



727 Hardin Hall
3310 Holdrege Street
Lincoln, NE 68583-0997
402 472-6706
Fax 402 472-8763
<http://hprcc.unl.edu>



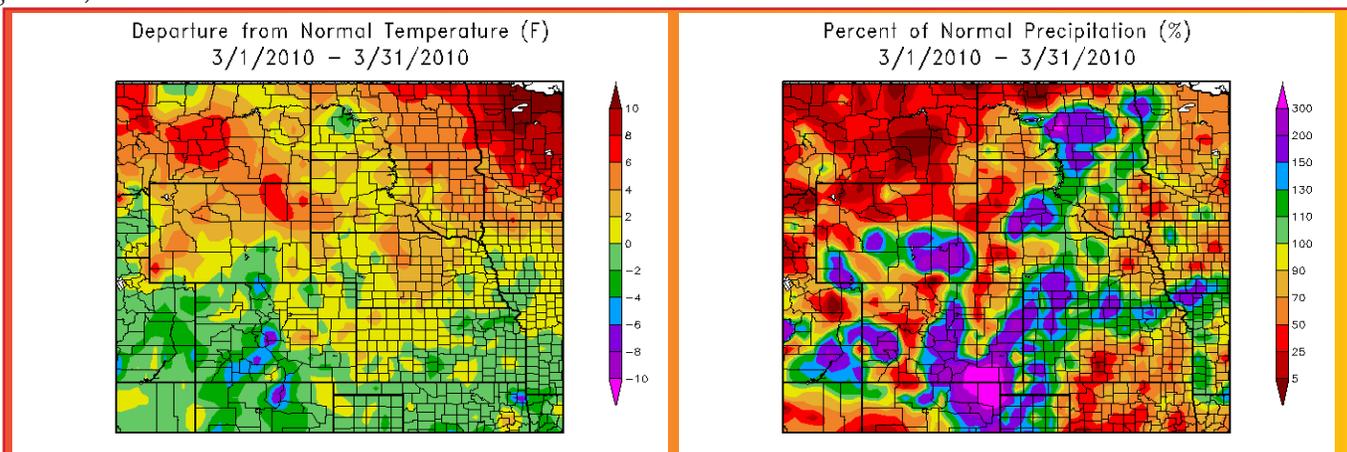
Rocky Mountain National Park - Photo by Bill Sorensen
<http://www.hprcc.unl.edu>

March 2010 Climate Summary

Region Breakdown

In stark contrast to the colder than normal temperatures of February, March 2010 was warmer than normal across the majority of the High Plains Region. Many locations of the Region were near normal. However, temperature departures ranged from 2 degrees F (1.1 degrees C) to 9 degrees F (5.0 degrees C) above normal from central Nebraska to Wyoming to the Canadian border. Isolated areas of the Region had temperature departures that were greater than 2 degrees F (1.1 degrees C) below normal. These occurred in central Colorado, southern and eastern Kansas, and pockets of Nebraska and North Dakota.

Many locations across eastern portions of North Dakota were ranked in the top 10 warmest. This month's warm location was Fargo, North Dakota which recorded its 4th warmest March on record (period of record 1881-2010). The average temperature was 35.4 degrees F (1.9 degrees C) which was 8.2 degrees F (4.6 degrees C) above normal. The warmest March on record occurred in 1910 when the average temperature was 40.9 degrees F (4.9 degrees C).



