Upper Loup NRD Drought Management Plan

2022

Plan prepared with
assistance from
JEO Consulting Group

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Groundwater Management Area (GWMA)
JEO Consulting Group, Inc. (JEO)
National Drought Mitigation Center (NDMC)
Nebraska Department of Environment and Energy (NDEE)
Nebraska Department of Natural Resources (NeDNR)
NOAA National Centers for Environmental Information (NCEI)
Palmer Drought Severity Index (PDSI)
Standardized Precipitation Index (SPI)
Upper Loup Natural Resources District (ULNRD)
USDA Risk Management Agency (RMA)
U.S Drought Monitor (USDM)

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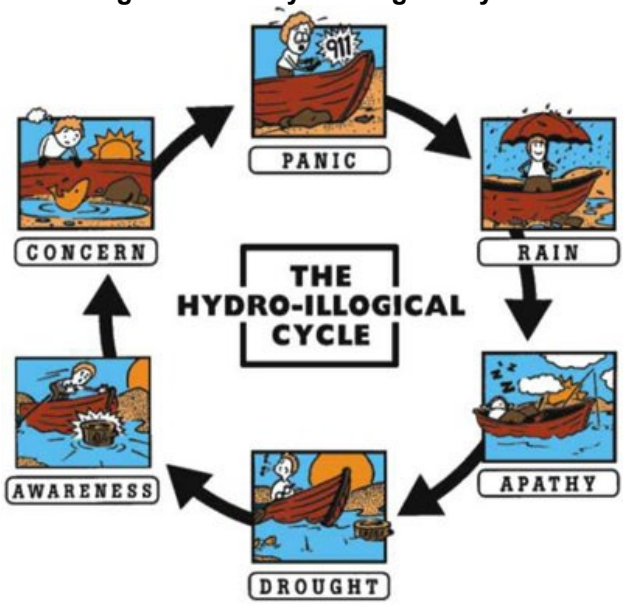
SECTION 1: INTRODUCTION

Hydro-Illogical Cycle

The Upper Loup Natural Resources District (ULNRD) has taken meaningful steps toward reducing vulnerability to drought since the NRD's creation in July of 1972. ULNRD leaders have continued to prioritize drought mitigation through efforts such as responsive groundwater management practices and numerous studies examining water quality and quantity. The development of this Drought Management Plan is another effort the NRD has undertaken to better prepare for drought.

Traditionally, water users have reacted to drought through a cyclical and destructive pattern 'Hydro-Illogical Cycle' (as shown in Figure 1). During normal (i.e., years receiving an typical amount of precipitation) or wet (i.e. years receiving an above average amount of precipitation) years, water users are often unconcerned about the possibility of drought. When a drought does inevitably occur, people are not sufficiently prepared and often respond too late. As a result, drought impacts are much more severe and costly than if people and governing bodies had planned ahead. Once the drought is over, people are glad to resume business as usual. The Upper Loup Natural Resources District is attempting to break the hydro-illogical cycle by taking a proactive approach to planning for drought.

Figure 1: The Hydro-Illogical Cycle



Source: National Drought Mitigation Center

Plan Purpose

The ULNRD Drought Management Plan's purpose is to identify processes to effectively monitor, respond to, and manage future drought events. The Drought Management Plan is a tool that will assist the ULNRD in communicating conditions, engaging stakeholders, and minimizing drought impacts through educational and outreach efforts.

Drought

Drought is generally defined as a natural hazard resulting from a substantial period with a lack of precipitation. Although many incorrectly consider it a rare and random event, drought is, in fact, a normal, recurrent feature of climate. It occurs in virtually all climatic zones, but its characteristics

vary significantly from one region to the next. Drought often coexists with periods of extreme heat, which together can cause significant social stress, economic losses, and environmental degradation.

Drought is a slow-onset, creeping phenomenon, and its impacts are largely non-structural. As drought conditions are typically spread over a large geographical area, its impacts normally affect more people than other types of natural hazards do. As a result, the detection and early warning signs of drought conditions and the subsequent assessment of impacts are more difficult to identify than quick-onset natural hazards (e.g., flood and storm) with more immediate, visible impacts or damages.

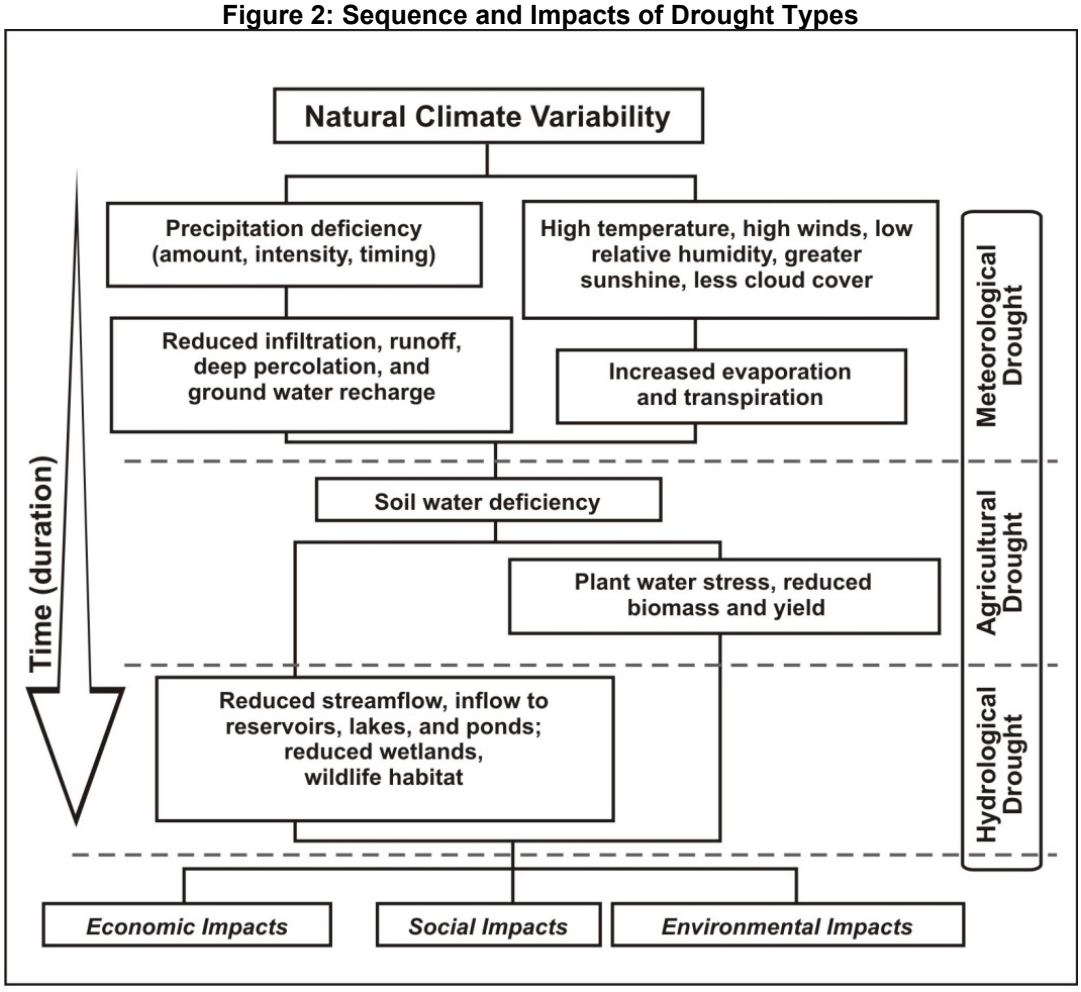
Drought is difficult to describe accurately for each region and has more than 150 recognized definitions. The lack of a universal definition makes it even harder to indicate drought's onset and ending. According to the National Drought Mitigation Center (NDMC), droughts are classified into four major types:

> *Meteorological Drought* is defined based on the degree of dryness and the duration of the dry period. Meteorological drought is often the first type of drought to be identified and should be defined regionally as precipitation rates and frequencies ("norms") vary.
>
> *Agricultural Drought* occurs when there is deficient moisture that hinders plant germination, leading to low plant population per hectare and a reduction of final yield. Agricultural drought is closely linked with meteorological and hydrological drought as agricultural water supplies are contingent upon the two sectors.
>
> *Hydrological Drought* occurs when water available in aquifers, lakes, and reservoirs falls below the statistical average. This situation can arise even when the area of interest receives average precipitation. This is due to the reserves diminishing from increased water usage, usually from agricultural use or high levels of evapotranspiration, resulting from prolonged high temperatures. Hydrological drought often is identified later than meteorological and agricultural drought. Impacts from hydrological drought may manifest themselves in decreased hydropower production and loss of water-based recreation.
>
> *Socioeconomic Drought* occurs when the demand for economic goods exceeds supply due to a weather-related shortfall in water supply. The supply of many economic goods includes, but is not limited to, water, forage, food grains, fish, and hydroelectric power.

The occurrence of a drought can also create conditions which exacerbate the impacts of other hazards or increase the probability of their occurrence. The damage done by these other hazards is understood as cascading impacts from drought. Drought, for example, might increase the risk of wildfires due to the resulting dry conditions, or conditions can lead to increased flash flooding, since overly dry soil is not able to absorb moisture quickly which increases the rate of runoff. Droughts conditions also weaken trees and result in greater damages during severe weather or high wind events.

Figure 2 illustrates the different types of droughts, their temporal sequence, and the various types of effects they can have on a community.

Figure 2: Sequence and Impacts of Drought Types



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SECTION 2: PLANNING PROCESS

Prior to the planning process kickoff, the ULNRD made several solicitations for interested parties to serve on the stakeholder group to guide the development of the plan. ULNRD and JEO staff were hoping for a group of stakeholders that would be representative of the NRD area and include water users, water suppliers, community leaders, regulatory agencies, and others. All interested parties within the NRD area were invited and welcome to join the planning process. The following summarizes the stakeholder and public engagement efforts for this plan.

Stakeholder Group

A group of stakeholders to guide the development of the plan. The stakeholder group met three times throughout the planning process and guided all aspects of plan development including identifying past drought impacts, identifying drought risks and vulnerabilities, establishing the drought monitoring protocol, determining drought response, and identifying potential drought management actions. Information gathered at the stakeholder meetings is incorporated throughout this Drought Management Plan. The following table lists members of the stakeholder group who attended at least one stakeholder group meeting. See Appendix C for meeting notes and stakeholder meeting materials.

Table 1: Stakeholder Meeting Attendees

Name	Title/Jurisdiction/Organization Represented
Amy Zoller	Environmental Specialist - NeDNR
Caitlin Kingsley	Environmental Specialist - NeDNR
Chris Vinton	Rancher - Chris Vinton Ranch Co
Connie Cox	Rancher - Byron Cox Ranch
Dana Larsen	Rancher - Broken Heart Livestock
Dave Knievel	Rancher - Knievel Farms
Elizabeth Smith	Range Tech - U.S. Forest Service
Greg Wright	Wildlife Biologist - U.S. Forest Service
Jim Purdum	County Commissioner - Thomas County
Joe Bob Atkins	President/Owner - Arnold Insurance
John Kraye	NRD Board Member - Upper Loup NRD
Julie Bain	District Manager - U.S. Forest Service
Justin Sprague	Upper Loup NRD
Kenny Jividen	Chairman - Village of Gandy
Madeline Hoffer	Office Services Manager - NeDNR
Natalie G'Swchind	U.S. Forest Service
Randy Barnes	Rancher
Richard Burnside	NRD Board Member - Upper Loup NRD
Ronda Standage	Rancher – Box K Ranch
Ryan Kelly	Integrated Water Management Coordinator - NeDNR
Sarah Mullins	Wildlife/Range Tech - U.S. Forest Service
Tyler Westlake	Rangeland Management Specialist - U.S. Forest Service
Anna Baum	General Manager - Upper Loup NRD
Lexi Spurlin	Information and Education Coordinator - Upper Loup NRD
Phil Luebbert	Senior Planner- JEO Consulting Group
Karl Dietrich	Planner - JEO Consulting Group
Anne Johnson	Planner - JEO Consulting Group
Anthony Kohel	Junior Planner - JEO Consulting Group
Nicole Wall	Senior Planner - JEO Consulting Group

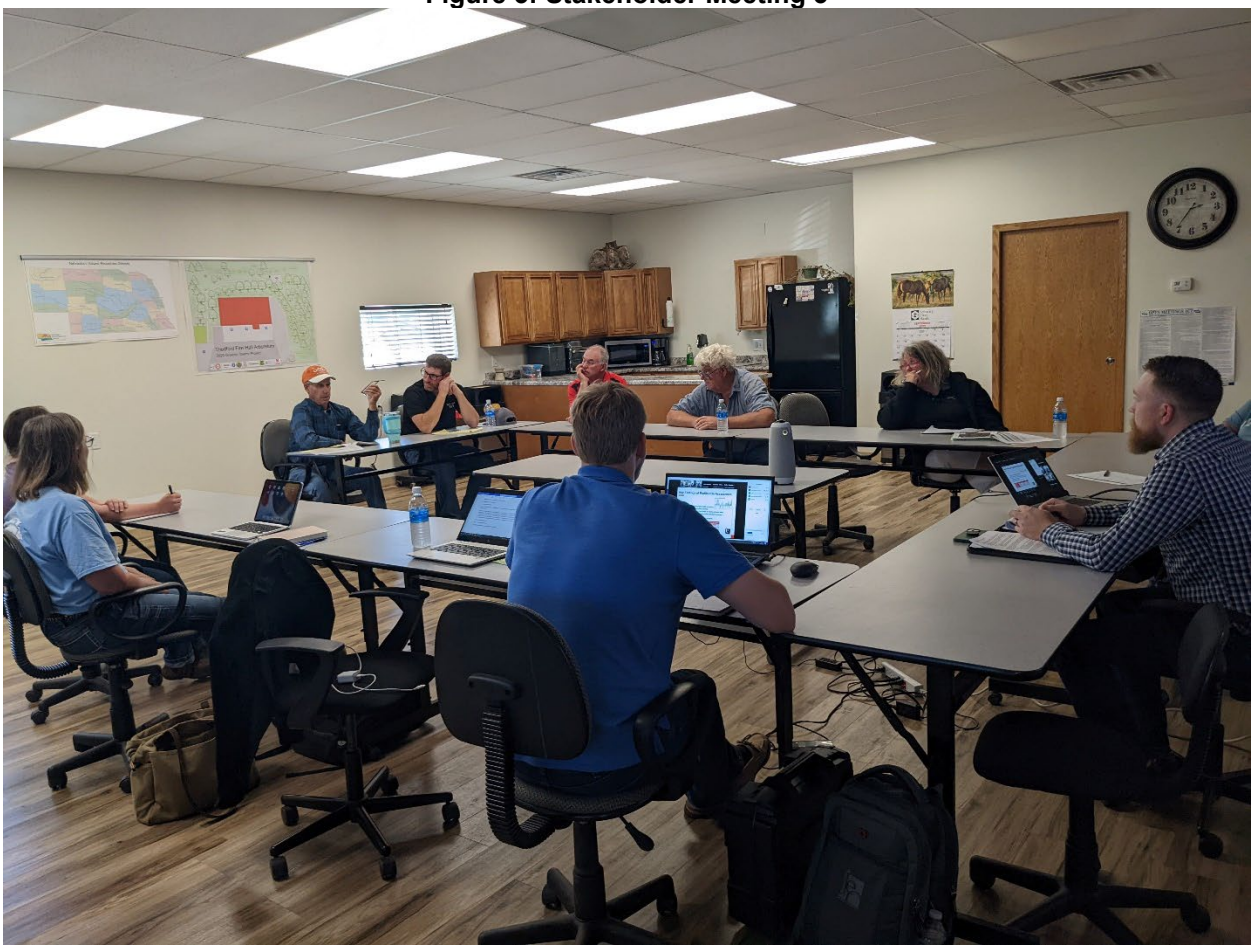
Stakeholder Meeting 1

The first stakeholder meeting was held in July 2021 at the ULNRD office in Thedford. At this meeting, JEO presented an overview of drought planning, the proposed planning process, and current available drought data. The group decided the engagement methods to be used in the upcoming planning process. The stakeholder group held a discussion focused on what drought looks like in the NRD, what current drought mechanisms exist, what an appropriate drought response looks like, and the stakeholders' personal goals for the project.

Stakeholder Meeting 2

The second stakeholder meeting was held in January 2022 at the ULNRD office in Thedford. The meeting was a hybrid meeting as some stakeholders chose to join virtually via Zoom. At this meeting, the stakeholders had a facilitated discussion focused on how the NRD should monitor drought, how the NRD should respond when drought occurs, and what mitigation/management actions should be done to reduce the impacts of drought.

Figure 3: Stakeholder Meeting 3



Stakeholder Meeting 3

The third stakeholder meeting was held in September 2022 at the ULNRD office in Thedford. The meeting was a hybrid meeting as some stakeholders chose to join virtually via Zoom. Survey results were shared with the group and the stakeholders discussed how to best use the feedback within the plan. A summary of the initial draft plan was then presented to the stakeholders so they could provide comments and feedback.

Public Involvement

Residents, water users, interested parties, and other stakeholders were invited to participate in the planning process by either joining the stakeholder group, filling out a survey, or commenting during the public review period. Findings from public involvement influenced and are incorporated into the Drought Management Plan.

The ULNRD utilized a survey to gain feedback from people in the NRD area that were unable to attend stakeholder meetings. Several efforts were made to advertise the survey to residents and stakeholders with the district including the newsletter, press releases, ULNRD website, ULNRD Board Meetings, and word of mouth. The survey was available online for a period of two months and paper copies of the survey were handed out at various in-person meetings throughout the district. In total, there were 29 returned surveys that included multiple responses from people within each of the counties in the ULNRD. Common survey responses and themes are summarized below by question. Responses shown in this summary may have been slightly edited for brevity and clarity.

- What scares you the most about drought?
  - Fire
  - Lack of feed/hay/grass for animals
  - Lack of water for animals
  - Economic losses
  - Loss of way of life (“the cowboy way”)

- How do you or your community/business/ organization monitor drought?
  - Visual observations
  - Drought monitor
  - Weather stations/radio
  - Static water level
  - Word of mouth
  - Rain gauges
  - Soil moisture

- Where do you currently obtain your drought indicator/forecasting information?
  - Drought monitor
  - Internet
  - Radio
  - Social Media
  - Newspaper
  - Newsletter
  - USDA Farm Service Agency (FSA)

- How do you or your community/business/organization prepare for drought?
  - Change agricultural practices
    - plant lower water usage forages, irrigate at night, reduce herd size, stockpile feed, livestock management, etc.
  - Don’t/Pray for rain
  - Ensure adequate water supply/systems
  - Financial preparedness

- What would help lessen the impacts of drought on you or your community/business/organization?
  - Planning ahead
  - Not sure
  - Financial help
  - Improving efficiency of water system
  - Improved community water management
  - Best management practices – ag

- What information do you need during drought?
  - Current/Future conditions
  - Available assistance programs
  - Feed/cattle markets
  - Best management practices

- What is the best way to share drought information and best practices with you?
  - Website
  - Social media
  - Newspaper
  - Newsletter
  - Email
  - Public meeting
  - Radio
  - Flyer

Once collected, survey results were shared with the stakeholder group for discussion as to how to best use this feedback within the plan. See Appendix C for all survey responses.

SECTION 3: UPPER LOUP NRD PROFILE

Upper Loup Natural Resources District

The ULNRD is one of Nebraska's 23 Natural Resources Districts (NRDs). Nebraska's NRDs are based on river basin boundaries, enabling them to approach natural resources management on a watershed basis, unlike the county-wide natural resources or conservation districts found in most states. The ULNRD is autonomous; governed by a locally elected Board of Directors. There are eleven members on the board, two of whom are elected from each of the five sub districts and one director at-large. While NRDs share a common set of responsibilities, each district sets its own priorities and develops its own programs to serve local needs. The ULNRD has twelve areas of responsibility:

- Erosion prevention and control
- Prevention of damages from flood water and sediment
- Flood prevention and control
- Soil conservation
- Water supply for any beneficial uses
- Development, management, utilization and conservation of groundwater and surface water
- Pollution control
- Solid waste disposal and sanitary discharge
- Drainage improvement and channel rectification
- Development and management of fish and wildlife habitat
- Development and management of recreational and park facilities
- Forestry and range management

Nebraska Statute, Chapter 2, Article 32 establishes Nebraska's NRDs and grants them the powers and authorities that assist in their district's functioning. The ULNRD has the authority to levy property taxes to fund the district's functioning, which includes a variety of programs and incentives to facilitate the implementation of resource management activities. This political subdivision of the state accepted all assets, liabilities and obligations of the special purpose districts that were merged to form this NRD.

