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Sunset in St. Petersburg, FL - Central Region Collaboration Team Meeting - Photo by Natalie Umphlett
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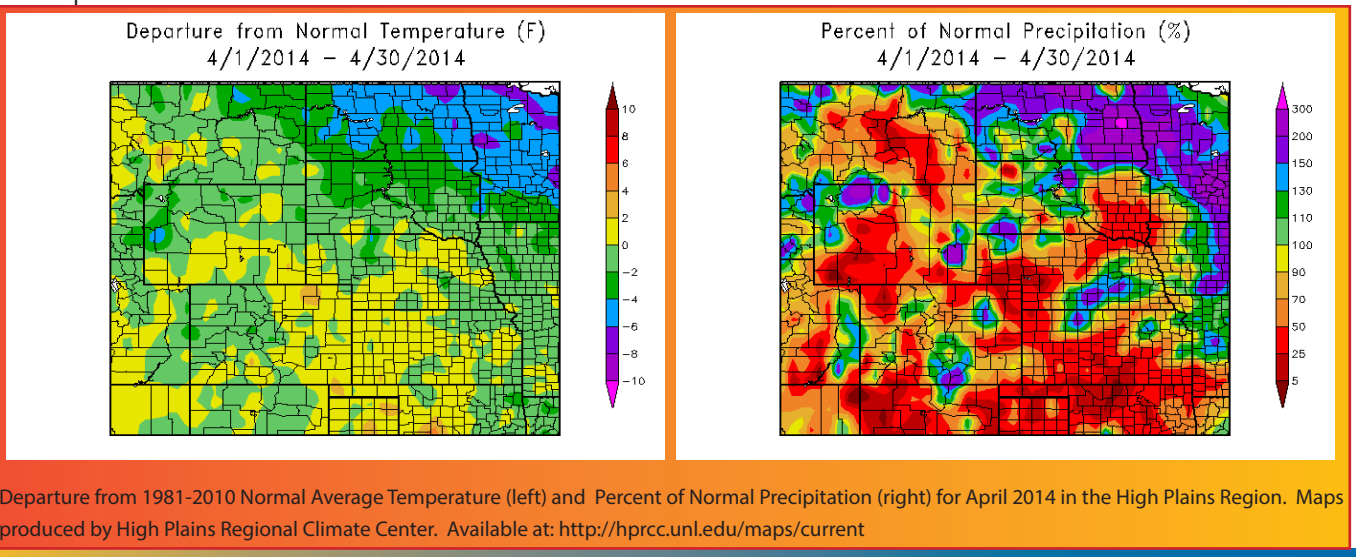
April 2014 Climate Summary

Region Breakdown

April 2014 was on the cooler side for the High Plains Region, however temperature departures were not near as extreme as February or March. The largest departures occurred in North Dakota where much of the state was 4.0-6.0 degrees F (2.2-3.3 degrees C) below normal. While the northern half of South Dakota ranged from 2.0-4.0 degrees F (1.1-2.2 degrees C) below normal, the rest of the Region was generally near normal with departures up to 2.0 degrees F (1.1 degrees C) above/below normal. Although North Dakota had the largest departures, these were not record breaking. Grand Forks had an average temperature of 37.3 degrees F (2.9 degrees C), which was 4.7 degrees F (2.6 degrees C) below normal, and only ranked as the 13th coolest April on record (period of record 1893-2014).

By the end of the month, spring field work was well underway. Below normal temperatures limited fieldwork in North Dakota as soil temperatures were too cool. As a result, all spring crops were behind the 5-year average, according to the National Agricultural Statistics Service. Cooler temperatures also hindered work in Colorado, as did high winds and scattered showers. Some crops were even damaged by the high winds which caused dust storms and uprooted winter wheat. Dust storms and freezing temperatures were a concern for the declining Kansas winter wheat crop as well.



