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Introduction

This plan is an update to the Little Blue Natural Resources District and Lower Big Blue Natural Resources District Hazard Mitigation Plan (HMP), last approved in 2016. The plan update was developed in compliance with the requirements of the Disaster Mitigation Act of 2000 (DMA 2000).

Hazard mitigation planning is a process in which hazards are identified and profiled; people and facilities at-risk are identified and assessed for threats and potential vulnerabilities; and strategies and mitigation measures are identified. Hazard mitigation planning increases the ability of communities to effectively function in the face of natural and human-caused disasters. The goal of the process is to reduce risk and vulnerability, in order to lessen impacts to life, the economy, and infrastructure.

Plan participants are listed in the following table and illustrated in the following planning area map. New participating jurisdictions in this plan update included the Village of Milligan, Village of Strang, Village of Cowles, City of Beatrice, Adams Central Public Schools, Beatrice Public Schools, South Central USD Public Schools, Barneston Fire District, and Wymore Fire District.

The communities of Roseland, Harvard, Steele City, Byron, Carleton, Nora, Oak, Gilead, and Bladen did not participate in this HMP. Additionally, several school districts who participated in the 2016 HMP did not participate in the 2021 update; however, this was largely due to the coronavirus pandemic in 2019.

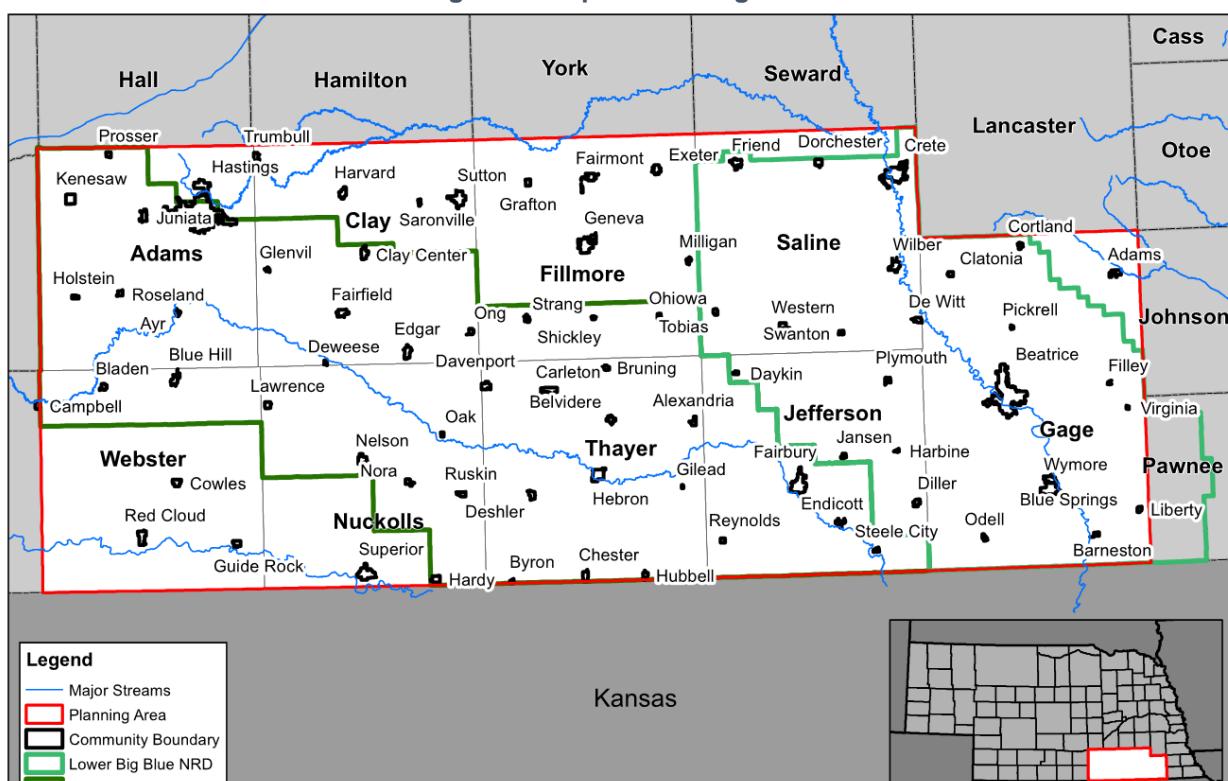
Table 1: Participating Jurisdictions in LBNRD and LBBNRD HMP