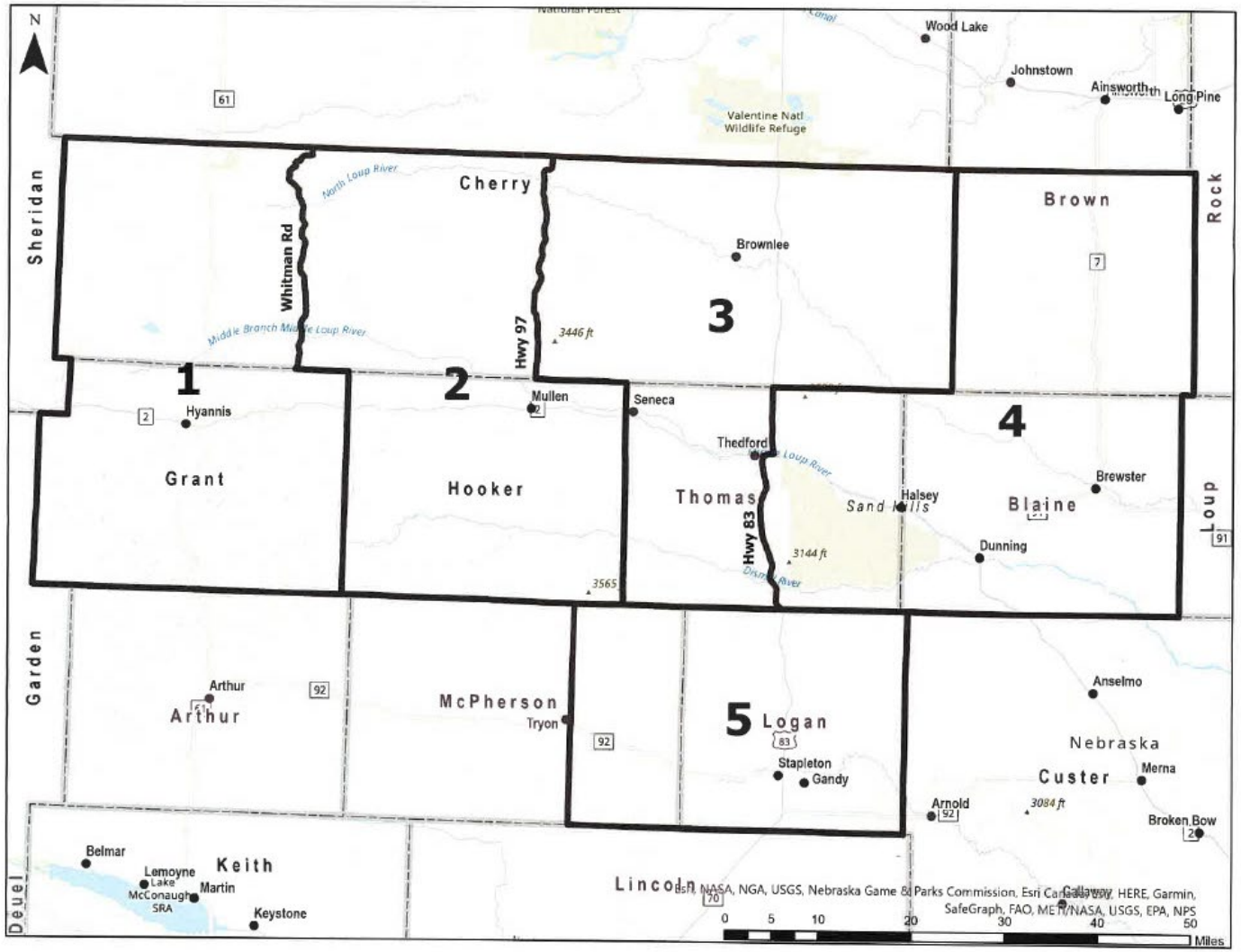
The ULNRD has a wide range of statutory responsibilities and authorities, including, but not limited to, Nebraska Revised Statutes §2-3,201 through 2-3,243 and the Ground Water Management and Protection Act (Nebraska Rev. Statutes §46-701 through 46-756). Specifically, Nebraska Rev. Statutes §46-707(f) confer to the NRDs the power to "conduct investigations and cooperate or contract with ...public or private corporations, or any association or individual on any matter relevant to the administration of the [Ground Water Management and Protection] act."

The Upper Loup NRD is located in north central Nebraska with its district seat in Thedford. Part of the Loup River Basin, the ULNRD covers 6,690 square miles and includes all of Blaine, Grant, Hooker, Logan, and Thomas Counties as well as parts of Brown, Cherry, and McPherson Counties. From east to west, the NRD runs 120 miles and from north to south it spans 78 miles — 4,275,000 acres in total. Primarily agricultural, the majority of the over four million acres of land in the NRD lies within the Nebraska Sandhills region, with some small areas in the southeast corner including valleys and dissected plains topography. Dissected plains are represented by hilly land with moderate to steep slopes and sharp ridge crests. Valleys are flat-lying land along major streams and include stream-deposited silt, clay, sand, and gravel materials. Sand hills are hilly lands comprised of low to high dunes of sand stabilized by a grass cover. The NRD sits above the High Plains Aquifer, whose thickness, according to the 2022 ULNRD Groundwater

Management Plan, ranges from approximately 1,200 feet beneath the western part of the NRD to 500 feet in the east. This reservoir of groundwater is larger than other NRDs in the state, providing the area with a significant water resource. Five major streams flow through the district: North Loup, Middle Loup, South Loup, Calamus and Dismal Rivers. Additionally, there are several smaller creeks within the NRD: Goose Creek, Calf Creek, Big Creek, Wild Horse Creek, and Rifle Creek.

Incorporated villages within the District include Brewster, Dunning, Gandy, Halsey, Hyannis, Mullen, Stapleton, and Thedford. Unincorporated villages include Brownlee, Elsmere, Purdy, Ashby, Seneca, and Whitman.

Figure 4: Upper Loup Natural Resources District



Population

Table 2 provides the estimated population trends within the NRD from 2000 to 2020. According to the NRD's 2021-2022 Long-Range Implementation Plan, the population within the NRD in 2020 was approximately 4,114. While not all of Brown, Cherry, and McPherson Counties are included in the NRD, their populations are included here for reference. Please note that as unincorporated communities, official population data are not available for Brownlee, Elsmere, or Purdum. Ashby, Seneca, and Whitman were no longer incorporated communities during the 2020 Census and are thus listed as N/A in the table.

It is important to address population trends because water use and population are positively correlated; meaning that as population increases there also is likely to be an increase in water use.

Table 2: Population Trends 2000-2020

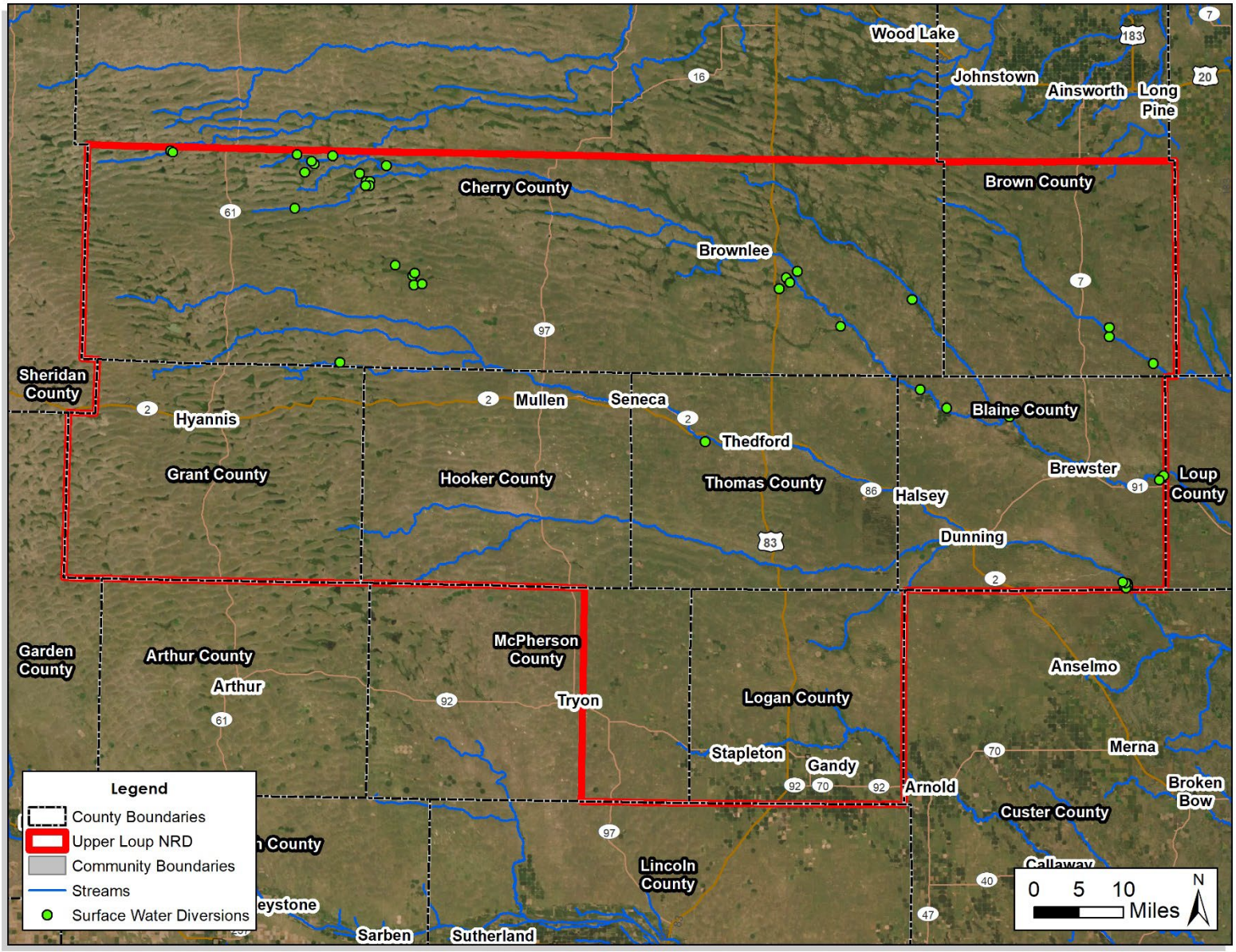
Jurisdiction	2000 Population	2010 Population	2020 Population
Blaine County	583	478	431
Brewster	29	17	12
Dunning	109	103	80
Halsey	59	76	68
Brown* County	3,525	3,145	2,903
Cherry* County	6,148	5,713	5,455
Grant County	747	614	611
Ashby	117	123	N/A
Hyannis	287	182	165
Whitman	209	190	N/A
Hooker County	783	736	711
Mullen	491	509	500
Logan County	774	763	716
Gandy	30	32	34
Stapleton	301	305	267
McPherson* County	533	539	399
Thomas County	729	647	669
Seneca	51	33	N/A
Thedford	211	188	208

Source: United States Census Bureau – 2000-2020

Surface Water Sources and Uses

There are surface water appropriations utilized for agricultural irrigation located within the NRD. The locations of these appropriations are shown in the figure below.

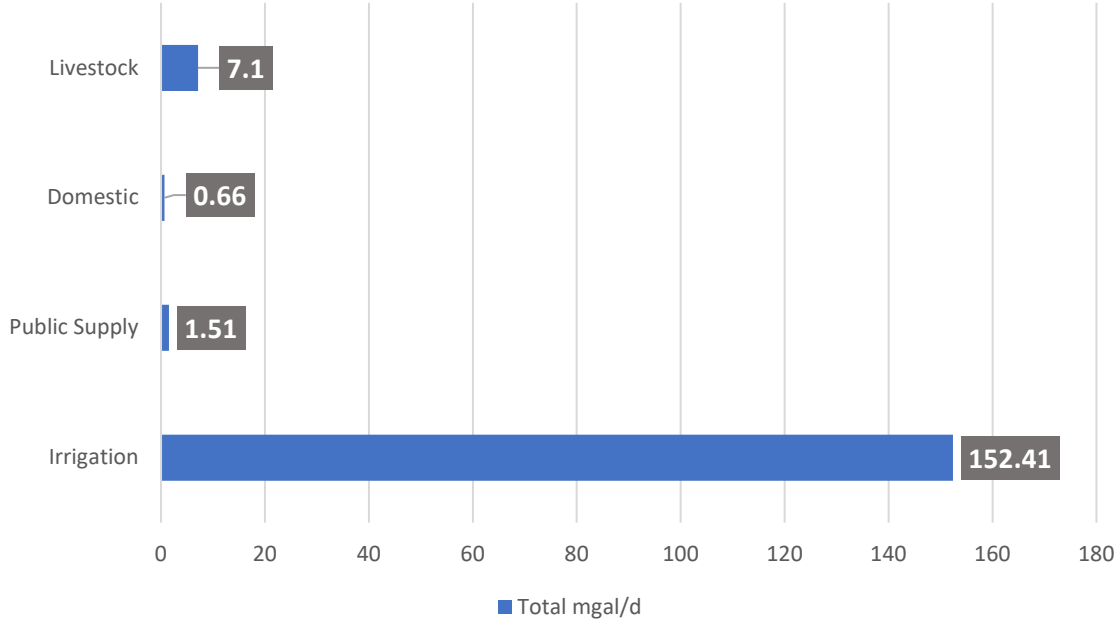
Figure 5: Surface Water Appropriations



Groundwater Sources and Uses

The majority of water used within the ULNRD is sourced from groundwater, as is common across the State of Nebraska. Barring the City of Omaha, 99% of the state sources drinking water from groundwater, according to the 2019 Nebraska Groundwater Quality Monitoring Report published by the Department of Environment and Energy. As shown Figure 6, the total water used in the NRD is 161,680,000 gallons per day (MGD). Irrigation accounts for the overwhelming majority of water use within the planning area, followed by livestock. Irrigation use is seasonal in nature, with peak demands occurring (depending upon the year) during the timeframe of late June through mid-September.

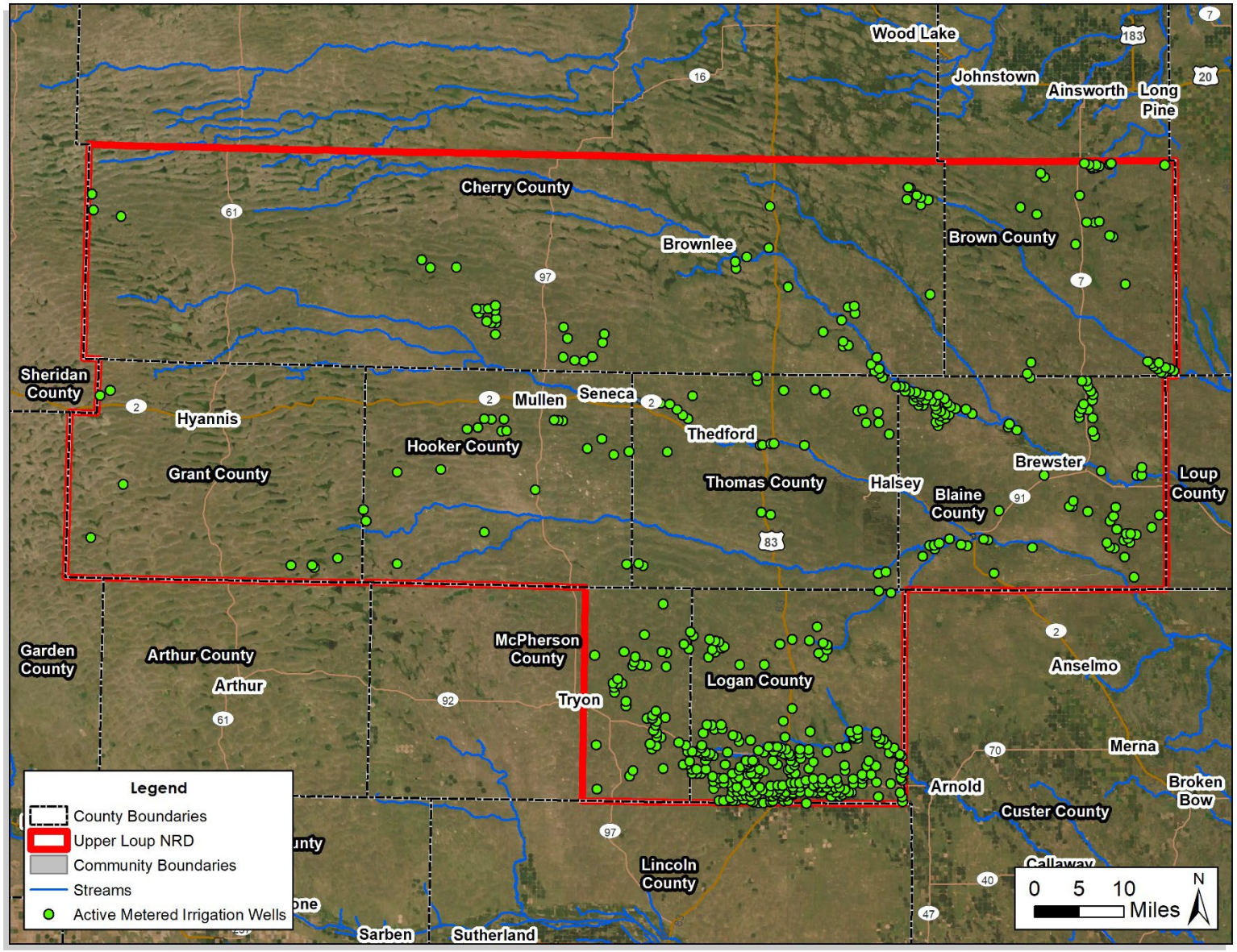
Figure 6: Water Use in the NRD (MGD)



Source: USGS, 2015 Water Use by County

While irrigation accounts for the most water used, it also benefits the NRD. As the following map demonstrates, the district has a number of irrigated acres. As more acres are irrigated, some recharge occurs on that irrigated ground. Because of this, irrigation may be a tool for resource managers, as it can be allocated or restricted according to drought conditions.

Figure 7: Metered Irrigation Wells in ULNRD



The ULNRD had 5,273 active registered wells (of all uses) as of November 2022. The registration of newly constructed domestic wells was not required until 1993; therefore, the actual number of wells within the district is likely much higher, as many of the older constructed wells have never been registered but are still in service. Most wells in the Upper Loup NRD are used for livestock (72.7%), irrigation (15.1%), and domestic (6.9%) purposes. Wells classified as "other" include wells that support uses like recovery, geothermal, aquaculture, etc.

