



July 2020 Climate Summary



Holmes Lake in Lincoln, NE. Photo courtesy Logan Winters.
<http://hprcc.unl.edu>

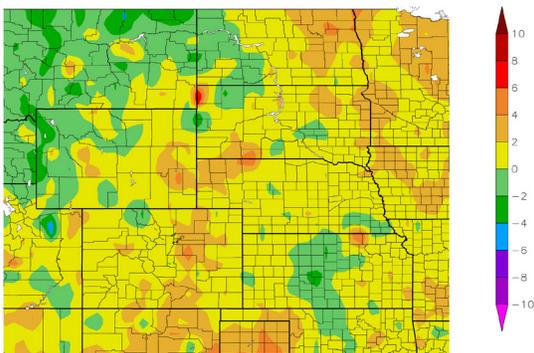
A Tale of Two Extremes

After the continuation of above-normal temperatures from June into the first part of July, temperatures moderated and ended up being near normal for the month for much of the region. There were some interesting extremes, however, that were particularly noteworthy (read more about these in the Temperature section). As for precipitation, it was a tale of two extremes. Above-normal precipitation occurred across portions of the Dakotas, Nebraska, and Kansas. Precipitation totals were particularly impressive in Hebron, Nebraska, which had its wettest July on record. The heavy rainfall proved to be beneficial for drought-stricken areas such as western North Dakota and western Kansas, but it was also responsible for overland flooding and rises on local waterways in portions of Kansas and South Dakota. In contrast, dry conditions persisted across areas of Wyoming, Colorado, and western and eastern portions of Nebraska. Casper, Wyoming had its driest July on record. The dryness contributed to further expansion of drought across these areas. Impacts continued to mount due to the dryness, such as the degradation of pasture and rangeland conditions, leading to the continuation of cattle sell-offs and increased irrigation.

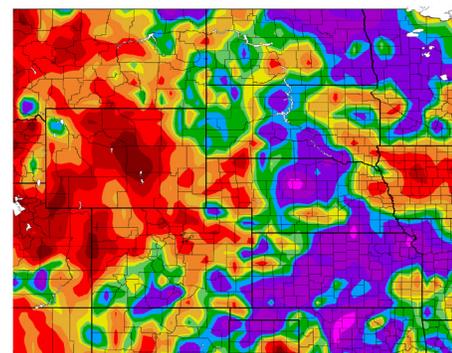
Crop conditions were generally in good shape across the region. By the end of July, corn was faring well in Nebraska, North Dakota, and South Dakota, with over 70 percent of the crop rated as in good to excellent condition. Corn was faring worst in drought-stricken Colorado, with 25 percent of the crop in poor to very poor condition. Soybeans were doing quite well region-wide. However, pastures and rangeland were struggling in Wyoming and Colorado due to worsening drought conditions. Compared to early July, topsoil moisture improved in Nebraska and Kansas but worsened in North Dakota, South Dakota, Wyoming, and Colorado. The biggest change occurred in Kansas, where the percent of topsoil moisture rated short to very short improved from 47 percent to only 19 percent. In areas where crops are struggling due to drought, receiving ample precipitation in August will be critical; otherwise, there is likely to be significant yield loss.

Temperature and Precipitation Overview

Departure from Normal Temperature (F)
7/1/2020 – 7/31/2020



Percent of Normal Precipitation (%)
7/1/2020 – 7/31/2020



Above: Departure from 1981-2010 normal temperature (left) and percent of normal precipitation (right) for July 2020 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

