



October 2023 Climate Summary

Glacier National Park in Montana, Photo Courtesy of Gannon Rush

Regional Breakdown

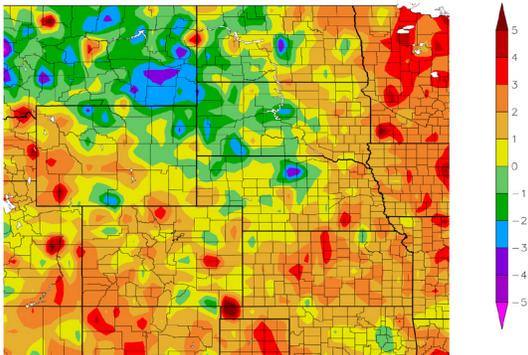
This October wrapped all seasons into a month in the High Plains. Scorching summerlike warmth and severe weather began the month, while the month ended with subzero temperatures and snow.

An unusual and impactful severe weather outbreak in Kansas and Nebraska occurred on the 3rd. Supported by temperatures reaching near or above 90 degrees F (32.2 degrees C), thunderstorms exploded across the central portions of both states. Two EF-1 tornadoes touched down causing minor damage, while winds up to 86 miles per hour (138 km/h) and 3-inch hail (7.62 cm) damaged vehicles and homes.

The first snowstorms of the year swept across parts of the region along with arctic temperatures. Several inches of snow fell in North Dakota on the 26th, limiting travel across the state. A more significant storm impacted Colorado on the 29th, with over 100 flights canceled and 700 delays at the Denver International Airport. Impacts stretched all the way into Nebraska, where two people, unfortunately, perished due to the snow and ice along Interstate 80.

Temperature and Precipitation Overview

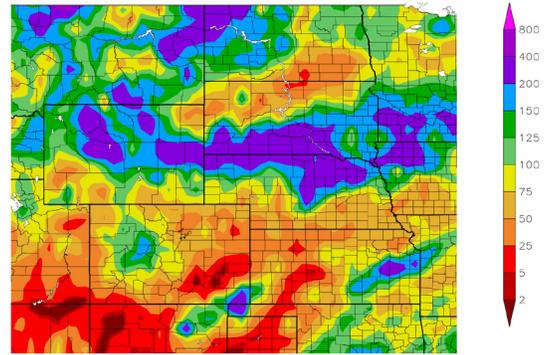
Departure from Normal Temperature (F)
10/1/2023 - 10/31/2023



Generated 11/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
10/1/2023 - 10/31/2023



Generated 11/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Above: Departure from 1991-2020 normal temperature (left) and percent of normal precipitation (right) for October 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

October brought precipitation to much of the northern part of the region, while the southern portions received isolated but plentiful amounts. Snow finally began falling at lower elevations, with the first winter storm of this season occurring near the end of the month.

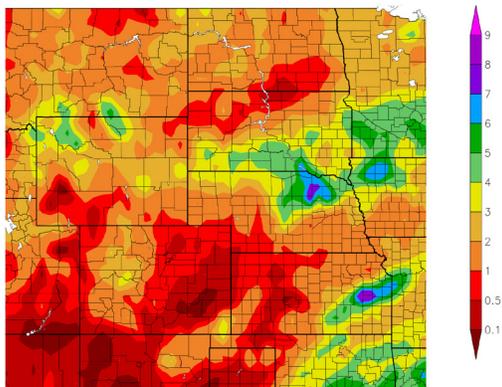
Northern Nebraska was a big beneficiary, with several locations ranking in the top 10 wettest Octobers. Norfolk recorded 6.62 inches (16.82 cm) to rank 2nd, while to the west, Chadron observed 2.62 inches (6.66 cm) to rank 3rd. Drought conditions improved significantly across these areas as a result.