Table 3: Active Registered Wells by Type

Registered Well Type in ULNRD	Number of Wells by Type	Percentage of Wells by Use
Commercial/Industrial	18	0.34%
Domestic	367	6.96%
Ground Heat Exchanger	9	0.17%
Injection	9	0.17%
Irrigation	797	15.11%
Livestock	3,834	72.71%
Monitoring (Ground Water Quality)	131	2.48%
Observation (Ground Water Levels)	65	1.23%
Other	45	0.85%
Total	**5,273**	

Source: NeDNR, 2022

Figure 8: Registered Wells in ULNRD

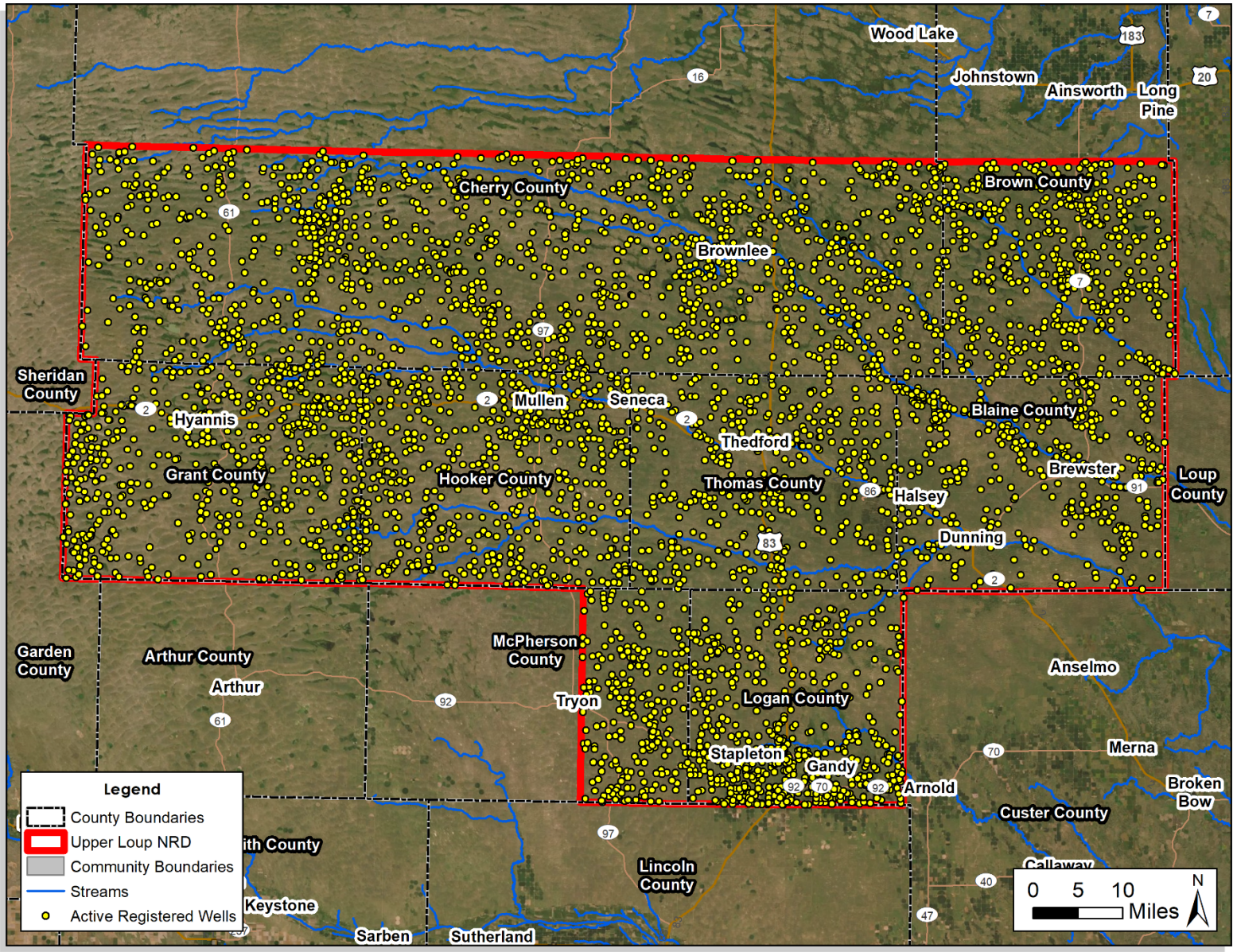
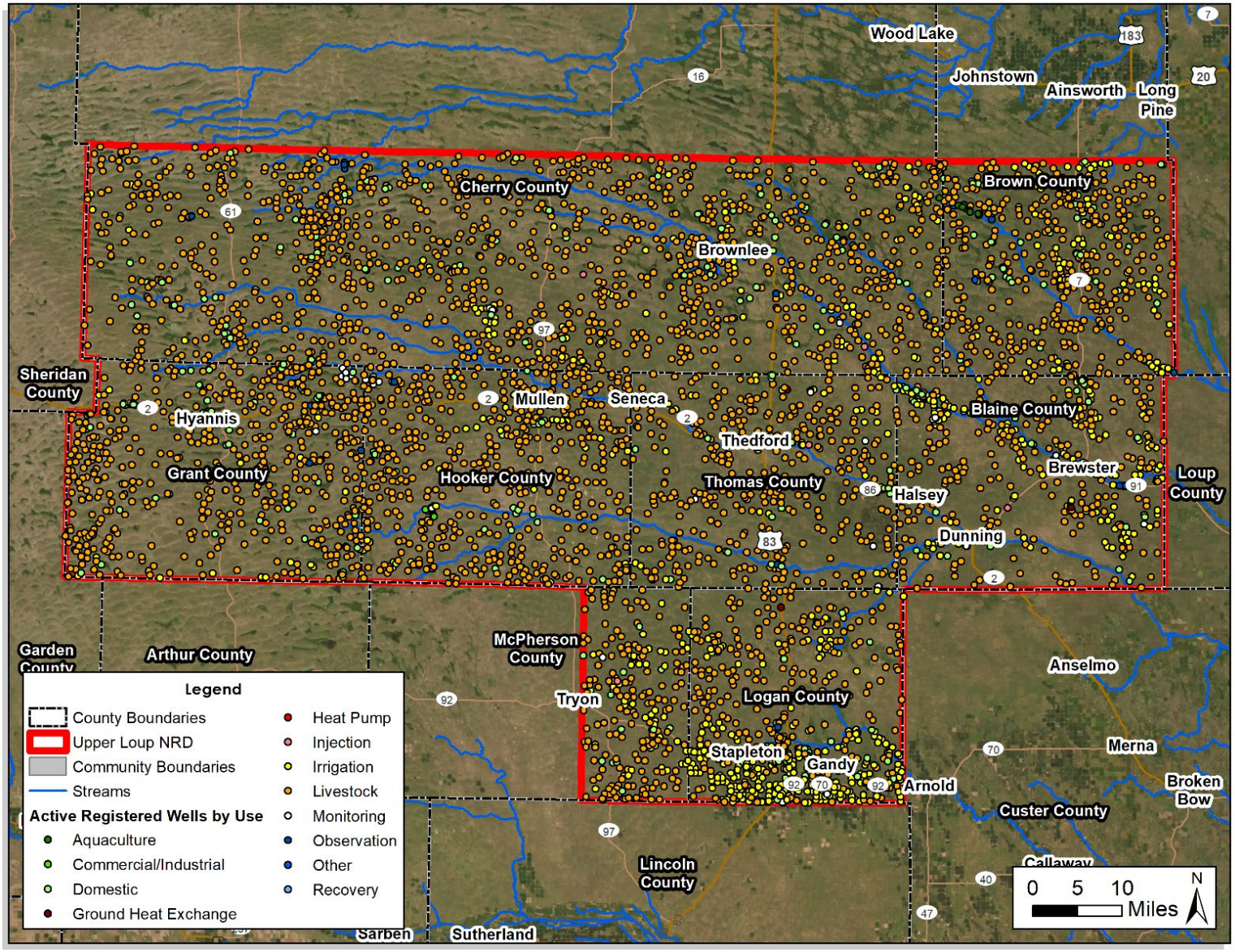


Figure 9: Registered Wells by Use in ULNRD



Current Drought Related Planning Efforts

As the ULNRD is tasked with managing the groundwater resources in the area, there are many current relevant planning efforts. The Drought Management Plan's process identified several of these current planning efforts within the ULNRD that either directly or indirectly relate to drought. Each identified planning mechanism is described below.

Drought Resilience Study (2022)

The ULNRD evaluated drought resilience of the upper and middle reaches of the South Loup River. The study allows the NRD to better understand the potential impacts a prolonged drought has on the South Loup River, as well as identify where streamflow retiming projects would be most effective. The study can be found on the USGS website: https://pubs.er.usgs.gov/publication/sir20225042.

Upper Loup NRD Multi-Jurisdictional Hazard Mitigation Plan (2019)

The ULNRD Hazard Mitigation Plan specifically addresses hazards including drought and proposes mitigation actions to reduce the risk of drought at the regional and local level. The following participants identified drought as a high priority hazard during the hazard mitigation planning process:

- Blaine County
- Hooker County
- Village of Mullen
- Thomas County

The ULNRD Hazard Mitigation Plan can be found on the project website: https://www.jeo.com/ulnrdhmp

Upper Loup NRD Master Plan (2022-2032)

The ULNRD Master Plan describes the district and outlines the NRD's goals and objectives. The ULNRD Master Plan aims to achieve the following goals:

1. Water quality and pollution control
2. Development and management of groundwater and surface water for beneficial uses
3. Resource awareness
4. Prevent damage from flood water
5. Forestry management
6. Erosion prevention, control and sediment reduction
7. Range management
8. Drainage improvement and channel rectification
9. Development and management of fish and wildlife habitat
10. Development and management of recreational and park facilities
11. Solid waste disposal

Projects identified within the Master Plan will be consistent with the projects identified within this Drought Management Plan. The Master Plan is updated by the ULNRD every 10 years. Further information about the master plan can be found on the ULNRD website: https://www.upperloupnrd.org/master-plan.

Long-Range Implementation Plan

The Long-Range Implementation Plan gives the goals and objectives from the NRD's Master Plan timelines for completion, priority ranking, and necessary financial obligation. The Long-Range

Implementation Plan is updated on an annual basis. Further information about the plan can be found on the ULNRD website: https://www.upperloupnrd.org/long-range-plan.

Groundwater Management Plan 2022

The ULNRD's 2022 Groundwater Management Plan serves as a foundation for decision-making and managing groundwater resources within the district. The plan creates rules and regulations for the enforcement of the Nebraska Groundwater Management and Protection Act. Sections within the plan include groundwater reservoir protection and management; climate, geology, and soils information; water withdraw and use; and potential groundwater use. The plan covers groundwater, surface water, groundwater monitoring, water quality, and conservation. Further information about the plan can be found on the ULNRD website: https://www.upperloupnrd.org/groundwater-management.

Lower Platte Basin-Wide Integrated Management Plan 2022

The plan was developed by the Lower Platte South NRD, Lower Platte North NRD, Lower Elkhorn NRD, Upper Elkhorn NRD, Lower Loup NRD, Upper Loup NRD, Papio-Missouri NRD and NeDNR to provide guidance and a framework for water-use policies and practices that protect existing surface and groundwater, while allowing for future water development. Goals of the plan include:

- Develop and maintain a water supply and use inventory based on the best available data and analysis.
- Implement a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.
- Develop and implement water use policies and practices that contribute to the protection of existing surface water and groundwater uses while allowing for future water development.
- To evaluate impacts of new development during drought conditions.

Further information about the plan can be found here: https://dnr.nebraska.gov/water-planning/lower-platte-basin-wide-plan.

Voluntary Integrated Management Plan 2016

The Voluntary Integrated Management Plan (IMP) provides a framework for how the ULNRD and NeDNR will work collaboratively to manage groundwater and surface water within the district, so that economic viability, social and environmental health, safety, and welfare can be achieved and maintained. The Upper Loup NRD volunteered to initiate an IMP and found robust community support in representing the many water interests across the district. On December 16, 2008, the Upper Loup NRD (and all of the Lower Platte River Basin), was designated as fully appropriated. Being fully appropriated means that the ways and degrees to which surface water and groundwater are being used will eventually lead to insufficient water supply. The plan works toward attaining or maintaining a balance between water users and water supplies. Further information about the plan can be found on the NeDNR website: https://dnr.nebraska.gov/water-planning/upper-loup-nrd .

Emergency Response Plans for Community Water Systems within the NRD

An Emergency Response Plan is a documented strategy describing actions that a community water system would take in response to various major events, including drought. Emergency Response Plans from the following community water systems were reviewed:

- The Village of Dunning
- Halsey Elementary

- Village of Hyannis
- McPherson County Schools GS #4
- McPherson County Schools HS #90
- Village of Mullen
- Village of Stapleton
- Village of Thedford

There are no water districts in Blaine County, Hooker, or Logan Counties. Additionally, the water districts in Brown, Cherry, Grant, and Thomas Counties are inactive.

The plans listed above are examples of community planning mechanisms that exist within the NRD. These response plans usually cover water quality and quantity and outline how communities plan to respond in case of drought or during an emergency. However, while wide-ranging, these plans often do not include enforcement mechanisms, limiting their utility. Additionally, most do not include defined triggers for drought, making the decisions to declare drought and enforce water restrictions more difficult. Drought declarations are typically politically challenging decisions as the declaration may impact some in the community economically. Pre-established triggers can help ease political pressure and enable decision makes to formulate an informed decision regarding a drought declaration. As most communities have diverse (or lacking) definitions of drought or triggers for water-use emergencies, the ULNRD Drought Management Plan acts as a comprehensive tool to coalesce these disparate efforts in their jurisdiction, easing plan integration and drought mitigation implementation.

Wellhead Protection Plans

Wellhead protection plans attempt to proactively protect and manage the source of community drinking water from potential contaminates. Wellhead protection plans often recommend specific actions that can be taken to protect water quality. The following table shows that the Village of Mullen is the only community within the ULNRD that has an established wellhead protection plan as of May 2013.

Table 4: Wellhead Protection Plans in ULNRD

Community	Date Approved
Village of Mullen	10/21/2011

Source: NDEE, State Approved Wellhead Protection

Comprehensive Plans

Comprehensive plans determine community goals and aspirations for future development. These plans often contain goals and strategies to protect ground and surface water quality and quantity. Comprehensive plans from the following areas were reviewed:

- Cherry County
- Thomas County

SECTION 4: RISK AND VULNERABILITY ASSESSMENT

This section describes the unique characteristics of the planning area that affect its risk and vulnerability to future drought events. The risk assessment provides the factual basis for developing specific strategies to mitigate drought impacts. This section contains a description of historical drought occurrence and extent, previous drought impacts and damages, probability of future occurrences, and a vulnerability assessment.

Historical Drought Occurrence and Extent

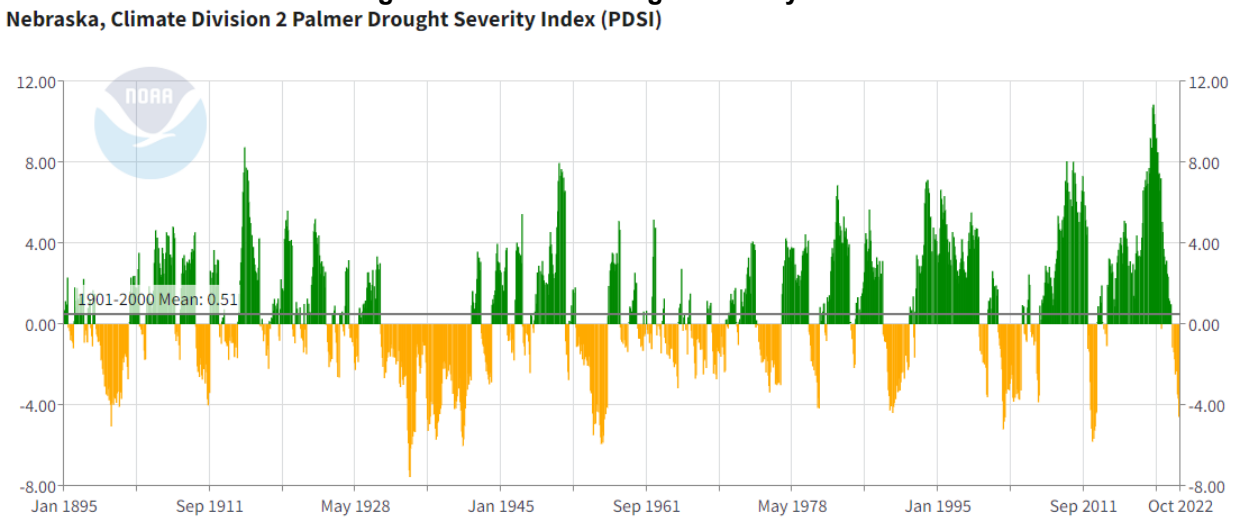
The Palmer Drought Severity Index (PDSI) was used to document historical occurrence and extent of drought within the planning area since 1895. Among the various indices, the PDSI has been widely used by state and local governments in the United States. The following table depicts the percentage of months the ULNRD experienced drought as classified by the PDSI and the extent associated with this index.

Table 5: Historical Drought Occurrence in ULNRD

Drought Classification	PDSI Range	Total Occurrences in Month	Percent of Months
Any Drought	-1.0 or Less	483/1,510	31.9%
Mild Drought	-1.0 to -1.99	183/1,510	12.1%
Moderate Drought	-2.0 to -2.99	133/1,510	8.8%
Severe Drought	-3.0 to -3.99	87/1,510	5.8%
Extreme Drought	-4.0 to -4.99	45/1,510	2.9%
Exceptional Drought	-5.0 or Less	35/1,510	2.3%