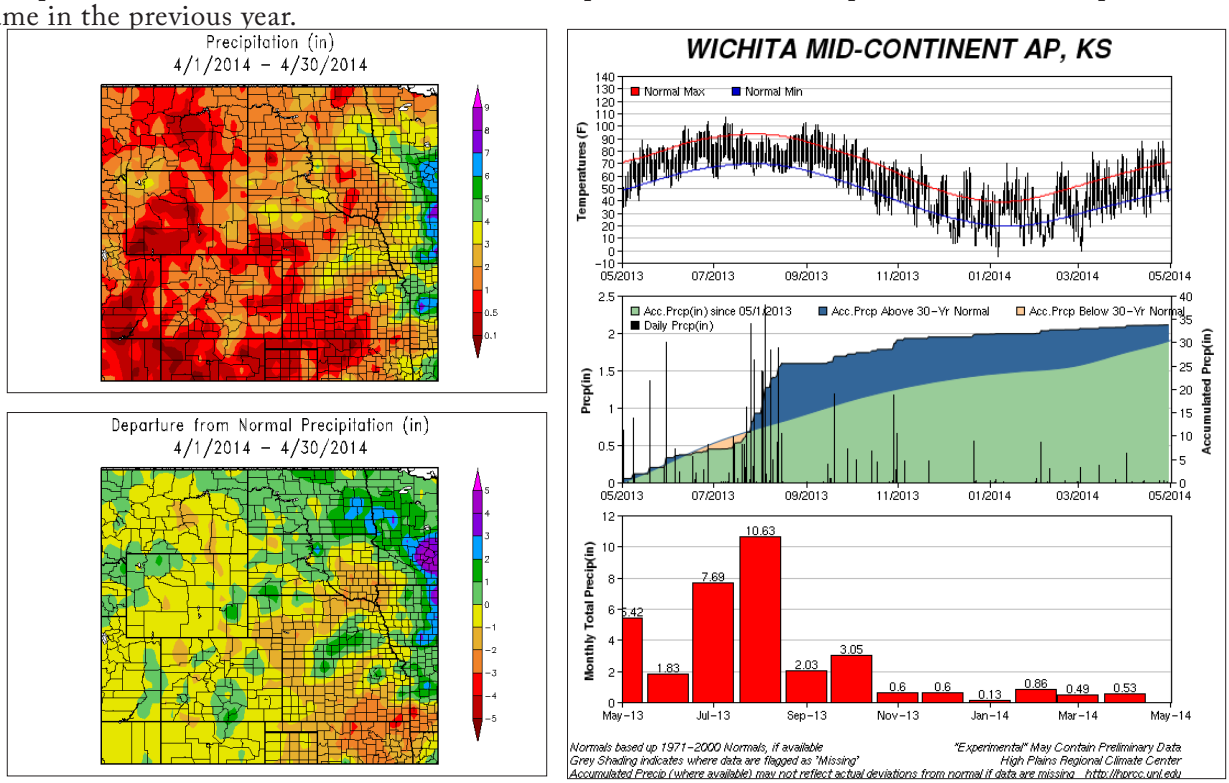
Departure from 1981-2010 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for April 2014 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: http://hprcc.unl.edu/maps/current

Precipitation Summary

April precipitation was varied across the High Plains Region. Above normal precipitation fell across much of North Dakota and areas to the east such as Minnesota and Iowa. While only a few pockets of above normal precipitation fell in the other states in the Region, large areas had precipitation totals which were at best 50 percent of normal. Notable areas included southeastern South Dakota, southern and western Kansas, southern and central Wyoming, and areas near the Nebraska/Colorado border. A few embedded areas even received as little as 25 percent of normal precipitation. Wichita, Kansas was one of these dry locations and had its 6th driest April on record with 0.53 inches (13 mm) of precipitation (period of record 1888-2014). This amount was only 20 percent of normal and just shy of the 1963 record of 0.22 inches (6 mm). After the second wettest August on record last year, precipitation has been lacking in the Wichita area. Water year to date precipitation (October-April) was only at 6.26 inches (159 mm), marking the 6th driest for this time period. On average, Wichita receives 12.70 inches (323 mm) from October to April. Interestingly, this has also been the driest start to a year in Wichita since the Dust Bowl year of 1936. The graph below shows the precipitation over the past year in Wichita.

