Climate Assessment and Response Committee (CARC)
Agency and Organization Summaries
Provided on April 8, 2022

In response to the expanding and intensifying drought conditions in Nebraska, CARC members and advisors were requested to submit brief summaries as follows:

- Responsibilities and duties as it relates to drought preparedness and response
- Current actions in place to prepare for, or react to, and impacts as a result of drought
- Any drought plans or directives as it relates to drought actions or activities

Jesse Bradley, Assistant Director, Nebraska Department of Natural Resources

The Department of Natural Resources conducts water quantity planning in each NRD and through several basin-wide plans to ensure a coordinated approach to long-term planning for surface water and hydrologically connected groundwater resources across the state. The goals and objectives of these stakeholder-driven plans often identify the need for additional emphasis on drought planning and preparedness by highlighting how local and regional water use affects water supplies over time. In 2019 NeDNR completed a drought plan for the Lower Platte River Basin in conjunction with three NRDs, the Metropolitan Utilities District (MUD), and Lincoln Water System (LWS). This plan established various monitoring criteria, triggers, and communication protocols that will be used in the event of drought.

Plan details are available at:
https://gis.ne.gov/portal/apps/experiencebuilder/experience/?id=c0b751c512a24b83a6ad1c3214941ea8

NeDNR is in the process of completing two additional basin-wide drought planning efforts, one in the Upper Platte River Basin and one in the Republican River Basin, as well as working with individual NRDs to establish drought monitoring triggers along with mitigation steps prior to, and reactive measures when drought conditions occur within their jurisdictions.

NeDNR serves as the state agency charged with monitoring streamflows, surface water uses and administration, and compliance with interstate water agreements. NeDNR fulfills its streamflow monitoring obligations by distributing real-time streamflow and canal data through its website at: (https://nednr.nebraska.gov/RealTime/). Streamflow data is relied upon by NeDNR and other agencies to evaluate and identify water supply issues, prioritize resources, and forecast and predict future impacts. NeDNR also uses streamflow data in its administration of water rights, including tracking storage water releases from reservoirs in Wyoming, Lake McConaughy, and other reservoirs across the state to the point where those flows are diverted for irrigation use.

During drought periods, NeDNR must often close junior surface water uses when water supplies are deemed insufficient. The closure of junior water uses can also result from the combination of low flow conditions and interstate obligations. Drought periods often cause insufficient deliveries of streamflow as required in the Blue River Basin Compact (Blue River basins) or insufficient water supply allocations as required by the Republican River Compact (Republican River Basin). NeDNR conducts a forecast of available water supplies for the Republican River

Basin each year to predict the sufficiency of water supplies and if such administration is required in that basin.

NeDNR distributes funding from the Water Resources Cash Fund and works in conjunction with the Natural Resources Commission to distribute funds from the Water Sustainability Fund. These funds can be used to support various drought mitigation measures including groundwater recharge, streamflow enhancement, consumptive use reduction, and other water use efficiency strategies aimed at lessening the impacts of drought.

Sarah Heidzig-Kraeger, Program Specialist, Conservation Environmental Price Support Programs, Nebraska State Office, Farm Service Agency

The Farm Service Agency has six programs that are available to producers who are suffering losses due to drought. The six programs are:

- Livestock Forage Disaster Program (LFP) – provides financial assistance to livestock producer who are suffering a grazing loss due to an eligible drought condition.
- Emergency Assistance for Livestock, Honeybee, and Farm-raised Fish (ELAP)
    - Water Transportation – provides financial assistance to livestock producers, who are transporting water to eligible livestock that are on eligible grazing land due to the qualifying drought condition.
    - Additional Mileage for Transporting Livestock Feed Above Normal – provides financial assistance to livestock producers who are transporting livestock feed additional milage above normal to eligible livestock due to an eligible drought condition.
    - Honeybee Additional Feed Purchased Above Normal – provides financial assistance to honeybee producer who must purchase additional feed above normal to sustain their colonies through an eligible loss condition until additional feed becomes available.
- Emergency Conservation Program – provides cost-share assistance to eligible producers help provide emergency water to grazing and confined livestock and existing irrigation systems for orchards and vineyards.
- Conservation Reserve Program (CRP) Emergency Haying and Grazing – allows grazing and haying to occur on CRP acres when an eligible drought level is reached for a county with written approval before haying or grazing occurs.
- Noninsured Crop Disaster Assistance Program (NAP) – provides financial assistance to producers of non-insurable crops that suffer lower yields, losses or prevent planning due to an eligible natural disaster. Drought is included as an eligible natural disaster.
- Tree Assistance Program (TAP) – provides financial assistance to eligible orchardists and nursery tree growers to replant or rehabilitated trees, bushes, and vines lost by natural disaster, including drought.

