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

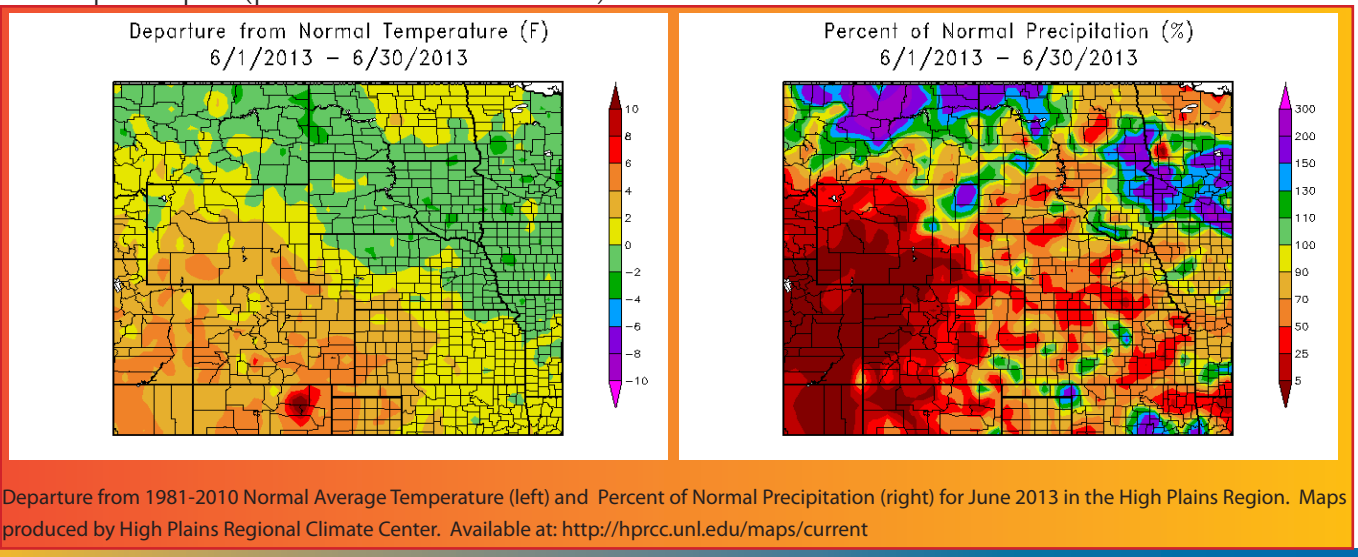
Lincoln, NE - Photo by Christopher Payer
http://hprcc.unl.edu

June 2013 Climate Summary

Region Breakdown

June 2013 average temperatures were generally near normal in the east and above normal in the west across the High Plains Region. The areas with average temperatures of about 2.0 degrees F (1.1 degrees C) above/below normal included North Dakota, South Dakota, Nebraska, eastern Kansas, and northern Wyoming. Meanwhile, southern Wyoming, most of Colorado, and western Kansas had average temperature departures of 2.0-6.0 degrees F (1.1-3.3 degrees C) above normal.

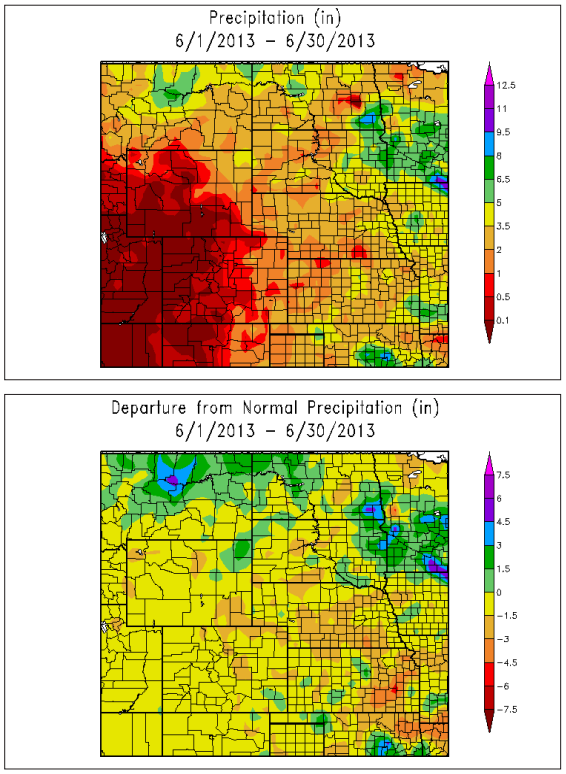
Some locations within the warmer than normal area broke into the top ten warmest Junes on record. One example was Colorado Springs, Colorado which had its 6th warmest June on record with an average temperature of 70.0 degrees F (21.1 degrees C). Although 4.9 degrees F (2.7 degrees C) above normal, this was not even close to the record that was set last year with 73.2 degrees F (22.9 degrees C). Interestingly, each June since 2010 has ranked in the top 10 warmest Junes in Colorado Springs (period of record 1894-2013). Another example was Laramie, Wyoming. With an average temperature of 62.5 degrees F (16.9 degrees C), Laramie had its 2nd warmest June. Just last year, Laramie set a new record for warmest June with 64.0 degrees F (17.8 degrees C). Now, the past two Junes hold the top two spots (period of record 1948-2013).



