



727 Hardin Hall
3310 Holdrege Street
Lincoln, NE 68583-0997
402 472-6706
Fax 402 472-2946
<http://hprcc.unl.edu>



Canoeing on the Niobrara River near Smith Falls State Park, NE - Photo by BJ Baule
<http://hprcc.unl.edu>

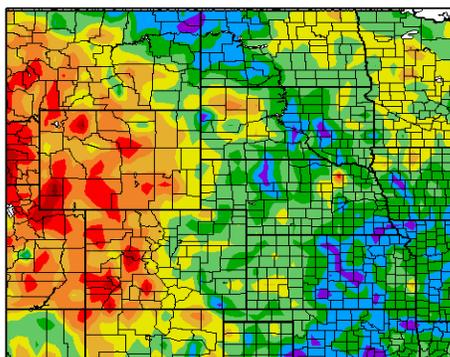
July 2013 Climate Summary

Region Breakdown

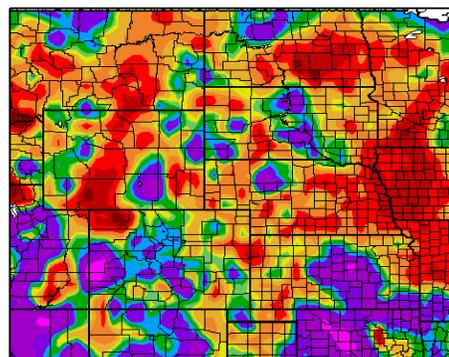
Average temperatures were generally below normal in the east and above normal in the west across the High Plains Region this month. Temperature departures of 2.0-4.0 degrees F (1.1-2.2 degrees C) below normal occurred in eastern Kansas, central South Dakota, western North Dakota, and a few pockets of Nebraska. Meanwhile, western portions of Colorado and Wyoming had temperature departures of 3.0-5.0 degrees F (1.7-2.8 degrees C) above normal. The cooler temperatures in the east were in stark contrast to last year, when a good portion of the area had temperature departures of 6.0-8.0 degrees F (3.3-4.4 degrees C) above normal.

Although monthly records were not set, a few stations did manage to sneak in to the top 10 rankings for warmest or coolest July. On the cool side, long-term station Wamego 4 W, which is located in northeastern Kansas, had its 5th coolest July with an average temperature of 75.6 degrees F (24.2 degrees C). The coolest July at Wamego 4 W was 72.0 degrees F (22.2 degrees C) in 1950 (period of record 1912-2013). On the warm side, Lander, Wyoming had its 10th warmest July with 74.2 degrees F (23.4 degrees C). Interestingly, 7 of the top 10 warmest Julys have occurred since 2000 in Lander and the top spot of 75.9 degrees F (24.4 degrees C) occurred in both 2003 and 2006 (period of record 1891-2013).

