



March 2017 Climate Summary



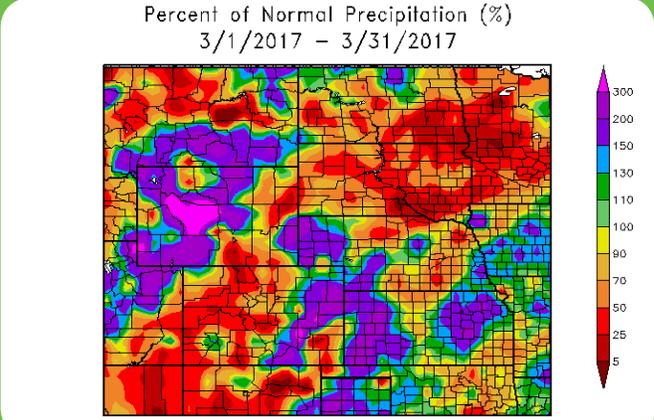
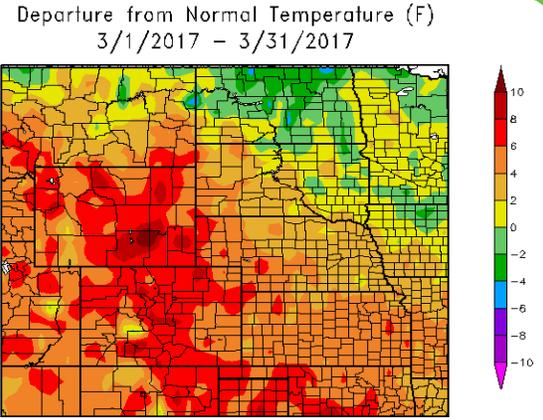
Sandhill cranes feeding in a corn field near Alda, NE. - Photo courtesy Josh Stiles
<http://hprcc.unl.edu>

Warm, Dry Conditions Spark Wildfires Across the Region

Warm weather continued into March across a large portion of the High Plains region, with the greatest departures occurring throughout Wyoming and Colorado. This March was the warmest on record for Alamosa, Colorado, Laramie, Wyoming, and Rawlins, Wyoming, with numerous locations experiencing a March that was among the top 5 warmest. Warm temperatures continued to accelerate plant growth and, according to the National Phenology Network, growth was a couple weeks ahead of schedule in the central and southern High Plains. Early growth of plants has put them at risk for freeze damage, as much of the region is several weeks away from the average last spring freeze. However, the warm weather has contributed to early calving in some areas and has allowed producers to begin prepping their fields for planting.

Wet conditions continued in the Wyoming portion of the Rockies, while it was dry along the Colorado Front Range. Snowpack fared well in Wyoming and Colorado during March as we near the end of the first half of the snowpack season. On the other hand, a continuation of warm and dry conditions caused drought to expand across eastern Colorado and Kansas. Topsoil moisture and pasture conditions declined during March, and concerns over winter wheat were growing. Most notably, wildfires raged across this region, spreading quickly due to high winds. The Northwest Oklahoma Complex fires impacted parts of Kansas, Oklahoma, and Texas in early March. One of the fires burned over 800 square miles of Clark and Comanche Counties in southern Kansas, killing six people and thousands of cattle. Thousands of miles of fences were burned too, which may cost \$10,000 per mile to replace. This fire became the largest single wildfire in Kansas' history, a record that was set just a year ago by the Anderson Creek fire. Later in March, a fire started in the Sunshine Canyon area near Boulder, Colorado, forcing many people to evacuate. While wildfires are not uncommon in these areas in the early spring, the areas they have burned have been quite large. Although heavy rainfall at the end of March brought some drought relief to the region, more moisture will be needed in April to mitigate wildfire conditions.