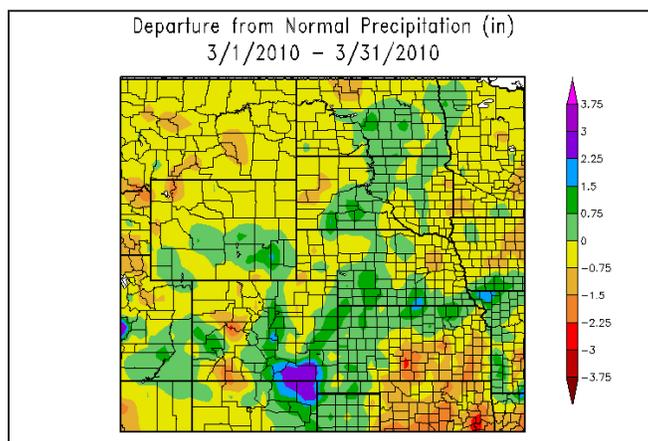
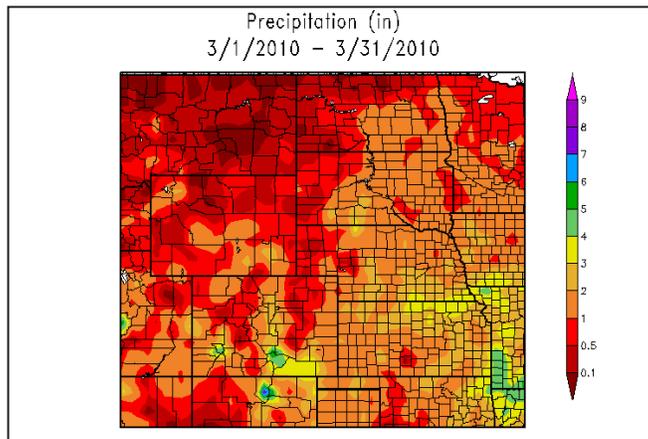
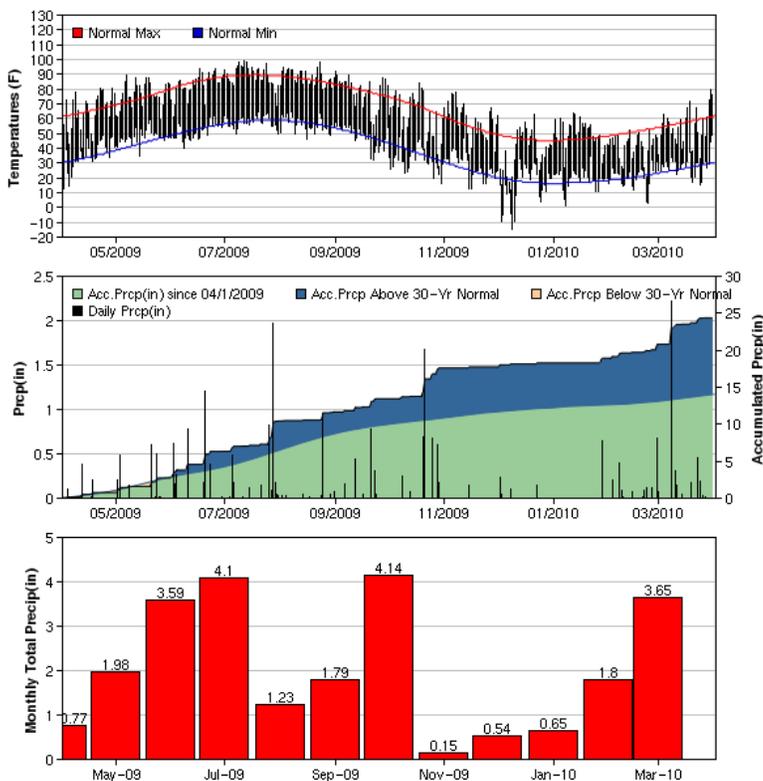
Departure from 1971-2000 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for March 2010 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

Precipitation Summary

March was an active month for many areas of the Region. Areas of the Region which received at least 150 percent of normal precipitation included central North Dakota, south central South Dakota, southwestern Nebraska, isolated pockets of Kansas, southeastern Wyoming, and western, central, and southeastern Colorado. Major flooding was reported in the Red River Valley in North Dakota and heavy precipitation broke records in southeast Colorado. Unfortunately, precipitation was lacking in areas which were already experiencing abnormally dry or drought conditions. This caused severe drought to develop in western Wyoming and moderate drought to develop in north central Colorado.

This month's wet location was again south central Colorado where precipitation totals were well over 300 percent of normal. The Trinidad Perry Stokes Airport, Colorado received 3.65 inches (92.71 mm) of precipitation which was 388 percent of normal precipitation (period of record 1948-2010). This crushed the old record of 2.58 inches (65.53 mm) received in March 2000. Interestingly, this was the second record breaking month in a row as the Trinidad Perry Stokes Airport, Colorado also set its wettest February on record in 2010. Of the total monthly precipitation at the Trinidad Perry Stokes Airport, 2.22 inches (56.39 mm) fell in one day, March 8th. This amount not only set the new record for the day, but also for the highest one day precipitation total for the month of March and the 4th highest one day precipitation total for entire period of record. The previous record for one day precipitation for March occurred March 18, 1984 when 0.95 inches (24.13 mm) of precipitation fell. The plots below (left) show just how wet the Trinidad Perry Stokes Airport has been over the past year with the accumulated precipitation above normal (in the blue shading) from April 1, 2009 to March 31, 2010. More graphs like this one may be found via the Station Search tool at: <http://www.hprcc.unl.edu/stations/>.