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

Precipitation Summary

June was on the drier side in the High Plains Region with most areas receiving less than 70 percent of normal precipitation. It was especially dry for most of Colorado and Wyoming which received less than 50 percent of normal precipitation and many locations in the western areas of those states received little to no precipitation. One such location was Rock Springs, Wyoming which tied with 2012 and 1956 for the driest June on record with only a trace amount of precipitation (period of record 1948-2013). There were some portions of the Region which received ample precipitation including northwestern and southeastern North Dakota, northeastern Wyoming, and a few other scattered pockets. In the Red River Valley, several slow moving storm systems brought heavy precipitation, wind, and hail. In addition to flash flooding, the heavy rains caused area rivers to rise above flood stage. Fargo, North Dakota was one of the wet spots in the Region and has been since May. Fargo set a new record for May 1-June 30 precipitation with 14.89 inches (378 mm). 7.73 inches (196 mm) fell in June marking the 7th wettest and 7.16 inches (182 mm) fell in May, marking the 4th wettest (period of record 1881-2013).



Above: Total precipitation (inches) (top) and Departure from Normal Precipitation (inches) (bottom) for June 2013 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.

Hot, dry, and windy weather created dangerous fire conditions in Colorado. Several fires burned in Colorado; however two were of note - the Black Forest Fire and the West Fork Complex Fire. According to InciWeb, the Black Forest Fire started on June 11th due to unknown causes. The fire, located northeast of Colorado Springs, spread quickly due to high winds and thousands of people had to evacuate from the area. Ultimately, this fire became the most destructive in Colorado history, in terms of structures burned, by burning over 500 homes. Just last year, the Waldo Canyon Fire had been deemed the most destructive with 346 homes destroyed. Another fire, the West Fork Complex Fire, consists of three fires which were started by lightning on June 5th. The fire is located in southern Colorado roughly between Durango and Alamosa. This area has steep, rugged terrain and large amounts of beetle-killed trees. These factors created a dangerous situation for firefighters and by the end of June only 2% of the fire had been contained and over 92,000 acres had burned.

Severe Weather Summary

Severe weather was reported somewhere in the High Plains Region on all but 3 days this month and resulted in a total of 910 reports (tornadoes, high winds, and large hail). Some interesting events occurred on the 18th and 20th. On June 18th a tornado moved across the eastern side of the Denver International Airport. The ASOS site located at the airport reported a 97 mph wind gust as the tornado went by. On the 21st, a bow echo caused widespread wind damage in central and northeast South Dakota. Winds of up to 90 mph uprooted trees and caused structural damage. At least 3 tornadoes were reported as well. On the other side of the state, hail of up to 4.25 inches was reported that same day.

June 2013 - Storm Reports
June 2012 Totals in Parentheses

State	Tornado	Hail	Wind
Colorado	10 (18)	65 (81)	35 (34)
Kansas	1 (1)	110 (31)	167 (65)
Nebraska	11 (0)	86 (40)	67 (26)
North Dakota	8 (6)	51 (48)	40 (28)
South Dakota	10 (6)	84 (96)	92 (75)
Wyoming	4 (5)	49 (38)	20 (14)
Total	44 (36)	445 (334)	421 (242)

