



May 2020 Climate Summary



The Nebraska Sandhills. Photo courtesy Logan Winters.
<http://hprcc.unl.edu>

Dry Conditions Persist

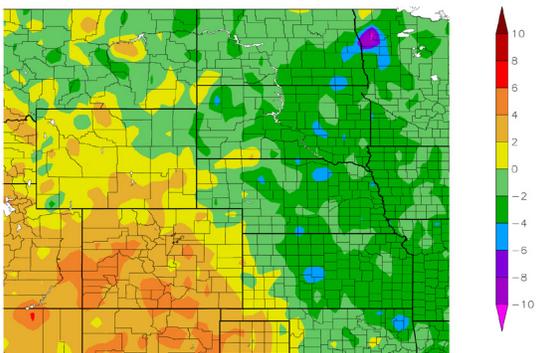
There was a stark contrast in temperatures across the High Plains region this month, with the dividing line between above- and below-normal temperatures occurring roughly along a line from north-central Wyoming through southwestern Kansas. Temperatures in areas east of this line were largely below normal, with widespread temperature departures up to 4.0 degrees F (2.2 degrees C) below normal. Areas to the west, however, were quite warm, with temperature departures up to 6.0 degrees F (3.3 degrees C) above normal. In the warmer areas, some locations ranked in the top 10 warmest Mays on record (see page 6).

Meanwhile, much of the High Plains region was dry this month, which contributed to the development or expansion of abnormally dry and drought conditions in many areas (see page 3 for more details). These dry conditions had mixed impacts across the region. Winter wheat conditions continued to decline in some areas, especially in eastern Colorado. According to the June 2nd USDA Weekly Weather and Crop Bulletin, 41 percent of Colorado's winter wheat crop and 25 percent of Kansas' winter wheat crop were rated poor to very poor. There have been reports of abandoned wheat fields in both states. Pastures and rangelands have also been impacted by the dry conditions. According to Grass-Cast, even if above-normal precipitation were to occur during the summer months, grassland production would still be below normal for the season in Colorado, eastern Wyoming, and portions of western Kansas.

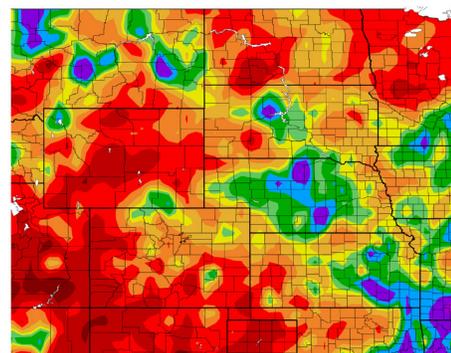
As for positive impacts, producers were able to make significant planting progress due to the dry conditions. In fact, at the end of May, corn planting was ahead of the 5-year average in Colorado, Kansas, Nebraska, and South Dakota. Planting progress was behind in North Dakota, however, largely due to wet soils and unharvested crops from 2019. Corn planting was 15 percent behind the 5-year average, while soybean planting was 29 percent behind the 5-year average in the state.

Temperature and Precipitation Overview

Departure from Normal Temperature (F)
5/1/2020 - 5/31/2020



Percent of Normal Precipitation (%)
5/1/2020 - 5/31/2020



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

Overall, May was a dry month across the High Plains region, with only a few areas receiving near normal to above-normal precipitation. Much of Wyoming, southern and western Colorado, western Kansas, and western North Dakota had precipitation totals of less than 50 percent of normal, which contributed to the degradation of drought conditions in these areas. May precipitation deficits were in excess of 1.50 inches (38 mm) in parts of east-central Wyoming and southwestern North Dakota. The dry conditions led to several locations ranking in the top 10 driest Mays on record. For instance, Lander, WY, which has a period of record extending back to 1892, tied for its driest May on record with only 0.06 inches (2 mm) of precipitation. May is typically the wettest month of the year in Lander, so it will be difficult to overcome deficits in the short term. Other locations ranking in the top 10 included Casper, WY (driest); Pueblo, CO (5th driest); Grand Junction, CO (10th driest); and Sheridan, WY (10th driest).