Participating Jurisdictions		
Little Blue Natural Resources District		
Lower Big Blue Natural Resources District		
Adams County	Gage County	Saline County
Village of Ayr	Village of Adams	City of Crete
City of Hastings	Village of Barneston	Village of DeWitt
Village of Holstein	City of Beatrice	Village of Dorchester
Village of Juniata	City of Blue Springs	City of Friend
Village of Kenesaw	Village of Clatonia	Village of Swanton
Village of Prosser	Village of Cortland	Village of Tobias
Clay County	Village of Filley	Village of Western
City of Clay Center	Village of Liberty	City of Wilber
Village of Deweese	Village of Odell	Thayer County
City of Edgar	Village of Pickrell	Village of Alexandria
City of Fairfield	Village of Virginia	Village of Belvidere
Village of Glenvil	City of Wymore	Village of Bruning
Village of Ong	Jefferson County	Village of Chester
Village of Saronville	Village of Daykin	Village of Davenport
City of Sutton	Village of Diller	City of Deshler
Village of Trumbull	Village of Endicott	City of Hebron
Fillmore County	City of Fairbury	Village of Hubbell
Village of Exeter	Village of Harbine	Webster County
Village of Fairmont	Village of Jansen	City of Blue Hill

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Participating Jurisdictions		
City of Geneva	Village of Plymouth	Village of Cowles*
Village of Grafton	Village of Reynolds	Village of Guide Rock
Village of Milligan	Village of Steele City	City of Red Cloud
Village of Ohiowa	Nuckolls County	
Village of Shickley	Village of Hardy	
Village of Strang	Village of Lawrence	
	City of Nelson	
	Village of Ruskin	
	City of Superior	
Special Jurisdictions		
Adams Central Schools	Superior Public Schools	Southeast Community College – Beatrice
Beatrice Public Schools	Tri-County Public Schools	Barneston Rural Fire Dept
Meridian Public Schools	Exeter-Milligan Public Schools	Wymore Fire District
South Central USD 5 School District	South Heartland Health Department	

Figure 1: Map of Planning Area



Created By: KDD
Date: 9/21/2020
Software: ArcGIS 10.7.1
File Name: Location Map.mxd

This map was prepared using information from record sources maintained by JEO and other applicable county, federal, or public or private entities. JEO does not guarantee the accuracy of this map or the information used to prepare this map. This is not a scaled plat.

Planning Area

2021 Blues Multi-Jurisdictional Hazard Mitigation Plan Update

0 10 20 Miles



Goals and Objectives

The potential for disaster losses and the probability of occurrence of natural and manmade hazards present a significant concern for the communities participating in this plan update. The driving motivation behind the update of this hazard mitigation plan is to reduce vulnerability and the likelihood of impacts to the health, safety, and welfare of all citizens in the planning area. To this end, the Regional Planning Team reviewed, updated, and approved goals and objectives which helped guide the process of identifying both broad-based and community specific mitigation strategies and projects that will, if implemented, reduce their vulnerability and help build stronger, more resilient communities.

These goals and objectives were reviewed by the Regional Planning Team at the Kick-off meeting and revised to reflect experiences from the past HMP process and newly identified priorities. The goals and objectives for this plan update are as follows:

GOAL 1: PROTECT THE HEALTH AND SAFETY OF THE PUBLIC

- Objective 1.1: Continue compliance with NFIP for participating communities; encourage joining NFIP if not currently participating
- Objective 1.2: Construct safe rooms in schools, public buildings, and in select locations at popular outdoor venues
- Objective 1.3: Update or obtain additional outdoor warning sirens as needed in the project area
- Objective 1.4: Develop additional emergency notification methods to alert the public of potential hazards
- Objective 1.5: Provide educational opportunities for the public to promote preparedness in the project area

