NEBRASKA

EMERGENCY MANAGEMENT AGENCY

2019
Hazard Mitigation Plan

State of Nebraska

Pete Ricketts, Governor

Good Life. Great Strength.

Pete Ricketts
Governor

STATE OF NEBRASKA
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May 3, 2019

Mr. Paul Taylor, Region Administrator
U.S. Department of Homeland Security
Federal Emergency Management Agency Region VII
11224 Holmes Road
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 CFR 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 statues as required in 44 C.F.R. §13.11 (d).

Sincerely,

Pete Ricketts
Governor

Contents

Tables 6
Figures 8
Distribution List 9
Acronyms 10
Glossary 12
1 – Introduction 14
1.1 – Purpose 14
1.2 – Organization 14
1.3 – Adoption 15
1.4 – Compliance, Authorities, and Regulations 15
1.4.1 – Federal Responsibilities 16
1.4.2 – State Responsibilities 17
2 – Planning Process 19
2.1 – Evolution of the State Hazard Mitigation Plan 19
2.1.1 – Planning History 19
2.1.2 – Summary of Changes 20
2.2 – Coordination and Documentation of the Planning Process 20
2.2.1 – Core Planning Team 21
2.2.2 – Planning Timeline 22
2.2.3- Participation 24
2.3 – Statewide Mitigation Engagement 25
2.4 – Integration with other plans, programs, and initiatives 26
2.4.1 – State, Federal, and Local 26
2.4.2 – Challenges to Integration 26
2.4.3 – Future Planning and Mitigation Efforts 26
3 – Risk Assessment 27
3.1 – Hazard Identification 28
3.1.1 – Hazard Elimination 28
3.1.2 – Hazards Profiled 31
3.2 – General Hazard Information 32
3.2.1 - Declarations 32

3.2.2 – State Assets 36
3.2.3 – Local Hazard Mitigation Planning Regions 41
3.3 – Hazard Profiles 42
3.3.1 – Animal Disease 43
3.3.2 – Plant Disease and Pests 51
3.3.3 – Dam Failure 62
3.3.4 – Drought 69
3.3.5 – Flood/Flash Flood 77
3.3.6 – Levee Failure or Overtopping 92
3.3.7 – Severe Winter Storm 97
3.3.8 – Severe Thunderstorm 102
3.3.9 – Terrorism 109
3.3.10 – Tornado 115
3.3.11 – Wildfire 123
3.4 – State Development Trends 131
4 – Mitigation Capabilities and Strategy 135
4.1 – 2014 Goals, Objectives, and Actions 136
4.2 – State Capability Assessment 138
4.2.1 – Organizations 139
4.2.2 – Funding Sources 144
4.2.3 – Evaluation of State Laws, Regulations, and Policies 145
4.2.4 – Challenges and Changes of State Capabilities 148
4.3 – Local Capability and Planning Assessment 148
4.4 – 2019 Core Capabilities 152
4.4.1 – Planning 152
4.4.2 – Public Information and Warning 153
4.4.3 – Operational Coordination 153
4.4.4 – Community Resilience 154
4.4.5 – Long-Term Vulnerability Reduction 155
4.4.6 – Risk and Disaster Resilience Assessment 155
4.4.7 – Threats and Hazards Identification 156
4.5 – Repetitive and Severe Repetitive Loss Strategy 156

4.6 – Project Prioritization Criteria and Process 159
4.6.1 – Project Criteria 159
4.6.2 – Project Development and Implementation Process 160
5 – Plan Evaluation, Maintenance, Implementation, and Revision 161
5.1 – Plan Review and Evaluation 161
5.2 – Monitoring of Mitigation Activities 162
References 164
Annexes 169

Tables

Table 2-1: Summary of Changes 20
Table 2-2: Core Planning Team 21
Table 2-3: GTF Meetings since 2014 22
Table 2-4: Stakeholders Meetings 23
Table 2-5: Agency Contributions to Plan Revision 24
Table 2-6: Statewide Mitigation Engagement 25
Table 3-1: Disaster Declarations by Type 32
Table 3-2: Federal Disaster Declarations 34
Table 3-3: USDA Disaster Declarations 36
Table 3-4: State Assets 37
Table 3-5: Animal Disease Impacts 43
Table 3-6: Plant Disease and Pests Impacts 51
Table 3-7: Dam Failure Impacts 62
Table 3-8: Dam Classification 63
Table 3-9: Dam Breakdown by Planning Area 66
Table 3-10: Drought Impacts 69
Table 3-11: US Drought Monitor Classifications 70
Table 3-12: Drought Probability 74
Table 3-13: Flood/Flash Flood Impacts 77
Table 3-14: Total Damages, Deaths, and Injuries 1996-2018 81
Table 3-15: Federal Disaster Declarations involving flooding 82
Table 3-16: Nebraska River Sub-Regions Summary 83
Table 3-17: Top Ten Counties for Flood Insurance Coverage 1978-2018 90
Table 3-18: Top Ten Counties for Flood Insurance Claims 1978-2018 91
Table 3-20: Levee Failure or Overtopping Impacts 92
Table 3-21: Counties with Levees 96
Table 3-22: Severe Winter Storm Impacts 97
Table 3-23: Federally Declared Disasters: Severe Winter Storms 98
Table 3-24: Replacement Values Top Ten Counties 101
Table 3-25: Severe Thunderstorm Impacts 102
Table 3-26: Federally Declared Disasters: Severe Thunderstorms 105
Table 3-27: Replacement Values Top Ten Counties 108
Table 3-28: Terrorism Impacts 109
Table 3-29: Terrorist Events Across Nebraska 112
Table 3-30: Tornado Impacts 115
Table 3-31: Fujita Scale 117
Table 3-32: Federally Declared Disasters: Tornados 120
Table 3-33: Replacement Values Top Ten Counties 122
Table 3-34: Wildfire Impacts 123
Table 3-35: Region 23 Complex Fire Estimated Loss 126
Table 3-36: Fires Across Nebraska 127

Table 3-37: Vulnerable Sites 129
Table 3-38: State Assets in High Vulnerability Areas 129
Table 3-39: State Assets in Moderate Vulnerability Areas 130
Table 3-40: Top Ten Counties By Population 132
Table 4-1: Project Funding Since 1990 145

Figures

Figure 2-1: Planning Timeline 22
Figure 3-1: Declared Disasters by Type 32
Figure 3-2: Nebraska Disaster Declaration Summary 33
Figure 3-3: Local Mitigation Planning Areas 41
Figure 3-4: Map of Dams in Nebraska 64
Figure 3-5: Dam Ownership Breakdown 65
Figure 3-6: US Drought Monitor Nov 20, 2012 71
Figure 3-7: Watershed Sub region Boundaries 80
Figure 3-8: Floodplain County Mapping Status 88
Figure 3-9: Statewide Flood Distribution (1996-2018) Proportion of flood and flash flood events statewide that have occurred in a given county. 89
Figure 3-10: Nebraska Levees (USACE Levee Inventory) 94
Figure 3-11: United States Wind Zones 104
Figure 3-12: The Staircase to Terrorism 110
Figure 3-13: Terrorist Events Across Nebraska 111
Figure 3-14: Hate Groups Across Nebraska 112
Figure 3-15: Hate Groups Across Nebraska 113
Figure 3-16: Wind Zones in the United States 118
Figure 3-17: Annual Average Tornado Watches Per Year 119
Figure 3-18: Mean Number of Tornado Days Per Year 119
Figure 3-19: Nebraska Tornados per Year 121
Figure 3-20: Nebraska Landscape Classes 125
Figure 3-21: Nebraska Wildfire Risk Map 125
Figure 3-22: NFS Community Wildfire Protection Plan Areas 128
Figure 3-23: County Population Map 131
Figure 3-24: County Population Younger than 5 Years Old 133
Figure 3-25: County Population Older than 65 Years Old 133
Figure 3-26: Poverty per County 134
Figure 4-1: Local Mitigation Planning Areas 149

Distribution List

Number	Agency	Position
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Acronyms

BCA	Benefit Cost Analysis
CAA	Clean Air Act
CARC	Climate Assessment Response Committee
CDBG	Community Development Block Grant
C.F.R.	Code of Federal Regulations
COOP	Continuity of Operations Plan
CRP	Conservation Reserve Program
CRS	Community Rating System
CTP	Cooperating Technical Partnership
DART	Drought Assessment and Response Team
EMA	Emergency Management Assistance/Agency
EMAP	Emergency Management Accreditation Program
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FMAG	Fire Management Assistance Grants
GAR	Governor's Authorized Representative
GTFDR	Governor's Task Force for Disaster Recovery
HIRA	Hazard identification and Risk Assessment
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
ICC	Increased Cost of Compliance
LEDRS	Livestock Emergency Disease Response System
LEPC	Local Emergency Planning Committee
MYTEP	Multi-Year Training and Exercise Program
NCDC	National Climatic Data Center (now National Centers for Environmental Information)
NCEI	National Centers for Environmental Information
NDAS	Nebraska Department of Administrative Services
NDED	Nebraska Department of Economic Development
NDEQ	Nebraska Department of Environmental Quality
NDHHS	Nebraska Department of Health and Human Services
NDOT	Nebraska Department of Transportation
NeDNR	Nebraska Department of Natural Resources

NeG&PC	Nebraska Game and Parks Commission
NEMA	Nebraska Emergency Management Agency
NFIP	National Flood Insurance Program
NFS	Nebraska Forest Service
NIAC	Nebraska Information Analysis Center
NOAA	National Oceanic and Atmospheric Administration
NSP	Nebraska State Patrol
NREA	Nebraska Rural Electric Association
NRCS	Natural Resources Conservation Service
NRD	Natural Resources District
NWS	National Weather Service
PA	Public Assistance
PDM	Pre-Disaster Mitigation Grant
PET	Planning, Training, and Exercise
PPD	Public Power District
PPE	Personal Protective Equipment
RFC	Repetitive Flood Claims Program
RiskMAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
SBA	Small Business Administration
SEOP	State Emergency Operations Plan
SERC	State Emergency Response Commission
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHMP	Sate Hazard Mitigation Plan
SHMT	State Hazard Mitigation Team
SHPO	State Historical Preservation Officer
SRL	Severe Repetitive Loss
THIRA	Threat and Hazard Identification and Risk Assessment
USACE	United States' Army Corps of Engineers
USDA	United States' Department of Agriculture
USDI	United States' Department of Interior
USGS	United States' Geological Survey
USHUD	United States' Department of Housing and Urban Development
USFWS	United States' Fish and Wildlife Service

Glossary

(SELECT DEFINITIONS FOR REFERENCE)

Climate Assessment Response Committee (CARC): replaced DART, formed to address the state-wide problem of drought and create the Drought Mitigation Response Plan.

Drought Assessment and Response Team: created to develop written strategies addressing the state-wide problem of drought; predecessor of CARC.

Flood Mitigation Assistance (FMA): The FMA program is authorized by section 1366 of the National Flood Insurance Act of 1968, as amended with the goal of reducing or eliminating claims under the NFIP. FMA provides funding to states, territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. Funding is appropriated by congress annually.

Governor's Authorized Representative (GAR)/Alternate Governor's Authorized Representative (ALT GAR): An individual appointed by and represents the Governor in all activities related to implementing Public Law 93-288 as amended and in ongoing state disaster/emergency preparedness, response, and hazard mitigation activities defined in the State Emergency Operations Plan (SEOP) and State Hazard Mitigation Plans.

Governor's Task Force for Disaster Recovery (GTFDR): Created in 1994 to coordinate disaster recovery, ensure efficient utilization of appropriations, and serve as the Nebraska Hazard Mitigation Planning Team.

Hazard: Natural or manmade source of cause of harm or difficulty. A hazard can be actual or potential.

Hazard Mitigation: Any cost-effective measure that will reduce the potential for damage from a natural disaster event, or any sustained action taken to reduce or eliminate long-term risk to life and property from a disaster.

Hazard Mitigation Plan: Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended by Section 104 of the Disaster Mitigation Act of 2000 requires a state Hazard Mitigation Plan as a condition of receiving disaster assistance funds, excluding assistance provided pursuant to emergency provisions. An approved Hazard Mitigation Plan is required to obtain Federal assistance.

Hazard Mitigation Grant Program (HMGP): The program authorized under §404 of the Stafford Act, which provides funding for certain mitigation measures identified through the evaluation of hazards conducted under Section 322 of the Disaster Mitigation Act of 2000.

National Flood Insurance Program (NFIP): A federal program created by Congress through the National Flood Insurance Act of 1968 that makes flood insurance available to homeowners, business owners, and renters that reside in communities that have joined the NFIP. Communities

in the NFIP program must adopt and enforce floodplain management regulations that meet or exceed the minimum floodplain management requirements of the NFIP.

Nebraska Information Analysis Center (NAIC): Nebraska'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 hazards. The NIAC is operated by the Nebraska State Patrol.

Natural Resource Districts (NRD): Twenty-three regional governmental entities that lead several local hazard mitigation plan developments along with responsible for water management, flood control, and other projects within their taxing authority area.

Pre-Disaster Mitigation (PDM) Grant: Authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, PDM assists states, territories, federally-recognized tribes, and local communities implement a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk from future hazard events and reducing reliance of federal funding in future disasters. PDM grants are funded annually by congressional appropriations and are awarded on a nationally competitive basis.

Public Assistance (PA): FEMA grant program to assist state and local governments in responding and recovering after a federally declared disaster.

Risk: Potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences.

Risk Assessment: Product or process which collects information and assigns values to risks for the purpose of informing priorities; developing or comparing courses of action; and informing decision making. A risk assessment can be the resulting product created through analysis of the component parts of risk.

State Hazard Mitigation Officer (SHMO): The representative of state government who is the primary point of contact in planning and implementing pre- and post-disaster mitigation programs and activities authorized under the Stafford Act.

State Hazard Mitigation Plan (SHMP): Must be approved by FEMA in order for states to be eligible to receive Stafford Act assistance, excluding emergency assistance. The Hazard Mitigation Plan required under section 322 of the Stafford Act as a condition of receiving Federal disaster assistance under PL. 93-288, as amended. The plan is the basis for the identification of measures to be funded under section 404. This plan demonstrates the state's goals, priorities, and commitment to reduce risks from natural hazards and serves as a guide for state and local decision makers as they commit resources to reducing the devastating effects of natural hazards.

Vulnerability: Physical feature or operational attribute that renders an entity, asset, system, network, or geographic area open to exploitation or susceptible to a given hazard.

1 – Introduction

The Disaster Mitigation Act of 2000 requires the revision of the Nebraska State Hazard Mitigation Plan every five years. The 2019 plan is an update of the 2014 plan and previous versions of the plan. Responsibility for the maintenance and revision of the plan is assigned to the Recovery Section of the Nebraska Emergency Management Agency. 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 Nebraska State Hazard Mitigation Plan is to provide a comprehensive discussion of the hazards that present risks to the citizens, resources, and property of Nebraska along with identifying the states objectives and commitment in reducing the risks 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 Nebraska State Hazard Mitigation Plan seeks to provide a framework to reduce the risk hazards possess to the lives and property of Nebraskans. It expands on Nebraska's commitment of over 30 years of programming to reducing risk and providing the tools and resources to encourage and engage in mitigation activities:

- Create a vision for a resilient future
- Set goals and objectives to build towards FEMA defined capabilities
- Promote interagency coordination in the areas of hazard mitigation and resiliency
- Comply with state and federal requirements
- Identify all hazards threatening the state
- Set a framework for the effective creation and implementation of mitigation activities

The purpose of the Nebraska State Hazard Mitigation Plan 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 – Organization

1. **Introduction:** states the purpose of the plan, provides the state's assurances of compliance with all applicable state and federal statutes and regulations.
2. **Planning Process:** explains the planning process including how the plan was revised, who was involved and the integration of other planning efforts.
3. **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.
4. **Mitigation Capabilities and Strategy:** outlines the state mitigation capabilities and provides the state's mitigation blueprint. Specifically, it examines the 2014 goals and objectives and lays out the mitigation core capabilities. This section also describes the state's roles in funding, developing, coordinating, and approving local mitigation plans.

5. **Plan, Review Evaluation, and Implementation:** outlines the method NEMA and the Governor's Task Force for Disaster Recovery (GTFDR) uses to monitor, evaluate, and update the plan. It also outlines how the state reviews progress on achieving the core capabilities of the mitigation strategy.

Annexes: The Nebraska Rural Electric Association Annex and additional individual Public Power District Annexes address specific electrical planning efforts.

Federal Emergency Management Agency plan requirements along with Emergency Management Accreditation Program standards are in blue italic text throughout the document.

1.3 – Adoption

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

The Governor's Authorized Representative (GAR), Assistant Director of NEMA, has adopted the 2019 update of the Nebraska Hazard Mitigation Plan for implementation on May 19, 2019 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

S20. Did the state provide assurances? [44 C.F.R. §201.4(c)(7)]

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 C.F.R.; 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); 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 C.F.R. §13.11(c), and will amend its plans whenever necessary to reflect changes in state or federal laws and statues as required in 44 C.F.R. §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

EMAP 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 interim and long-term strategies, actions, goals, and objectives.

This plan incorporates the associated federal/state hazard mitigation program, including the applicable sections of the Disaster Mitigation Act of 2000 and is in compliance with the mitigations standards for accreditation outlined in the Emergency Management Accreditation Program (EMAP).

1.4.1 – Federal Responsibilities

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

1.4.2 – State Responsibilities

44 C.F.R. §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 HMG funding, prepared 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 C.F.R. §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 C.F.R. §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 C.F.R. parts 200 and 3002.

44 C.F.R. §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 C.F.R. §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 C.F.R. §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.

2 – Planning Process

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)]

This section documents the process used in the revision of the 2014 for the 2019 edition including how the state coordinates its efforts with other agencies and 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 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 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 2019 revision of the state hazard mitigation plan is to considered to be a comprehensive review and updating of the 2014 plan.

Table 2-1: Summary of Changes

Summary of Changes	
Section	**Change**
Overall	• Comprehensive review and updating • Simplification and reduction of duplicate information • Increased readability and usefulness • Inclusion of EMAP requirements in appropriate sections
Section 1: Introduction	• Simplified to highlight key information locations in the plan • Updated to reflect content location changes
Section 2: Planning Process	• Participants and engagement information revised • 2019 planning timeline added
Section 3: Risk Assessment	• Latest storm and disaster declaration data add to appropriate hazards • Impact summary revised to reflect latest impacts on the state • Removal of the chemical transportation, power failure, and transportation hazard profiles • Incorporated updated stakeholder information in hazard profiles
Section 4: Mitigation Capabilities and Strategy	• Adapted from the 2014 plan to include additional analysis on state and local capabilities • State objectives replaced with goals under the Core Capabilities concept • Updates to funding descriptions and requirement per latest FEMA guidance documents
Section 5: Plan Evaluation, Maintenance, Implementation, and Revision	• Expanded detail on plan evaluation, maintenance, implementation, and revision

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 2019 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 listed in section 4. It is also intended to actively promote and coordinate mitigation planning and programming by 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 Nebraska Emergency Management Agency initiated the plan review and update process with NEMA Recovery Section staff meetings in 2016. During those meetings it was determined that all aspects of the plan needed revisions to provide clarity and to meet planning requirements of FEMA. A core planning team of individuals across NEMA was assembled to assist in the revision of the state plan and are identified in Table 2-2. This group was expanded to meet workload requirements and bring in additional input.

Table 2-2: Core Planning Team

Core Planning Team		
Name	**NEMA Section**	**Title**
Colton Baker	Recovery	Recovery Planning Specialist
Molly Bargmann	Recovery	Recovery Section Supervisor
Kyle Barzen-Hanson	Recovery	Recovery Planning Specialist
Donny Christenson	Recovery	Recovery Section Manager
Patrick Conway	Recovery	Recovery Planning Specialist
John Cook	Recovery	Recovery Planning Specialist
Walter Kirkland	Planning	EM Planning Specialist
Camille Pipis	Recovery	Recovery Planning Specialist
Patrick Rooney	Planning	EM Planning Specialist
Sean Runge	Planning	Planning Unit Supervisor
Ashton Tennis	Recovery	Recovery Planning Specialist
Nicholas Walsh	Recovery	Recovery Program Specialist

2.2.2 – Planning Timeline

Figure 2-1: Planning Timeline

Table 2-3: GTF Meetings since 2014

Meetings of the Governor's Task Force Since 2014	
Date	**Participating Entities**
April 21, 2014	NEMA., DHHS, NDEQ, NDOT, SHPO, NEDED, NDAS, NDAG, NeG&P
October 3, 2014	NEMA, NeDNR, USACE, DHHS, NDEQ, NDED, NDOT, NDAS, SHPO, NDAG
October 5, 2015	NEMA, USACE, DHHS, NDEQ, SHPO, NDAS, NDAG, NeG&P
October 30, 2017	NEMA, NeDNR, USACE, DHHS, DEQ, NDOT, SHPO, DAG, NDE, AND NFS
November 20, 2018	NEMA, NeDNR, NDAG,NDE, NDED, NDOT, SHPO, USACE, USDA, NDEQ, DHHS, NFS

Participation of agencies and stakeholders was determined by the list of stakeholders involved in the 2014 plan revision along with members in the Governor's Taskforce for Disaster Recovery. Coordination between state agencies and other organizations was accomplished with stakeholder meetings conducted throughout 2016 and 2017 followed by meetings of the core planning team comprised of NEMA Recovery and Planning Staff. This was in addition to the regular meetings of the GTF since the 2014 revision as outline in table 2-3.

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 meeting dates are including in Table 2-4. Those who did not attend the stakeholder meeting or an individual meeting provided input via technical assistance or data. Figure 2-1 shows the general timeline of the plan revision.

Table 2-4: Stakeholders Meetings

Stakeholders Meetings		
Agency	**Stakeholder Meeting on 3/16/2017**	**Individual Meeting**
Nebraska Volunteer Organizations Active in Disasters		10/12/2016
University of Nebraska – Lincoln Emergency Management		11/26/2016
Nebraska State Patrol	✓	
Nebraska Department of Economic Development	✓	
Nebraska Department of Environmental Quality	✓	5/3/2017
Nebraska Department of Natural Resources	✓	4/18/2017
Nebraska Game and Parks Commission	✓	4/25/2017
Nebraska Historical Society	✓	5/4/2017
Nebraska Department of Administrative Services	✓	
Nebraska Department of Health and Human Services		4/3/2017
Nebraska State Climate Office	✓	4/11/2017
Nebraska Forest Service	✓	4/19/2017
Nebraska Emergency Management Agency	✓	
Nebraska Department of Energy	✓	8/10/2017
Nebraska Department of Transportation	✓	
University of Nebraska Extension	✓	
USDA Community Programs	✓	
National Weather Service	✓	5/16/2017
United States Army Corps of Engineers	✓	4/27/2017
National Drought Mitigation Center – UNL		4/26/2017
High Plains Regional Climate Center – UNL		4/11/2017
USDA Natural Resources Conservation Service		8/1/2017

Over the course of time between the initial meetings and final submission, stakeholders reviewed drafts of hazard profiles and provided feedback along with data such as historical damages, frequency of current and future events, and resource ideas. A final draft was emailed to stakeholders during the first part of 2019 for review and comments. Stakeholder and FEMA review comments were combined with final core planning reviews to complete the final submission to FEMA in March 2019.

