



August 2023 Climate Summary

Hidden Falls in Wyoming, Photo Courtesy of Gannon Rush

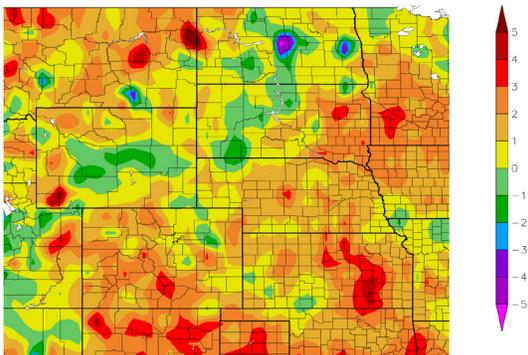
Regional Breakdown

August ended with a bang, after one of the more significant heatwaves impacted parts of the region in the final days of the month. Thousands of daily temperature records were broken, after temperatures eclipsed 100 degrees F (37.8 degrees C) for nearly a week. Adding to miserably high temperatures, dewpoints reached up to 84 degrees F (28.9 degrees C). The unbearable and oppressive combination led to the heat index topping out at 134 degrees F (56.7 degrees C) in Lawrence on the 20th. Schools in Kansas and Nebraska were releasing early or closing due to the dangerous conditions in the afternoon, while athletic teams in both states were either forced to practice well before sunrise or indoors. Unfortunately, there were several deaths and a spike in emergency room visits as a result of this historic heatwave.

Adding to the records broken this month, a 5.25-inch (13.34 cm) hailstone fell outside of Kirk, Colorado. Pending verification from the State Climate Extremes Committee, this would beat out a 4.83-inch (12.27 cm) stone that was recovered from Bethune in 2019. The storm would also go on to produce several tornadoes, including an EF-3 with 150 mph (241 km/h) winds.

Temperature and Precipitation Overview

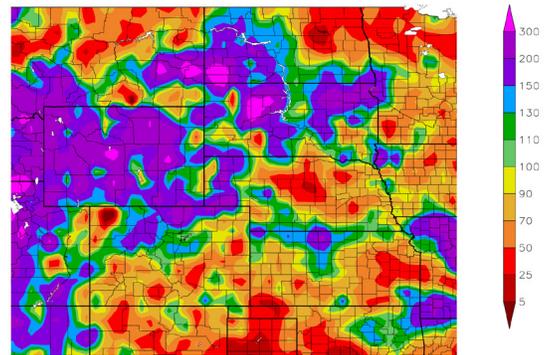
Departure from Normal Temperature (F)
8/1/2023 – 8/31/2023



Generated 9/10/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
8/1/2023 – 8/31/2023



Generated 9/10/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Departure from 1991-2020 normal temperature (left) and percent of normal precipitation (right) for August 2023 in the High Plains region. Maps produced by the High Plains Regional Climate Center and are available at: <http://hprcc.unl.edu/maps/current>.

Precipitation

The western parts of the region continued the summertime trend of above-normal precipitation. Some areas in the Dakotas and Wyoming received record to near-record precipitation, which eliminated drought conditions.

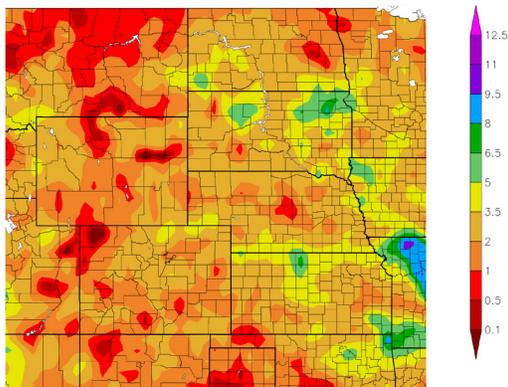
Southwestern North Dakota, northern South Dakota, and much of Wyoming recorded well above-normal precipitation this month. Although no records were broken at major locations, several outer-lying areas observed record-breaking amounts. De Smet, South Dakota received 7.28 inches (18.49 cm) of rain, breaking record set in 1893. Nearby Webster recorded the highest in the region and broke their record, with 9.93 inches (25.22 cm).