GOAL 2: PROTECT CRITICAL FACILITIES, CRITICAL INFRASTRUCTURE, AND MAINTAIN THEIR OPERATION AFTER A HAZARD

- Objective 2.1: Protect power lines throughout the NRDs by burying them or reinforcing them
- Objective 2.2: Obtain backup power systems and emergency equipment required to keep critical facilities, critical infrastructure, and emergency operations running after a hazard event
- Objective 2.3: Develop studies to determine infrastructure systems that require updating

GOAL 3: PROTECT EXISTING PROPERTIES AND NATURAL RESOURCES

- Objective 3.1: Implement or strengthen regulations and building codes promoting development and construction that protects existing and future development or properties
- Objective 3.2: Protect existing infrastructure or critical facilities from flooding
- Objective 3.3: Perform studies to determine locations of concern and determine projects to mitigate against the hazards
- Objective 3.4: Protect public structures and recreational facilities against hazard events and damages from trees
- Objective 3.5: Improve drainage through creeks where necessary
- Objective 3.6: Develop and implement planning mechanisms which address hazard mitigation actions and maintenance procedures for structures throughout the planning area to protect against hazard events

GOAL 4: PROMOTE MULTI-AGENCY COORDINATION AND RESOURCES

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- Objective 4.1: Maximize funding opportunities through grant money and other outside sources
- Objective 4.2: Prioritize projects based on greatest risk
- Objective 4.3: Encourage individual property owners to develop independent measures to protect their property and not rely on public funding
- Objective 4.4: Promote the efficient use of all public, private, and allocated funds

Summary of Changes

The hazard mitigation planning process undergoes several changes during each plan update to best accommodate the planning area and specific conditions. Changes from the 2016 Hazard Mitigation Plan and planning process in this update included: combined risk assessment for hazards with similar mitigation strategies (High Winds and Tornadoes, Drought and Extreme Heat, and Severe Thunderstorms with Hail); elimination of hazards of low risk to local planning teams; modified public meeting planning process to respond to the COVID-19 pandemic; and the inclusion of Plan Maintenance sections to individual community profiles.

This update also works to unify the various planning mechanisms in place throughout the participating communities (i.e. comprehensive plans, local emergency operation plans, zoning ordinances, building codes, etc.) to ensure that the goals and objectives identified in those planning mechanisms are consistent with the strategies and projects included in this plan. Other changes made to the plan to address review comments from the 2016 plan are described in the table below.

Table 2: 2021 LBNRD and LBBNRD HMP Changes

Comment/Revision from 2016 Review Tool	Location of Revision	Summary of Change
Improve map labeling, legibility, and legends	Throughout plan	New maps have been developed and included where appropriate
Include discussion of extreme cold along with wind chill	Severe Winter Storms	Discussion of extreme cold as a component of severe winter storms
Include more specific information for climate change for individual hazards	Hazard risk profiles	Regional vulnerabilities table includes impacts from climate change on hazard type
Include specific actions for communities to support the NFIP	Section five, community profiles	Regional vulnerabilities table includes impacts from climate change on hazard type
Remove mitigation action redundancies or clarify mitigation action status	Section five, community profiles	Selected mitigation actions were reviewed and renamed/combined to remove redundancies between jurisdictions.

It should be noted as well that due to the COVID-19 outbreak, numerous changes were made in the midst of the planning process to plan meeting dates and requirements. To best protect residents and staff members in the planning area, Round 1 public meetings were held as a mixture of in-person and virtual formats and Round 2 meetings were held virtually. Additional one-on-one

meetings were held via phone as needed. Additional changes and summary of the planning process are described in Section Two.

Plan Implementation

Various communities across the planning area have implemented hazard mitigation projects following the 2016 Hazard Mitigation Plan. A few examples of completed projects include updating or adopting more stringent ordinance or building codes, removing hazardous trees, alert siren updates or replacements, expanding local emergency response capabilities, and flood protection or drainage improvements throughout the planning area.

In order to build upon these prior successes and to continue implementing mitigation projects, despite limited resources, communities will need to continue relying upon multi-agency coordination as a means of leveraging resources. Communities across the nine-county planning area have been able to work with a range of entities to complete projects; potential partners for future project implementation include, but are not limited to: University of Nebraska-Lincoln (UNL), Nebraska Forest Service (NFS), Nebraska Department of Energy and Environment (NDEE), Nebraska Department of Transportation (NDOT), Nebraska Department of Natural Resources (NeDNR); Nebraska Emergency Management Agency (NEMA), United States Department of Agriculture (USDA), and Federal Emergency Management Agency (FEMA).