Although dry conditions were widespread, there were some areas that received above-normal precipitation, such as central and northern Nebraska, central South Dakota, and eastern Kansas. In these areas, precipitation totals were up to 200 percent of normal. One particularly wet location was Parsons, KS, which is located in the southeast corner of the state. The Parsons 2 NW COOP station received 12.66 inches (322 mm) of precipitation this month, which was 6.73 inches (171 mm) above normal, or 213 percent of normal precipitation. Although this was enough to rank as the 4th wettest May on record, last year's record-setting amount of 19.27 inches (489 mm) firmly held (period of record 1925-present). A nearby Kansas Mesonet station, called Parsons, received slightly more precipitation, with 13.72 inches (348 mm).

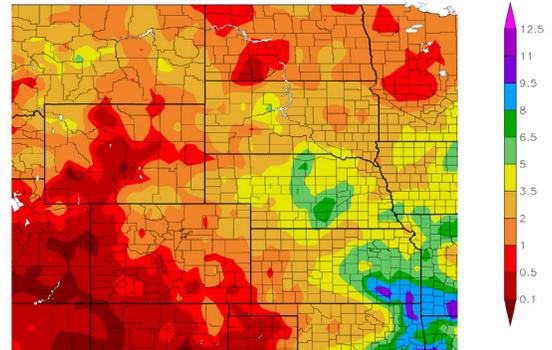
Interestingly, May was a quiet month for severe weather, not just for the High Plains region, but for the nation as a whole. According to the National Weather Service, 2020 was the first year in which the Storm Prediction Center did not issue a Day 1 outlook for a moderate or high risk for severe weather in the month of May (records extend back to 1995). May 2020 also yielded the fewest severe weather reports since 2014, nationally. Here in the High Plains region, there were 362 reports of high winds, large hail, and tornadoes this May, which was about half of the most recent 5-year average of 697 (2015-2019).

Snowpack and Runoff Update

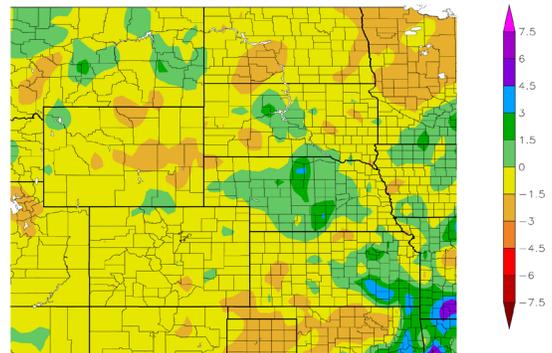
At the beginning of June, snowpack was below normal for most basins in Colorado and Wyoming, with the exception of western Wyoming, where snowpack was near to above normal. Above-normal temperatures have contributed to increased runoff, with some areas experiencing much above normal or high streamflows for this time of the year. Just outside the High Plains region in Montana, for instance, unseasonably warm conditions have led to record or near-record flooding along some tributaries of the Missouri River. As of May 31st, mountain SWE was 84 percent of normal above Fort Peck and 83 percent of normal in the reach from Fort Peck to Garrison, according to the U.S. Army Corps of Engineers. Monthly streamflows were generally near to above normal across the region, with some exceptions in areas of western and southern Colorado and portions of the Republican River in Nebraska.

Regional Precipitation

Precipitation (in)
5/1/2020 - 5/31/2020



Departure from Normal Precipitation (in)
5/1/2020 - 5/31/2020



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

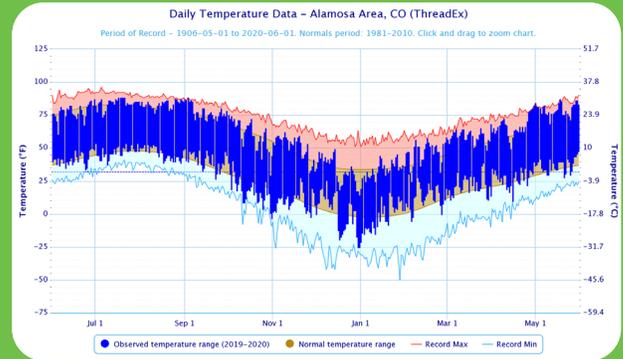
Temperatures

Temperatures varied across the High Plains during the month of May, with below-normal temperatures across roughly the eastern half of the region, and above-normal temperatures across the western half. The dividing line between the above- and below-normal temperatures generally extended from north-central Wyoming through southwestern Kansas. Although temperature departures did reach upwards of 6.0 degrees F (3.3 degrees C) below normal in some isolated areas in the east, this was not enough for widespread records to occur. To the west, however, where temperature departures were up to 6.0 degrees F (3.3 degrees C) above normal, many locations ranked in the top 10 warmest Mays on record.

