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Jewel Cave National Monument, South Dakota - Photo by Ramesh Laungani
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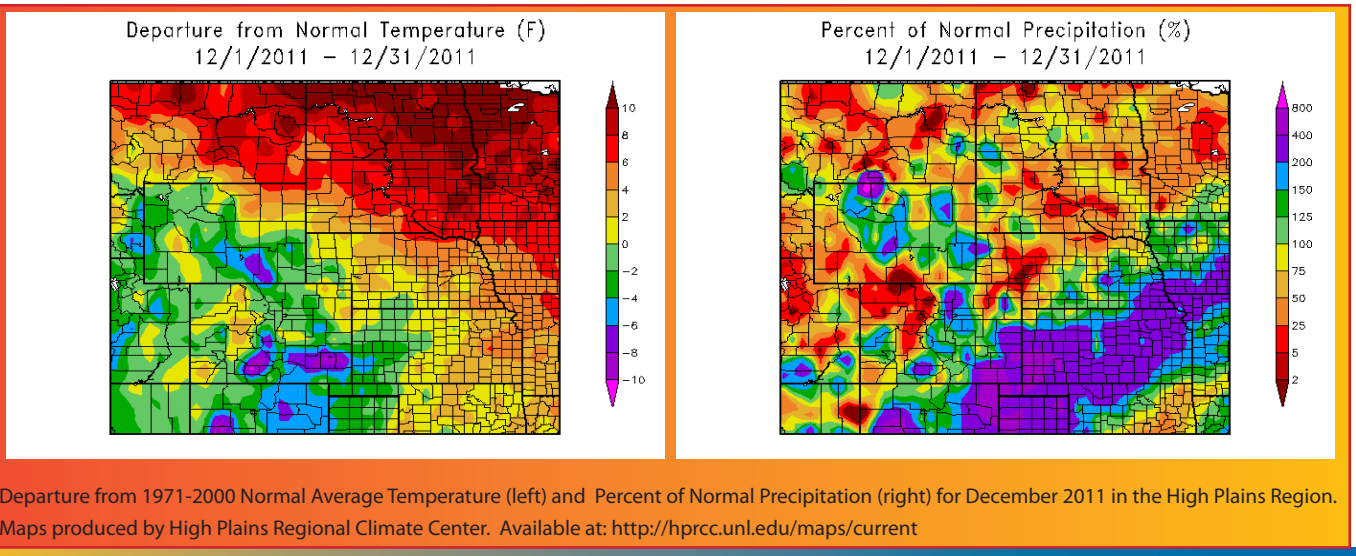
December 2011 Climate Summary

Region Breakdown

December was an interesting month across the High Plains Region. The northern areas of the region were generally drier and warmer than normal and many areas did not experience a White Christmas. The lack of snow cover, not just in the High Plains Region, but also in areas north into Canada, contributed to the unseasonably warm temperatures. The Dakotas had the largest temperature departures in the region, ranging from near normal in the southwest corner of South Dakota to over 12 degrees F (6.7 degrees C) above normal in northern and northeastern North Dakota. These warm temperatures caused many locations in the Dakotas to be ranked in the top 15 warmest Decembers on record. For instance, Fargo, North Dakota had an average temperature of 25.3 degrees F (-3.7 degrees C), which was 12.8 degrees F (7.1 degrees C) above normal. Fargo's average temperature for December was ranked as the 3rd warmest and was just shy of the record which occurred in 1959 with 25.9 degrees F (-3.4 degrees C) (period of record 1881-2011). Meanwhile, the western areas of the Region were generally colder than normal with temperature departures at least 6 degrees F (3.3 degrees C) below normal occurring in areas of southern Colorado and Wyoming. A few locations in southern Colorado ranked in the top 10 coolest Decembers on record. Lamar, Colorado had its 3rd coolest December on record with an average temperature of 21.8 degrees F (-5.7 degrees C). While this was 8.5 degrees F (4.7 degrees C) below normal, it was not cool enough to beat the old December record of 18.1 degrees F (-7.7 degrees C) which occurred in 1924 (period of record 1893-2011).