Temperature and Precipitation Overview



Above: Departure from 1981-2010 normal temperature (left) and percent of normal precipitation (right) for March 2017 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

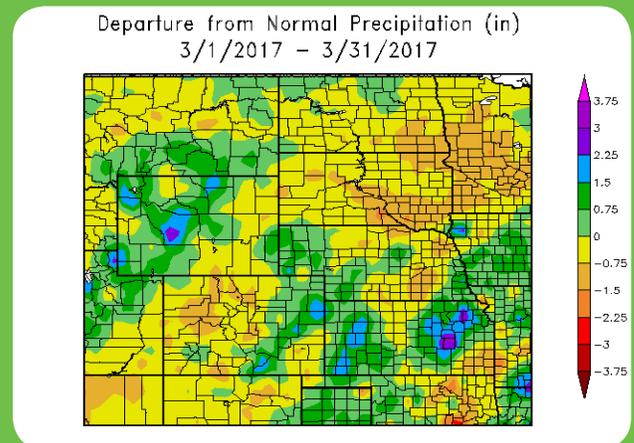
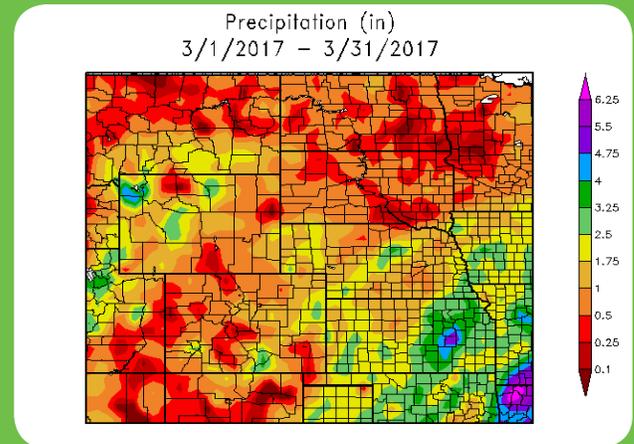
Precipitation varied across the region during March, with some areas experiencing wet conditions while others were dry. Wet locations included the western half of Wyoming, the Nebraska Panhandle, and parts of Kansas. Precipitation was 150-300 percent of normal, with west-central Wyoming receiving greater than 300 percent of normal precipitation. Meanwhile, it was dry throughout western and central Colorado, the Dakotas, and central Nebraska. These locations received no more than 70 percent of normal precipitation. Some areas, such as eastern Colorado and Kansas, would have been much drier in March had they not received copious precipitation the last few days of the month. This rainfall was welcome, as it helped ease drought conditions.

Heavy rain and snow led to extremely wet conditions in Wyoming. In fact, Lander and Sheridan had their wettest March on record. The Lander area was hit with a snowstorm on the 31st and received an impressive 2.71 inches (69 mm) of liquid equivalent precipitation, which was the highest 1-day total precipitation to ever occur in March and the 6th highest of any month on record. Snowfall has been plentiful this season in the Rockies of Wyoming. However, the snow was so deep in some places it forced wildlife onto roads that had been plowed, which ultimately caused an increase in roadkill.

Warm and wet weather caused the convective season to get off to an early start this year. On March 6th, a strong low pressure system tracked across the area, causing blizzard conditions in northern North Dakota and severe weather in far eastern Nebraska and eastern Kansas. Several tornadoes were reported in Kansas, and this storm system caused the first widespread severe weather event of the calendar year in the High Plains. Although not in the region, it is worth noting that a tornado was confirmed in Minnesota on the 6th, which was the earliest tornado on record in the state.

For some areas, snowfall has been scarce this season, and March did not help the snow drought. Only a trace of snow was recorded in Denver, Colorado in March, tying 2012 for the least snowiest March on record. As of March 31st, Denver had only received 19.3 inches (49 cm) of snow since July 1st and is on pace to have its least snowiest season on record. Lincoln, Nebraska received 0.6 inches (2 cm) of snow during March and, as of the 31st, it was the 2nd least snowiest season on record.

Regional Precipitation



Above: Total precipitation in inches (top) and departure from normal precipitation in inches (bottom) for March 2017. 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

Despite above-normal temperatures throughout the month of March, snowpack continued to be near to above average in the Rockies of Colorado and Wyoming. It was an especially wet month in mountainous areas of Wyoming, with precipitation exceeding 300 percent of normal in the Wind River Range. Meanwhile, it was drier in Colorado, as much of the Front Range received no more than 50 percent of normal precipitation. According to the U.S. Army Corps of Engineers, Snow Water Equivalent (SWE) above Fort Peck Dam was 94 percent of average at the end of March, which was a slight decrease from the previous month. Snowpack also decreased slightly between Fort Peck and Garrison Dams but was still abundant as SWE was 129 percent of average. Normally by April 1, about 97 percent of the peak mountain SWE has occurred in both reaches, and snowpack is expected to reach its peak in April.