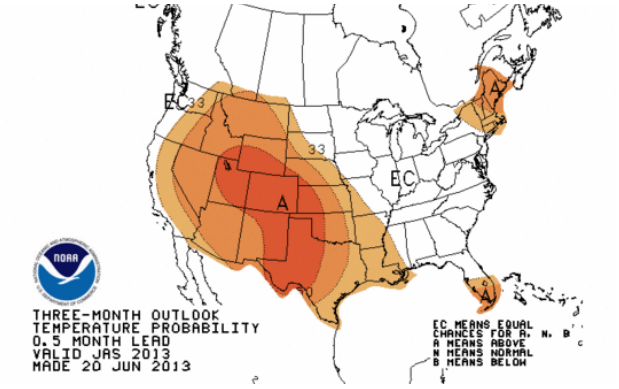
Storm report totals are preliminary and are provided by the NOAA Storm Prediction Center located in Norman, OK. For more information on storm reports and the Storm Prediction Center, please see: http://www.spc.noaa.gov.

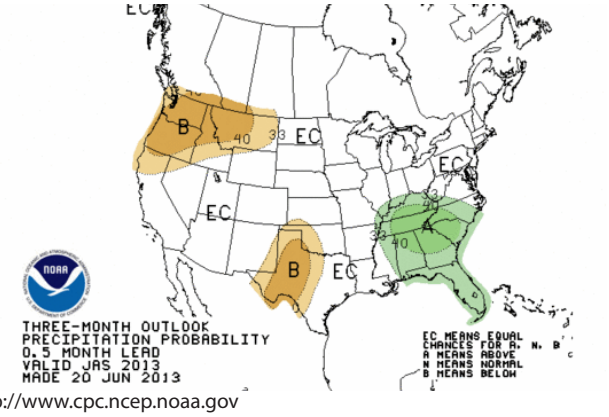
The High Plains Regional Climate Center is one of the Regional Climate Centers, and is involved in the Applied Climate Information System (ACIS) development and management effort. Data found throughout this publication were derived using products built on the ACIS framework.

ACIS
Applied Climate Information System - Regional Climate Centers

Climate Outlook

At the end of June, ENSO-neutral conditions were still present and likely to continue through the summer. For the next three months, the temperature outlook indicates a higher probability of above normal temperatures for most of the High Plains Region including Colorado, Kansas, Wyoming, all but the extreme northeast corner of Nebraska, the western half of South Dakota, and western North Dakota. Meanwhile, the precipitation outlook indicates a higher probability of below normal precipitation for only the far northwest corner of Wyoming and extreme southwestern Kansas. Equal chances of above, near, or below normal temperatures and precipitation exist for the rest of the High Plains Region. The seasonal outlooks combine the effects of long-term trends, soil moisture, and when applicable, the El Niño Southern Oscillation cycle (ENSO).

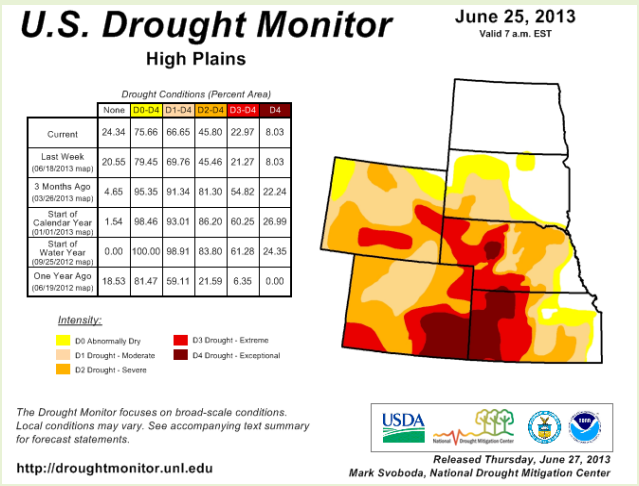


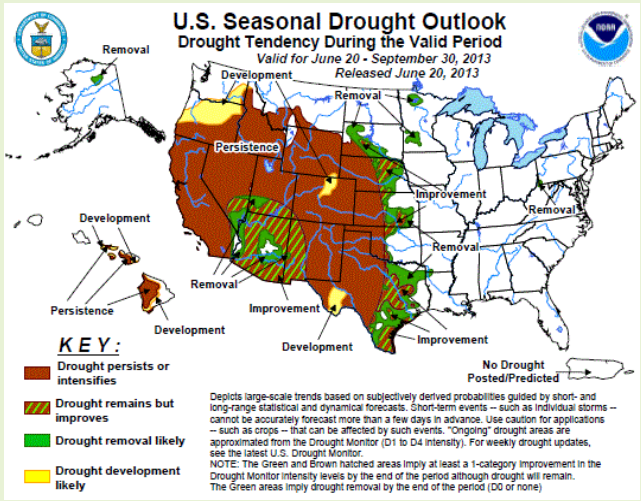


Above: 3-Month Outlook Maps Courtesy the NOAA Climate Prediction Center - http://www.cpc.ncep.noaa.gov
(left) The Three-Month Temperature Probability Outlook, (right) The Three-Month Precipitation Probability Outlook