With the end of August, summer has reached its conclusion. Precipitation amount was favorable in Wyoming, the Front Range of the Rockies, and southwestern Kansas. Cheyenne, Wyoming ranked 2nd wettest with a whopping 11.02 inches (27.99 cm) precipitation, well above their normal of 5.79 inches (14.71 cm). In Colorado, Akron and Colorado Springs ranked 3rd wettest, while Rawlins, Wyoming ranked 3rd as well. While much of Colorado had abundant precipitation, Alamosa had its driest summer with a meager 0.56 inches (1.42 cm).

Streamflow for the region is in decent shape, however, the eastern parts of Kansas and Nebraska continue to report below normal conditions. Several streamflow observing stations in east-central Kansas reported record lows, while others are at much below normal. In the west, several stations near Rapid City, South Dakota are at record highs.

Regional Precipitation

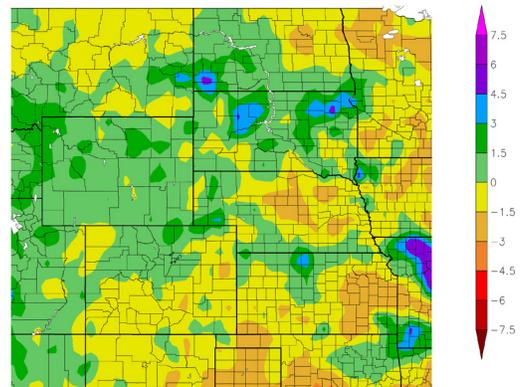
Precipitation (in)
8/1/2023 – 8/31/2023



Generated 9/10/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Precipitation (in)
8/1/2023 – 8/31/2023



Generated 9/10/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Total precipitation in inches (left) and departure from normal precipitation in inches (right) for August 2023. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

Temperatures

Warmer temperatures dominated much of the region but were not record-breaking despite the intense heatwave. Large portions of the region observed 2 to 4 degrees F (1.1 to 2.2 degrees C) above normal temperature, while only a few isolated locations reporting below-normal temperatures.

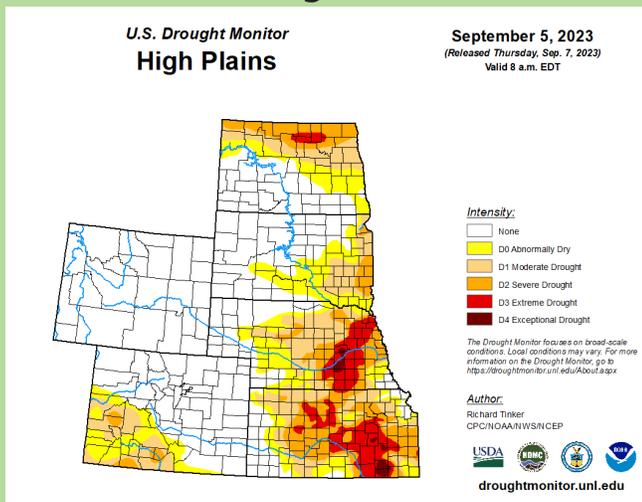
All walks of daily life were impacted by the historic heatwave near the end of the month. Crops were burnt to a crisp, all but sealing the fate of an already poor crop for some. Hundreds of cattle reportedly perished in Kansas and Nebraska after the heat index surpassed 120 degrees F (49 degrees C) for multiple days. Manhattan, Kansas hit 115 degrees F (46 degrees C) on the 19th, beginning one of the warmest weeks for the city. From the 19th to the 25th, the average high temperature was 108.3 degrees F (42.4 degrees C). This put a serious strain on utility providers, as the extended period of heat forced people to use air-conditioning longer than usual to cool their homes.