Temperatures

Most of the High Plains region experienced above-normal temperatures in March, ranging from about 3.0-5.0 degrees F (1.7-2.8 degrees C) above normal in central and southern portions of the region to greater than 6.0 degrees F (3.3 degrees C) above normal in the western High Plains. The exception was North Dakota and eastern South Dakota where temperatures were near normal to 3.0 degrees F (1.7 degrees C) below normal. Abnormal warmth has become a common occurrence in some parts of the region. In fact, the National Weather Service in Sioux Falls, South Dakota reported that Sioux Falls just had its 19th consecutive month of above-normal average temperatures! The warmest temperatures of the month generally occurred on the 18th-19th, as widespread temperatures exceeding 80.0 degrees F (26.7 degrees C) occurred throughout Colorado, Nebraska, and Kansas. Temperatures soared to 90.0 degrees F (32.2 degrees C) in southwestern Nebraska, as well as western and southern parts of Kansas. As a result, many daily maximum temperature records were broken in these areas over the 2-day period.

Despite above-normal temperatures across much of the region during March, there were some cooler periods that included sub-freezing temperatures in areas where plant growth was further along than normal. For instance, a cold snap occurred across much of Kansas the week of March 8th-14th, which may have caused winterkill of winter wheat. Leaf tissue damage was reported in some fields as well. It is important to remember that most of the region is still several weeks away from the date of median last freeze, so conditions should be monitored closely.

Drought Conditions

Drought conditions both improved and worsened during March throughout the High Plains. Overall, the percent area of the region in abnormal dryness or drought (D0-D4) increased slightly from approximately 35 percent to 37 percent on the U.S. Drought Monitor. Improvements occurred in northeastern Colorado and central Nebraska where beneficial rains fell in the latter part of the month. Meanwhile, degradations occurred throughout much of Kansas where most of the month was dry. Drought conditions in the Black Hills region of South Dakota and northeastern Wyoming changed little during March.

U.S. Drought Monitor

U.S. Drought Monitor
High Plains

March 28, 2017
(Released Thursday, Mar. 30, 2017)
Valid 8 a.m. EDT

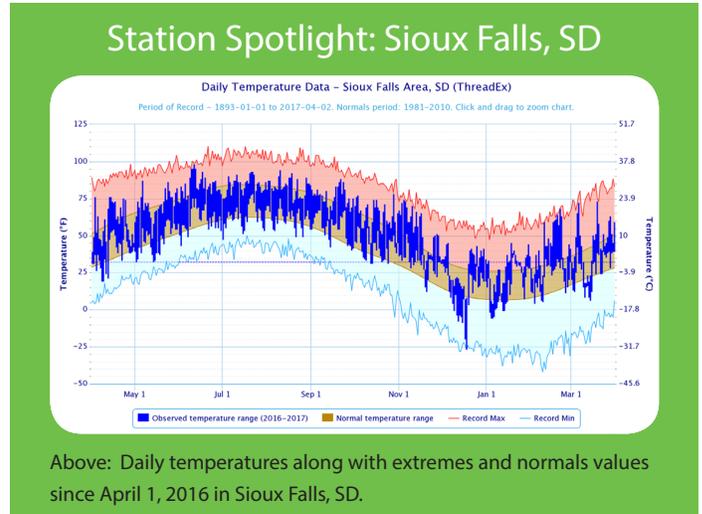
	Drought Conditions (Percent Area)				
	None	D0-D4	D1-D4	D2-D4	D3-D4
Current	62.61	37.39	17.01	3.11	0.13
Last Week <small>02/27/17</small>	59.21	40.79	22.12	2.51	0.13
3 Months Ago <small>12/27/16</small>	50.65	49.35	21.54	4.05	0.00
Start of Calendar Year <small>01/01/17</small>	50.65	49.35	21.54	3.95	0.00
Start of Water Year <small>09/01/16</small>	70.96	29.14	8.66	2.68	0.17
One Year Ago <small>03/28/16</small>	50.67	49.33	8.61	0.41	0.00

Intensity:
■ D0 Abnormally Dry ■ D3 Extreme Drought
■ D1 Moderate Drought ■ D4 Exceptional Drought
■ D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for more details.

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U.S. Department of Agriculture

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/>.