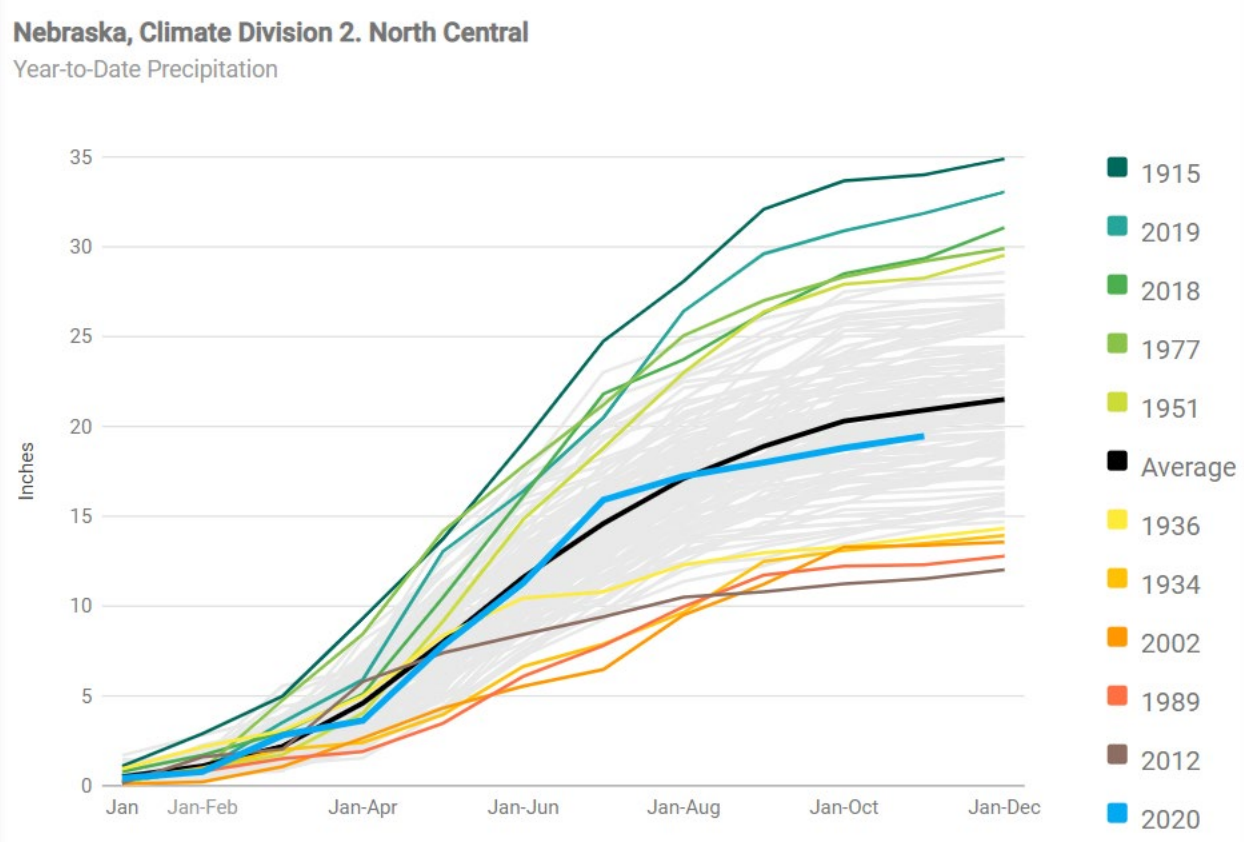
Source: NCEI, PDSI 1895 to 2020

Figure 10: Palmer Drought Severity Index



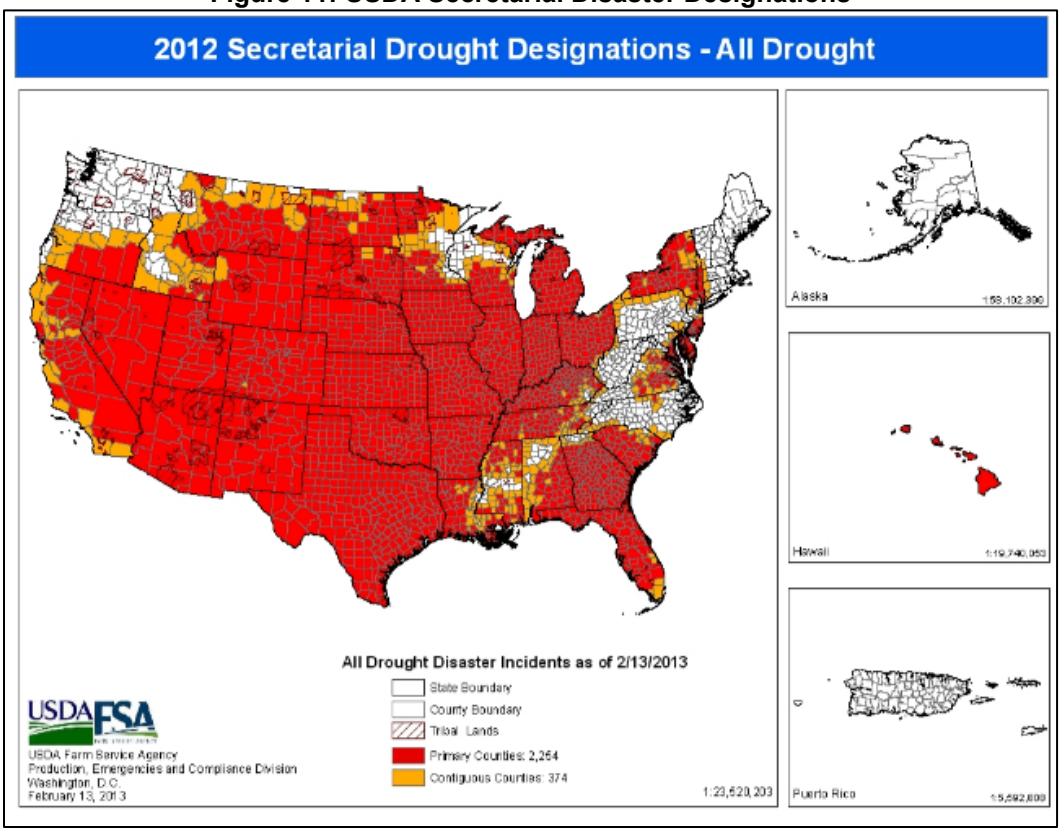
Source: NCEI 2022

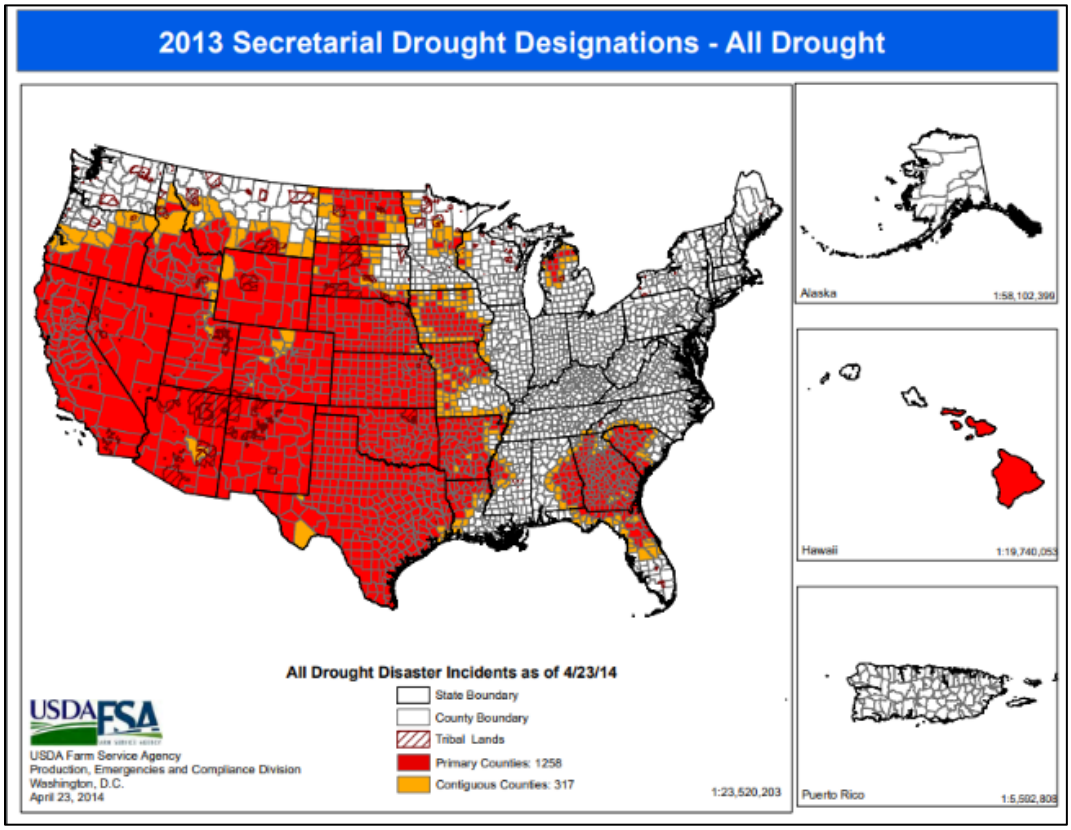
Visualized another way, the following figure highlights the five wettest and driest years on record and displays the other years nearer to the mean. The graph shows that the five wettest years on record in the planning area, in descending order, were 1915, 2019, 2018, 1977, and 1951. Although 2019 and 2018 were record-setting years for total precipitation, this does not mean that the planning area is immune from drought. Indeed, in the five driest years on record, 1936, 1934, 2002, 1989, and 2012 show recent brushes with drought that severely impacted both the Upper Loup NRD and the State of Nebraska at large.

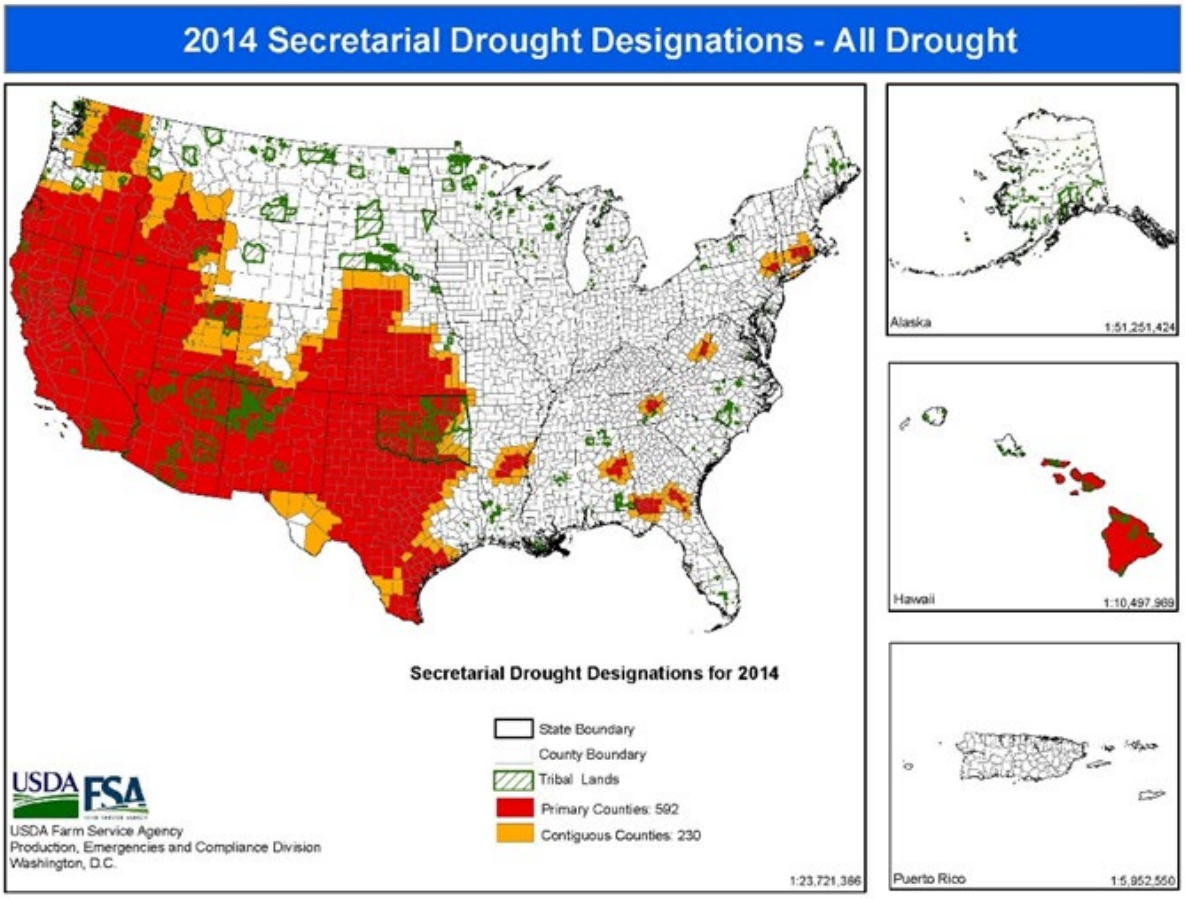


Past drought events in the planning area have resulted in United States Department of Agriculture (USDA) Secretarial Disaster Designations, most recently in 2012, 2013, and 2014 as shown by Figure 11. All Upper Loup NRD counties—and the entire State of Nebraska—were included in these three years' disaster declarations.

Figure 11: USDA Secretarial Disaster Designations







Source: U.S. Department of Agriculture

Past Drought Impacts

Drought causes significant economic, environmental, and social impacts. Drought impacts several sectors including agriculture, rural and municipal water supplies, fish and wildlife, tourism, recreation, water quality, soil erosion, the incidence of wildfires or flash floods, electricity demand, and other sectors. Drought can also indirectly impact personal and business incomes, tax revenues, unemployment, and other social or economic areas as well.

The National Drought Mitigation Center's (NDMC) Drought Impact Reporter documents the impacts of drought throughout the United States. The following table summarizes, by category, the impacts within the ULNRD from 2010 to 2020. Many of these reported impacts have been in the agricultural sector.

Table 6: Reported Drought Impacts (2010 to 2020)

Area	Agricultural	Business & Industry	Energy	Fire	Plant & Wildlife	Relief, Response, & Restrictions	Society & Public Health	Tourism & Recreation	Water Supply & Quality
ULNRD	8	0	0	4	4	4	1	1	1

Source: NDMC – Drought Impact Reporter

According to the Drought Impact Reporter, since 2010 there have been 23 impacts reported in the planning area. While a valuable means of recording some drought impacts, the Drought Impact Reporter does not account for every impact from drought. Therefore, while there were 23 *reported* impacts, the actual number of drought impacts since 2010 is likely much higher.

During the 2012 drought more than 1,100 surface irrigators across the state received a notice to stop pumping from the Nebraska Department of Natural Resources.[i] However, the NRD did not receive any reports of well issues during the 2012 drought.

Drought's consequences make it one of the costliest hazard events. According to the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI), there have been 27 drought-related billion-dollar disasters in the U.S. since 1980. Table 7: Average Annual Damages showcases the reported property and crop damage that drought causes in the planning area each year. This table does not include losses from displacement, functional downtime, economic loss, injury, or loss of life and is likely underreporting the total economic burden of drought on agricultural producers.

Table 7: Average Annual Damages

Total Property Loss[1]	Average Annual Property Loss[1]	Total Crop Loss[2]	Average Annual Crop Loss[2]
$46,000,000	$1,840,000	$5,251,357.05	$250,064.62

Source: 1 Indicates the data is from NCEI (January 1996 to December 2020); 2 Indicates data is from USDA RMA (2000 to 2020)

[i] Lincoln Journal Star: https://journalstar.com/news/state-and-regional/govt-and-politics/state-orders-irrigators-to-stop-pumping-water/article_98391404-9487-50b1-9820-323a19f94f42.html

Future Probability of Occurrence

The probability for future drought events was calculated by the previous number of months in drought divided by the total months on record. The planning area experienced drought 676 out of 1,510 months on record; resulting in a 44.8% chance of drought occurring in any given month within the ULNRD. According to the University of Nebraska-Lincoln report *Understanding and Assessing Climate Change: Implications for Nebraska 2014*, [ii] the Upper Loup NRD area can expect an increase in drought frequency and severity in the future.

Vulnerability Assessment

As drought is a normal, recurrent feature of climate, the entirety of the planning area is susceptible to its impacts. However, there are some areas, industries, and populations that may experience greater impacts due to the vulnerabilities described below.

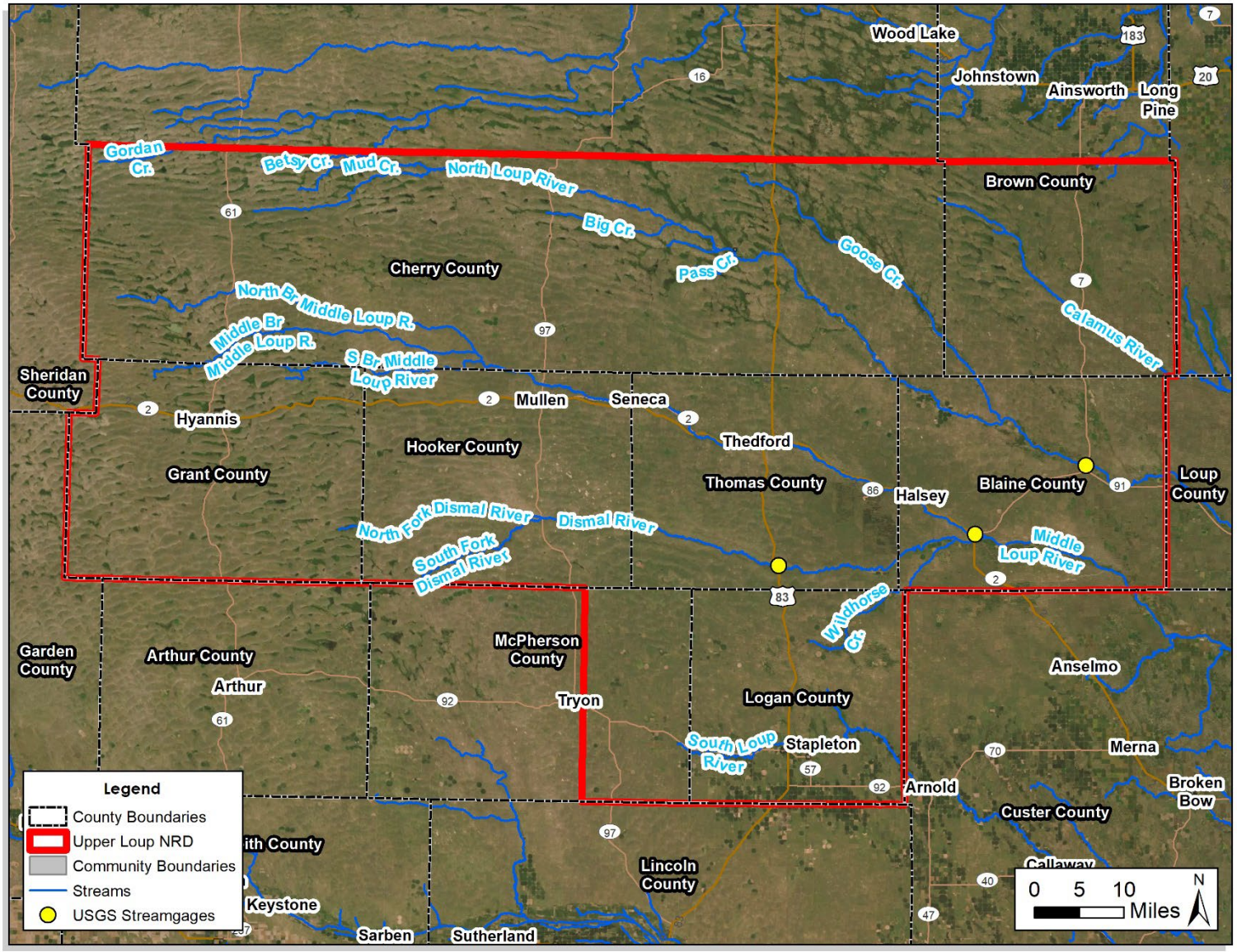
Water Quantity Concerns

Drought conditions have a major impact on water quantity conditions for both surface water and groundwater. The effects of drought can be especially difficult on areas where there are already water quantity concerns. The Upper Loup NRD monitors groundwater levels through Water Level Observation Wells. In 2016, the NRD released their annual report as part of the Integrated Management Plan. After sampling 115 wells within the NRD, the report found no significant changes in wells from sub-districts 1,2, and 3; sub-district 4 wells declined slightly less than half a foot (the trend for the past 3 years); and sub-district 5 wells declined a little under half a foot but do not show a downward trend.

The following maps feature three stream gages monitoring surface water within the NRD. Figure 14 shows the change in water levels from 2010 to 2020 at Brewster and from the 1990s to 2020 for Mullen and Dunning. As the graphs demonstrate, water levels across the NRD are variable, with significant gains and falls. While these gages do not show that the falls have dropped near zero, they still suggest that water levels are subject to change, and thus, must be carefully monitored.

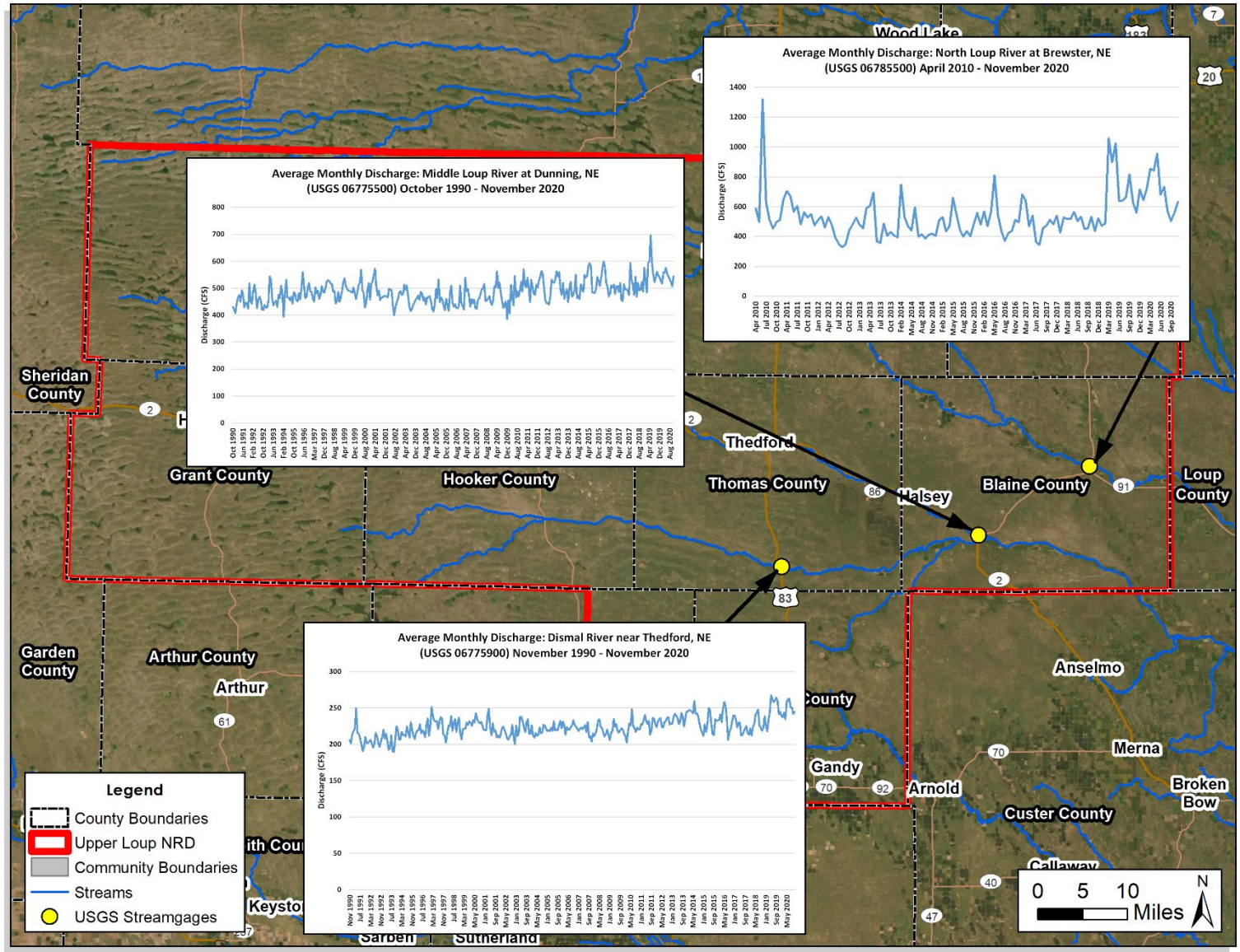
[ii] University of Nebraska – Lincoln: http://snr.unl.edu/download/research/projects/climateimpacts/2014ClimateChange.pdf

Figure 12: Surface Water Stream Gages



Source: USGS

Figure 13: Surface Water Level Graphs



Source: USGS

Water Quality Concerns

Water quality concerns are often exacerbated under drought conditions because contaminants can become more concentrated in a diminished water supply. The following map shows the known nitrate levels within wells (tested for nitrate concentrations) throughout the district. The EPA has set a Maximum Contaminant Level of nitrate at 10 mg/L (or 10 parts per million) for safety of drinking water. Wells with nitrate levels approaching 10 mg/L are shown in Figure 14, along with those over 10mg/L.

In 2008, the Upper Loup NRD created a Groundwater Management Area (GWMA) to protect and improve the quality of groundwater across the district. The entire NRD is in Phase 1, which means that the area's average groundwater nitrate content is below seven parts per million. The Phase 1 classification also constitutes a permit requirement before wells that pump over 50 gallons of water per minute can be constructed. This permit also requires that wells be sampled once every five years.

Figure 15 shows the identified wellhead protection areas within the district. A wellhead protection area is defined by the geographic area (and flow direction) contributing water to the well or well field of a municipal water system. These areas also include information that estimate the time-of-travel of the groundwater as it flows towards the wellhead. Identifying the wellhead protection area allows a community to proactively protect and manage the source of community drinking water.