2.2.3- Participation

The above-named agencies were also tasked with providing input and recommendations for the 2019 plan revision. Table 2-5 summarizes the agencies involvement and contributions.

Table 2-5: Agency Contributions to Plan Revision

Agency Contributions to Plan Revision	
Agency	**Contributions**
Nebraska Emergency Management Agency	Organized meetings along with NeDNR. Captured and summarized data. Incorporated updates into plan.
Nebraska Department of Natural Resources	Provided extensive information on current and previous flooding hazards across the state. Reviewed information on flooding, dams, and levees. Detailed the state's repetitive and severe repetitive loss strategies. Provided information concerning current mitigation activities and FMA grants. Provide information and guidance related to RiskMAP projects.
Nebraska Department of Transportation	Provided feedback on overall hazard mitigation strategy along with data on infrastructure.
Nebraska Department of Administrative Services	Provided information on state owned properties for analysis of vulnerability.
Nebraska Department of Environmental Quality	Provided information on mitigation activities and environmental protection.
U. S. Army Corps of Engineers	Supplied updated list of levees in Nebraska constructed, operated, or sponsor-operated by the USACE. Organizing agency of the National Dam Database and National Levee Inventory A lead agency of the Nebraska Silver Jackets Program.
Nebraska Silver Jackets	Inter-agency work group of state and federal partners. Provide updates on various flood mitigation activities across the state.
Public Power Districts	Provided information on hazards and historical impacts on district infrastructure Assisted with the development of power district annexes.
Natural Resource Districts	Facilitates the creation and revision of 14 regional hazard mitigation plans across the state.

FEMA	Provided information on past federal disaster and mitigation grants. Provided guidance via state consolations. Completed plan draft reviews and provided feedback.
UNL College of Architecture Planning Students	Students completed risk assessments on various hazards over the course a semester. These analyses provided insight used to refine hazard profiles.

Several federal agencies were consulted or used 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. U.S. Geological Survey
7. National Weather Service

2.3 – Statewide Mitigation Engagement

Mitigation engagement activities occur year round in the form of outreach webinars, applicant briefs, recovery related trainings, NEMA basic academy, and NFIP training along with others. Table 2-6 reflects a sample of mitigation engagement since the 2014 plan.

Table 2-6: Statewide Mitigation Engagement

Statewide Mitigation Engagement		
Event	**Topic**	**Dates**
GTF	Mitigation Projects and Plans	April 2014 October 2014 October 2015 October 2017 November 2018
Applicant Briefings	Mitigation after a disaster	June, July, August 2014 June, August, September 2015 July, August 2017 July, September 2018
G-205 Recovery from Disasters	Disaster Recovery	March 2019
Recovery Webinar Series	Disaster Recovery Process and Mitigation	Spring 2018
Hazard Mitigation Plans Training	Hazard Mitigation Plans	April 2014
G-393 Mitigation for Emergency Managers	Mitigation	August 2016
Silver Jackets Meetings, workshops, and projects	Mitigation Projects, Outreach, Public Meetings	2017 – 6 Events 2018 – 13 Events

		2019 – 1 Event

2.4 – Integration with other plans, programs, and initiatives

2.4.1 – State, Federal, and Local

The Nebraska Hazard Mitigation Plan is part of an overall planning process that is on-going in the State of Nebraska involving several state agencies. 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.

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 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 has also been a regular participant in workshops at both the national and local levels.

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. As of this update, staffing level have increased and have allowed for the integration of local plan information with this plan revision. Increased staffing will also provide opportunity 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, non-privates, 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 encourage active engagement between entities and local emergency management.

3 – Risk Assessment

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 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.

The foundation of the Nebraska State Hazard Mitigation Plan is the statewide risk assessment built off of previous state plans analysis, historical data, and local planning analysis updated to include recent data and shifts to hazard patterns. In order 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 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. The following definitions where used in this risk assessment:

Hazard: Natural or manmade source of cause of harm or difficulty. A hazard can be actual or potential.

Vulnerability: Physical feature or operational attribute that renders an entity, asset, system, network, or geographic area open to exploitation or susceptible to a given hazard.

Risk: Potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences.

Risk Assessment: Product or process which collects information and assigns values to risks for the purpose of informing priorities; developing or comparing courses of action, and information

decision making. A risk assessment can be the resulting product created through analysis of the component parts of risk.

As with other aspects of planning, hazard identification and risk assessment is an ongoing, continually evolving process. This plan incorporates efforts to improve the knowledge of the planning team/GTFDR, stakeholders, and citizens regarding the hazards known to threaten the state.

3.1 – Hazard Identification

The 2019 plan revision planning team identified hazards identified with in the previous 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 previous version were formulated.

3.1.1 – Hazard Elimination

The first step by the planning team was to identify which hazards are not likely to occur or significantly impact the state. Given the central location of Nebraska in North America and its generally flat, high plains terrain several hazards are precluded from occurrence. 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:

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

Additionally, several natural and manmade hazards were eliminated from further consideration in the risk assessment by both the 2014 planning team and the 2019 planning team. Additionally, the 2019 planning team eliminated chemical transportation, power failure, and transportation from further consideration. This determination is based on previous state hazard mitigation plans along with additional research to confirm that none of these hazards have changed since the 2014 plan revision. They are identified below:

1. Expansive Soils:
    a. 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.
    b. Areas of Nebraska have soil types that may contain expansive capabilities, 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.

2. Land Subsistence (Sinkholes):
    a. 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.
    b. 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.
3. Landslides:
    a. From the University of Nebraska's School of Natural Resources, the majority of Nebraska's landslides fall under five categories: rock falls, 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.
    b. A review of the University of Nebraska School of Natural Resources' Nebraska Landslides Database shows that a total 313 landslides have been documented in the state since surveys began around 1986 with no significant damages documented. Landslides in this data base 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.
    c. 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.
4. Chemical and Radiological Fixed Sites and Transportation:
    a. 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). These facilities report hazardous and extremely hazardous chemicals that are stored in their facility to local fire jurisdictions, the local emergency planning committee (LEPC), and the State Emergency Response Commission (SERC). In addition to the federal guidelines that have been enacted; the Nebraska Emergency Management Agency has signed agreements with fire jurisdictions that can be called upon to respond to a large chemical response.
    b. One active and one inactive nuclear power stations are located along the Missouri River in Nebraska. These facilities are tightly regulated by federal agencies and have engaged in extensive planning and exercise to prepare for any event.

c. Additionally, large amounts of radiological and chemical materials are transported across Nebraska by highway and rail. These shipments are highly regulated and are extensively covered by other planning efforts. Additionally, there has been no incidents that have required state assistance beyond what is routinely provided or has required activation of the State Emergency Operations Plan or Center.
d. As these facilities that fall under the EPCRA, CAA, and other federal regulations, it has been determined not to further profile chemical fixed sites as a hazard.

5. Civil Disorder
    a. 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.
    b. Records indicate that no state emergencies were declared or that the State Emergency Operations Center has been operation for a civil disorder event. However, the Governor has ordered National Guard units to support local entities during periods of civil disorder.
    c. Due to the limited number of incidents, limited scale of incidents, and that these incidents are within the scope of other planning documents this hazard has not been selected to further profile.
6. Power Failure
    a. Power failure can range from a small inconvenience to a life threating situation. However, power failure is primarily caused by one of the other profiled hazards such as severe thunderstorms, tornadoes, flooding, or severe winter storms. Historically, the public power districts have address power failure by addressing the causing hazards such as moving facilities out of the flood plain or using stronger conductors to reduce breaking from severe storms.
    b. Power failure is almost always a result of another hazard and is exclusively cover in PPD annexes. As a result, power failure has not been selected for further profiling.
7. Transportation
    a. 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.
    b. 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.
    c. For these reasons, transportation was eliminated from further profiling.

8. Urban Fires
    a. 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.
9. Earthquake
    a. Historically, Nebraska has seen less than one earthquake a 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.
    b. 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.
    c. 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. These impact would not be in the form of damages but in assisting impacted states and residents.
    d. Given the low chance of impact to the state, earthquakes were not further profiled.

3.1.2 – Hazards Profiled

Historically, planning efforts in Nebraska have consistently identified similar hazards for further analysis and profiling. The 2011 State Hazard Mitigation Plan identified 10 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. Additionally, it expanded dam/levee failure into two separate profiles.

As the 2019 planning team reviewed the various hazards, it was determined that chemical transportation, earthquake, and transportation should be eliminated from the hazards profiled (as discussed in section 3.1.1. Furthermore, plant disease has been expanded to include dangerous pests. The result of the team's analysis identifies 11 hazards to be further profiled:

- Animal Disease
- Plant Disease and Pests
- Dam Failure
- Drought
- Flood/Flash Flood
- Levee Failure
- Severe Winter Storm
- Severe Thunderstorm
- Terrorism
- Tornado
- Wildfire

3.2 – General Hazard Information

3.2.1 - Declarations

FEMA Declarations

Since 1960, Nebraska has received 64 federal emergency declarations, federal disaster declarations, and Fire Management Assistance Grant declarations resulting in over $400 million in disaster funding. Countless other events required state assistance. These can be broadly grouped under eight types: drought, fire, flood, hurricane, severe ice storm, severe storms, snow, and tornado. Figure 3-# shows a breakdown the 64 declarations. The most common involve flooding and severe storms. Some of events listed with severe storms included tornados.

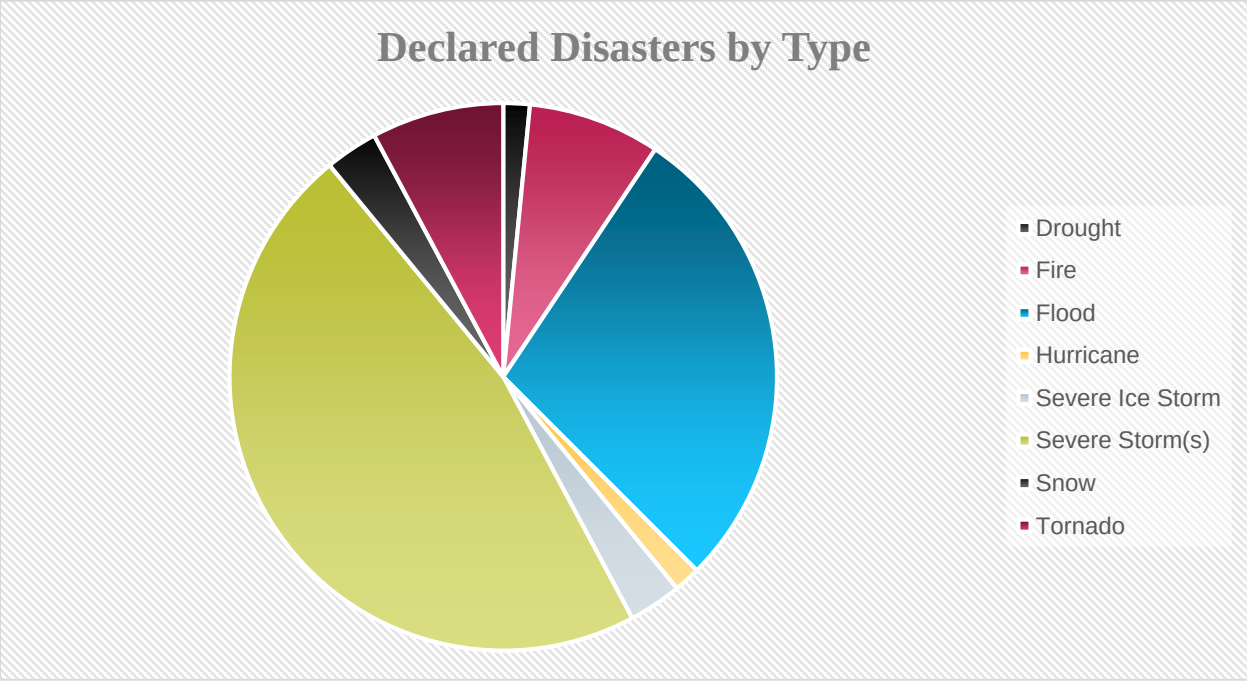


Figure 3-1: Declared Disasters by Type

Table 3-1: Disaster Declarations by Type

Disaster Declarations by Type		
Type	**Number**	**Amounts**
Drought	1	$ -
Fire	5	$ -
Flood	18	$ 65,509,923.94
Hurricane	1	$ 393,813.27
Severe Ice Storm	2	$ 2,891,172.04
Severe Storm(s)	30	$ 334,742,065.00
Snow	2	$ 4,207,723.46
Tornado	5	$ 9,791,526.92

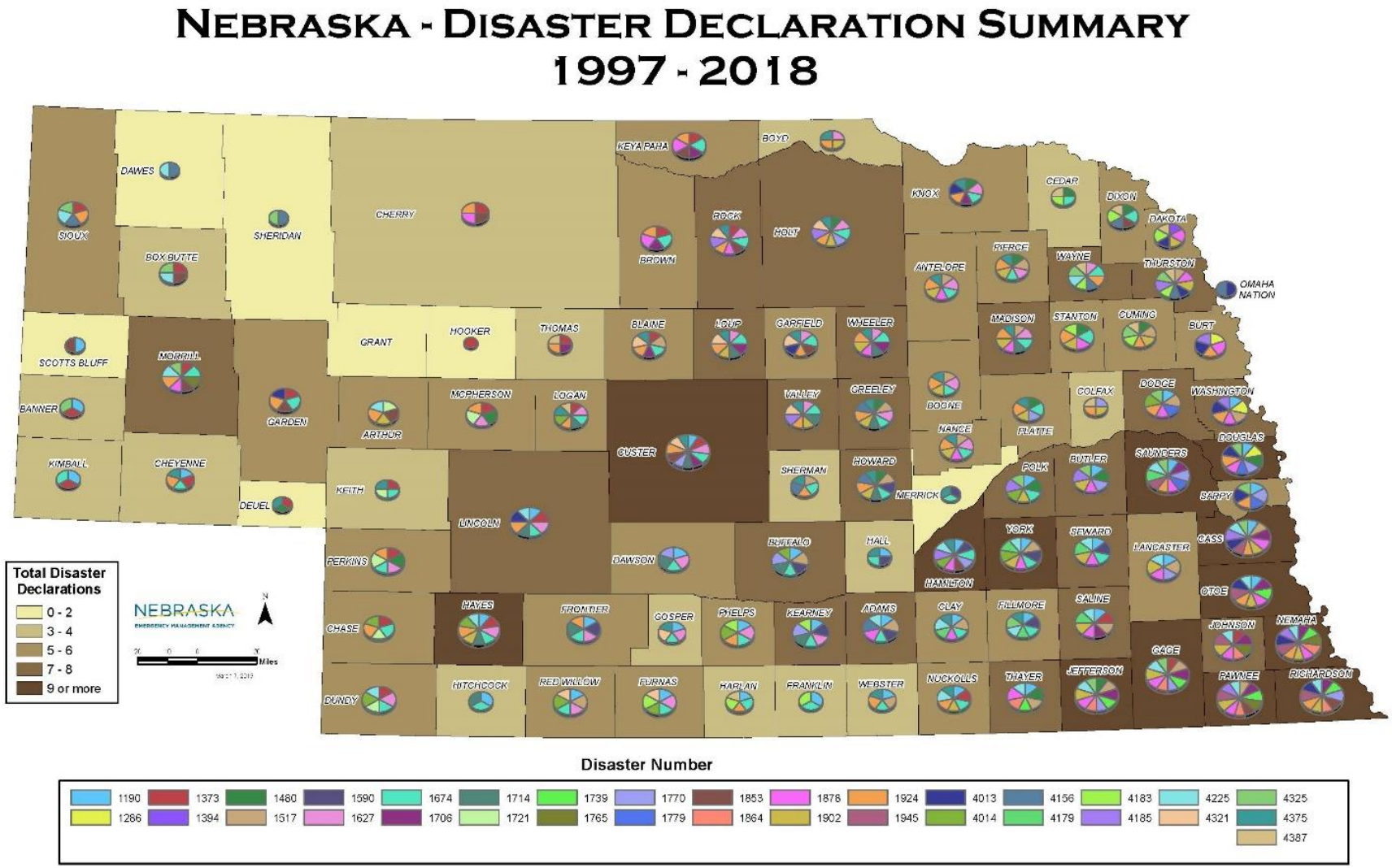


Figure 3-2: Nebraska Disaster Declaration Summary

Table 3-2: Federal Disaster Declarations

Federal Disaster Declarations					
Disaster	**Year**	**DR 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	$ -
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	$ -
4013	2011	DR	Flood	16	$ 62,444,842.87
4014	2011	DR	Severe Storm(s)	12	$ 3,344,622.68
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
5009	2012	FM	Fire	3	$ 5,281,075.21
Total			**64**		**$ 422,817,299.84**

USDA Secretarial Disaster Declarations

Table 3-3: USDA Disaster Declarations

USDA Disaster Declarations		
Year	**Primary Counties**	**Contiguous Counties**
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

3.2.2 – State Assets

The Department of Administrative Services provided information on state resources. Table 3-# breaks down the number of facilitates by county and values.

Table 3-4: State Assets

State Assets					
County	**# of Properties**	**Insurance Value**	**Contents Insurance**	**Total Value**	**Replacement Cost**
Blaine	0	$ -	$ -	$ -	$ -
McPherson	0	$ -	$ -	$ -	$ -
Thurston	0	$ -	$ -	$ -	$ -
Banner	1	$ -	$ -	$ -	$ 91,640.08
Hayes	1	$ 2,458,627.60	$ -	$ 2,458,627.60	$ 2,458,627.60
Stanton	1	$ 12,120.00	$ -	$ 12,120.00	$ 12,587.83
Arthur	2	$ -	$ -	$ -	$ 123,214.56
Logan	2	$ -	$ -	$ -	$ 1,954,258.20
Franklin	3	$ -	$ -	$ -	$ 192,930.19
Howard	3	$ -	$ -	$ -	$ 2,653,779.55
Keya Paha	3	$ -	$ -	$ -	$ 738,335.33
Rock	3	$ 617,999.03	$ 2,907.00	$ 620,906.03	$ 1,699,369.58
Thomas	3	$ -	$ -	$ -	$ 619,722.32
Wheeler	3	$ -	$ -	$ -	$ 450,802.96
Boone	4	$ -	$ -	$ -	$ 861,362.44
Butler	4	$ -	$ -	$ -	$ 997,455.35
Colfax	4	$ -	$ -	$ -	$ 525,863.22
Greeley	4	$ -	$ -	$ -	$ 458,670.75
Hooker	4	$ -	$ -	$ -	$ 1,415,226.32
Kimball	4	$ -	$ -	$ -	$ 912,928.82
Perkins	4	$ -	$ -	$ -	$ 1,263,143.87
Boyd	5	$ -	$ -	$ -	$ 1,113,018.41
Deuel	5	$ -	$ -	$ -	$ 2,544,278.30

Furnas	5	$ -	$ -	$ -	$ 640,304.38
Harlan	5	$ -	$ -	$ -	$ 638,755.54
Merrick	5	$ -	$ -	$ -	$ 887,229.08
Nance	5	$ -	$ -	$ -	$ 1,848,365.30
Cuming	6	$ -	$ -	$ -	$ 1,058,354.99
Hamilton	6	$ 617,999.03	$ -	$ 617,999.03	$ 1,580,519.37
Nuckolls	6	$ 1,809,998.20	$ -	$ 1,809,998.20	$ 2,225,553.06
Sheridan	6	$ 1,981,692.00	$ -	$ 1,981,692.00	$ 2,842,681.14
Polk	7	$ -	$ -	$ -	$ 717,635.19
Pawnee	8	$ 20,066.94	$ -	$ 20,066.94	$ 538,923.78
Saline	8	$ 584,416.20	$ -	$ 584,416.20	$ 1,499,761.94
Sioux	8	$ -	$ -	$ -	$ 2,346,626.84
Dakota	9	$ -	$ -	$ -	$ 6,176,169.48
Seward	9	$ -	$ -	$ -	$ 7,195,718.26
Garfield	10	$ 54,339.00	$ -	$ 54,339.00	$ 5,169,643.13
Webster	11	$ -	$ -	$ -	$ 2,730,111.52
Cedar	12	$ -	$ -	$ -	$ 2,086,115.51
Cheyenne	12	$ 1,061,305.60	$ -	$ 1,061,305.60	$ 6,431,500.41
Burt	13	$ 163,500.00	$ -	$ 163,500.00	$ 1,178,508.31
Dawson	14	$ 259,658.67	$ -	$ 259,658.67	$ 3,684,108.95
Garden	14	$ -	$ 1,893.00	$ 1,893.00	$ 4,371,058.85
Red Willow	14	$ 20,332,877.12	$ 1,737,000.00	$ 22,069,877.12	$ 21,575,875.30
Grant	15	$ -	$ -	$ -	$ 3,630,119.69
Platte	16	$ 2,694,272.94	$ -	$ 2,694,272.94	$ 13,598,253.40
Box Butte	17	$ 350,000.00	$ 147,963.00	$ 497,963.00	$ 3,608,281.40
Thayer	17	$ -	$ -	$ -	$ 3,169,867.58
Holt	18	$ 968,509.30	$ -	$ 968,509.30	$ 7,966,887.94
Phelps	19	$ 617,999.03	$ -	$ 617,999.03	$ 6,215,423.92

Valley	19	$ -	$ -	$ -	$ 5,922,672.32
Kearney	20	$ -	$ -	$ -	$ 3,724,179.86
Morrill	21	$ 1,064,617.76	$ 55,500.00	$ 1,120,117.76	$ 4,056,262.44
Pierce	23	$ 50,690.00	$ -	$ 50,690.00	$ 1,492,114.48
Washington	23	$ -	$ -	$ -	$ 8,240,510.64
Chase	25	$ 42,367.75	$ -	$ 42,367.75	$ 2,227,790.36
Clay	25	$ -	$ -	$ -	$ 5,045,138.05
Hitchcock	25	$ 217,508.00	$ -	$ 217,508.00	$ 2,167,989.75
Loup	27	$ -	$ 4,814.00	$ 4,814.00	$ 3,573,886.69
Otoe	27	$ 1,224,403.73	$ 1,511.00	$ 1,225,914.73	$ 33,513,746.21
Sarpy	27	$ 23,570,093.31	$ 2,708,030.00	$ 26,278,123.31	$ 35,951,430.79
Johnson	28	$ 204,362,004.00	$ 12,996,000.00	$ 217,358,004.00	$ 120,239,106.08
Adams	29	$ 67,998,691.26	$ -	$ 67,998,691.26	$ 73,032,448.04
York	30	$ 77,117,996.43	$ 2,922,000.00	$ 80,039,996.43	$ 34,178,386.71
Gosper	31	$ -	$ -	$ -	$ 2,853,841.99
Brown	32	$ -	$ -	$ -	$ 3,188,388.07
Antelope	37	$ 50,195.20	$ -	$ 50,195.20	$ 8,303,285.87
Custer	37	$ 3,154,772.85	$ -	$ 3,154,772.85	$ 10,017,325.00
Jefferson	37	$ 242,208.00	$ -	$ 242,208.00	$ 4,013,817.22
Dundy	38	$ -	$ -	$ -	$ 4,829,401.80
Nemaha	47	$ -	$ -	$ -	$ 95,731,781.18
Fillmore	48	$ 22,363,565.96	$ 26,749.00	$ 22,390,314.96	$ 29,118,200.16
Sherman	48	$ 18,581.00	$ -	$ 18,581.00	$ 2,160,382.95
Wayne	49	$ 1,526,659.14	$ -	$ 1,526,659.14	$ 189,960,431.02
Madison	53	$ 60,002,309.93	$ 20,843.00	$ 60,023,152.93	$ 80,384,528.48
Dodge	61	$ 419,015.00	$ -	$ 419,015.00	$ 7,993,296.70
Richardson	65	$ 250,174.94	$ 3,227.00	$ 253,401.94	$ 4,627,640.92
Gage	70	$ 72,279,951.53	$ -	$ 72,279,951.53	$ 89,192,686.26

Frontier	86	$ 48,795.39	$ -	$ 48,795.39	$ 18,409,702.00
Hall	86	$ 103,566,711.63	$ 2,290,428.00	$ 105,857,139.63	$ 166,169,672.63
Cherry	90	$ 617,999.03	$ -	$ 617,999.03	$ 11,012,035.83
Keith	92	$ 552,416.00	$ -	$ 552,416.00	$ 10,938,684.54
SCOTTS BLU	101	$ 23,252,435.12	$ 1,669,396.00	$ 24,921,831.12	$ 58,638,804.94
Knox	106	$ 2,464,505.78	$ -	$ 2,464,505.78	$ 13,690,815.10
Dixon	113	$ 297,208.00	$ 11,034.00	$ 308,242.00	$ 35,771,114.68
Lincoln	123	$ 14,107,205.35	$ 965,313.00	$ 15,072,518.35	$ 50,594,697.88
Buffalo	140	$ 22,971,084.05	$ 2,209,237.00	$ 25,180,321.05	$ 442,806,812.15
Saunders	178	$ 1,852,150.97	$ -	$ 1,852,150.97	$ 53,057,932.03
Dawes	199	$ 5,114,523.28	$ -	$ 5,114,523.28	$ 225,858,259.90
Douglas	253	$ 404,996,773.39	$ 12,945,008.00	$ 417,941,781.39	$ 1,818,996,612.43
Cass	262	$ 343,676.00	$ 94,231.00	$ 437,907.00	$ 81,399,655.78
Lancaster	610	$ 955,663,770.58	$ 83,437,739.00	$ 1,039,101,509.58	$ 2,074,202,136.90
Total	**3,799**	**$ 2,106,410,441.02**	**$ 124,250,823.00**	**$ 2,230,661,264.02**	**$ 6,063,987,176.77**

3.2.3 – Local Hazard Mitigation Planning Regions

The local hazard mitigation planning regions are mention frequently throughout this plan. Figure 3-# shows these regions.

