



# June 2021 Climate Summary

A dry watering hole in McHenry County, ND. Photo courtesy Condition Monitoring Observer Reports. <http://hprcc.unl.edu>

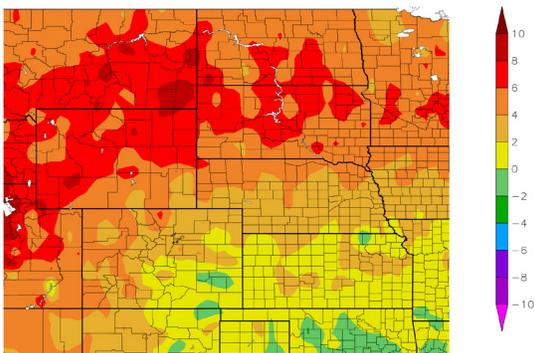
## Hot and Dry

Oppressive heat and dryness caused drought conditions to continue to intensify throughout the High Plains in June. Impacts were being felt in several sectors across multiple states in the region. The continuation of poor pasture and range conditions across the Dakotas and Wyoming has made it increasingly difficult to find forage for livestock, which has forced producers to sell off their herds. The availability of high-quality water supplies for livestock was also very limited. Soil moisture was depleted across the northern part of the region. For instance, according to the June 29th USDA Weekly Weather and Crop Bulletin, 90 percent of South Dakota's topsoil moisture and 87 percent of its subsoil moisture were rated short to very short. Spring wheat and barley were not only faring poorly in the Dakotas, but nationwide as well, as both crops were in the worst condition ever recorded up to this point in the season since at least 2001. Corn and soybean conditions began to deteriorate throughout the Dakotas as well, as curling corn leaves and short soybeans were reported. Corn will be entering the silking stage very soon in this region, which is a critical growth stage due to the amount of moisture needed. If ample precipitation is not received during this stage, yield is likely to be lower.

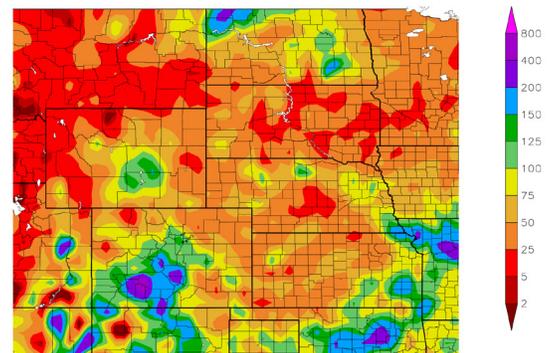
Ongoing drought conditions across the Northern Plains also contributed to extremely high temperatures. While heatwaves are certainly not uncommon in June, the intensity of the heat that early in the summer was unusual. Several locations throughout the Dakotas reached 100.0 degrees F (37.8 degrees C) the first week of the month. However, it was the heatwave in late June across the northern U.S. that was highly impactful, especially across the Pacific Northwest. Numerous all-time high temperature records were shattered across Washington and Oregon, and many were left vulnerable to the heat due to the lack of air conditioning, resulting in over 100 deaths. It is worth mentioning that the heatwave also impacted western Canada. Lytton, British Columbia set an unofficial record high for Canada at 121.3 degrees F (49.6 degrees C). While the number varies by source, several hundred deaths were blamed on the heatwave in British Columbia.

