



February 2021 Climate Summary



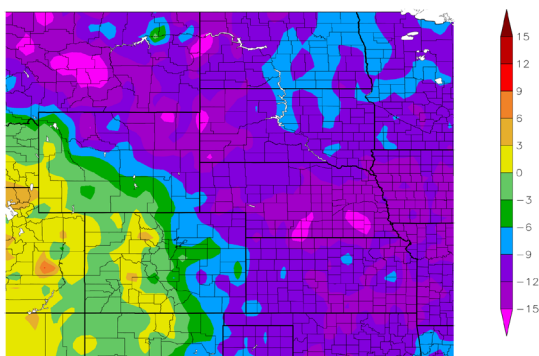
Historic Cold Event Grips the Region

The coldest air in decades invaded the central U.S. in mid-February, breaking many temperature records and taking a toll on the nation's power grid. On the 16th, temperature departures exceeding 40.0 degrees F (22.2 degrees C) below normal occurred from Nebraska southward to Texas. From an east-west perspective, bitter cold stretched from the Continental Divide eastward to include much of the Midwest and southern states. While numerous daily temperature records were broken on the 16th, it was the longevity of the cold snap that was particularly impressive. Extreme cold persisted for 1-2 weeks, and the majority of the central U.S. remained below freezing during that time. Given the severity, duration, and spatial extent of the event, the energy demand for heating overwhelmed the power grid, prompting rolling blackouts in many states. The Southwest Power Pool, which serves much of North Dakota, South Dakota, Nebraska, and Kansas, was adversely impacted by the event. In addition to rolling blackouts, residents were asked to conserve energy until temperatures moderated. It is worth noting that Texas was most impacted by the extreme cold, as millions of people were left without power for days, and some residents had no water due to pipes bursting underground. It is anticipated that recovery from this event, which was declared a major disaster in Texas, will take quite some time.

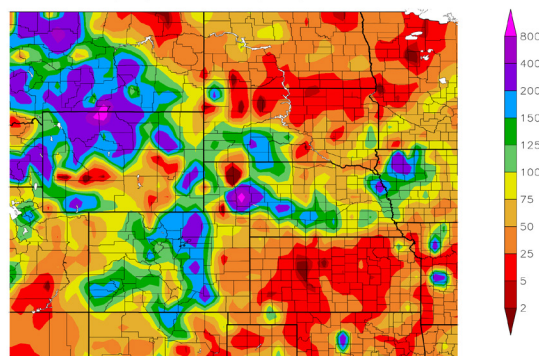
In addition to the cold, other adverse weather conditions increased the occurrence of avalanches and fires in February. According to The Denver Post, avalanche forecasters said that the avalanche danger is extremely high this season for the Rockies, mostly due to a bottom layer of snow that fell in October and was weakened by dry conditions in November. As new snow continues to build, the avalanche risk increases. Two men were killed by avalanches in Colorado. Fires were also an issue in February, particularly in drought-stricken areas of Colorado and Kansas where there was little snow cover. Increasing dryness and the lack of snow cover in western North Dakota prompted the National Weather Service in Bismarck to begin issuing their fire weather products unusually early.

Temperature and Precipitation Overview

Departure from Normal Temperature (F)
2/1/2021 – 2/28/2021



Percent of Normal Precipitation (%)
2/1/2021 – 2/28/2021



Above: Departure from 1981-2010 normal temperature (left) and percent of normal precipitation (right) for February 2021 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

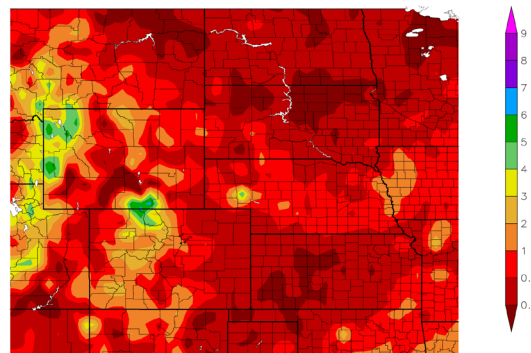
It was a mix of wet and dry conditions throughout the High Plains in February. Areas of the Dakotas and Kansas were especially dry, receiving less than 25 percent of normal precipitation. On the other hand, pockets of wetness existed throughout northern Wyoming, central Colorado, southwestern South Dakota, and several areas of Nebraska where precipitation exceeded 150 percent of normal. Sheridan, Wyoming had its 3rd wettest February on record, while it was the 6th wettest February for North Platte, Nebraska (Sheridan period of record 1907-2021, North Platte period of record 1874-2021).

