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Cave bacon at Jewel Cave National Monument, South Dakota - Photo by Ramesh Laungani
<http://www.doane.edu>

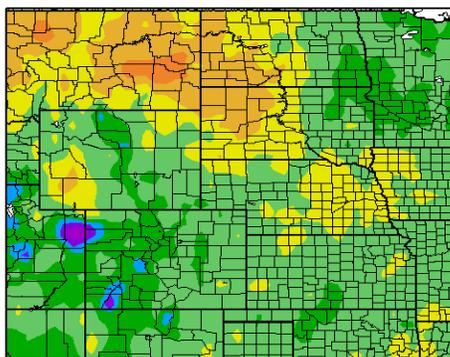
February 2013 Climate Summary

Region Breakdown

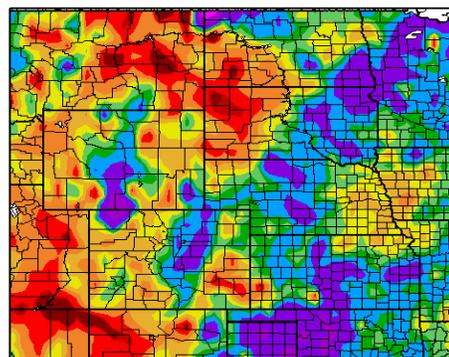
Average temperatures for February 2013 were generally on the cooler side for the High Plains Region. The only exceptions were the western halves of the Dakotas, southwest Wyoming, and central and eastern Nebraska. The largest above normal temperature departures occurred in western North Dakota and South Dakota where average temperatures ranged from 3.0-6.0 degrees F (1.7-3.3 degrees C) above normal. These temperature departures were not record breaking. Meanwhile, temperature departures of 3.0-6.0 degrees F (1.7-3.3 degrees C) below normal were common in central and western Colorado, central Wyoming, south-central Kansas, and the eastern sides of the Dakotas. Western Colorado had some of the larger departures in the Region with average temperatures of 6.0-10.0 degrees F (3.3-5.6 degrees C) below normal.

A few locations ranked in the top 5 coolest Februaries on record in parts of Colorado. Crested Butte, the popular ski destination, had its second coolest February on record with an average temperature of only 7.5 degrees F (-13.6 degrees C). Although this was 5.9 degrees F (3.3 degrees C) below normal, the 1974 record of 3.9 degrees F (-15.6 degrees C) firmly held (period of record 1910-2013).

Departure from Normal Temperature (F)
 2/1/2013 - 2/28/2013



Percent of Normal Precipitation (%)
 2/1/2013 - 2/28/2013

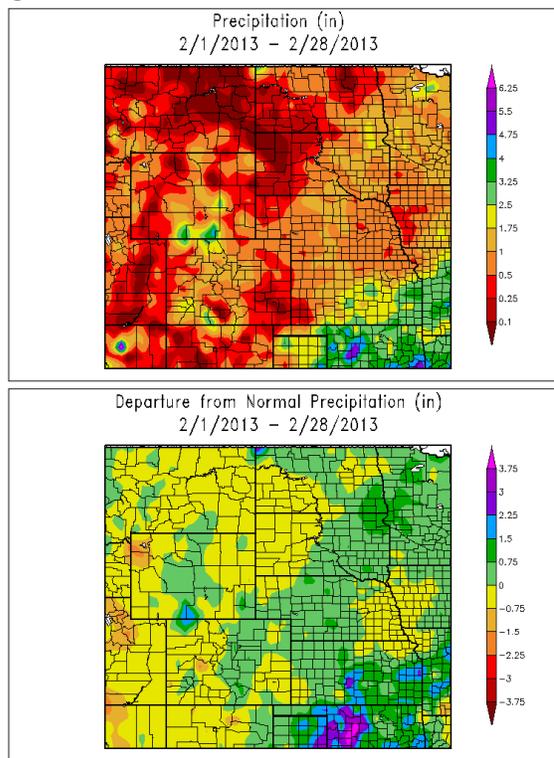
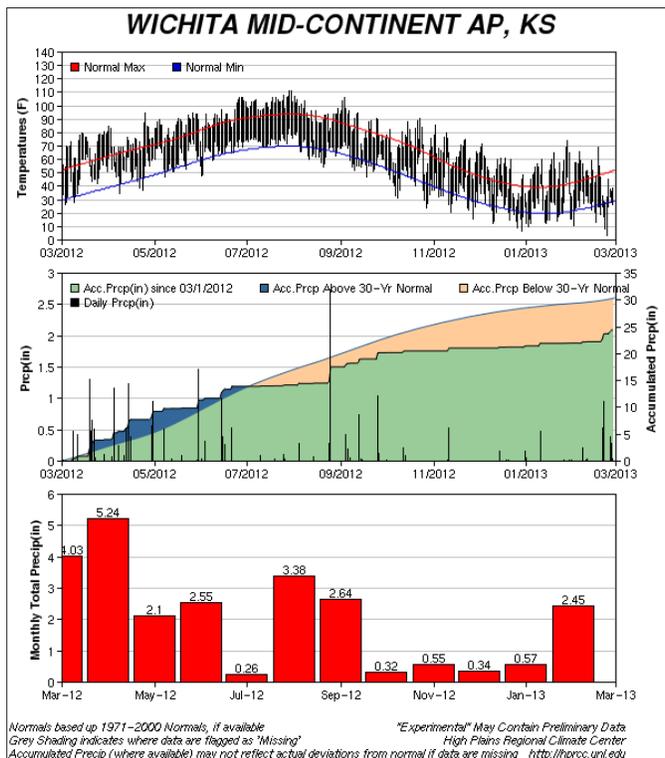