Aaron Young, Survey Geologist, Conservation and Survey Division, University of Nebraska-Lincoln

- Responsibilities and duties as it relates to drought preparedness and response
    - The CSD has led a groundwater level monitoring program since 1930 to monitor changes in groundwater levels statewide resulting from both human pumping and climate variability. Yearly water level changes from more than 5,000 well statewide are published annually in the CSD's annual Groundwater Level Monitoring Report. A subset of this program, the Nebraska Real-Time Water-Level Monitoring Network, is designed to provide water level data in near real-time from 68 wells statewide to assess the impact of and react to changing conditions.

Eric Zach, Ag Program Manager, Nebraska Game and Parks Commission

The Nebraska Game and Parks Commission (Commission) is a member of the Nebraska Wildfire Council which is currently meeting weekly in light of the drought. The Commission has a signed agreement with other agencies to assist on wildfires.

The Commission's Wildfire Response Plan is being updated. The Wildfire Response Plan is an internal document that directs our response to wildfire events across the state and includes communications plans, protocols for fires on various property types, staffing, and equipment availability. We have numerous staff active in federal wildfire training and staff across the state assist on wildfires. The Commission maintains firebreaks on many properties (Wildlife Management Areas and state parks/recreational areas) to provide access and containment options in the event of a wildfire. Often our lakes and reservoirs serve as water sources for helicopters and firefighting rigs.

We continue to apply prescribed fire where we have acceptable prescriptions because these burned areas have aided in stopping wildfires in past years. One reason we conduct prescribed burns each year is to reduce the risk of catastrophic fires resulting from a build-up of fuels like Eastern redcedar. From a habitat standpoint we often get better results such as Eastern redcedar control when we burn in dry years.

No decision has been made yet but in the past, we have offered additional haying opportunities on our properties to help landowners meet their forage needs.

Jason Lambrecht, Acting Deputy Director of Hydrologic Observations, USGS Dakota Water Science Center, Deputy Director of Hydrologic Observations
USGS Nebraska Water Science Center

The U.S. Geological Survey (USGS) National Integrated Drought Science Plan seeks to improve understanding of drought processes and impacts on human and natural systems through coordinated and multidisciplinary data collection, synthesis, analysis, and predictions generated from Mission Areas and a variety of partnerships. The long-term goal is to provide decision support tools and technologies to stakeholders for enhancing drought resilience and adaptation. Our integrated drought science effort includes:

Data Collection and Integration

- Strengthen data observation and monitoring networks to maximize spatial and temporal coverage, provide reliable operation and near-real-time delivery, increase interoperability with other agencies, and improve early warning
- Improve data collection during and after drought events to gather critical, ephemeral information
- Develop and advance new monitoring tools and technologies
- Facilitate citizen science for crowdsourced data related to water availability

Understanding Drought Processes and Impacts

- Synthesize datasets and models to better understand drought drivers, responses, and interactions
- Promote targeted research on drought processes, extreme events, impacts, risk, and response
- Develop robust models to predict drought risk and vulnerability for decision-making
- Examine and synthesize ecological impacts of drought for conservation management
- Promote multi-disciplinary research, integrated assessments, predictive modeling, and knowledge transfer to address drought complexity and uncertainty

