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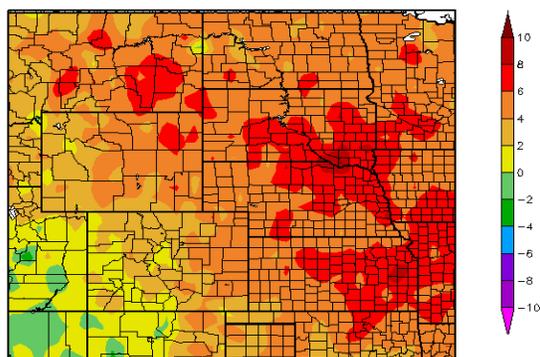
Cornfield near Davis, South Dakota - Photo by Joseph Brum  
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# July 2012 Climate Summary

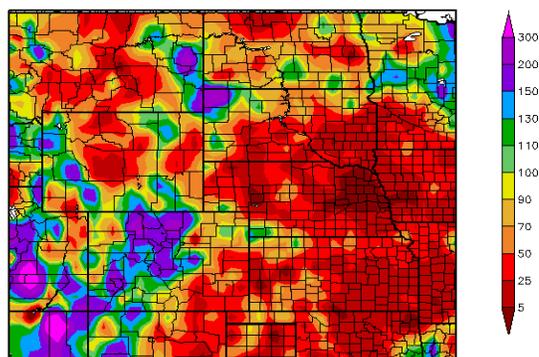
## Region Breakdown

Hot and dry conditions continued this July across the majority of the High Plains Region. The larger temperature departures occurred in northeastern Wyoming, southern and eastern South Dakota, northern and eastern Nebraska, and central and eastern Kansas where the departures from normal temperature ranged from 6.0-8.0 degrees F (3.3-4.4 degrees C) above normal. There were even a few pockets of eastern Kansas, northern Nebraska, and eastern South Dakota which had temperature departures which were 8.0-10.0 degrees F (4.4-5.6 degrees C) above normal. No station in the Region had monthly average temperatures which were below normal and the continued warm pattern caused many locations across the Region to be ranked in the top 10 warmest Julys on record. One location was Denver, Colorado which had its warmest July on record with an average temperature of 78.9 degrees F (26.1 degrees C). This was 4.7 degrees F (2.6 degrees C) above normal (period of record 1872-2012). The previous record occurred in 1934 with an average temperature of 77.8 degrees F (25.4 degrees C). Interestingly, this was also the warmest month ever recorded in Denver. The previous record also occurred in July 1934. So far this year, Denver has had 13 days at or above 100 degrees F (37.8 degrees C), with 7 of those occurring this month. Previously, the most days at or above 100 degrees F (37.8 degrees C) was 7 in 2005. For more information on July temperature

Departure from Normal Temperature (F)  
7/1/2012 - 7/31/2012



Percent of Normal Precipitation (%)  
7/1/2012 - 7/31/2012



Departure from 1981-2010 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for July 2012 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

## July 2012 Climate Summary

rankings, please see the table below.

Again, this month was just one more month of continued warmth as most of the Region had warmer than normal temperatures each month this year. Eastern portions of the Region have had January-July average temperatures which were 6.0-8.0 degrees F (3.3-4.4 degrees C) above normal. Many locations in this portion of the Region have had the warmest January-July period on record. One of these locations was Topeka, Kansas which had a January-July average temperature of 62.1 degrees F (16.7 degrees C). This was 7.5 degrees F (4.2 degrees C) above normal and easily beat the old record of 58.9 degrees F (14.9 degrees C) set in 1946 (period of record 1887-2012).