As for snow, some areas of the High Plains experienced a very snowy month, while others missed out. For instance, several storm systems brought snow to portions of Wyoming, Colorado, and Nebraska throughout the month. The snow was very welcome in Wyoming and Colorado, as mountain snowpack was lagging behind this season, and the snows helped these areas to catch up. In Nebraska, a winter storm that came through early in the month brought impressive snow totals. North Platte, Nebraska received 13.3 inches (34 cm) of snow from the 5th to the 7th, which was its highest 3-day total snowfall on record for February. Several locations broke into the top 10 of snowiest Februaries (see page 6 for details). However, snowfall was below normal in some areas, especially in the Dakotas and western Kansas. For instance, Aberdeen, South Dakota received only 0.6 inch (2 cm) of snow the entire month, which was 6.2 inches (16 cm) below normal. Also, major winter wheat growing areas in the region were largely snow-free when bitter cold settled in early in the month, leaving winter wheat vulnerable. While it is likely that there was damage to winter wheat, the full extent of the damage will not be realized until the spring.

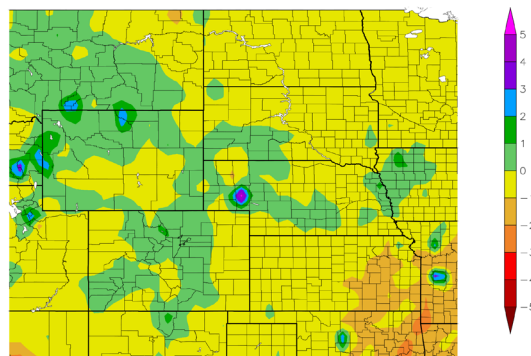
The winter season (December-February) was very dry for the Dakotas, northern and western Kansas, and the Nebraska Panhandle, while parts of Nebraska and Colorado were quite snowy. The following locations ranked among the top 10 driest winters on record: Chadron, NE (6th driest), Williston, ND (7th driest), Mobridge, SD (tied for 9th driest), and Grand Forks, ND (10th driest). Locations ranking among the top 10 snowiest winters on record included Lincoln, NE (snowiest), Omaha, NE (tied for snowiest), Hastings, NE (5th snowiest), North Platte, NE (5th snowiest), Grand Island, NE (6th snowiest), and Colorado Springs, CO (8th snowiest).

Regional Precipitation

Precipitation (in)
2/1/2021 – 2/28/2021



Departure from Normal Precipitation (in)
2/1/2021 – 2/28/2021



Above: Total precipitation in inches (top) and departure from normal precipitation in inches (bottom) for February 2021. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

Snowpack Update

Several snowstorms moved across the Upper Missouri Basin region in February, boosting mountain snowpack. According to the U.S. Army Corps of Engineers, as of March 1st, Snow Water Equivalent (SWE) was 94 percent of average above Fort Peck Reservoir as well as between Fort Peck and Garrison Reservoirs. Colorado and Wyoming were also fortunate enough to receive ample moisture, as SWE improved to 94 percent of median in Wyoming and 86 percent of median in Colorado. Plains snowpack varied throughout the month. At the beginning of February, snow covered the eastern Dakotas and central and eastern Nebraska, while the western Plains were largely snow-free. However, by mid-February, an active weather pattern had brought snow to much of the Plains, except for portions of the Dakotas. Then, a rapid warmup melted much of the snow by the end of the month.

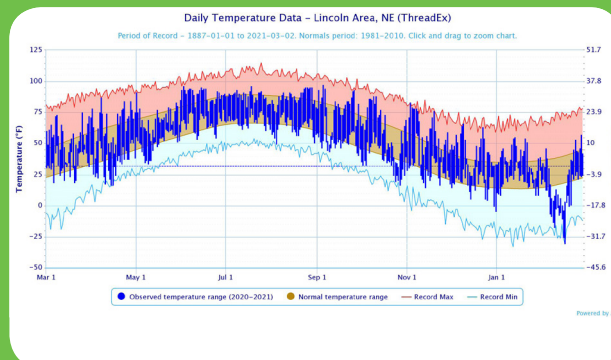
Temperatures

February was quite cold for the majority of the High Plains region. With the exception of southwestern Wyoming and the western half of Colorado, where temperatures were near to slightly above normal, the region experienced temperature departures ranging from 6.0-15.0 degrees F (3.3-8.3 degrees C) below normal. This February was among the coldest on record for numerous locations (for more details, see page 6).