Figure 3-3: Local Mitigation Planning Areas

3.3 – Hazard Profiles

EMAP 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.

General profiles for the hazards selected by the planning team were compiled from the previous plans along with the latest hazard information. Each hazard is broken into the following sections:

1. Hazard Description: A general description of the hazard and how it is defined for the plan.
2. Geographic Area of Impacts: Discussion on the areas that this hazard has historically occurred in the state.
3. Previous Occurrences and Extent: Information on historical occurrences, including federally declared disasters and the extent of the loss of life, injuries, and damages.
4. Probability of Future Events: Discussion on the likelihood the hazard occurring in the future and changes in hazard patterns.
5. Local Plan Data: Information from the 21 regional hazard mitigation plans on the profiled hazard.
6. Jurisdictional Vulnerability and Potential Losses: Discussion on the vulnerability of the state's population and assets and related potential losses. Additional discussion on development in hazard prone areas.

3.3.1 – Animal Disease

Table 3-5: Animal Disease Impacts

Animal Disease Impact Summary	
Public: Housing, Causalities, Fatalities, Work, Food, Water	Housing: If the disease is widespread, many rural homes and farms may be quarantined. Causalities/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, Water, Roads, Bridges	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.
Environment	Impact on the environment will need to be mitigated by proper disposal and decontamination methods.
Economic Conditions	An animal disease 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 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.

3.3.1.1 – Hazard Description

Ninety-one percent of Nebraska's land area is devoted to agricultural uses, with 45.2 million acres of land in farms scattered throughout the state (Nebraska Department of Agriculture, 2018). Nebraska's total agricultural output reached $22.57 billion in 2016. Livestock and farm animals contributed to the bulk of this amount, with $12.17 billion (USDA ERS, 2018). 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, 2018); 3.6 million head of swine (Nebraska Department of Agriculture, 2018); 80,000 head of sheep (USDA, 2018); 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 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 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).

3.3.1.2 – Geographic Area of Impacts

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% or more of the state of Nebraska, leading animal disease to be a wide ranging hazard geographically and financially.

3.3.1.3 – Previous Occurrences and Extent

(Numbers of cases mentioned are based on 2018 numbers drawn from Nebraska Department of Agriculture reports)

Cattle

Anaplasmosis: 1618 cases statewide, 1200 in Cuming 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. The disease increases in fatality levels as the age of the animal when infected increases (The Cattle Site, 2014). 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.).

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 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, n.d.).

Bovine Viral Diarrhea: 683 cases statewide, 300 in Howard County, 216 in Dawson County, 140 in Buffalo 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, 2014).

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. Outbreaks of severe acute BVD in Canada around 1998 led to estimated losses of $40,000 to $100,000 per herd, or about $400 per cow in the infected herd (APHIS, 2007).

Bovine Tuberculosis: This disease most frequently affects cattle, but deer and humans are also susceptible, as it can be transmitted to any warm-blooded animal (APHIS, 2014). 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, 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 (Kamm, 2017).

Paratuberculosis (Johne's Disease): 2341 cases statewide, 1437 cases in Buffalo County, 516 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 (Collins, 2018). 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 2018, 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). 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): 25002 cases statewide, 25001 in Jefferson 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). Higher mortality rates result from co-infections or other risk factors that become more acute as a result of the dehydration and malnourishment that results from the diarrhea (Schwartz & Main, 2013).

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 (Schwartz & Main, 2013).

Porcine Reproductive and Respiratory Syndrome (PRRS): 530 cases statewide, 400 in Gage 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): 202 Porcine cases statewide, 101 Bovine cases statewide. 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). Research into PMWS led to finding a new circovirus, PCV2 (Neumann, Sorden, & Halbur, 2002).

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 (APHIS, 2018).

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 (van der Zee, 2018).

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 53,000 dear have been tested for CWD in Nebraska and 630 tested positive. As of December, 2018, Chronic Wasting Disease has been found in 42 counties across Nebraska (Norfolk Daily News, 2018).

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).

3.3.1.4 – 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 species population density increases, the potential for an epidemic increase, as well.

Additionally, the perceived trend toward higher average temperatures and increased periods of severe drought increase 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.

3.3.1.5 – 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.

3.3.1.6 – 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.

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 91% of the state's land. In 2017 farm marketings contributed over $21 billion to Nebraska's economy.

3.3.2 – Plant Disease and Pests

Table 3-6: Plant Disease and Pests Impacts

Plant Diseases and Pest Impact Summary	
Public: Housing, Causalities, Fatalities, Work, Food, Water	Low impact on the population in general until or unless the disease becomes long term then the impacts will be mostly economic.
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.

3.3.2.1 – Hazard Description

Ninety-one percent of Nebraska's land area is devoted to agricultural uses, with 45.2 million acres of land in farms scattered throughout the state (Nebraska Department of Agriculture, 2018). Nebraska's total agricultural output reached $22.57 billion in 2016. Livestock and farm animals contributed to the bulk of this amount, with $12.17 billion. Crops contributed $8.83 billion and services/forestry contributed $1.57 billion (USDA ERS, 2018). Nebraska cropland is vulnerable to disease and other agricultural pests. An estimated 1.68 billion bushels of corn, 326 million bushels of soybeans, 46.9 million bushels of wheat, 451 thousand tons of potatoes, 195 thousand tons of dry beans were grown in Nebraska, according to the 2017 State Agriculture Overview produced by the USDA (USDA, 2018). In 2016, cash receipts from all farm commodities reached over $21.5 Billion, with crops bringing in $9.4 billion of that (Nebraska Department of Agriculture, 2018).

A plant disease outbreak or pest infestation could negatively impact crop production and agriculturally dependent businesses. 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.

3.3.2.2 – Geographic Area of Impacts

In 2017 there were 47,400 farms in Nebraska covering more than 45 million acres (USDA, 2018). Farming is found in every county and some diseases and pests affect residential and community plants and trees.

3.3.2.3 – Previous Occurrences and Extent

<u>Known plant diseases and pests in Nebraska.</u>

Due to uncalculated variables and lack of 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, according to information from the University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources (IANR).

<u>Corn diseases and pests</u>

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 (IANR, 2018). Additionally, Nebraska ranks second nationally in ethanol production, using 36% of the state's corn crop (Nebraska Department of Agriculture, 2018).

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 (Broderick, 2018). Not all of the diseases that impact corn in Nebraska will be discussed here, but some of those that may lead to yield decreases will be.

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 (Wright, 2013). 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).

Anthracnose: This is a fungal disease with three distinct phases: leaf blight, top die-back, 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).

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, Illinois, Iowa, and Kansas. 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 (Jackson-Ziems, Cropwatch: Bacterial Leaf Streak, 2018).

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).

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. 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).

Nematodes: Nematodes are parasitic, microscopic worms that have been known to cause some of the most severe crop diseases and yield loss. At least a dozen different types of nematode have been found in corn fields in Nebraska. Symptoms of a nematode infestation can range from mild to severe, but are difficult to diagnose as such because they mimic issues brought about by many other common problems. Nematodes may be distributed across an entire field, but the areas with the more concentrated populations will frequently develop “hot spots” where the damage is greater (Jackson-Ziems, Cropwatch: Nematodes, 2018).

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 2017, Nebraska was eighth in the United States for winter wheat production with just under 47 million bushels and a production value of over $185 million (USDA, 2018). 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, 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).

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. 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).

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 2017, Nebraska farmers produced over 326 million bushels of Soybeans for a production value of almost $3 billion (USDA, 2018). Exports of soybeans had a value of $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 races found in Nebraska has increased considerably over the last few decades. PRR is persistent in that it cannot be eradicated from a field once it is established, however it may lay dormant for years in the soil as “resting spores.” PRR can cause seed rot, stem rot, and damping off of seedlings early in the soybean life cycle. Root and stem rot will appear later in the season, and move up the plant from a starting point in the roots. Roots and stems will eventually turn brown and leaves will wilt, but they will not usually fall off the plant (Giesler & Broderick, Management of Phytophthora Root and Stem Rot of Soybean, 2016).

Management is possible through the use of resistant varieties of soybeans and seed treatment fungicides. In order to effectively use management techniques, it is imperative that the race of Phytophthora in the field be determined, as resistance in seed stock is typically race-specific (Giesler & Broderick, Management of Phytophthora Root and Stem Rot of Soybean, 2016).

Soybean Cyst Nematode: Soybean Cyst Nematode (SCN) causes the most yield loss of soybean in the United States. As of 2011, SCN has been found in 52 counties throughout eastern and central Nebraska. SCN is a parasitic roundworm that preys on plants. (Giesler & Wilson, Soybean Cyst Nematode: Identification and Management, 2011).

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 2017, dry bean production in Nebraska had a value just over $101 million on 155,000 harvested acres (USDA, 2018). Most of the dry bean production is centered in western Nebraska. In 2015, Nebraska was top producer in the nation of Great Northern beans, 2nd in production of pinto and light red kidney beans, and 4th in overall production of all dry edible beans (IANR, 2018).

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, 2018The 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 is 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, many of the resistant varieties are more prone to some of the fungal infections. 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 1, 2018, 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, 2018).

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. The working group has 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, 2018).

Japanese Beetle: Japanese beetles are invasive pests first found in the United States in New Jersey in 1916. Japanese beetles are currently found in 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. 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).

3.3.2.4 – Probability of Future Events

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 were as previously they could not. Many native plants do not have a defense against these insects.

3.3.2.5 – Local Plan Data

Many 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 updated in 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.

3.3.2.6 – Jurisdictional Vulnerability and Potential Losses

All in 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, 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.

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.

3.3.3 – Dam Failure

Table 3-7: Dam Failure Impacts

Dam Failure Impact Summary	
Public: Housing, Causalities, 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.

3.3.3.1 – Hazard Description

Dam failure is the uncontrolled release of impounded water resulting in downstream flooding, affecting both life and property. Flooding, earthquakes, flow blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, or terrorism can cause dam failures. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation.

Dams are classified by the state of Nebraska into four categories based on the potential risk to people and property in the event of breach. A dam's hazard classification sets the design standards as well as the inspection, maintenance, and emergency preparedness requirements for the dam. As the classification goes up, the standards and requirements for the dam are increased. The classification of a given dam may change over time because of development downstream from the dam after its construction. Because of these changes in classifications, older dams may not have been built to the standards of their current classification level. Table 3-8 shows the hazard classifications as defined by NeDNR.

Table 3-8: Dam Classification

Dam Classifications	
High Hazard	Failure expected to result in loss of life and serious damage to residential, industrial, commercial, important public utilities, public buildings, or major transportation corridors.
Significant Hazard	Failure expected to result in damage to important resources, isolated homes, moderately traveled transportation corridors, water supply systems, and other moderate commercial/business uses.
Low Hazard	Failure expected to result in damage to minor resources such as livestock, agricultural land, and lesser used roads. Loss of human life is considered unlikely.
Minimal Hazard	Failure expected to result in no economic loss beyond the cost of the structure itself and losses principally limited to the owner's property.

3.3.3.2 – Geographic Area of Impacts

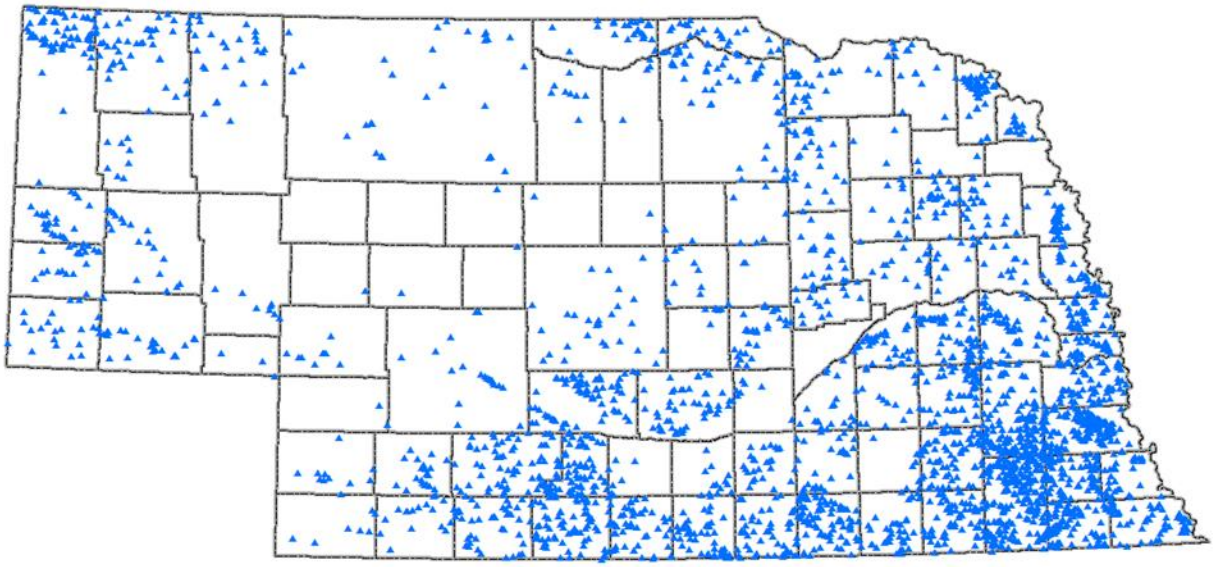


Figure 3-4: Map of Dams in Nebraska

In figure 3-4, each colored triangle represents a dam. As the map shows, there are dams located across Nebraska with the highest density in the southeastern portion of the state. The majority of the dams across Nebraska are classified as low hazard with a lower risk of major damage or loss of life.

Nebraska's highest ranked dam based on population at risk is the Kingsley Dam controlling the North Platte River in western Nebraska. Failure of the Kinsley Dam would likely impact communities along the Platte River including North Platte, Lexington, Kearney, Grand

Island, Columbus, and Fremont. The dam forms the eastern edge of Lake McConaughy holding back two million acre feet of water when full. Based off actions of the owner/operator, Central Nebraska Public Power and Irrigation District, along with a study by an independent contractor, the failure of the Kingsley Dam is highly unlikely.

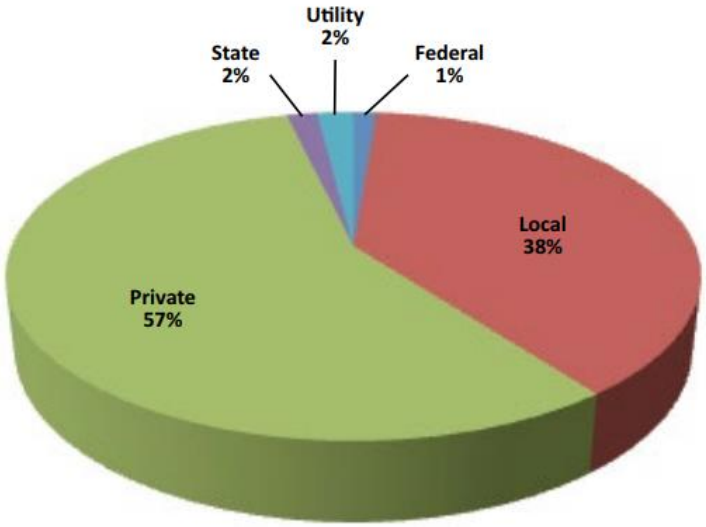


Figure 3-5: Dam Ownership Breakdown

Unlike most other major infrastructure in Nebraska, the majority of dams in Nebraska are privately owned. NeDNR actively works with private dam owners and educates them about the risks associated with owning a dam and actions they should take in case of an emergency.

Upstream of the state of Nebraska, the USACE operates six flood control damns along the Missouri River. Seven dams regulate flow along the North Platte River in Wyoming and several dams regulate the South Platte River in Colorado. Flows out of these dam may result in flooding as discussed in the flooding section.

Table 3-9: Dam Breakdown by Planning Area

Dam Breakdown by Planning Area					
Region	**High Hazard**	**Significant Hazard**	**Low Hazard**	**Minimal Hazard**	**Total**
Blues Plan	13	47	530	0	590
Cedar-Dixon	2	9	46	0	57
Central Platte NRD	8	15	160	0	183
Hayes, Frontier, Hitchcock	4	6	93	0	103
Lower Elkhorn NRD	9	7	100	0	116
Lower Loup NRD	6	6	132	0	144
Lower Platte North NRD	5	11	107	0	123
Lower Platte South NRD	30	36	143	0	209
Nemaha NRD	5	15	378	0	398
North Platte NRD	8	14	52	0	74
Papio-Missouri NRD	32	10	78	1	121
Perkins, Chase, Dundy	2	0	20	0	22
Quad Counties	2	5	215	0	222
Region 23	3	14	129	0	146
Region 24	1	2	82	0	85
South Platte NRD	7	6	35	1	49
Tri-Basin NRD	2	1	105	0	108
Tri-County	0	4	111	0	115
Twin Platte NRD	8	2	30	0	40
Upper Big Blue NRD	2	4	91	0	97
Upper Loup NRD	0	0	3	0	3
	149	**214**	**2640**	**2**	**3005**

3.3.3.3 – Previous Occurrences and Extent

In June of 2010, historic flooding caused the failure of six dams across Nebraska. Five were classified as low hazard with 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. Disaster-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

During May of 2015, 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.

3.3.3.4 – Probability of Future Events

For the 2011 state plan revision, Pat Diederich, former Dam Safety Chief for NeDNR, stated:

> *"The probability of a high hazard potential dam failing is 'very low' due to the high design standards for this class of dam, say 1 chance in 10,000 every year for each dam. These dams must pass the probable maximum flood, which is determined from the probable maximum precipitation that varies from 18.5 inches of rainfall in a twenty-four-hour period in the western part of the state to 26.2 inches of rainfall in the extreme southeast corner of the state. The probability of failure for a significant hazard potential dam is somewhat higher because the design flood is approximately half of that for a high hazard potential dam, but I would still say is quite low, maybe one failure every three to five years. We can expect approximately ten low hazard potential dams to fail every year, because these structures are designed only for the 100-year storm and there are several thousand currently on the inventory. No loss of life is expected for either significant or low hazard potential dams. Rainfall events of the magnitude we experienced last summer (2010) and the subsequent dam failures are rare, but not unexpected."*

Nebraska Department of Natural Resources staff review engineering drawings for construction of new dams or rehabilitation of older dams. Additionally, emergency action plans are required for dams classified as high hazard. High hazard dams are inspected annually, significant hazard dams are inspected every three years, and low hazard dams every five years. NeDNR has the authority to order owners to correct deficiencies and defects to ensure safe operating conditions.

Due to the increasing age of dams and a predicted increase in the number of heavy rain events along with increased volume of precipitation per event, in the coming years the overtopping or failure of low risk dams will increase slightly over time. However, regular inspections reduce the risk of dam failures to a minimum by increasing the likelihood of discovering damage and preventing catastrophic failure before an event occurs.

3.3.3.5 – Local Plan Data

Local plans lack significant data or plans for dam failures as each region generally considers dam failures as a very low probability event. In a survey of the hazard mitigation plans throughout Nebraska, it was found that the risk of dam failure is lower than 2% due to current upkeep practices. Most local hazard mitigation plans consider strong evacuation plans and smart land management along with public education on what to do if a dam were to fail as the primary mitigation strategies.

3.3.3.6 – Jurisdictional Vulnerability and Potential Losses

Large urban areas, in and around Lincoln and Omaha, are located downstream of dams. These dams provide flood control for the various streams and rivers winding through the cities. While there is always the chance that a dam may fail, the probability remains extremely low. These dams were constructed and are maintained to meet the highest safety standards.

State Assets

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.