Although parts of the plains were dry, the mountain snowpack continued to be above average in Colorado, Wyoming, and Montana. The typical snowpack accumulation season has ended and snowmelt is underway. Widespread significant flooding due to mountain snowpack melting is not expected at this time. Some minor to moderate flooding could occur, however.

The severe storm season was off to a slow start this year. According to the Storm Prediction Center (SPC), as of April 21st, this year had been the least active tornado year in at least 60 years. The end of the month was quite active, however as large areas of the southern U.S. were impacted by a severe weather outbreak. Some areas of the High Plains Region were impacted as well. In all, there were 169 storm reports for the Region during April (this includes reports of tornadoes, hail, and wind). For comparison, 141 storm reports came in last April and 396 reports came in the previous year.



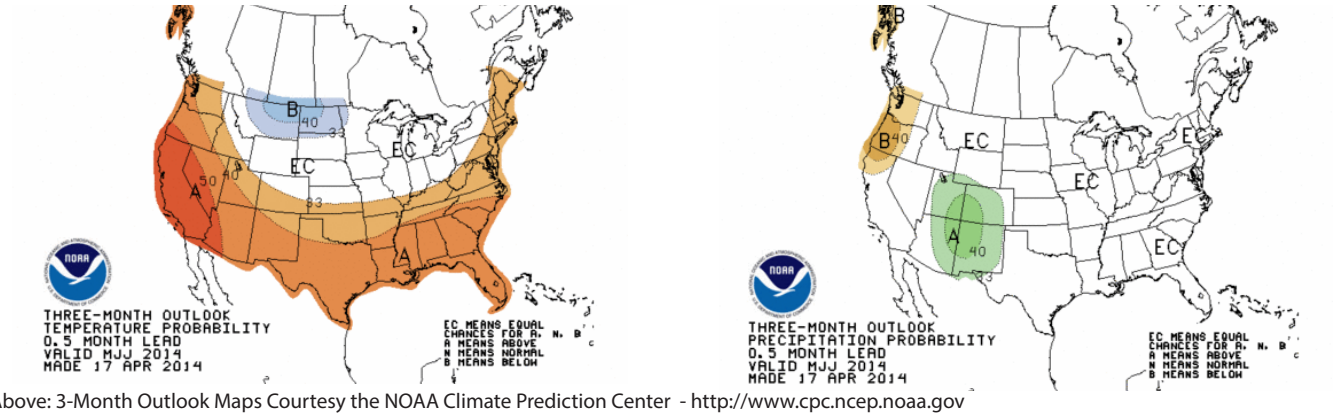
Above: Total precipitation (inches) (top left) and Departure from Normal Precipitation (inches) (bottom left) for April 2014 in the High Plains Region. Accumulated and monthly precipitation for Wichita, KS (right) over the past year. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: http://hprcc.unl.edu/maps/current.

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

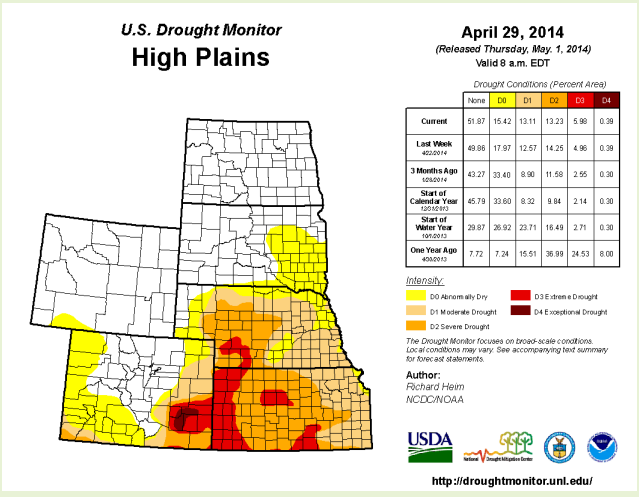
Just like last month, ENSO-neutral conditions continued during April; however there is a 50 percent chance that El Niño conditions will develop later this year in the summer or fall. For the next three months, the temperature outlook indicates a higher probability of above normal temperatures across southern portions of Colorado and Kansas. A higher probability of below normal temperatures exists for all of North Dakota and a small area of northern South Dakota. Areas in between have equal chances of above, near, or below normal temperatures. The precipitation outlook shows a higher probability of above normal precipitation in the southwest U.S. with the highest probability in the Four Corners region. Equal chances of above, near, or below normal precipitation exist for the remainder 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).