Impressive one-day precipitation amounts occurred on two separate occasions in Kansas and Nebraska. Several rounds of heavy showers on the 12th dropped 7.39 inches (18.77 cm) on an observer outside of Ewing, Nebraska, and set a record for the highest single-day precipitation total for the state of Nebraska in the month of October. Slow-moving thunderstorms on the 25th produced a staggering 9.35 inches (23.75 cm) precipitation outside of Osage City, Kansas to rank 2nd highest single-day amount in October. Several nearby observers near Emporia reported over 7.50 inches (19.05 cm) precipitation, while a large swath from Wichita to Kansas observed over 3 inches (7.62 cm).

Winter made an early appearance, with the first snowstorm impacting the northern part of the region on the 26th. Western North Dakota experienced several inches of snow, with Minot recording 11 inches (27.94 cm) and Bismarck recording 8.5 inches (21.59 cm) on the higher end. Another round of snow occurred several days later on the 29th in Colorado, with over 10 inches (25.4 cm) reported in parts of Colorado Springs and Denver.

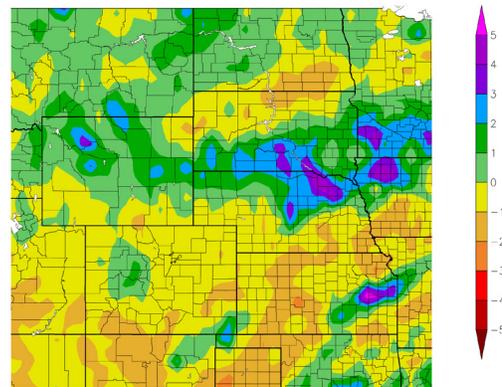
Regional Precipitation

Precipitation (in)
10/1/2023 – 10/31/2023



Generated 11/20/2023 at HPRCC using provisional data. NOAA Regional Climate Centers

Departure from Normal Precipitation (in)
10/1/2023 – 10/31/2023



Generated 11/20/2023 at HPRCC using provisional data. NOAA Regional Climate Centers

Above: Total precipitation in inches (left) and departure from normal precipitation in inches (right) for October 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

The overall trend of warmer temperatures continued into yet another month. A late shot of cold air provided some much-needed relief; however, parts of the region were up to 6 to 9 degrees F (3.3 to 5 degrees C) above normal in October.

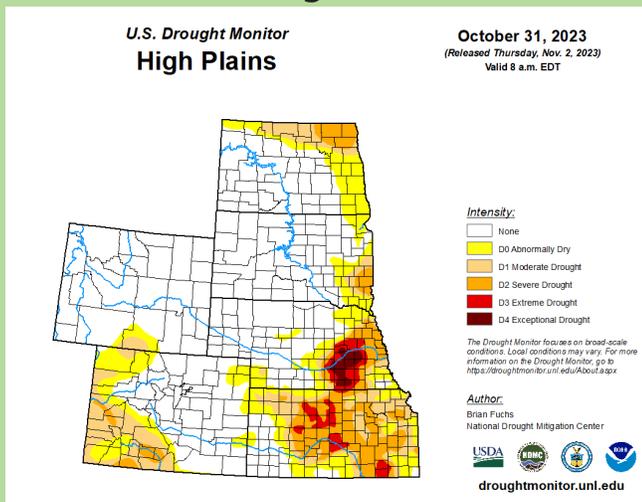
The month began extremely warm, with much of the region well above 90 degrees F (32.2 degrees C). Western Kansas and southwestern Nebraska were scalding hot, reaching up to 98 degrees F (36.7 degrees C) in places. Numerous daily records were set, with some locations close to their all-time highs for October. Temperatures hovered slightly above normal until a blast of arctic air pushed through the region late in the month, leading to the first hard freeze of the year for many. Subzero temperatures were recorded in Wyoming and North Dakota, while single-digit lows reached all the way to Kansas and Nebraska. Combined with gusty winds, the region experienced a shock to an otherwise mild fall season.