3.3.4 – Drought

Table 3-10: Drought Impacts

Drought Impact Summary	
Public: Housing, Causalities, Fatalities, Work, Food, Water	Housing – In the event of severe drought, foundations of structures could be impacted by contracting soils. No impact. Causalities/fatalities – Could result if the drought is accompanied by severe and lingering heat. Food/Water – a result of drought is lower ground water levels that can lead to water supply impacts.
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.
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.
Public Confidence in the Governance	Depends on the efficiency of governments to handle the resulting impacts.

3.3.4.1 – Hazard Description

Drought is a slow-onset, creeping phenomenon and its impacts are largely non-structural. This makes the detection or early warning of drought conditions more difficult than the detection of quick-onset natural hazards that result in more visible, structural impacts.

Droughts affect 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 from drought are spread over a larger geographical area than are damages 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 that 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.

Table 3-11: US Drought Monitor Classifications

US Drought Monitor Classifications		
Category	**Description**	**Possible Impacts**
D0	Abnormally Dry	Going into drought: Short-term dryness slowing planting, growth of crops or pastures Coming out of drought: Some lingering water deficits and pastures or crops not fully recovered
D1	Moderate Drought	- Some damage to crops, pastures - Streams, reservoirs, or wells low, some water shortages developing or imminent - Voluntary water-use restrictions requested
D2	Severe Drought	- Crop or pasture losses likely - Water shortages common - Water restrictions imposed
D3	Extreme Drought	- Major crop/pasture losses - Widespread water shortages or restrictions
D4	Exceptional Drought	- Exceptional and widespread crop/pasture losses - Shortages of water in reservoirs, streams, and wells creating water emergencies

The University of Nebraska's National Drought Mitigation Center's Drought Monitor map identifies areas of drought and labels them by intensity. D1 is the least intense level and D4 the most intense. Drought is defined as a moisture deficit bad enough to have social, environmental or economic effects. D0 areas are not in drought, but are experiencing abnormally dry conditions that could turn into drought or are recovering from drought but are not yet back to normal.

Primary physical effects are indicated for 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)

3.3.4.2 – Geographic Area of Impacts

Based on past occurrences, the effects of drought may be experienced by a part or all of the state.

3.3.4.3 – 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 and 1980s. Most recently, the drought of 2012 is a great example of the impact that a significant drought can have in Nebraska.

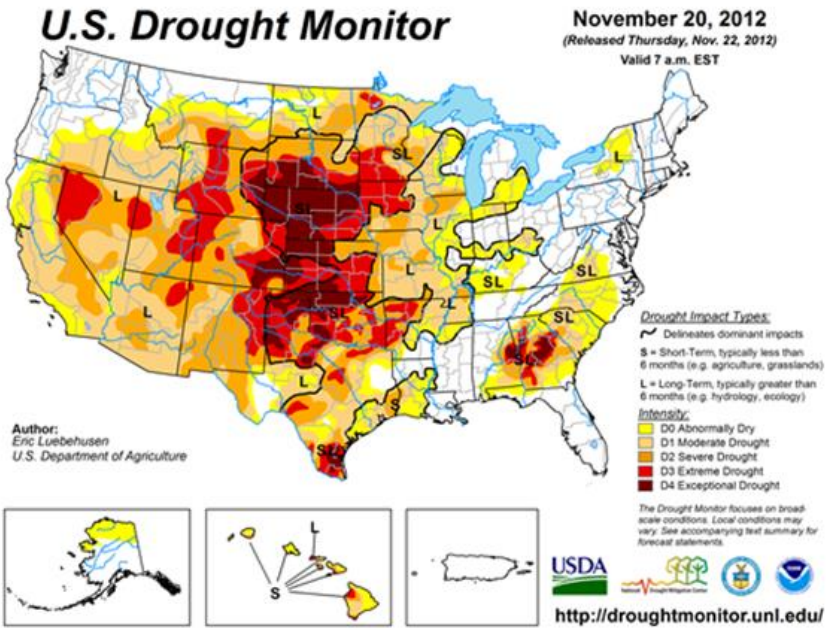


Figure 3-6: US Drought Monitor Nov 20, 2012

At the beginning of the year, there was little indication that the drought of would develop and emerge as a significant natural disaster. By the end of 2012, Nebraska was being 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. The following graph from the National Drought Mitigation Center illustrates the extent of drought in the U.S. and Nebraska in November 2012.

Dry conditions had allowed drought to develop in the eastern part of the state in the fall of 2011, which meant that as 2012 began, about 14% 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% was in the severe category (D2).

The warmth of the 2011-2012 winter season in Nebraska was influenced by many 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).

By the end of July, the entire state was in drought 68 and 83% was in extreme or exceptional drought (D3-D4), with only southeast Nebraska in severe drought (D2). By the end of August, the drought conditions in Nebraska were rapidly deteriorating; 97% of the state was in extreme to exceptional drought (D3-D4) and almost a quarter of Nebraska (23.33%) was in exceptional drought (D4), which is considered a 1-in-50-year drought event.

The heat and drought of 2012 had severe impacts on agriculture across the state. Impacts were felt on all scales, from neighborhood plots and small organic farms to large-scale corn and soybean production and ranches. According to a March 2013 report for the Farm Credit Services of America, the total indemnity payments in Nebraska due to the 2012 drought totaled $1.49 billion.

Cattle production was also impacted greatly by the drought conditions. Ranchers were forced to cull herds by 25-60% in the state as forage production was only about 28-64% of normal during 2012 in western Nebraska. Those ranchers who were finishing out cattle on feedlots were experiencing increased costs because of the price of corn and forage. With those added expenses, ranchers were losing $200 a head (or more) based on taking cattle to market earlier than normal and also the added expenses of finishing them. Ethanol production in Nebraska also was impacted by the drought.

With the corn crop being damaged by the drought, commodity prices increased to the point that production of ethanol was not cost effective. Several ethanol plants in Nebraska reduced production or even closed during the drought.

Plants and wildlife

Drought conditions led to an increased fire danger during 2012. Drought combined with intense heat contributed to what was, according to CropWatch, Nebraska's worst fire season since 1919. More than $12 million in damage was reported, primarily in central and western areas of the state. By the end of the year, more than 400,000 acres had burned in more than 1,200 fire events, according to the fire program leader with the Nebraska Forest Service.

The drought took a toll on the state's plant life not only through fire, but also from stress due to the high temperatures and lack of precipitation. According to the Omaha World-Herald, one example of tree loss came from Pioneers Park, in Lincoln, where about 700 pine trees died and were removed. Many trees located in wind breaks died in western Nebraska as well. Evergreens were hit particularly hard, including white pines, arborvitae, spruces, red cedars, and junipers.

Wildlife also suffered during the drought of 2012. The Norfolk Daily News reported that the 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 during the

summer of 2012. In addition, according to the Lower Platte River Corridor Alliance, the Lower Platte River experienced record low flows over the summer, with many areas of the river running completely dry. Water temperatures were quite high, ranging from 92 F to 97 F. The low flows combined with high water temperatures led to considerable fish kills, including the endangered pallid sturgeon, catfish, carp, minnows, and others. In addition, most water-based recreation came to a halt.

When thinking of weather-related infrastructure damage, most people would think of issues related to tornadoes or floods. But the 2012 drought caused quite a bit of damage to building foundations, private and municipal wells, water mains, and even trails.

The 2012 drought was particularly hard on home foundations. When the soils dry during a drought, they shift and sink, causing damage to the building's foundation. The U.S. News & World Report showed that one estimate indicated the drought damage to houses could reach $1 billion or more.

In May, June, and July alone, 178 water main breaks were reported in Omaha. Officials of the Metropolitan Utility District believe that a combination of extreme heat, drought, and increased water usage caused increased pressure on the city's water lines, causing some of them to crack. For comparison, only 56 water mains broke during those same months of 2011.

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.

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.

3.3.4.4 – Probability of Future Events

Scientists don't know how to predict drought a month or more in advance for most locations. Predicting drought depends on the ability to forecast two fundamental meteorological surface parameters, precipitation and temperature. From the historical record we know that climate is inherently variable. We also know that 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.

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 4oF for the annual average by 2050 and 8oF or higher by 2090. Each season shows a warming, 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 95oF 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 10oF 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 lead to 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. With a decreased frequency of extreme low temperatures during winter, however, 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 happens to sit 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.

Based on historical data from NOAA's National Climatic Data Center for the years 1895 through 2016, the following table shows the annual probability and magnitude of drought in Nebraska.

Table 3-12: Drought Probability

Drought Probability	
Magnitude	**Probability**
Extreme Drought	13%
Severe Drought	7%
Moderate Drought	10%
Mild Drought	27%
No Drought	43%

3.3.4.5 – 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 nation 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, economic, 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.

3.3.4.6 – 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.

Agriculture is the main sector affected by drought in Nebraska but drought has a major impact on other sectors as well. 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.

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.

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.

The vulnerability to wildfires also increases during drought years. The 2012 wildland fire season was the worst fire season on record in Nebraska. Nearly 500,000 acres burned across the north and northwest part of the state. 65 structures were destroyed, and the cost of fighting those wildfires was in excess of $12 million. The hot dry summer combined with high winds and low humidity led to extreme fire behavior.

State assets could be impacted by drought. State parks and recreation areas could be prone to increase fire risk (discussed in the Wildfire Profile), lack of water resources for animals or guest services, and damage to building due to settling of buildings.

3.3.5 – Flood/Flash Flood

Table 3-13: Flood/Flash Flood Impacts

Flood/Flash Flood Impact Summary	
Public: Housing, Causalities, 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 the 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, amount 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 overwhelmed 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, the amount of debris in the floodwater, the longevity of the flood, and the 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 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.

3.3.5.1 – Hazard Description

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 of flooding 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 NeDNR work together to track stream gage heights to estimate future crests and stage heights. This allows for distribution 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 flood 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 distribution of advanced flood warning. The 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 up 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.

3.3.5.2 – Geographic Area of Impacts

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.

3.3.5.3 – Previous Occurrences and Extent

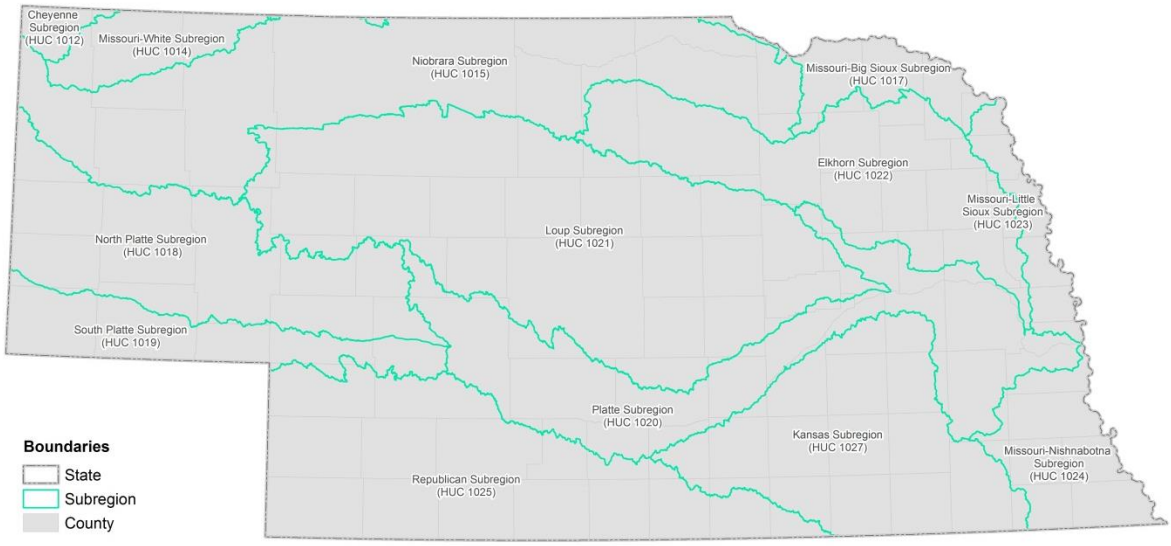


Figure 3-7: Watershed Sub region Boundaries

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 in a wide variety of watersheds and stream types.

Table 3-14 shows a summary of estimates of damage, deaths, and injury caused directly and indirectly by flooding and flash flooding between 1996 – 2018. The monetary sum is a combination of property damage and crop damage costs with the majority portion coming from property damage overall. However, the crop damages are not insignificant. Death and injuries are not common with floods in Nebraska according to the source data, however, human safety and awareness of potential dangers should always be considered in mitigation efforts. The cost of damages in a single given year ranged from an estimated $391,000 – $256,694,000, with an average of $23,619,000. Just under half of all flood events were estimated to have caused no property or crop damage in this timeframe. 8 deaths and 6 injuries directly or indirectly related to flooding events are recorded in the data. This table indicates that flooding is highly probable on an annual basis across the state and should take a high priority in mitigation planning. Table #-# outlines some the major river sub regions and flooding within them.

Table 3-14: Total Damages, Deaths, and Injuries 1996-2018

Total Damages, Deaths, and Injuries Related to Flooding 1996 – 2018 NCEI Database			
HM Plan	**Total Sum of Damage**	**Total Sum of Deaths**	**Total Sum of Injuries**
Blues Plan	$198,080,900.00	1	0
Cedar-Dixon	$2,991,000.00	0	0
Central Platte NRD	$71,244,000.00	0	0
Hayes, Frontier, Hitchcock	$4,380,000.00	0	0
Lower Elkhorn NRD	$10,635,000.00	1	0
Lower Loup NRD	$16,424,200.00	0	1
Lower Platte North NRD	$122,175,500.00	0	0
Nemaha NRD	$15,631,000.00	1	1
North Platte NRD	$2,428,000.00	0	0
Papio-Missouri NRD	$32,566,000.00	4	1
Perkins, Chase, Dundy	$3,200,000.00	0	0
Quad Counties	$7,468,000.00	0	0
Region 24	$3,454,000.00	0	0
South Platte NRD	$4,274,000.00	0	1
Tri-Basin NRD	$14,683,000.00	0	0
Tri-County	$6,222,000.00	0	0
Twin Platte NRD	$4,005,000.00	1	2
Upper Big Blue NRD	$22,587,000.00	0	0
Upper Loup NRD	$795,000.00	0	0
Grand Total	**$543,243,600.00**	**8**	**6**

Table 3-15: Federal Disaster Declarations involving flooding

Federal Disaster Declarations					
Disaster	Year	DR Type	Type	# of Counties	PA Funds
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
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
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
3323	2011	EM	Flood	18	$ -
4013	2011	DR	Flood	16	$ 62,444,842.87
4014	2011	DR	Severe Storm(s)	12	$ 3,344,622.68
4156	2014	DR	Severe Storm(s)	10	$ 2,635,144.54
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
Total					**$ 258,172,425.91**

Table 3-16: Nebraska River Sub-Regions Summary

Nebraska River Sub-Regions Summary				
Sub-region	**River Information**	**Flooding 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	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 Creek and its tributaries.	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.
Other Watersheds	There are numerous other smaller channels and tributaries across the state that are vulnerable to flooding.	Riverine Flooding Flash Flooding		

3.5.5.4 – Mitigation

Mitigation projects and programs occur at the local and state levels, which means that an examination 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 activates 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 at-risk structures, and flood proofing.

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 systems 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 complete 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 top 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 Lincoln, placed thousands of building in a floodplain along with being listed as an impaired stream. Mitigation came in the form of a complete and wide ranging 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 beatifying 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 delisted from impair status in 2017.

Similar flood control projects are also under way. 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 an interagency work group for planning and implementing projects addressing flooding risk. This group state and federal agencies. Each agency contributes a piece to a complete solution leveraging resources, talent, and data. Some Silver Jackets activities have included:

- Workshops and outreach
- High water mark fact signs placed to highlight significant floods in various locations
- System modeling's
- 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.

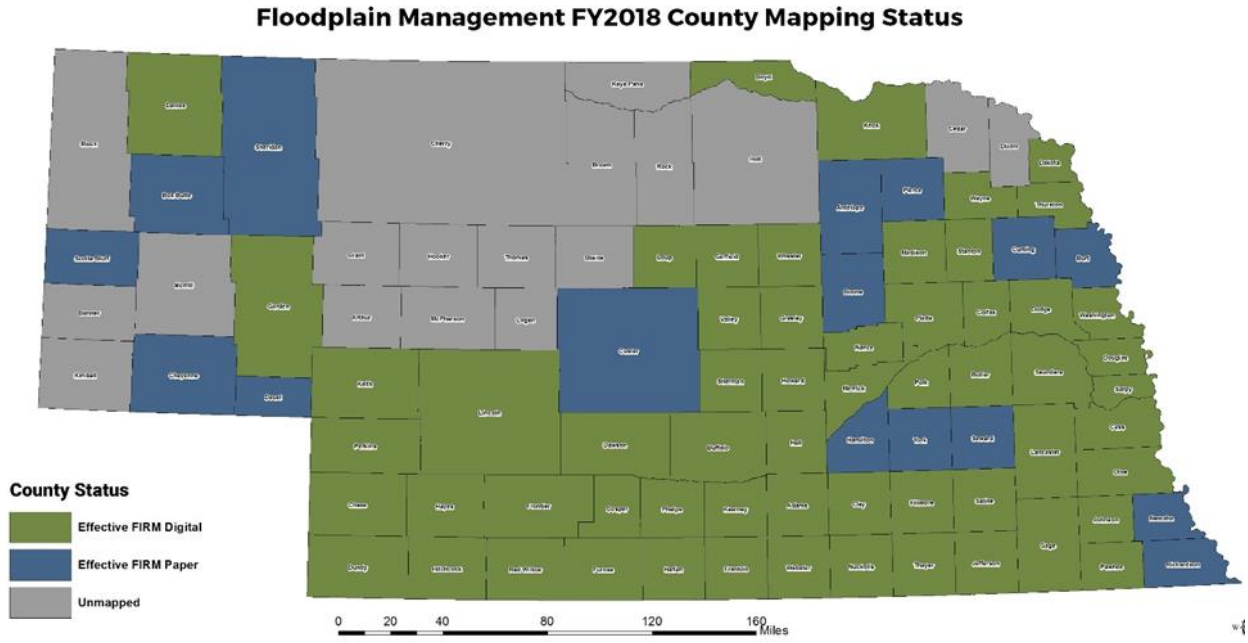


Figure 3-8: Floodplain County Mapping Status

3.3.5.5 – Probability of Future Events

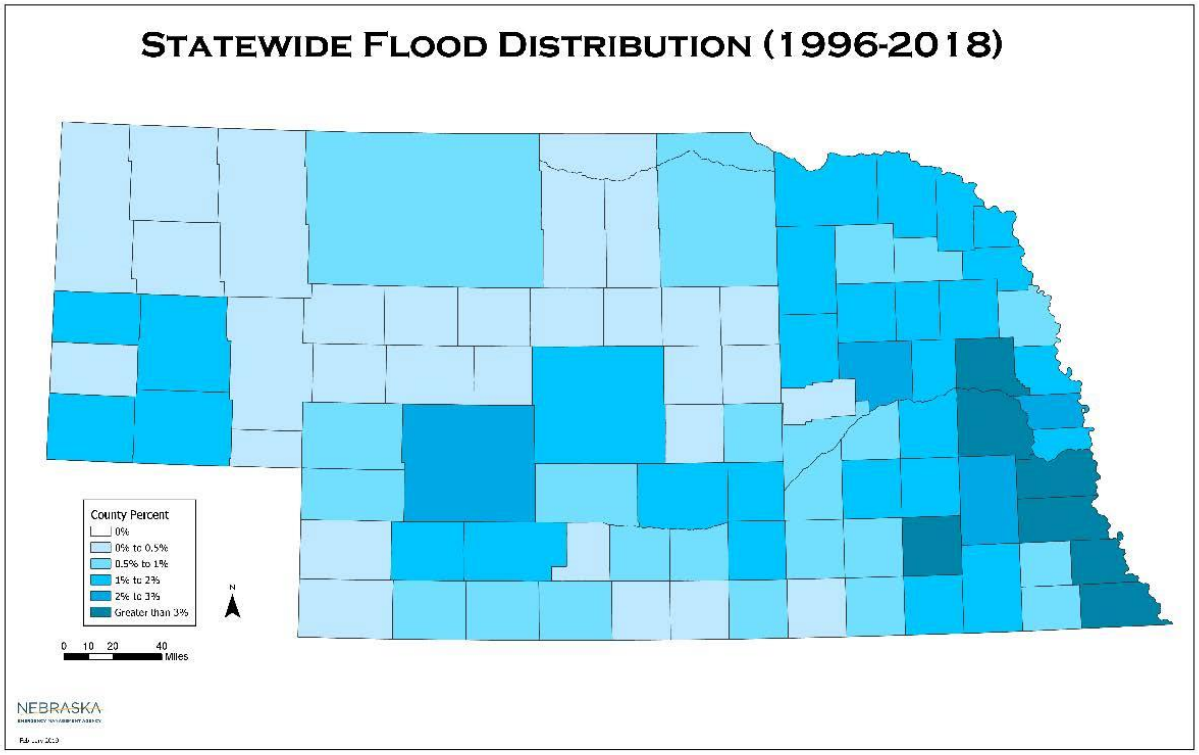


Figure 3-9: Statewide Flood Distribution (1996-2018) Proportion of flood and flash flood events statewide that have occurred in a given county.

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 – 2018 presented in table 3-15. 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. Figure 3-9 shows that every county in Nebraska has experienced flooding since 1996, and more importantly, has incurred some amount of damages as a result (NOAA, n.d.).

From this map, 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.

3.3.5.6 – Local Plan Data

Flooding is a highly damaging event with a high probability of occurrence in Nebraska. Across all districts, flooding is identified as a priority consideration for mitigations. All sampled districts are pursuant of evacuation plans and encourage flood insurance amongst residents and business owners. Vulnerable populations vary in proportion of overall populations, however they are consistently identified as the same peoples: low-income, minority, low mobility, elderly, and those outdoors during a flooding event. Additionally, those with homes inside of flood zones need to be accounted for. Special considerations should be made in all mitigation actions to ensure equitable access to assistance and protection for these peoples as they make up the majority of affected peoples during all types of flooding disasters.

3.3.5.7 – Jurisdictional Vulnerability and Potential Losses

Nebraska has a long history of flooding across all areas of the state. 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 population increases there is an increase in development. The majority of Nebraska counties are seeing a decrease in population with the counties with the largest populations seeing increases. Population and development trends are further discussed in section 3.3 – State Development Trends.

Additionally, agriculture is a large portion of Nebraska economy. Flooding events that may not impact a community directly can cause serve 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.