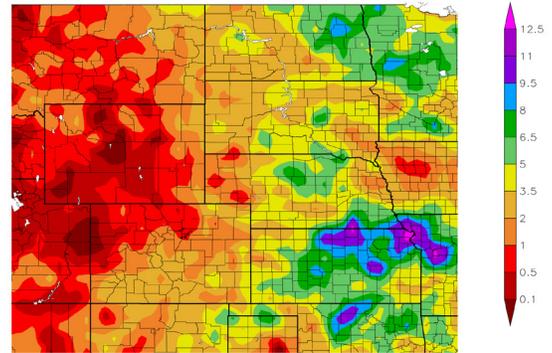
Precipitation varied widely across the High Plains region this month, with some locations setting records for wettest July and others setting records for the driest. The wettest areas of the region were generally in the east, with the majority of Kansas, central Nebraska, central South Dakota, and eastern North Dakota receiving at least 150 percent of normal precipitation. Drought conditions improved or were removed across much of these areas. Additionally, many locations ranked among the top ten wettest Julys on record, including Concordia, KS (3rd wettest); Dodge City, KS (5th wettest); Grand Forks, ND (6th wettest); and Topeka, KS (7th wettest). One of the wettest locations in the region this month was Hebron, NE, which is located in south-central Nebraska, just north of the Kansas border. Not only did Hebron have its wettest July, with 16.70 inches (424 mm) of precipitation, it also had its wettest month on record (period of record 1893-2020). Interestingly, 4.98 inches (126 mm) of this monthly total was reported on July 27th, which was the 6th highest one-day precipitation total for the location.

On the other end of the spectrum, dry conditions prevailed across much of Wyoming, northern Colorado, and the panhandle of Nebraska. Locations in this area received, at best, 50 percent of normal precipitation. Some embedded pockets received less than 5 percent of normal precipitation. This lack of precipitation contributed to a rapid intensification of drought conditions across Wyoming, where the total area in severe and extreme drought increased by nearly 34 percent. One extremely dry location in this drought-stricken area was Casper, WY, which had its driest July on record with only 0.02 inches (1 mm) of precipitation (period of record 1939-2020). This paltry amount was just over 1 percent of normal precipitation.

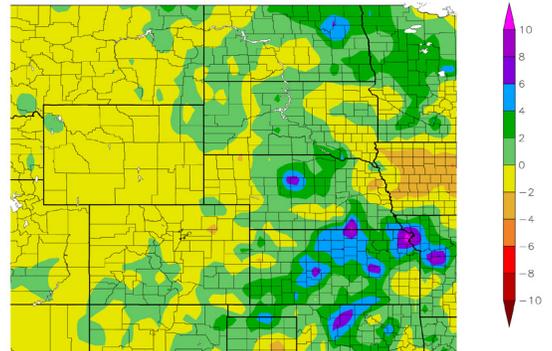
The month of July featured a more active weather pattern for portions of the region. On the 24th and 25th, a slow-moving complex of thunderstorms tracked along the North Dakota-South Dakota border. According to the NWS office in Aberdeen, SD, these storms developed in a very moist air mass, which resulted in significant amounts of rainfall in a short time. Rainfall totals ranged from 4.00-10.00 inches (102-254 mm), which resulted in rises on local lakes and rivers. The Elm River just below Elm Lake reached a record stage of 19.56 feet (5.96 m) on the 25th. There were also many local roads that became inundated or washed out as a result of the excessive rainfall.

Regional Precipitation

Precipitation (in)
7/1/2020 - 7/31/2020



Departure from Normal Precipitation (in)
7/1/2020 - 7/31/2020



Above: Total precipitation in inches (top) and departure from normal precipitation in inches (bottom) for July 2020. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

Streamflow Update

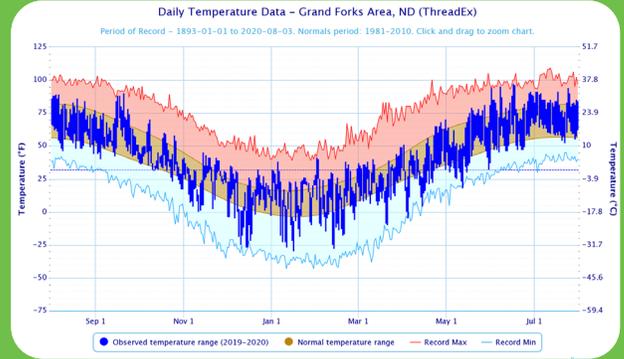
Streamflows were both above and below normal across the region during July. Streamflows were below normal across western Colorado, portions of Wyoming, and southwestern Nebraska as persistent dryness continued in this area. Some of the lowest streamflows were located along the Republican River in southwestern Nebraska. Streamflows were generally near normal across the western Dakotas, eastern Colorado, and western and eastern areas of South Dakota. Above-normal streamflows were prevalent across much of Kansas, central and southeastern Nebraska, and the eastern Dakotas. Precipitation amounts in excess of 200 percent of normal during the month of July were largely responsible for the above-normal streamflows in these areas.