Departure from 1971-2000 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for December 2011 in the High Plains Region.
Maps produced by High Plains Regional Climate Center. Available at: http://hprcc.unl.edu/maps/current

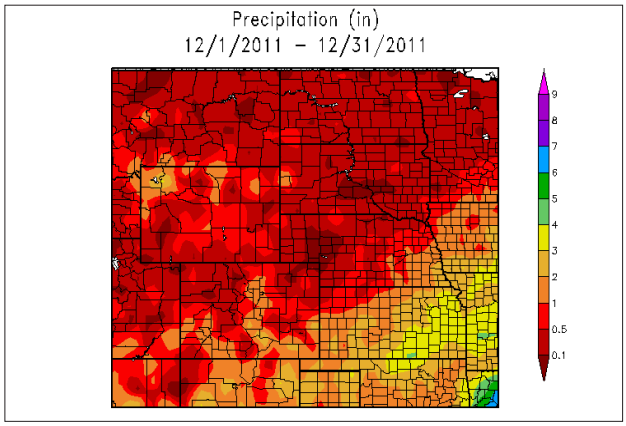
Precipitation Summary

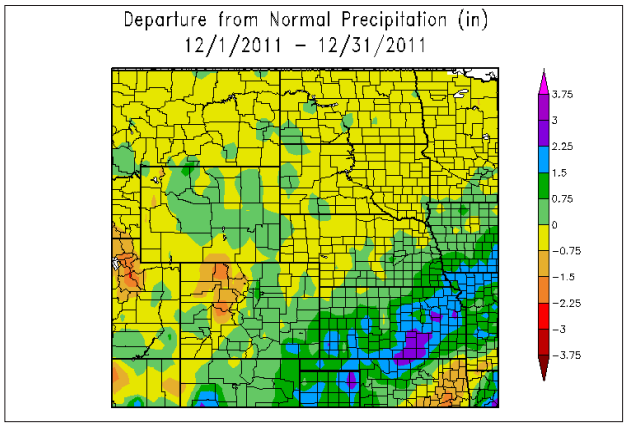
Precipitation was varied across the Region this month. The Dakotas were generally drier than normal, with a few isolated pockets receiving above normal precipitation. The ongoing dry conditions in eastern North Dakota led to the expansion of moderate drought conditions (D1). Meanwhile, heavy rain and snow across Kansas and southern Colorado helped alleviate and in some cases eliminate drought conditions.

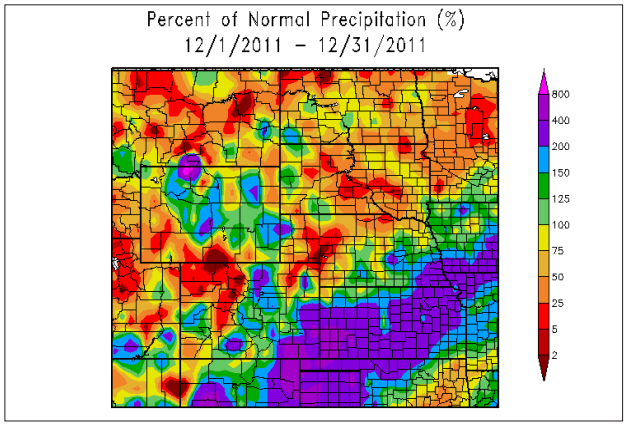
Precipitation was a welcome sight in drought-stricken areas of Colorado, Kansas, and southeast Nebraska. This month, the heaviest precipitation in the Region fell in a large swath that stretched from southeastern Colorado, through Kansas, and into southeastern Nebraska. The majority of the locations in this swath received 200-400 percent of normal precipitation, while clusters of locations in Kansas and Colorado received 400-800 percent of normal precipitation. Numerous locations ranked in the top 10 wettest Decembers on record and many had precipitation totals which were ranked second and third wettest. Wichita, Kansas had its 5th wettest December with 3.69 inches (94 mm) of liquid equivalent precipitation (period of record 1888-2011). The wettest December occurred in 1984 with 4.71 inches (120 mm) of liquid equivalent precipitation. Snowfall totals for the month of December also ranked in the top 10 across some areas of Kansas and Colorado. At least one location had its snowiest December on record - Pueblo, Colorado. Pueblo received 18.6 inches (47 cm) of snow this month, which beat out the old record of 18.2 inches (46 cm) set all the way back 1913 (period of record 1888-2011).

December 19-20 was an active period as a major winter storm brought heavy rain, sleet, and snow to Colorado and Kansas. Heavy snow was accompanied by strong winds which created blizzard conditions in some locations. According to the National Weather Service in Dodge City, Kansas, snow drifts of 8 to 10 feet (243 to 305 cm) were also reported. Some of the heaviest snow fell in southeastern Colorado where some interesting records were set. Lamar, Colorado received 19.0 inches (48 cm) of snow on December 20th and set an impressive new daily snowfall total for that day. This snow total well exceeded the old record of 10.0 inches (25 cm) set in 2006 (period of record 1893-2011). The snowfall on the 20th also set a new record as the highest one-day snowfall total for any day in December. Interestingly, the 19.0 inches (48 cm) of snow was also the second highest one-day snowfall total for any day of the year in Lamar. The record one-day snowfall occurred October 26, 1997 when 22.0 inches (56 cm) fell in Lamar.