Perhaps the most notable drought story of the month was rapidly-deteriorating conditions in Kansas and eastern Colorado. At the end of March, about 90 percent of Kansas was experiencing D0-D4 conditions, compared to approximately two-thirds of the state at the end of February. Topsoil moisture suffered, and 62 percent of the winter wheat in Kansas was rated fair or worse. In Colorado, producers were voicing concerns about winter wheat stands. They also reported that fall-planted crops came out of dormancy early due to mild temperatures during late winter, and the topsoil moisture they need for additional growth is lacking. Both states were ravaged with wildfires during March as a result of drought conditions. Fortunately, the last few days of March brought heavy rainfall to drought-stricken areas of Kansas and Colorado, so conditions will be reassessed and improvements will likely be made to the depiction of drought on the U.S. Drought Monitor in early April.

Climate Outlooks

According to the Climate Prediction Center, ENSO-neutral conditions are present in the Pacific. Equatorial sea surface temperatures are near average in the central and east-central Pacific Ocean, while they are above average in the eastern Pacific Ocean. ENSO-neutral conditions are favored to continue through at least spring 2017, with increasing chances for El Niño development into the fall. If you are looking for more information about ENSO, check out the ENSO blog here: <https://www.climate.gov/news-features/department/8443/all>.

NOAA's Spring Outlook states that moderate to major flooding is expected in North Dakota along the Souris River, Devils Lake, and the northernmost reaches of the Red River. This is due to a high snowpack in the northern and western Plains combined with warming temperatures and expected spring convection.

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 April-June temperature outlook indicates an increased chance of above-normal temperatures for the central, southern, and eastern U.S. This includes Colorado, Kansas, Nebraska, the southern half of Wyoming, and extreme southern South Dakota in the High Plains region. Elsewhere, there is an equal chance for above-, below-, or near-normal temperatures in the contiguous U.S. during the April-June period.

Precipitation

The precipitation outlook for the next three months calls for a higher probability of above-normal precipitation across the northern Rockies, northern Plains, and along much of the Gulf Coast. In the High Plains region, this includes North Dakota, South Dakota, the northern half of Nebraska, and northern and central Wyoming. The remainder of the contiguous U.S. has equal chances for above-, below-, or near-normal precipitation.

Drought

The March 16th U.S. Seasonal Drought Outlook shows that drought is expected to persist across portions of the Southwest, the southern Plains, and the Southeast. In the High Plains, this includes eastern Colorado and southwestern Kansas. Drought may improve or be removed in portions of the West, the Plains, the Northeast, and the Southeast. This includes the area in drought in the Black Hills region of South Dakota extending west into Wyoming, southwestern Nebraska, northeastern Colorado, and western and eastern Kansas. Drought development is likely in the Texas Panhandle and eastern New Mexico, but additional drought development is not likely in the High Plains region through June.

Temperature Outlook

THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
0.5 MONTH LEAD
VALID RMJ 2017
MADE 16 MAR 2017

EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

Precipitation Outlook

THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID RMJ 2017
MADE 16 MAR 2017

EC MEANS EQUAL CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

Drought Outlook

U.S. Seasonal Drought Outlook Valid for March 16 - June 30, 2017
Released March 16, 2017

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short-lived events. *Ongoing drought areas are based on the U.S. Drought Monitor areas (extension of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

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NOAA/NWS/NCEP/Climate Prediction Center

■ Drought persists
■ Drought remains but improves
■ Drought removal likely
■ Drought development likely

<http://go.usa.gov/3eZ73>

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	61.6	31.0	46.3	7.1	81	03/23	14	03/07	1.56	0.69	179
Alamosa San Luis Airport	60.1	21.7	40.9	7.4	73	03/18	8	03/07	0.73	0.20	138
Colorado Springs Municipal Airport	62.0	31.4	46.7	7.6	80	03/19+	16	03/02+	0.44	-0.56	44
Denver International Airport	64.0	31.9	47.9	7.5	81	03/18	14	03/01	0.90	-0.02	98
Grand Junction Walker Field Airport	64.7	36.4	50.5	6.6	80	03/18	16	03/07	0.39	-0.53	42
Pueblo Memorial Airport	68.7	30.2	49.4	7.1	86	03/19	10	03/02	0.95	0.02	102

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	57.9	35.1	46.5	3.5	89	03/19	20	03/13	3.19	1.18	159
Dodge City Regional Airport	64.8	34.1	49.5	5.1	94	03/19	17	03/02	2.58	0.99	162
Goodland Renner Field	62.5	28.5	45.5	5.0	89	03/19	13	03/02	1.68	0.61	157
Topeka Municipal Airport	60.2	37.7	49.0	4.2	89	03/19	21	03/15+	4.03	1.54	162
Wichita Mid-Continent Airport	63.0	40.0	51.5	5.0	89	03/20+	23	03/13	3.50	0.81	130