Table 3-17: Top Ten Counties for Flood Insurance Coverage 1978-2018

Top Ten Counties for Flood Insurance Coverage 1978-2018	
County	**Total Coverage**
Douglas	$ 328,134,100
Lancaster	$ 323,270,200
Sarpy	$ 190,468,100
Dodge	$ 160,528,200
Cass	$ 102,688,700
Saunders	$ 83,435,500
Lincoln	$ 46,296,200
Colfax	$ 42,569,100
Buffalo	$ 42,479,500
Dawson	$ 40,502,200
Total	**$ 1,360,371,800**

Table 3-18: Top Ten Counties for Flood Insurance Claims 1978-2018

Top Ten Counties for Flood Insurance Claims 1978-2018	
County	**Total Claims**
Sarpy	$ 9,014,034
Douglas	$ 4,148,638
Cass	$ 3,506,986
Madison	$ 3,099,103
Dodge	$ 2,823,254
Lancaster	$ 2,792,710
Washington	$ 2,733,364
Saunders	$ 2,518,346
Richardson	$ 2,377,178
Gage	$ 1,608,711
Total	**$ 34,622,324**

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.

3.3.6 – Levee Failure or Overtopping

Table 3-19: Levee Failure or Overtopping Impacts

Levee Failure or Overtopping Impact Summary	
Public: Housing, Causalities, Fatalities, Work, Food, Water	Housing – Structures within inundation areas could be destroyed depending on the depth and velocity of the flooding. Causalities/Fatalities and Work – dependent on warning and severity of flooding. People living and/or working in areas with less than 30 minutes of warning are at most risk. The time of day also plays a factor into effectiveness of warning.
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 overwhelmed medical and community capabilities.
Continuity of Operations	If major governmental facilities (courthouse, city/county/state 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 depth and velocity of the floodwater.
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 the structure that fails and the amount of water the structure is holding back.
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.

3.3.6.1 – Hazard Description

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 level 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.

3.3.6.2 – Geographic Area of Impacts

Levees are found across the state, primarily along the Platte River, Elkhorn River, Missouri River and their tributaries. Levees protects land with various uses from agriculture to large parts of major metro areas. Figure 3-# shows levees across the state. Table 3-# outlines the number of levee systems per county.

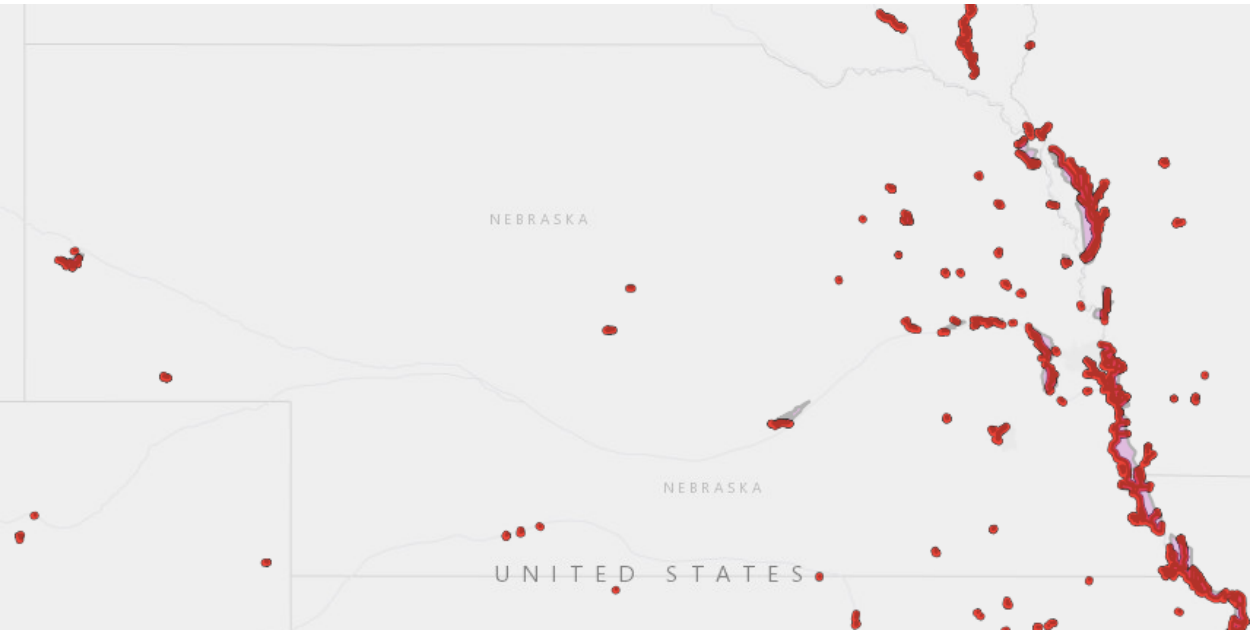


Figure 3-10: Nebraska Levees (USACE Levee Inventory)

3.3.6.3 – Previous Occurrences and Extent

Levees and dams along the Missouri River were tested by the 1952, 1993, 2010, and 2011 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."

During the 2011 flood on the Missouri River, levees within Nebraska were tested but did not experience failure. This may be due to levee breaches on the Iowa bank of the Missouri leading to decreased flood stages. While no breaches occurred, significant resources were spent in the operation and maintenance of the levees and the post flood rehabilitation.

In 2015, 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.

3.3.6.4 – Probability of Future Events

Levees in the State of Nebraska are generally of 3 categories. Un-engineered levees associated with sandpit developments are likely the most prone to failure. A full accounting of these features and their vulnerabilities is not available. Agricultural levees along the Missouri River and other streams likely represent the second most vulnerable category, both due to age and design level of protection (it should be noted that these may not protect significant consequence sources). Last, levees thorough out the state protect individual communities. These features are generally certified for purposes of the NFIP to provide a 100-year level of protection.

The levees in Nebraska are exposed annually to risk during the flood season. Historical data points that several storms will impact the state each season with storms 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.

3.3.6.5 – Local Plan Data

The majority of the 137 levee systems in Nebraska are located in the Eastern half of the state. As such, the mitigation strategies are adopted by counties and districts who contain levees and remain simple, yet effective. The sampled districts acknowledge dam and levee risks and what might overwhelm their respective hydraulic capacities. It is also heavily recognized 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 mitigations. 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.

3.3.6.6 – Jurisdictional Vulnerability and Potential Losses

The rate of failure of a levee or floodwall is difficult to predict because of the lack of data on the state and federal levels. Although sudden failure is certainly a possibility, preventive measures such as proper maintenance, sound design, and proper construction can limit the probability of a levee failure. 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, participate in breach inundation mapping and risk assessments in levee communities.

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-#. Currently, 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. This is identified as a future mitigation activity.

Table 3-20: 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**

3.3.7 – Severe Winter Storm

Table 3-21: Severe Winter Storm Impacts

Severe Winter Storm Impact Summary	
Public: Housing, Causalities, 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. Causalities/Fatalities – There are chances for frostbite on exposed skin, hypothermia for people caught outdoors which can cause death, people suffer heart attacks shoveling snow. Work – Employee will likely have a difficult time traveling to and from places of employment. Building can also have roof damage or fail due to heavy snow, there can be prolonged power outages causing work stoppage. 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 go way beyond what's budgeted causing stress on local and state government budgets. The ability for businesses to return to normal operations may be impacted.
Public Confidence in the Governance	Depending on how quickly and efficiently governments open roads, restores power, and brings things back to normal winter conditions.

3.3.7.1 – Hazard Description

A Severe Winter Storm is the second most common event in the state of Nebraska behind Severe Thunderstorms. They are the result of the collision of high-pressure systems with moderate temperatures and low-pressure systems having lower temperatures. These 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.

The National Weather Service (NWS) defines a blizzard as a storm system which contains large amounts of snow fall or blowing snow, with winds in excess of 35 MPH and visibilities of less than ¼ mile for an extended period of time (at least 3 hours). Ground blizzards can also occur when snow that has already fallen gets picked up and blown around from heavy winds causing limited visibility.

An Ice storm is a storm which results in the accumulation of at least .25" of ice on exposed surfaces. They create hazardous driving and walking conditions. Tree branches and power lines can easily snap under the weight of the ice causing significant damage and/or injury. Ice storms can also bring black ice which is a deadly driving hazard when there is ice on surfaces that cannot be seen. Ice jams can also occur when bodies of water have long periods of frozen spells which causes a rise in the water level or a thaw breaks the ice into large chunks which become jammed at manmade and natural obstructions.

3.3.7.2 – Geographic Area of Impacts

Storms may impact anywhere from one to two counties to blizzard conditions across the state. Due to the geographic location and makeup of the state of Nebraska, the whole region is likely severe winter storms including blizzards and ice storms. Large sized ice storms have historically caused large power outages across multiple counties.

3.3.7.3 – Previous Occurrences and Extent

In the past 10 (2009-2018) years, there have been 5 declared disasters related to winter storms outlined in table

Table 3-22: Federally Declared Disasters: Severe Winter Storms

Federally Declared Disasters: Severe Winter Storms				
DR #	Year	PA Obligated	Emergency Work (Cat A, B)	Permanent Work (Cat C-G)
4375	2018	$3,936,202.37	$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
		$ 20,983578.38	**$ 4,350,175.84**	**$ 15,207,265.17**

According to NOAA's NCEI, there has been 4 recorded fatalities from winter storms within the 2009 to 2018 timeframe. Three were in 2009 in Douglas County which one was direct while the other two were indirect. There was also one death that occurred in Box Butte in 2013 which was direct. For ice storms, NCEI lists 14 events since 1950 with four deaths, five injuries, and $77.4 Million in property damage estimated.

3.3.7.4 – Probability of Future Events

With the central location of Nebraska, winter storms are historic a part of each winter to various degrees of severity. Historical data points that several storms will impact the state each season with storms covering areas from a few counties to the entire state.

"Global warming is causing more intense rain and snowstorms in the United States, and making extreme events such as the January 2016 snow storm that crippled most of the Mid-Atlantic and Northeast more likely. Studies also find that it made the extreme amount of rain falling over the Houston area during hurricane Harvey more likely. Global warming means hotter air, and hotter air can hold more moisture. This translates into heavier precipitation in the form of more intense rain or snow, simply because more moisture is available to storms. Therefore, less of a region's precipitation is likely to fall in light storms and more of it in heavy storms" (UCSUSA.org).

In conclusion, the meteorological trend of the weather being warmer by the cause of global warming, there is a lot more moisture in the air which causes for large/record amounts of snowfall. Essentially this makes the future winter storm events more severe and more frequent.

3.3.7.5 – Local Plan Data

A sample group of county hazard mitigation plans (HMPs) was conducted to examine their discussions of severe winter storms. All plans listed severe winter storms as a common hazard.

The Local Hazard Mitigation Plan for Twin Platte Natural Resources District (NRD) 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 NRD 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 NRD Plan, 2016)

The Papio-Missouri River NRD was another plan that was in the sample of local HMPs. This 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 NRD also uses 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)

The last HMP from the sampling is the Region 23 multi-jurisdictional plan from the northwest part of the state. Region 23 has 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 Plan, 2016)

In conclusion, the Twin Platte Natural Resources District (NRD), the Papio-Missouri River NRD and the Region 23 multi-jurisdictional plan all have a severe winter storm having a 100% chance of an event occurring annually. The three samples were also plans from jurisdictions from all around the state to get a full coverage. This proves that the state of Nebraska as a whole is likely going to be effected by a severe winter storm event. As far as the mitigation practices go 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 a guidance for additional needs.

3.3.7.6 – Jurisdictional Vulnerability and Potential Losses

"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 2016 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 2016 update).

Access and functional needs populations may be at risk of being snowed in with limited ability for emergency response. Hospitals, nursing homes, and other critical facilities may require generator power and support for several hours or days during recovery operations.

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 falls into an area with vulnerability to these types of storms.

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 respond to clear 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-#.

Table 3-23: Replacement Values Top Ten Counties

Replacement Values Top Ten Counties	
County	**Replacement Value**
Douglas	$ 1,818,996,612.43
Lancaster	$ 2,074,202,136.90
Sarpy	$ 35,951,430.79
Hall	$ 166,169,672.63
Buffalo	$ 442,806,812.15
Dodge	$ 7,993,296.70
Scotts Bluff	$ 58,638,804.94
Lincoln	$ 50,594,697.88
Madison	$ 80,384,528.48
Platte	$ 13,598,253.40
Total	**$ 4,749,336,246.30**

3.3.8 – Severe Thunderstorm

Table 3-24: Severe Thunderstorm Impacts

Severe Thunderstorm Impact Summary	
Public: Housing, Causalities, 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 is Extreme straight-line winds, homes and buildings may incur major damage or be destroyed. Causalities/Fatalities – may occur with individuals lacking shelter during the storm Work - Business and industrial buildings can incur similar damages or can be shut down for a time 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 tornados.
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	Property may have minor damages similar to the housing. There may be some homes 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 waste water 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, business 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 lack of confidence in governance.

3.3.8.1 – Hazard Description

A severe thunderstorm is an important hazard to the State of Nebraska due to the fact that it has one of the highest HIRA scores out of most of the hazards of occurring state wide according to the 2014 State Hazard Mitigation Plan. A severe thunderstorm is considered severe if at least one out of two events start to occur. This includes hail that is one inch in diameter or larger and winds start to form of up to 58 miles per hour (mph) or greater. Severe thunderstorms also produce lightning which can cause a substantial amount of damage during this event as well.

There are three products that can form from severe thunderstorms. Hail is a product that is produced by a severe thunderstorm that are small ice particles and super cooled water droplets that are lifted into a thunderstorm by its updraft 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 has been repeated several times, the hail grows and becomes heavier thus resulting with the stones to fall to Earth. Hail stones 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. Wind is another product produced by severe thunderstorms which can form tornadoes and straight line winds. A Microburst can also occur which produces these straight line winds that can cause heavy damage. “The winds come directly out of the bottom of the storm onto the ground and spreads out in all directions. Snapped and uprooted trees are very common with straight line wind damage” (NOAA, 2019). 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.

3.3.8.2 – Geographic Area of Impacts

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 equal throughout the state, with random variations in frequency from county to county. In conclusion, the whole state can be effected by severe thunderstorms including all rural terrain as well as all urban areas.

Figure 3-11: United States Wind Zones

3.3.8.3 – Previous Occurrences and Extent

In the past 11 years (2008-2018) there have been 15 declared disasters relating to severe thunderstorms in the state of Nebraska. Overall, these 15 disasters have effected 302 counties (multiple counties have been effected more than once). Of Nebraska's 93 counties, only four (Grant, Hitchcock, Keith, and Kimball) were not involved in declared severe storm disasters since 2008 (FEMA.gov/disasters).

Table 3-25: Federally Declared Disasters: Severe Thunderstorms

Federally Declared Disasters: Severe Thunderstorms						
DR#	**Type**	**Incident Period**	**Declaration Date**	**P.A. Obligated**	**Adjusted Dollars**	**Counties Effected**
DR-1765	Severe Storms, Tornadoes, Flooding	23-26 April, 2008	30 May, 2008	$499,319.42	$582,879.68	5
DR-1770	Severe Storms, Tornadoes, Flooding	22 May-24 June, 2008	20 June, 2008	$36,258,650.19	$42,587,742.64	62
DR-1779	Severe Storms, Straight-line winds, Flooding	27 June, 2008	18 July, 2008	$12,058,395.64	$14,163,236.84	4
DR-1853	Severe Storms, Tornadoes, Flooding	5 June-26 June, 2009	31 July, 2009	$4,491,366.48	$5,294,188.01	17
DR-1902	Severe Storms, Ice Jams, Flooding	6 March-3 April, 2010	21 April, 2010	$3,112,391.72	$3,609,518.56	37
DR-1924	Severe Storms, Flooding, Tornadoes	1 June-29 August, 2010	15 July, 2010	$49,926,354.50	$57,900,842.71	61
DR-1945	Severe Storms, Flooding, Tornado, Straight-line winds	13-14 September, 2010	21 October, 2010	$2,138,551.99	$2,480,132.26	7
DR-4014	Severe Storms, Tornadoes, Straight-line winds, Flooding	19-21 June, 2011	12 August, 2011	$3,362,468.45	$3,780,215.23	12
DR-4156	Severe Storms, Winter Storms,	2-6 October, 2013	26 November, 2013	$2,670,513.58	$2,898,959.15	10

	Tornadoes, Flooding					
DR-4179	Severe Storms, Tornadoes, Straight-line winds, Flooding	11-12 May, 2014	17 June, 2014	$10,125,817.92	$10,816,552.89	6
DR-4183	Severe Storms, Tornadoes, Straight-line winds, Flooding	14-21 June, 2014	24 July, 2014	$12,420,716.97	$13,267,999.00	12
DR-4185	Severe Storms, Tornadoes, Straight-line winds, Flooding	1-4 June, 2014	28 July, 2014	$3,937,963.86	$4,206,592.96	12
DR-4225	Severe Storms, Tornadoes, Straight-line winds, Flooding	6 May-17 June, 2015	25 June, 2015	$14,235,509.29	$15,188,559.33	28
DR-4325	Severe Storms, Tornadoes, Straight-line winds	12-17 June, 2017	1 August, 2017	$19,768,675.81	$3,978,761.00	18
DR-4387	Severe Storms, Tornadoes, Straight-line winds, Flooding	17 June-1 July, 2018	27 August, 2018	$713,719.21	N/A	11

3.3.8.4 – Probability of Future Events

Due to the geographic location of the state within the continent, the probability of future events is very likely that severe thunderstorms will occur each year.

"Global warming is causing more intense rain and snowstorms in the United States, and making extreme events such as the January 2016 snow storm that crippled most of the Mid-Atlantic and Northeast more likely. Studies also find that it made the extreme amount of rain falling over the Houston area during hurricane Harvey more likely. Global warming means hotter air, and hotter air can hold more moisture. This translates into heavier precipitation in the form of more intense rain or snow, simply because more moisture is available to storms. Therefore, less of a region's precipitation is likely to fall in light storms and more of it in heavy storms" (UCSUSA.org).

3.3.8.5 – Local Plan Data

All local plans assess this hazard as a high risk. All provide mitigation techniques for severe thunderstorms such as installing and maintaining surge protection for critical facilities, bury overhead power lines, incorporate text messaging into severe weather messaging programs as well as establishing mutual aid agreements with neighboring communities and privately owned businesses. The severe thunderstorm warning event will continue to be a concern and high profile hazard which will continue with local plan integration.

3.3.8.6 – Jurisdictional Vulnerability and Potential Losses

The whole population of the state is vulnerable since all of Nebraska is highly likely to be effected. "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 is 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 2016 Plan).

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 is susceptible to thunderstorms/high winds/hail/lightning and experiences hazard on a regular basis meaning all state assets are vulnerable to severe thunderstorms.

The state realizes that a threat exists from severe thunderstorms and encourages local entities to apply for safe room 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.

State property replacement values in the top ten most populated counties with increased concentrations of infrastructure and buildings are listed in table 3-#.

Table 3-26: Replacement Values Top Ten Counties

Replacement Values Top Ten Counties	
County	**Replacement Value**
Douglas	$ 1,818,996,612.43
Lancaster	$ 2,074,202,136.90
Sarpy	$ 35,951,430.79
Hall	$ 166,169,672.63
Buffalo	$ 442,806,812.15
Dodge	$ 7,993,296.70
Scotts Bluff	$ 58,638,804.94
Lincoln	$ 50,594,697.88
Madison	$ 80,384,528.48
Platte	$ 13,598,253.40
Total	**$ 4,749,336,246.30**

3.3.9 – Terrorism

Table 3-27: Terrorism Impacts

Terrorism Impact Summary	
Public: Housing, Causalities, 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.
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 damages.
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?

3.3.9.1 – Hazard Description

The definition of terrorism changes slightly according to what entity is asked and the practical purpose of the definition. As of 2018, the Federal Bureau of Investigation (FBI) uses two definitions of terrorism: international and domestic. International terrorism is, "perpetrated by individuals and/or groups inspired by or associated with designated foreign terrorist organizations or nations (state-sponsored). Domestic terrorism is that which is, "perpetrated by individuals and/or groups inspired by or associated with primarily U.S.-based movements that espouse extremist ideologies of a political, religious, social, racial, or environmental nature (FBI,

2017). Legally, Title 22 Chapter 38 U.S. Code § 2656f defines terrorism as, "premeditated, politically motivated violence perpetrated against noncombatant targets by subnational groups or clandestine agents" (LEI, n.d.).

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, 2017). 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-right wing organizations. However, terrorist crimes have been committed by Muslim-based extremists, left-wing extremists such as eco-terrorists, and other independently-associated activists as well (GTD, n.d.). 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 (Cato, 2016).

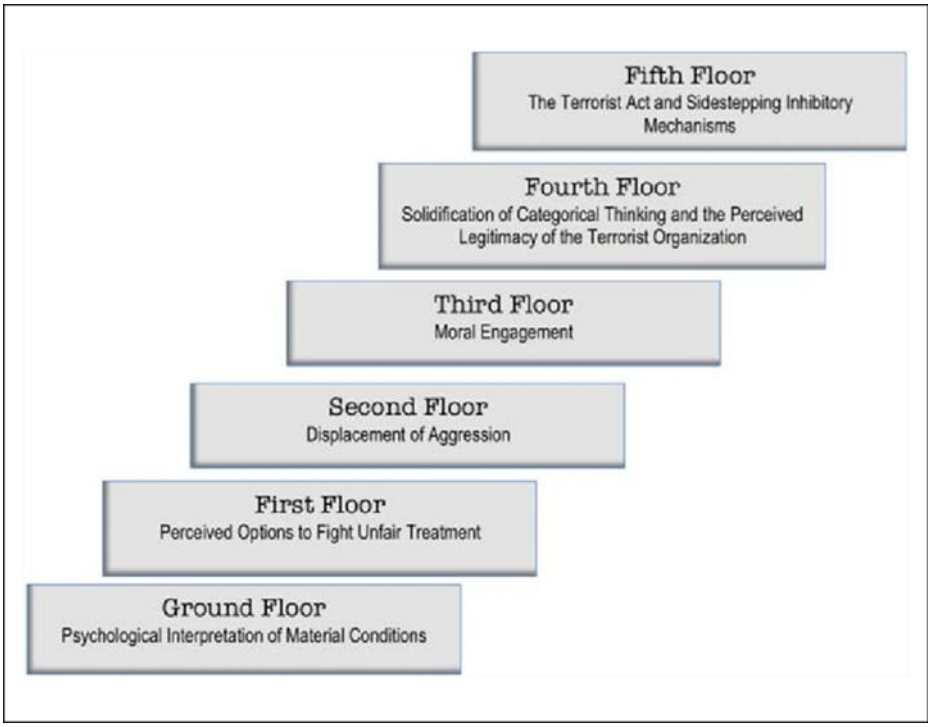


Figure 3-12: The Staircase to Terrorism
Fathali M. Moghaddam, Georgetown University, 2005.

Whereas, most people remain at the ground floor and never become radicalized, some follow a path illustrated by this model after experiencing hardship.

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. This can include hacking into networks, taking control of networks, introducing viruses or other malicious software, and threats. 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.