Drought Planning and Decision-Support

- Predict future drought vulnerability of species and ecosystems with comprehensive understanding of drought processes, ecosystem impacts, and recovery times
- Deliver decision-support guides that link research, monitoring, forecasting, and early warning with risk planning and management
- Provide technical assistance to address stakeholders' needs
- Create and deliver effective multimedia to communicate drought through partnerships with stakeholders, policymakers, and the public

Barb Cooksley, Livestock Producer

The sandhills are dry on top. As we proceed with spring fencing, we are finding good moisture down below the top 3-4 inches. Our soil profile is still showing a lot of ground water available from the past years of above normal rainfall. The root systems of the native grasses are strong and deep in the ground for the major grasses (4 to 6 feet of root depth) and will provide nutrients to the plants for growth when/if moisture comes. The sub-irrigated meadows are showing water rising to the surface at this time.

Our range management plan always includes planning for drought, EVERY year. We made adjustments to our prairie hay (native warm season grasses) harvest in 2019 when we had flowing water all year long in valleys that had never flowed water in the 100+ years of the ranch. (close to 40 inches in 2019) We harvested more grass and baled it in round bales in most pastures, added bale yards to those pastures to store for the dry years that always come. The additional bales will provide feed if the rains do not come and give us time to make decisions of when and if to sell livestock to protect the grassland. The grass will stay dormant if the rains do not fall and that is their protection in dry cycles.

Rainfall and snow accumulation have been scant so far this year. IF there is a time for drought, it is in the winter when you raise livestock! The ranch has received a little over an inch of moisture, with most of that in early March.

Wildfires are becoming more frequent in the area, due to surface dryness, wind, and prescribed burning of pastures for grazing management and cedar infestation.

Much of the calving is done in the area. We will start our calving season at the end of April.

Carl Sousek, Row Crop Producer

Nebraska's corn industry along with the other major commodities and ag groups continually strive to develop a sustainable system of production of Nebraska's ag products. Nebraska ag producers implement sustainable practices regardless of signs of impending weather challenges.

Commodities groups have and will continue to encourage growers to adapt Best Management Practices (BMP's) that maximize irrigation water use efficiencies, as well as practices that maximize sequestration of rain fall.

These groups will continue to fund research projects that seek to achieve these goals.

These groups continue to advocate for, and educate producers about, federal level risk management tools to mitigate the economic effects of drought and other weather-related perils.

Nicholas Streff, Regional Director, U.S. Department of Agriculture, National Agricultural Statistics Service

Responsibilities and duties as it relates to drought preparedness and response

• USDA NASS is the only source of information on crop progress and condition. NASS data can be paired with climate data to paint a clearer picture of how the current climate is affecting farmers and Ranchers.
• See below for the current information NASS can provide for April.
• NASS can also provide remotely sensed satellite data to show drought and flooding areas.

Crop Progress and Condition Report for April 3

For the week ending April 3, 2022, there were 5.5 days suitable for fieldwork, according to the USDA's National Agricultural Statistics Service. Topsoil moisture supplies rated 33% very short, 48% short, 19% adequate, and 0% surplus. Subsoil moisture supplies rated 32% very short, 50% short, 18% adequate, and 0% surplus.

In comparison to last year, the soil moisture ratings are lower. Topsoil is 19% adequate to surplus compared to 76% last year.

Nebraska Topsoil Moisture Rating April 3, 2022				
Year	Very Short	Short	Adequate	Surplus
Current Year %	33	48	19	0
Last Year %	5	19	74	2

Subsoil is 18% adequate to surplus compared to 67% last year.

Nebraska Subsoil Moisture Rating April 3, 2022				
Year	Very Short	Short	Adequate	Surplus
Current Year %	32	50	18	0
Last Year %	9	24	66	1

Field Crops Report: Winter wheat condition rated 7% very poor, 15% poor, 51% fair, 23% good, and 4% excellent.

See table below – the percent of wheat in good to excellent for the current year is 27, which is below last year at 40% and 60% for the five-year average.

