



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



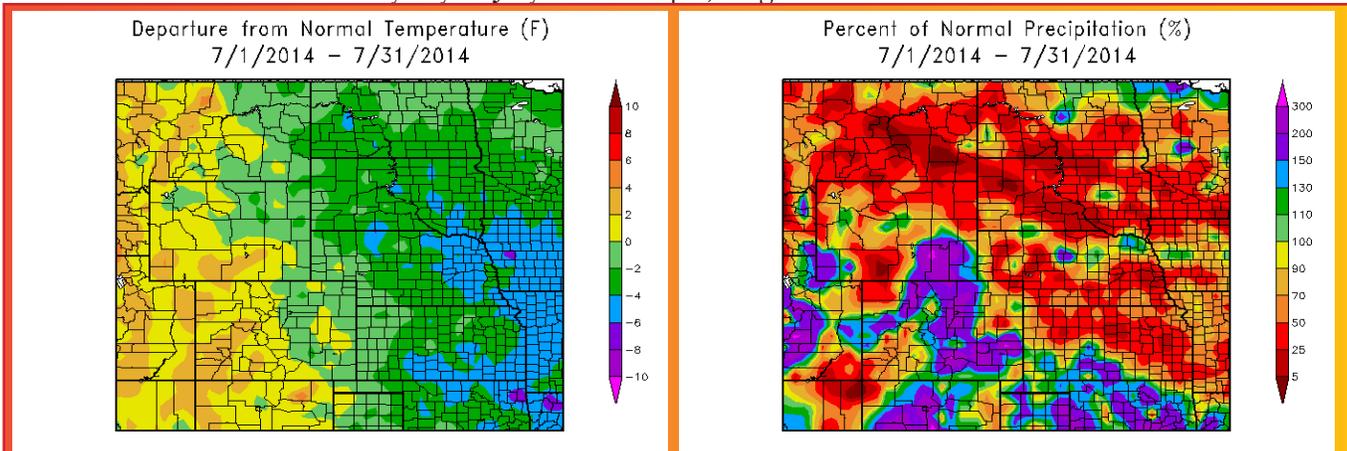
AASC Annual Meeting in Stevenson, WA - Photo by Natalie Umphlett
<http://hprcc.unl.edu>

July 2014 Climate Summary

Region Breakdown

The country was divided this month with above normal temperatures dominating the western U.S. and below normal temperatures in the central and eastern U.S. This left the High Plains Region split as well, with cooler conditions for the Dakotas, Nebraska, and Kansas and warmer conditions in western portions of Colorado and Wyoming. The largest temperature departures occurred across southern and eastern Kansas, eastern Nebraska, and pockets of South Dakota, ranging from 4.0-6.0 degrees F (2.2-3.3 degrees C) below normal. This caused some locations to be ranked in the top 10 coolest Julys on record. One example was Dodge City, Kansas which had its 10th coolest July with an average temperature of 75.4 degrees F (24.1 degrees C). The old 1906 record held with 72.8 degrees F (22.7 degrees C) (period of record 1874-2014). Meanwhile, some areas of Colorado and Wyoming were 2.0-4.0 degrees F (1.1-2.2 degrees C) above normal, but this warmth was not record breaking either.

Crop impacts varied greatly this month. Warm and wet conditions aided pasturelands in southeastern Wyoming, while cooler conditions slowed row crop development in North Dakota. Some crop damage occurred due to severe storms, but not nearly as badly as the past two of months. Meanwhile, the residual moisture from June was beneficial to areas which turned extremely dry in July. For example, irrigation in Nebraska started later than usual.