Hazard Profiles

The hazard mitigation plan includes a description of the hazards considered, including a risk and vulnerability assessment. Data considered during the risk assessment process includes: historic occurrences and recurrence intervals; historic losses (physical and monetary); impacts to the built environment (including privately-owned structures as well as critical facilities); and the local risk assessment. The following tables provide an overview of the risk assessment for each hazard and the losses associated with each hazard.

Table 3: Regional Risk Assessment

Hazard	Previous Occurrences (events/year)	Approximate Annual Probability	Likely Extent
Agricultural Animal Disease	125/7	100%	Mean ~214 animal per event; Median ~1 animal per event
Agricultural Plant Disease	258/21	90%	Unavailable
Dam Failure	18/129	10%	Varies by structure
Drought	493/1,504 months	>32.8%	Mild Drought
Earthquakes	2/121	2%	~2.0 – 4.0 magnitude
Extreme Heat	Avg. 6 days per year	98%	>100°F
Flooding	234/25	98%-100%	Some inundation of structures and roads near streams. Some evacuations of people may be necessary.

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Hazard	Previous Occurrences (events/year)	Approximate Annual Probability	Likely Extent
Grass/wildfire	2,059/20	100%	<21 acres; Some homes and structures threatened or at risk
Hazardous Materials - Fixed Sites	368/30	100%	Localize to the facilities and adjacent surroundings.
Hazardous Materials - Transportation	72/50	81%	<50 gallons, Limited (<0.5 mile) from release site
High Winds	183/25	84%	9 BWF (47-54mph)
Levee Failure	0	<1%	Total of 649 people and 585 structures in leveed areas
Public Health Emergency	3/12	>1%	Varies by event; >1 fatality
Severe Thunderstorms (includes hail)	2,755/25	100%	>1" rainfall Avg 1.16 hail; 35-58 mph
Severe Winter Storms	766/25	100%	0.25-0.5" ice 20°-40° below zero (wind chill) 4-8" snow 35-45 mph winds
Terrorism	2/48	<1%	Isolated to a single building; damages <\$1M; varies by event
Tornadoes	148/25	96%	EF0-EF4

The following table provides loss estimates for hazards with sufficient data. Detailed descriptions of major events are included in *Section Seven: Community Profiles* as appropriate per jurisdiction.

Table 4: Hazard Loss Estimates for the Planning Area

HAZARD		COUNT	PROPERTY	CROP
AGRICULTURAL DISEASE	Animal Disease	125	26,789 animals	N/A
	Plant Disease	258	N/A	\$3,156,617
DAM FAILURE		18	\$0	N/A
DROUGHT & EXTREME HEAT	Drought	493/1,504 months	\$70,000,000	\$246,935,998
	Extreme Heat	Avg. 6 days per year	\$400,000	\$22,026,050
EARTHQUAKES		2	\$0	\$0
FLOODING 1 FATALITY	Flash Flood	112	\$21,010,000	\$2,408,030
	Flood	122	\$117,270,900	
GRASS/WILDFIRE 15 INJURIES, 3 FATALITIES		2,059	41,288 acres and \$613,319	\$1,361,497
HAZARDOUS MATERIALS 1 INJURY	Fixed Sites	368	\$0	N/A
	Transportation	72	\$1,206,459	N/A