## Temperature and Precipitation Overview

Departure from Normal Temperature (F)  
6/1/2021 - 6/30/2021



Percent of Normal Precipitation (%)  
6/1/2021 - 6/30/2021



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

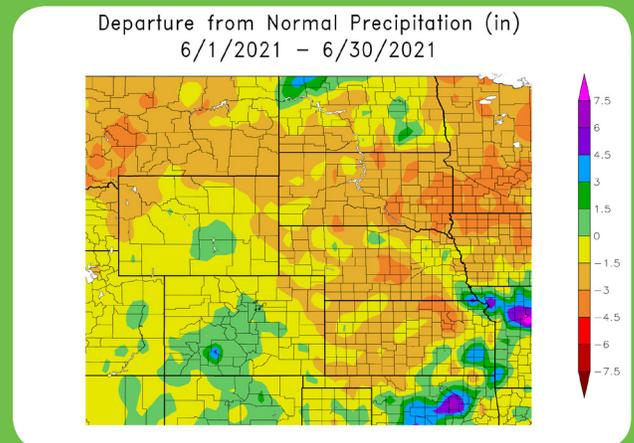
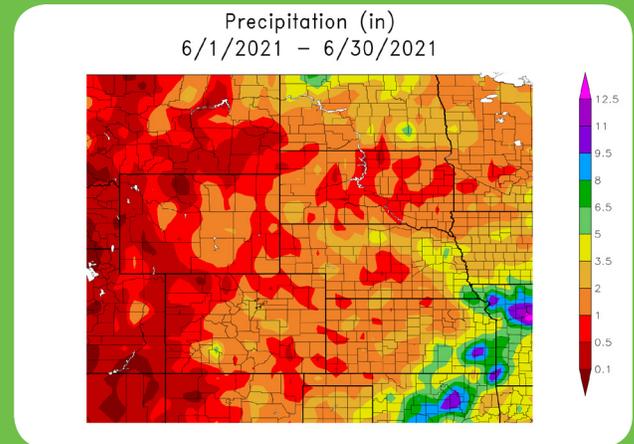
For the most part, June was dry across the High Plains. Monthly precipitation totals of less than 50 percent of normal were widespread, with pockets of South Dakota, Wyoming, and Nebraska receiving 25 percent of normal precipitation at best. This resulted in several locations breaking into the top 10 driest Junes on record. For instance, Moberge, South Dakota tied for its 2nd driest June, recording a paltry 0.38 inch (10 mm) of precipitation (period of record 1911-2021). The dryness drove up temperatures and exacerbated drought conditions across the region.

On the other hand, southwestern and central Colorado, as well as pockets of North Dakota and eastern Kansas, had a wet June with precipitation exceeding 150 percent of normal. While this was not record-breaking, heavy rains did cause impacts in Colorado. For instance, localized flooding occurred in Montrose on the 24th after the CQ canal was overwhelmed with water. According to an article in the Montrose Press, floodwaters damaged homes and agriculture and livestock operations. A few days later, heavy rain fell over the Grizzly Creek Fire burn scar in Glenwood Canyon, triggering several mudslides that forced the closure of Interstate 70 two separate times over the course of a few days.

When one thinks about June on the High Plains, an active severe weather period usually comes to mind. While there were reports of severe weather throughout the region in June, it was rather quiet compared to recent years. For instance, according to the National Weather Service in Wichita, only four tornado warnings were issued across Kansas, which was well below the June average of 29 (based on data going back to 1986). According to the Storm Prediction Center, 109 tornadoes were reported nationwide in June, which is below the most recent three-year average of 141.

The 2020-21 snow season officially ended on June 30th. Snowfall varied across the region, with portions of Wyoming, Colorado, and Nebraska having an above-normal snow season while much of North Dakota, South Dakota, and Kansas missed out. Lincoln, NE had its 3rd snowiest season, while Scottsbluff, NE had its 4th snowiest (Lincoln period of record 1948-2021, Scottsbluff period of record 1893-2021). Meanwhile, it was the 7th least snowiest season for Bismarck, ND and the 8th least snowiest for Grand Forks, ND (Bismarck period of record 1886-2021, Grand Forks period of record 1893-2021).

### Regional Precipitation



Above: Total precipitation in inches (top) and departure from normal precipitation in inches (bottom) for June 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>.