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	56.5	28.4	42.5	6.7	83	03/19	14	03/13	1.82	0.59	148
Grand Island Airport	54.4	30.0	42.2	2.8	82	03/19	16	03/13	0.81	-0.99	45
Lincoln Municipal Airport	55.5	31.9	43.7	3.6	87	03/19	16	03/10	1.62	-0.31	84
Norfolk Karl Stefan Airfield	51.1	29.0	40.0	2.6	80	03/19	15	03/13+	1.21	-0.56	68
North Platte Regional Airport	59.4	28.2	43.8	5.8	90	03/19	11	03/13	1.82	0.77	173
Omaha Eppley Airport	53.7	32.9	43.3	3.8	82	03/19	17	03/10	2.39	0.40	120
Valentine Miller Field	53.7	26.5	40.1	3.9	82	03/19	10	03/13	0.76	-0.31	71

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismarck Municipal Airport	41.5	20.6	31.0	1.1	65	03/29+	-7	03/13	0.52	-0.35	60
Fargo International Airport	39.5	19.6	29.5	1.7	65	03/06	-3	03/10	0.33	-0.97	25
Grand Forks International Airport	36.3	18.7	27.5	2.3	62	03/29	-5	03/10	0.85	-0.11	89
Theodore Roosevelt Airport	43.5	20.7	32.1	2.1	65	03/05	-8	03/13+	0.34	-0.35	49
Williston International Airport	41.7	20.6	31.2	1.9	65	03/30+	-4	03/13	0.85	0.14	120

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>.

March 2017 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	41.5	20.4	30.9	1.0	65	03/19	-5	03/13	0.67	-0.49	58
Huron Regional Airport	44.0	24.3	34.2	1.1	70	03/19	-2	03/13	0.77	-0.69	53
Pierre Regional Airport	48.0	25.3	36.6	2.2	73	03/05+	0	03/13	0.34	-0.89	28
Rapid City Regional Airport	52.9	25.8	39.4	4.0	75	03/16	9	03/13	0.53	-0.40	57
Sioux Falls Joe Foss Field Airport	44.1	26.5	35.3	2.4	73	03/19	6	03/14	0.54	-1.22	31

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	53.7	29.8	41.8	6.6	75	03/18	8	03/01	1.79	0.97	218
Cheyenne Municipal Airport	56.5	29.9	43.2	7.3	76	03/18	19	03/02+	0.73	-0.32	70
Lander Hunt Field Airport	54.0	29.5	41.8	6.3	72	03/18	7	03/01	4.65	3.49	401
Laramie Regional Airport	52.3	26.8	39.5	8.6	69	03/18	12	03/01	0.38	-0.20	66
Rawlins Municipal Airport	51.7	30.4	41.0	8.7	71	03/18	11	03/01	0.30	-0.38	44
Sheridan County Airport	53.1	28.9	41.0	5.8	76	03/18	15	03/01	3.43	2.45	350

March 2017 Highlights

Monthly Rankings

Temperature in degrees F, Precipitation in inches

Warmest	Temperature / Ranking	Record / Year	Period of Record
Alamosa, CO	40.9 / WARMEST	39.4 / 2015+	1933-2017
Laramie, WY	39.5 / WARMEST	38.7 / 2012	1948-2017
Rawlins, WY	41.0 / WARMEST	39.6 / 1986	1952-2017
Pueblo, CO	49.4 / 2nd warmest	51.3 / 1910	1889-2017
Grand Junction, CO	50.5 / 2nd warmest	51.2 / 1910	1893-2017
Denver, CO	47.9 / 3rd warmest	50.4 / 1910	1872-2017
Casper, WY	41.8 / 3rd warmest	44.1 / 2012	1940-2017
Cheyenne, WY	43.2 / 3rd warmest	44.6 / 2012	1873-2017
Scottsbluff, NE	44.9 / 3rd warmest	49.4 / 1910	1893-2017
Chadron, NE	42.4 / 5th warmest	48.3 / 2012	1942-2017
Wettest	Precipitation / Ranking	Record / Year	Period of Record
Lander, WY	4.65 / WETTEST	4.59 / 2016	1892-2017
Sheridan, WY	3.43 / WETTEST	3.32 / 1918	1908-2017
Chadron, NE	1.82 / 4th wettest	2.37 / 1983	1942-2017
Casper, WY	1.79 / 5th wettest	2.43 / 1954	1940-2017