Drought Conditions

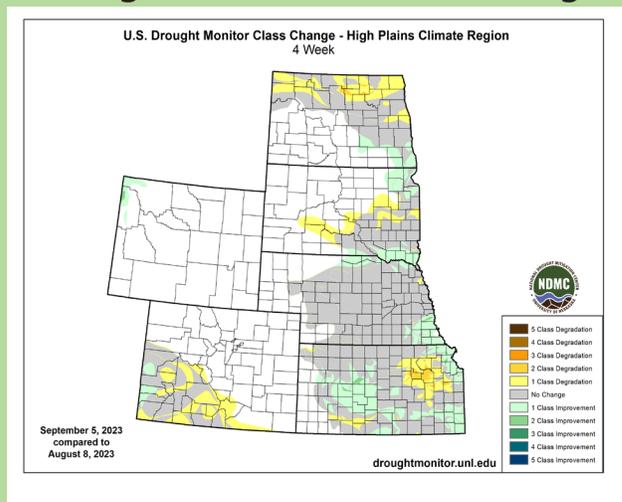
Drought conditions improved across the central portions of the region but continued to degrade in North Dakota and southwestern Colorado. Overall, abnormally dry to exceptional drought (D0-D4) was reduced by nearly 7 percent in the High Plains.

An unusual pattern this summer has led to high precipitation amounts in the western part of the region, with Wyoming benefiting the most. The entire state is drought-free for the first time since July of 2019. Kansas continued to improve, with a 10 percent reduction to extreme to exceptional drought (D3-D4) this month. Despite improvements this month, drought firmly remains entrenched in eastern Nebraska. Elsewhere in the region, other localized improvements and degradations were observed.

U.S. Drought Monitor



Drought Monitor 1-Month Change



The U.S. Drought Monitor is produced as a joint effort of the U.S. Department of Agriculture (USDA), National Drought Mitigation Center, U.S. Department of Commerce, and the National Oceanic and Atmospheric Administration (NOAA). For current Drought Monitor information, please see: <http://droughtmonitor.unl.edu/>.

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Climate Outlooks

According to the Climate Prediction Center, an El Niño Advisory has been issued and conditions are likely to increase over the coming months. For more information, visit https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

The National Weather Service's long-range flood outlook indicates increased chances of Minor Flooding in central South Dakota. According to the National Interagency Fire Center (NIFC), fire potential will be limited across the region through December.

The seasonal temperature and precipitation outlooks presented below combine the effects of long-term trends, soil moisture, and when applicable, the El Niño Southern Oscillation cycle (ENSO). To learn more about these outlooks, please visit <http://www.cpc.ncep.noaa.gov>.

Temperature

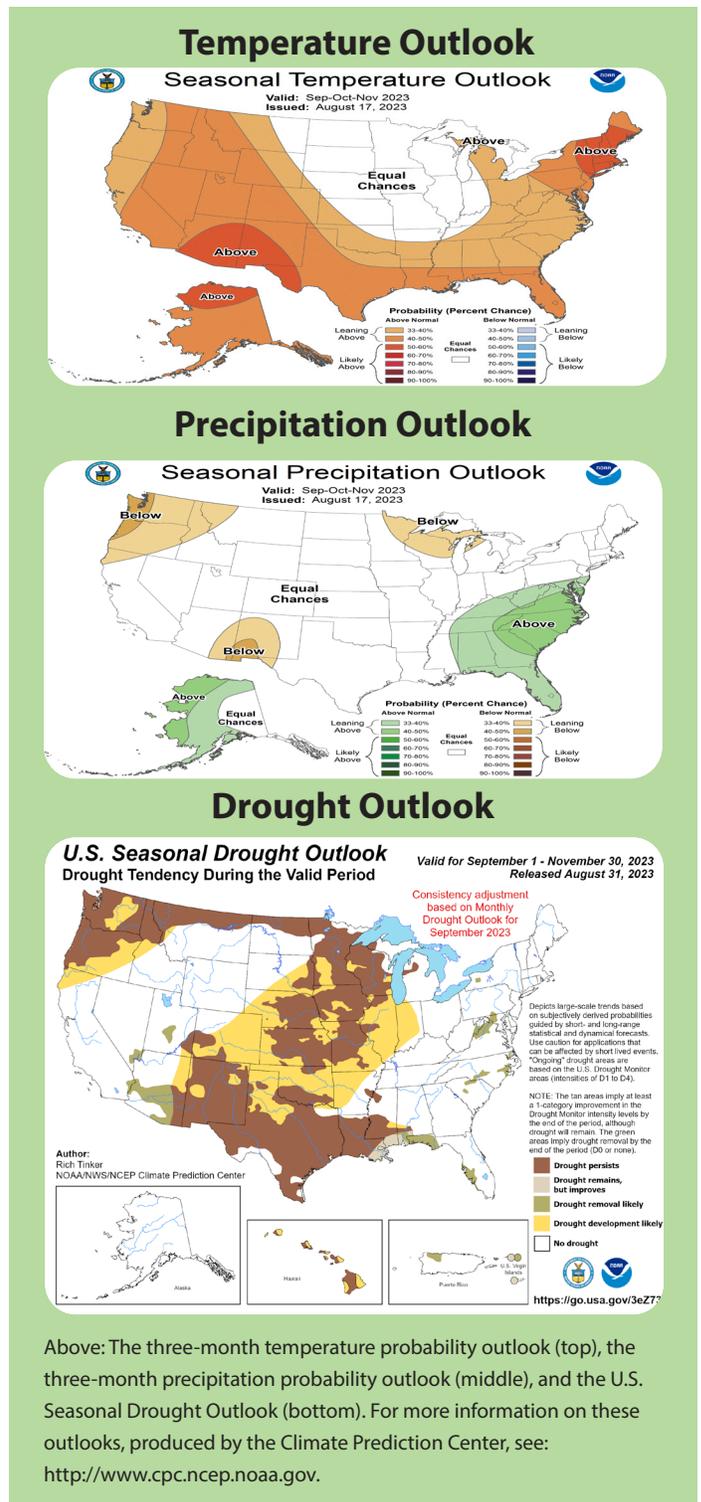
The three-month temperature outlook shows an increased chance of above-normal temperatures across the United States, except for the central states. Increased chances of above-normal temperatures are present in Colorado, Wyoming, and western Kansas.