Figure 14: Known Nitrate Levels

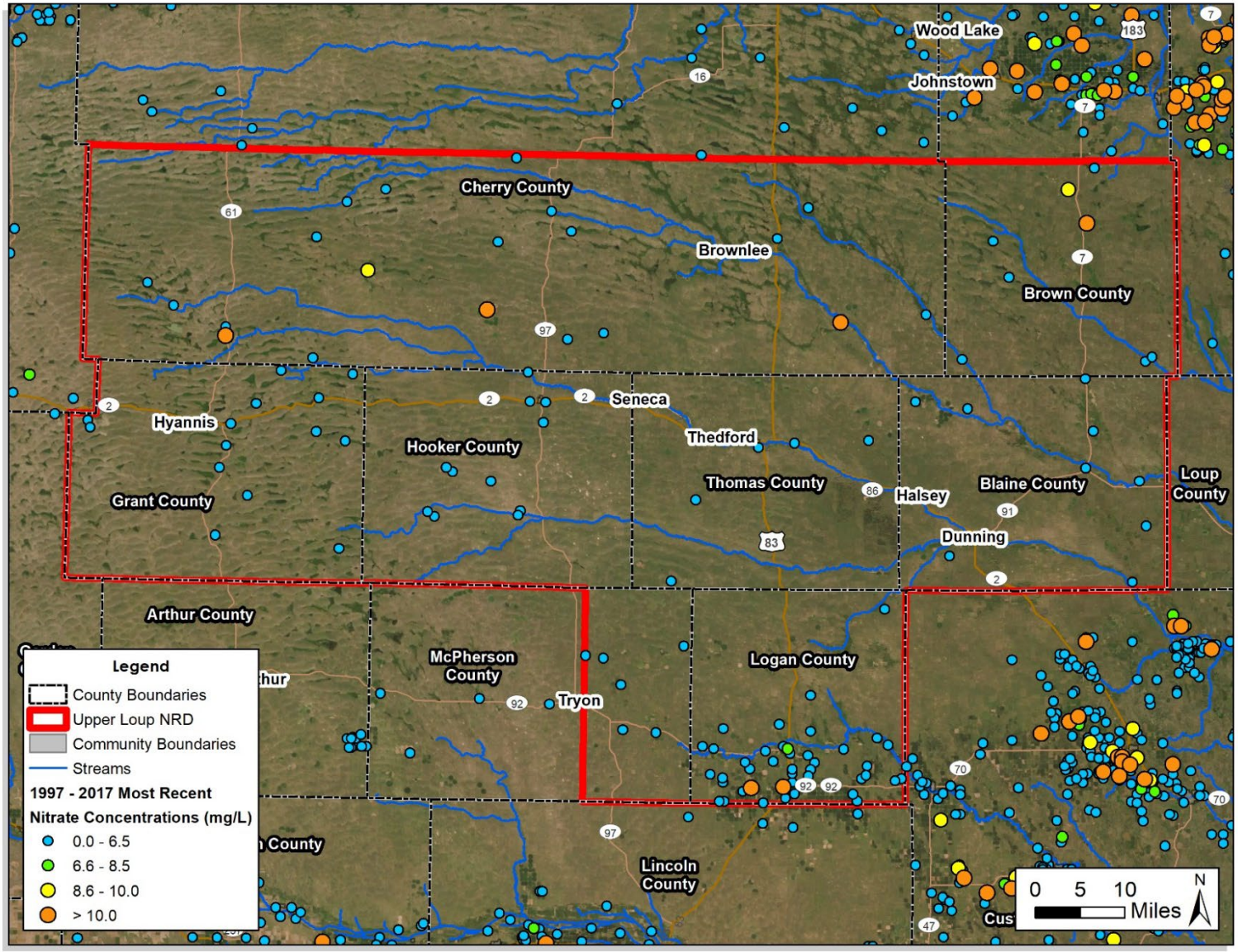
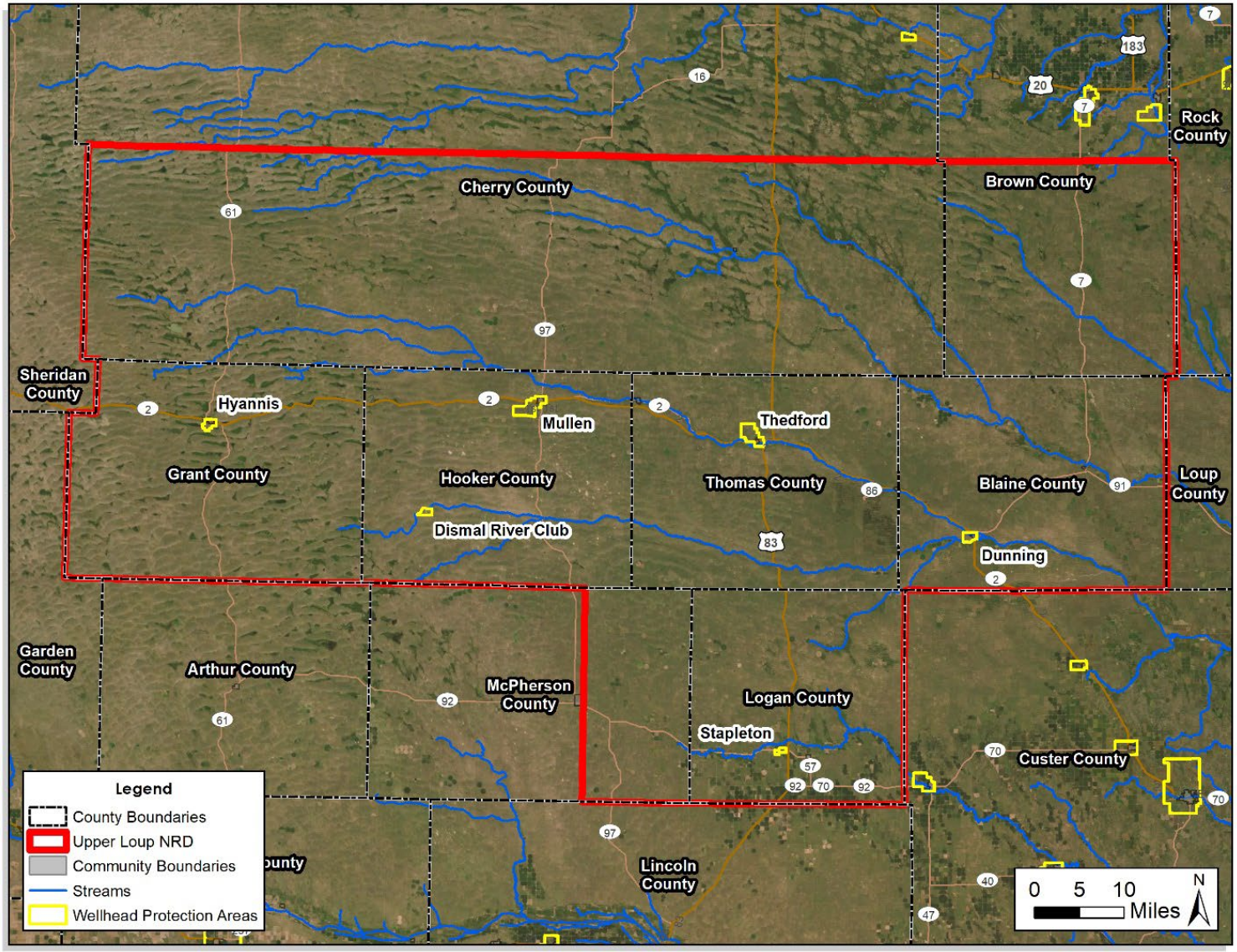


Figure 15: Wellhead Protection Areas



Source: NDEE 2020

Economics

Agriculture is the main industry and economic driver within the ULNRD. The following tables display the importance of the agricultural sector within the ULNRD. Note that Brown, Cherry, and McPherson Counties are included in this analysis, even though only small portions of them are part of the NRD. To represent this, they are denoted with an asterisk. Drought can cause significant economic impacts in agriculturally based economies. According to the USDA Risk Management Agency (RMA), drought accounted for $5,251,357.05 in crop losses within the planning area from 2000 through 2020. Reduced income for farmers has a ripple effect into other sectors as their ability to purchase goods and services is reduced. The State of Nebraska's economic status is heavily influenced by the ULNRD region, with agricultural production in the area accounting for $673,302,000 of the state's economy according to the 2017 US Census of Agriculture.

Table 8: Farm Employment Structure by County, 2019

County	Jobs	% of Jobs
Blaine	153	42%
Brown*	379	17.4%
Cherry*	824	18.7%
Grant	112	23.7%
Hooker	90	13.8%
Logan	146	33.4%
McPherson*	124	42%
Thomas	93	17.7%
Total	**1,921**	

Source: Nebraska Regional Economic Analysis Project (NE-REAP) with data provided by the U.S. Department of Commerce, Bureau of Economic Analysis, 2019

Table 9: Agricultural Land Sales by County

County	Number of Farms	Land in Farms, Acres	Market Value of Agricultural Sales
Blaine	101	366,649	$ 32,055,000
Brown*	268	614,967	$290,746,000
Cherry*	567	3,562,961	$230,927,000
Grant	64	495,096	$24,129,000
Hooker	97	427,028	$14,035,000
Logan	117	298,017	$28,614,000
McPherson*	109	488,982	$28,399,000
Thomas	90	388,140	$24,397,000

Source: USDA, 2017 Census of Agriculture

Seasonal Vulnerabilities

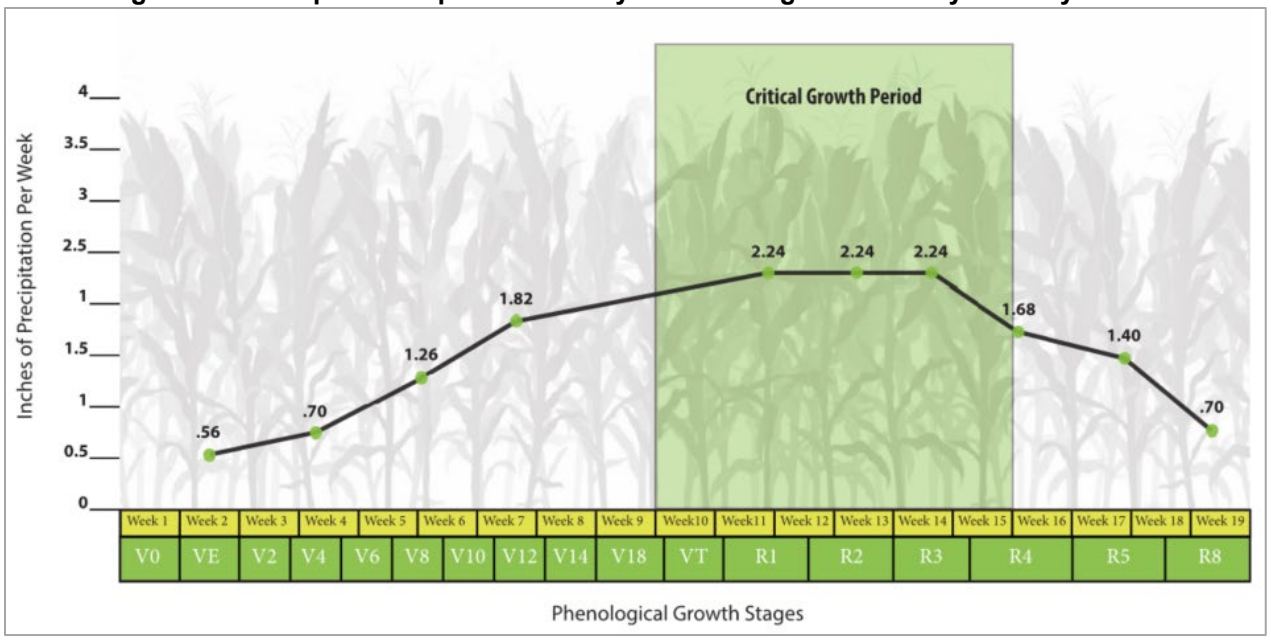
Seasonal variabilities related to water availability and high-water demand exist within the NRD and across the state. The planning area will be more vulnerable to drought during these regular periods of low water availability and high-water demand.

Agricultural irrigation is one key consideration directly related to monitoring and managing water use and water needs for the ULNRD. The phenology for crop development provides insight regarding times of high-water demand. Corn specifically is one of the primary crops in the region and has a water-intensive development cycle. The following figure outlines the water needs throughout the growing cycle for corn.

Clearly moisture is necessary throughout the growth cycle, but the most critical times for adequate soil moisture are during the pre-tasseling and tasseling phases. Critical moisture management times for 113-day maturing corn occur between weeks 10 and 15. If the assumed sowing date is May 1, critical periods with adequate soil moisture for corn would be during the months of July and August.

While monitoring water supplies throughout the year is helpful, it is most important for agricultural, municipal, commercial, and industrial water users to manage and develop contingency plans in case of shortage, during periods of peak demand.

Figure 16: Example of Crop Water Use by Growth Stage for 113-Day Maturity Corn



Threatened or Endangered Species

Threatened and Endangered Species (T&E) also warrant special considerations for water usage, demand, conservation, and allocation. The Fish and Wildlife Service maintains a list of all T&E species across the nation and Nebraska Game and Parks Commission maintains a state-specific list. There are numerous regulations in place which can influence water management strategies communities or the NRD can take.

There are several species with ranges in the planning area that are on either the state or federal threatened and endangered species list. These species are: American burying beetle, blowout penstemon, finescale dace, northern long-eared bat, northern redbelly dace, rufa red knot, Topeka shiner, western prairie fringed orchid, and the whooping crane. Although drought will impact each species differently, species will become more vulnerable during drought conditions. When a drought occurs critical habitat and food supplies may become damaged. Certain species may also find it difficult to find adequately supplies of drinking water.

Health Implications

In periods of limited rainfall, water bodies may become reduced in size, causing them to become stagnant. Inadequate water supplies can also cause people to collect rainwater which can lead to additional bodies of water. These stagnant water bodies provide an excellent breeding ground for certain types of types of mosquitoes (for example, *Culex tarsalisn*) which carry West Nile Virus and other diseases. Outbreaks of West Nile Virus, which is transmitted to humans via mosquitoes, are more likely to occur during drought conditions.[iii]

Drought conditions may impact air quality causing acute issues as well as negatively impacting individuals who have certain chronic health conditions such as asthma. Fire and dry soil can increase the number of particulates in the air such as dust, pollen and smoke. These substances can increase the risk for acute respiratory infections like bronchitis and bacterial pneumonia.[iv]

Drought can also have a significant impact on mental health. Drought's impact on mental health was a common concern of the stakeholders and survey respondents. The University of Nebraska – Lincoln has several resources to help manage physical and mental health during drought: https://droughtresources.unl.edu/health.

[iii] Centers for Disease Control and Prevention. August 2017. "Drought and Health". Accessed May 2020. https://www.cdc.gov/nceh/drought/default.htm

[iv] Centers for Disease Control and Prevention. August 2017. "Drought and Health". Accessed May 2020. https://www.cdc.gov/nceh/drought/default.htm

Section Five: Drought Monitoring and Response

Drought Monitoring Resources

The ULNRD and stakeholder group considered several indicators that could be used to monitor drought. Examples include the Palmer Drought Severity Index (PDSI), the Standardized Precipitation Index (SPI), the U.S. Seasonal Drought Outlook, stream flows, static water levels, Grass-Cast, and the U.S. Drought Monitor. The NRD also considered creating their own drought monitoring dashboard using data from multiple sources. Below are descriptions of tools the NRD will utilize to monitor drought conditions.

U.S. Seasonal Drought Outlook – Climate Prediction Center
(https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php)
The Climate Prediction Center have products that predict long-term forecasts. These climate outlooks describe the chances that conditions will be below-normal, near-normal, or above-normal for the outlook period indicated. One of the products from the Climate Prediction Center is the U.S. Seasonal Drought Outlook which shows where drought is 'likely to persist', 'remain but improve', 'likely be removed', or 'likely develop' based on long-term forecasts.

USGS Stream Flows (https://grasscast.unl.edu/)
USGS streamflow gages measure and record stream flow data for several of the major rivers and streams in the state. The real-time streamflow compared to historical streamflow shows what percentile class the flow is currently in. It should be noted that these are impacted by ice during the winter months.

Static Water Levels
Groundwater levels are collected once a year in the spring from 135+ monitor wells. Real time transducers are located at some of these wells and data is collected by the district monthly.

High Plains Regional Climate Center (https://hprcc.unl.edu/)
The High Plains Regional Climate Center produces several maps and resources that can be used to monitor drought conditions. These include temperature, precipitation, SPI, SPEI, etc.

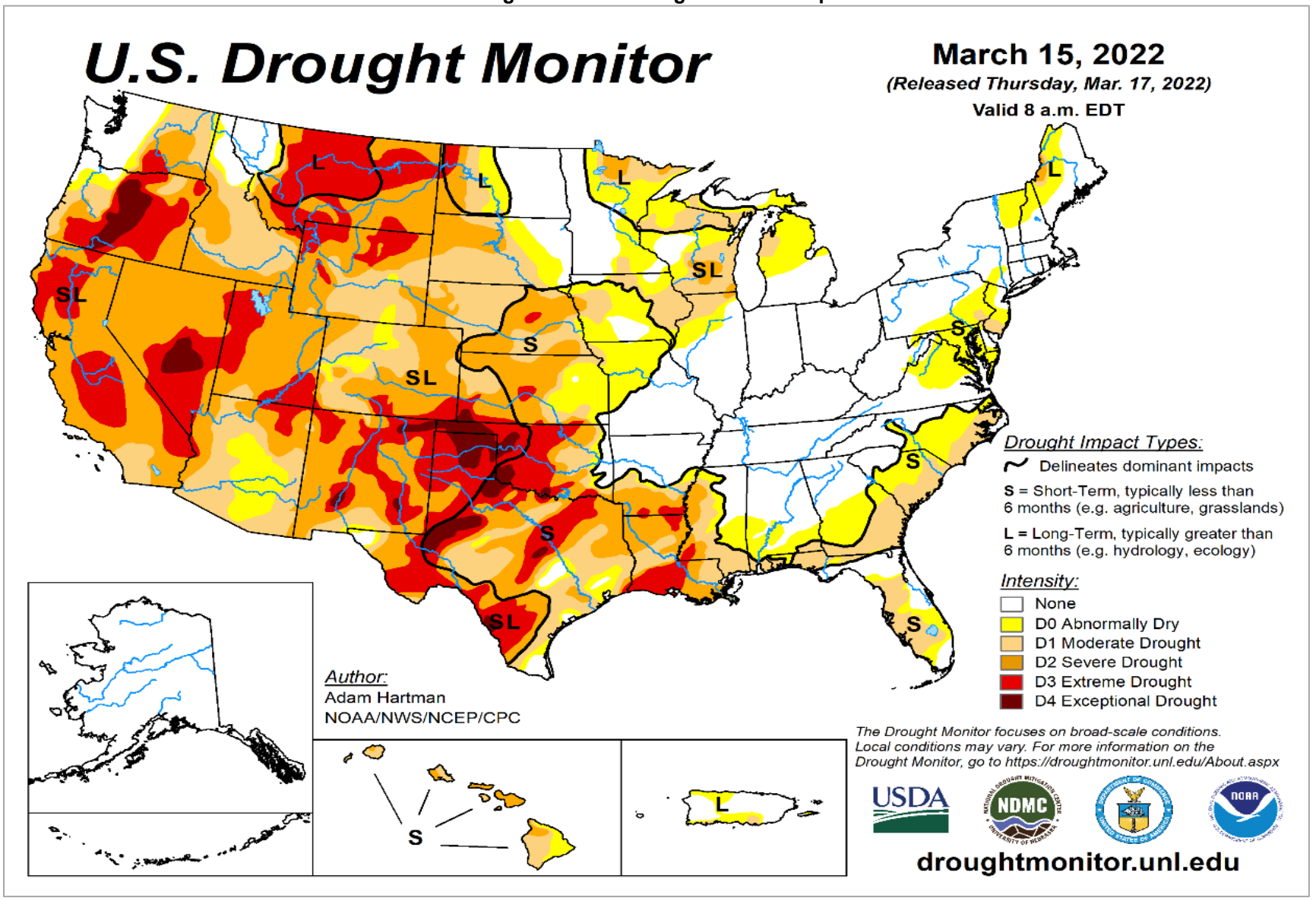
Grass-Cast (https://grasscast.unl.edu/)
Grass-Cast is a grassland productivity forecast that uses 40 years of historical data to predict how likely areas are to produce above, near, or below average vegetation under three precipitation scenarios. This can help ranchers better estimate how much grass will be available for livestock to graze, as well as help provide a view of regional rangeland productivity.