Drought Watch

The changes in the U.S. Drought Monitor this month showed a general improvement in the east and persistence in the west. At the end of June, approximately 67 percent of the Region was in moderate (D1) to exceptional (D4) drought - down from 73 percent at the end of May. Widespread, beneficial rains led to improvements across much of South Dakota, eastern Nebraska, eastern Kansas, and northern Wyoming. However, much of southern Wyoming and western Colorado had little to no precipitation and drought conditions persisted or worsened there. Colorado contended with high temperatures, little rainfall, and large wildfires and as of June 25th, 100 percent of the state was in the D1-D4 categories. Colorado was the only state in the Region which did not have any improvements this month. The large D4 area in eastern Colorado and western Kansas persisted as well. According to the U.S. Seasonal Drought Outlook released June 20th, some areas of drought in central South Dakota, eastern Nebraska, and eastern Kansas were expected to improve or be removed. Drought was expected to persist elsewhere through September 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	86.9	54.5	70.7	3.5	104	06/11	43	06/02	1.20	-1.26	49
Alamosa San Luis Airport	84.4	39.3	61.9	2.3	94	06/27	27	06/02	0.55	0.06	112
Colorado Springs Municipal Airport	85.4	54.6	70.0	4.9	98	06/27+	45	06/02+	0.60	-1.90	24
Grand Junction Walker Field Airport	92.1	58.0	75.0	3.0	103	06/28	44	06/01	0.01	-0.45	2
Pueblo Memorial Airport	91.9	56.7	74.3	4.3	104	06/27+	40	06/01	0.27	-1.09	20

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	86.3	61.9	74.1	0.7	100	06/26	46	06/02	1.28	-2.77	32
Dodge City Regional Airport	92.3	62.3	77.3	3.4	107	06/27	41	06/02	2.61	-0.63	81
Goodland Renner Field	88.6	55.9	72.3	2.6	107	06/11	39	06/02	3.04	-0.21	94
Topeka Municipal Airport	86.1	65.6	75.8	1.6	98	06/26+	49	06/03	3.15	-2.25	58
Wichita Mid-Continent Airport	89.3	66.8	78.1	2.3	104	06/27	51	06/02	1.83	-3.37	35

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	81.9	51.3	66.6	0.7	96	06/26	35	06/06	2.62	-0.62	81
Grand Island Airport	84.8	60.4	72.6	1.3	100	06/21+	44	06/02	1.63	-2.67	38
Lincoln Municipal Airport	83.0	60.6	71.8	-0.8	97	06/21	47	06/07	2.49	-1.86	57
Norfolk Karl Stefan Airfield	80.4	58.5	69.4	-0.8	97	06/21	43	06/02	2.18	-2.08	51
North Platte Regional Airport	84.6	53.8	69.2	1.3	97	06/21	33	06/02	1.95	-1.47	57
Omaha Eppley Airport	81.6	62.3	72.0	-0.1	93	06/21	50	06/07+	4.74	0.56	113
Valentine Miller Field	80.9	54.7	67.8	0.3	96	06/26	37	06/02	2.45	-1.11	69

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	76.2	53.2	64.7	0.0	89	06/26	38	06/06	2.71	-0.46	85
Fargo International Airport	78.0	57.1	67.5	1.3	89	06/19	41	06/02	7.73	3.83	198
Grand Forks International Airport	76.9	54.9	65.9	1.9	89	06/25+	38	06/03	3.10	-0.38	89
Theodore Roosevelt Airport	72.9	50.1	61.5	-0.7	83	06/19	39	06/02	2.32	-0.88	73
Williston International Airport	73.4	49.5	61.5	-1.7	85	06/19	36	06/05+	4.16	1.64	165

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.