Precipitation

The outlook for the next three months indicates below-normal precipitation in parts of the southwestern and northwestern United States, while above-normal precipitation is favored for the east-central part of the country. Equal chances of above-, below-, or normal precipitation are present in the High Plains.

Drought

The U.S. Seasonal Drought Outlook released on August 31st indicates drought conditions will likely redevelop for much of Colorado, Kansas, Nebraska, and South Dakota.



Above: The three-month temperature probability outlook (top), the three-month precipitation probability outlook (middle), and the U.S. Seasonal Drought Outlook (bottom). For more information on these outlooks, produced by the Climate Prediction Center, see: <http://www.cpc.ncep.noaa.gov>.

Station Summaries: By the Numbers

Colorado	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Akron Washington County Airport	87.7	59.5	73.6	1.1	99	08/16	44	08/14	1.59	-0.77	67
Alamosa San Luis Airport	84.7	46.6	65.7	2.5	91	08/06	40	08/07	0.39	-0.90	30
Colorado Springs Municipal Airport	85.3	57.7	71.5	1.4	97	08/18	52	08/29	2.34	-0.62	79
Denver International Airport	88.3	60.1	74.2	1.3	99	08/21	49	08/14	0.93	-0.65	59
Grand Junction Walker Field Airport	94.0	64.5	79.2	2.9	101	08/17	57	08/09	1.27	0.35	138
Pueblo Memorial Airport	92.4	61.4	76.9	2.1	102	08/18	53	08/30	0.91	-1.20	43

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	94.5	68.5	81.5	5.1	109	08/21	58	08/15	4.25	0.76	122
Dodge City Regional Airport	93.4	65.1	79.3	1.2	107	08/19	54	08/27	1.18	-1.81	39
Goodland Renner Field	89.4	60.5	74.9	1.3	100	08/19	50	08/15	3.58	0.52	117
Topeka Municipal Airport	92.7	68.5	80.6	2.7	111	08/19	56	08/01	2.04	-2.51	45
Wichita Mid-Continent Airport	95.6	69.2	82.4	2.5	111	08/19	60	08/15	2.38	-1.92	55