2011 ended on a windy note as damaging winds affected Wyoming, Colorado, Kansas, and Nebraska. Wind gusts over 60 mph (97 km/hr) were widespread and there were even reports of winds over 100 mph (161 km/hr) in some of the mountainous areas of Colorado. The high winds led to dangerous driving conditions on the open highways and some structural damage. According to the National Weather Service in Cheyenne, Wyoming, vehicles, buildings, and signs were damaged as a result of the high winds.







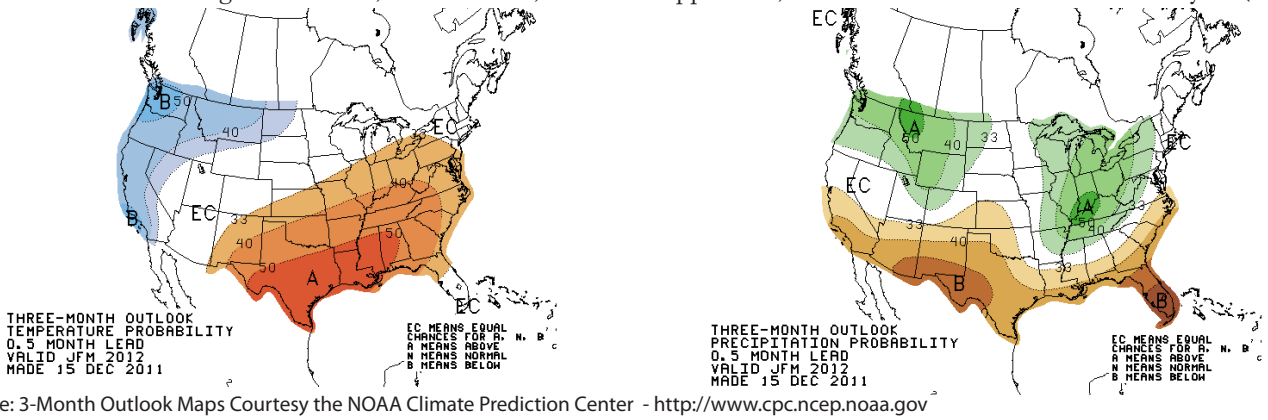
Above: Total precipitation (inches) (top), Departure from Normal Precipitation (inches) (middle), and Percent of Normal Precipitation (bottom) for December 2011 in the High Plains Region. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: http://hprcc.unl.edu/maps/current.

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

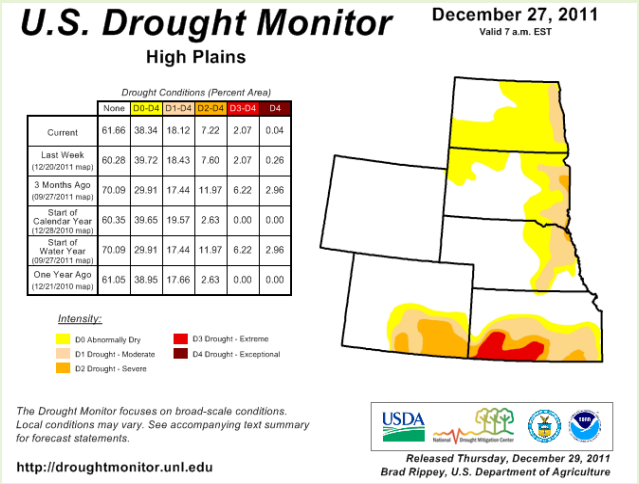
La Niña conditions are present in the equatorial Pacific and are expected to continue through winter. The temperature outlook indicates a higher probability of above normal temperatures for most of Kansas, the southeast corner of Colorado, and the far southeast corner of Nebraska. A higher probability for below normal temperatures exists for the western half of North Dakota, northwestern Wyoming, and the northwest corner of South Dakota. The precipitation outlook indicates a higher probability of above normal precipitation for the majority of Wyoming, western portions of the Dakotas, and northwestern Colorado. Meanwhile, western Kansas and southeastern Colorado have a higher probability of below normal precipitation. Equal chances of above, near, or below normal precipitation and temperature 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).