TRINIDAD PERRY STOKES AP, CO



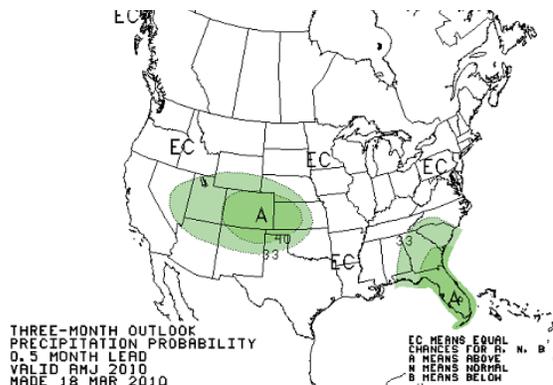
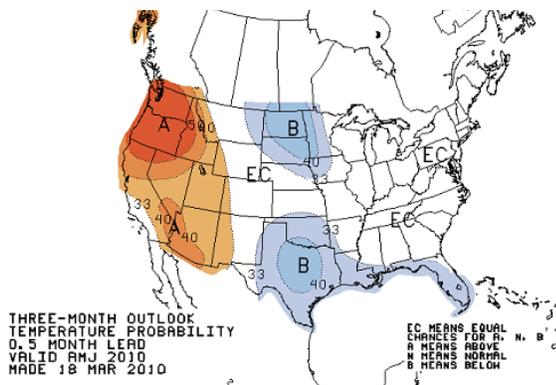
Normals based up 1971-2000 Normals, if available
Grey Shading indicates where data are flagged as 'Missing'
Accumulated Precip (where available) may not reflect actual deviations from normal if data are missing <http://hprcc.unl.edu>

"Experimental" May Contain Preliminary Data
High Plains Regional Climate Center

Above: Total precipitation (inches) (top right) and Departure from Normal Precipitation (inches) (bottom right) for March 2010 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

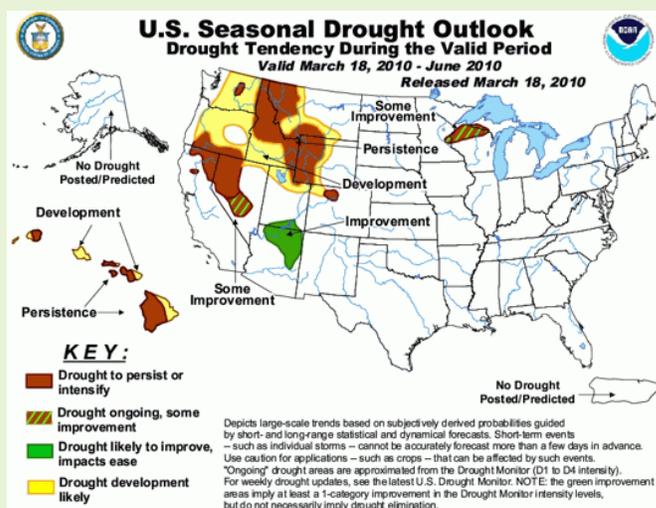
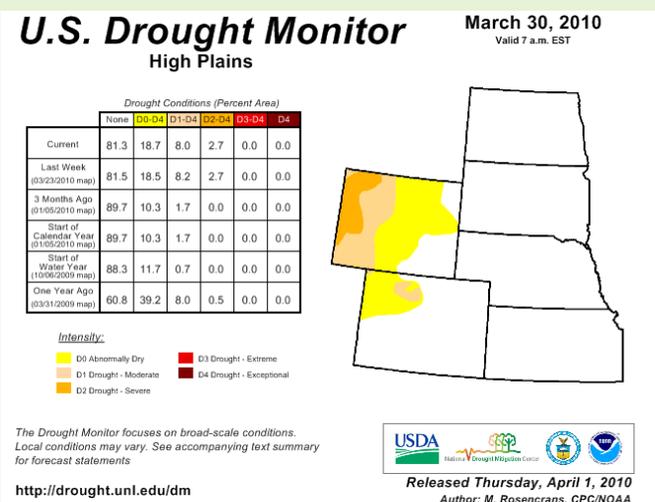
El Niño conditions were present this month and are expected to continue at least through Spring 2010. The temperature outlook indicates a higher probability of below normal temperatures for the Dakotas, northern Nebraska, far southern Kansas, and the northeast corner of Wyoming. Only far western Colorado and far western Wyoming have a higher probability for above normal temperatures. Equal chances of above, near, or below normal temperatures are predicted elsewhere. The precipitation outlook indicates a higher probability of above normal precipitation for Colorado, southern Wyoming, western Kansas, and western Nebraska. Equal chances of above, near, or below normal precipitation 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 (ENSO) cycle. More information about these forecasts can be found here: <http://www.cpc.ncep.noaa.gov/>.