### Streamflow Update

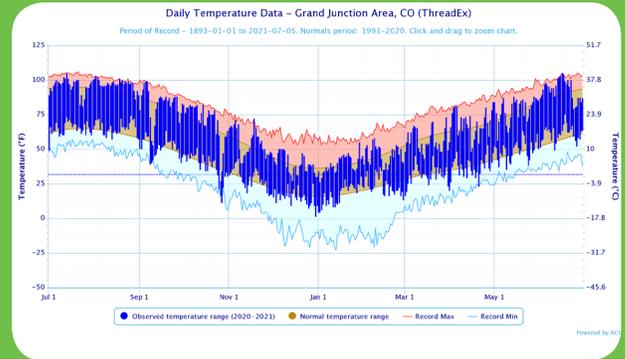
Upper Missouri Basin mountain snowpack completely melted out in June. Due to drought conditions in the upper Basin, the U.S. Army Corps of Engineers Missouri River Water Management Division announced that they will reduce navigation flow support for the second half of the navigation season. However, they do expect that the length of the navigation flow support season will be a full eight months, ending December 1. Below-normal precipitation continued to cause streamflows to dwindle throughout the region. The lowest streamflows could be found across much of North Dakota, eastern South Dakota, western Colorado, and along the northern, southern, and western borders of Wyoming. However, streamflows were faring well across much of Kansas and eastern Colorado where precipitation has been more plentiful.

## Temperatures

After much of the region experienced below-normal temperatures in May, the pattern flipped in June, bringing above-normal temperatures to nearly the entire region. With the exception of the majority of Kansas and eastern Colorado, most of the High Plains experienced temperature departures of at least 2.0 degrees F (1.1 degrees C) above normal. However, the greatest departures occurred across a large portion of Wyoming and areas of the Dakotas, where temperatures were 6.0-8.0 degrees F (3.3-4.4 degrees C) above normal. Numerous locations in five High Plains states broke into the top 10 warmest Junes on record.

Partly to blame for the widespread temperature records was a heat wave that occurred in mid-June, which sent temperatures soaring above 100.0 degrees F (37.8 degrees C). During this heat wave, Sheridan, WY recorded its highest June temperature on record when it reached 107.0 degrees F (41.7 degrees C) on the 15th (period of record 1907-2021). This tied the highest temperature ever recorded in any month for Sheridan. On the 16th, it reached 105.0 degrees F (40.6 degrees C) in Grand Junction, CO, which tied the record for highest June temperature (period of record 1893-2021). In fact, three of Grand Junction's top 10 highest June temperatures were reached last month on the 15th, 16th, and 17th. It is also worth noting that the heat came especially early this year for some locations. Casper, WY reached 101.0 degrees F (38.3 degrees C) on the 15th, which was its earliest 100.0 degrees F (37.8 degrees C) day on record by six days (period of record 1939-2021). Colorado Springs, CO had its earliest 100.0 degrees F (37.8 degrees C) reading as well, occurring on the 16th. Interestingly, Colorado Springs has only recorded a maximum temperature of 100.0 degrees F (37.8 degrees C) 10 times since record-keeping began in 1894.

### Station Spotlight: Grand Junction, CO



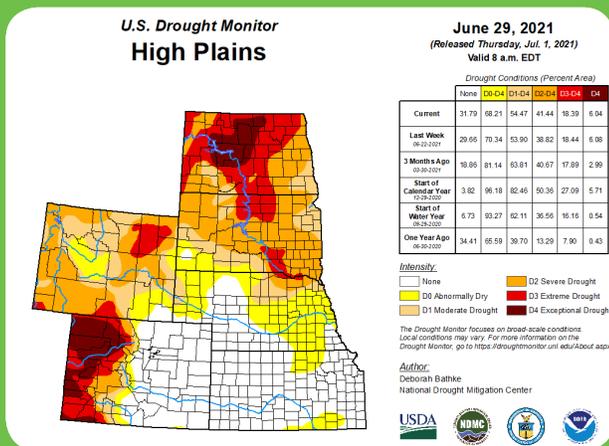
Above: Daily temperatures along with extremes and normals values since July 1, 2020 in Grand Junction, CO.

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## Drought Conditions

Both improvements and degradations in drought conditions occurred in the High Plains in June. According to the U.S. Drought Monitor, the area experiencing drought (D1-D4) increased from approximately 48 percent to 55 percent over the course of the month. However, the area experiencing abnormal dryness and drought (D0-D4) decreased slightly from about 69 percent to 68 percent.