The continued hot and dry conditions have taken their toll on many crops and livestock across the Region and beyond. According to the U.S. Department of Agriculture, by the end of the month 88 percent of all corn, 87 percent of all soybeans, 64 percent of all hay acreage and 72 percent of all cattle were within an area experiencing drought conditions in the United States. Poor pastureland conditions in the High Plains Region have led to the early weaning of calves in some areas and even culling of herds. Some producers have decided to chop the drought damaged dryland corn for silage or hay due to the poor condition of the pastures, which have been providing little to no grazing capacity at this point. Conservation Reserve Program (CRP) acres have been released for emergency use in Colorado, Kansas, and Nebraska. In Colorado, irrigated crops have progressed ahead of schedule; however there were growing concerns over dwindling water reserves. Meanwhile, in Nebraska, irrigators were struggling with the water demands as surface water use was stopped due to low river levels. According to the National Agricultural Statistics Service (NASS), there were some cases in Nebraska where more water had been used by mid-July than what would normally be used in an entire season.

## July 2012 Top 5 Temperature Rankings - Highlights

Temperature Rankings			
Temperature in degrees F			
Location	Average Temperature / Ranking	Record or Old Record / Year	Period of Record
Colorado Springs, CO	75.4 / 3rd warmest	75.8 / 2003	1894-2012
Denver, CO	78.9 / warmest	77.8 / 1934	1872-2012
Salina, KS	87.4 / 2nd warmest	88.8 / 1980	1948-2012
Wichita, KS	88.2 / 4th warmest	90.4 / 1980	1888-2012
Norfolk, NE	82.5 / 3rd warmest	86.5 / 1936	1893-2012
North Platte, NE	80.4 / 5th warmest	82.9 / 1934	1874-2012
Omaha, NE	84.8 / 4th warmest	86.7 / 1936	1871-2012
Scottsbluff, NE	79.7 / 2nd warmest	80.9 / 1936	1893-2012
Valentine, NE	82.6 / 2nd warmest	84.0 / 1936	1889-2012
Fargo, ND	76.6 / 2nd warmest	80.2 / 1936	1881-2012
Grand Forks, ND	74.8 / warmest	73.9 / 1989	1893-2012
Williston, ND	75.0 / 5th warmest	80.7 / 1936	1894-2012
Huron, SD	80.3 / 3rd warmest	84.5 / 1936	1881-2012
Rapid City, SD	78.4 / 3rd warmest	79.7 / 2007	1942-2012
Sioux Falls, SD	81.3 / 2nd warmest	84.5 / 1936	1893-2012
Casper, WY	75.2 / 3rd warmest	76.1 / 1954	1939-2012
Lander, WY	75.5 / 4th warmest	75.9 / 2006*	1891-2012
Sheridan, WY	75.8 / 2nd warmest	77.9 / 1936	1907-2012

All Data are Preliminary and Subject to Change.

\* indicates multiple records, latest date is listed

Source: National Weather Service Cooperative Observation Network Data

The High Plains Regional Climate Center is one of the Regional Climate Centers, and is involved in the Applied Climate Information System (ACIS) development and management effort. Data found throughout this publication were derived using products built on the ACIS framework.