One of these locations was Alamosa, CO, which is located in south-central Colorado, just to the southwest of the Great Sand Dunes National Park and Preserve. With an average temperature of 57.7 degrees F (14.3 degrees C), Alamosa had its warmest May on record. The previous record occurred in both May 1996 and May 1984 with an average monthly temperature of 55.2 degrees F (12.9 degrees C) (period of record 1906-present). Interestingly, only two days during the month of May 2020 were below normal in Alamosa - May 21st and May 25th.

Other locations that ranked in the top 10 warmest Mays on record included Pueblo, CO (6th warmest); Colorado Springs, CO (9th warmest); and Grand Junction, CO (9th warmest). While Denver, CO did not rank in the top 10 warmest Mays, Denver did observe its first 90.0 degrees F (32.2 degrees C) day three weeks earlier than average.

Station Spotlight: Alamosa, CO

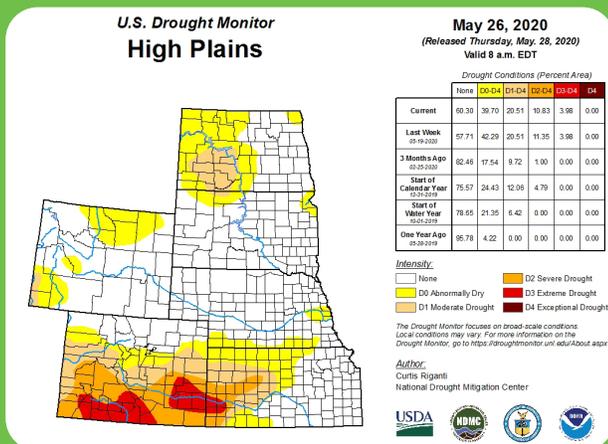


Above: Daily temperatures along with extremes and normals values since June 1, 2019 in Alamosa, CO.

Drought Conditions

This month, drought conditions continued to expand and intensify across portions of the High Plains region. According to the U.S. Drought Monitor, the area experiencing drought (D1-D4) in the region increased about 8 percent between April 28th and May 26th. This increase was due to the development and/or expansion of drought in Colorado, western Kansas, far southwestern Wyoming, and an area extending from west-central North Dakota into northern South Dakota.

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/>.

Across southern portions of the region, warm, dry conditions contributed to the expansion and intensification of drought across the southern half of Colorado and western Kansas. Drought now encompasses approximately 65 percent of Colorado and 27 percent of Kansas. The most dramatic change to occur during the month was the development of extreme drought (D3) conditions across portions of southwestern Kansas and southern and eastern Colorado. In some of these areas, burn bans are in effect and there have been reports of cattle sell-offs.

In other areas of the region, there was a mix of degradations and improvements. For instance, a large area of abnormally dry conditions (D0) was removed from central South Dakota, but D0 expanded across portions of western and northern Wyoming. An area of D1 also developed in western North Dakota and northern South Dakota.

Conditions will be monitored closely through the summer.

Climate Outlooks

According to the Climate Prediction Center, ENSO-neutral conditions continued through May in the Pacific. These conditions will likely continue through 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 a greater than 50 percent chance of minor to moderate flooding across portions of the region. This includes a few locations along the Missouri River mainstem in North Dakota, Nebraska, and Kansas, along with tributaries, such as the James River in South Dakota. Minor to moderate flooding is also forecast along the Little Osage River and the Marais Des Cygnes River in Kansas. Only one location has a greater than 50 percent chance of major flooding - James River near Ashton, SD. Meanwhile, above-normal wildland fire potential is expected across portions of southern and western Colorado through July.