U.S. Drought Monitor (https://droughtmonitor.unl.edu/)
The United States Drought Monitor (USDM) is a map released weekly, showing which parts of the U.S. are in drought. The map uses five classifications (Figure 17). These maps are available at both a country and statewide (showing counties) scale. Figure 18 shows the map released on March 15, 2022 for the nation. The USDM is not a statistical model but relies on experts to synthesize the best available data and local observers to interpret the information. Data inputs include PDSI, SPI, the Keech-Byram Drought Index for fire, Surface Water Supply Index, snowpack, hydrologic data, assessments of vegetation health, and various indicators of soil moisture. The USDM can be used for monitoring throughout the year. Special attention should be given to the NRD and surrounding area, as well as the Rocky Mountain areas in Colorado, Montana, and Wyoming as conditions in those areas may impact the NRD region.

Figure 17: U.S. Drought Monitor Classifications

			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Figure 18: U.S Drought Monitor Map



Source: U.S Drought Monitor

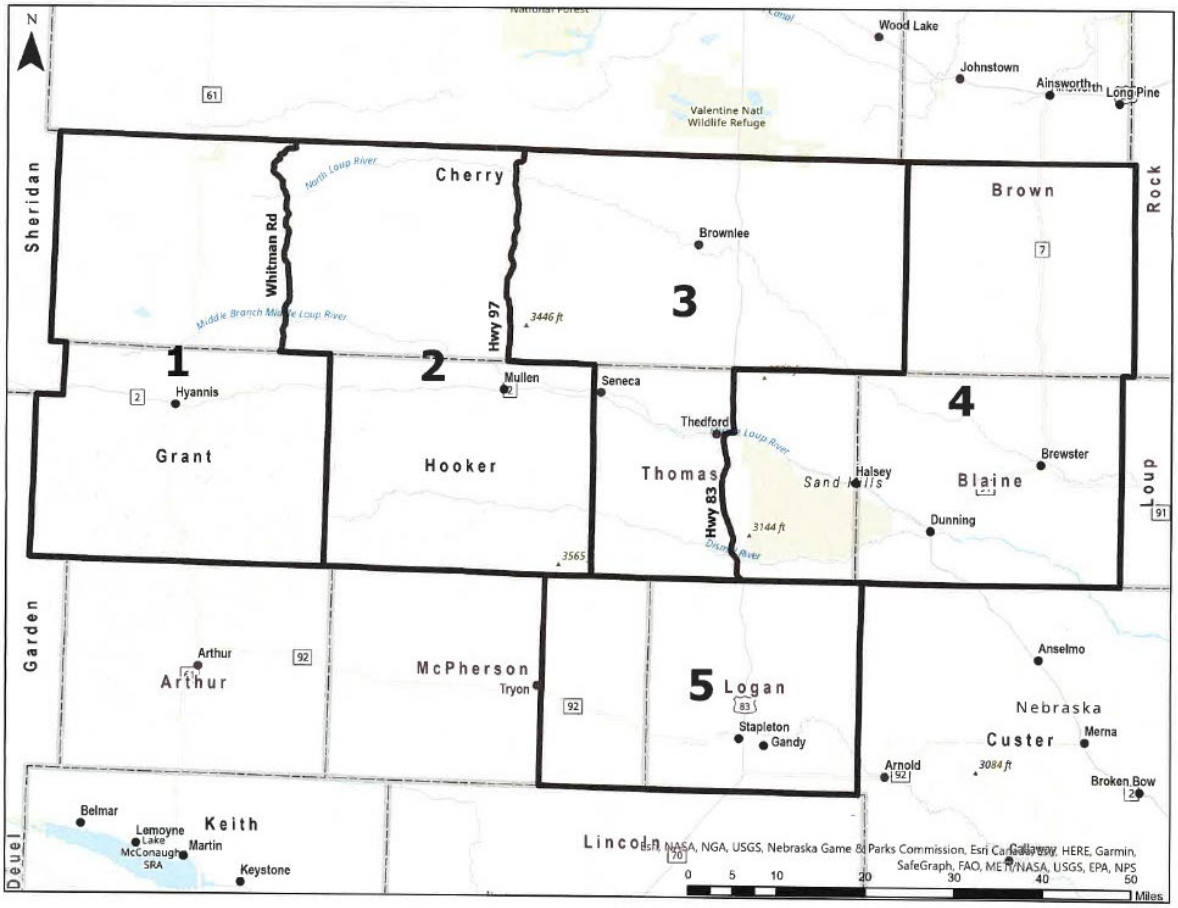
Recommended Drought Monitoring and Declaration Protocol

Every drought event is different and has varying impacts. These monitoring and response recommendations should serve as a framework for the ULNRD to follow and revise as the situation dictates. After each drought event, the NRD should update the framework based on lessons learned to continue serving the district.

The ULNRD will use the USDM as its primary drought indicator. In addition, the NRD will continue to monitor products from the High Plains Regional Climate Center, as well as static water levels and streamflow levels throughout the district. For the more long-term drought outlook, the NOAA U.S. Seasonal Drought Outlook and Grass-Cast will be used.

The ULNRD will declare a drought level within a county when over 50 percent of the county is within a USDM designation.

Figure 19: ULNRD Subdistricts



A web-based drought dashboard will be developed with assistance from NeDNR and will include, at a minimum, the USDM for the area. A drought monitoring committee will be created and include local stakeholders, government agency staff, and subject matter experts. This group will meet in-person or virtually during drought events and provide data, review drought conditions, and recommend management actions for the NRD and other entities to consider. A drought contact list with all interested parties (including the Drought Monitoring Committee) will be created to share information and resources during drought events. Below are actions which the NRD will take, depending on the district's drought designation given by the USDM. Some of the data from

the tools and resources described below are not collected at the same timescale as the monitoring protocol. Therefore, the latest available data will be reviewed as described below.

D0 Abnormally Dry (yellow on the USDM map): The NRD will continue to monitor the USDM map and ULNRD Drought Dashboard on at least a monthly basis until D1 conditions.

D1 Moderate Drought (light orange on the USDM map): Once the county is designated as D1, the NRD should begin to monitor the ULNRD Drought Dashboard and other drought indicators such as static water levels, streamflows, and the U.S. Seasonal Drought Outlook on at least a *monthly* basis and perform the following response action.

Response:

1. Send monthly email to drought contact list about current drought conditions and educational resources. (Every two weeks during the growing season: April – September)
2. Convene Drought Monitoring Committee within a month. Committee will determine at meeting/call when the next meeting will be.

D2 Severe Drought (dark orange on the USDM map): Once the county is designated as D2, the NRD should monitor the ULNRD Drought Dashboard and other drought indicators such as static water levels, streamflows, Grass-Cast, indicators from the High Plains Regional Climate Center, and the U.S. Seasonal Drought Outlook on at least a *biweekly* basis and perform the following response actions.

Response:

1. Send bi-weekly email to drought contact list about current drought conditions and educational resources and encourage them to monitor drought conditions.
2. Put out a press release and other appropriate public notification.
3. Convene Drought Monitoring Committee within a month.
4. Coordinate with the National Drought Mitigation Center and other stakeholders for messaging and appropriate responses.

D3 Extreme Drought (red on the USDM map): Once any county is designated as D3, the NRD should monitor the ULNRD Drought Dashboard and other drought indicators such as static water levels, streamflows, Grass-Cast, indicators from the High Plains Regional Climate Center, and U.S. Seasonal Drought Outlook on at least a *weekly* basis and perform the following response actions.

Response:

1. Call all representatives on drought contact list to inform them of D3 Extreme Drought status and encourage them to monitor drought conditions.
2. Send bi-weekly email to drought contact list about current drought conditions and educational resources.
3. Put out a press release and other appropriate public notification.
4. Convene Drought Monitoring Committee within a month.
5. Hold a meeting with communities, counties, other NRDs, and major stakeholders to discuss current drought impacts and ways to mitigate them. If needed, additional long-term controls should also be discussed. This meeting can help the district identify areas of need and help create a unified message to the public.

6. Coordinate with the National Drought Mitigation Center and other stakeholders for messaging and appropriate responses.

D4 Exceptional Drought (dark brown on the USDM map): Once the county is designated as D4, the NRD should monitor the ULNRD Drought Dashboard and other drought indicators such as static water levels, streamflows, Grass-Cast, indicators from the High Plains Regional Climate Center, and the U.S. Seasonal Drought Outlook on at least a *weekly* basis and perform the following response actions.

Response:

1. Call all representatives on drought contact list to inform them of D4 Exceptional Drought status and encourage them to monitor drought conditions.
2. Send bi-weekly (every two weeks) email to drought contact list about current drought conditions and educational resources.
3. Put out a press release and other appropriate public notification.
4. Convene Drought Monitoring Committee within a month.
5. Hold a meeting with communities, counties, other NRDs, and major stakeholders to discuss current drought impacts and ways to mitigate them. If needed, additional long-term controls should also be discussed. This meeting can help the district identify areas of need and help create a unified message to the public.
6. Coordinate with the National Drought Mitigation Center and other stakeholders for messaging and appropriate responses.

Section Six: Mitigation and Management Actions

Operational and Administrative Framework

In order to manage ground and surface water, the ULNRD must operate within the framework provided by the State of Nebraska. Below is a brief explanation of some of the frameworks for surface water and ground water administration.

Surface Water Administration

The NeDNR governs the use of surface water in the State of Nebraska. This means that NeDNR has the authority to restrict the use of surface water. The state governs surface water through the prior appropriation doctrine which states that the oldest water rights holders get their full allocation of water before any junior rights holders can get their water.

As drought conditions develop, a senior water rights holder can place a call to the local NeDNR field office and can request a hold to be placed on junior rights holders because the senior water right holders are not receiving their full allocation. The field office will then analyze the situation and determine how they can adjust water consumption to ensure that the senior rights holder will be able to get the water they need. If the senior appropriator is in fact not receiving the allocated amount, other surface water users whose priority date is junior will be required to cut back, or cease usage, in order to satisfy the senior appropriator.

Groundwater Management

The ULNRD is authorized by the state to manage and govern groundwater within the district. This authority provides the NRD with the means to restrict the use of groundwater, if conditions warrant, to prevent long-term harm to the aquifer. The ULNRD collects measurements from 150+ monitoring wells across the NRD on an annual basis to monitor the district's groundwater levels.

The NRD also established a Groundwater Management Area to improve and protect groundwater quality in 2008. The entire ULNRD is in Phase 1 of the NRD Groundwater Management Program (average nitrate content between zero and seven milligrams per liter) thus, no parts have been identified as having a high risk to nitrate contamination. Phase 1 controls include: having wells sampled once every five years and encouraging operators to attend classes for fertilizer and irrigation water management as well as performing deep soil testing for residual nutrients and to not apply nitrogen fertilizer on sandy soils in the fall or winter.

Mitigation Actions

The following actions are drought-specific mitigation actions identified throughout the planning process for the 2019 Upper Loup NRD Multi-Jurisdictional Hazard Mitigation Plan. Some of these actions were edited for clarity and brevity. Although this Drought Plan is focused solely on the jurisdiction of the ULNRD, there are actions that other entities and individuals within the NRD region can take to mitigate the impact of drought. In addition to the actions below, Appendix A shows actions that communities, water utilities, businesses, agricultural producers, and homeowners can take to mitigate drought. Appendix B has summaries of funding resources and programs that can help those in the ULNRD region mitigate and respond to drought impacts.

Action	Public Awareness/Education
Description	Public education activities such as outreach projects, distribution of maps and environmental education to increase awareness of drought and water conservation methods. Continue to develop and maintain a list of best management practices to conserve water use and reduce total use (high water use to low water use) and consumption of groundwater resources that can be used by communities, businesses, residents, producers, etc.
Estimated Cost	$500+
Potential Funding	ULNRD Budget
Timeline	5+ years
Priority	Medium
Status	On an annual basis, ULNRD staff visit schools to educate the students on hazards and environmental conservation methods. This information is also posted on the ULNRD website. ULNRD will also utilize and distribute resources from the National Drought Mitigation Center and NIDIS to aid in education efforts. This drought plan will include a list of BMPs to be used for entities across the district in Appendix A.

Action	Water Storage
Description	Work with communities to identify needs for additional water storage facilities. Act as a point of contact for local jurisdictions for water suppliers.
Estimated Cost	$30,000+
Potential Funding	Local funds
Timeline	5+ years
Priority	Medium
Status	The ULNRD plans to maintain contacts with counties that could help provide water in times or shortage.

The following actions were identified during the drought planning process.

Action	Develop Drought Stakeholder Contact List
Description	Develop a contact list of representatives in each community and county to communicate with during times of drought. Should include NRD board, village clerks and chairs, fire chiefs, emergency managers, county commissioners, water intensive businesses, UNL Extension Office, USDA Farm Service Agency, NeDNR, etc.
Estimated Cost	Staff Time
Potential Funding	ULNRD Budget
Timeline	1 year
Priority	High

Action	Fair/Event Outreach
Description	Perform public outreach to increase drought awareness at local fairs and events within the NRD. This could include setting up a booth/table, handing out flyers, etc.
Estimated Cost	Staff Time
Potential Funding	ULNRD Budget
Timeline	Ongoing
Priority	Medium

Action	Identify Drought Monitoring Committee
Description	Identify a drought monitoring committee that will regularly meet or communicate during drought periods.
Estimated Cost	Staff Time
Potential Funding	ULNRD Budget
Timeline	1 year, Ongoing maintenance
Priority	High

Action	Investigate Assistance Programs
Description	Investigate possible assistance programs for producers/ranchers and communicate them to all stakeholders. The National Drought Mitigation Center website has information on many programs and resources. This Drought Plan has several resources and programs for producers/ranchers in Appendix B.
Estimated Cost	Staff Time
Potential Funding	ULNRD Budget
Timeline	1-2 years
Priority	High

Action	Purchase Additional Transducers
Description	Purchase additional transducers to install at monitoring wells.
Estimated Cost	$1,000-$2,500 per unit
Potential Funding	ULNRD Budget, grants
Timeline	2-5 years
Priority	Medium

Action	Develop Drought Dashboard
Description	Work with NeDNR to develop an online dashboard that summarizes local drought conditions and indicators.
Estimated Cost	$5,000 - $20,000, Staff Time
Potential Funding	ULNRD Budget, grants
Timeline	1 Year, Ongoing maintenance
Priority	High

Action	Develop Quantitative Recommendations
Description	Conduct a study/engineering analysis to determine appropriate quantitative recommendations/triggers based on historical context and latest data to establish limits for water intensive users across the district.
Estimated Cost	Staff time
Potential Funding	ULNRD Budget, grants
Timeline	5+ years
Priority	Low

Action	Drought Workshops
Description	Provide drought preparedness, planning, and response workshops across the district.
Estimated Cost	$1,000 - $3,000/year
Potential Funding	ULNRD Budget
Timeline	Ongoing
Priority	Medium

Action	Post Drought Assessments
Description	Following drought events, work with the Drought Monitoring Committee to develop post drought assessments to summarize impacts, identify lessons learned, etc.
Estimated Cost	Staff Time
Potential Funding	ULNRD Budget
Timeline	Ongoing
Priority	Low

Section Seven: Plan Maintenance and Updates

The ULNRD will be responsible for monitoring, evaluating, and updating the plan. Support and suggestions from stakeholders and the public will influence and enhance this process. Review of this plan shall occur every three years, beginning in 2026. The plan may be updated more frequently at the discretion of the ULNRD Board, especially in the event of a major drought. If new, innovative mitigation strategies arise that could impact the planning area or elements of this plan, a plan amendment may be proposed and considered separate from the regular plan review.

Continued Public Involvement

To ensure plan support and input from the public as well as other stakeholders, public involvement should remain a top priority for the ULNRD. Notices for public meetings involving the discussion of or action on plan updates should be published and posted at least two weeks in advance.

Appendix A: Drought Actions by Sector

Although this Drought Plan is focused on the jurisdiction of the ULNRD, there are actions that other entities and individuals within the NRD region can take to mitigate the impact of drought. Below is a sample of actions that communities, water utilities, businesses, agricultural producers, and homeowners can take to mitigate drought. These lists are not meant to be comprehensive, but below each list of actions is a resource that sector can utilize to further explore drought mitigation options.

Communities

- Develop a drought response plan
- Develop a water use ordinance that restricts non-essential uses during drought emergencies such as landscaping, washing cars, swimming pools, etc.
- Encourage xeriscaping or drought tolerant landscapes
- Develop a stormwater management plan that supports an approach to collecting, treating, and reusing water.
- Utilize the capital improvement plan to invest in efficient water systems to prevent water loss
- Share drought and water reduction education materials

Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards
https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf

Water Utilities

- Establish staffing and drought response teams
- Estimate quantity of current water supplies
- Develop ways to reduce water use
- Identify potential supplemental water supplies
- Establish and communicate key messages to customers and stakeholders during drought
- Develop a drought response plan that includes trigger levels and water use reduction measures
- Conduct a tabletop exercise to practice scenarios such as: hauling potable water, availability of tanker trucks, hauling routes, truck disinfection, maintenance and operational procedures for introducing water into the system, identifying additional water sources or operational changes to expand water supplies, procedures for communicating with customers and large water users.
- Regularly check for leaks to minimize water losses

Drought Response and Recovery – A Basic Guide for Water Utilities
https://www.epa.gov/sites/default/files/2017-10/documents/drought_guide_final_508compliant_october2017.pdf

Business and Manufacturing

- Conduct a water audit to understand facility water use
- Identify best management practices to use water efficiently in restrooms, laundry, kitchens, mechanical, and laboratory equipment
- Identify potential alternative water supply sources including reclaimed, recycled, or recirculated water
- Use native or drought tolerant plants in your landscape

EPA WaterSense – Tools for Commercial and Industrial Facilities
https://www.epa.gov/watersense/tools-ci-facilities

Agricultural Producers

- Purchase crop insurance
- Ensure drought is accounted for in your financial plan
- Rotating crops to reduce soil erosion
- Using the correct irrigation equipment and structures to ensure water efficiently goes where needed
- Control drainage to help with too much or too little water
- Develop a grazing strategy and ensure that strategy matches your enterprise mix
- Pasture improvements such as removing undesirable shrubs or trees, oversee pastures, or plant new pastureland
- Stockpile feed
- Planting cover crops to prevent soil erosion
- Ensure adequate stockwater resources

Drought Risk on the Ranch – A Planning Guide for Great Plains Ranchers
https://drought.unl.edu/ranchplan/Overview.aspx

U.S. Department of Agriculture https://www.farmers.gov/protection-recovery/drought

Homeowners

- Install water saving devices such as low flow toilets and showerheads
- Turning off the water while you brush your teeth
- Adjust lawn sprinklers to water the lawn and not the sidewalk or street
- Running dishwasher and washing machine only when full
- Check for plumbing leaks or dripping faucets
- Install rain-capturing devices for irrigation such as a rain barrel
- Use native or drought tolerant plants in your landscape

- Use permeable driveways and surfaces to reduce runoff and promote groundwater recharge

EPA WaterSense https://www.epa.gov/watersense

EPA WaterSense – Landscape Design and Irrigation System Solutions
https://www.epa.gov/watersense/watersense-labeled-homes-outdoors

All Sectors

National Integrated Drought Information System https://www.drought.gov/

National Drought Mitigation Center https://drought.unl.edu/

Appendix B: Drought Assistance Programs

Agriculture Risk Coverage and Price Loss Coverage Program (USDA)[1]

Overview

This program provides revenue and price loss payments to eligible produces. Owners must one-time elect to select the type of coverage for each of the covered commodities. The Agriculture Risk Coverage (ARC) program provides income support tied to historical base acres, not current production, of covered commodities. ARC payments are issued when the actual county crop revenue of a covered commodity is less than the ARC guarantee for the covered commodity. Price Loss Coverage (PLC) program payments are issued when the effective price of a covered commodity is less than the respective reference price for that commodity. The effective price equals the higher of the market year average price or the national average loan rate for the covered commodity. Covered commodities include wheat, oats, barley, corn, grain sorghum, rice, soybeans, sunflower seed, rapeseed, canola, safflower, flaxseed, mustard seed, crambe and sesame seed, dry peas, lentils, small chickpeas, and large chickpeas. Visit https://www.fsa.usda.gov/programs-and-services/arcplc_program/index for more information about the program.

Bureau of Reclamation's Drought Response Program[2]

Overview

The Bureau of Reclamation's Drought Response Program provides assistance to water users for drought contingency planning and to take actions that build long-term resiliency to drought. The program is split up into three areas Drought Contingency Planning, Drought Resiliency Projects, and Emergency Response Actions. For information about each area is given below. For more detailed information visit: https://www.usbr.gov/drought/index.html.

Drought Contingency Planning

The Bureau of Reclamation can provide financial assistance for applicants to develop a drought contingency plan or to update an existing plan.