HAZARD		COUNT	PROPERTY	CROP
HIGH WINDS & TORNADOES <i>35 INJURIES, 1 FATALITY</i>	High Winds	183	\$2,284,580	\$10,526,687
	Tornadoes	148	\$124,804,000	\$388,802
LEVEE FAILURE		0	N/A	N/A
PUBLIC HEALTH EMERGENCY		3 outbreak events	>9,825 infections; >91 fatalities	N/A
SEVERE THUNDERSTORMS <i>2 FATALITIES, 9 INJURIES</i>	Hail	1,712	\$83,647,000	\$134,205,021
	Heavy Rain	196	\$1,097,000	
	Lightning	25	\$20,335,000	
	Thunderstorm Wind	822	\$53,817,200	
SEVERE WINTER STORMS <i>1 INJURY</i>	Blizzards	79	\$105,000	\$12,156,696
	Extreme Cold	25	\$0	
	Heavy Snow	41	\$5,500,000	
	Ice Storms	51	\$12,464,000	
	Winter Storms	379	\$16,382,000	
	Winter Weather	191	\$95,000	
TERRORISM		2	\$0	N/A
TOTAL		6,990	\$531,031,458	\$433,165,398

N/A – Data not available

Many of the natural hazards can be expected to occur annually within the planning area. Events like agricultural disease, flooding, extreme heat, grass and wildfires, severe thunderstorms, and severe winter storms will occur annually. Other hazards like drought will occur less often. What is not known regarding hazard occurrences is the scope of events and how they will manifest themselves locally.

Historically, severe thunderstorms and flooding have resulted in the most significant structural damage within the planning area. These top hazards of concern for the planning area are summarized below.

Flooding

Flooding is one of the most costly hazards in the planning area. Flash flooding and riverine flooding are common for the planning area due to the regular occurrence of severe thunderstorms in spring and summer, the proximity of many communities next to rivers and tributaries, and aged or undersized stormwater drainage infrastructure. Flooding can occur on a local level, only affecting a few streets, but can also extend throughout an entire district, affecting whole drainage basins particularly along major waterways such as the Little Blue River, Big Blue River, and Republican River.

During the 2016 plan update, the planning area experienced one of its largest flooding events in history. Severe storms and flooding events resulted in presidential disaster declarations for Gage, Jefferson, Saline, and Thayer Counties. These events occurred intermittently between May 6, 2015 and June 17, 2015. Communities impacted by these events, including Hebron, Deshler, Roseland DeWitt and Fairbury, saw hundreds of residents evacuate to avoid danger. One elderly woman drowned in Fairbury. The planning area expects loss inducing floods to occur on an annual

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basis with 234 flooding events being recorded by the National Climate Data Center (NCDC) over nearly 25 years. These events have resulted in an approximated \$138,280,900 in losses and damages. T

High Winds and Tornadoes

High winds and tornadoes occur in the planning area annually. The NCEI reports 148 tornadoes for the nine-county area since 1996. Tornado events ranged between an F/EF0 and EF4 with many events reporting damages. These events have resulted in more than \$127M in losses and structural damage. While the most frequently occurring tornadic event (for the planning area) is an EF 0 there is a history of major tornadic events. In 1996 a F2 tornado passed through Gage County injuring 15 and causing an estimated \$12M in losses and structural damages. In 2003, a tornado moved through Thayer County and directly impacted the community of Deshler, this event killed one, injured seven and damaged hundreds of homes in the community. Finally, in 2004 Saline and Gage County experienced the F4 tornado which destroyed a community in nearby Lancaster County. This tornado injured eight and resulted in an estimated \$40M in damages.

Vulnerable populations within the planning area include residents living in mobile homes, aged housing stock, facilities without storm shelters which house large numbers of people (such as nursing homes, schools, factories, etc.), homeowners without storm shelters or basements, and residents with decreased mobility. The majority of communities in the planning area have outdoor warning sirens; however, many noted sirens and emergency alert systems should be updated or improved.

Severe Thunderstorms

Thunderstorms differ from many other hazards in that they are generally large in magnitude, have a long duration, and travel across large areas and through multiple jurisdictions within a single region. Hail, lightning, heavy rain, and strong winds can all occur during storm events and cause damage. Additionally, thunderstorms often occur in a series, with one area having the potential to be impacted multiple times in one day. Severe thunderstorms are most likely to occur between the months of March and September with the highest number of events occurring in June. Typical impacts resulting from severe thunderstorms include (but are not limited to): loss of power, obstruction to transportation routes, grass/wildfires starting from lightning strikes, localized flooding, and damages discussed in the hazard profiles for hail and high winds as these are typical component of severe thunderstorms. The discussion related to severe thunderstorms in the planning area include a few key and regularly occurring local concerns. Severe thunderstorms within the planning area commonly include excessive rainfall, high winds, and hail. Hail and high winds are two of the most costly hazards for this region.