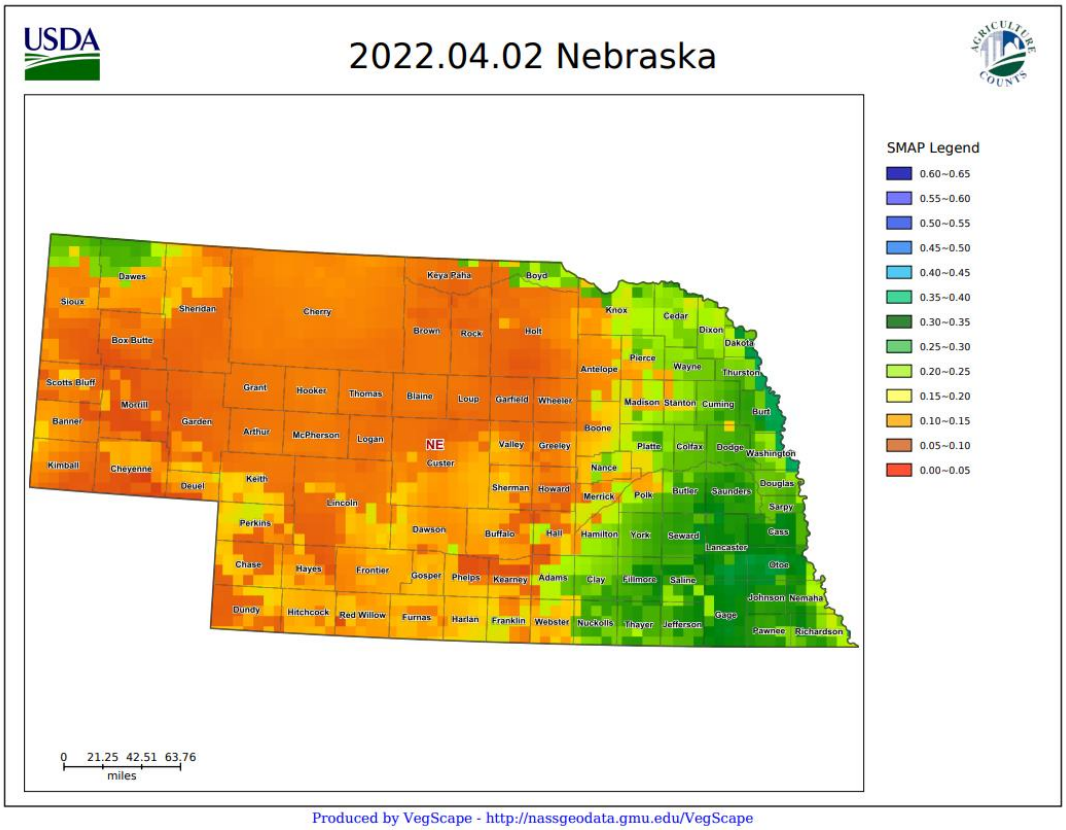
Nebraska Wheat Condition April 3, 2022					
Year	Very Poor	Poor	Fair	Good	Excellent
Current Year %	7	15	51	23	4
Last Year %	5	12	43	38	2
5 Year Avg %	2	7	31	52	8