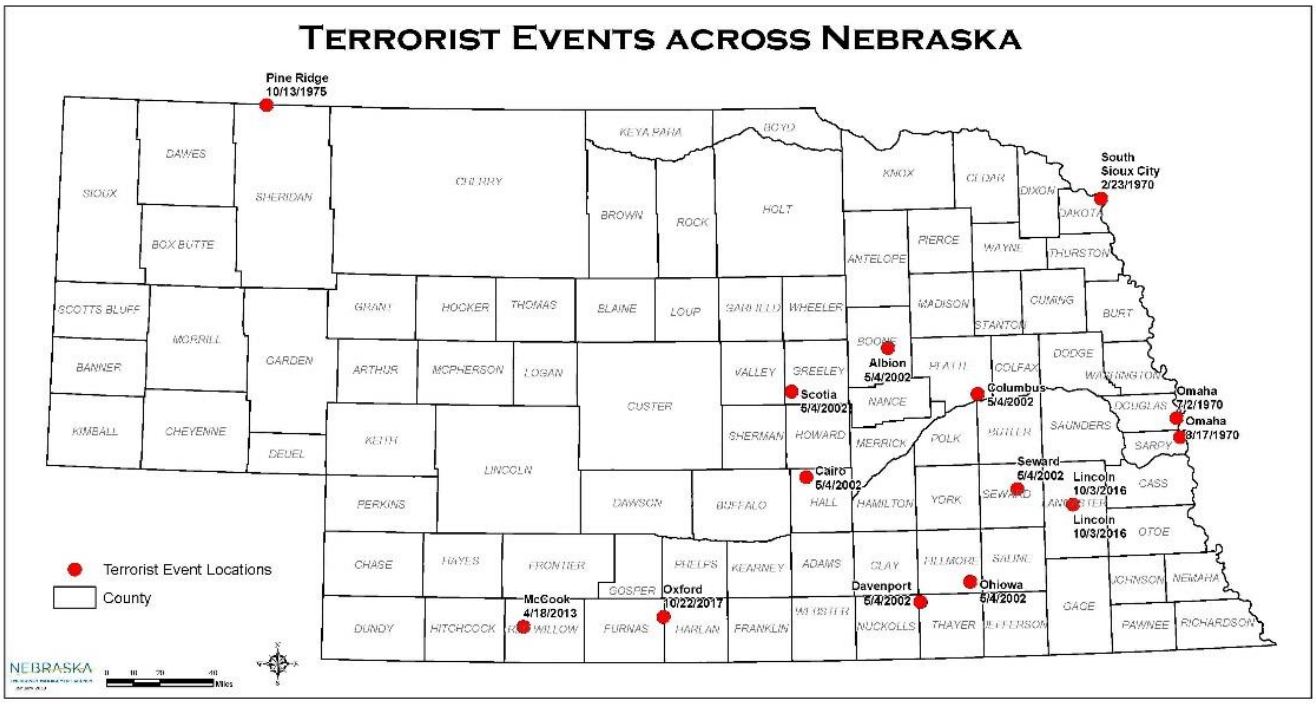


Figure 3-13: Terrorist Events Across Nebraska

3.3.9.2 – Geographic Area of Impacts

Due to the inherent unpredictable nature of terrorism, virtually all areas of the state are potential targets and vulnerable to casualties and property damage. However, areas of particular concern are heavily populated areas, areas with known racial, ethnic, or other demographic fractions, and those important to daily economic or governmental activity.

3.3.9.3 – Previous Occurrences and Extent

Nebraska lists 19 targets from 12 incidents. Most recently, Neo-Nazis were the perpetrator group. This is consistent with national trends (FBI, 2017). Currently, there are nine established hate groups in Nebraska. These groups pose increased risks to their immediate vicinity as well as ethno-cultural centers of peoples they may target. These groups are primarily tracked through the Southern Poverty Law Center's Hate Map (SPLC, 2018)

Table 3-28: Terrorist Events Across Nebraska

Terrorist Events Across Nebraska				
Date	Fatalities	Injuries	Property Damage	Target
10/22/2017	0	0	No	Transportation
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 Citizen affiliated with abortion
6/3/1979	0	0	Yes	Private Citizens & Property
8/18/1977	0	0	Yes	Private Citizen 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

Figure 3-14: Hate Groups Across Nebraska

Figure 3-15: Hate Groups Across Nebraska

3.3.9.4 – Probability of Future Events

The probability of a terrorist attack occurring is near 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.

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 commit crimes with anonymity and remotely. 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.

3.3.9.5 – Local Plan Data

Local mitigation plans should be considered on an individual basis. As Terrorism is a highly unlikely event, unique circumstances may present challenges that are not consistent with established figures warrant increased measures beyond the initial design of a building, 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.

3.3.9.6 – 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. Consult the FBI Crime Statistics Database and cross reference local demographics with terrorism and biased crime data to determine heightened vulnerability in geo-cultural blocks within Nebraska. Any state facility could be the target of terrorism along with facilities own by other government entities or private entities. Analysis of the most vulnerable state facilities is classified.

Additionally, cyberterrorism is an increasing threat. 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.

3.3.10 – Tornado

Table 3-29: Tornado Impacts

Tornado Impact Summary	
Public: Housing, Causalities, 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. Causalities/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 of causalities/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. Tornados 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 building 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 amount of trees may be destroyed during a tornado; streams and creeks can be clogged with debris and contaminated by secondary spills.
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.

3.3.10.1 – Hazard Description

The National Weather Service (NWS) defines a tornado as "a violently rotating column of air extending from a thunderstorm to the ground." Tornadoes are the most violent of all atmospheric storms and are capable of tremendous destruction. Wind speeds can exceed 250 miles per hour and damage paths can be more than one-mile-wide and 50 miles long. 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.

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 tornados 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 tornados 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 F0-F5 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 videogrammetry. Based on the most severe damage to any well-built frame house, or any comparable damage as determined by engineer, an F-Scale number is assigned to the tornado. The table below summarizes the new EF Scale, old F-Scale, and typical damage for tornados. Table 3.29 is from the NCEI Website, and summarizes information about tornado damages in the state of Nebraska. The strength of the tornadoes in the table is measured by the Fujita Scale (or F-Scale).

Table 3-30: Fujita Scale

Fujita Scale		
New EF Scale	**Old F-Scale**	**Typical Damage**
EF0 (65-85 mph)	F0 (65-73 mph)	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1 (86-110 mph)	F1 (73-112 mph)	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2 (111-135 mph)	F1 (113-157 mph)	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.
EF3 (136-165 mph)	F1 (158-206 mph)	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4 (166-200 mph)	F4 (207-260 mph)	Devastating damage. Whole frame houses Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5 (>200 mph)	F5 (261-318 mph)	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yds.); high-rise buildings have significant structural deformation; incredible phenomena will occur.

3.3.10.2 – Geographic Area of Impacts

While the certain locales have historically experienced greater tornado activity, the entire state is vulnerable to tornado damage. Figure #-## shows the wind zones across Nebraska. Large parts of the state are located within the 250 MPH zone.

Figure 3-16: Wind Zones in the United States

3.3.10.3 – Previous Occurrences and Extent

Since 2008, Nebraska has been hit by 469 reported tornadoes, an average of over 42 tornadoes per year. The 469 tornadoes resulted in 6 fatalities and 103 injuries. (Storm Prediction Center, 2019). Since 1990, every county in Nebraska has been impacted by tornadoes (The Tornado Project, 2015).

Presidential Disaster Declarations in Nebraska from tornados occurring between the years 2008 and 2018 resulted in a total in excess of $144 million in FEMA Public Assistance, alone. Below is a table of the Presidential 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 (FEMA, 2019). Table 3-23 highlights the last ten years of federal declarations involving tornados.

Recent tornado events have caused severe damage. In June 2014, Pilger was hit by twin tornados destroying the majority of the community. Two individuals were killed including a five-year-old girl. In 2017, small tornados hit parts of the Lincoln and Omaha metro leaving minor damage but highlighting the risk to all areas of the state.

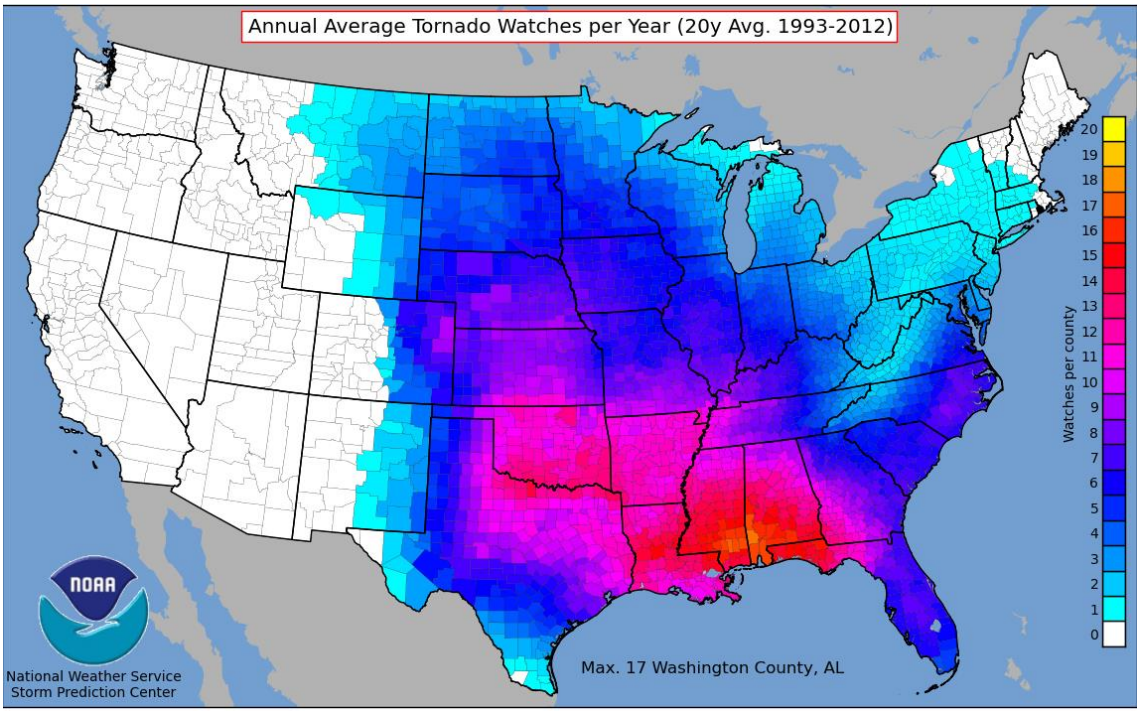


Figure 3-17: Annual Average Tornado Watches Per Year

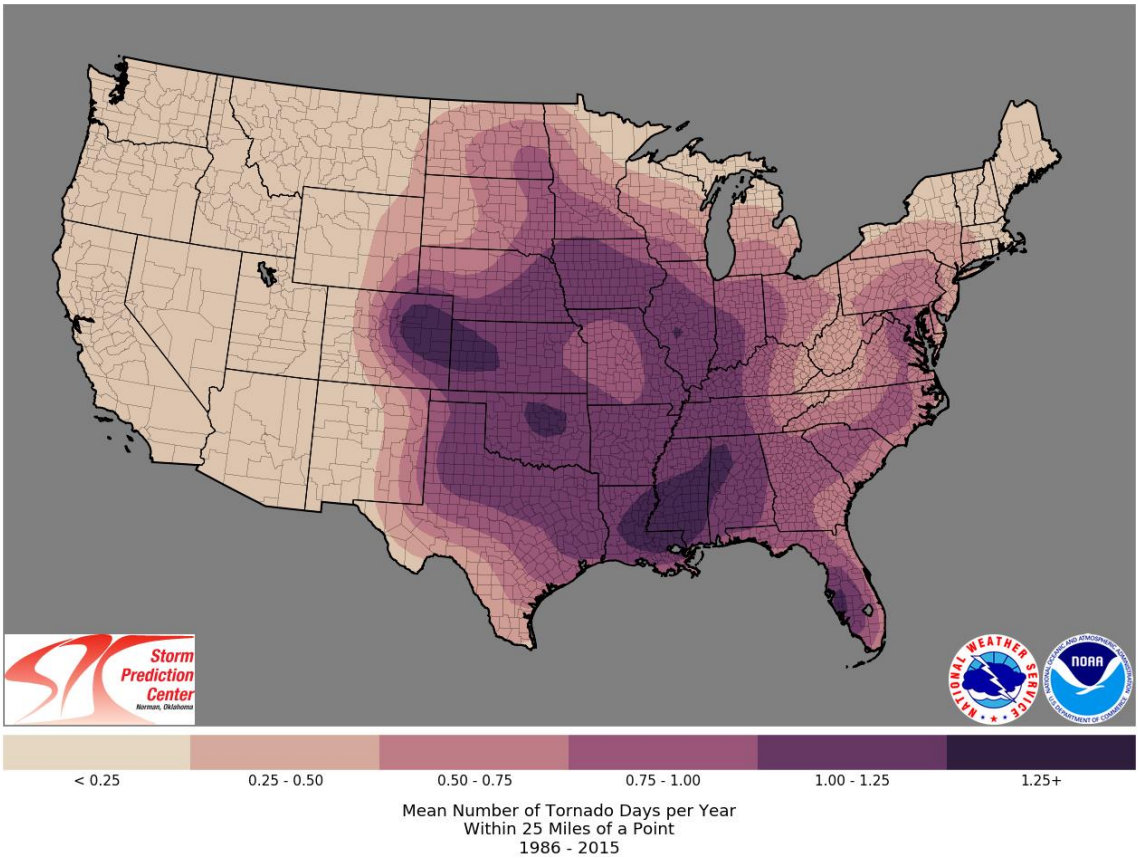


Figure 3-18: Mean Number of Tornado Days Per Year

Table 3-31: Federally Declared Disasters: Tornados

Federally Declared Disasters: Tornados				
Year	**Federal Disaster Number**	**Dates of Incident**	**Public Assistance Awarded**	**Description/ Location**
2018	4387	17 June- 1 July, 2018	$4,148,402.53 (estimated)	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 11 declared counties in Nebraska
2017	4325	12-17 June, 2017	$3,856,590.53 (total expected to increase)	Severe Storms, Tornadoes, And Straight-line Winds resulted in 18 declared counties in Nebraska
2015	4225	6 May- 17 June, 2015	$14,235,509.29	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 28 declared counties in Nebraska
2014	4185	1-4 June, 2014	$3,937,963.86	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 12 declared counties in Nebraska
2014	4183	14-21 June, 2014	$12,420,716.97	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 12 declared counties in Nebraska
2014	4179	11-12 May, 2014	$10,125,817.92	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 6 declared counties in Nebraska
2013	4156	2-6 October, 2013	$2,670,513.58	Severe Storms, Winter Storms, Tornadoes, and Flooding resulted in 10 declared counties in Nebraska
2011	4014	19-21 June, 2011	$3,362,468.45	Severe Storms, Tornadoes, Straight-line Winds, and Flooding resulted in 12 declared counties in Nebraska
2010	1945	13-14 September, 2010	$2,138,551.99	Severe Storms, Flooding, Tornado, and Straight-line Winds resulted in 7 declared counties in Nebraska
2010	1924	1 June- 29 August, 2010	$49,926,354.50	Severe Storms, Tornadoes, and Flooding resulted in 61 declared counties in Nebraska
2009	1853	5-26 June, 2009	$4,491,366.48	Severe Storms, Tornadoes, and Flooding resulted in 17declared counties in Nebraska
2008	1770	22 May-24 June, 2008	$36,258,650.19	Severe Storms, Tornadoes, and Flooding resulted in 62 declared counties in Nebraska
2008	1765	23-26 April, 2008	$499,319.42	Severe Storms, Tornadoes, and Flooding resulted in five declared counties in Nebraska

3.3.10.4 – Probability of Future Events

Nebraska averages 41 tornadoes a year. As shown in figure 3-#, this trend is increasing over the last 70 years with some years being more active than other. Nebraska will experience tornados year each, and with continued growth of communities, the likelihood of deadly tornados has and will continue to increase.

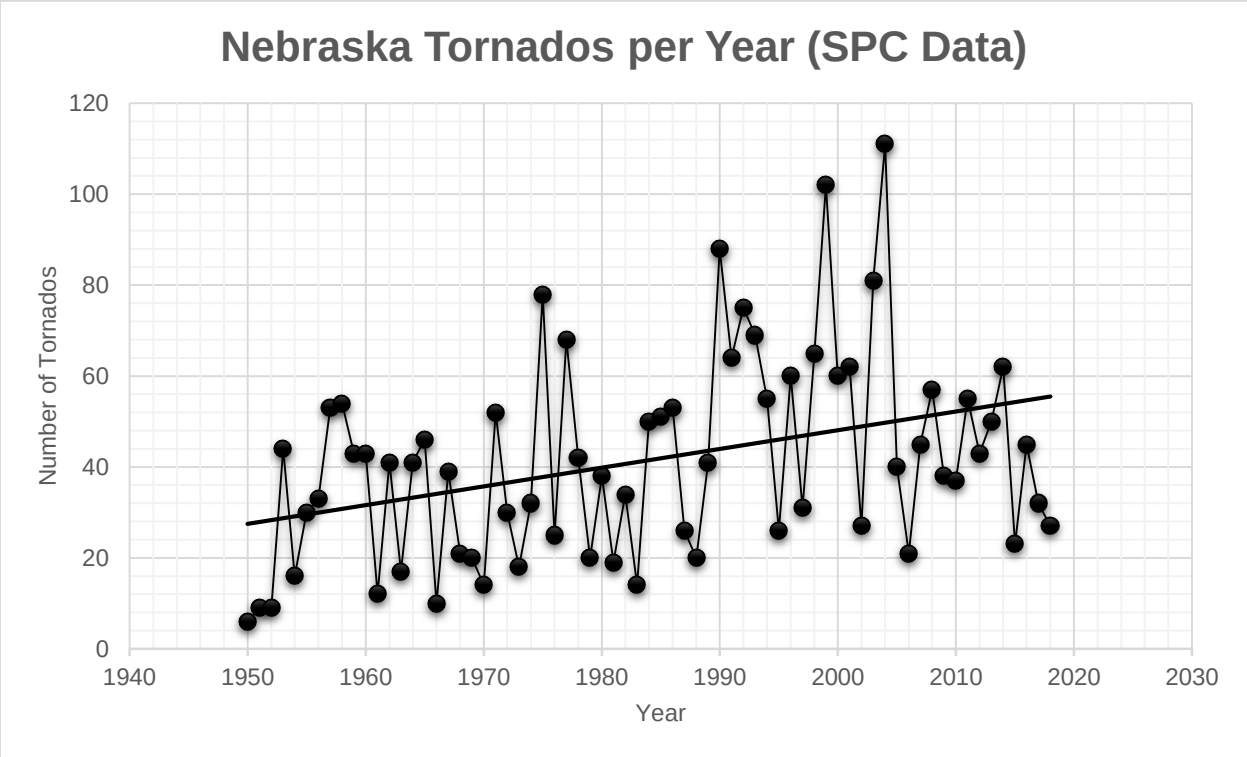


Figure 3-19: Nebraska Tornados per Year

3.3.10.5 – Local Plan Data

Tornados are considered a top hazard in all local hazard mitigation plans. Plans highlight that past historical events have impacted all areas of the state. Common mitigation discussion outlined includes installation and maintenance of outdoor warning sirens, residential safe rooms, and community safe rooms.

3.3.10.6 – Jurisdictional Vulnerability and Potential Losses

The entire state is vulnerable to tornados and all 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 3-33.

Table 3-32: Replacement Values Top Ten Counties

Replacement Values Top Ten Counties	
County	**Replacement Value**
Douglas	$ 1,818,996,612.43
Lancaster	$ 2,074,202,136.90
Sarpy	$ 35,951,430.79
Hall	$ 166,169,672.63
Buffalo	$ 442,806,812.15
Dodge	$ 7,993,296.70
Scotts Bluff	$ 58,638,804.94
Lincoln	$ 50,594,697.88
Madison	$ 80,384,528.48
Platte	$ 13,598,253.40
Total	**$ 4,749,336,246.30**

3.3.11 – Wildfire

Table 3-33: Wildfire Impacts

Wildfire Impact Summary	
Public: Housing, Causalities, 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. Causalities/Fatalities – With good warning and if citizens will evacuate when asked, causalities and/or fatalities will be mitigated. With good adherence to safety and the proper use of PPE responder causalities and fatalities can be minimized. Work – If the fire is contained to the wild area, little to no impact on work. Food/Water – there should be no impact on food and water supplies. Supplies of food and water will need to be brought in for firefighters.
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 to keep responders safe and accounted for.
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, moves very quickly. Homes and businesses in an area adjacent to a wilderness area are vulnerable to destruction from fire.
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 natural event 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 interrupted for the season of the fire but that is a temporary disruption.
Public Confidence in the Governance	Public confidence will depend on proper management of the firefighting operation and the activities taken to return the area to normal.

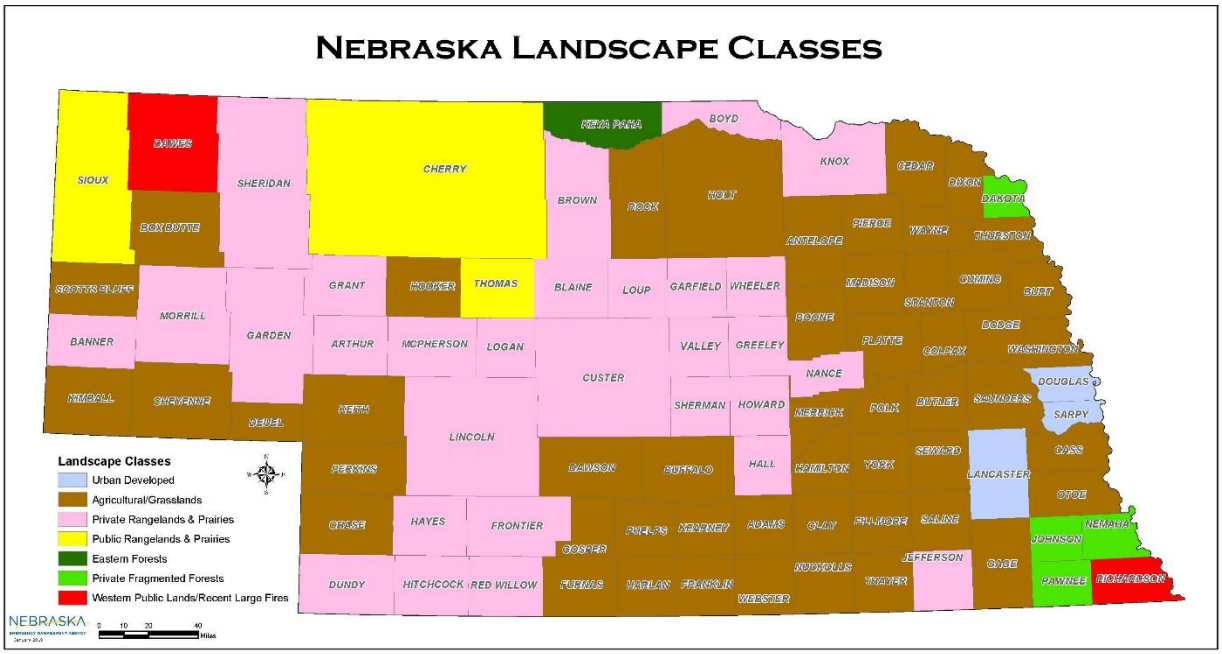
3.3.11.1 – Hazard Description

Wildland fires fire events that occur in forests and grasslands, resulting from naturally occurring events, 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. Only a small fraction of wildland fires can be classified as catastrophic, and a small percentage of fires account for the majority of acres burned. Only about 1% of fires become conflagrations, raging, destructive fires, and predicting which ones will turn into conflagrations depends 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 our 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 and real and ever present hazard to the state and its growing population.