Departure from Normal Temperature (F)
7/1/2013 - 7/31/2013



Percent of Normal Precipitation (%)
7/1/2013 - 7/31/2013



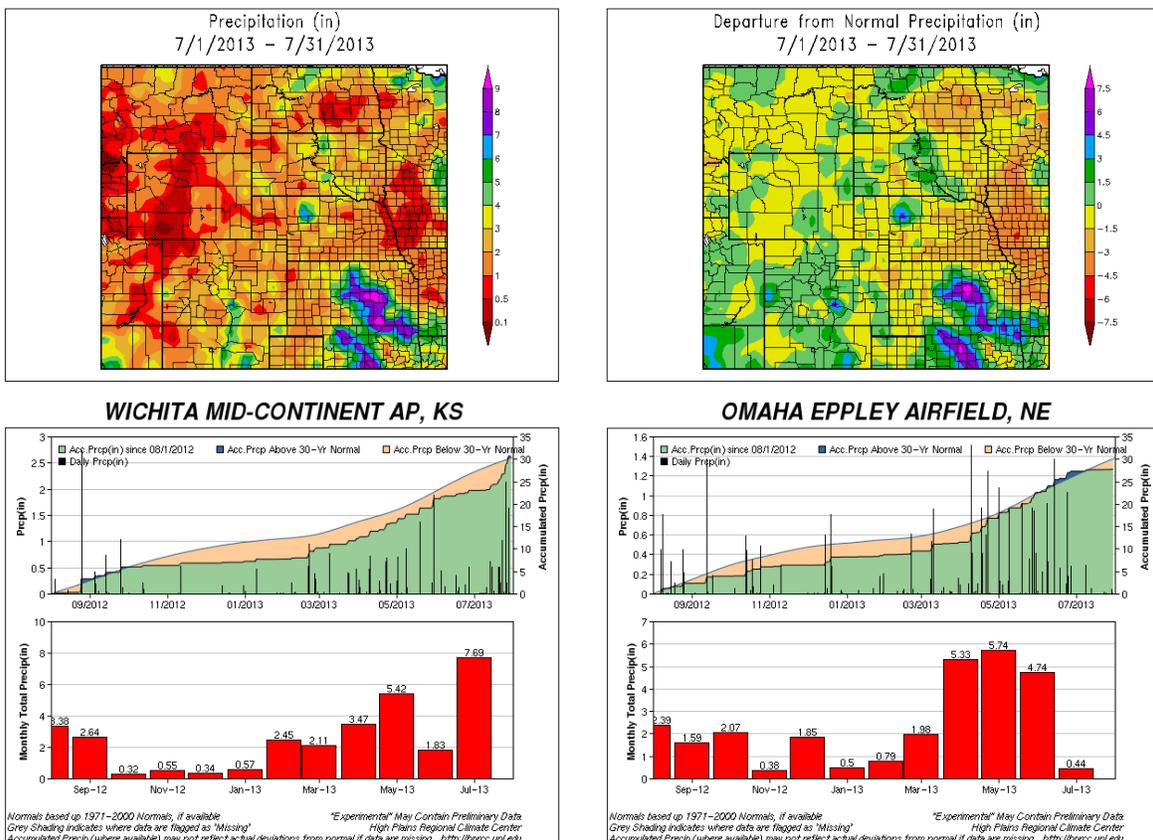
Departure from 1981-2010 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for July 2013 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

While monthly extremes were not common, numerous daily records occurred throughout the month. One notable record was for the July all-time coolest maximum temperature in Concordia, Kansas. On July 28th, Concordia's high temperature only reached 62.0 degrees F (16.7 degrees C) and beat out the old record of 63.0 degrees F (17.2 degrees C) which occurred back in 1979 and 1988 (period of record 1885-2013).

Precipitation Summary

July precipitation was hit or miss across the High Plains Region. Areas receiving at least 150 percent of normal precipitation included central Kansas, central South Dakota, central and western Colorado, and scattered pockets in eastern Wyoming, north central Nebraska, southwestern South Dakota, and northern North Dakota. While rain was needed to help alleviate ongoing drought conditions, some storms brought heavy rain which caused mudslides in fire burn scars in Colorado and flash flooding in parts of Colorado, Kansas, and Wyoming. Areas which missed out included eastern and central Nebraska, eastern and central North Dakota, and central Wyoming. These areas received less than 50 percent of normal precipitation.