June 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	77.1	53.5	65.3	-0.3	90	06/26	37	06/02	2.20	-1.50	59
Huron Regional Airport	78.3	55.8	67.0	-0.8	90	06/26	37	06/02	3.46	-0.47	88
Pierre Regional Airport	78.0	55.5	66.7	-1.0	91	06/26	37	06/02	2.96	-0.61	83
Rapid City Regional Airport	77.5	51.2	64.4	-0.1	89	06/27	38	06/06	2.16	-0.37	85
Sioux Falls Joe Foss Field Airport	77.0	56.9	67.0	-0.8	88	06/26+	42	06/03	4.28	0.36	109

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	84.3	46.0	65.2	3.0	96	06/27	32	06/04	0.87	-0.74	54
Cheyenne Municipal Airport	82.3	50.8	66.5	4.4	94	06/27	38	06/02	0.15	-2.19	6
Lander Hunt Field Airport	83.3	50.2	66.7	3.7	96	06/27	40	06/04	0.05	-1.22	4
Laramie Regional Airport	80.5	44.4	62.5	5.3	90	06/28+	30	06/04	0.44	-1.10	29
Rawlins Municipal Airport	82.1	43.8	63.0	3.7	94	06/28	30	06/02	0.03	-1.00	3
Sheridan County Airport	77.4	47.2	62.3	0.7	92	06/19	32	06/05	2.19	0.07	103

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

Summer arrives with strong contrasts

June was a picture of differences across the state. The biggest differences were in temperatures. Both the highest and the lowest temperatures for the month were recorded in the western third of the state. The highest temperature was 113 F, recorded at Tribune 14N (Greeley County) on the 12th. Just ten days earlier on the 3rd, the coldest reading of 36 F was recorded at Brewster 4W (Thomas County). Overall, the mean temperature across the state was warmer than average. The state-wide average temperature of 74.9 F was the 34th warmest since 1895. This was considerably cooler than last year's average temperature of 77.2 F, which was the 10th warmest on record. The East Central division was closest to normal. Their average temperature was 73.6 F, which was 0.7 degrees above average. The Southwest division had the greatest departure from normal. With a mean temperature of 77.4 F, it was 4.0 degrees warmer than average. For individual stations, Great Bend (Barton County) was the coolest. With a mean temperature of 74.4 F, it was 1.4 degrees below normal. Richfield (Stanton County) was the warmest. At 77.8 F, the mean temperature was 5 degrees above normal.

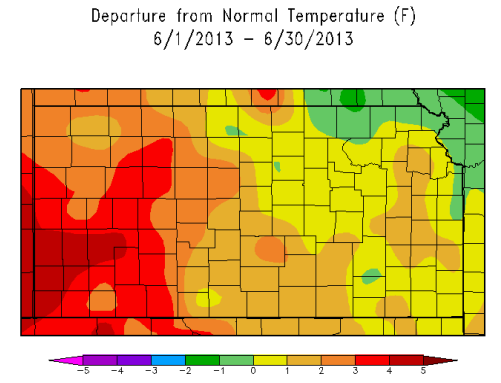


Figure 1. June 2013 departure from average temperatures across Kansas (High Plains Regional Climate Center)

State-wide, the average precipitation was 2.52 inches, which was 59% of normal. As percent of normal, the Southwest Division ranked the highest at 78 percent. The average was 2.55 inches, much of which came in the form of heavy rain during the 16th and 17th. The Northwest division had the lowest percent of normal: 41 percent. This translates to just 1.18 inches. Heaviest precipitation totals fell in the eastern portion of the state. For the Community Collaborative Rain Hail and Snow Network (CoCoRaHS), Uniontown 4.7 WSW in Bourbon County reported 10.42 inches for the month. Of the National Weather Service (NWS) stations, Moran in Allen County had the greatest total with 7.42 inches. The highest 24 hour precipitation total from a NWS site was 4.60 inches at Lindsborg, McPherson County on the 17th. The greatest 24 hour total from a CoCoRaHS station was 4.84 inches at Lindsborg 0.7 NNW, McPherson County, also on the 17th. Despite these localized heavy amounts, June ended as the 23rd driest of 119 years.