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	88.5	57.0	72.7	-0.1	105	08/22	46	08/26	2.56	1.29	202
Grand Island Airport	89.0	64.7	76.9	2.3	106	08/21	54	08/15	1.44	-1.76	45
Lincoln Municipal Airport	89.3	65.2	77.3	1.7	105	08/24	52	08/15	3.76	0.44	113
Norfolk Karl Stefan Airfield	87.2	63.9	75.6	3.2	102	08/23	51	08/15	2.98	-0.52	85
North Platte Regional Airport	88.9	60.0	74.5	1.5	103	08/22	48	08/15	2.72	0.16	106
Omaha Eppley Airport	86.7	66.4	76.5	0.8	104	08/24	55	08/15	3.55	-1.05	77
Valentine Miller Field	87.9	60.1	74.0	0.4	104	08/21	50	08/26	3.21	1.17	157

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	82.1	59.0	70.6	1.0	97	08/01	49	08/26	3.06	0.56	122
Fargo International Airport	82.9	60.8	71.8	3.0	96	08/01	50	08/30	4.00	1.40	154
Grand Forks International Airport	80.6	56.0	68.3	1.3	96	08/01	45	08/30	1.14	-1.67	41
Theodore Roosevelt Airport	81.1	55.2	68.2	-0.3	95	08/18	47	08/26	2.71	1.18	177
Williston International Airport	82.0	57.5	69.7	0.7	96	08/18	50	08/17	2.14	0.57	136

All data are preliminary and subject to change. + indicates multiple dates, latest date listed. * indicates some missing data for the period. ** indicates value is under evaluation. Data are retrieved through the Applied Climate Information System (ACIS) and are available online through the CLIMOD system. For more information please contact us: <http://www.hprcc.unl.edu/contact.php>.

About the High Plains Regional Climate Center

The High Plains Regional Climate Center (HPRCC) is one of six NOAA Regional Climate Centers (RCCs) that has been providing timely climate data and information to the public for cost effective decision-making since 1987. The HPRCC primarily serves the six-state region of Colorado, Kansas, Nebraska, North Dakota, South Dakota, and Wyoming, but has also served people from all across the country and even throughout the world. HPRCC operates under a three-tiered structure of climate services and works closely with other organizations on the local, regional, and national levels. HPRCC staff engage with a wide range of stakeholders including K-20 education, the public, media, private industry, research, and state/tribal/federal entities, among others.

Much of the data and products found throughout this publication were built on the Applied Climate Information System (ACIS) framework. ACIS was designed to manage the complex flow of information from climate data collectors to the end users of climate data information. The main purpose of ACIS is to alleviate the burden of climate information management for people who use climate information to make management decisions.

HPRCC is involved in the ongoing development and management of ACIS. In the spring of 2014, the RCCs released a new website for ACIS. This new and improved website not only contains descriptions of ACIS and the sources of data found within, but also features real-world examples of how RCCs and external groups are using ACIS for their particular climate data needs. In addition to these examples, there is extensive documentation and tutorials on how ACIS can be used and accessed by external clients using Web Services. For more information see: <http://rcc-acis.org>.



Additional Summary Information for the High Plains

Missouri River Basin Quarterly Climate Impacts and Outlook

The screenshot shows the cover page of a report titled "Missouri River Basin Quarterly Climate Impacts and Outlook" for September-October 2014. It features a map of the basin, a table of contents, and several sections of text and graphics. Key sections include "National - Significant Events for September - November 2014", "Regional - Impacts for September - November 2014", "Regional - Climate Overview for September - November 2014", "Drought Co-Occurrence", "3 Month Precipitation and Temperature Outlooks", and "Soil Moisture Conditions".

For more information:
<https://www.drought.gov/drought/dews/missouri-river-basin/reports-assessments-and-outlooks>

Midwest and Great Plains Monthly Climate and Drought Webinar

The screenshot shows a video player for a webinar titled "20141120 Monthly Climate and Drought Webinar". The main content is a map titled "Forecast Precipitation Amounts (7 day)" showing precipitation forecasts for the Midwest and Great Plains regions. The map uses a color scale from blue (low) to red (high). A play button is visible in the center of the map.

To sign up for future webinars:
<https://www.drought.gov/drought/calendar/webinars>

For an archive:
www.hprcc.unl.edu/webinars.php

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