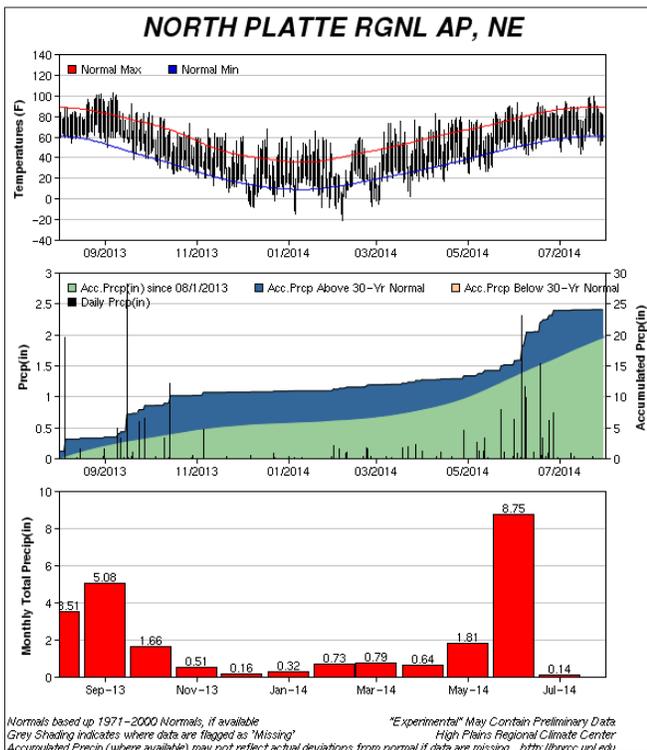
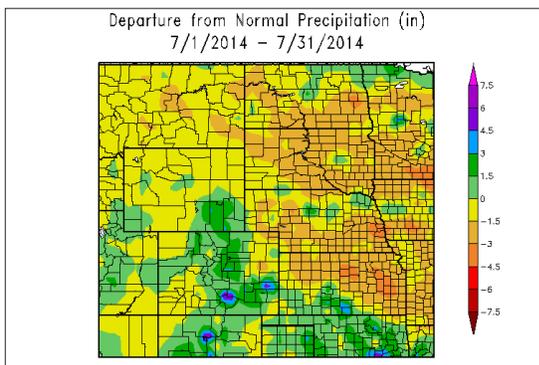
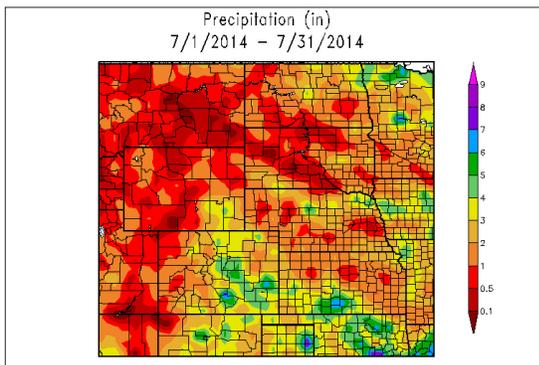
Departure from 1981-2010 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for July 2014 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

Precipitation Summary

The High Plains Region was generally dry this month, with the main exceptions in central Colorado, southeastern Wyoming, and south-central Kansas. Precipitation totals were quite low across much of Kansas, Nebraska, South Dakota, and North Dakota with widespread precipitation totals of less than 50 percent of normal. Embedded within this area were some locations that received less than 25 percent of normal precipitation. Wyoming had large areas of both dry and wet conditions with some areas to the north receiving less than 50 percent of normal, while southeastern Wyoming received upwards of 300 percent of normal precipitation. One particularly wet spot was Laramie, Wyoming which received 3.32 inches (84 mm). This amount was 232 percent of normal and ranked as the 6th wettest July on record (period of record 1948-2014). The wettest July occurred back in 1998 with 4.43 inches (113 mm).

Some locations in the eastern part of the Region shifted from extreme wetness to extreme dryness. North Platte, Nebraska went from its 2nd wettest June with 8.75 inches (222 mm) to its driest July on record with 0.14 inches (4 mm). This beat the old record of 0.34 inches (9 mm) set all the way back in 1901 (period of record 1874-2014). A couple of other dry locations included Lincoln, Nebraska with its 7th driest July and Aberdeen, South Dakota with its 5th driest.