The lingering cold snap in the middle of February was primarily responsible for below-normal average temperatures for the month. This bitterly cold Arctic air mass remained in place for nearly two weeks, breaking many daily records for both lowest minimum and maximum temperature. Several locations experienced their lowest February temperature on record, including Goodland, KS (-24.0 degrees F (-31.1 degrees C)), Hastings, NE (-30.0 degrees F (-34.4 degrees C)), and Lincoln, NE (-31.0 degrees F (-35.0 degrees C)). Looking at all months, Hastings tied for its coldest temperature ever recorded, while it was the 2nd coldest for Lincoln and 3rd coldest for Goodland.

As for the winter season, temperatures were 2.0-6.0 degrees F (1.1-3.3 degrees C) above normal throughout a large portion of the Dakotas, while the rest of the High Plains had near-normal temperatures. Sisseton, South Dakota had its 4th warmest winter on record, while Mobridge, South Dakota had its 8th warmest (Sisseton period of record 1931-2021, Mobridge period of record 1911-2021). However, average winter temperatures masked the extremes that occurred, as December and January were extremely warm for much of the region, while February was extremely cold.

Station Spotlight: Lincoln, NE



Above: Daily temperatures along with extremes and normals values since March 1, 2020 in Lincoln, NE.

Drought Conditions

On the whole, drought conditions improved slightly in the High Plains in February. According to the U.S. Drought Monitor, the area experiencing drought (D1-D4) decreased from approximately 86 percent to 82 percent over the course of the month. However, the area experiencing abnormal dryness and drought (D0-D4) remained nearly the same at 93 percent.

U.S. Drought Monitor

U.S. Drought Monitor High Plains

February 23, 2021
(Released Thursday, Feb. 25, 2021)
Valid 7 a.m. EST

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	7.42	92.58	82.39	53.05	19.24	3.25
Last Week (2-14-2021)	7.42	92.58	82.38	47.67	20.07	3.63
3 Months Ago (11-24-2020)	4.05	95.95	76.21	48.67	25.74	5.63
Start of Calendar Year (1-1-2021)	3.82	96.18	82.46	50.36	27.09	5.71
Start of Water Year (12-15-2020)	6.73	93.27	82.11	36.56	16.16	0.54
One Year Ago (2-23-2020)	82.45	17.54	9.72	1.00	0.90	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/about.aspx>

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NOAA/NWS/NCEP/CPC

USDA NDMC

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/>.

A continued lack of snowfall across western portions of the Dakotas prompted a large expansion of severe drought (D2) in this area. Several impacts to livestock and ranching were reported, including the use of supplemental feed, overgrazed winter pastures, and little water for livestock. There is growing concern that hay supplies will be limited in the spring. An increasing risk for wildfire was also reported. Conditions worsened in northern and western Wyoming as well, as continued dryness caused mountain snowpack to fall further behind the average for this time of the year.

However, there were also widespread improvements in drought conditions in February. Several snowstorms traversed the region, easing conditions in portions of Nebraska, Kansas, Colorado, and Wyoming. The greatest improvements occurred in northeastern Kansas, where moderate drought (D1) and abnormal dryness (D0) were erased, and the Nebraska Panhandle extending westward into eastern Wyoming, where extreme drought (D3) improved to D1. The Rockies in Colorado received a boost in snowpack in drought-stricken areas in February, improving conditions in areas experiencing exceptional drought (D4) and D3.

Climate Outlooks

According to the Climate Prediction Center, La Niña conditions are present in the Pacific and a La Niña Advisory is in effect. There is about a 60 percent chance of La Niña transitioning to neutral conditions during the spring. For more information about ENSO, check out the ENSO blog here: <https://www.climate.gov/news-features/department/enso-blog>.