Drought Conditions

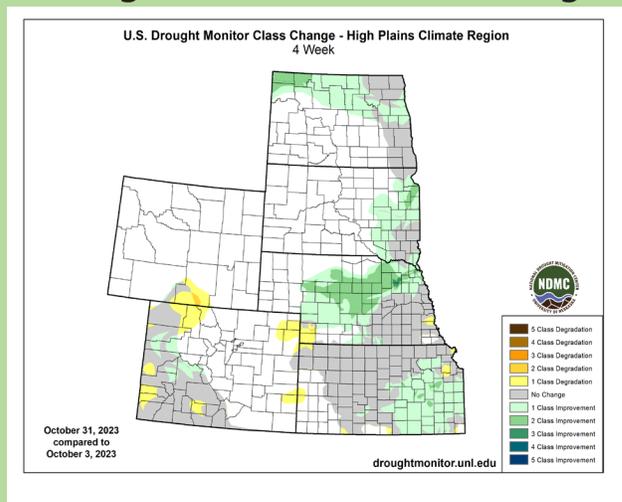
Improvements to drought conditions were the major story this month. The heavy bouts of rain led to large-scale improvements in several states. Overall, abnormally dry to exceptional drought (D0-D4) was reduced by over 5 percent in the High Plains.

Nebraska experienced the most significant changes, with up to 3 classes of improvement. Moderate to exceptional drought (D1-D4) was over 20 percent, with conditions nearly erased from the northern part of the state. Kansas also greatly benefited, with extreme drought (D3) reduced by 13 percent and D4 completely eliminated for the first time in well over a year. Parts of the Dakotas observed up to 2 classes of improvement in response to above-normal precipitation. 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 is likely to be a moderate to strong event. 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 low chances of flooding through January. According to the National Interagency Fire Center (NIFC), fire potential will be normal across the region through February.

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

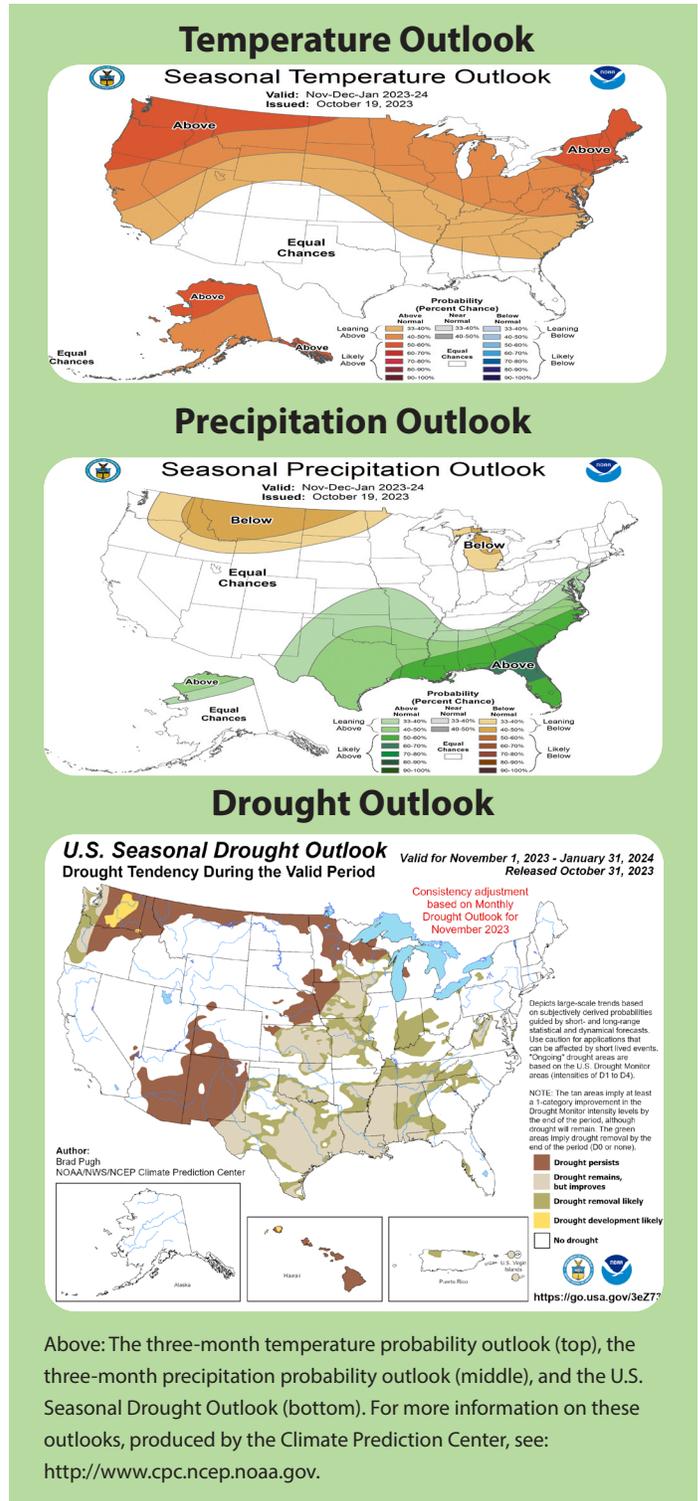
The three-month temperature outlook shows an increased chance of above-normal temperatures across the northern United States. Increased chances of above-normal temperatures are present in the Dakotas, Nebraska, Wyoming, and eastern Kansas.