### 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/>.

Drought conditions intensified in parts of Wyoming, South Dakota, and Nebraska. New areas of extreme drought (D3) were introduced to northeastern Wyoming and southeastern South Dakota/northeastern Nebraska, while the area of D3 in north-central South Dakota expanded southward. Severe drought (D2) expanded throughout much of Wyoming, as well as eastern South Dakota into northeastern Nebraska. Moderate drought (D1) spread across portions of north-central Nebraska and the Nebraska Panhandle and filled in remaining areas of eastern South Dakota that had not been in drought. Abnormal dryness (D0) expanded into central and southern Nebraska down into north-central Kansas. All of these areas have experienced below-normal precipitation going back to April.

Several areas also experienced improvement in conditions. Much-needed rain fell in southwestern North Dakota/northwestern South Dakota, improving D3 areas to D2 or D1. Heavy rains also improved D1 conditions along the Continental Divide in Colorado, and D0 was eradicated across much of eastern Colorado and southern Kansas.

## Climate Outlooks

According to the Climate Prediction Center, ENSO-neutral conditions are present in the Pacific. ENSO-neutral is expected to persist through the summer and fall. 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 September for the Stranger Creek at Easton, Kansas. Minor flooding is expected along the Neosho River and Cow Creek in Kansas, the North Platte River in Nebraska, and the Arkansas River in Colorado. Above-normal wildland fire potential is expected across North Dakota, most of Wyoming, western and central South Dakota, western Colorado, and northwestern Nebraska through August, and across much of Wyoming, southwestern South Dakota, and northwestern portions of Nebraska and Colorado in September. Wildland fire potential is expected to return to normal across the region in October. 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

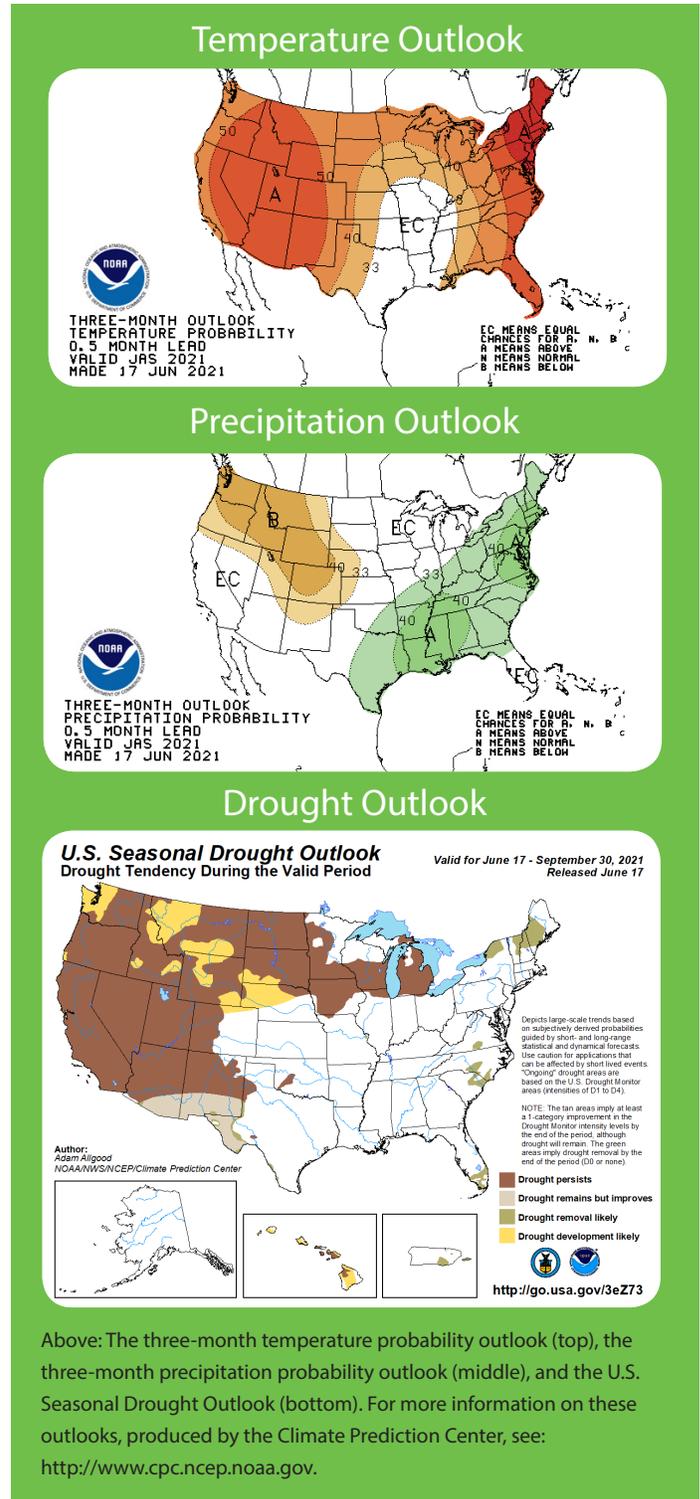
The July-September temperature outlook indicates an increased chance of above-normal temperatures for western, central, northern, and eastern portions of the contiguous U.S. In the High Plains, this includes Colorado, Wyoming, North Dakota, South Dakota, the majority of Nebraska, and western and central Kansas. Below-normal temperatures are not anticipated for any regions in the contiguous U.S. Elsewhere, there are equal chances for above-, below-, and near-normal temperatures during the July-September period.