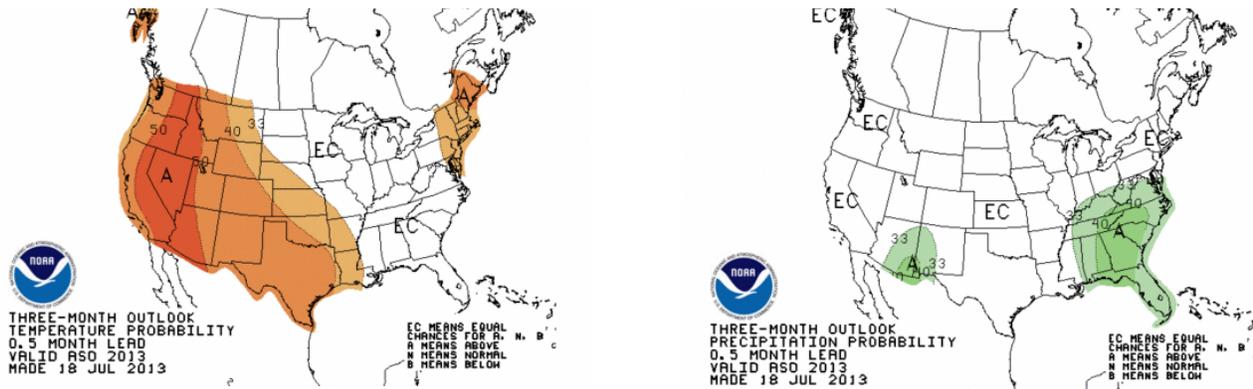
Because of the wide range in precipitation, there were stations which ranked in the top 10 driest or wettest Julys on record. With only 11 percent of normal precipitation, Omaha, Nebraska had its 2nd driest July on record with 0.44 inches (11 mm) of precipitation (period of record 1871-2013). The driest on record occurred only last year with 0.01 inches (0 mm). Meanwhile, precipitation in central Kansas helped alleviate drought conditions there, although long-term deficits were still high. For instance, Wichita, Kansas had measurable precipitation on 17 days in July, which broke the old record of 16 in 1950 (period of record 1888-2013). On average, Wichita has about 8 days with measurable precipitation in July. By the end of the month, Wichita received 7.69 inches (195 mm) of precipitation making this July its 4th wettest. Although 232 percent of normal, this was not nearly enough to beat the top spot of 13.37 inches (340 mm) in 1950.



Above: Total precipitation (inches) (top left) and Departure from Normal Precipitation (inches) (top right) for July 2013 in the High Plains Region. Accumulated and monthly precipitation for Wichita, KS (bottom left) and Omaha, NE (bottom right) over the past year. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

Climate Outlook

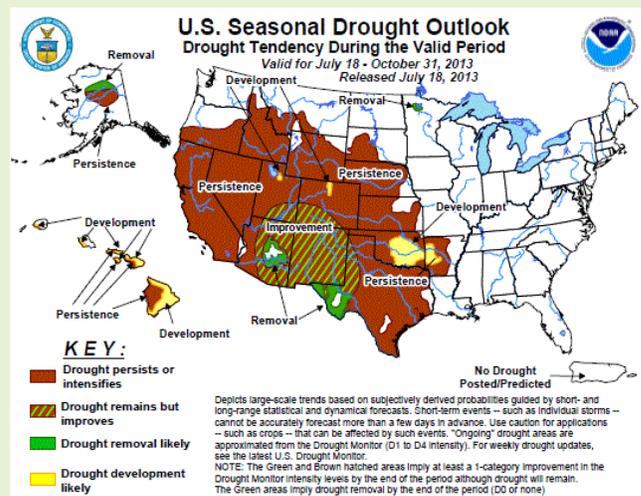
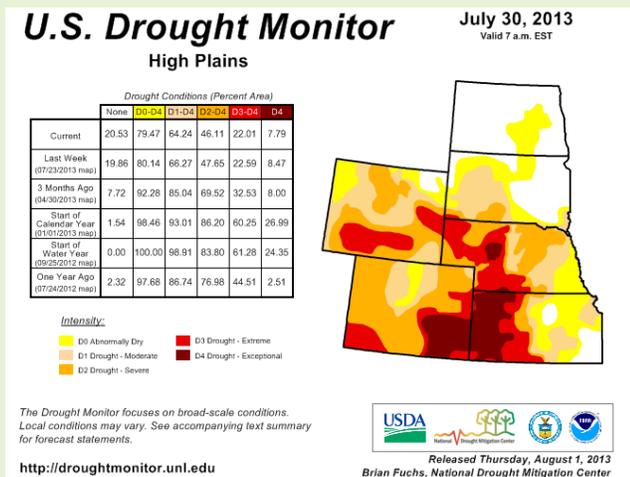
At the end of July, ENSO-neutral conditions were still present and likely to continue into the fall. For the next three months, the temperature outlook indicates a higher probability of above normal temperatures for much of the High Plains Region including Colorado, Wyoming, most of Kansas and Nebraska, and southwestern South Dakota. Equal chances of above, near, or below normal temperatures exist for the rest of the Region. Meanwhile, the precipitation outlook indicates an equal chance of above, near, or below normal precipitation for the entire High Plains Region. The only areas of the country with an enhanced chance of above normal precipitation are areas of the desert southwest and the southeast U.S. The seasonal outlooks combine the effects of long-term trends, soil moisture, and when applicable, the El Niño Southern Oscillation cycle (ENSO).