Temperatures

Overall, temperatures were near normal across the High Plains this month. Scattered areas of above-normal temperatures, in the 2.0-4.0 degrees F (1.1-2.2 degrees C) range, did lead to some locations ranking in the top 10 warmest Julys on record. For instance, Grand Forks, ND, had its 8th warmest July with an average monthly temperature of 72.7 degrees F (22.6 degrees C). Grand Forks' warmest July occurred during the Dust Bowl in 1936 when the average temperature for the month was 79.3 degrees F (26.3 degrees C) (period of record 1893-2020). Although top 10 temperature rankings were not widespread this month, there were many locations that ranked in the top 10 warmest season-to-date temperatures (June 1 through July 31). Some of those locations included Aberdeen, SD; Bismarck, ND; Denver, CO; and Cheyenne, WY.

It is worth noting that a number of temperature extremes have occurred in Colorado this season. On July 10th, Alamosa, CO set a new record low of 37.0 degrees F (2.8 degrees C) and a new record high of 92.0 degrees F (33.3 degrees C) all on the same day (period of record 1906-2020). This was an incredibly rare event! Several locations also had an impressive number of days that reached at least 90.0 degrees F (32.2 degrees C) this month. Pueblo, CO had 27 days with temperatures of at least 90.0 degrees F (32.2 degrees C), which pushed its year-to-date total to 60 days - a new record for this timeframe (January 1 through July 31) (period of record 1888-2020). Meanwhile, Denver, CO had 23 days with temperatures of 90.0 degrees F (32.2 degrees C) or higher, for a year-to-date total of 42 days. This amount was just behind the record of 46 days, which occurred in 2012 (period of record 1872-2020).

Station Spotlight: Grand Forks, ND

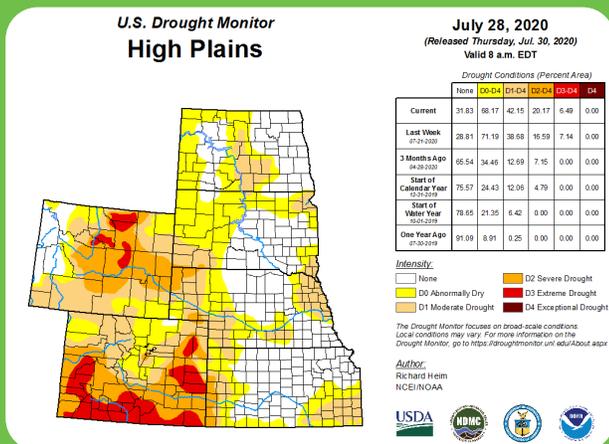


Above: Daily temperatures along with extremes and normals values since August 1, 2019 in Grand Forks, ND.

Drought Conditions

This month, drought conditions expanded and intensified in portions of the High Plains, but there were other parts of the region that experienced improvements. According to the U.S. Drought Monitor, the area experiencing drought (D1-D4) in the region increased slightly by approximately 2.5 percent between June 30th and July 28th.

U.S. Drought Monitor



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 continuation of below-normal precipitation in portions of Colorado, Wyoming, and Nebraska led to worsening conditions in these areas. Extreme drought conditions (D3) developed over parts of north-central Wyoming at the end of the month. Severe drought (D2) was also introduced across Wyoming and the Nebraska Panhandle. Areas of moderate drought (D1) conditions were introduced to northeastern Nebraska and eastern areas of South Dakota. Abnormally dry conditions (D0) also increased in coverage across portions of the High Plains region, including areas of Colorado, Nebraska, and South Dakota.