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 big changes to the U.S. Drought Monitor for the High Plains Region this month. Abnormally dry conditions (D0) spread further east in Wyoming, while moderate drought conditions (D1) developed in north central Colorado. In addition, severe drought conditions (D2) developed in western Wyoming due to continued below average snow water equivalence measurements and below normal precipitation. According to the U.S. Seasonal Drought Outlook released March 18th, the abnormally dry and drought conditions in northwestern Colorado and western Wyoming are expected to persist through June 2010.



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 NOAA 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://www.ndmc.unl.edu/dm/monitor.html>
 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
Alamosa San Luis Airport	48.8	16.8	32.8	0.1	68	3/30	-3	3/20	1.01	0.55	220
Akron Washington County Airport	52.5	28.5	40.5	1.5	84	3/30	17	3/19	0.69	-0.35	66
Colorado Springs Municipal Airport	53.6	27.7	40.7	2.9	78	3/30	16	3/25	0.55	-0.51	52
Grand Junction Walker Field Airport	54.0	30.8	42.4	-1.0	74	3/30	23	3/20	1.22	0.22	122
Pueblo Memorial Airport	58.3	25.2	41.7	-0.1	83	3/30	14	3/21	1.01	0.04	104

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	53.5	34.2	43.8	1.3	76	3/31	19	3/21	2.74	0.39	117
Dodge City Regional Airport	57.2	31.3	44.2	0.0	85	3/30	17	3/21	2.12	0.28	115
Goodland Renner Field	55.5	27.7	41.6	1.8	88	3/30	16	3/20	1.75	0.55	146
Topeka Municipal Airport	55.7	36.0	45.9	1.7	84	3/31	22	3/03	1.51	-1.05	59
Wichita Mid-Continent Airport	57.5	36.7	47.1	1.2	85	3/31	21	3/22	1.82	-0.89	67

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	53.4	27.0	40.2	4.0	78	3/30	17	3/12	0.85	-0.06	93
Grand Island Airport	50.9	32.6	41.8	3.5	78	3/29	18	3/21	2.53	0.49	124
Lincoln Municipal Airport	51.5	30.4	41.0	1.6	78	3/31	15	3/21+	1.77	-0.44	80
Omaha Eppley Airfield	49.9	31.7	40.8	1.5	80	3/31	11	3/03	1.71	-0.41	81
Norfolk Karl Stefan Airport	48.3	30.5	39.4	2.4	78	3/30	11	3/02	0.90	-1.07	46
North Platte Regional Airport	52.7	27.2	39.9	1.9	81	3/30	15	3/21	2.26	1.02	182
Valentine Miller Field	51.1	28.9	40.0	4.7	84	3/30	14	3/20	1.20	0.09	108

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	41.9	25.5	33.7	4.0	74	3/30	0	3/01	1.06	0.21	125
Fargo International Airport	42.6	28.2	35.4	8.2	68	3/30	-2	3/01	1.41	0.24	121
Grand Forks International Airport	40.0	25.7	32.9	7.1	66	3/30	-4	3/01	1.45	0.56	163
Theodore Roosevelt Airport	37.8	22.5	30.1	-0.3	66	3/30	9	3/12	0.44	-0.25	64
Williston International Airport	42.3	23.4	32.9	4.2	71	3/29	14	3/01	0.35	-0.39	47

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>.

South Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Aberdeen Regional Airport	43.4	26.1	34.7	4.0	70	3/30	0	3/01	1.24	-0.10	93
Huron Regional Airport	45.1	29.1	37.1	4.5	75	3/30	2	3/01	1.82	0.15	109
Pierre Regional Airport	45.6	27.7	36.7	2.0	81	3/30	7	3/01	1.42	0.23	119
Rapid City Regional Airport	50.7	26.9	38.8	3.9	78	3/30	16	3/20	0.17	-0.86	17
Sioux Falls Joe Foss Field Airport	45.9	29.0	37.5	4.9	80	3/30	5	3/02	1.02	-0.79	56

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	49.3	26.7	38.0	3.0	67	3/30	8	3/20	1.57	0.67	174
Cheyenne Municipal Airport	46.2	25.6	35.9	1.7	72	3/30	3	3/20	1.30	0.25	124
Lander Hunt Field Airport	46.9	25.8	36.4	0.8	64	3/17	8	3/20	1.87	0.63	151
Laramie Regional Airport	39.4	17.5	28.5	-1.5	61	3/30	-9	3/20	0.30	-0.49	38
Rawlins Municipal Airport	44.8	22.2	33.5	-0.3	62	3/30	-5	3/20	0.65	0.0	100
Sheridan County Airport	54.5	25.4	39.9	4.6	70	3/17	13	3/20	0.61	-0.39	61

All Data are Preliminary and Subject to Change.

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 - North Dakota

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



Precipitation:

The north and western regions generally had from 0.1 to 1 inch of total March precipitation. The south central and southeast had from 1 to 2 inches of total precipitation. The north and western areas of the state had below normal precipitation. The south central and southeast had above normal precipitation ranging from 100 to 300% of normal (Figure 1. High Plains Regional Climate Center). The majority of March precipitation fell from the 9th through the 12th. The National Weather Service recorded breaking daily total precipitation records on the 9th at Grand Forks airport and on the 10th at Jamestown, Dickinson, Grand Forks and Fargo. During the second half of March, moderate to major flooding from snowmelt occurred in the central and eastern parts of the state. The Red River crested at 46.07 feet in Grand Forks on the 20th. At Fargo, the Red River crested on the 21st with 36.99 feet.

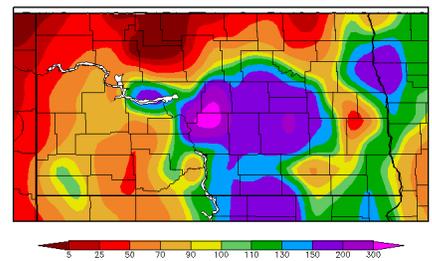


Figure 1. Precipitation Percent of Normal in March 2010 for North Dakota (HPRCC)

Temperature:

March average monthly temperatures ranged from 28°F to 35°F. Average monthly temperatures of 28°F to 31°F covered the northern and western regions. The southeast and western edge had average monthly temperatures of 32°F to 35°F. The central western part of the state had near normal to 4°F below normal average air temperatures. The remainder of the state had near normal to 8°F above normal average air temperatures (Figure 2. High Plains Regional Climate Center). Daily average air temperatures started below normal and rose to near normal in the first few days of March. The temperatures continued as near normal and above for the rest of the month except for the 19th and 25th when temperatures were below normal. Record high temperatures were set on the 29th in Williston with 71°F and on the 30th at Jamestown with 74°F.

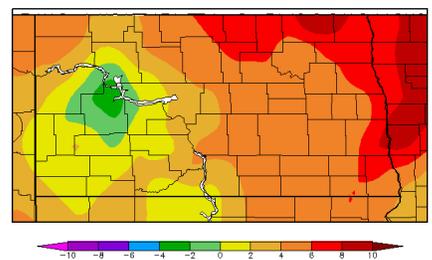


Figure 2. Temperature Departure from Normal in March 2010 for North Dakota (HPRCC)

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 operated under the National Oceanic and Atmospheric Administration (NOAA), 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>

NOAA 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

714 Hardin Hall

3310 Holdrege Street

Lincoln, NE 68583-0997