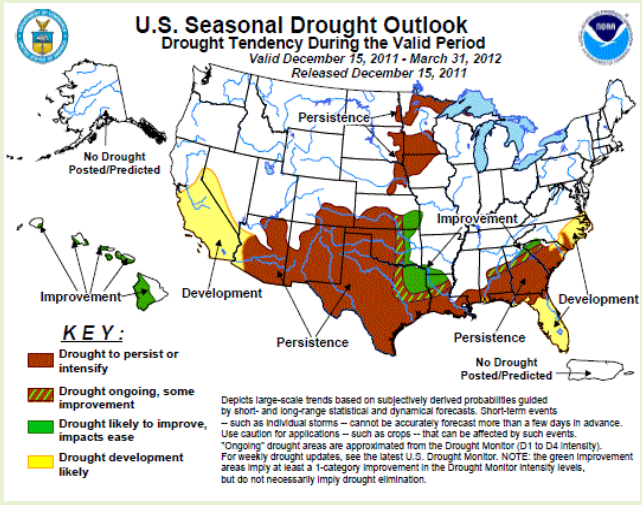


Above: 3-Month Outlook Maps Courtesy the NOAA Climate Prediction Center - http://www.cpc.ncep.noaa.gov
(left) The Three-Month Temperature Probability Outlook, (right) The Three-Month Precipitation Probability Outlook

Drought Watch

The U.S. Drought Monitor had many changes this month. Storm systems bringing beneficial rain and snow to Colorado and Kansas have led to the erasure of all exceptional drought conditions (D4) in those states. In addition, extreme drought conditions (D3) were also erased in Colorado. Other major changes occurred in Kansas as well, as all drought conditions were eliminated in the north and the drought conditions that remain have contracted to the south somewhat. Southeastern Nebraska also benefitted from the December precipitation as drought conditions were erased for a large portion of that area. Meanwhile, due to an ongoing lack of precipitation in North Dakota, moderate drought conditions (D1) have expanded northward in the eastern side of the state. Drought conditions in South Dakota remained largely the same since last month, with the exception of a slight expansion of abnormally dry (D0) and D1 conditions in the southeast. According to the U.S. Seasonal Drought Outlook drought conditions in portions of the Dakotas, Nebraska, Colorado, and western Kansas were expected to persist, while drought conditions in eastern Kansas were expected to improve.





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
Alamosa San Luis Airport	30.5	-2.2	14.1	-3.0	48	12/30	-17	12/23	0.27	-0.06	82
Akron Washington County Airport	39.9	15.6	27.8	-1.0	60	12/29	-4	12/06	0.03	-0.37	7
Colorado Springs Municipal Airport	41.9	15.9	28.9	-0.1	61	12/18	-5	12/06	0.46	0.04	110
Grand Junction Walker Field Airport	39.5	18.0	28.7	0.5	51	12/01	7	12/06	0.35	-0.17	67
Pueblo Memorial Airport	40.7	9.7	25.2	-5.1	62	12/18	-11	12/23	0.84	0.45	215

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	43.2	24.5	33.9	3.7	61	12/31	9	12/06	1.87	1.01	217
Dodge City Regional Airport	40.4	22.6	31.5	-1.6	61	12/18	6	12/23	2.13	1.36	277
Goodland Renner Field	41.9	17.5	29.7	0.1	68	12/29	-8	12/06	0.41	0.01	103
Topeka Municipal Airport	46.8	26.5	36.7	5.3	66	12/31	13	12/07	3.41	1.99	240
Wichita Mid-Continent Airport	46.4	27.0	36.7	3.1	66	12/31	14	12/07	3.69	2.34	273

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	41.8	11.5	26.7	1.6	59	12/29+	-6	12/06	0.23	-0.19	55
Grand Island Airport	39.6	19.5	29.5	3.9	57	12/29	-9	12/06	1.11	0.45	168
Lincoln Municipal Airport	40.5	17.9	29.2	2.7	57	12/29+	-3	12/06	1.58	0.72	184
Omaha Eppley Airfield	39.6	20.7	30.2	4.5	52	12/31+	2	12/06	1.71	0.79	186
Norfolk Karl Stefan Airport	39.0	16.4	27.7	4.0	58	12/28	-10	12/06	0.79	0.14	122
North Platte Regional Airport	42.9	12.4	27.7	2.0	65	12/29	-6	12/06	0.32	-0.08	80
Valentine Miller Field	42.0	15.0	28.5	4.9	62	12/18	-5	12/06	0.20	-0.13	61

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	35.1	15.1	25.1	9.9	56	12/18	-7	12/05	0.47	0.03	107
Fargo International Airport	34.6	15.9	25.3	12.8	55	12/18	-1	12/09	0.36	-0.21	63
Grand Forks International Airport	31.9	12.6	22.2	11.0	51	12/18	-3	12/05	0.65	0.10	118
Theodore Roosevelt Airport	34.7	15.5	25.1	6.9	54	12/28	-8	12/05	0.12	-0.22	35
Williston International Airport	33.8	16.2	25.0	12.0	48	12/28	-14	12/05	0.18	-0.39	32

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.