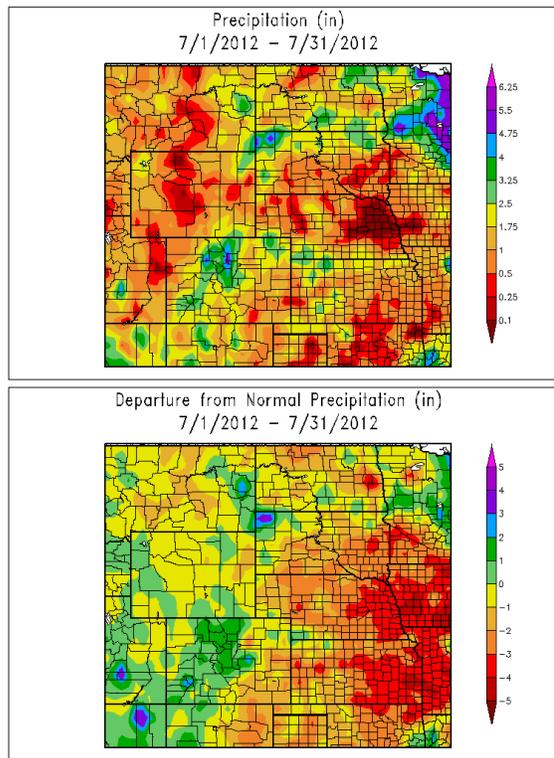
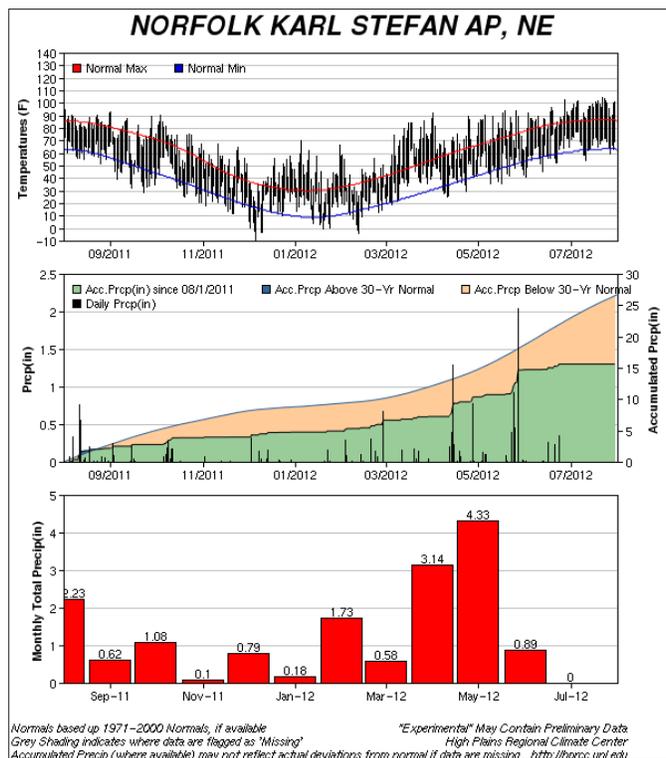


# Precipitation Summary

Precipitation was varied across the Region this month. Kansas, Nebraska, and South Dakota were hit the hardest by the dryness as the majority of each of those states received only 50 percent or less of normal precipitation. Northern and eastern North Dakota and central and eastern Wyoming also received precipitation which was only 50 percent of normal or less. Some locations in Nebraska did not receive any measurable precipitation this month. Norfolk, Nebraska was one of those locations and set a new record for driest July (period of record 1893-2012). To put this record into perspective, Norfolk normally receives over 3 inches (76 mm) of precipitation in July. The old record occurred in 1936 with 0.18 inches (5 mm). Ultimately, Norfolk went a total of 38 consecutive days without measurable precipitation which is quite unusual for this time of year. This ranked as the 14th longest stretch without measurable precipitation on record and was the longest stretch to occur solely in the summer months. The second longest stretch of days without measurable precipitation to occur only in the summer was a 28 day stretch ending on August 2, 1901 (this stretch ranks 51st).

While large areas received little to no precipitation, central Colorado, northwestern South Dakota, and pockets of Wyoming received at least 150 percent of normal precipitation. Boulder, Colorado was one of the wetter locations with 4.99 inches (127 mm) precipitation. This amount of precipitation was 3.20 inches (81mm) above normal, or 279 percent of normal, and enough for Boulder to have its 3rd wettest July on record (period of record 1893-2012). The record set in 1919 held at 7.46 inches (189 mm).

Although July was a relatively quiet severe weather month, an interesting event occurred on July 28th in the Rocky Mountains. According to the National Weather Service in Boulder, Colorado, an EF-0 tornado touched down approximately 1.75 miles northeast of Mount Evans. This tornado touched down at an estimated altitude of 11,900 feet (3627 m), making it the second highest altitude tornado on record. The highest tornado on record occurred on July 4, 2004 in the Sequoia National Park in California at 12,000 feet (3658 m).