### Precipitation

The precipitation outlook for the next three months calls for a higher probability of above-normal precipitation across southern and eastern parts of the contiguous U.S. Below-normal precipitation is anticipated for portions of the Pacific Northwest, the northern Rockies, and the western Plains. In the High Plains, this includes Colorado, Wyoming, and western areas of South Dakota, Nebraska, and Kansas. Elsewhere, there are equal chances for above-, below-, and near-normal precipitation during the July-September period.

### Drought

The June 17th U.S. Seasonal Drought Outlook indicates that drought is expected to persist or develop throughout much of the West, the northern and central Plains, and the Great Lakes region through September. In the High Plains, drought persistence is likely, with further development possible in northern Colorado, northern and southeastern Wyoming, southwestern South Dakota, and northern and western Nebraska. Drought may improve or be removed in portions of the Southwest, as well as pockets of the Northeast, the Mid-Atlantic, and southern Florida.



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	84.6	56.6	70.6	2.4	100	06/16	46	06/02+	0.74	-1.50	33
Alamosa San Luis Airport	82.2	43.8	63.0	2.4	94	06/16	34	06/01	0.89	0.46	207
Colorado Springs Municipal Airport	83.9	55.3	69.6	2.4	100	06/16	40	06/01	2.15	-0.12	95
Denver International Airport	86.4	56.8	71.6	3.4	101	06/15	44	06/01	0.84	-1.10	43
Grand Junction Walker Field Airport	93.2	60.8	77.0	4.0	105	06/16	49	06/11	0.10	-0.31	24
Pueblo Memorial Airport	89.5	57.0	73.2	1.4	103	06/17	45	06/02	0.38	-0.90	30

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	89.9	65.2	77.6	3.2	105	06/17	52	06/02	1.16	-2.67	30
Dodge City Regional Airport	90.8	65.0	77.9	2.8	105	06/18	53	06/02	0.84	-2.45	26
Goodland Renner Field	87.4	58.2	72.8	2.1	104	06/17	43	06/02	0.99	-1.97	33
Topeka Municipal Airport	88.7	66.8	77.8	2.3	101	06/17	54	06/02	4.67	-0.25	95
Wichita Mid-Continent Airport	88.4	66.4	77.4	0.5	102	06/20	53	06/03+	6.36	1.43	129

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	89.3	55.2	72.3	5.3	103	06/23+	43	06/02	1.56	-0.90	63
Grand Island Airport	89.7	62.9	76.3	3.5	106	06/17	52	06/02+	1.85	-2.16	46
Lincoln Municipal Airport	89.5	63.5	76.5	2.8	103	06/17	47	06/02	4.46	-0.02	100
Norfolk Karl Stefan Airfield	88.2	61.9	75.0	4.6	100	06/17+	47	06/01	3.40	-0.97	78
North Platte Regional Airport	88.4	58.4	73.4	3.7	103	06/16	41	06/01	1.58	-1.96	45
Omaha Eppley Airport	89.5	65.8	77.7	3.8	105	06/17	51	06/02	3.79	-0.65	85
Valentine Miller Field	90.3	58.9	74.6	5.6	108	06/23	47	06/01	2.01	-1.95	51