December 2011 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	36.3	12.3	24.4	8.4	57	12/18	-10	12/06	0.33	-0.05	87
Huron Regional Airport	38.0	15.9	27.0	8.4	60	12/18	-2	12/06+	0.24	-0.15	62
Pierre Regional Airport	38.6	17.8	28.2	6.3	57	12/18	-4	12/06	0.09	-0.39	19
Rapid City Regional Airport	39.9	16.0	28.0	3.3	61	12/18	-4	12/06	0.29	-0.12	71
Sioux Falls Joe Foss Field Airport	37.6	16.2	26.9	8.6	54	12/26	-3	12/06	0.62	0.10	119

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	33.1	14.9	24.0	0.2	50	12/30	-7	12/05	0.71	0.09	115
Cheyenne Municipal Airport	38.0	14.0	26.0	-1.1	54	12/30+	-6	12/05	0.43	-0.03	93
Lander Hunt Field Airport	26.9	6.3	16.6	-4.7	53	12/30	-9	12/06	0.97	0.36	159
Laramie Regional Airport	27.0	-0.4	13.3	-8.0	47	12/30	-29	12/05	0.06	-0.40	13
Rawlins Municipal Airport	30.2	9.2	19.7	-4.4	47	12/30	-16	12/05	0.11	-0.38	22
Sheridan County Airport	38.2	13.0	25.6	3.2	54	12/29	-5	12/05	0.58	-0.10	85

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State Spotlight - North Dakota

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

Precipitation:

The High Plains Regional Climate Center (HPRCC) December percent of normal precipitation was less than 80% for most of North Dakota. (Figure 1. High Plains Regional Climate Center). The southwest corner had the greatest amount of precipitation with 150% to 200% of normal. December continued a pattern of dry and unseasonally warm temperatures. The precipitation events from the 1st through the 26th produced amounts of a trace to around a tenth of an inch with the east being the driest. Snow depth from the 1st through the 26th varied from a trace in most areas to an inch in the northern regions. The 27th through the 31st had precipitation fall in most areas with the highest amounts in the northeast.

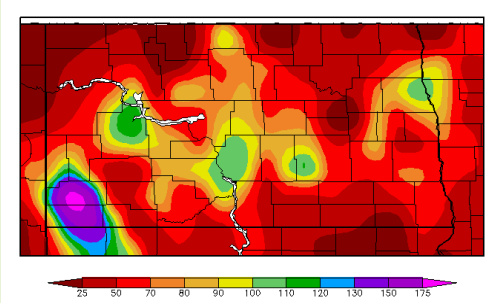

Figure 1. Percent of Normal Precipitation in December 2011 for North Dakota (High Plains Regional Climate Center)

Temperature:

NDAWN December average air temperatures ranged from 19 °F to 25 °F. NDAWN departure from normal temperatures were above normal across the state and ranged from 6 °F to 13 °F (Figure 2. North Dakota State Climate Office). The 4th through the 9th had near normal to below normal temperatures across the state. The majority of all other days had above normal to far above normal average air temperatures across the state. The National Weather Service reported breaking or tying high temperature records on the 18th and the 26th. Bismarck's December average air temperature ranked 8th warmest with 25.1 °F (tied with 1991). Williston's December was the 7th warmest with 25.0 °F. Fargo's December was 3rd warmest on record with 25.3 °F and Grand Forks was 3rd warmest with 22.2 °F. Similar to November, the lack of or sparse snow pack contributed to the warm temperatures.

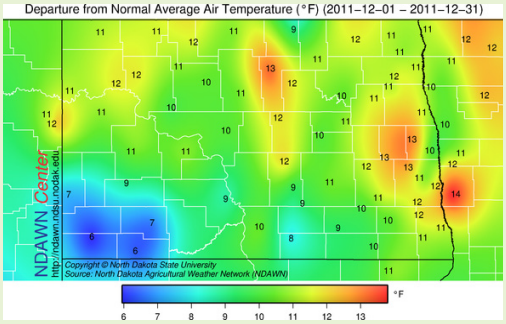

Figure 2. Temperature Departure from Normal in December 2011 for North Dakota (North Dakota State Climate Office)

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

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