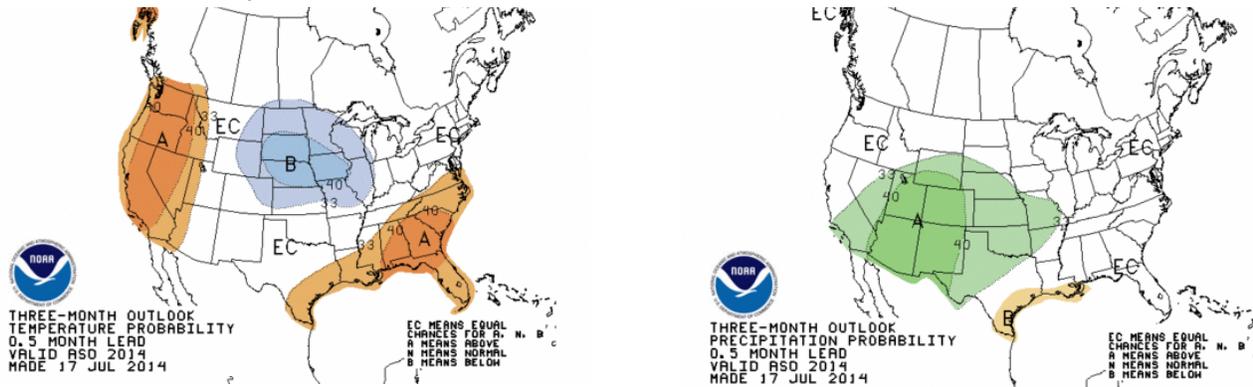
July was another active severe weather month with hail, wind, or tornado reports on almost every day in the High Plains Region. One particularly active day was June 21st when a squall line moved across North Dakota, continuing on toward Lake Superior the next day. In addition to destructive winds, several tornadoes were reported as well as hail and heavy rain. Grand Forks, North Dakota received 2.79 inches (71 mm) of rain on the 21st which set a new record for the day beating out the old 1966 record of 2.57 inches (65 mm). This ranked as the 6th highest 1-day precipitation total for July in Grand Forks (period of record 1893-2014). According to the North Dakota State Climate Office, the North Dakota Agricultural Weather Network's Michigan station received a whopping 4.00 inches (102 mm) on the 21st as well.



Above: Total precipitation (inches) (top left) and Departure from Normal Precipitation (inches) (bottom left) for July 2014 in the High Plains Region. Accumulated and monthly precipitation for North Platte, NE (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>.

Climate Outlook

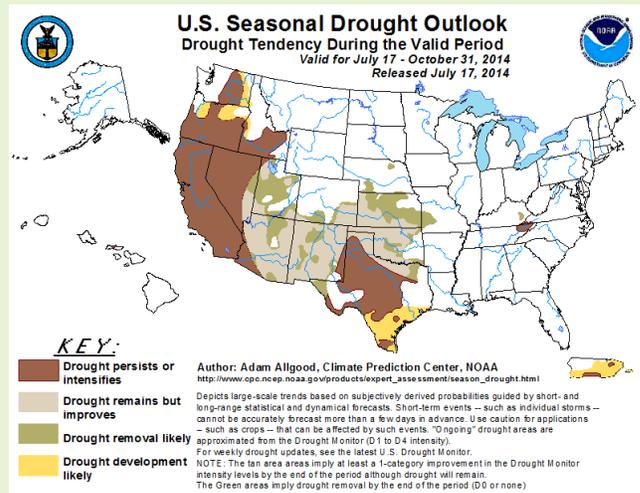
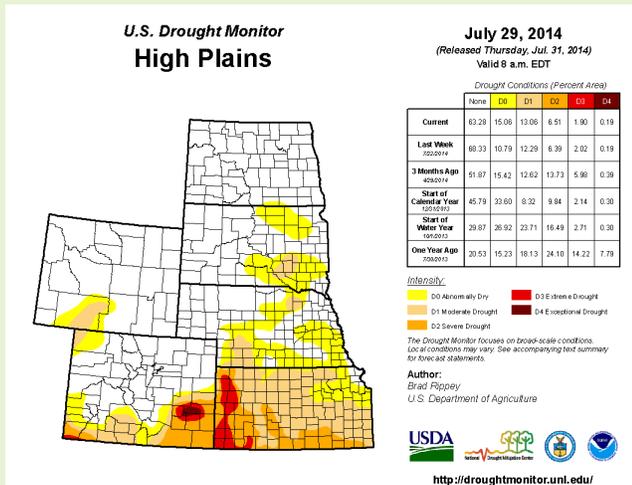
Just like last month, ENSO-neutral conditions continued, but it is still likely that El Niño conditions will develop with increasing chances through the fall and winter. For the next three months, the temperature outlook indicates that a higher probability of below normal temperatures exists for much of the Region including the Dakotas, Nebraska, the northern half of Kansas, and the eastern sides of Wyoming and Colorado. Meanwhile, the precipitation outlook shows a higher probability of above normal precipitation centered on the Four Corners states, but also including Wyoming, Kansas, most of Nebraska, and southwestern South Dakota. All other areas in the Region have equal chances of above, near, or below normal temperatures and precipitation. 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