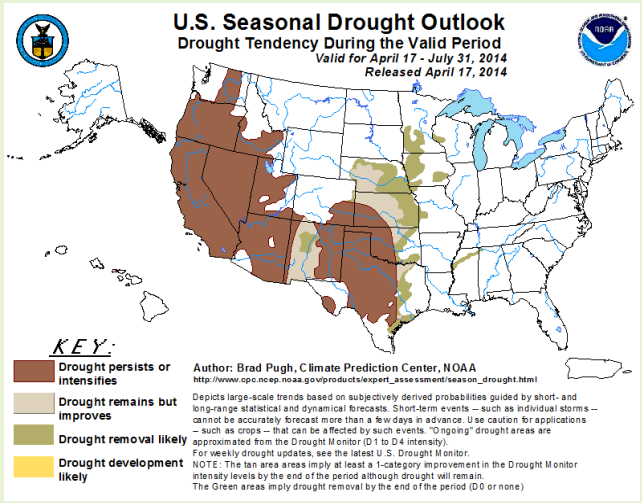


Above: 3-Month Outlook Maps Courtesy the NOAA Climate Prediction Center - http://www.cpc.ncep.noaa.gov
(left) The Three-Month Temperature Probability Outlook, (right) The Three-Month Precipitation Probability Outlook

Drought Watch

In the High Plains Region, there were only slight changes to the U.S. Drought Monitor this month as there were both improvements and degradations. By the end of the month, the total area in moderate (D1) to exceptional (D4) drought increased from 29 to 33 percent. In eastern Colorado, conditions worsened and D1 spread northward while extreme drought (D3) expanded eastward. Additionally, severe drought (D2) developed in the southwestern corner of the state. Meanwhile, D2 in Kansas spread eastward and two new areas of D3 emerged in the central part of the state. Nebraska had slight improvements where ample precipitation fell, but overall, there was a decline in conditions as D1 spread throughout the eastern part of the state. Abnormally dry conditions were reduced or eliminated in the Dakotas and Wyoming. According to the U.S. Seasonal Drought Outlook released April 17th, current drought conditions are expected to persist across southeastern Colorado and southwestern Kansas through July. Meanwhile, drought conditions may improve or be eliminated in other parts of Kansas and Nebraska.





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	61.7	33.9	47.8	0.8	80	04/22	16	04/14	0.76	-0.89	46
Alamosa San Luis Airport	59.8	25.3	42.6	0.8	72	04/11	14	04/04	1.06	0.47	180
Colorado Springs Municipal Airport	61.5	33.5	47.5	1.0	78	04/11	18	04/14+	0.92	-0.50	65
Denver International Airport	62.8	35.2	49.0	1.6	80	04/22	18	04/14	1.24	-0.47	73
Grand Junction Walker Field Airport	63.1	36.1	49.6	-2.1	77	04/11	24	04/14	0.81	-0.10	89
Pueblo Memorial Airport	67.4	36.8	52.1	1.5	82	04/18	24	04/14	2.06	0.66	147

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	66.8	41.2	54.0	0.9	88	04/09	22	04/15	1.29	-1.16	53
Dodge City Regional Airport	68.8	39.4	54.1	0.2	90	04/26+	24	04/15+	0.74	-1.08	41
Goodland Renner Field	65.6	35.1	50.4	1.2	86	04/26	20	04/01	0.43	-1.16	27
Topeka Municipal Airport	68.0	42.1	55.1	0.0	84	04/12	27	04/15+	3.45	-0.08	98
Wichita Mid-Continent Airport	70.5	43.3	56.9	0.8	88	04/26+	27	04/15	0.53	-2.06	20