According to the National Weather Service's long-range flood outlook, there is greater than a 50 percent chance of moderate flooding through May for several streams in eastern Kansas, including Stranger Creek, Little Osage River, and the Neosho River. Minor flooding is expected along the Red River at Fargo, North Dakota and the Wahoo Creek in Nebraska. Minor flooding is anticipated along several rivers in eastern Kansas, including the Big Blue, Black Vermillion, Missouri, Neosho, and Marais Des Cygnes. Above-normal wildland fire potential is expected in southern areas of Colorado and Kansas through April and southern Colorado only through June. The seasonal temperature and precipitation outlooks 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 see: <http://www.cpc.ncep.noaa.gov>.

Temperature

The March-May temperature outlook indicates an increased chance of above-normal temperatures for western, southern, central, and eastern portions of the contiguous U.S. In the High Plains, this includes Colorado, Kansas, Nebraska, central and southern South Dakota, and southern and eastern Wyoming. Below-normal temperatures are anticipated in the Pacific Northwest. Elsewhere, there are equal chances for above-, below-, and near-normal temperatures during the March-May period.

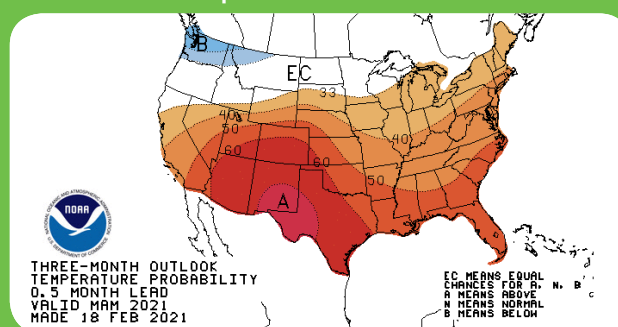
Precipitation

The precipitation outlook for the next three months calls for a higher probability of above-normal precipitation across the Pacific Northwest, the Great Lakes and Ohio Valley regions, and parts of the Northeast. Below-normal precipitation is anticipated across the southern U.S., as well as the Central Plains. In the High Plains, this includes Colorado, Nebraska, most of Kansas, southern South Dakota, and southeastern Wyoming. Elsewhere, there are equal chances for above-, below-, and near-normal precipitation during the March-May period.

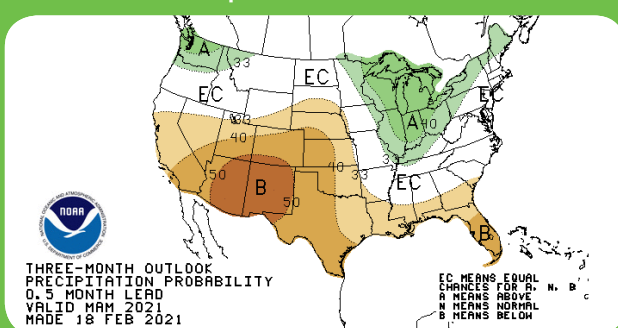
Drought

The February 18th U.S. Seasonal Drought Outlook indicates that drought is expected to persist or develop throughout much of the West, the Plains, and the Southeast. In the High Plains, drought persistence is likely, with further development possible. Drought may improve or be removed in pockets of the Pacific Northwest, the Midwest, and the Northeast. Improvement in drought conditions is not expected in the High Plains through May.