Drought Resiliency Projects

The Bureau of Reclamation also funds projects that help communities prepare for and respond to drought. Eligible project types include:

- Infrastructure improvements, modifying surface intakes, and recharge, treatment, and storage facilities.
- Decision support tools, including drought forecasting tools, and water measurement and monitoring equipment.
- Projects benefitting fish, wildlife, and the environment.

1 U.S. Department of Agriculture. "ARC/PLC Program". Accessed August 2022. https://www.fsa.usda.gov/programs-and-services/arcplc_program/index.

2 Bureau of Reclamation. "Drought Response Program". Accessed June 2022. https://www.usbr.gov/drought/docs/DroughtResponseProgramFactSheet.pdf.

Emergency Response Actions

Emergency response actions are meant to minimize losses and damages resulting from drought. They are crisis driven actions in response to unanticipated circumstances. Eligible emergency response actions are limited to temporary construction activities and other actions that do not involve the construction of permanent facilities.

Circuit Rider Program (USDA)[3]

Overview

This program provides technical assistance to rural water systems that are experiencing day to day operation, financial, or managerial issues. Topics the circuit rider can assist with:

- Board training
- Management and finance
- Operation and maintenance
- Leak detection
- Water treatment
- Regulatory compliance
- Facility security
- Loan application and reporting
- Disaster and emergency assistance

For more information visit the USDA page: https://www.rd.usda.gov/programs-services/water-environmental-programs/circuit-rider-program-technical-assistance-rural-water-systems.

Eligibility

To be eligible, the water system must serve an area with a population of 10,000 or fewer and be either a public body, nonprofit, or Tribe with legal authority to own and operate the water facility.

Coping with Drought Research Competition (National Integrated Drought Information System)[4]

Overview

Research through the Coping with Drought Research Competition assesses impacts of drought on agriculture, ecosystems, and water resources and develops decision support tools for regional, state and local use. The projects incorporate consultation with stakeholders and focus on information that is most useful for decision-making to increase resilience; models and tools that bring this information to decision makes; and strategies for improving engagement with communities in preparedness. For more information about this year's competition visit: https://www.drought.gov/drought-research/coping-with-drought-competition?resource=fy2018#about.

3 U.S. Department of Agriculture. "Circuit Rider Program – technical Assistance for Rural Water Systems". Accessed June 2022. https://www.rd.usda.gov/programs-services/water-environmental-programs/circuit-rider-program-technical-assistance-rural-water-systems.

4 National Integrated Drought Information System. "NIDIS Coping with Drought Research Competition". Accessed June 2022. https://www.drought.gov/drought-research/coping-with-drought-competition.

Disaster Epidemiology and Response (Centers for Disease Control and Prevention)

Overview

The Center for Disease Control and Prevention (CDC) provides expertise and leadership in epidemiology to state, tribal, local, territorial, and federal partners to help them prepare for and respond to disasters. Two specific programs are discussed below.

Community Assessment for Public Health Emergency Response (CASPER)[5]

CASPER is a type of Rapid Needs Assessment that provides household-level information to public health leaders and emergency managers. The information generated can be used to initiate public health action, identify information gaps, facilitate disaster planning, response and recovery activities, and assess new or changing needs in the community. To find out more about CASPER and how to request one, visit: https://www.cdc.gov/nceh/casper/overview.htm.

Training and Technical Assistance[6]

The CDC provides consultation and technical assistance during all phases of a disaster cycle. Topic areas include disaster morbidity and mortality surveillance, disaster-specific preparedness and response planning, and advice on epidemiologic studies and research. The CDC also provides in-person disaster epidemiology training. For more information on the training and technical assistance offered visit: https://www.cdc.gov/nceh/hsb/disaster/training.htm.

Disaster Set-Aside Program (USDA)[7]

Overview

Farm Service Agency (FSA) borrowers located in designated disaster areas or contiguous counties who are unable to make their scheduled payment on any FSA debt, can get a set-aside of one payment to allow the operation to continue.

A fact sheet for the Disaster Set-Aside Program can be found here: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2019/disaster-set-aside-program-factsheet-19.pdf.

Eligibility

Eligibility to receive the set-aside will primarily be determined based on the following criteria:

- As a direct result of the disaster, the borrower is unable to pay all family living and farm operating expenses, payments to other creditors, and payments to FSA;
- The borrower must have operated a farm or ranch in a county designated as a disaster area or in a contiguous county. Each loan considered for set-aside must have been outstanding at the time of the disaster;
- The borrower must have acted in good faith and complied with written agreements with FSA;
- The borrower must not be in non-monetary default;
- The borrower must be current or not more than 90 days past due on any FSA loan;
- After the set-aside, the borrower will be current on all FSA loans;
- The borrower's FSA debt has not been restructured since the disaster;

5 Centers for Disease Control and Prevention. "Overview of CASPER"
6 Centers for Disease Control and Prevention. "Training and Technical Assistance". Accessed June 2022. https://www.cdc.gov/nceh/hsb/disaster/training.htm.
7 U.S. Department of Agriculture. 2019. "Disaster Set-Aside Program". https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2019/disaster-set-aside-program-factsheet-19.pdf.

- The amount set aside will not exceed one year's FSA payment;
- No loan may receive more than one disaster set-aside unless it is later restructured; and
- The borrower must be able to develop a positive cash-flow projection for the coming year.

Disaster Unemployment Assistance (U.S. Department of Labor)[8]

Overview

The Disaster Unemployment Assistance (DUA) provides temporary benefits to individuals whose employment or self-employment has been lost or interrupted as a direct result of a major disaster and who are not eligible for regular unemployment insurance.

A Major Disaster means any natural catastrophe or other types of disasters that result in a Presidential declaration of a disaster. For a fact sheet about the DUA visit: https://oui.doleta.gov/unemploy/docs/factsheet/DUA_FactSheet.pdf.

Eligibility

One of the following conditions of unemployment must have occurred as a direct result of the disaster to qualify for DUA:

- The individual has had a week of unemployment following the date the major disaster began;
- The individual is unable to reach his/her place of employment;
- The individual was scheduled to start work and the job no longer exists or the individual was unable to the job;
- The individual became the breadwinner or major support because the head of the household died as a direct result of the disaster; or
- The individual cannot work because of an injury caused as a direct result of the disaster.

Economic Injury Disaster Loan (U.S. Small Business Administration)[9]

Overview

The Economic Injury Disaster Loan (EIDL) program was created to assist businesses, renters, and homeowners located in regions affected by declared disasters (presidential, Small Business Administration, or Secretary of Agriculture). The Small Business Administration can provide up to $2 million to help meeting financial obligations and operating expenses that could have been met had the disaster not occurred. EIDL assistance is available only to small businesses when SBA determines they are unable to obtain credit elsewhere. For more information visit the website at: https://www.sba.gov/funding-programs/disaster-assistance/economic-injury-disaster-loans.

Eligibility

The following entities are eligible for the EIDL program.

- Small businesses with fewer than 500 employees
- Sole proprietors
- Independent contractors
- Most private nonprofits

8 U.S. Department of Labor. "Disaster Unemployment Assistance". Accessed June 2022. https://oui.doleta.gov/unemploy/docs/factsheet/DUA_FactSheet.pdf.

9 U.S. Small Business Administration. "Economic Injury Disaster Loans". Accessed June 2022. https://www.sba.gov/funding-programs/disaster-assistance/economic-injury-disaster-loans.

Emergency Assistance for Livestock, Honeybees and Farm-Raised Fish Program (USDA)[10]

Overview

The Livestock, Honeybees and Farm-Raised Fish Program (ELAP) provides financial assistance to eligible producers of livestock, honeybees, and farm-raised fish for losses due to disease, certain adverse weather events or loss conditions, including blizzards and wildfires. ELAP assistance is provided for losses not covered by other disaster assistance programs, such as losses not covered by the Livestock Forage Disaster Program and the Livestock Indemnity Program. A fact sheet for ELAP can be found here: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/elap-general-fact-sheet.pdf.

What is Eligible?

ELAP provides assistance for:

- Livestock feed and grazing losses that are not due to drought or wildfires on federally managed lands;
- Losses resulting from the cost of transporting water to livestock due to an eligible drought*;
- Cost of transporting feed for livestock that rely on grazing due to an eligible drought*;
- Losses resulting from the additional cost associated with gathering livestock for treatment and/or inspection related to cattle tick fever;
- Honeybee feed, colony and hive losses; and
- Farm-raised fish feed and death losses.

*Eligible Drought:

- Drought intensity of D2 for eight consecutive weeks as indicated by the USDM.
- Drought intensity is D3 or greater.

Emergency Community Water Assistance Grants (USDA)[11]

Overview

The Emergency Community Water Assistance Grants helps eligible entities prepare or recover from an emergency that threatens the availability of safe, reliable drinking water. A federal disaster declaration is not required for these grants. Funds can be used for water transmission lines (extensions, repair breaks or leaks, maintenance) or water source projects (construction of an intake or treatment facility). For more information visit: https://www.rd.usda.gov/programs-services/water-environmental-programs/emergency-community-water-assistance-grants.

Eligible Areas

Eligible areas include:

- Rural areas and towns with populations of 10,000 or less;
- Tribal lands in rural areas; and
- Colonias.

10 U.S. Department of Agriculture. “Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish”. Accessed June 2022. https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/emergency-assist-for-livestock-honey-bees-fish/index.

11 U.S. Department of Agriculture. “Emergency Community Water Assistance Grants”. Accessed June 2022. https://www.rd.usda.gov/programs-services/water-environmental-programs/emergency-community-water-assistance-grants.

Emergency Conservation Program (USDA)[12]

Overview

The Emergency Conservation Program (ECP) provides emergency funding and technical assistance to farmers and ranchers to rehabilitate farmland and conservation structures damaged by natural disasters and implement emergency water conservation measures in periods of severe drought. The county Farm Service Agency office will provide guidance on the approval process and next steps. For more information about the ECP, visit: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/emergency-conservation-program-ecp-fact_sheet.pdf.

Eligibility

Land eligibility is based on on-site inspections of damaged land and the type and extent of damage. Eligible land includes land used for:

- Commercial farming, ranching and orchard operations;
- Grazing for commercial livestock production; and
- Conservation structures such as, waterways, terraces, diversions, and windbreaks.

Emergency Haying and Grazing (USDA)[13]

Overview

Emergency haying and grazing of Conservation Reserve Program (CRP) acres may be authorized to provide relief to livestock producers in areas affected by Severe Drought (D2) or similar natural disaster. Requests for emergency haying and grazing may also be initiated due to a livestock emergency. The request must document a 40 percent or greater loss of forage production due to the disaster event.

For a fact sheet regarding emergency use of CRP acres for haying and grazing visit: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/crp_haying_grazing_factsheet.pdf.

Eligible Acres

Emergency haying or grazing is limited to acres physically located within the boundary of the eligible county or portion of a county. Aces will only be authorized for a specified time and may end earlier than announced if conditions improve.

Producers can use the CRP acreage for their own livestock or may grant another livestock producer use of their acreage. For emergency haying, producers are limited to one cutting and are permitted to sell the hay. Participants must remove all hay from CRP acreage within 15 days after baling and remove all livestock from CRP acreage no later than one day after the end of the emergency grazing period.

12 U.S. Department of Agriculture. “Disaster Assistance Emergency Conservation Program”. Accessed June 2022. https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/emergency-conservation-program-ecp-fact_sheet.pdf.

13 U.S. Department of Agriculture. “Conservation Reserve Program”. Accessed June 2022. https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/.

Emergency Loan Program (USDA)[14]

Overview

These emergency loans help producers recover from production and physical losses due to drought, flooding, other natural disasters, or quarantine. Emergency loan funds may be used to:

- Restore or replace essential property;
- Pay all or part of production costs associated with the disaster year;
- Pay essential family living expenses;
- Reorganize the farming operation; and
- Refinance certain debts.

A fact sheet for the Emergency Loan Program can be found here: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2019/emergency-loan-program.pdf.

Eligibility

Emergency loans may be made to farmers and ranchers who:

- Own or operate land located in a county declared by the President or designated by the Secretary of Agriculture as a primary disaster area or quarantine area. All counties contiguous to the declared, designated, or quarantined primary counties are also eligible for emergency loans.
- Are established family farm operators and have sufficient farming or ranching experience;
- Are citizens or permanent residents of the United States;
- Have suffered at least a 30 percent loss in crop production or physical loss to livestock, livestock products, real estate, or chattel property;
- Have an acceptable credit history;
- Are unable to receive credit from commercial sources;
- Can provide collateral to secure the loan; and
- Have repayment ability.

Emergency Water Assistance/Drought Assistance (U.S. Army Corps of Engineers)[15]

Overview

The U.S. Army Corps of Engineers is authorized to provide emergency water assistance to any community or tribal entity with water supply problems associated with drought conditions or a contaminated source. The intent is to provide temporary emergency water assistance to meet public health requirements. Water assistance for livestock, industrial use, irrigation, and recreation is not available. Types of drought assistance provided include the following.

- Transportation of water to local distribution points, for human consumption/usage.
- Sale of water from Corps' Reservoirs that is deemed surplus.
- Temporary connection of new supply to existing system.
- Construction of wells on a reimbursable basis.
- Installation of temporary filtration.
- Use of military units with purification/storage/distribution capability.

14 U.S. Department of Agriculture. "Emergency Farm Loans". Accessed June 2022. https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/emergency-farm-loans/index.

15 U.S. Army Corps of Engineers. "Emergency Water Assistance". Accessed June 2022. https://www.mvp.usace.army.mil/Missions/Emergency-Management/Emergency-Water/.

Additional information can be found on the Corps' website: https://www.mvp.usace.army.mil/Missions/Emergency-Management/Emergency-Water/.

Criteria for Drought Assistance

- Written request from the governor or tribal representative.
- The area is drought-distressed and found to have an inadequate water supply which is causing or is likely to cause a substantial threat to the health of people in the area.
- State/local government, or tribe has developed a long-term solution that can be implemented expeditiously.
- A Cooperation Agreement has been signed and all necessary easements and rights-of-way have been provided.

Emergency Watershed Protection Program (Natural Resources Conservation Service)[16]

Overview

The Emergency Watershed Protection programs offers vital recovery options for local communities to help people reduce hazards to life and property caused by floodwaters, droughts, wildfires, earthquakes, windstorms, and other natural disasters. Project funds address erosion related watershed impairments by supporting activities such as removing debris from stream channels, road culverts and bridges; reshaping and protecting eroded banks; correcting damaged drainage facilities; repairing levees and structures; and reseeding damaged areas. 75% of the eligible construction costs of emergency measures will be paid for by the Natural Resources Conservation Service.

Eligibility

Public and private landowners are eligible for assistance but must be represented by a project sponsor such as a city, county, conservation district, or any Native American tribe.

Environmental Quality Incentives Program (Natural Resources Conservation Service)[17]

Overview

Through the Environmental Quality Incentives Program, the Natural Resources Conservation Service provides financial assistance to repair and prevent the excessive soil erosion caused or impacted by natural disasters. These practices include activities like stream bank restoration, grassed waterways and buffers. Socially disadvantaged, beginning and limited resource farmers, and beginning farmers/veterans are eligible for an increased payment rate and may receive advance payment of up to 50 percent to purchase materials and services needed to implement conservation practices included in their contract. For more information visit: https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/?cid=nrcseprd1361073.

16 Natural Resources Conservation Service. February 2020 "Emergency Watershed Protection Program". Accessed July 2022. file:///C:/Users/kdietrich/Downloads/NRCS_EWP_19.pdf.

17 Natural Resources Conservation Service. "Natural Disaster Recovery Assistance Through EQIP". Accessed June 2022. https://www.nrcs.usda.gov/Internet/FSE_MEDIA/nrcseprd1429025.pdf.

Federal Emergency Management Agency (FEMA) Disaster Assistance

FEMA has several grants and programs available for tribal entities and tribal citizens. Information about the different grants and programs is given below.

Building Resilient Infrastructure and Communities (BRIC) Grant[18]

BRIC provides funding to support states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. Funds may be used for capability and capacity building activities, mitigation projects, and management costs. All state, local, tribal, and territorial governments must develop and adopt hazard mitigation plans to receive funding for their projects. All federally recognized tribal governments may apply for $1 million federal cost share per applicant under the Tribal Set-Aside. For more information visit: https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities.

Hazard Mitigation Grant Program (HMGP)[19]

FEMA's HMGP provides funding to state, local, tribal, and territorial governments to rebuild in a way that mitigates future disaster losses in their communities. This grant funding is available only after a presidentially declared disaster. All state, local, tribal, and territorial governments must develop and adopt hazard mitigation plans to receive funding for their hazard mitigation projects. The grant program can fund a wide variety of mitigation projects. For more information visit: https://www.fema.gov/grants/mitigation/hazard-mitigation.

Individuals and Households Program (IHP)[20]

IHP provides financial and direct services to eligible individuals and households affected by a disaster, who have uninsured or under-insured necessary expenses and serious needs. The assistance is intended to meet basic needs and supplement disaster recovery efforts. Assistance may include:

- Temporary housing
- Repair or replacement of owner-occupied homes
- Hazard mitigation assistance
- Other uninsured or under-insured disaster-caused expenses and serious needs

For more information visit: https://www.fema.gov/assistance/individual/program.

Public Assistance Program[21]

FEMA's Public Assistance Program provides supplemental grants to state, tribal, territorial, and local governments to quickly respond to and recover from major disasters or emergencies. After a disaster event, communities need help to cover their costs for debris removal, life-saving emergency protective measures, and resting public infrastructure. For more information visit: https://www.fema.gov/assistance/public.

18 Federal Emergency Management Agency. "Building Resilient Infrastructure and Communities". Accessed June 2022. https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities.
19 Federal Emergency Management Agency. "Hazard Mitigation Grant Program". Accessed June 2022. https://www.fema.gov/grants/mitigation/hazard-mitigation.
20 Federal Emergency Management Agency. "Individuals and Households Program". Accessed June 2022. https://www.fema.gov/assistance/individual/program.
21 Federal Emergency Management Agency. "Assistance for Governments and Private Non-Profits After a Disaster". Accessed June 2022. https://www.fema.gov/assistance/public.

Guaranteed Farm Operating Loans (USDA)[22]

Overview

Farm operating loans may be made to purchase items needed, such as livestock, farm equipment, feed, seed, fuel, farm chemicals, repairs, insurance, and other operating expenses. The maximum loan amount is $400,000. For more information about the loans, visit https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/farm-operating-loans/index.

Hay and Forage Hotline (Nebraska Department of Agriculture)[23]

Overview

The Nebraska Department of Agriculture created the Hay and Forage Hotline to connect buyers with sellers of hay, pasture, and other types of forage. The hotline is available to all buyers and sellers for free. To see the sellers list or list hay for sale, visit: https://nda.nebraska.gov/promotion/hay/index.html.

Hay Harvesting Permits (NDOT)[24]

Overview

The Nebraska Department of Transportation issues permits for the mowing and harvesting of hay on the right-of-way of highways of the state highway system. An abutting landowner has priority to obtain a permits from March 1 through July 29. All applicants who are not abutting landowners may not apply for a permit until July 30. Only one cutting is allowed per permit. For additional requirements and permit application, visit: https://dot.nebraska.gov/business-center/permits/hay-harvest/.

Internet Hay Exchange[25]

Overview

The Internet Hay Exchange is an online buying/selling site where anonymous producers can post hay available for purchase on a state-by-state basis. Listings for Nebraska can be found here: http://www.hayexchange.com/ne.php.

Livestock Forage Disaster Program (USDA)[26]

Overview

The Livestock Forage Disaster Program (LFP) provides payments to:

- Eligible livestock owners and contract growers who have covered livestock and
- Who are also producers of grazed forage crop acreage (native and improved pasture land with permanent vegetative cover or certain crops planted specifically for grazing) that have suffered a loss of grazed forage due to a qualifying drought during the normal grazing period for the county.

LFP also provides payments to:

- Eligible livestock owners or contract growers that have covered livestock and

22 U.S. Department of Agriculture. 2020. “Farm Operating Loans”. Accessed August 2022. https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/farm-operating-loans/index.
23 Nebraska Department of Agriculture. “Hay and Forage Hotline”. Accessed August 2022. https://nda.nebraska.gov/promotion/hay/index.html.
24 Nebraska Department of Transportation. “Hay Harvest Permits”. Access September 2022. https://dot.nebraska.gov/business-center/permits/hay-harvest/.
25 Internet Hay Exchange. “Nebraska Hay for Sale Listings”. Accessed July 2022. http://www.hayexchange.com/ne.php.
26 U.S. Department of Agriculture. “Livestock Forage Disaster Program”. Accessed June 2022. https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/livestock-forage/index.

- Who are also producers of grazed forage crop acreage on rangeland managed by a federal agency if, the eligible livestock producer is prohibited by the federal agency from grazing the normal permitted livestock on the managed rangeland due to a qualifying fire.