Above: 3-Month Outlook Maps Courtesy the NOAA Climate Prediction Center - <http://www.cpc.ncep.noaa.gov>
 (left) The Three-Month Temperature Probability Outlook, (right) The Three-Month Precipitation Probability Outlook

Drought Watch

The latest U.S. Drought Monitor showed both improvements and degradations over the past month. At the end of July, approximately 64 percent of the Region was in moderate (D1) to exceptional (D4) drought - down just slightly from 67 percent at the end of June. An expansion of abnormally dry conditions (D0) occurred in east-central North Dakota and eastern parts of Kansas, Nebraska, and South Dakota. In addition, two new areas of D1 were introduced in far southeastern South Dakota and northeastern Kansas. One category improvements were made in some areas of north-central and eastern Colorado. There was quite a bit of jostling of drought conditions in Kansas where some areas had improvements, while others had degradations. By the end of the month, 25 percent of the state remained in the D4 designation, however. Wyoming had an increase in severe (D2) and extreme (D3) drought coverage, going from about 47 percent of the state to 52 percent of the state. According to the U.S. Seasonal Drought Outlook released July 18th, the only area of drought expected to improve was in southwestern Colorado. Drought conditions were expected to develop in north-central Colorado and persist elsewhere through October 2013.



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). Real-time data provided through ACIS from the Regional Climate Centers are often used by the agencies involved in the U.S. Drought Monitor when determining the area and intensity of drought conditions, although the product itself is not produced by HPRCC. For current Drought Monitor information, please see: <http://droughtmonitor.unl.edu/>
 Portions of this Drought Watch are courtesy the Drought Monitor Text Discussion found on the Drought Monitor webpage.

State Summaries

Colorado	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Akron Washington County Airport	86.1	59.4	72.7	-1.3	98	07/09	53	07/28+	3.92	1.37	154
Alamosa San Luis Airport	83.1	47.8	65.4	0.8	90	07/23	41	07/30	0.80	-0.17	82
Colorado Springs Municipal Airport	84.7	57.8	71.3	0.4	94	07/08	51	07/16	4.61	1.77	162
Grand Junction Walker Field Airport	93.9	64.8	79.3	1.1	101	07/10	58	07/29	1.37	0.76	225
Pueblo Memorial Airport	91.9	60.7	76.3	0.5	102	07/23	53	07/16+	1.68	-0.38	82

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	86.7	65.0	75.9	-3.2	102	07/09	52	07/01	4.32	0.40	110
Dodge City Regional Airport	92.7	65.4	79.0	-0.6	106	07/13	51	07/02	2.52	-0.56	82
Goodland Renner Field	89.3	60.6	75.0	-0.7	102	07/12	48	07/02	0.45	-3.02	13
Topeka Municipal Airport	89.5	67.4	78.4	-0.6	105	07/09	57	07/27+	1.78	-2.04	47
Wichita Mid-Continent Airport	90.4	68.6	79.5	-1.6	107	07/09	58	07/04	7.69	4.37	232

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	89.4	60.6	75.0	1.4	101	07/18	52	07/27	2.08	-0.03	99
Grand Island Airport	87.6	65.0	76.3	0.1	99	07/22	51	07/28	1.39	-2.01	41
Lincoln Municipal Airport	87.7	63.9	75.8	-1.8	98	07/09	47	07/28	1.00	-2.40	29
Norfolk Karl Stefan Airfield	86.0	61.6	73.8	-1.2	96	07/22	44	07/28	1.23	-2.09	37
North Platte Regional Airport	87.8	60.4	74.1	-0.2	102	07/13+	44	07/02	2.74	-0.33	89
Omaha Eppley Airport	86.9	65.6	76.3	-0.4	96	07/09	48	07/28	0.44	-3.39	11
Valentine Miller Field	86.6	61.7	74.2	-0.3	98	07/12	47	07/02	3.78	0.57	118