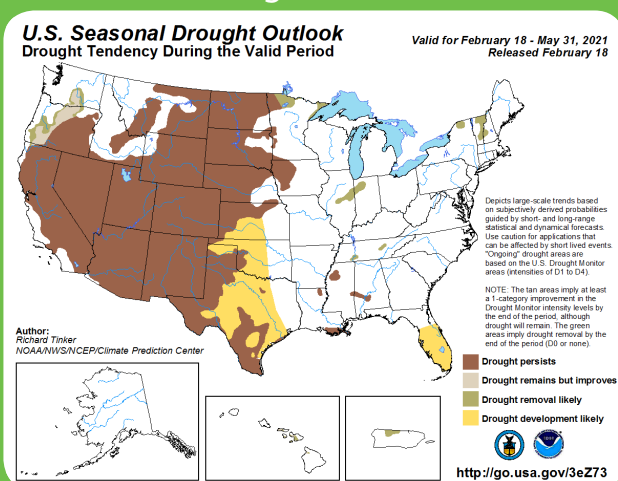
Temperature Outlook



Precipitation Outlook



Drought Outlook



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	33.4	12.4	22.9	-8.5	68	02/03	-22	02/15	0.20	-0.24	45
Alamosa San Luis Airport	41.3	9.8	25.5	2.7	55	02/23	-6	02/19	0.28	0.02	108
Colorado Springs Municipal Airport	38.1	14.1	26.1	-6.0	65	02/23	-16	02/15	0.84	0.50	247
Denver International Airport	38.4	12.3	25.4	-7.1	67	02/03	-16	02/15	0.80	0.43	216
Grand Junction Walker Field Airport	46.0	23.2	34.6	0.1	58	02/08	13	02/28	0.32	-0.22	59
Pueblo Memorial Airport	40.6	14.2	27.4	-6.5	74	02/23	-20	02/15	0.49	0.19	163

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	31.9	12.9	22.4	-10.3	71	02/23	-22	02/16	0.27	-0.52	34
Dodge City Regional Airport	38.3	13.3	25.8	-10.1	76	02/27	-14	02/15	0.09	-0.59	13
Goodland Renner Field	34.8	10.6	22.7	-9.6	72	02/03	-24	02/15	0.30	-0.19	61
Topeka Municipal Airport	33.5	12.7	23.1	-11.3	71	02/23	-21	02/16	0.26	-1.06	20
Wichita Mid-Continent Airport	36.2	15.8	26.0	-11.2	69	02/23	-17	02/16	0.30	-0.88	25

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	27.9	5.9	16.9	-10.5	63	02/03	-25	02/15	0.13	-0.48	21
Grand Island Airport	24.3	6.7	15.5	-13.6	54	02/23	-27	02/16	0.80	0.12	118
Lincoln Municipal Airport	25.5	4.8	15.1	-13.9	57	02/27	-31	02/16	0.79	0.02	103
Norfolk Karl Stefan Airfield	23.5	5.0	14.2	-12.6	56	02/23	-31	02/16	0.57	-0.19	75
North Platte Regional Airport	30.0	4.6	17.3	-11.7	68	02/03	-29	02/15	1.43	0.93	286
Omaha Eppley Airport	25.0	7.6	16.3	-11.8	54	02/27+	-23	02/16	1.14	0.29	134
Valentine Miller Field	28.8	6.0	17.4	-9.8	70	02/03	-33	02/15	0.73	0.25	152

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	22.1	-1.0	10.5	-7.6	54	02/22	-28	02/13	0.13	-0.38	25
Fargo International Airport	14.5	-0.8	6.8	-7.8	44	02/26	-25	02/14	0.29	-0.32	48
Grand Forks International Airport	14.1	-3.6	5.3	-6.7	47	02/22	-27	02/13	0.16	-0.36	31
Theodore Roosevelt Airport	22.4	-1.9	10.3	-10.2	58	02/02	-30	02/14	T*	-0.33	0
Williston International Airport	18.4	-2.1	8.1	-8.8	51	02/02	-28	02/13	0.16	-0.23	41

All data are preliminary and subject to change. + indicates multiple dates, latest date listed. * indicates some missing data for the period. 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	22.1	0.6	11.3	-6.3	60	02/22	-25	02/15	0.07	-0.48	13
Huron Regional Airport	22.4	3.1	12.8	-8.8	60	02/22	-23	02/14	0.27	-0.33	45
Pierre Regional Airport	26.4	5.1	15.7	-8.6	63	02/22	-24	02/14	0.40	-0.19	68
Rapid City Regional Airport	24.7	2.3	13.5	-13.9	59	02/03	-24	02/13	0.58	0.14	132
Sioux Falls Joe Foss Field Airport	21.4	4.3	12.8	-8.7	55	02/23	-26	02/15	0.73	0.13	122