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North Dakota Climate Summary

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Precipitation:

Based on the National Centers for Environmental Information (NCEI), statewide total March precipitation was 0.55”, 0.02” greater than the last year, but 0.28” less than the 1981-2010 average, making it the 48th driest March in the 123-year period of record. It was the wettest March since 2013. Above-average precipitation was limited in north central part of the state. Widespread drier-than-normal conditions were observed elsewhere (Figure 1). The greatest monthly precipitation accumulation was 1.14” recorded in Elgin, Grant County. The greatest monthly snowfall accumulation was 17” recorded in Crosby, Divide County. The greatest 24-hr precipitation was 1.01” that was recorded in Medora, Billings County on March 12. The highest 24-hr snowfall of 8.5” was recorded in Bottineau, Bottineau County on March 7. Based on historical records, statewide March precipitation showed a slight negative long-term trend of 0.01” per century since 1895. The highest and the lowest March precipitation for the state ranged from 2.31” in 1902 to 0.11” in 1930.

Temperature:

The official state average March temperature was 27.5°F, 8.8° colder than the last year, but the same as the 1981-2010 average, making it the 42nd warmest March in the 123-year period of record. Above-average temperatures were observed in southwestern and southeastern parts of the state. In contrast, below average conditions were observed in the north, especially north-central parts of the state. The warmest anomalies were observed in the southwestern regions (Figure 2). The state’s highest and lowest daily temperatures ranged from 68° on March 6 in Hettinger, Adams County to -26° on March 14 in Lake Metigoshe State Park, Bottineau County. Based on historical records, the state average March temperature showed an increasing trend of 0.53°F per decade since 1895 (The second highest March trend in the US, after Montana). The highest and the lowest monthly state March average temperatures ranged from 40.6° in 2012 to 7° in 1899.

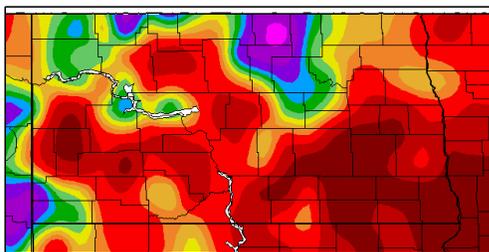
Drought and other notable impacts:

Drought Monitor: Based on the Drought Monitor (DM) and given the nature of the residual conditions from the winter, the drought conditions did not change throughout March in ND. Less than 10% of the state was consistently designated as “Abnormally Dry”.

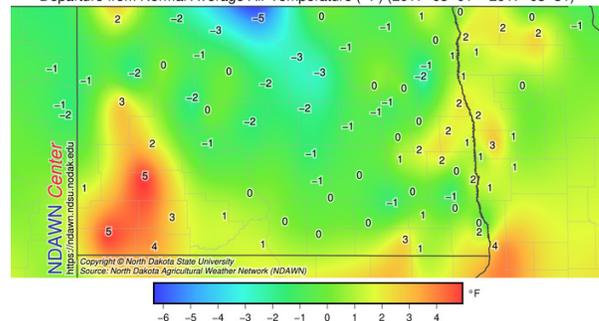
Agricultural Impact: USDA’s National Agricultural Statistics Service (NASS) reported 95 % of winter wheat conditions are fair or better in the state. Based on the NASS report published on March 27, cattle and calf conditions were rated 98% fair or better. Based on the National Weather Service Advanced Hydrologic Prediction Center, Pembina River at Neche, Devils Lake at Creel Bay and Stump Lake, and Souris River at Westhope reached their major flood levels. In addition, the Red River at Pembina is at its moderate flood level. However, based on the current conditions and the 7-day forecast, the river at this location is not expected to rise to its major flood stages. Flooded fields along these rivers will have a late start. The latest statewide North Dakota Agricultural Weather Network soil temperature readings at 4” under bare are reading above the 50°F threshold in most locations, with a few exceptions in the northern-tier counties.