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	82.9	57.0	70.0	-1.1	93	07/17	39	07/27	1.63	-1.26	56
Fargo International Airport	83.4	60.1	71.7	0.7	95	07/18	44	07/28	0.90	-1.89	32
Grand Forks International Airport	81.2	57.0	69.1	0.5	90	07/16	42	07/28	2.08	-1.07	66
Theodore Roosevelt Airport	80.5	53.9	67.2	-2.0	91	07/21	40	07/27	2.09	-0.35	86
Williston International Airport	80.7	55.4	68.0	-2.1	97	07/11	46	07/26	1.75	-0.79	69

All Data are Preliminary and Subject to Change. + indicates multiple dates, latest date listed.

Source: National Weather Service Cooperative Observation Network Data

Data are retrieved through the Applied Climate Information System (ACIS).

These data are available for the entire period of record through the CLIMOD system. For more information please see <http://hprcc.unl.edu/services>.

July 2013 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	82.1	58.1	70.1	-1.2	94	07/18	40	07/28	2.70	-0.32	89
Huron Regional Airport	83.4	61.2	72.3	-1.4	93	07/18+	41	07/28	1.93	-0.99	66
Pierre Regional Airport	86.1	59.9	73.0	-2.4	101	07/18	44	07/27	2.58	-0.03	99
Rapid City Regional Airport	87.3	59.1	73.2	0.6	100	07/11	48	07/27	1.87	0.02	101
Sioux Falls Joe Foss Field Airport	82.7	61.6	72.2	-0.8	92	07/18	44	07/28	0.60	-2.49	19

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	89.8	54.5	72.1	1.6	98	07/22+	48	07/31	1.66	0.25	118
Cheyenne Municipal Airport	83.3	56.1	69.7	0.3	94	07/11	50	07/03	1.60	-0.59	73
Lander Hunt Field Airport	90.3	58.1	74.2	3.0	97	07/22	50	07/29	0.28	-0.50	36
Laramie Regional Airport	81.4	50.5	65.9	1.9	93	07/11	45	07/30+	1.89	0.46	132
Rawlins Municipal Airport	86.9	52.5	69.7	2.7	94	07/11	46	07/03	1.13	0.29	135
Sheridan County Airport	89.0	54.8	71.9	1.9	98	07/11	49	07/31	0.43	-0.75	36

All Data are Preliminary and Subject to Change. + indicates multiple dates, latest date listed.

Source: National Weather Service Cooperative Observation Network Data

Data are retrieved through the Applied Climate Information System (ACIS).

These data are available for the entire period of record through the CLIMOD system. For more information please see <http://hprcc.unl.edu/services>.

State Spotlight - Kansas

Mary Knapp - State Climatologist
 Kansas State Climate Office, Kansas State University

Strong contrasts continue

July continued with a sharp difference across the month. Temperatures started off cooler than average, then quickly moved to more summer-like conditions, before ending on a cool note. All divisions saw highs exceed 100 degrees, but all divisions ended the month below average. The western divisions were closest to the 1981-2010 normal, while the central divisions saw the biggest departures from average. The highest temperature was 110F, recorded at Abilene, in Dickinson County on July 9th. The coolest temperature recorded was 34F, at Tribune 14N, on the 2nd of July. Overall, the mean temperature across the state was cooler than average. The state-wide average temperature of 77.0F was 1.7 degrees below normal and the 28th coolest since 1895. This was considerably cooler than last year's average temperature of 84.3F, which was the 7th warmest on record. The Southwestern division was closest to normal. Their average temperature was 78.8, which was 0.1 degrees below average. The Central division had the greatest departure from normal. With a mean temperature of 76.8F, it was 3.1 degrees cooler than average. For individual stations, Great Bend (Barton County) was the coolest. With a mean temperature of 72.5F, it was 8.3 degrees below normal. Melvern Lake (Osage County) was the warmest. At 79.1F, the mean temperature was 1 degree above normal.