Departure from 1981-2010 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for February 2013 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

Precipitation Summary

Precipitation was highly variable this month with many locations receiving above normal precipitation and others receiving little to none. Areas receiving at least 150 percent of normal precipitation generally included a swath running from central Colorado to the northeast through the eastern Dakotas, central and eastern Kansas, northern North Dakota, and central Wyoming. The precipitation had various impacts on the ongoing drought. For example, the snows in Kansas had ample moisture to put a dent in drought conditions, while the snows in Nebraska were drier and had little to no impact on the drought conditions there. Meanwhile, snowpack in the Rockies remained lower than average as Wyoming increased from last month to 84 percent of average and Colorado held at 75 percent of average.

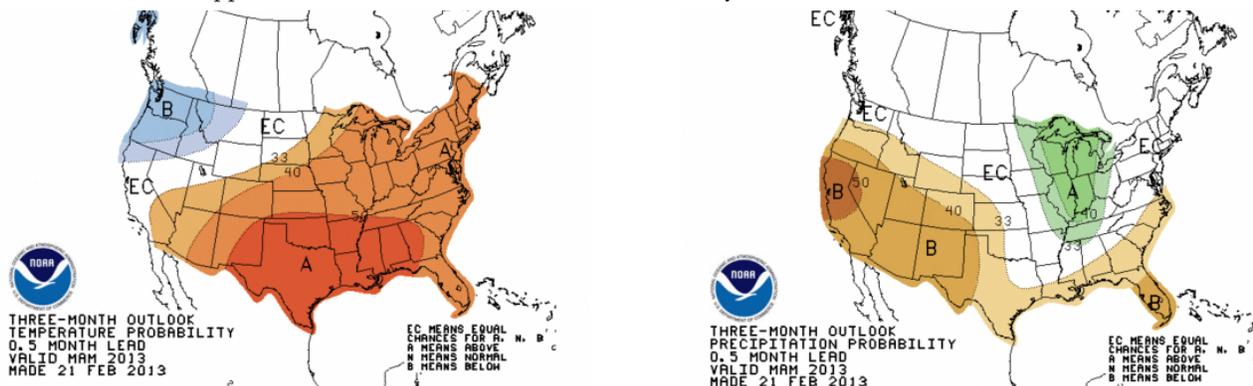
Several systems passed through the Region this month. One storm on February 10-11 brought heavy snows to parts of the Dakotas with the highest totals topping out at about 20.0 inches (51 cm). This snowstorm closed parts of I-29 and I-90 as well as numerous schools and universities. Later in the month, two other major snowstorms hit the Region in just a matter of days. A large storm on February 20-21 spurred winter storm warnings across all of Kansas and the majority of Nebraska, Iowa, and Missouri. Snowfall totals in Kansas and Nebraska generally ranged from 6.0-12.0 inches (15-30 cm), however, the highest amounts were found in north-central Kansas where snowfall amounts exceeded 20.0 inches (51 cm). In addition, snowfall rates close to 4.0 inches (10 cm) per hour and thundersnow were reported. Schools, universities, and businesses closed in both Kansas and Nebraska. The heavy snow caused travel to become nearly impossible as roads closed and flights were cancelled. A second snowstorm blasted southern parts of the Region just a week later (February 24-26) bringing heavy snow not only to Kansas, but also Oklahoma and Texas. Again, thundersnow was reported in addition to blizzard conditions and up to a foot (30 cm) of snowfall accumulations. These two snowstorms caused Wichita, Kansas to set a new February snowfall record. Wichita's February total was 21.2 inches (54 cm) which just beat out the old record of 20.5 inches (52 cm) set all the way back in 1913 (period of record 1888-2013). Not only was this the snowiest February in Wichita, it was also the snowiest month ever recorded. For more snow totals, see page 5.