Vulnerable populations related to severe thunderstorms include: residents of mobile homes (two percent of housing units), citizens with decreased mobility, and those caught outside during storm events. Most residents within the planning area are familiar with severe thunderstorms and know how to appropriately prepare and respond to events.

Severe Winter Storms

Severe winter storms are an annual occurrence for the planning area and the entire state of Nebraska. Winter storms can bring extreme cold temperatures, freezing rain and ice, and heavy or drifting snow. Blizzards are particularly dangerous and can have significant impacts throughout

the planning area. Severe winter storms typically occur between November and March but early and late season storms have occurred in the past and can have dramatic impacts in the planning area. Impacts resulting from severe winter storms include (but are not limited to): hypothermia and frost bite; death to those trapped outdoors; closure of transportation routes; downed power lines and prolonged power outages; collapse of dilapidated structures; death of livestock; and closure of critical facilities. Severe winter weather has resulted in significant losses within the planning area, but due to the frequency of exposure most Nebraskans and Nebraskan communities are prepared to address the most frequently occurring events. Many communities did express concerns about major winter storms and their capabilities to respond, specifically power outages and local snow removal resources.

Mitigation Strategies

There are a wide variety of strategies that can be used to reduce the impacts of hazards for the built environment and planning area residents. *Section Five: Mitigation Strategy* shows the mitigation actions chosen by the participating jurisdictions to prevent future losses. The following table shows the most common mitigation actions that can be implemented to prevent future losses.

Table 5: Key Mitigation Strategies

Hazard	Mitigation Strategies
Agricultural Plant and Animal Disease	<ul style="list-style-type: none"> -Public education and awareness -Outbreak emergency exercises
Chemical Fixed Site and Transportation Spills	<ul style="list-style-type: none"> -Public education and awareness -Chemical spill emergency exercises -Shelter in place or HAZMAT training
Dam Failure	<ul style="list-style-type: none"> -Develop evacuation plans -Emergency exercise
Drought and Extreme Heat	<ul style="list-style-type: none"> -Identify additional water sources -Expand water storage capacity -Establish drought best practices and response plan -Upgrade rural water infrastructure -Develop vulnerable population databases within the community
Flooding	<ul style="list-style-type: none"> -Limit or restrict development in flood-prone areas via ordinances or development restrictions -Property acquisition or flood-proofing of structures in the floodplain -Improve or upgrade drainage structures and stormwater management systems -Bank stabilization or channel improvements
Grass/Wildfire	<ul style="list-style-type: none"> -Additional personnel, training and equipment for local fire departments -Upgrade/expand fire facilities -Hazardous fuels reduction -Public education and awareness
High Winds and Tornadoes	<ul style="list-style-type: none"> -Remove hazardous trees -Design and construct storm shelters and safe rooms -Upgrade and maintain emergency warning sirens and early notification systems

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Hazard	Mitigation Strategies
	<ul style="list-style-type: none"> -Bury power lines or harden critical infrastructure
Levee Failure	<ul style="list-style-type: none"> -Maintain and upgrade levee systems -Conduct role-play tabletop levee failure exercises
Public Health Emergency	<ul style="list-style-type: none"> -Purchase or upgrade health facility equipment and facilities -Develop and implement Pandemic Response Plans
Severe Thunderstorms	<ul style="list-style-type: none"> -Purchase and install backup power generators for redundant power -Install static detectors, surge protectors, and/or lightning rods -Remove hazardous trees -Design and construct storm shelters and safe rooms -Upgrade and maintain emergency warning sirens and early notification systems -Bury power lines or harden critical infrastructure
Severe Winter Storms	<ul style="list-style-type: none"> -Incorporate use of snow fences to protect vulnerable transportation routes -Purchase and install backup power generators for redundant power -Remove hazardous trees -Review and improve snow/ice removal protocols -Upgrade and maintain emergency warning sirens and early notification systems -Bury power lines or harden critical infrastructure
Terrorism	<ul style="list-style-type: none"> -Improve local security systems for critical facilities