State-wide, the average precipitation was 4.29 inches, which 112 percent of normal. As percent of normal, the Central Division ranked the highest at 189 percent. The average was 7.50 inches, much of which came during the last week of the month. The Southwest division had the lowest percent of normal: 67 percent. This translates to just 1.81 inches. Heaviest precipitation totals were seen in both the Central and Southeastern divisions. For the Community Collaborative Rain Hail and Snow Network (CoCoRaHS), Lindsborg 0.7 NNW in McPherson County reported 15.13 inches for the month. Of the National Weather Service (NWS) stations, Lindsborg in McPherson County had the greatest total with 14.11 inches. The highest 24-hour precipitation total from a NWS site was 7.93 inches at Pittsburg, Crawford County on the 30th. The greatest 24 hour total from a CoCoRaHS station was 8.99 inches at Cherokee 0.3 N, Crawford County also on the 30th. With these localized heavy amounts, July ended as the 31st wettest of 119 years.

After a brief return of abnormally dry conditions in the Southeast, recent rains have returned conditions to normal on the Drought Monitor. Improvements in the western divisions have been limited, as rainfall continues to be well below average. Cooler than average temperatures have somewhat moderated the negative impacts, but severe to exceptional drought conditions remain throughout the region. No change has been made to the Seasonal Drought outlook, but the Monthly Drought Outlook for August indicates some improvement in the western half of the state, with removal of drought conditions in the eastern and central areas. The El Niño/Southern Oscillation (ENSO) is expected to remain neutral. For August, both the temperature and precipitation outlooks are neutral. That means conditions are equally likely to be above or below normal. The mid-term outlook of 8-14 days calls for cooler and wetter than average conditions to remain through the 15th of August.

Severe weather was again a factor this month. While there was only one tornado reported-- in Stanton County -- hail and high wind reports were much more common. There were 42 hail reports and 61 wind damage reports. With the rains on the 30th of July flooding was an issue. Saturated grounds in the Central and Southeastern divisions have raised concerns of flooding, if the wet pattern continues. At the end of July, rivers in western KS continued to be low, while many streams and rivers in the eastern part of the state were above average levels, with some flooding.

For more information about the Kansas State Climate Office: <http://www.ksre.ksu.edu/wdl/>

The KSU's AWDN is a part of the High Plains Automated Weather Data Network (AWDN). Data are available through KSU or HPRCC.

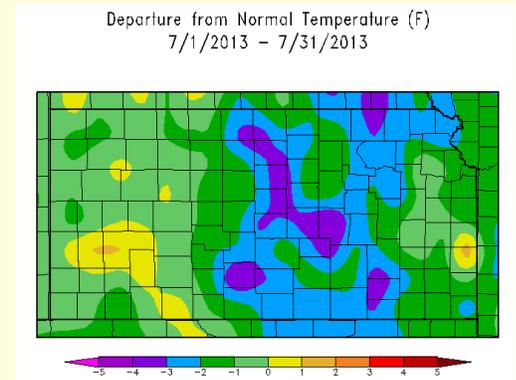


Figure 1. July 2013 departure from average temperatures across Kansas (High Plains Regional Climate Center)

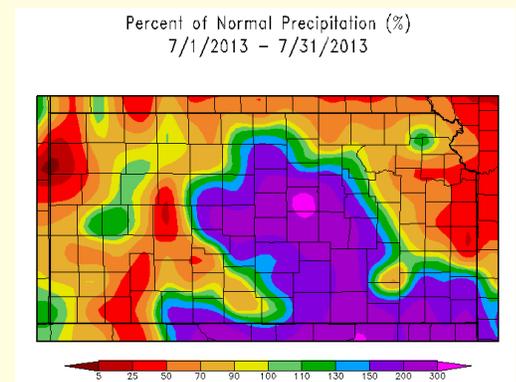


Figure 2. July 2013 percent of normal precipitation across Kansas (High Plains Regional Climate Center)

State Spotlight - North Dakota



F. Adnan Akyüz - State Climatologist, Barb Mullins - Assistant to the State Climatologist
 North Dakota State Climate Office, North Dakota State University

Precipitation:

The North Dakota Agricultural Weather Network recorded precipitation totals were generally below normal in the east and west central edge with near normal and above elsewhere (Figure 1). There were many scattered thunderstorms throughout the month. The greatest NDAWN total precipitation amount was 5.62 inches at Minot which is 220% above normal. The Storm Prediction Center (SPC) reported one tornado on the 9th in Morton County. The SPC reported two tornadoes spotted on the 21st in McHenry and Ramsey County along with a significant amount of hail in several Counties. Some locations in the southwest reported baseball sized hail. The end of July was cool and dry. The dry conditions have stressed crops in many areas. The U.S. Drought Monitor June 30th report listed 16.55% of the state as being Abnormally Dry (D0) and included McIntosh, Logan, Kidder, Stutsman, Eddy, Foster and Griggs Counties.