However, drought conditions improved in southwestern Kansas, which was due to precipitation amounts of up to 200 percent of normal during July. By the month's end, D3 conditions and exceptional drought (D4) conditions had been completely removed in southwestern Kansas, with D4 conditions also being removed in southeastern Colorado. D3 conditions also decreased slightly in eastern Colorado. There were also improvements across much of western North Dakota as well, with drought conditions being removed.

Climate Outlooks

According to the Climate Prediction Center, ENSO-neutral conditions continued through July in the Pacific. However, a La Niña Watch was issued. While ENSO-neutral conditions are expected through the remainder of the summer, there is a 50-55 percent chance that a La Niña will develop in the fall and continue through the winter. For more information about ENSO, see: <https://www.climate.gov/news-features/department/enso-blog>.

According to the National Weather Service's long-range flood outlook, there is a greater than 50 percent chance of moderate flooding along the Stranger Creek at Easton, KS and the North Platte River at North Platte, NE through October. Minor flooding is likely along the James River in South Dakota, the Cow Creek above Hutchison, KS, and the Stranger Creek near Tonganoxie, KS. Above-normal wildland fire potential is expected across western North Dakota, northwestern Wyoming, and northwestern South Dakota through September.

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, see: <http://www.cpc.ncep.noaa.gov>.

Temperature

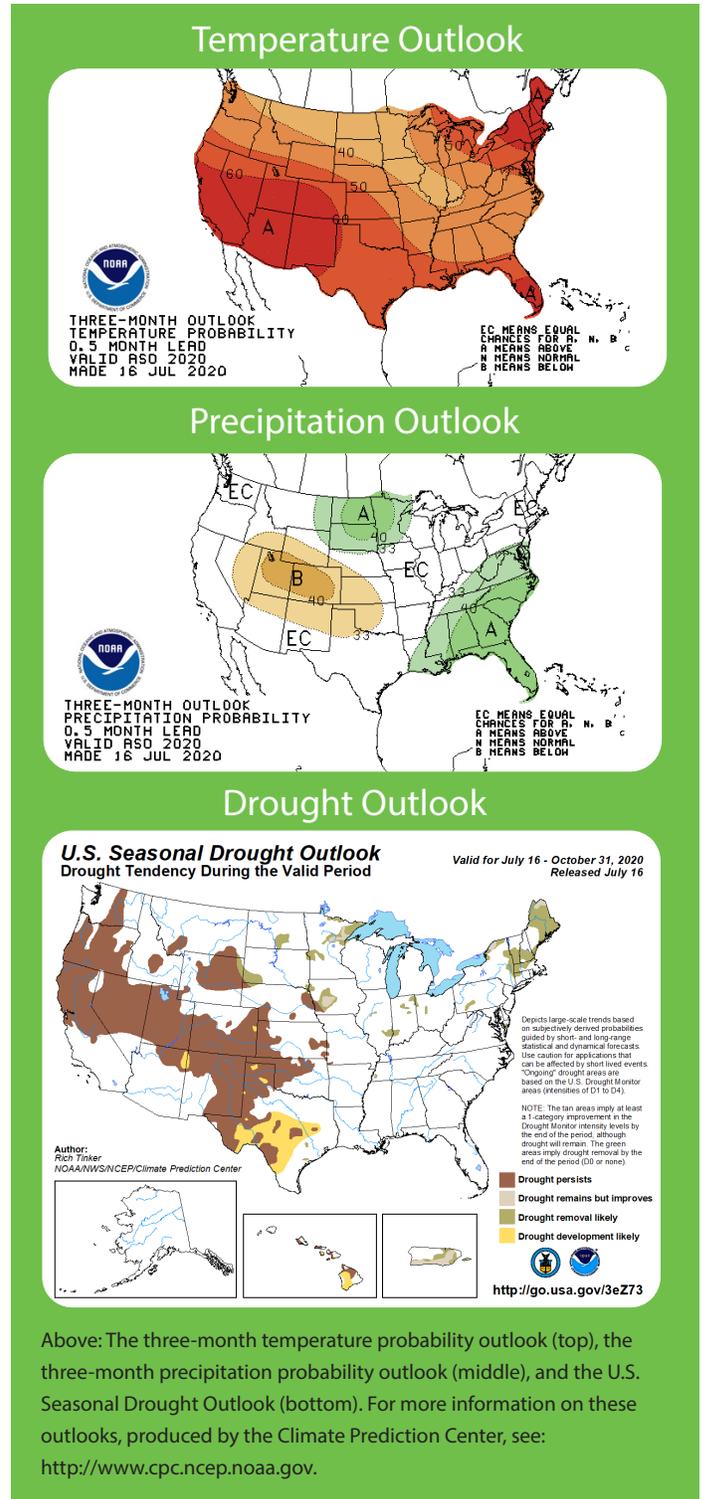
The August-October temperature outlook indicates an increased probability of above-normal temperatures for all of the contiguous U.S. This also includes the entire High Plains region. The highest probability of above-normal temperatures is across Colorado, northern and central Kansas, southwestern Nebraska, and southern Wyoming.