Precipitation

The outlook for the next three months indicates below-normal precipitation in the northwestern part of the country and in the Great Lakes region, while above-normal precipitation is favored for the southeastern United States. Increased chances of below-normal precipitation are present in parts of the Dakotas and Wyoming, while above-normal precipitation is favored in eastern Kansas. Equal chances of above-, below-, or normal precipitation are present in the rest of the region.

Drought

The U.S Seasonal Drought Outlook released on October 31st indicates drought conditions will likely improve in Kansas but persist for the rest of the region.



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	65.3	36.1	50.7	0.5	86	10/02	11	10/30	0.93	-0.06	94
Alamosa San Luis Airport	66.0	25.0	45.5	1.7	75	10/21	5	10/31	0.42	-0.23	65
Colorado Springs Municipal Airport	66.7	37.2	52.0	1.3	85	10/17	4	10/30	0.56	-0.21	73
Denver International Airport	67.5	37.5	52.5	1.4	86	10/20	11	10/30	0.52	-0.47	53
Grand Junction Walker Field Airport	69.5	41.4	55.4	2.2	81	10/09	20	10/30	0.55	-0.44	56
Pueblo Memorial Airport	71.3	36.2	53.8	1.0	88	10/17	7	10/30	0.06	-0.70	8

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	69.9	46.5	58.2	2.6	93	10/01	20	10/30	1.50	-0.48	76
Dodge City Regional Airport	72.9	42.9	57.9	1.1	91	10/020	17	10/30	0.15	-1.87	7
Goodland Renner Field	67.4	35.9	51.7	-0.1	88	10/20	11	10/30	0.38	-1.03	27
Topeka Municipal Airport	72.0	47.0	59.5	2.5	94	10/01	20	10/31	1.22	-1.63	43
Wichita Mid-Continent Airport	71.9	49.2	60.6	1.6	93	10/	23	10/30	5.98	3.13	210