Forage Information

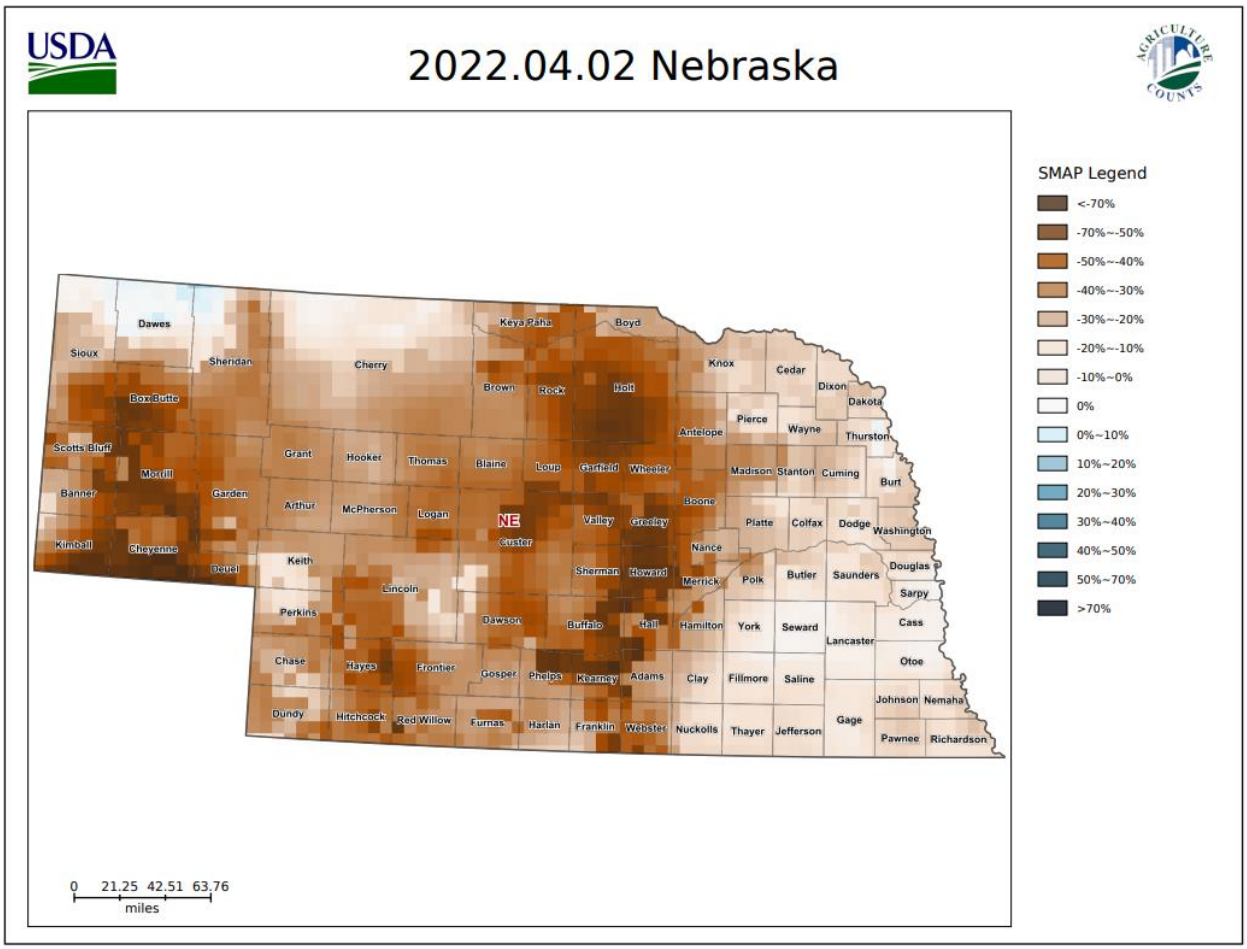
Pasture and range condition will be reported by NASS starting in May. When last reported in November of 2021, less than 20 percent of Nebraska pastures were rated good or excellent. December 1, 2021 hay stocks were 4.65 million tons, up 11% from last year.

Soil Moisture Map Crop-CASMA

In March of 2021, USDA NASS along with NASA and George Mason University released a new data product called Crop Condition and Soil Moisture Analytics (Crop-CASMA). This data product provides access to soil moisture data from remote sensing and is updated daily. See attached map.



Crop-CASMA (gmu.edu)



Current actions in place to prepare for, or react to, and impacts as a result of drought.

• NASS does not have any current actions in place for drought.
• NASS is a data provider and can act on special requests from CARC to provide additional data such a satellite images.

Any drought plans or directives as it related to drought actions or activities

• NASS does not complete any special surveys for drought conditions. However, NASS will conduct reinterview surveys to assess planting or harvesting delays.