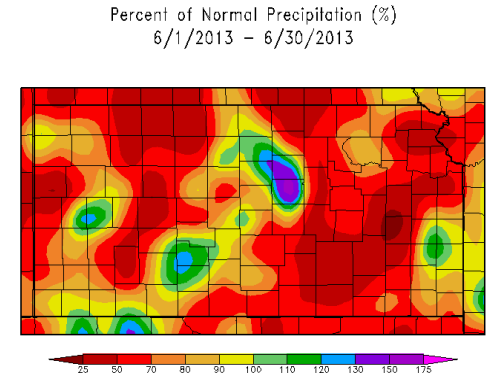


Figure 2. June 2013 percent of normal precipitation across Kansas (High Plains Regional Climate Center)

Changes in the Drought Monitor have been limited. In the Eastern divisions, with near normal temperatures there has been little change. In a small portion of East Central KS and Northeastern KS, the Drought Monitor is actually near normal. Extreme and Exceptional drought expanded in Southwestern KS, where moisture was very limited. The latest Drought Outlook indicated some drought conditions are expected to improve. Strongest signal for continued improvement is in the eastern third of the state. In addition to the seasonal drought outlook, the Drought Mitigation Center has released a new product which gives a drought outlook for the next month. In the Seasonal Outlook, continued improvement is forecast for the central and eastern portions of the state, with persistence in the western third. In the monthly drought outlook, the forecast depicts removal of drought in the eastern portion of South Central KS. The El Niño/Southern Oscillation (ENSO) is expected to remain neutral. For July, both the temperature and precipitation outlooks are neutral. That means conditions are equally likely to be above or below normal.

Severe weather was again a factor this month. While there was only one tornado reported -- in Grant County -- hail and high wind reports were much more common. There were 110 hail reports and 167 wind damage reports. Some flooding was also reported, but that tended to be minor and short in duration. At the end of June, many streams and rivers were below the 24th percentile.

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.

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:

North Dakota experienced its 58th wettest June based on the preliminary state rankings. However, the spatial distribution of the monthly total precipitation was highly variable. The North Dakota Agricultural Weather Network recorded percent of normal precipitation totals which ranged from nearly 250% between Dickey and Sargent counties and nearly 20% in Foster County (Figure 1). June total precipitation amounts ranged from 9.24" in Valley City to 0.8" in Carrington. Heavy rainfall caused interstate 94 to close in Valley City which made travel hazardous. The persistent rainfall in drought stricken areas in south central and south eastern parts of the state ended the 2-yr long drought spell. Drought Monitor of June 26th report listed no areas in ND under any drought conditions. The persistent rainfall event halted field work in much of the state. Based on the USDA's State Agricultural Statistics Service there were only an average of 15.2 suitable days for field work in ND.

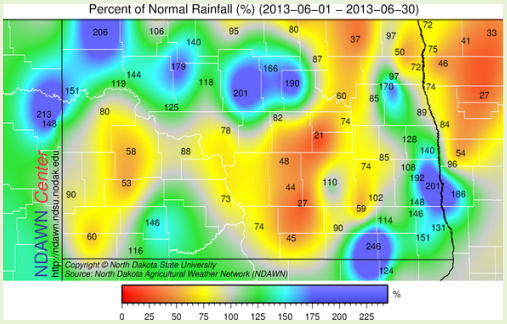


Figure 1. Percent of Normal Precipitation in June 2013 for North Dakota (North Dakota State Climate Office)

Temperature:

North Dakota experienced its 60th warmest June since 1895 based on the preliminary state rankings. June average air temperatures ranged from a maximum of 57.5 °F in Fargo to a minimum of 52.2 °F in Foxholm (near Minot). Based on the NDAWN Network, departure from normal average air temperatures ranged from 3 °F in the north to -2 °F in the west (Figure 2). A high pressure system in southern MN, associated with a warm front and southerly flow, pushed the mercury above the 90 degree- mark in some of the eastern North Dakota locations.

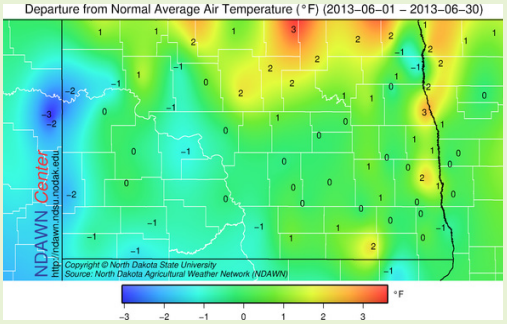


Figure 2. Temperature Departure from Normal in June 2013 for North Dakota (North Dakota State Climate Office)

For more information about the North Dakota State Climate Office: http://www.ndsu.edu/ndsco
For more information on the North Dakota Agricultural Network: http://www.ndawn.ndsu.nodak.edu
The North Dakota Agricultural Network is a part of the Automated Weather Data Network (AWDN).

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