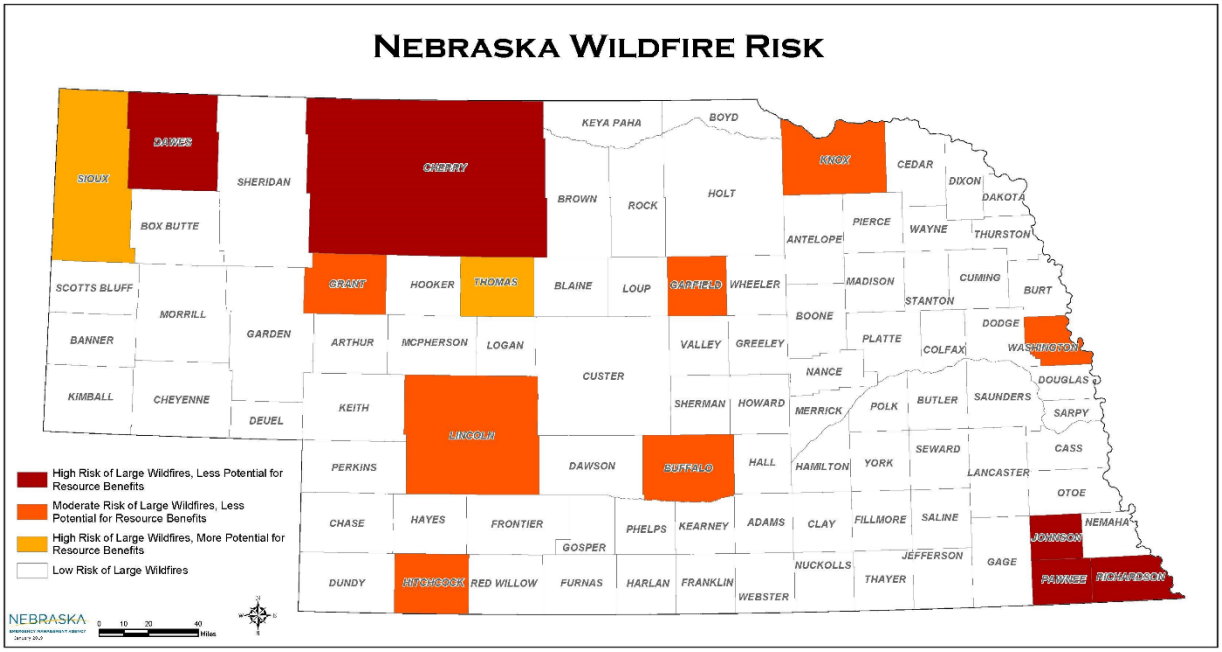
3.3.11.2 – Geographic Area of Impacts

The State of Nebraska is comprised of 93 ecologically diverse counties. The data regarding fuel models was gathered from Landscape Fire and Resource Management Planning Tools (LANDFIRE) and the National Cohesive Wildland Fire Management Strategy Landscape Classes. LANDFIRE contains 20 national geospatial layers of data that support regional and landscape scale projects, is used in hazardous fuel reduction and conservation planning, Community Wildfire Protection Plans and other initiatives. The majority of state, 50 counties, fall under landscapes classes characterized as agricultural and grassland areas that have relatively little forested area or federal ownership and have historically experienced very high fire levels of natural fire. The second most common landscape classification, 30 counties, are areas characterized as private rangelands and prairies with, no federal ownership, have had recent fires between 2002-2012, have historically experienced very 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.



* Landscape Classes obtained from Cohesive Wildland Fire Management Strategy/Spacial Prioritization/Response
https://cohesivefire.nemac.org/national-priorities

Figure 3-20: Nebraska Landscape Classes



* https://cohesivefire.nemac.org/national-priorities

Figure 3-21: Nebraska Wildfire Risk Map

3.3.11.3 – Previous Occurrences and Extent

More than 1,400 fires were reported to the Nebraska Forest Service by volunteer fire departments in 2017. Most were quickly extinguished and relatively small. However, catastrophic fires, like the 2012 Region 23 Complex fire remain a real threat. The Region 23 Complex consisted of three fires, the Douthit, West Ash Creek and Wellnitz Fires, located in 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, 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 Pine Ridge and Niobrara River Valley areas experienced extreme fire behavior in 2006 and 2012. The Spotted Tail fire in 2006 threatened the city of Chadron and most of its residents had to be evacuated. The West Ash Fire in 2012 (Part of Region 23 Complex Fire) prompted an evacuation of the town of Whitney which is 10 miles north of the forested area. The Big Rock Fire in 2006 charred over 1,720 acres and burned into the city of Valentine, resulting in a partial evacuation of the city and the destruction of many homes and other structures. Again in 2012, The Region 24 Wildfire Complex destroyed the town of Nordon and burned more than 75,000 acres in Keya Paha, Brown, and Cherry Counties. Two other fires in 2012, one south of the town of Merriman threatened several ranch homes and burned over 3,200 acres and the other, a 6,717-acre fire burned into Cherry County from South Dakota and prompted the evacuation of the town of Crookston.

Table 3-34: Region 23 Complex Fire Estimated Loss

Region 23 Complex Fire Estimated Losses			
	Loss in value per unit	**Acres Burned**	**Estimated loss**
Timber	$ 75.00	138000	$ 10,350,000.00
Forest Rehab	$ 275.00	138000	$ 37,950,000.00
Reforestation	$ 175.00	20000	$ 3,500,000.00
Buildings	$ 50,000.00	65	$ 3,250,000.00
Fence	$ 57,000.00	781	$ 44,517,000.00
Lost grazing	$ 15.00	500000	$ 7,500,000.00
Tourism	$ 10.00	500000	$ 5,000,000.00
Total			**$ 112,067,000.00**

The Region Complex 23 fire in 2012 prompted the Nebraska legislature and the Nebraska Forest Service to take action – 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. In Nebraska, 92.3% of fire departments are volunteer based and supporting their efforts was made 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. Seven years later, the actions and components of LB 634 are in place and operational.

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 895,147 acres were burned.

Table 3-35: Fires Across Nebraska

Fires Across Nebraska		
Year	**Total Fires**	**Acres Burned**
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	1835	90,531
TOTAL	**18,758**	**1,047,689**

3.3.11.4 – Probability of Future Events

Nebraska averages over a thousand wildfires in a given year. Most of these occur during the late summer and fall periods 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 wildfires every year, there is a 100% probability that a wildfire will impact an area of the state in a given year.

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.

3.3.11.5 – Local Plan Data

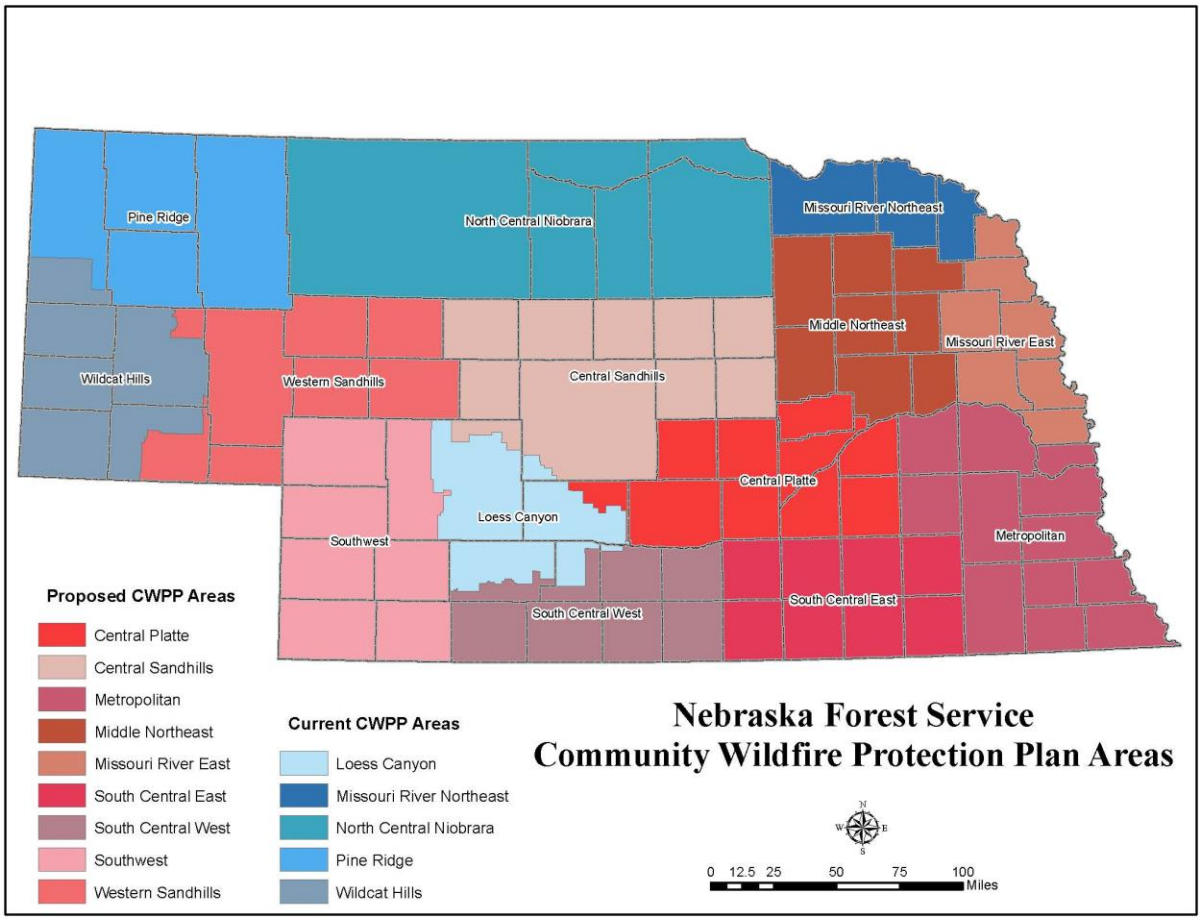


Figure 3-22: NFS Community Wildfire Protection Plan Areas

The 2008 Farm Bill 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, five NFS CWPP Areas had completed plans: Pine Ridge Area, The Wildcat Hills area, The North Central/Niobrara Area, and the Missouri River Northeast areas. These areas are described below in detail. These areas have recently experienced large fires and historically experienced high levels of wildfire.

3.3.11.6 – Jurisdictional Vulnerability and Potential Losses

Critical facilities were identified and intersected with the counties considered to have High to Moderate Vulnerability to wildfire. This is not to suggest that these specific facilities are at a high level of risk, but to indicate that these facilities could be affected by wildfire.

Table 3-36: Vulnerable Sites

Vulnerable Sites				
County	**Police Departments**	**Fire Departments**	**Critical Access Hospitals**	**Schools –Public & Private (K-12)**
Sioux	1	1	0	4
Dawes	3	2	1	5
Cherry	2	6	1	9
Thomas	1	2	0	2
Pawnee	1	5	1	3
Richardson	2	9	1	4
Grant	1	1	0	1
Lincoln	3	7	0	23
Hitchcock	2	4	0	4
Buffalo	4	8	1	29
Knox	6	7	1	8
Washington	2	5	1	12
Total	**28**	**57**	**7**	**104**

Table 3-37: State Assets in High Vulnerability Areas

High Vulnerability					
County	**Number of Structures**	**Insurance Value**	**Content Value**	**Total Value**	**Replacement Value**
Cherry	90	$617,999.03	N/A	$617,999.03	$11,012,035.83
Dawes	199	$5,114,523.28	N/A	$5,114,523.28	$225,858,259.90
Richardson	28	$250,174.94	$3,227.00	$253,401.94	$120,239,106.08
Pawnee	8	$20,066.94	N/A	$20,066.94	$538,923.78
Johnson	65	$250,174.94	$3,227.00	$253,401.94	$4,627,640.92
Sioux	8	N/A	N/A	N/A	$2,346,626.84
Thomas	3	N/A	N/A	$619,722.32	N/A

Table 3-38: State Assets in Moderate Vulnerability Areas

Moderate Vulnerability					
County	**Number of Structures**	**Insurance Value**	**Content Value**	**Total Value**	**Replacement Value**
Grant	15	N/A	N/A	N/A	$3,630,119.69
Garfield	10	$54,339.00	N/A	$54,339.00	$5,169,643.13
Lincoln	123	$14,107,205.35	$965,313.00	$15,072,518.35	$50,594,697.88
Hitchcock	25	$217,508.00	N/A	$217,508.00	$2,167,989.75
Buffalo	140	$22,971,084.05	$2,209,237.00	$25,180,321.05	$442,806,812.15
Washington	23	N/A	N/A	N/A	$8,240,510.64
Knox	106	$2,464,505.78	N/A	$2,464,505.78	$13,690,815.10

There are 401 structures located in High Vulnerability area, 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.

3.4 – State Development Trends

Development, demographic, and land use trends are important elements to consider in a risk assessment. They look at the economic growth, social vulnerability, demography, and distribution of land use trends as inputs to vulnerability discussions that take place in the hazard profiles.

The population of Nebraska has a wide disparity across the state with the largest county having a population of 561,620 (Douglas County) to 457 (Arthur County) (2017 Estimates). Roughly 75% of the geographic area of the state has a population of less than 11 individuals per square mile. Changes to the population have been modest with only 30 of the 93 counties experiencing a growth in population between 2010 and 2017. Following a general trend for Nebraska counties experienced a gradual decline of population and increases in urban areas.

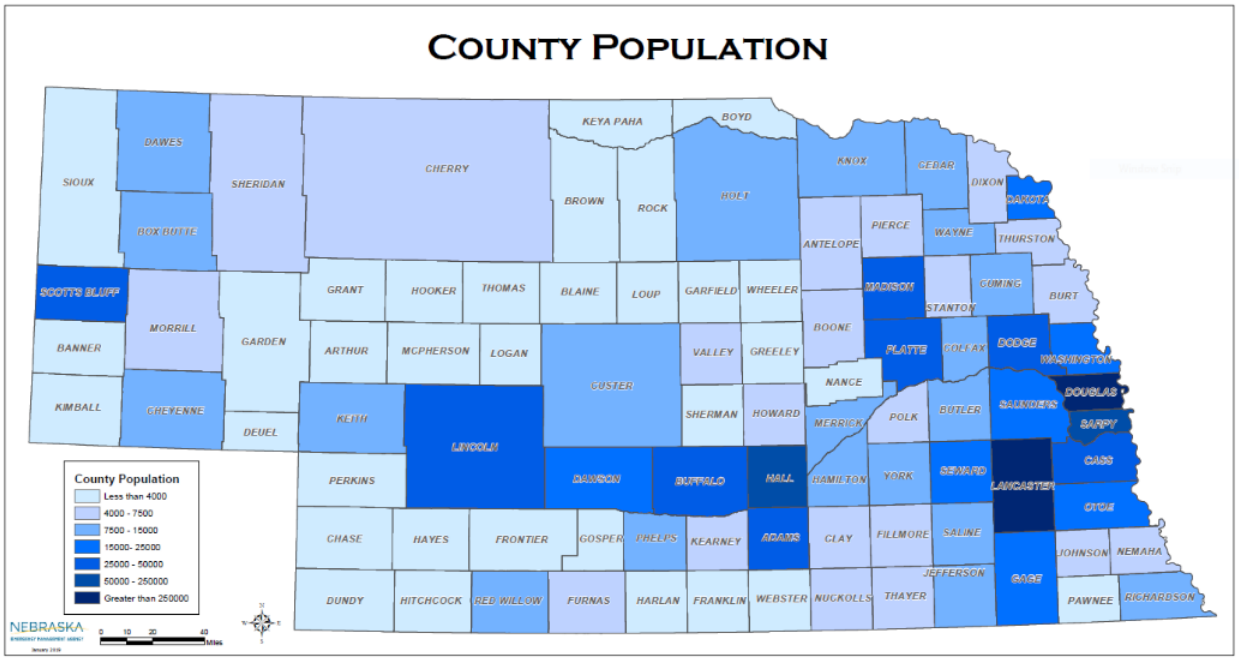


Figure 3-23: County Population Map

Table 3-39: Top Ten Counties By Population

Top Ten Counties by Population				
County	**2010**	**2017**	**Change**	**Percent Change**
Douglas	517,116	561,620	44,504	8.6%
Lancaster	285407	314358	28951	10.1
Sarpy	158840	181439	22599	14.2
Hall	58607	61519	2912	5
Buffalo	46102	49732	3630	7.9
Dodge	36685	39707	22	0.1
Scotts Bluff	36970	36363	-607	-1.6
Lincoln	36288	35280	-1008	-2.8
Madison	34876	35144	268	0.8
Platte	32237	33175	938	2.9
Total	**1,243,128**	**1,345,337**	**102,209**	**8.22 %**

The top ten counties by population have a total of 1,345,337 which is 73% of the state. This covers around one-tenth of the land mass of the state. Areas with a large population concentration would be some of the most vulnerable to loss of life and property from hazards in terms of raw impact. However, rural areas may face increased per capita risk due to their inherent challenges of limited resources, distance from services, limited tax base, and other factors.

As shown in figure 3-23, highly populated areas are generally located across the eastern part of the state and along the interstate system. The high populated counties tend to have a higher population density and property values. Due to the large number of individuals that may need services, governmental entities and relief agencies may experience difficulties during a large event. Sparsely populated areas have a scarcity of services due to longer travel distances and lower population bases.

Overall, counties with fewer residents per square mile tend to have higher percentages of residents 65 or older along with increased percentages of families living below the poverty level. The most populated counties of Lancaster, Douglas, and Sarpy have the lowest percentage of residents over 65 years old. Due to the limited number of service providers and distances traveled, rural areas have a harder time providing needed services. This hold true population younger than 5 years old as shown in Figure 3-24.