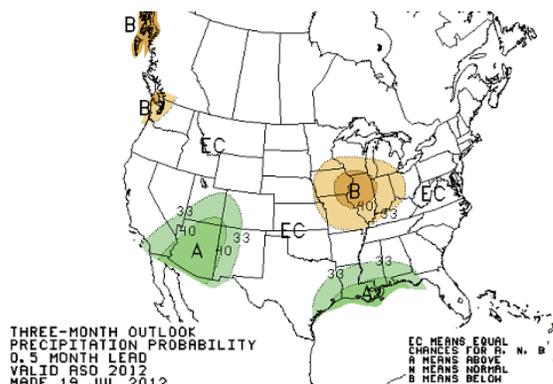
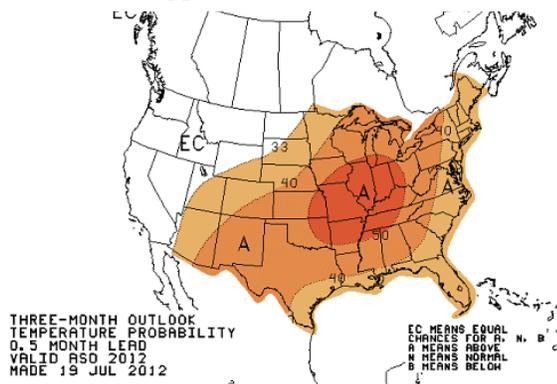


Above: Maximum, minimum, and normal temperatures, accumulated precipitation, and monthly total precipitation for Norfolk, NE over the past year (top left). Total precipitation (inches) (top right) and Departure from Normal Precipitation (inches) (bottom right) for July 2012 in the High Plains Region. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

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# Climate Outlook

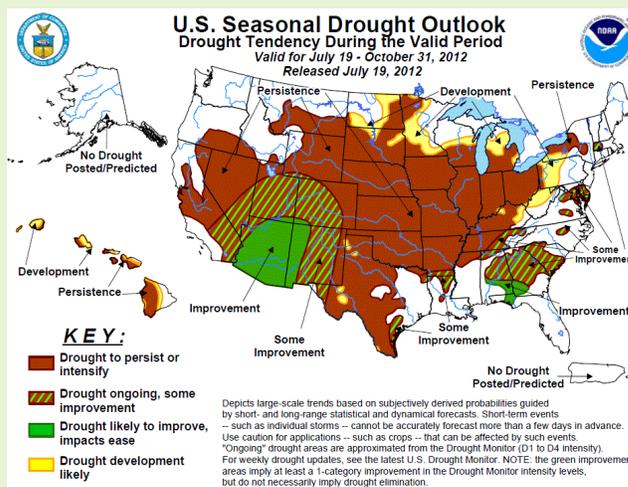
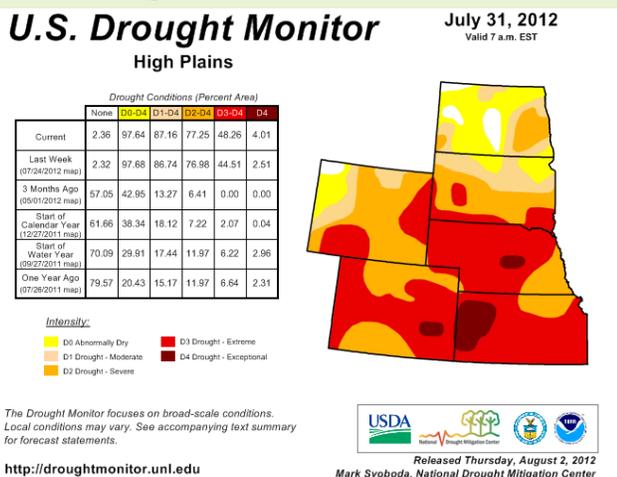
ENSO-neutral conditions continue and the chances for El Niño conditions increase through September. The temperature outlook indicates a higher probability of above normal temperatures for Colorado, Kansas, Nebraska, the southeastern half of Wyoming, southeast North Dakota, and all but the far northwest corner of South Dakota. The precipitation outlook indicates a higher probability of below normal precipitation for far southeastern Nebraska and eastern Kansas. There is a higher probability of above normal precipitation for southwestern Colorado. Equal chances of above, near, or below normal precipitation and temperatures are predicted elsewhere in the Region. 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