Above: Maximum, minimum, and normal temperatures, accumulated precipitation, and monthly total precipitation for Wichita, KS over the past year (top left). Total precipitation (inches) (top right) and Departure from Normal Precipitation (inches) (bottom right) for February 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>.

Climate Outlook

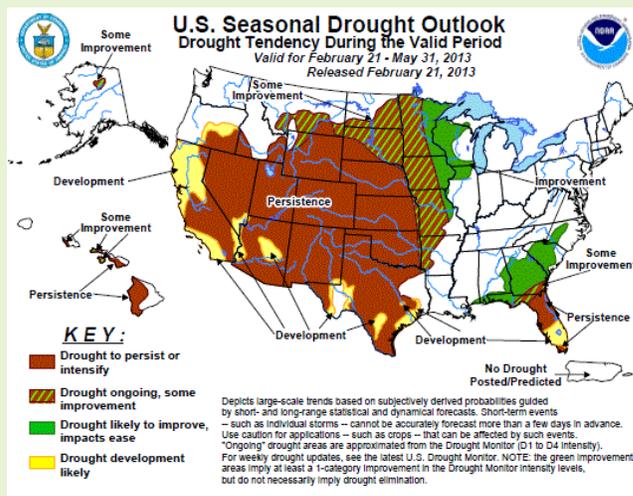
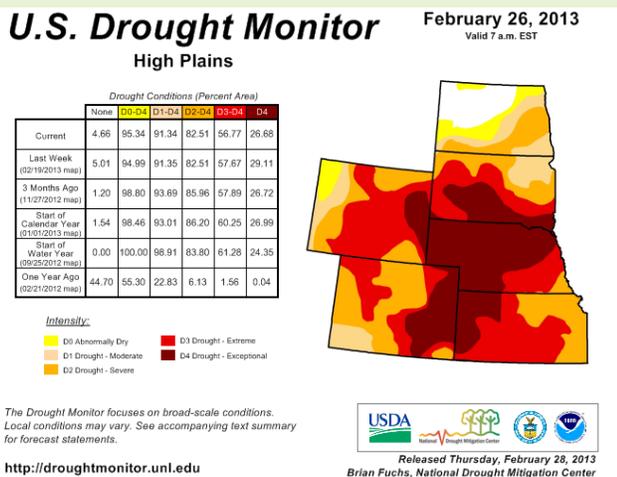
At the end of February, ENSO-neutral conditions were still present and likely to continue through the spring. For the next three months, the temperature outlook indicates a higher probability of above normal temperatures for a large portion of the High Plains Region including Colorado, Kansas, Nebraska, southeastern Wyoming, and southern and eastern portions of South Dakota. Meanwhile, the precipitation outlook indicates a higher probability of below normal precipitation for Colorado, western Kansas, southwestern Nebraska, and much of Wyoming. 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