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	88.8	57.0	72.9	7.5	106	06/04	48	06/22+	1.62	-1.74	48
Fargo International Airport	86.3	57.0	71.6	4.8	102	06/04	46	06/22+	3.59	-0.70	84
Grand Forks International Airport	84.7	53.8	69.3	4.7	103	06/04	42	06/21	2.45	-1.32	65
Theodore Roosevelt Airport	83.1	52.7	67.9	5.4	97	06/23+	42	06/21	1.70	-1.35	56
Williston International Airport	83.3	56.2	69.8	6.3	97	06/04	43	06/21	2.12	-0.52	80

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	90.0	57.0	73.5	5.9	104	06/05	44	06/21	0.78	-2.98	21
Huron Regional Airport	88.9	58.3	73.6	5.3	101	06/16+	45	06/21	1.12	-2.77	29
Pierre Regional Airport	91.3	58.0	74.6	6.8	104	06/23+	45	06/22+	0.53	-3.16	14
Rapid City Regional Airport	86.2	54.0	70.1	5.5	99	06/15	46	06/22	2.52	-0.35	88
Sioux Falls Joe Foss Field Airport	89.5	61.0	75.3	5.4	101	06/05	41	06/01	0.78	-3.45	18

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	87.1	49.5	68.3	5.8	101	06/15	37	06/12	1.97	0.63	147
Cheyenne Municipal Airport	81.4	52.3	66.9	3.8	95	06/17	43	06/01	2.62	0.46	121
Lander Hunt Field Airport	86.3	53.9	70.1	7.3	98	06/16+	38	06/11	0.86	-0.22	80
Laramie Regional Airport	80.3	45.5	62.9	4.9	94	06/15	35	06/11	1.52	0.03	102
Rawlins Municipal Airport	83.6	47.5	65.6	5.7	96	06/16+	34	06/12	0.93	0.06	107
Sheridan County Airport	87.6	50.6	69.1	7.3	107	06/15	40	06/12	0.32	-1.66	16

## June 2021 Highlights

### Monthly Rankings

Temperature in degrees F, precipitation in inches

Warmest	Temperature / Ranking	Record / Year	Period of Record
Sheridan, WY	69.1 / 2nd warmest	74.1 / 1988	1907-2021
Lander, WY	70.1 / 2nd warmest	72.5 / 1988	1891-2021
Scottsbluff, NE	74.1 / 2nd warmest	75.3 / 2012	1893-2021
Bismarck, ND	72.9 / 3rd warmest	75.6 / 1988	1874-2021
Fargo, ND	71.6 / 3rd warmest	73.8 / 1988	1881-2021
Aberdeen, SD	73.5 / 3rd warmest	75.0 / 1988	1893-2021
Sioux Falls, SD	75.3 / 3rd warmest	76.3 / 1988	1893-2021
Laramie, WY	62.9 / 3rd warmest	64.0 / 2012	1948-2021
Chadron, NE	72.3 / 4th warmest	74.2 / 2012	1941-2021
Valentine, NE	74.6 / 4th warmest (tie, 1956)	77.2 / 1933	1889-2021
Grand Junction, CO	77.0 / 5th warmest (tie, 2017+)	79.1 / 1977	1893-2021
Driest	Precipitation / Ranking	Record / Year	Period of Record
Mobridge, SD	0.38 / 2nd driest (tie, 1911)	0.26 / 1974	1911-2021
Sioux Falls, SD	0.78 / 3rd driest	0.36 / 1893	1893-2021
Pierre, SD	0.53 / 4th driest	0.32 / 1913	1893-2021
Sheridan, WY	0.32 / 4th driest	0.07 / 1933	1907-2021
Aberdeen, SD	0.78 / 5th driest	0.07 / 1929	1893-2021
Goodland, KS	0.99 / 11th driest (tie, 2012)	0.10 / 1976	1895-2021

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

For an archive:  
[www.hprcc.unl.edu/webinars.php](http://www.hprcc.unl.edu/webinars.php)

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