Precipitation

The August-October precipitation outlook indicates a higher chance of above-normal precipitation across eastern and southern portions of the contiguous U.S., and across the northern Plains. In the High Plains, this includes the northern fringes of Nebraska, South Dakota, North Dakota, and northeastern Wyoming. Meanwhile, there is an increased chance of below-normal precipitation across portions of the western U.S. and the southern Plains. In the High Plains, this includes Colorado, much of Kansas and Wyoming, and southwestern Nebraska. Elsewhere, there are equal chances for above-, below-, and near-normal precipitation.

Drought

The July 16th Seasonal Drought Outlook indicates that, over the next three months, drought is expected to persist in parts of the West, Northwest, and Plains. Drought conditions may develop in portions of the Four Corners region and the southern Plains. Drought may improve or be removed across portions of the northeastern U.S., Midwest, and the northern Plains. In the High Plains, drought conditions could further develop or persist across much of Colorado, northern Wyoming, and portions of Nebraska and Kansas. Drought will likely be removed across northeastern Wyoming, central North Dakota, and portions of 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	90.5	61.3	75.9	1.9	101	07/12	52	07/01	1.45	-1.10	57
Alamosa San Luis Airport	84.7	46.5	65.6	1.0	93	07/11	28	07/01	1.58	0.61	163
Colorado Springs Municipal Airport	89.2	59.2	74.2	3.3	96	07/10+	50	07/01	1.53	-1.31	54
Denver International Airport	92.4	60.7	76.5	2.3	99	07/18+	52	07/01	0.95	-1.21	44
Grand Junction Walker Field Airport	95.8	64.5	80.1	1.9	105	07/13	49	07/01	0.05	-0.56	8
Pueblo Memorial Airport	95.5	62.3	78.9	3.1	104	07/13+	55	07/20+	1.31	-0.75	64

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	90.5	70.2	80.3	1.2	99	07/18	64	07/31	10.24	6.32	261
Dodge City Regional Airport	91.7	66.9	79.3	-0.3	103	07/08	60	07/31	7.07	3.99	230
Goodland Renner Field	90.7	62.8	76.7	1.0	100	07/18+	50	07/01	4.99	1.52	144
Topeka Municipal Airport	89.1	71.2	80.1	1.1	96	07/18	62	07/12	9.95	6.13	260
Wichita Mid-Continent Airport	92.5	72.0	82.3	1.2	99	07/02	66	07/31+	4.67	1.35	141