Temperature and Precipitation Overview

Percent of Normal Precipitation (%)
 3/1/2017 - 3/31/2017



Departure from Normal Average Air Temperature (°F) (2017-03-01 - 2017-03-31)



Above: Percent of normal precipitation (left, figure 1) and departure from normal average temperature (right, figure 2) for March 2017 in North Dakota. Figure 1 produced by ACIS, Figure 2 produced by NDAWN.

Kansas Climate Summary

Mary Knapp - Service Climatologist
Kansas Weather Data Library, Kansas State University
For more information: www.ksre.ksu.edu/wdl



Beneficial end

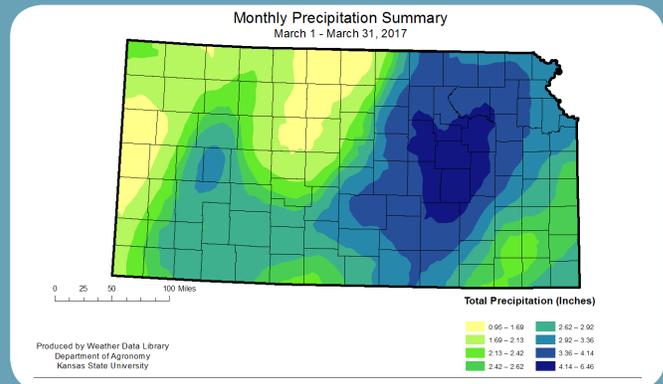
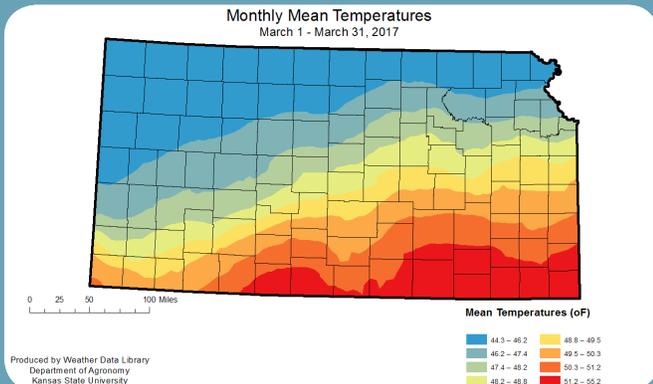
Much of March was warm and dry. The state-wide average temperature was 47.7 oF, which was 4.4 degrees warmer than normal. That places this March as the 17th warmest since 1895. The warmest temperatures were recorded on the 20th of the month. On that day Coldwater, Comanche County, set the warmest reading for the month at 99 oF., while many locations saw readings in the 90s. There were 134 new daily record maximum temperatures this month and 66 occurred on the 20th. Of those new records, 14 set new daily record maximums for March. Overall, the Southwest Division showed the greatest departure from normal with an average of 49.2 oF and a departure of 5.2 degrees. The Northeast Division, which averaged 46.0 oF, was the closest to normal and was still 3.4 degrees warmer. Not surprisingly, there were no record cold minimum temperatures. However, despite the warmth there were 9 new record low maximum temperatures across the state. The lowest temperature reported was 9 oF at Wallace, Wallace County, on the 2nd. There were 70 record warm minimum temperatures reported during March.

The warmer than normal temperatures were accompanied by much drier than usual conditions, until the last week of the month. The last seven days pushed many locations above normal for March. The state-wide average precipitation was 2.28 inches, or 141 percent of normal. This ranks as the 14th wettest March since 1895. All division were above normal for the month. The Northwest Division was the driest with an average of 1.41 inches, which was 107 percent of normal. The Southwest Division saw the greatest percent of normal, with an average of 3.30 inches or 244 percent of normal. The greatest 24-hour precipitation total for a National Weather Service (NWS) station was 3.07 inches at Peck 2S, Sumner County on the 29th. The greatest 24-hour precipitation total for a Community Collaborative Rain Hail and Snow (CoCoRaHS) station was 5.71 inches at El Dorado 7.9 NNW, Butler County, also on the 29th. The stations with the greatest monthly totals: 6.46 inches at Tallgrass National Prairie Park, Chase County (NWS)); 7.21 inches at Hutchinson 3.6 NE, Reno County (CoCoRaHS). While snow wasn't a huge factor, there were still some snow events during the month. The greatest snowfall total for March at a National Weather Service station was 3.6 inches at Hoyt 2S, Jackson County. The greatest snowfall total for the month at a CoCoRaHS station was 2.1 inches at McFarland 0.1 SE, Wabaunsee County.