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

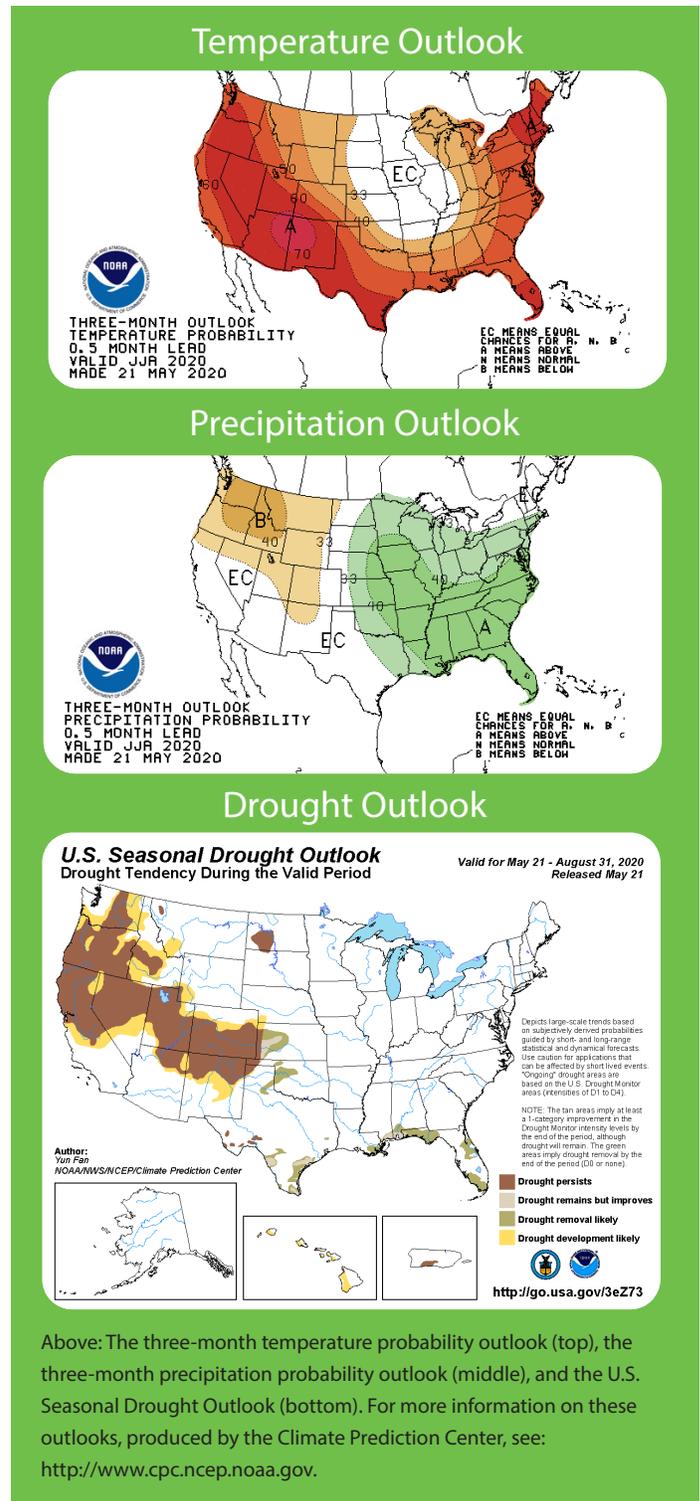
The June-August temperature outlook indicates an increased probability of above-normal temperatures for much of the western, southern, and eastern U.S. In the High Plains, this includes Wyoming, Colorado, and western portions of Kansas, North Dakota, South Dakota, and Nebraska. Across the remainder of the U.S., there are equal chances for above-, below-, and near-normal temperatures. There are no areas with an increased chance of below-normal temperatures through August.

Precipitation

The June-August precipitation outlook indicates a higher probability of above-normal precipitation across much of the eastern half of the contiguous U.S. In the High Plains, this includes most of Nebraska and Kansas, the eastern half of South Dakota, and southeastern North Dakota. Across parts of the western U.S., there is an increased chance for below-normal precipitation. In the High Plains, this includes western Colorado, much of Wyoming, and far western North Dakota. Elsewhere, there are equal chances for above-, below-, and near-normal precipitation through August.

Drought

The May 21st Seasonal Drought Outlook indicates that drought is expected to persist or develop across much of the West and isolated areas of the Plains. Drought may improve or be removed across portions of the southern U.S., part of Florida, and portions of the Plains. In the High Plains region, drought conditions are expected to persist across much of Colorado, western Kansas, west-central North Dakota, and northern South Dakota. Drought conditions may improve or be removed across portions of west-central Kansas over the next three months.