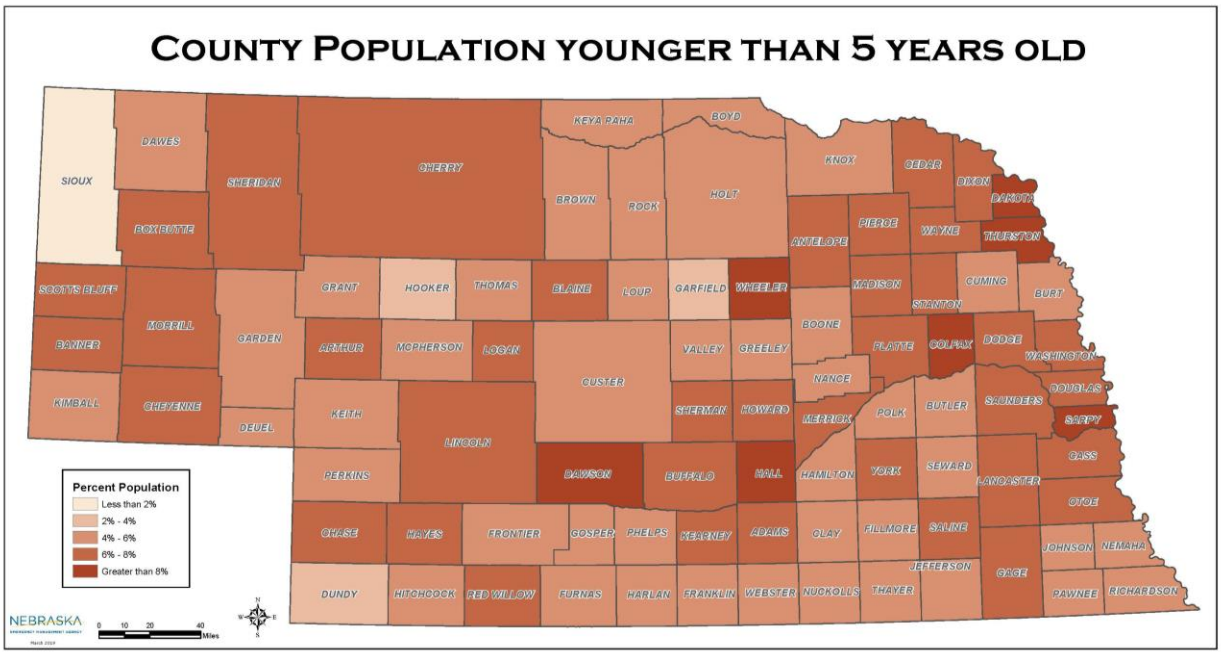


Figure 3-24: County Population Younger than 5 Years Old

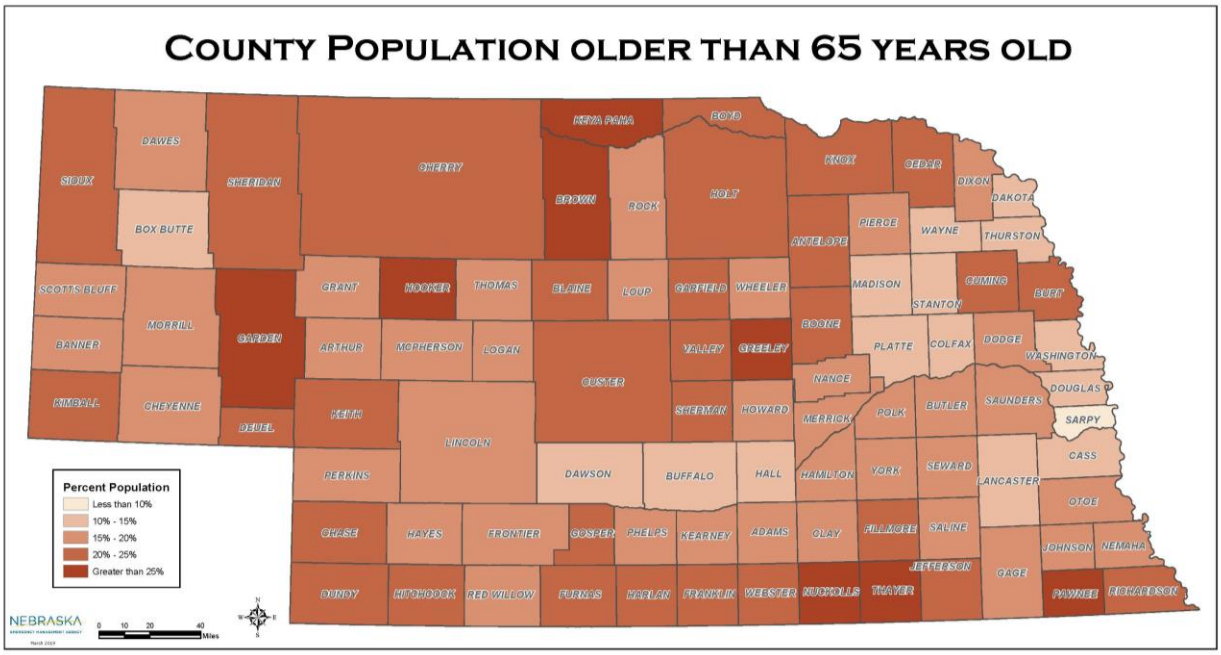


Figure 3-25: County Population Older than 65 Years Old

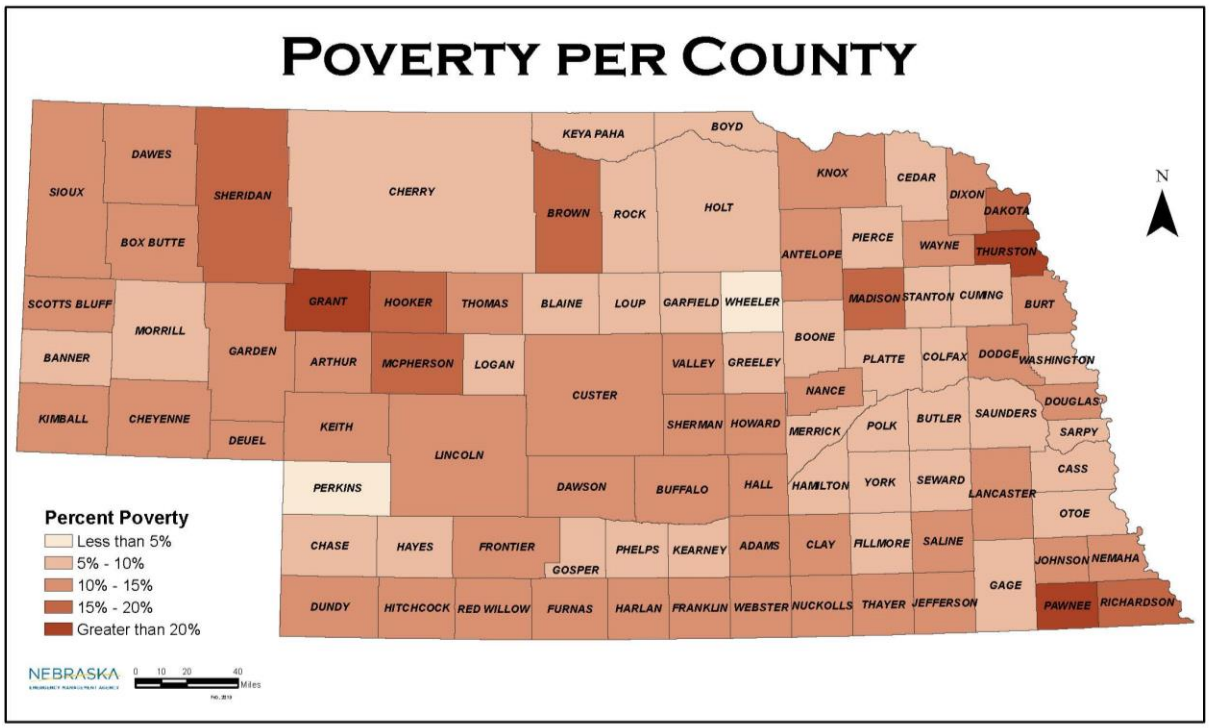


Figure 3-26: Poverty per County

4 – Mitigation Capabilities and Strategy

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)]

EMAP 4.2.4: The Emergency Management Program, consistent with scope of the mitigation program, does the following:

(1) Provides technical assistance in implementing applicable mitigation codes and ordinances;
(2) Identifies ongoing opportunities and tracks repetitive loss; and
(3) Participates in applicable jurisdictional, inter-jurisdictional and multi-jurisdictional mitigation efforts.

This section describes the goals, objectives, and strategies of the 2019 hazard mitigation plan, the state's current capability, and the shift to the use of FEMA's Core Capabilities for Mitigation. Use of the Core Capabilities provides NEMA with a standardized measurement line in line with other state readiness activities. In order to be effective, the state's capabilities 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 Core Capabilities outline in this plan represent the growth of Nebraska's hazard mitigation program and reflect progress in planning efforts since the development of the first mitigation plan. It is the intention of the state that these Core Capabilities will encourage local entities to use this plan as a resource in the update of local hazard mitigation plans.

The Nebraska Emergency Management Agency is guided as a whole by it 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.

Guidance 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.*

4.1 – 2014 Goals, Objectives, and Actions

The 2014 hazard mitigation plan created a framework for the state's mitigation strategy. 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.

The overall goals for the 2019 plan were retained from previous versions of the plan. Objectives and actions steps were revised during the 2019 process based off of current conditions and feedback of GTFDR members and local mitigation plans. The 2014 Goals, Objectives, and action steps are broken out below.

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.

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.

Goal Process since 2014 update

Nebraska has aggressively sought to reduce the impact of hazards on life and property across the state over the past five years. Numerous projects were conducted or supported by state

agencies and countless projects at the local levels. Programs such as RiskMAP have assisted communities at understanding their updated risk. Outreach programs about flood insurance, mitigation after disasters, and planning reached citizens across the state. Partnerships between various communities are tackling water during drought concerns and developing interagency plans and agreements.

Ten community safe rooms have been completed across the state including several in public schools. Minatare Public Schools finished construction of their safe room and conducted community wide drills. Those efforts were put to the test just a few months later as a tornado touched down just outside town. The safe room was active and held the community until danger past.

4.2 – State Capability Assessment

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)]

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 do not undertake mitigation projects as state agencies, but rather promote and oversee projects sponsored by political subdivisions, agencies, and local governments.

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 within the state to promote and support mitigation efforts within their jurisdiction.

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. Cities and counties are the entities responsible for the prevention of development in hazard-prone areas.

During the 2019 plan revision, the planning team evaluated the capabilities of the 2014 and previous version of the plan. Between 2014 and 2019, several challenges and successes were met within the state's capability to implement mitigation activities. During this time, XX regional multi-jurisdictional plans were approved and over XX mitigation activities were completed. Several meetings of the Governor's Taskforce for Disaster recovery 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.

This assessment is to do the following:

- Identify statewide entities that have hazard mitigation capabilities or programs that should be direct 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 actions.

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 planning, 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.

4.2.1 – Organizations

Overarching Groups:

- Governor's Taskforce for Disaster Recovery
  - Established by Governor's Executive Order 94-3 on January 19, 1994, the taskforce 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)
    - The task force serves the following functions:
        - Ensure disaster relief and recovery operations are efficiently coordinated between all agencies.
        - The task force will 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.
- Nebraska Silver Jackets
    - The Silver Jackets are a collaborative group that designs plans and solutions for statewide issues in flood risk management. It is made up of the following state agencies:
        - Nebraska Department of Natural Resources (NDNR)
        - 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)
    - The primary goals of the Nebraska Silver Jackets are:
        - 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

State of Nebraska Agencies/Departments and quasi-state entities:

- 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).

- Nebraska Department of Natural Resources (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 received and approves planning grant applications, recommends projects for FEMA approval, coordinates and participate in all activates concerning flood mitigation plans and completed 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 NDNR 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. NDNR receives federal funding and can help local jurisdictions with mitigation planning and floodplain mapping. NeDNR has been in FEMA's Cooperating 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/FY2018_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. The Cities of Fremont, Omaha, Valley, Lincoln, Papillion, and Scottsbluff are currently enrolled in the CRS program.

- Nebraska Department of Economic Development (NDED)
    - The 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.
- Nebraska Game and Parks Commission (NeG&PC)
    - The Nebraska Game and Parks Commission is responsible for disaster operations including damage assessment and mitigation on 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 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.
- Nebraska State Historic Preservation Office (SHPO)
    - All mitigation projects are reviewed by the Nebraska State Historic Preservation office to ensure respect of all historic properties across the state. Additionally, the relationship between NEMA and the SHPO allows for the development of mitigation activities to reduce risk to the states historic properties.
- Nebraska Forest Service (NFS)
    - As part 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.
- University of Nebraska School of Natural Resources
    - The University of Nebraska's 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.
- 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.

Federal Agencies:

- 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.
- Federal Emergency Management Agency (FEMA)
    - The Federal Emergency Management Agency supports the mitigation efforts of Nebraska in several ways. All local hazard mitigation plans undergo a through FEMA review 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.

4.2.2 – Funding Sources

The Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant 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. 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.
- 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
  - 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 4-1: Project Funding Since 1990

Project Funding Since 1990		
Program	**Project Amounts**	**Federal Share Obligated**
HMGP	$ 97,090,117	$ 72,107,359
PDM	$ 3,848,835	$ 2,861,504
FMA	$ 1,410,153	$ 1,085,634
Total	**$ 102,349,105**	**$ 76,054,498**

4.2.3 – Evaluation of State Laws, Regulations, and Policies

The following state laws, regulations, and policies govern emergency management, hazard mitigation, and project selection in Nebraska:

- RRS §81-829.31 to §81.829.73 Nebraska Emergency Management Act
  - 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."

- RRS §2-1501 to §2-15,106 Operation of the 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
  - (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
    - 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
    - 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.

4.2.4 – Challenges and Changes of State Capabilities

Staffing Issues

Historically, the state plan has identified staffing issues as a challenge to the state capability to implement hazard mitigation projects. The state has taken steps to address staffing shortages and training levels. Progress has been made and the Recovery Section of NEMA is fully staffed 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 has shifted during the course of hazard mitigation project application periods causing issues with determining funding levels. 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 previous described in this plan, the structure of using NRDs and regions for plans has allowed for plans to be revised in a timely manner.

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 – Local Capability and Planning Assessment

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)]

S14. 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)]

Since the 2014 plan revision, 92 of 93 counties are covered by a FEMA approved hazard migration plan. This accounts for nearly 98% of the state's population living in a cover area. Currently, all of the state's 23 local plans are approved of which 13 are championed by a natural resources district. Only three single county mitigation plans remain and are being brought together under a new NRD plan. Additionally, a new mitigation plan will address the hazards facing the University of Nebraska Lincoln in the coming year.

Figure 4-1: Local Mitigation Planning Areas

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 hazard mitigation plan, it still remains a challenge to engage local communities in participating in the planning process. Lack of full time staff, funding, and each individual having multiple roles in a community contributes to lack of local interest at times. Educational outreach about the benefits of planning along with using planning methods that meet the needs of locals can help increase plan participation.

Another challenge noted in the examination of local capabilities and planning, is including non-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. Each of 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 hazard reduction.

Local plans are submitted to 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 late than five years after previous approval.

During the 2019 revision of the state plan, information from the local hazard mitigation plans was included in the various hazard profiles. This review included: identification of hazards and risk assessments; compilation of property value and populations 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.

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. Additionally, the use of databases to track information addresses this challenge.

Local mitigation projects in Nebraska have been effective in reducing risk from a range of hazards. 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 most vulnerable populations.

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 has led to reduce ability to fund mitigation. Additionally, local emergency management officials serve several positions with limited time to seek funding for projects.

Since the 2014 plan revision, NEMA has increased outreach to communities about the availability of disaster recovery funding and mitigation funding. This 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.

Local capabilities for flood mitigation vary widely across the state with this variability 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 shave limited resources for floodplain management and emergency management in general. Implementation of mitigation projects in these area 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. Out of 529 cities in the state, 412 participate in local hazard mitigation plans.

Lincoln, Papillion, Omaha, Fremont, Valley, and DeWitt participate in the Community Rating System by meeting higher standards of floodplain management. This scale rates 1-10 with 1 being the best. Lincoln rates at class 5 with Papillion at class 7. Valley and Fremont are at class 8 and Omaha and DeWitt are class 9.

4.4 – 2019 Core Capabilities

The 2015 edition to the National Preparedness Goal outlined updates to 32 Core Capabilities designed to address risks of the nation. These Core Capabilities are grouped into five areas:

- Prevention: Prevent, avoid, or stop an imminent, threatened, or actual act of terrorism.
- Protection: Protect our citizens, residents, visitors, and assets against the greatest threats and hazards in a manner that allows our interests, aspirations, and way of life to thrive.
- Mitigation: Reduce the loss of life and property by lessening the impact of future disasters.
- Response: Respond quickly to save lives, protect property and the environment, and meet basic human needs in the aftermath of a catastrophic incident.
- Recovery: Recover through a focus on the timely restoration, strengthening and revitalization of infrastructure, housing and as sustainable economy, as well as the health, social, cultural, historic, and environmental fabric of communities affected by a catastrophic incident.

During the annual Threat and Hazard Identification and Risk Assessment (THIRA) workshops conducted by NEMA, the core capabilities are determined and used to define the state's capability baseline and set goals for progress towards achieving heightened capabilities. By developing the 2019 Hazard Mitigation Strategy around the determined core capabilities for mitigation, this plan will be congruent with other state planning efforts and encourage cooperation across the state with all stakeholders. The following objectives were developed from feedback by the State Preparedness Report, the Nebraska Multi-Year Training and Exercise Plan, 2013 State Flood Mitigation Plan, and other stakeholder input.

4.4.1 – Planning

FEMA Description:

Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or tactical-level approaches to meet defined objectives.

Develop approved hazard mitigation plans that address relevant threats/hazards in accordance with the results of their risk assessment within all local, state, tribal, territorial, and federal partners.

Objectives and actions:

1. Develop approved hazard mitigation plans that that address relevant threats/hazards in accordance with the results of local risk assessments.
    a. Reach and maintain 98% of population coverage under a local hazard mitigation plan.
    b. Maintain approval of plans before the end of five-year plan period.
2. Engage local, state, tribal, and federal partners in the development of hazard mitigation plans.

    a. Identify hazard specific agencies and engage in plan development.
3. Identify and encourage the participation in local hazard mitigation plans by school districts; non-profits; the Nebraska college and community college systems, and the University of Nebraska system.
4. Integrate Hazard Mitigation planning into other local and state planning efforts.

4.4.2 – Public Information and Warning

FEMA Description:

Deliver coordinated, prompt, reliable, and actionable information to the whole community through the use of clear, consistent, accessible, and culturally, as well as, linguistically appropriate methods to effectively relay information regarding any threat or hazard and, as appropriate, the actions being taken and the assistance being made available.

Communicate appropriate information, in an accessible manner, on the risks faced within a community after the conduct of a risk assessment.

Objectives and actions:

1. Communicate appropriate information, in an accessible manner, on the risks facing the state and locals.
    a. Identify ways to communicate risk with access and functional needs community members.
2. Improve public warning systems for all hazards that may include floods; tornadoes; dam or levee breach/failure; and severe storms.
3. Conduct outreach activities that address local and regional risks.
    a. Targeted outreach on improved building codes, flooding risk, and building near flood plains.
4. Promote annual drills using the theory behind the Great Shake Out drills in conjunction with other agencies (2018 Nebraska Multi-Year Training and Exercise Plan (MYTEP)).
5. Promote the evaluation and updating of building codes in counties and communities.
6. Promote public awareness of flooding hazards and post-flooding response.
    a. Engage in activities that improve flood warning systems in high risk communities.
    b. Provide educational opportunities to the public to learn about flood risk awareness, floodplain management, and post-flooding response.
    c. Provide education opportunities to insurance agents, realtors, and lenders.

4.4.3 – Operational Coordination

FEMA Description:

Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of Core Capabilities.

Establish protocols to integrate mitigation data elements in support of operations with local, state, tribal, territorial, and insular area partners and in coordination with Federal agencies.

Objectives and actions:

1. Engage in training state and local staff to quickly assist communities impacted by an emergency in identifying opportunities to implement mitigation actions in during the recovery process.
2. Imbed mitigation staff into local recovery groups and community organizations active in disasters.
3. Coordinate with state and federal agencies regarding disaster response and mitigation opportunities.

4.4.4 – Community Resilience

FEMA Description:

Enable the recognition, understanding, communication of, planning for risk, and empowerment of individuals and communities to make informed risk management decisions necessary to adapt to, withstand, and quickly recover from future incidents.

Maximize the coverage of the U.S. population that has a localized, risk-informed mitigation plan developed through partnerships across the entire community.

Empower individuals and communities to make informed decisions to facilitate actions necessary to adapt to, withstand, and quickly recover from future incidents.

Objectives and actions:

1. Promote the creation of local community resilience planning groups involving various local and state agencies (i.e. economic recovery, housing). (MYTEP)
    a. Use local Hazard Mitigation planning activities as a tool for encouraging the development of community resilience plans.
2. Sponsor community resiliency workshops via PET regions. (MYTEP)
    a. Engage the partners and stakeholders to provide subject matter experts.
3. Host an annual community resilience conference to share best practices among community partners. (MYTEP)
    a. Highlight successful mitigation projects.
4. Encourage the inclusion of community resilience ideas and topics into hazard mitigation plans.
5. Assist communities with training and information needed to enhance floodplain management knowledge and effort.

4.4.5 – Long-Term Vulnerability Reduction

FEMA Description:

Build and sustain resilient systems, communities, and critical infrastructure and key resources lifelines so as to reduce their vulnerability to natural, technological, and human-caused threats and hazards by lessening the likelihood, severity, and duration of the adverse consequences.

Achieve a measurable decrease in the long-term vulnerability of the Nation against current baselines amid a growing population base, changing climate conditions, increasing reliance upon information technology, and expanding infrastructure base.

Objectives and actions:

1. Achieve 98% population participation in local hazard mitigation plans. (cross over from Planning core capability.) (MYTEP)
2. Integrate mitigation planning and activities into short and long term recovery planning efforts.
3. Increase awareness of hazard mitigation planning among state and local elected officials across Nebraska through a strategic information sharing with quantified cost-savings proposals from other state initiatives. (MYTEP)
4. Identify new diverse and sustainable funding streams for hazard mitigation planning and implementation at the local, county, and/or state levels. (MYTEP)
5. Pre-identify and prepare projects for future funding opportunities.
6. Promote and support initiatives that protect or exclude human habitation in flood zones.
7. Reduce or eliminate long term flood risk to property and/or the environment. (Flood)
    a. Effective development and growth management to minimize flooding risks for new structures and to preserve the natural and beneficial functions of flood hazard areas.
    b. Mitigation of flood hazards for existing structures, including repetitive loss and severe repetitive loss properties.
    c. Protection of state facilities and local critical facilities.

4.4.6 – Risk and Disaster Resilience Assessment

FEMA Description:

Assess risk and disaster resilience so that decision makers, responders, and community members can take informed action to reduce their entity's risk and increase its resilience.

Ensure that local, state, tribal, territorial, and insular area governments and the top 100 Metropolitan Statistical Areas complete a risk assessment that defines localized vulnerabilities and consequences associated with potential natural, technological, and human-caused threats and hazards to their natural, human, physical, cyber, and socioeconomic interests.

Objectives and actions:

1. Annually review and revise the state risk assessment to include any changes to hazards, areas impacted, or changes in vulnerability. (Cross over with Threats and Hazards Identification)
2. Develop a standard assessment method and scale to rate an areas disaster resilience.
3. Conduct an annual core capability review and revise the state plan accordingly.
4. Partner with state and local agencies to identify critical first responder facilities within hazard zones.

4.4.7 – Threats and Hazards Identification

FEMA Description:

Identify the threats and hazards that occur in the geographic area; determine the frequency and magnitude; and incorporate this into analysis and planning processes so as to clearly understand the needs of a community or entity.

Identify the threats and hazards within and across local, state, tribal, territorial, and insular area governments and the top 100 Metropolitan Statistical Areas, in collaboration with the whole community, against a national standard based on sound science.

Objectives and actions:

1. Annually review and revise the state risk assessment to include any changes to hazards, areas impacted, or changes in vulnerability. (Cross over with Risk and Disaster Resilience Assessment)
2. Integrate local hazard mitigation risk assessment data into state planning efforts.
3. Provide best available floodplain mapping and regulatory data for floodplain management purposes. (Flood)

4.5 – Repetitive and Severe Repetitive Loss Strategy

RL. Did the state develop a Repetitive Loss Strategy? [44 C.F.R. §201.4(c)(3)(v)]

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 is strategy serves to make local jurisdictions eligible for increased federal cost share for FEMA Flood Mitigation Assistance 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 buy-outs 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 AW-501 "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. These are also included in the Core Capabilities identified in section 4.4.

- 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.

4.6 – Project Prioritization Criteria and Process

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.

4.6.1 – Project Criteria

In addition to the core capabilities outlined in the previous section, 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 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 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.

NeDNR uses three main qualities in prioritizing it 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. That projects can be done with the staff capacity at NeDNR.

4.6.2 – Project Development and Implementation Process

The process for development and implementation of 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 bought before the Governor's Task Force for Disaster Recovery for Prioritization based on the criteria listed in 4.5.1 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 complete of work, the grant is closed out.

5 – Plan Evaluation, Maintenance, Implementation, and Revision

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 4.1.3: The Emergency Management Program has a method and schedule for evaluation, maintenance, and revision of its Hazard Identification, Risk Assessment (HIRA) and Consequence Analysis identified in Standard 4.1.1.

EMAP 4.2.5: The Emergency Management Program has a method and schedule for evaluation, maintenance, and revision of the plan identified in Standard 4.2.1.

5.1 – Plan Review and Evaluation

The state maintains responsibility for accountability of programs affecting the citizens of Nebraska. As a continuing and ongoing process, NEMA is the lead agency for the development and review of the State Hazard Mitigation Plan. Changes in hazard mitigation programs, funding availability, or a major disaster might prompt future modifications to this plan.

The Nebraska State Hazard Mitigation Plan is a living document and will be reviewed and revised on a regular basis, as outlined below. Meetings will be held to review and revise the plan based on current events of the state including incidents and declared disasters. The meetings will include members of the GTFDR and additional stakeholders as identified by NEMA or 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 revisions and 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.

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?

A complete revision of the State Hazard Mitigation Plan will occur for submission to FEMA in 2024. The development of future hazard mitigation plan revisions will be based on the evaluation on the effectiveness of the 2019 plan.

5.2 – Monitoring of Mitigation Activities

EMAP 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.

NEMA and NeDNR serve as the recipients for project management and accountability of funds under the HMA grants in accordance to federal regulations and program guidance. As most mitigation projects are funded by these three grants, NEMA and NeDNR staff will track mitigation projects, monitoring costs, progress, project modifications, and track project timelines. Using the 44 C.F.R. and the 2015 Hazard Mitigation Assistance Unified Guidance, all HMA grants will be implemented accordingly. Detailed information on NEMA and NeDNR's management of HMA grants can be found in each grants 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 details 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 to 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 are required for all reimbursement requests.
- Benefit Cost Analysis (BCA):
    - Require 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 state staff to determine that the project was completed according to the approved scope and location. 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. Subrecipient 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 maintains 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 will maintain oversight of 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.
- Conducting on-site visits and monitoring of 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 monitoring progress of plan implementation across the various stakeholders will continue 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 evolve with the plan.

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