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	61.6	32.8	47.2	-0.9	86	10/01	10	10/31	2.62	1.34	205
Grand Island Airport	66.0	40.3	53.1	0.0	91	10/01	14	10/31	0.77	-1.22	39
Lincoln Municipal Airport	68.2	43.1	55.6	1.8	94	10/01	17	10/30	1.42	-0.72	66
Norfolk Karl Stefan Airfield	64.0	41.4	52.7	1.9	93	10/01	20	10/30	6.62	4.47	308
North Platte Regional Airport	64.8	34.4	49.6	-0.6	90	10/02	9	10/30	0.71	-0.94	43
Omaha Eppley Airport	65.8	44.2	55.0	0.6	92	10/01	22	10/30	1.83	-0.49	79
Valentine Miller Field	61.6	35.1	48.3	-1.0	88	10/02	6	10/31	3.29	1.87	232

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	56.3	34.4	45.3	0.5	88	10/01	5	10/28	1.75	0.32	122
Fargo International Airport	58.6	39.8	49.2	3.7	96	10/01	15	10/28	1.82	-0.35	84
Grand Forks International Airport	55.4	35.6	45.5	2.3	92	10/01	8	10/28	2.17	0.29	115
Theodore Roosevelt Airport	53.8	31.4	42.6	-1.2	76	10/17	-4	10/31	1.43	0.26	122
Williston International Airport	50.5	33.1	41.8	-1.4	73	10/19	0	10/31	2.72	1.78	289

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>.

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South Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Aberdeen Regional Airport	59.4	35.7	47.5	1.2	93	10/01	12	10/29	1.41	-0.73	66
Huron Regional Airport	60.2	38.0	49.1	1.2	91	10/01	15	10/31	4.01	2.06	206
Pierre Regional Airport	59.4	36.5	48.0	-0.5	90	10/01	14	10/31	2.56	0.87	151
Rapid City Regional Airport	59.4	32.8	46.1	-1.0	85	10/01	5	10/27	2.70	1.29	191
Sioux Falls Joe Foss Field Airport	62.4	41.3	51.9	2.3	95	10/01	18	10/31	2.54	0.18	108

Wyoming	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Casper Natrona County International AP	59.5	30.5	45.0	-0.3	78	10/10	2	10/27	1.88	0.69	158
Cheyenne Municipal Airport	61.7	33.6	47.7	1.2	80	10/01	8	10/30	0.95	-0.05	95
Lander Hunt Field Airport	59.8	35.0	47.4	2.0	77	10/20	14	10/30	1.97	0.57	141
Laramie Regional Airport	60.8	28.5	44.7	2.8	77	10/20	2	10/30	0.82	-0.01	99
Rawlins Municipal Airport	59.1	30.0	44.5	0.9	73	10/20	8	10/29	0.92	0.24	135
Sheridan County Airport	58.7	31.6	45.2	-0.2	82	10/19	-2	10/26	3.06	1.49	195

October 2023 Highlights

Monthly Rankings

Temperature in degrees Fahrenheit, Precipitation in inches

Precipitation	Precipitation/ Ranking	Record / Year	Period of Record
Norfolk, Nebraska	6.62 / 2nd Wettest	6.81 / 2007	1893-2023
Chadron, Nebraska	2.62 / 3rd Wettest	3.57 / 2013	1941-2023
Williston, North Dakota	2.56 / 3rd Wettest	3.56 / 1071	1894-2023
Wichita, Kansas	5.98 / 5th Wettest (tied 1918)	9.42 / 1998	1888-2023
Rapid City, South Dakota	2.70 / 6th Wettest	5.60 / 1998	1942-2023
North Platte, Nebraska	3.29 / 6th Wettest	4.81 / 1911	1874-2023
Sheridan, Wyoming	3.06 / 6th Wettest	3.72 / 2011	1907-2023
Huron, South Dakota	4.01 / 7th Wettest	6.44 / 1946	1881-2023
McCook, Nebraska	0.05 / 7th Driest	Trace / 2003+	1894-2023
Snowfall	Snowfall/ Ranking	Record / Year	Period of Record
Bismarck, North Dakota	9.1 / 4th Snowiest	23.7 / 1991	1886-2023
Colorado Springs, Colorado	8.3 / 9th Snowiest	25.9 / 1984	1894-2023

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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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