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	27.2	6.5	16.9	-9.8	53	02/02	-24	02/14	0.41	-0.16	72
Cheyenne Municipal Airport	32.5	11.1	21.8	-7.8	58	02/02+	-15	02/14	0.58	0.11	123
Lander Hunt Field Airport	34.3	7.6	20.9	-4.3	55	02/22	-13	02/14	0.15	-0.43	26
Laramie Regional Airport	30.7	8.9	19.8	-3.7	49	02/02	-17	02/14	0.22	-0.12	65
Rawlins Municipal Airport	29.0	11.3	20.1	-3.6	44	02/02	-14	02/14	0.28	-0.14	67
Sheridan County Airport	27.1	3.3	15.2	-11.4	60	02/02	-27	02/14+	1.60	1.06	296

February 2021 Highlights

Monthly Rankings

Temperature in degrees Fahrenheit, Snowfall in inches

Coollest	Temperature / Ranking	Record / Year	Period of Record
Rapid City, SD	13.5 / 3rd coolest	8.7 / 2019	1942-2021
Chadron, NE	16.9 / 3rd coolest (tie, 1978)	15.0 / 2018	1941-2021
Lincoln, NE	15.1 / 4th coolest	13.0 / 1979	1887-2021
Norfolk, NE	14.2 / 4th coolest	2.6 / 1936	1893-2021
Grand Island, NE	15.5 / 5th coolest	6.5 / 1936	1895-2021
Omaha, NE	16.3 / 5th coolest	6.5 / 1936	1871-2021
Goodland, KS	22.7 / 5th coolest (tie, 1989)	19.7 / 1978	1895-2021
Wichita, KS	26.0 / 6th coolest	21.2 / 1899	1888-2021
Concordia, KS	22.4 / 7th coolest	16.8 / 1936+	1885-2021
North Platte, NE	17.3 / 7th coolest	11.4 / 1936	1874-2021
Sheridan, WY	15.2 / 8th coolest	3.8 / 1936	1907-2021
Topeka, KS	23.1 / 8th coolest	18.9 / 1899	1887-2021
Snowiest	Snowfall / Ranking	Record / Year	Period of Record
North Platte, NE	18.7 / 2nd snowiest	20.6 / 1978	1874-2021
Lincoln, NE	16.6 / 6th snowiest	26.1 / 1965	1948-2021
Colorado Springs, CO	13.6 / 8th snowiest	23.2 / 1987	1894-2021
Omaha, NE	17.4 / 9th snowiest (tie, 1971)	27.0 / 2019	1881-2021

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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.

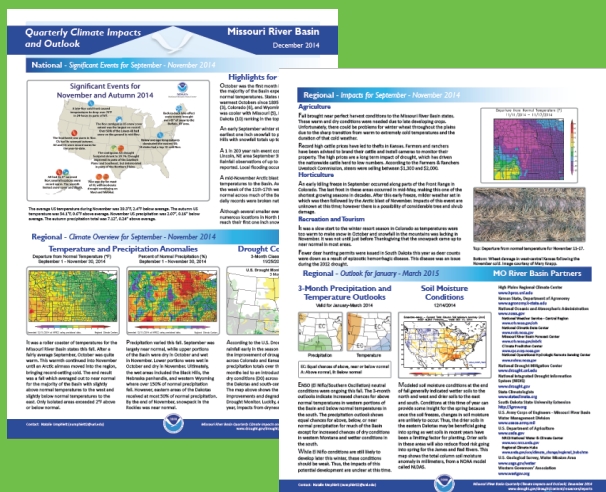
Much of the data and products found throughout this publication were built on the Applied Climate Information System (ACIS) framework. ACIS was designed to manage the complex flow of information from climate data collectors to the end users of climate data information. The main purpose of ACIS is to 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>.



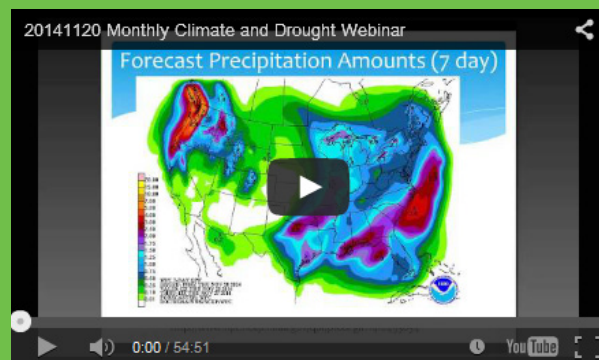
Additional Summary Information for the High Plains

Missouri River Basin Quarterly Climate Impacts and Outlook



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



To sign up for future webinars:
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