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	71.6	43.4	57.5	0.4	92	05/31	29	05/09	2.84	-0.08	97
Alamosa San Luis Airport	79.2	36.3	57.7	6.5	87	05/18	27	05/21	0.23	-0.35	40
Colorado Springs Municipal Airport	74.1	44.3	59.2	3.3	89	05/19+	32	05/09	1.15	-0.88	57
Denver International Airport	75.0	44.2	59.6	2.5	92	05/19	30	05/05	1.65	-0.47	78
Grand Junction Walker Field Airport	81.5	50.2	65.8	4.2	94	05/29	37	05/05	0.10	-0.78	11
Pueblo Memorial Airport	82.1	47.9	65.0	4.6	97	05/30	36	05/09	0.27	-1.24	18

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	72.6	52.9	62.7	-0.4	85	05/31	34	05/10	3.26	-0.90	78
Dodge City Regional Airport	76.8	50.2	63.5	-0.7	92	05/30+	38	05/12+	1.84	-1.01	65
Goodland Renner Field	73.8	45.5	59.6	0.2	95	05/31	30	05/09	2.89	-0.06	98
Topeka Municipal Airport	72.2	54.2	63.2	-1.8	84	05/31	37	05/09	6.03	1.12	123
Wichita Mid-Continent Airport	74.6	54.3	64.5	-1.5	87	05/02+	38	05/09	4.36	-0.21	95

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	70.8	41.2	56.0	0.2	94	05/31	22	05/10	1.31	-1.45	47
Grand Island Airport	69.9	49.7	59.8	-1.4	90	05/01	31	05/10	7.48	3.07	170
Lincoln Municipal Airport	70.0	50.1	60.1	-2.2	91	05/01	33	05/09	5.09	0.80	119
Norfolk Karl Stefan Airfield	67.6	48.9	58.3	-2.2	89	05/01	32	05/09	4.60	3.93	117
North Platte Regional Airport	70.5	43.9	57.2	-0.7	90	05/31	25	05/10	3.76	0.48	115
Omaha Eppley Airport	68.7	50.9	59.8	-2.5	86	05/01	34	05/11	3.25	-1.51	68
Valentine Miller Field	69.6	45.0	57.3	-0.3	90	05/31	25	05/10	2.69	-0.44	86

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	67.9	42.1	55.0	-0.5	85	05/22	24	05/11+	0.61	-1.79	25
Fargo International Airport	66.0	43.3	54.7	-2.4	86	05/27	22	05/12	1.47	-1.34	52
Grand Forks International Airport	64.8	39.5	52.2	-2.6	81	05/31+	18	05/12	1.05	-1.63	39
Theodore Roosevelt Airport	66.6	38.8	52.7	-0.4	83	05/22+	20	05/11	1.35	-0.97	58
Williston International Airport	68.1	43.0	55.5	1.4	89	05/31	27	05/11	0.92	-1.00	48

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May 2020 Climate Summary

South Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Aberdeen Regional Airport	67.1	44.9	56.0	-0.4	87	05/27	29	05/12+	2.69	-0.42	86
Huron Regional Airport	67.0	45.8	56.4	-1.7	85	05/27	31	05/11	1.91	1.20	61
Pierre Regional Airport	66.0	43.5	54.7	-3.2	82	05/27	23	05/11	3.45	0.30	110
Rapid City Regional Airport	65.8	40.3	53.1	-1.9	84	05/31	25	05/10	2.26	-0.96	70
Sioux Falls Joe Foss Field Airport	67.4	48.5	57.9	-0.1	86	05/01	34	05/10	2.17	-1.23	64

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	69.8	36.3	53.0	0.8	91	05/31	22	05/08	0.30	-1.72	15
Cheyenne Municipal Airport	67.3	40.8	54.1	1.7	87	05/31	29	05/11	1.06	-1.28	45
Lander Hunt Field Airport	70.3	40.9	55.6	2.3	89	05/30+	31	05/08	0.06	-2.14	3
Laramie Regional Airport	64.8	35.0	49.9	2.3	83	05/29	22	05/08	2.03	0.34	120
Rawlins Municipal Airport	67.2	36.4	51.8	2.4	86	05/30	26	05/08	0.58	-0.83	41
Sheridan County Airport	67.0	38.9	53.0	0.5	92	05/31	23	05/08	0.74	-1.61	31

May 2020 Highlights

Monthly Rankings

Precipitation in inches, Temperature in degrees F

Driest	Precipitation / Ranking	Record / Year	Period of Record
Casper, WY	0.30 / DRIEST	0.30 / 1966	1939-2020
Lander, CO	0.06 / DRIEST	0.06 / 2006	1891-2020
Pueblo, CO	0.27 / 5th driest	T / 2004	1888-2020
Grand Junction, CO	0.10 / 10th driest	T / 1970	1893-2020
Sheridan, WY	0.74 / 10th driest	0.15 / 1936	1907-2020
Warmest	Temperature / Ranking	Record / Year	Period of Record
Alamosa, CO	57.7 / WARMEST	55.2 / 1996+	1906-2020
Pueblo, CO	65.0 / 6th warmest	67.4 / 2018	1888-2020
Colorado Springs, CO	59.2 / 9th warmest	62.2 / 2018	1894-2020
Grand Junction, CO	65.8 / 9th warmest	68.9 / 1934	1893-2020