There were slight changes to the U.S. Drought Monitor over the past month - some for better and some for worse. Approximately 91 percent of the Region was still in moderate (D1) to exceptional (D4) drought. This was down slightly from the end of last month when 92 percent of the Region was in D1-D4. Areas of degradation included an expansion of extreme drought (D3) in northwest South Dakota and a D4 expansion in eastern Colorado. Luckily, there were also improvements. The small area of D4 in southwestern Wyoming was erased and severe drought conditions (D2) continued to improve in eastern portions of the Dakotas. Although two large snowstorms hit southern areas of the Region, there were varying degrees of improvement in drought conditions. Luckily, portions of the D4 conditions improved in the north-central and south-central parts of Kansas. The D3 area in northeast Kansas improved as well. According to the U.S. Seasonal Drought Outlook released February 21st, drought conditions were expected to improve somewhat in North Dakota, northern and eastern South Dakota, northwestern Wyoming, and the far eastern edge of Kansas. Drought was expected to persist elsewhere through May 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	41.3	17.6	29.5	-1.9	63	02/17	9	02/26+	0.09	-0.35	20
Alamosa San Luis Airport	38.1	3.7	20.9	-1.9	48	02/17+	-7	02/21	0.15	-0.11	58
Colorado Springs Municipal Airport	41.2	17.5	29.4	-2.7	62	02/17	9	02/23	0.90	0.56	265
Grand Junction Walker Field Airport	41.5	22.2	31.8	-2.7	55	02/08	13	02/12	0.39	-0.15	72
Pueblo Memorial Airport	47.7	16.1	31.9	-2.0	65	02/16+	8	02/13	0.48	0.18	160

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	42.8	21.6	32.2	-0.5	67	02/17	2	02/23	0.79	0.00	100
Dodge City Regional Airport	47.0	20.6	33.8	-2.1	70	02/17	3	02/22	0.90	0.22	132
Goodland Renner Field	44.9	16.7	30.8	-1.5	65	02/17	-1	02/22	0.78	0.29	159
Topeka Municipal Airport	45.2	23.6	34.4	0.0	65	02/06	1	02/23	1.89	0.57	143
Wichita Mid-Continent Airport	47.2	24.2	35.7	-1.5	69	02/17	3	02/23	2.45	1.27	208

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	42.4	18.8	30.6	3.2	56	02/17	4	02/11	0.24	-0.37	39
Grand Island Airport	40.9	20.5	30.7	1.6	65	02/17	3	02/22	0.97	0.29	143
Lincoln Municipal Airport	40.6	19.1	29.9	0.9	62	02/17	-1	02/01	0.54	-0.23	70
Norfolk Karl Stefan Airfield	38.5	16.9	27.7	0.9	60	02/17	-4	02/23	0.66	-0.10	87
North Platte Regional Airport	42.8	15.0	28.9	-0.1	58	02/06	-5	02/23	1.04	0.54	208
Omaha Eppley Airport	38.5	20.2	29.4	1.3	55	02/13	-3	02/01	0.79	-0.06	93
Valentine Miller Field	39.9	16.9	28.4	1.2	56	02/17	-3	02/23	0.98	0.50	204

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	31.0	12.7	21.9	3.8	45	02/25+	-16	02/01	0.34	-0.17	67
Fargo International Airport	21.3	4.0	12.7	-1.9	32	02/13+	-21	02/01	1.22	0.61	200
Grand Forks International Airport	19.7	1.9	10.8	-1.2	33	02/12	-19	02/01	0.37	-0.15	71
Theodore Roosevelt Airport	34.2	16.9	25.5	5.0	48	02/25	-8	02/19	0.00	-0.33	42
Williston International Airport	30.0	12.9	21.4	4.5	41	02/25	-12	02/19	0.14	-0.25	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>.

February 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	25.9	3.6	14.7	-2.9	38	02/13	-31	02/01	1.06	0.51	193
Huron Regional Airport	28.8	10.7	19.7	-1.9	41	02/13+	-12	02/01	1.10	0.50	183
Pierre Regional Airport	34.8	16.6	25.7	1.4	48	02/13	-1	02/20	0.79	0.20	134
Rapid City Regional Airport	42.4	15.9	29.2	1.8	58	02/03	3	02/11	0.18	-0.26	41
Sioux Falls Joe Foss Field Airport	30.3	12.7	21.5	0.0	44	02/17	-8	02/01	0.94	0.34	157

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	36.1	15.1	25.6	-1.1	50	02/04	-5	02/10	0.50	-0.07	88
Cheyenne Municipal Airport	37.0	15.1	26.1	-3.5	53	02/17	-1	02/11	0.70	0.23	149
Lander Hunt Field Airport	34.5	12.4	23.4	-1.8	48	02/04	-4	02/12	1.28	0.70	221
Laramie Regional Airport	32.6	8.1	20.4	-3.1	47	02/05	-15	02/25	0.10	-0.24	29
Rawlins Municipal Airport	30.5	10.6	20.6	-3.1	46	02/08	-17	02/11	0.19	-0.23	45
Sheridan County Airport	36.0	13.0	24.5	-2.1	47	02/03	-6	02/19	0.79	0.25	146