A fact sheet for the LFP can be found at https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/fsa_lfp-livestockforageprogramfactsheet-2022_final.pdf.

Eligible Counties

An eligible livestock owner or contract grower who, as a grazed forage crop producer, owns or leases grazing land or pastureland physically located in a county rated by the USDM as having a:

- D2 (severe drought) intensity in any area of the county for at least eight consecutive weeks during the normal grazing period is eligible to receive assistance in an amount equal to one monthly payment;
- D3 (extreme drought) intensity in any area of the county at any time during the normal grazing period is eligible to receive assistance in an amount equal to three monthly payments;
- D3 (extreme drought) intensity in any area of the county for at least four weeks during the normal grazing period or is rated a D4 (exceptional drought) intensity at any time during the normal grazing period is eligible to receive assistance in an amount equal to four monthly payments; or
- D4 (exceptional drought) in a county for four weeks (not necessarily four consecutive weeks) during the normal grazing period is eligible to receive assistance in an amount equal to five monthly payments.

A list and map of eligible counties can be found at https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/livestock-forage/index.

Livestock Indemnity Program (USDA)[27]

Overview

The Livestock Indemnity Program (LIP) provides benefits to eligible livestock owners or contract growers for livestock deaths in excess of normal mortality caused by eligible loss conditions, including adverse weather and disease. In addition, LIP provides assistance to livestock owners that must sell livestock at a reduced price because of an injury from an eligible loss condition. Payments for owners are based on national payment rates that are 75 percent of the market value. A fact sheet for the LIP can found at https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2022/fsa_lip_livestockImdemnityprogram_factsheet_2022_final_v3.pdf.

Eligible Livestock Owners

To be eligible for LIP:

- A livestock owner must have legally owned the livestock on the day the livestock died and or were injured by an eligible loss condition; and
- An owners livestock must have either:
    - Died in excess of normal mortality as a direct result of an eligible loss condition, or been injured as a direct result of an eligible loss condition and were sold at a reduced price.

27 U.S Department of Agriculture. “Livestock Indemnity Program”. Accessed June 2022. https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/livestock-indemnity/index.

Note that drought is not an eligible adverse weather event except when associated with anthrax and results in the death of eligible livestock.

Mitigation Assistance Loan (U.S. Small Business Administration)[28]

Overview

Eligible U.S. Small Business Administration disaster loan borrowers may choose to receive expanded funding to help mitigate their home or business against future disasters. Loans can be increased up to 20% to make building upgrades. Approval of mitigation measures is required before any loan increase can be made. There is no cost to apply, and you are under no obligation to accept a loan if approved. For information on these loans or how to apply visit: https://www.sba.gov/funding-programs/disaster-assistance/mitigation-assistance.

Nebraska Alfalfa Marketing Association[29]

Overview

The Nebraska Alfalfa Marketing Association connects producers with ranchers, dairy farmers, stables, feedlot operators, and others looking for alfalfa hay and other forages. Product inventory can be found here: https://www.nebraska-alfalfa.com/.

Noninsured Crop Disaster Assistance Program (USDA)[30]

Overview

The Noninsured Crop Disaster Assistance Program (NAP) provides financial assistance to producers of non-insurable crops to protect against natural disasters that result in lower yields, crop losses, or prevents crop planning. For more information about the program visit: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/noninsured_crop_disaster_assistance_program-nap-fact_sheet.pdf.

Eligible Producers

An eligible producer is a landowner, tenant or sharecropper who shares in the risk of producing an eligible crop and is entitled to an ownership share of that crop. An individual's or entity's average adjusted gross income cannot exceed $900,000.

Physical Damage Loans (U.S. Small Business Administration)[31]

Overview

If you live in a declared disaster area and have experienced damage to your home or personal property, you may be eligible for financial assistance from the U.S. Small Business Administration – even if you do not own a business. Homeowners may apply for up to $200,000 to replace or repair their primary residence. Renters and homeowners may borrow up to $40,00 to replace or repair personal property damaged or destroyed in a disaster. These loans cover disaster losses not fully covered by insurance or other sources. For more information about the loans or how to apply visit: https://www.sba.gov/funding-programs/disaster-assistance/physical-damage-loans.

28 U.S. Small Business Administration. "Mitigation Assistance". Accessed June 2022. https://www.sba.gov/funding-programs/disaster-assistance/mitigation-assistance.
29 Independent Forage Growers. "Discover the Advantage". Access September 2022. https://www.nebraska-alfalfa.com/.
30 U.S. Department of Agriculture. "Noninsured Crop Disaster Assistance Program". Accessed June 2022. https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/noninsured-crop-disaster-assistance/index.
31 U.S. Small Business Administration. "Physical Damage Loans". Accessed June 2022. https://www.sba.gov/funding-programs/disaster-assistance/physical-damage-loans.

Special Evaluation Assistance for Rural Communities and Households (USDA)[32]

Overview

This program helps very small, financially distressed rural communities with predevelopment feasibility studies, design, and technical assistance on proposed water and waste disposal projects. Communities less than 2,500 people, nonprofits, and federally recognized tribes may apply. All have to have a median household income below the poverty line or less than 80 percent of the statewide median household income. For more information about the program visit: https://www.rd.usda.gov/programs-services/water-environmental-programs/search-special-evaluation-assistance-rural-communities-and-households.

Tax Deferral Options for Livestock Producers[33]

Overview

Cattle producers impacted by weather conditions such as drought or flood could be eligible for federal tax relief. There are two main provisions that assist producers from the effects of adverse weather-related livestock sales. The two provisions are Internal Revenue Code (IRC) Section 1033 and IRC Section 451(g). A summary of the two provisions is provided below, for additional information speak with your tax agent or visit: https://www.ncba.org/Media/NCBAorg/Docs/ncba-drought-related-tax-relief-faq-82021_1.pdf.

IRC Section 1033 – Involuntary Conversion of Draft or Breeding Animals

A livestock producer who sells more draft, breeding, or dairy animals than normal due to a weather-related event may defer recognition of the gains for up to two years. This election applies only to the number of animals sold in excess of normal business practices. A declaration of a disaster area is not necessary, but the producer must be able to show that weather-related conditions forced the sale of more livestock than would normally be sold.

IRC Section 451(g) – One Year Deferral on Income

The gain from the sale of livestock sold early due to drought, flood, or other weather-related events may be deferred for one year. There are five conditions for eligibility:

1. The taxpayer's principal business is farming.
2. The taxpayer uses the cash method of accounting.
3. Under normal business practices, the sale would not have occurred in the current year except for the drought, flood, or other weather event.
4. The drought, flood, or other event resulted in the area designated as eligible for assistance by the federal government.
5. Only livestock in excess of the number that normally would have been sold under usual business practices are eligible for the deferral.

32 U.S. Department of Agriculture. "SEARCH – Special Evaluation Assistance for Rural Communities and Households". Accessed June 2022. https://www.rd.usda.gov/programs-services/water-environmental-programs/search-special-evaluation-assistance-rural-communities-and-households.

33 National Cattlemen's Beef Association. August 2021. "Tax Relief for Cattle Producers Impact by Natural Disaster". https://www.ncba.org/Media/NCBAorg/Docs/ncba-drought-related-tax-relief-faq-82021_1.pdf.

Water and Energy Efficiency Grants (Bureau of Reclamation)[34]

Overview

Through the WaterSMART Water and Energy Efficiency Grants, the Bureau of Reclamation provides 50/50 cost share funding to irrigation and water districts, tribes, states and other entities with water or power delivery authority. Identified projects should conserve and use water more efficiently; increase the production of hydropower; mitigate conflict risk in areas at a high risk of future water conflict; or accomplish other benefits that contribute to water supply reliability. The focus should be on projects that can be completed within two or three years. For more information visit: https://www.usbr.gov/watersmart/weeg/.

Water and Waste Disposal Loans and Grants (USDA)[35]

Overview

This program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas. Rural communities of less than 10,000 people, private nonprofits, and federally recognized tribes not otherwise able to obtain commercial credit on reasonable terms are eligible to apply. Funds may be used to finance the acquisition, construction or improvement of drinking water sourcing, treatment, storage, and distribution. For more information about the loans and grants visit: https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-loan-grant-program.

Water and Waste Disposal Predevelopment Planning Grants (USDA)[36]

Overview

The Water and Waste Disposal Predevelopment Planning Grant assists communities of less than 10,000 people, nonprofit organizations, and federally recognized tribes with initial planning and development of applications for USDA Rural Development Water and Waste Disposal direct loan/grant and loan guarantee programs. The maximum grant amount is $30,000 or 75 percent of the planning costs. Areas must have a median household income below the poverty line or less than 80 percent of the statewide median household income. For more information visit: https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-predevelopment-planning-grants.

Weed Free Forage Program (Nebraska Weed Control Association)[37]

Overview

The Nebraska Weed Control Association provides a list of weed free forage that is for sale by various private farmers. To see the list of for sale forage, visit http://www.neweedfree.org/ForageForSale.aspx.

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34 Bureau of Reclamation. “WaterSMART Water and Energy Efficiency Grants”. Accessed June 2022. https://www.usbr.gov/watersmart/weeg/.

35 U.S. Department of Agriculture. “Water & Waste Disposal Loan and Grant Program”. Accessed June 2022. https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-loan-grant-program.

36 U.S. Department of Agriculture. “Water & Waste Disposal Predevelopment Planning Grants”. Accessed June 2022. https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-predevelopment-planning-grants.

37 Nebraska Weed Control Assocation. 2022. “Weed Free Forage for Sale”. http://www.neweedfree.org/ForageForSale.aspx.

Appendix C: Stakeholder Engagement Materials

Upper Loup NRD Drought Plan

Meeting #1 Summary

1. **Introductions**

2. **What is a drought mitigation plan?**
   - Summary of need
   - Historical drought occurrences
   - What will the plan try to accomplish?
     - Proactive rather than reactive
     - Engage stakeholders/decision makers
     - Identify drought specific vulnerabilities/risk
     - Identify how to monitor drought
     - Determine appropriate drought response
     - Identify mitigation actions

3. **Planning Process**
   - Diverse stakeholder group will guide the planning process
     - Meetings with stakeholder group determined to be best method moving forward
     - Stakeholder group currently includes: NRD board members, NRD staff, county board members, irrigators, ranchers, insurance providers, and US Forest Service
     - Local businesses and banks to be encouraged to join planning process
   - Public and additional stakeholder engagement
     - Determined that drought tournament would not be effective engagement method. Stakeholder meetings, word of mouth, survey (sent through email, website, NRD newsletter), and online engagement decided to be most effective methodology

4. **What does drought look like in the ULNRD area?**
   - Past drought impacts
     - Lack of grass
     - Shifts of where cattle go (different regions/states)
     - Increase in fires
     - Local economy suffered, all businesses suffered as people were buying less
     - Psychological impacts, depression. Mental outlook
     - Impacts on local governments, didn't want to raise taxes
     - Erosion starts to be become an issue (especially with row crops)
     - Long-term production losses due to long-term over use
     - Flow in the rivers was largely unaffected (No large drops or raises). Recreation only saw small impacts
   - Potential Impacts
     - Displacement of long-term ranchers
     - People selling and leaving the area
     - Well restrictions
     - Loss of small businesses leading to a large conglomerate takes over
     - Loss of schools and businesses

- Collapse of the local economy

5. **Drought Monitoring/Indicators of drought**
   - Growth/height of grass
   - How good/bad range conditions are
   - How dryland crops are looking
   - US Drought Monitor
   - GrassCast with Drought Mitigation Center
   - Hay prices
   - Grass/wildfire occurrences
   - Precipitation frequency
   - Vegetation monitoring (Forest Service)

6. **What planning/response mechanisms already exist?**
   - Some individual landowner drought plans (not always written down/largely informal)
   - Drought education has been much better since 2012
   - More crop insurance is used

7. **What should a response look like?**
   - Mandates would not go over well in the region. Suggestions would go over much better
   - Education on Best Management Practices (for individual producers, ranchers, etc.)
   - Provide examples that look at past economic impacts
   - Webpage: with region and sub district drought monitoring information for people to look at
   - Have public meetings that bring in experts to discuss options that may help during a drought
     - These meetings would likely have to take place during the initial stages of a drought
   - Create a drought monitoring committee (NRD Staff, Local Stakeholders, Others?)

8. **Personal goals for the plan?**
   - Drought plan should have a long-term outlook because a lot of people have a short time period drought response plan
   - Minimal net loss of the number of ranches and people
   - Lead to healthy rangeland
   - Expanded networks/sharing of successes and failures
   - Plan should be accessible and readable
   - Drought plan should have a long-term outlook because a lot of people have a short time period drought response plan

9. **Other comments**
   - Good range management is very important to how an area will deal with drought
   - Drought in other surrounding states can have a big impact on the region (i.e. where cattle will go. Hay availability)
   - NRD has 5 sub districts (based on Census). Could have different sub districts have different triggers/response actions
   - Perception that surrounding areas would want the region's water

Upper Loup NRD Drought Plan

Meeting #2 Summary
January 10, 2022
Thedford, Nebraska

1. **Introductions**

2. **How do you want the NRD to monitor for drought?**
   - U.S. Drought Monitor
     - Follow same drought levels
   - U.S. Seasonal Drought Outlook
   - Groundwater levels
   - Surface water levels
   - Grass-Cast?

3. **How do you want to respond when triggers are hit?**
   - D1: General Manager to send out monthly drought status email to Forest Service, Emergency Managers, Village Representatives, and County Commissioners. (Twice a month from April to September)
   - D2: Report to NRD Board?
   - Outreach and Education
     - What?
       - Possible impacts/past impacts
       - Drought Best Management Practices, rural and urban
       - Producer assistance programs
       - Insurance providers, bankers
       - Mental health/stress
     - Channels:
       - UL NRD Drought Dashboard
       - Regular Newsletters
       - Schools
       - Workshops in communities (go to the people)
       - Booths at County Fairs
       - Extension Educators
   - Talk with politicians about drought impacts during/after a drought occurs

4. **What actions do you want to see from the NRD?**
   - Develop contact list of who to contact when drought occurs.
     - Visit communities and identify person and method to communicate response protocol and actions.
   - Develop a Drought Monitoring Committee
   - Develop drought dashboard with assistance from NeDNR
     - Include Drought Outlook
     - Include weather forecast/alerts to encourage regular usage
     - Include StoryMap of 2012 drought?

- Investigate use of transducers
- Investigate assistance programs
- Outreach and Education
    - What?
        - Possible impacts/past impacts
        - Drought Best Management Practices, rural and urban
        - Producer assistance programs
        - Insurance providers, bankers
        - Mental health/stress
    - Channels:
        - UL NRD Drought Dashboard
        - Regular Newsletters
        - Schools
        - Workshops in communities (go to the people)
        - Booths at County Fairs
        - Extension Educators

Upper Loup NRD Drought Plan

Meeting #3 Summary
September 16, 2022
Thedford, Nebraska

1. Introductions

2. Goals of the meeting

- Present an executive summary
- Solicit feedback from stakeholders

3. Planning Process – Engagement and Survey Results

- Engagement efforts included: stakeholder meetings, newsletter, press releases, NRD website, online surveys, in-person surveys
- Survey results: Responses from every county – 29 total
  - What scares you the most about drought?
    - Fire
    - Lack of feed/hay/grass for animals
    - Lack of water for animals
    - Economic losses
    - Loss of way of life (“the cowboy way”)
    - Apocalyptic scale death
  - How do you or your community/business/ organization monitor drought?
    - Visual observations
    - Drought monitor
    - Weather stations/radio
    - Static water level
    - Word of mouth
    - Rain gauges
    - Soil moisture
  - Where do you currently obtain your drought indicator/forecasting information?
    - Drought monitor
    - Internet
    - Radio
    - Social Media
    - Newspaper
    - Newsletter
    - FSA
  - How do you or your community/business/organization prepare for drought?
    - Change ag practices
    - plant lower water usage forages, irrigate at night, reduce herd size, stockpile feed, livestock management, etc.
    - Don’t/Pray for rain

        - Ensure adequate water supply/systems
        - Financial preparedness
    - What would help lessen the impacts of drought on you or your community/business/organization?
        - Planning ahead
        - Not sure
        - Financial help
        - Improving efficiency of water system
        - Improved community water management
        - Best management practices – ag
    - What information do you need during drought?
        - Current/Future conditions
        - Available assistance programs
        - Feed/cattle markets
        - Best Management practices
    - What is the best way to share drought information and best practices with you?
        - Website, social media, newspaper, newsletter, email, public meeting, radio, flyer

4. Key Findings from Profile and Risk Assessment

- Drought occurs in the ULNRD in 32% of months
- 60% of registered wells are for livestock
- Irrigation accounts for the most water use (but in a limited area)
- Drought accounts for an average of over $2 million in property and crop damages annually
- Economic, mental health, “way of life” concerns

5. Summary of Monitoring and Response Protocol

- US Drought Monitor
- Drought Outlook
- Streamflow
- Static Water Levels
- GrassCast
- High Plains Regional Climate Center

6. Summary of Mitigation and Management Actions

- Public Awareness/Education
- Water Storage – work with communities to identify storage needs
- Drought Stakeholder Contact List
- Fair/Event Outreach
- Drought Monitoring Committee
- Investigate Assistance Programs
- Purchase Transducers
- Drought Dashboard
- Develop Quantitative Recommendations

7. **Other Items**
    - Funding and Other Drought Resources
    - Potential Mitigation/Management Actions by Sector

8. **Next Steps**
    - Incorporate comments and edits into plan
    - Finalize draft plan

Upper Loup NRD
Drought Mitigation Plan
Thedford, NE – July 21, 2021, 1:00pm

Name	Title	Organization Represented	Address	Phone	Email
Phil Luebbert	Project Manager	JEO Consulting Group	201 Coffman Street #1536 Longmont, Colorado 80502	402-474-8768	pluebbert@jeo.com
Karl Dietrich	Planner	JEO Consulting Group	2000 Q St Suite 500 Lincoln, NE 68503	402-742-7213	kdietrich@jeo.com
John Krayc				308-546-7309	
Dave Knievel			2381 N. F-76 Frontage Rd Wiggins, Co 80654	970-380-6166	Knievelfarms@aol.com
Chris Yuta			80687-HALEY LANE	308-541-6992	
Greg Wright	Wildlife Biologist	U.S. Forest Service	40637 River Loop, Halsey NE 69142	308-533-8112	gregory.wright@usda.gov
Tyler Westlake	Rangeland Management specialist	US forest Service		308-533-8103	
Sarah Mullins	Wildlife/Range Tech	US Forest Service		308-533-8111	
Elizabeth Smith	Range Tech	US Forest Service		832-778-0047	
Joe Bob Atkins		Arnold Insurance	102 Cedar St Arnold	308-520-3019	joebob@arnold.ins.com
Lexi Spurlin		Upper Loup NRD		308-645-2250	lspurlin@upperloupnrd.org
Anna Baum	ULNRD Manager	"			
Dana Larsen			84598 US Hwy 83 Thedford, NE 69166	308-458-9701	danalarsen@live.com
Julie Bain	District Ranger	US Forest Service	PO Box 39 Halsey NE 69142	308-533-8115	julie.bain@usda.gov
Jim Purdum			PO Box 156 Thedford NE	308-645-2645	
Connie Cox			84367 Harvest Ave. Purdum, NE	308-834-3323	
Richard Burnside			132 Hwy 92 Stapleton NE	(308) 636 8231	rburnside501@gmail.com

Please Sign In!

Upper Loup NRD
Drought Mitigation Plan
Thedford, NE – January 10, 2022 - 2:00pm

Name	Title	Organization Represented	Address	Phone	Email
KENNY JIVIDEN	CHAIRMAN	VILLAGE of GANDY	404 GANDY STAPLETON	308)870.5547	KGJIV@GPCOM.NET
John Krugg					
Julie Bain	District Ranger	US Forest Service	POB 39 Halsey 69142	308-533-8115	julie.bain@usda.gov
Anna Baum	ULNRD Manager	Upper Loup NRD			
Lexi Spurlin		ULNRD			
Phil Luebbert	Project Manager	JEO			
Anthony Kohel	Planner	JEO			
Amy Zoller	Environmental Specialist	NeDNR			
Caitlin Kingsley		NeDNR			
Madeline Hoffer	Office Services Manager	NeDNR			
Ryan Kelly	Integrated Water Management Coordinator	NeDNR		402-471-1080	ryan.kelly@nebraska.gov

Please Sign In!

Upper Loup NRD

Drought Mitigation Plan

Thedford, NE – September 16, 2022, 2:00pm

Name	Organization/Community Represented	Address	Phone	Email
Phil Luebbert	JEO Consulting Group	201 Coffman Street #1536 Longmont, Colorado 80502	402-474-8768	pluebbert@jeo.com
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Please Sign In!