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	60.9	32.2	46.5	1.7	82	04/18	12	04/01	2.72	0.74	137
Grand Island Airport	64.2	39.0	51.6	1.0	84	04/09	21	04/01	2.91	0.38	115
Lincoln Municipal Airport	66.2	39.3	52.7	1.1	85	04/12	19	04/15	3.50	0.79	129
Norfolk Karl Stefan Airfield	62.8	37.8	50.3	0.7	82	04/20+	19	04/15	3.31	0.66	125
North Platte Regional Airport	63.2	32.8	48.0	0.4	83	04/09	17	04/15	0.64	-1.63	28
Omaha Eppley Airport	64.0	39.6	51.8	0.1	85	04/20	22	04/15+	2.62	-0.34	89
Valentine Miller Field	61.6	32.9	47.3	0.6	82	04/20	13	04/01	3.05	0.83	137

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	54.5	27.7	41.1	-2.7	78	04/20+	6	04/01	1.95	0.69	155
Fargo International Airport	50.5	30.1	40.3	-3.9	79	04/09	9	04/02	3.43	2.07	252
Grand Forks International Airport	47.3	27.3	37.3	-4.7	72	04/20	-6	04/02	2.62	1.61	259
Theodore Roosevelt Airport	51.3	26.7	39.0	-3.3	71	04/22	-9	04/01	1.19	-0.28	81
Williston International Airport	53.6	27.6	40.6	-2.8	72	04/08	7	04/01	1.71	0.71	171

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.

April 2014 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	54.6	26.8	40.7	-3.7	80	04/09	6	04/01	2.04	0.19	110
Huron Regional Airport	58.7	31.3	45.0	-1.5	85	04/09	13	04/17	1.41	-0.90	61
Pierre Regional Airport	58.6	30.8	44.7	-2.3	84	04/09	8	04/01	1.97	0.16	109
Rapid City Regional Airport	57.1	29.6	43.4	-1.6	79	04/09	11	04/03	2.27	0.47	126
Sioux Falls Joe Foss Field Airport	58.1	33.5	45.8	-0.6	81	04/09	11	04/15	1.17	-1.84	39

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	57.0	28.5	42.7	0.0	74	04/18	10	04/14	1.15	-0.14	89
Cheyenne Municipal Airport	56.0	31.2	43.6	0.8	73	04/22+	12	04/14	0.91	-0.87	51
Lander Hunt Field Airport	57.8	30.3	44.1	0.2	71	04/18+	11	04/14	0.70	-1.17	37
Laramie Regional Airport	51.2	25.3	38.3	0.4	69	04/18	1	04/14	0.80	-0.27	75
Rawlins Municipal Airport	54.5	27.6	41.1	1.0	71	04/18	-1	04/14	0.59	-0.46	56
Sheridan County Airport	57.4	30.2	43.8	0.2	74	04/09	15	04/01	1.54	-0.06	96

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

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

Drought Continues

April saw a mix of challenging weather as the drought continues and intensifies. Windy weather aggravated the dry conditions in western and central KS. Several fatal accidents were attributed to low visibility due to blowing dust. In addition, cold temperatures April 13-15th provided an additional blow to already stressed winter wheat. Temperatures in the mid-20s reached most of the state, while in the Northwest and West Central, temperatures plunged into the teens. There were several stations in western and North Central Kansas that reported over five hours with temperatures at or below 24F, which could cause significant damage to the wheat. The final week of the month saw a severe weather outbreak that produced a tornado in Baxter Springs that resulted in 25 injuries, and one fatality. The system also produced heavy rains in a small portion of Northeastern KS, which resulted in isolated flooding. In all, preliminary severe storm reports for April include 5 tornadoes, 97 hail events, and 25 damaging wind events.