Over the last month, there were major changes to the U.S. Drought Monitor as hot and dry conditions prevailed. These conditions led to a rapid expansion and deterioration of the drought. At the end of June, about 67 percent of the Region was under moderate (D1) to extreme (D3) drought. Unfortunately, at this end of this month, 87 percent of the Region was under drought, with 4 percent of the Region in the exceptional drought designation (D4). D4 areas included a small area of central Nebraska, a small area of southeastern Colorado, and much of western Kansas. The D3 areas expanded tremendously since last month to include nearly all of Kansas and Nebraska, and significant portions of Colorado, South Dakota, and Wyoming. There were even some areas of the Region which went from no drought to D3 in just a matter of weeks. According to the U.S. Seasonal Drought Outlook released July 19th, drought conditions were expected to improve slightly in Colorado and extreme southern Wyoming. Areas of drought in all other areas of the Region were expected to persist, while new areas of drought were expected to develop in the Dakotas.



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	94.1	63.6	78.9	4.9	101	07/22+	57	07/26+	2.87	0.32	113
Alamosa San Luis Airport	84.6	47.4	66.0	1.4	92	07/01	42	07/19+	1.00	0.03	103
Colorado Springs Municipal Airport	89.1	61.6	75.4	4.5	96	07/04+	56	07/11	3.56	0.72	125
Grand Junction Walker Field Airport	93.9	66.4	80.1	1.9	101	07/12+	60	07/06	0.98	0.37	161
Pueblo Memorial Airport	96.3	63.3	79.8	4.0	102	07/02	58	07/18+	0.91	-1.15	44

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	96.8	70.5	83.7	4.6	105	07/25	59	07/11	1.22	-2.70	31
Dodge City Regional Airport	98.6	69.5	84.0	4.4	105	07/29	58	07/12	1.92	-1.16	62
Goodland Renner Field	97.3	63.6	80.4	4.7	105	07/21	53	07/10	1.85	-1.62	53
Topeka Municipal Airport	100.0	72.6	86.3	7.3	108	07/07	65	07/11	1.64	-2.18	43
Wichita Mid-Continent Airport	102.2	74.3	88.2	7.1	111	07/30+	69	07/13+	0.26	-3.06	8

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	98.1	62.0	80.0	6.4	109	07/20	51	07/09	0.23	-1.88	11
Grand Island Airport	96.0	68.9	82.4	6.2	104	07/22	58	07/11	0.16	-3.24	5
Lincoln Municipal Airport	97.0	69.2	83.1	5.5	105	07/22	57	07/11	0.33	-3.07	10
Omaha Eppley Airfield	96.9	72.8	84.8	8.1	106	07/25	63	07/11+	0.01	-3.82	0
Norfolk Karl Stefan Airport	96.9	68.0	82.5	7.5	105	07/22	54	07/11	0.00	-3.32	0
North Platte Regional Airport	98.0	62.7	80.4	6.1	108	07/22	55	07/13+	0.69	-2.38	22
Valentine Miller Field	99.4	65.7	82.6	8.1	110	07/21	52	07/27+	0.08	-3.13	2

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	89.7	61.6	75.7	4.6	104	07/19	48	07/05	2.65	-0.24	92
Fargo International Airport	88.6	64.7	76.6	5.6	100	07/20	54	07/05	2.88	0.09	103
Grand Forks International Airport	87.5	62.2	74.8	6.2	96	07/22	52	07/27+	3.35	0.20	106
Theodore Roosevelt Airport	90.7	59.5	75.1	5.9	102	07/19	51	07/27+	1.16	-1.28	48
Williston International Airport	89.1	60.9	75.0	4.9	100	07/19	49	07/05	1.89	-0.65	74

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 2012 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	88.9	64.6	76.7	5.4	98	07/15	53	07/08	2.70	-0.32	89
Huron Regional Airport	92.9	67.6	80.3	6.6	104	07/16	55	07/27	0.50	-2.42	17
Pierre Regional Airport	96.7	65.9	81.3	5.9	109	07/15	55	07/27	0.68	-1.93	26
Rapid City Regional Airport	94.5	62.4	78.4	5.8	107	07/19	53	07/27	1.57	-0.28	85
Sioux Falls Joe Foss Field Airport	94.0	68.7	81.3	8.3	104	07/06	56	07/10	0.24	-2.85	8