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February 2013 Top 20 Snowfall Rankings

Snowfall Rankings			
Snowfall in inches			
Location	Snowfall / Rank	Record or Previous Record / Year	Period of Record
Colorado Springs, CO	10.6 / 15th snowiest	23.2 / 1987	1894-2013
Denver, CO	14.1 / 14th snowiest	22.1 / 1912	1882-2013
Dodge City, KS	14.3 / 6th snowiest	27.7 / 1903	1893-2013
Goodland, KS	12.5 / 7th snowiest	24.4 / 1960	1895-2013
Topeka, KS	14.5 / 8th snowiest	27.1 / 1900	1887-2013
Wichita, KS	21.2 / SNOWIEST	20.5 / 1913	1888-2013
Grand Island, NE	11.0 / 19th snowiest	29.7 / 1915	1895-2013
North Platte, NE	11.0 / 11th snowiest	20.6 / 1978	1892-2013
Fargo, ND	14.4 / 9th snowiest	19.5 / 1979	1885-2013
Grand Forks, ND	10.8 / 18th snowiest	19.6 / 1943*	1893-2013
Aberdeen, SD	15.6 / 10th snowiest	38.5 / 1915	1893-2013
Huron, SD	13.8 / 14th snowiest	39.9 / 1962	1892-2013
Lander, WY	23.8 / 10th snowiest	43.8 / 1955	1891-2013

All Data are Preliminary and Subject to Change.

* indicates multiple records, latest date is listed

Source: National Weather Service Cooperative Observation Network Data

State Spotlight - Kansas

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



Winter Storms

Two major winter storms were the main feature of the month. The first hit February 21st to 22nd with state-wide impacts, and widespread snowfall amounts over 6 inches. The heaviest snowfall for the month was reported as 17 inches on the 22nd at Sun City S6 in Barber County. For the month, they reported a total of 42.5 inches of snowfall. As part of these storms, 3 all-time daily snowfall totals were set and 2 records tied. There were 26 records for February daily snowfall totals set, and two tied. For individual daily snowfall records, 241 new records were set, and 14 records tied. Unfortunately, at least 6 fatalities were reported due to the storms. Not surprisingly, the heavy snow contributed to higher than average precipitation for the month in most areas of the state. All divisions, except the northeast, saw above average precipitation. With a divisional average of 1.04 inches, the Northeastern Division was 90 percent of normal. Highest average precipitation was seen in the Southeastern division at 2.59 inches which is 149 percent of normal. The Central Division recorded the greatest departure from normal. The divisional average precipitation was 1.89 inches which was 185 percent of normal. State-wide average precipitation for February was 1.48 inches or 143 percent of normal. Greatest monthly total precipitation reported from National Weather Service COOP stations was 4.42 inches at Osage City 4WNW in Osage County. The greatest monthly total precipitation for a CoCoRaHS station was 5.66 inches at Olathe 2.8 W in Johnson County. This February ended as the 24th wettest in the 119 years of record.

State-wide temperatures averaged 32.5 F, which is 1.5 degrees below average. The Central Division had the coldest average at 31.9 F, or 2.3 degrees below average. The East Central Division had the smallest departure from average. The division reported an average temperature of 32.8 F, or 0.9 F below average. Ashland (Clark Co.) and Hays 1S (Ellis Co) reported the warmest readings for the month with 73 F on the 18th. The coldest reading for the month was reported as -6 F at Brewster 4W (Thomas County) on the 22nd.

With all the moisture, the latest Drought Monitor shows some improvement. Extreme drought now covers 69.75 percent of the state, with just over 21 percent of the state in exceptional drought. Normal precipitation in February is low, so even the areas with above normal moisture in February have seen only minimal improvement. All of the state is still in severe drought or worse. The latest Drought Outlook indicates drought conditions are expected to continue through May. The El Niño/Southern Oscillation (ENSO) is expected to remain neutral. That means the signal for increased winter precipitation will also be weaker. The jet stream is expected to shift northward. For March chances are equally likely for precipitation to be above or below in state-wide. The temperature outlook calls for cooler than normal temperatures for much of the state. This does not indicate how much cooler conditions might be, and does not exclude the possibility of significant warm weather in the period.