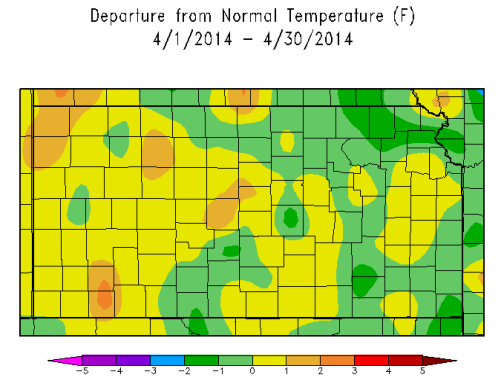

Figure 1. April 2014 departure from average temperatures across Kansas (High Plains Regional Climate Center)

Precipitation was below normal for most of the state, with state-wide average precipitation equal to 1.4 inches or 53 percent of normal. The wettest division was the Northeast with an average of 3.22 inches, or 98 percent of normal. Unfortunately, much of that was confined to a small area of Riley, Pottawatomie, and Geary counties. A small portion of Phillips, Norton, and Graham counties also saw favorable moisture, but that was not enough to move the divisions above the 75 percent level. For the year-to-date, all divisions are significantly below normal. Four of the divisions have had one of the ten lowest moisture accumulations, and at 3.58 inches, the Southeast Division has had the second driest January-April period on record. The driest was 1936, which was only 2.59 inches in the first four months of the year. The greatest monthly precipitation total for a National Weather Service station was 7.16 at Centerville 4 SW in Linn County. The greatest monthly total for a CoCoRaHS station was 6.87 inches at Lenexa 2.8 E in Johnson County. The greatest 24 hour precipitation totals were 3.77 on the 3rd at Iola 1W, Allen County (NWS), and 3.83 on the 3rd at Iola 0.8 E in Allen County (CoCoRaHS). Greatest snowfall reported was 4 inches on the 14th at Atwood (NWS) and Atwood 0.7 S (CoCoRaHS) both in Rawlins County.

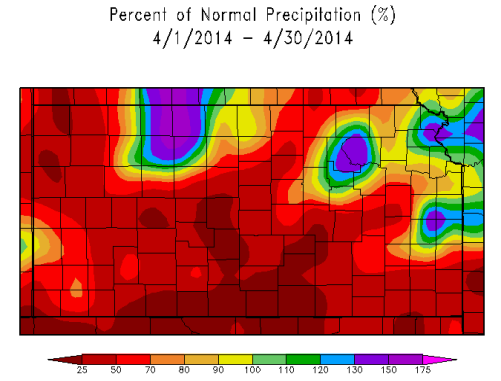

Figure 2. April 2014 percent of normal precipitation across Kansas (High Plains Regional Climate Center)

The state-wide average temperature for the month was very close to normal, at 57.3F, or just 0.2 degrees warmer than normal. The range of temperatures, however, was quite wide. The highest temperature reported for the month was 96F at Great Bend (Barton County) on the 13th. The lowest temperature for the month was 15F at Alton 2SW (Osborne County) on the 15th. When considering records established during the month, they mostly occurred for low events. While there were 25 record daily high maximum temperature records tied or set, there were 65 record low minimum temperatures tied or set.

Drought conditions persist across the state. No portion of the state was in near normal conditions, and the portion of the state in abnormally dry conditions continues to shrink. Nearly 25 percent of the state is now in extreme drought conditions and 47 percent of the state is in severe drought. Warm, dry conditions to start May will likely intensify conditions. The El Niño/Southern Oscillation (ENSO) is expected to switch to an El Niño event by late summer, but remains to be seen what impact will be felt. The May temperature outlook is neutral state-wide, but there is a slight chance for wetter than normal conditions from Northwest to Southeastern KS. This does not indicate how much wetter conditions might be, and does not exclude the possibility of drier than normal weather in the period.

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, Daryl Ritchison - Research Specialist
North Dakota State Climate Office, North Dakota State University

Precipitation:

April 2014 finished wet in many parts of North Dakota. Most of the month was quite dry, but a widespread rain system dropped significant rain across much of the state during the last week of the month. That one event pushed rainfall totals during April to near or over 200% of normal precipitation (Figure 1) for much of the eastern one-half of North Dakota. That end of month rain event caused flooding, especially in the Red River Valley. Preliminary data suggest a state wide average of 1.89 inches of precipitation in comparison to the average of 1.37 inches. That would rank April 2014 as the 28th wettest April on record. The U.S. Drought Monitor did not include any part of North Dakota in drought conditions.