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	93.8	60.0	76.9	3.3	107	07/07	45	07/01	0.77	-1.34	36
Grand Island Airport	88.0	66.7	77.4	1.2	100	07/18	60	07/31	4.55	1.15	134
Lincoln Municipal Airport	88.1	67.9	78.0	0.4	96	07/18	60	07/28	5.73	2.33	169
Norfolk Karl Stefan Airfield	88.6	65.0	76.8	1.8	99	07/18	56	07/31	2.52	-0.80	76
North Platte Regional Airport	90.2	62.9	76.6	2.3	97	07/24+	48	07/01	4.31	1.24	140
Omaha Eppley Airport	89.6	68.8	79.2	2.5	98	07/18	60	07/16	1.56	-2.27	41
Valentine Miller Field	91.1	63.3	77.2	2.7	103	07/17	48	07/01	3.68	0.47	115

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	87.5	60.4	74.0	2.9	98	07/17	53	07/20	1.60	-1.29	55
Fargo International Airport	84.3	62.3	73.3	2.3	93	07/24	52	07/22	5.50	2.71	197
Grand Forks International Airport	83.7	61.7	72.7	4.1	94	07/24	52	07/22	6.70	3.55	213
Theodore Roosevelt Airport	85.0	55.1	70.1	0.9	97	07/17	46	07/14	1.93	-0.51	79
Williston International Airport	83.9	57.8	70.9	0.8	98	07/23	49	07/13	2.46	-0.08	97

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	87.7	62.8	75.2	3.9	95	07/24	53	07/15	1.73	-1.29	57
Huron Regional Airport	85.6	64.0	74.8	1.1	92	07/24+	56	07/15	2.54	0.38	87
Pierre Regional Airport	89.8	62.5	76.1	0.7	103	07/17	55	07/01	3.29	0.68	126
Rapid City Regional Airport	87.9	58.7	73.3	0.7	100	07/23	47	07/01	2.16	0.31	117
Sioux Falls Joe Foss Field Airport	87.4	65.5	76.5	3.5	94	07/18	54	07/15	2.21	-0.88	72

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	91.2	52.2	71.7	1.2	100	07/12	41	07/02	0.02	-1.39	1
Cheyenne Municipal Airport	86.5	56.4	71.4	2.0	96	07/12+	48	07/01	1.67	-0.52	76
Lander Hunt Field Airport	89.6	56.2	72.9	1.7	96	07/17+	46	07/01	0.09	-0.69	12
Laramie Regional Airport	84.1	48.1	66.1	2.1	91	07/07	35	07/01	0.52	-0.91	36
Rawlins Municipal Airport	87.3	49.4	68.4	1.4	93	07/12	37	07/01	0.15	-0.69	18
Sheridan County Airport	91.0	53.2	72.1	2.1	103	07/22+	43	07/15	0.06	-1.12	5

July 2020 Highlights

Monthly Rankings

Precipitation in inches, Temperature in degrees F

Warmest	Temperature / Ranking	Record / Year	Period of Record
Colorado Springs, CO	74.2 / 8th warmest	75.8 / 2003	1894-2020
Grand Forks, ND	72.7 / 8th warmest	79.3 / 1936	1893-2020
Driest	Precipitation / Ranking	Record / Year	Period of Record
Casper, WY	0.02 / DRIEST	0.09 / 1991	1939-2020
Sheridan, WY	0.06 / 2nd driest	0.02 / 1999	1907-2020
Grand Junction, CO	0.05 / 8th driest	T / 1898	1893-2020
Wettest	Precipitation / Ranking	Record / Year	Period of Record
Concordia, KS	10.24 / 3rd wettest	16.75 / 1993	1885-2020
Dodge City, KS	7.07 / 5th wettest	9.13 / 1962	1874-2020
Grand Forks, ND	6.70 / 6th wettest	9.08 / 1995	1893-2020
Topeka, KS	9.95 / 7th wettest	12.02 / 1950	1887-2020

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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:
<https://www.drought.gov/drought/calendar/webinars>

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

Author Information

For questions, comments, or suggestions, please contact:
Logan Winters, Service Climatologist
(402) 472-3471 - lwinters2@unl.edu
701 Hardin Hall, 3310 Holdrege Street
Lincoln, NE 68583-0997
<http://hprcc.unl.edu>