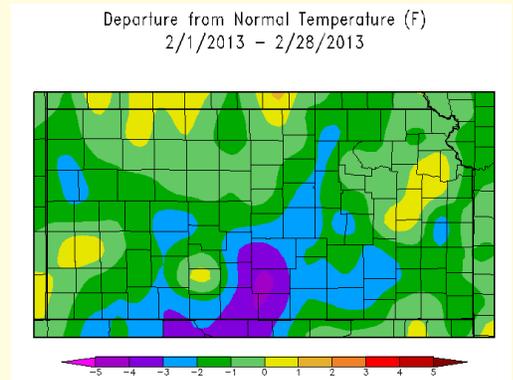


Figure 1. February 2013 departure from average temperatures across Kansas (High Plains Regional Climate Center)

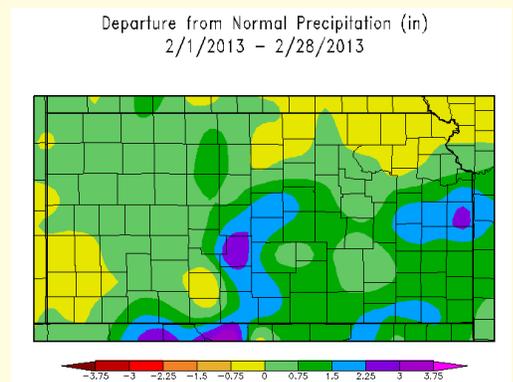


Figure 2. February 2013 departure from normal precipitation across Kansas (High Plains Regional Climate Center)

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:

Precipitation amounts were below normal for the southwestern part of North Dakota based on the High Plains Regional Climate Center (HPRCC) analysis (Figure 1). The far southeast corner had above normal precipitation of ~200% to ~400%. HPRCC total precipitation amounts were less than 0.9 inches for all but the southeast corner which had ~1 to ~2 inches of precipitation. A winter storm on the 10th and 11th brought two day snow totals as high as 20 inches in Fairmount, 15.5 inches in Lidgerwood, and 15.0 inches in McLeod. The U.S. Drought Monitor February 26th report listed 66.41% of the state as having anywhere from Abnormally Dry (D0) through Severe Drought (D2). The Severe Drought (D2) was reported for 23.85% of the state with 33.59% of the state having no drought conditions.

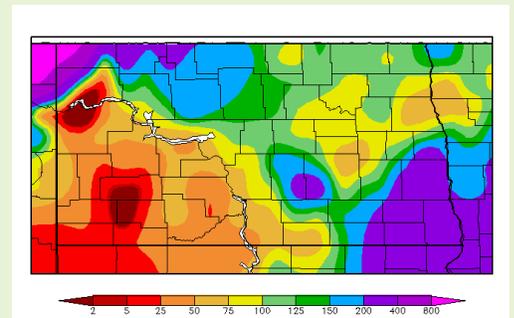


Figure 1. Percent of Normal Precipitation in February 2013 for North Dakota (High Plains Regional Climate Center)

Temperature:

NDAWN February average air temperatures ranged from ~8 °F in the northeast to ~27 °F in the southwest. Departure from normal average air temperatures ranged from -6 °F to 6 °F (Figure 2). Temperatures throughout the month were generally above normal in the west and below normal in the east. The coldest days of the month were the 19th and 20th when minimum temperatures plunged to ~10 °F to as much as ~25 °F below zero. Quiet weather with near normal February temperatures covered the last part of the month from the 22nd to the 28th.

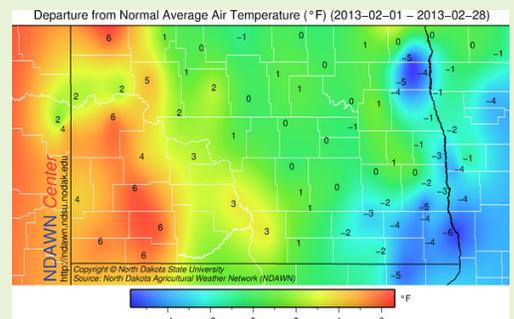


Figure 2. Temperature Departure from Normal in February 2013 for North Dakota (North Dakota State Climate Office)

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

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