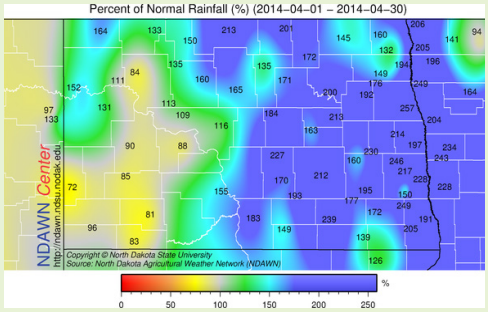

Figure 1. Percent of Normal Precipitation in April 2014 for North Dakota (HPRCC)

Temperature:

April was a noticably cold month in North Dakota. The NDAWN average temperature anomalies ranged from 2 to 8 degrees below normal for the month. The coldest readings were in the northeastern portion of North Dakota where a late March snow storm dropped a significant snow cover that negatively impacted the temperatures for the first week of April. The preliminary statewide average temperature was 38.1 degrees which is 3.1 degrees below normal and would rank April 2014 as the 25th coldest on record.

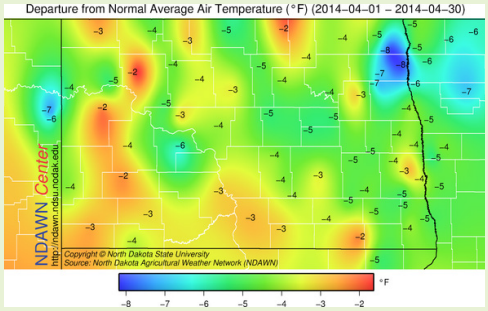

Figure 2. Temperature Departure from Normal in April 2014 for North Dakota (NDSCO)

Notable Weather:

The most notable weather event during the month was a large slow moving storm that impacted much of the central part of the United States in late April. In North Dakota, although some snowfall was recorded in the western part of the state, that storm system was principally a rain maker. The storm came with many waves of rainfall and by the time that area of low pressure moved out of the area all of the NDAWN stations recorded over one inch of rain. The highest totals were in southeastern North Dakota where some locations recorded over three inches of rain (Figure 3).

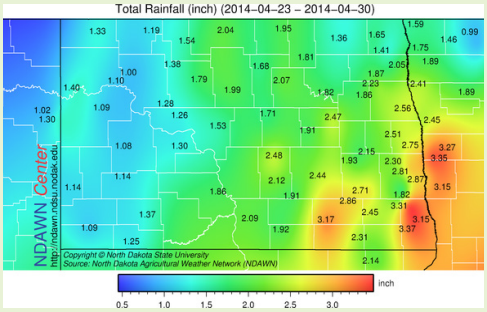

Figure 3. Recorded rainfall at the NDAWN sites from April 23-30, 2014 (NDAWN)

The excessive rain recorded in southeastern North Dakota attributed to quick rises for streams and rivers, especially in the southern Red River Valley. The Wild Rice at Abercrombie, North Dakota rose to 17.14 feet, just shy of the 18 foot major flood stage for that location. The Red River gauge at Wahpeton, North Dakota rose to 12.5 feet, not too far from the 13 foot moderate stage. In Fargo, (Figure 4) the Red River rose into the moderate flood stage with a crest near 26.7 feet on May 2.

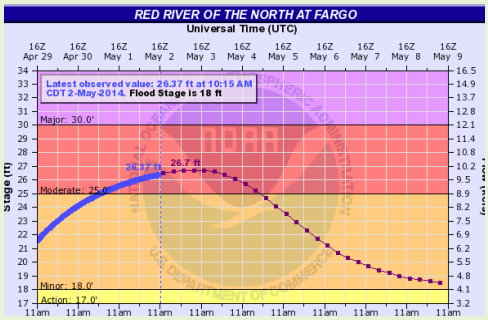

Figure 4. Red River at Fargo approaching crest on May 2, 2014 from heavy rain in late April (NOAA)

Although the heaviest rain was near the headwaters of the Red River, even locations far removed from the heaviest rain recorded notable river rises. As an example, the Red River at East Grand Forks rose into the minor flood stage and at Pembina, North Dakota, along the Canadian border, the Red River gauge crested near flood stage.

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

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