Rick Rasby, Associate Dean of Extension Ag and Natural Resources Program Leader, UNL

University of Nebraska Extension has been discussing drought since January 2022 during monthly ZOOM meetings. If this spring continues to maintain the dry trend we've seen so far that began last fall and has continued through the winter of 2022. Our 3-phase approach:

Phase I – Articles/Webpage Resources - example - https://beef.unl.edu/cattleproduction/drought
Phase II – Webinars – example

April 7 Noon-1 p.m. CDT	**Triggering Pasture and Forage Management Decisions Before a Drought** With: Randy Saner, Ryan Benjamin and T.L. Meyer (Nebraska Extension Beef Systems Educators) Pasture and native rangeland forage production fluctuates greatly through time due to precipitation, temperature, range health, and soil nutrients. The amount and timing of spring and early summer precipitation is an important factor in determining annual plant production. Using critical or trigger dates can help producers adjust stocking rates if precipitation, and the resulting forage production, is expected to be below average. This webinar will walk through trigger dates and discuss how drought impacts forage production on native rangeland. It will also discuss what management options may be possible for producers at each date. **Related article via BeefWatch:** Drought Planning Trigger Dates

Phase III – Producer Meetings

As such, we are going to enter Phase I. This means initial planning/preparation for further programing if conditions continue to deteriorate, as well as making sure the resources we already have are available on UNL websites.

Mark Svoboda, Director and Associate Professor, National Drought Mitigation Center at UNL

- **Responsibilities and duties as it relates to drought preparedness and response**
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- The NDMC provided guidance to the states of Minnesota and Indiana in 2021 on updating their state drought plan, currently advising Iowa to develop a state drought plan, and ***have had initial conversations with the NE Department of Agriculture on updating the Nebraska State Drought Mitigation and Response Plan***.
- In early March, the NDMC met with representatives from the Sac and Fox Nation of Missouri in Kansas and Nebraska, Iowa Tribe of Kansas and Nebraska, and Winnebago Tribe of Nebraska (along with other relevant state and national agency representatives) to discuss current drought conditions and options for providing early warning information to appropriate tribal decision makers.
- The NDMC is working with Jerry Volesky with UNL Extension, the Northern Plains Climate Hub, and researchers at the University of Colorado to complete a literature review and article outlining the guidance available for livestock operations to manage multiple-year drought.
- The Managing Drought Risk on the Ranch website is being continually updated to address rancher's questions on monitoring and managing drought.
    - Development of Ranch Drought Monitoring Dashboard – https://drought.unl.edu/ranchplan/monitor.aspx
    - New ranch drought planning case studies found at https://drought.unl.edu/ranchplan, and some new ones are under development
    - Organized and conducted a "Building the Ultimate Ranch Drought Plan Toolbox" session at Society for Range Management highlighted GrassCast and a number of other tools that ranchers discussed and responded to (happy to share a list and/or the draft report)
- The National Drought Mitigation Center's Drought Impacts Toolkit (https://droughtimpacts.unl.edu) hosts interactive maps and dashboards and curates links that can help detect emerging drought impacts. It includes the Drought Impact Reporter, with impacts reported in media added in near real-time; crowdsourced Condition Monitoring Observer Reports (CMOR) that collect photos and observations to help us "see more drought;" results of an automated news search filtered to in-state news; and filtered results of regular Twitter searches. It links to CoCoRaHS citizen science reports as well as list of other places to detect emerging drought: https://droughtimpacts.unl.edu/EmergingImpacts.aspx
- The NDMC is working with the Department of Natural Resources and four NRDs to devise, conduct and evaluate a scenario-based drought planning exercise for stakeholders in the Republican River Basin, which will inform future drought preparedness in the basin.

Van DeWald, Lead Meteorologist, National Weather Service Omaha

The National Weather Service is one of the primary drivers of the US drought monitor. The NWS provides one of the most critical data inputs in the form of daily rainfall assessments and observations. They actively steer the direction of the drought monitor, and each NWS office nationwide provides important input that dictates which drought categories are in effect and for what areas. They collaborate closely with the drought monitor authors weekly, providing input on the magnitude and areal coverage of the drought. In addition, they provide, through various divisions in their organization, the various daily, weekly, monthly, and seasonal outlooks that partners rely on, offering precipitation and temperature outlooks to help mitigate the drought. The National Weather Service also provides drought information to the public through various statements and information packets. Primary drought mitigation efforts include working directly with local federal, state, and county partners to assess drought impacts.