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North Dakota Climate Summary

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Precipitation:

Based on the National Centers for Environmental Information (NCEI), the statewide average May precipitation was 1.43 inches, which was 0.68 inch more than last month but 0.87 inch less than in May 2019. It also was 1.1 inches less than the 1981-2010 average, making it the 26th driest May in the 126-year period of record. It was the driest May since 2018. The values less than 100 in Figure 1 below are shaded in yellow, orange and red to depict the region with below-average rainfall in May. The greatest monthly precipitation accumulation was 2.95 inches, recorded in Northville, LaMoure County. The greatest monthly snowfall accumulation was 5 inches, recorded in Maxbass, Bottineau County. Based on historical records, statewide May precipitation showed a slight positive long-term trend of 0.3 inch per century since 1895. The lowest and highest May precipitation for the state ranged from 0.23 inch in 1901 to 5.96 inches in 1927.

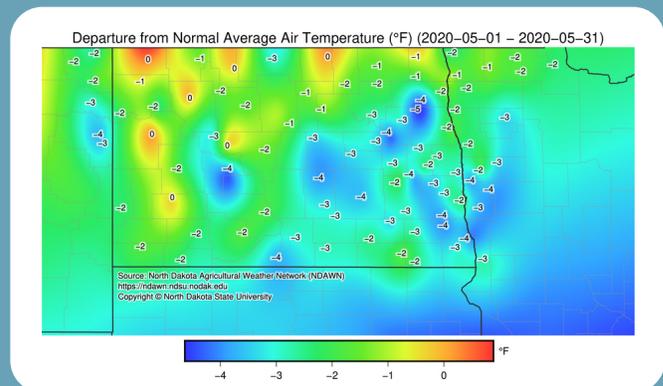
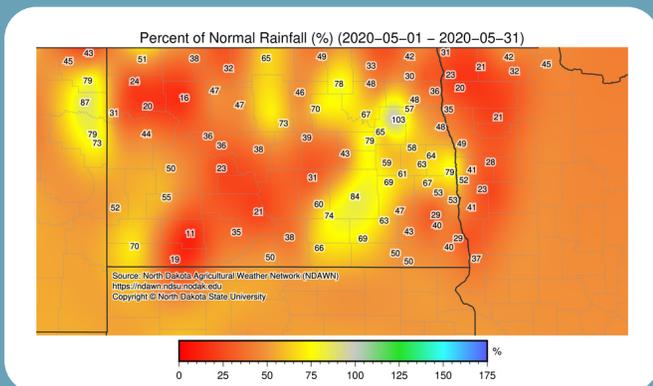
Temperature:

The official state average May temperature was 52.4 F, which is 14.7 degrees warmer than last month and 2.8 degrees warmer than in May 2019. The average May temperature, however, was 1.7 degrees cooler than the 1981-2010 average, which made it the 48th coolest May in the 126 years of record. The negative numbers in Figure 2 are shaded in green and blue to depict the region with cooler-than-average temperatures in May. In contrast, the positive numbers in the same figure are shaded in red and orange to illustrate the region with warmer-than-average temperatures in May. The state's lowest and highest daily temperatures ranged from 14 F on May 11 in Taylor, Stark County, to 92 F on May 22 in Dunn Center, Dunn County. Based on the historical records, the state average May temperature showed a slight positive long-term trend of 0.1 degree per decade since 1895. The lowest and highest monthly state May average temperatures ranged from 44.4 F in 1907 to 63.4 F in 1934.

Drought and other notable impacts:

The NOAA Storm Report showed one tornado (land spout), two hail and no damaging wind reports, with a total of three significant storm event in May. Across the observation network of weather stations with at least 30 years of history, three daily high- and 21 daily low-temperature records were set or tied. A total of seven highest daily precipitation-related records were set or tied.

Temperature and Precipitation Overview



Above: Percent of normal precipitation (left, figure 1) and departure from normal average temperature (right, figure 2) for May 2020 in North Dakota. Figures 1 and 2 produced by NDAWN.

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

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