheet

[Complete annually and for five-year plan update.]

Project #	Mitigation Action	Hazard/ Project Type*	Completed	In progress	Delayed	Removed	Comments

APPENDIX D: Local Hazard Mitigation Plans

D-1 Local Mitigation Plan Database

Because of the size of the Excel file containing the Local Hazard Mitigation Plan database, a sampling is provided below and some formatting elements may not be clearly displayed. An additional sheet documents all jurisdictions that participate in each plan. The electronic Excel file is updated and maintained by the Nebraska Emergency Management Agency (NEMA).

Data Type	SubType	Description	Code	Cedar Dixon	Central Platte NRD
Plan Year	2021 NE SHMP	STATUS - [Expires 2021]	2016		
Hazard	2021 NE SHMP	Agricultural Animal Disease		M	X
Hazard	2021 NE SHMP	Agricultural Plant Disease		X	X
Hazard	2021 NE SHMP	Chemical Fixed Sites		X	
Hazard	2021 NE SHMP	Chemical Transportation		X	X
Hazard	2022 NE SHMP	Civil Disorder			
Hazard	2021 NE SHMP	Dam Failure		X	X
Hazard	2021 NE SHMP	Drought		M	X
Hazard	2021 NE SHMP	Earthquake			X
Hazard	2021 NE SHMP	Expansive Soil			
Hazard	2021 NE SHMP	Extreme Cold			
Hazard	2021 NE SHMP	Extreme Heat		M	X
Hazard	2021 NE SHMP	Flood		H	H
Hazard	2021 NE SHMP	Hail		X	H
Hazard	2021 NE SHMP	High Winds		X	X
Hazard	2021 NE SHMP	Hurricane			
Hazard	2021 NE SHMP	Ice			
Hazard	2021 NE SHMP	Invasive Species			

Hazard	2021 NE SHMP	Landslide		X	
Hazard	2021 NE SHMP	Land Subsidence			
Hazard	2021 NE SHMP	Levee Failure		X	X
Hazard	2021 NE SHMP	Lightning			
Hazard	2021 NE SHMP	Pandemic			
Hazard	2022 NE SHMP	Radiological			
Hazard	2021 NE SHMP	Severe Thunderstorm		H	H
Hazard	2021 NE SHMP	Severe Winter Storms		M	H
Hazard	2021 NE SHMP	Snow			
Hazard	2021 NE SHMP	Tornado		H	H
Hazard	2021 NE SHMP	Terrorism		X	X
Hazard	2021 NE SHMP	Transportation Incidents			
Hazard	2021 NE SHMP	Urban Fire		X	
Hazard	2021 NE SHMP	Wildfire		X	X
Dataset and Demographics	HAZUS	Has the county done a level 2 HAZUS model?	X		
Dataset and Demographics	Built Environment	Does plan list existing and future structures	X	X	X
Dataset and Demographics	Built Environment	Building Assets	List	X	X
Dataset and Demographics	Built Environment	Risk/Vulnerability Analysis Resources	1 through 5	X	X
Dataset and Demographics	Built Environment	Potential $ amount of structural loss (flood)	$ Amount	$ 2,926,000	$ 20,224,000
Dataset and Demographics	Program	Cost Benefits of Projects	$Amount		

Dataset and Demographics	Planning and Regulatory	Building Code Effectiveness Grading Schedule (BCEGS) Score	X		
Dataset and Demographics	Program	Fire Department ISO rating	X		
Capability	Plans	Capital improvement plan	X		X
Capability	Plans	College campus plan	X		
Capability	Plans	Comprehensive/Master Plan	X	X	X
Capability	Plans	Continuity of Operations Plan	X		
Capability	Plans	Community Wildfire Protection Plan/FireWise	X		
Capability	Plans	Disaster Recovery Plan	X		
Capability	Plans	Drought Preparedness Plan	X		
Capability	Plans	Economic development plan	X	X	X
Capability	Plans	Emergency management, response/evacuation plan	X	X	X
Capability	Plans	Flood Mitigation Plan (CRS/NFIP/SFHA)	X		X
Capability	Plans	Farmland Preservation Plan	X		
Capability	Plans	Historical Preservation Plan	X		
Capability	Plans	Natural Resource Protection Plan	X		
Capability	Plans	Open space / Parks & Rec	X		
Capability	Plans	Post-Disaster Recovery Plan	X		
Capability	Plans	Radiological Plan	X		
Capability	Plans	Post-disaster Redevelopment plan	X		
Capability	Plans	Storm Water Management Plan	X		
Capability	Plans	Transportation Plan	X		
Capability	Plans	Regional Sustainability Plan	X		
Capability	Plans	Wellhead Protection Plan			
Capability	Plans	Watershed Plan	X		
Capability	Policies / Ordinance	Building codes	X	X	X
Capability	Policies / Ordinance	Flood Insurance Rate Map (FIRM, DFIRM)	X	X	X