The month was more active as far as severe weather events. There were 10 reports of tornadoes, 56 hail and 67 high wind events. Snowfall wasn't an issue this month. The most damaging feature were wildfires, with more than 500,000 acres burned in Clark County alone.

The higher than normal precipitation resulted in improving conditions in the U.S. Drought Monitor. Biggest improvement was in the Southwest, where extreme drought was removed entirely. Unfortunately, the updated April outlook is neutral, and continued normal rainfall is critical to sustain this improvement.

Temperature and Precipitation Overview



Above: March 2017 monthly mean temperatures (left) and total precipitation (right) in Kansas. Maps produced by Weather Data Library, Department of Agronomy, Kansas State University.

Nebraska Climate Summary

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 For more information: <https://nsco.unl.edu/>

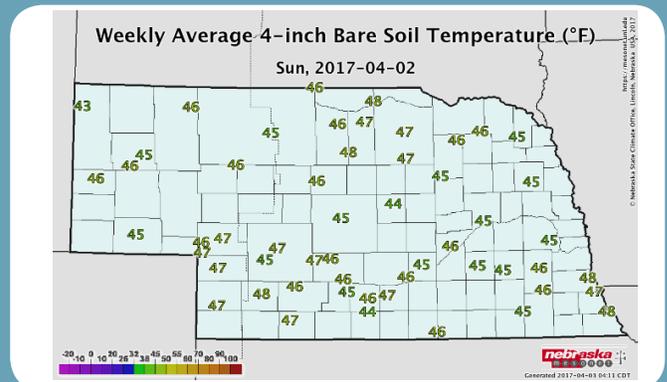
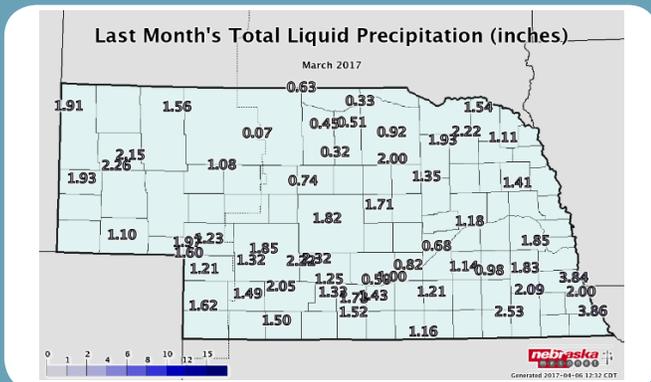


Nebraska continued its warm trend in 2017 with the third straight month of statewide average above normal temperatures. The average temperature of 42.2°F ranked as 10th warmest and was 4.1°F above the 30-year average (1981 – 2010). Temperature departures were strongest in the west (+6°F) and least in the east (+2°F). It is of interest to note that over the long-term, March temperatures in Nebraska have shown a warming trend over time with an increase of 4°F since systematic record-keeping began (1895). Nebraska Mesonet temperature extremes included a high for the month of 90°F near Cozad on March 19th and a low of 7°F near Sparks on March 13th.

Precipitation totals for the month showed some regional differences around the state. Areas of the Panhandle, southwest, central and southeast benefited from the relatively wet and active weather pattern for the Central U.S. These areas ended March in the above normal category. However, portions of the northcentral and east received 70% of normal or less. Nebraska Mesonet stations reported rainfall totals ranging from 0.07” in central Cherry County (Mullen 30N, Merritt area) to 3.86” at Indian Cave State Park in the southeast (Nemaha 4SE). Most Mesonet stations observed more than an inch for the month. The driest areas statewide were in northcentral Nebraska. The monthly total precipitation for the state as a whole averaged 1.56”, which is 0.06” wetter than the 30-year average. When looking back to 1895, the overall trend in March precipitation is a slight increase, by approximately three tenths of an inch.

Soils continue to warm as spring progresses. In one month’s time, temperatures under bare ground at the four-inch depth are averaging approximately 10 degrees higher than at the end of February. By the start of April, the weekly average bare soil temperature was in the mid to high 40s across the state.

Soil Temperature and Precipitation Overview



Above: March 2017 total precipitation (left) and average 4-inch bare soil temperatures for the last week of March (right) in Nebraska. Maps produced by the Nebraska Mesonet/Nebraska State Climate Office.

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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