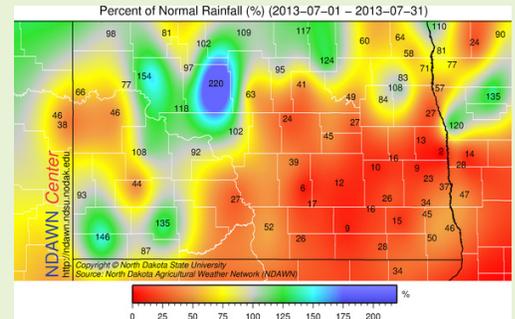


Figure 1. Percent of Normal Precipitation in July 2013 for North Dakota (North Dakota State Climate Office)

Temperature:

NDAWN July average air temperatures ranged from ~65 °F in the north to ~72 °F in the southeast. Departure from normal average air temperatures ranged from 1 °F to -4 °F (Figure 2). The daily average air temperatures were primarily above normal until the 19th after which a cold air mass settled in causing the daily average air temperatures to fall below normal for the remainder of the month. Average air temperatures were 5 to 20 °F below normal on the 27th and 28th. The National Weather Service reported new minimum average air temperature records set on the 27th at Jamestown and Bismarck with 42 °F and 39 °F, respectively. Grand Forks Airport and Jamestown set new minimum average air temperatures on the 28th with 42 °F and 41 °F, respectively.

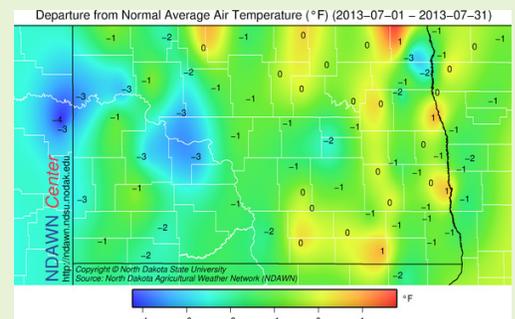


Figure 2. Temperature Departure from Normal in July 2013 for North Dakota (North Dakota State Climate Office)

About the High Plains Regional Climate Center

The High Plains Regional Climate Center (HPRCC) operates out of the University of Nebraska - Lincoln (UNL) in Lincoln, Nebraska. As one of 6 regional climate centers throughout the nation, HPRCC works closely with other organizations such as the National Climatic Data Center (NCDC), Local and Regional National Weather Service (NWS) Offices, and other climate services organizations such as the National Drought Mitigation Center (also located at UNL) to provide climate data services and specialized climate products.

For More Information Online

High Plains Regional Climate Center: <http://hprcc.unl.edu>

High Plains Regional Climate Services: <http://hprcc.unl.edu/services>

CLIMOD: <http://climod.unl.edu>

Regional Climate Centers and ACIS: <http://www.rcc-acis.org>

National Weather Service: <http://www.weather.gov>

National Climatic Data Center: <http://ncdc.noaa.gov>

University of Nebraska - Lincoln: <http://www.unl.edu>

National Drought Mitigation Center: <http://drought.unl.edu>

Climate Prediction Center: <http://www.cpc.noaa.gov>

NOAA Storm Prediction Center: <http://www.spc.noaa.gov>



Photo of the Nebraska Sandhills by Bill Sorensen - Senior Programmer - HPRCC

Author Information

For questions, comments, or suggestions, please contact:

Natalie Umphlett - Regional Climatologist - High Plains Regional Climate Center

(402) 472-6764 - numphlett2@unl.edu

712 Hardin Hall

3310 Holdrege Street

Lincoln, NE 68583-0997