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	92.9	57.5	75.2	4.7	100	07/01	48	07/08+	1.01	-0.40	72
Cheyenne Municipal Airport	86.2	58.5	72.3	2.9	94	07/01	53	07/26+	2.73	0.54	125
Lander Hunt Field Airport	91.2	59.8	75.5	4.3	99	07/01	54	07/06	0.08	-0.70	10
Laramie Regional Airport	83.4	52.1	67.8	3.8	92	07/01	47	07/26+	1.48	0.05	103
Rawlins Municipal Airport	88.0	54.6	71.3	4.3	96	07/01	48	07/26+	0.98	0.14	117
Sheridan County Airport	93.7	57.9	75.8	5.8	103	07/01	49	07/07	0.99	-0.19	84

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Source: National Weather Service Cooperative Observation Network Data

# State Spotlight - North Dakota

**F. Adnan Akyüz - State Climatologist, Barb Mullins**  
**North Dakota State Climate Office, North Dakota State University**



## Precipitation:

The North Dakota Agricultural Weather Network (NDAWN) July percent of normal precipitation ranged from ~10% to an isolated ~180% of normal in Adams County (Figure 1, NDAWN Center). The greatest majority of the state had below normal precipitation with the driest areas of less than 50% of normal in the north central and east central regions. Throughout July there were hit and miss rain events across the state with very few that were wide spread. According to the U.S. Drought Monitor July 31st assessment, the eastern and south west corner of the state had a drought intensity of D2 (severe drought) with nearby areas as D1 (moderate drought). The north central region had a drought intensity of D1 (moderate drought). The few areas assessed with no drought conditions included the far north west corner, parts of west central, and central regions with the remaining areas assessed as D0 (abnormally dry). Based on the coverage and the intensity of the current drought in North Dakota, it is the worst drought to impact North Dakota since July 29, 2008.

## Temperature:

July daily average air temperatures ranged from ~70 °F in the north to ~75 °F in the south and western regions. The departure from normal average air temperatures were above normal across the state with a range of ~2 °F to ~8 °F. Daily average air temperatures were above normal most of the month with only a few days with below normal temperatures. Many places had below normal average air temperatures on the 6th, 15th, 26th, and 27th. The National Weather Service recorded record high air temperatures at Bismarck, Minot, Jamestown, and Dickinson on the 19th with 104 °F, 101 °F, 101 °F, and 102 °F, respectively.

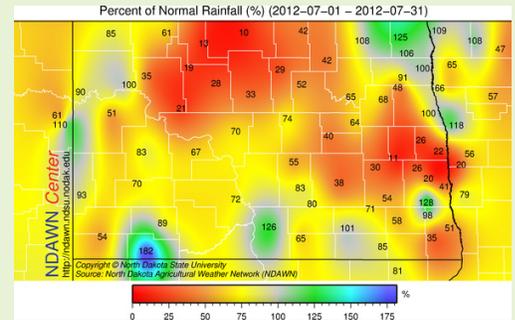


Figure 1. Percent of Normal Precipitation in July 2012 for North Dakota (North Dakota State Climate Office)

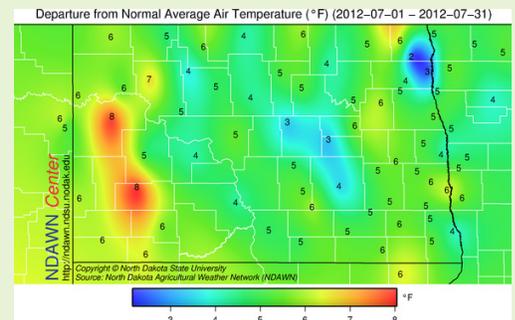


Figure 2. Temperature Departure from Normal in July 2012 for North Dakota (North Dakota State Climate Office)

# 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

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