Capability	Policies / Ordinance	Historic Preservation Ordinance/Plan	X		
Capability	Policies / Ordinance	Land Acquisition Ordinance	X		
Capability	Policies / Ordinance	Post-Disaster Recovery Ordinance	X		
Capability	Policies / Ordinance	Real estate disclosure requirements	X		
Capability	Policies / Ordinance	Steep slope ordinance	X		
Capability	Policies / Ordinance	Storm Water / Watershed Management Ordinance	X		
Capability	Policies / Ordinance	Tree Ordinance		X	
Capability	Policies / Ordinance	Water Conservation Standards	X	X	
Capability	Policies / Ordinance	Wildfire Protection Ordinance	X		
Capability	Policies / Ordinance	Zoning ordinance/land use restrictions	X	X	X
Capability	Program	Code Enforcement Disaster Assistance Response	X		
Capability	Program	Dam Safety Program	X		
Capability	Program	Infrastructure Maintenance	X		
Capability	Program	Mutual Aid Agreement	X	X	
Capability	Program	National Flood Insurance Program participant	X	X	X
Capability	Program	Flood Control Program			
Capability	Program	Bridge Flood Watch Program	X		
Capability	Program	Highway Infrastructure	X		
Capability	Program	Public Education / awareness programs	X	X	X
Capability	Program	Seismic Design Specifications for New Bridges	X		
Capability	Program	Snow/Ice Removal Program		X	X
Capability	Program	Technical Assistance Program	X		
Capability	Program	Tree City USA Program		X	X
Capability	Program	Windbreak/Shelterbelt Establishment program			
Capability	Program	Wellhead Protection Program			
Capability	Program	Ignition Resistant Building Materials Incentive Program			
Asset / Action	Projects	Bank/Dune Stabilization	X		

Asset / Action	Projects	Drought Resistant Vegetation	X		
Asset / Action	Projects	Hydrological / hydraulic studies	X		
Asset / Action	Projects	Property Acquisition	X		
Asset / Action	Projects	Drainage system improvement/stormwater management	X	X	
Asset / Action	Projects	Mitigation Policy Development/Improvement		X	X
Asset / Action	Projects	Heating and Cooling Centers	X		
Asset / Action	Projects	Infrastructure Retrofit	X	X	
Asset / Action	Projects	Dam Repairs			
Asset / Action	Projects	Levee/ Floodwall Construction and/or Improvements			
Asset / Action	Projects	Streambeds, Channel & Drainage Bottlenecks/Flow Restrictions Improvement			
Asset / Action	Projects	Relocation of Structures	X	X	
Asset / Action	Projects	Flood Proofing	X		
Asset / Action	Projects	Hail Resistant Design and Construction		X	
Asset / Action	Projects	Wind Resistant Design and Construction	X	X	
Asset / Action	Projects	Warning Sirens Installation/Improvements		X	
Asset / Action	Projects	New Municipal Wells			
Asset / Action	Projects	Berm Installation			
Asset / Action	Projects	Safe Rooms			
Asset / Action	Projects	Loop and/or Bury Powerlines			
Asset / Action	Projects	Backup Generators			
Asset / Action	Studies / Reports	Hazard Analysis / Risk Assessment	X	X	X
Asset / Action	Studies / Reports	Floodplain maps / Flood Insurance Studies	X	X	X
Asset / Action	Studies / Reports	Hydrological / hydraulic studies	X		
Asset / Action	Staff /Departments	Engineer	X	X	X
Asset / Action	Staff /Departments	Planner	X	X	X
Asset / Action	Staff /Departments	Building code official	X	X	X

Asset / Action	Staff /Departments	HAZUS specialist	X		
Asset / Action	Staff /Departments	GIS Specialist	X	X	X
Asset / Action	Staff /Departments	Public Works official	X		
Asset / Action	Staff /Departments	Environmental conservation specialist	X		
Asset / Action	Staff /Departments	Public information official	X		
Asset / Action	Staff /Departments	Grant Writer	X	X	X
Asset / Action	Staff /Departments	Emergency Personnel	X	X	X
Asset / Action	Staff /Departments	Floodplain Personnel	X		X
Asset / Action	Funding	Capital Improvement Projects Funding	X	X	X
Asset / Action	Funding	Community Development Block Grant(s)	X	X	
Asset / Action	Funding	DEP Floodplain Management Funding	X		
Asset / Action	Funding	FEMA Hazard Mitigation Grant Program	X	X	
Asset / Action	Funding	FEMA Pre-Disaster Mitigation Grant	X		
Asset/Action	Funding	FEMA FMA Grant	X		
Asset / Action	Funding	Federal Funding - Other	X	X	X
Asset / Action	Funding	State Funding	X		
Asset / Action	Funding	Levee Local Tax/Bond for Mitigation			
Asset / Action	Funding	Local Tax/Bond for Mitigation Projects		X	X
Asset / Action	Funding	U.S. Small Business Administration (SBA)		X	X
Asset / Action	Plan Maintenance	Stakeholders / Steering Committee	X		
Asset / Action	Plan Maintenance	County, City or Village Administrator/Manager			
Asset/Action	Plan Maintenance	Hazard Mitigation Coordinator	X		