Overall, there was little change to the drought conditions in the High Plains Region this month. According to the U.S. Drought Monitor, approximately 22 percent of the Region remained in moderate (D1) to exceptional (D4) drought at the end of July. This range of conditions at the end of June totaled 23 percent. While June was very wet across the eastern half of the Region, July was quite dry. Some areas of eastern South Dakota and Nebraska received little precipitation in July and so abnormally dry conditions (D0) reemerged. An area of D1 also developed in southeastern South Dakota as well as southwestern Wyoming and northwestern Colorado. Kansas had significant improvements regarding extreme drought (D3), decreasing from 21 percent to 9 percent coverage. Conditions in Colorado improved in the east and degraded slightly in the west. Colorado continued to have the last remaining D4 area in the Region. According to the U.S. Seasonal Drought Outlook released July 17th, current drought conditions are expected to improve or be removed in Nebraska, Kansas, and Colorado.



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	86.4	60.6	73.5	-0.5	101	07/24	53	07/15	2.27	-0.28	89
Alamosa San Luis Airport	82.8	49.1	66.0	1.4	90	07/22	42	07/04	1.52	0.55	157
Colorado Springs Municipal Airport	83.3	57.3	70.3	-0.6	95	07/24+	50	07/17+	4.63	1.79	163
Denver International Airport	88.3	60.6	74.5	0.3	100	07/07	55	07/17+	3.85	1.69	178
Grand Junction Walker Field Airport	93.7	64.6	79.2	1.0	100	07/23+	57	07/30+	1.02	0.41	167
Pueblo Memorial Airport	89.2	60.9	75.1	-0.7	101	07/07	57	07/19+	3.28	1.22	159

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	88.4	64.3	76.3	-2.8	103	07/25	50	07/15	1.14	-2.78	29
Dodge City Regional Airport	86.8	64.0	75.4	-4.2	102	07/26+	53	07/15	3.01	-0.07	98
Goodland Renner Field	87.3	60.8	74.1	-1.6	101	07/20	54	07/31+	2.07	-1.40	60
Topeka Municipal Airport	88.6	64.9	76.8	-2.2	103	07/22	50	07/16	0.95	-2.87	25
Wichita Mid-Continent Airport	87.5	66.6	77.0	-4.1	104	07/26	55	07/15	3.07	-0.25	92

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	89.6	55.9	72.8	-0.8	108	07/24	42	07/02	0.66	-1.45	31
Grand Island Airport	84.9	61.9	73.4	-2.8	100	07/21	50	07/15	2.19	-1.21	64
Lincoln Municipal Airport	87.7	62.3	75.0	-2.6	102	07/21	48	07/16	0.51	-2.89	15
Norfolk Karl Stefan Airfield	82.0	59.4	70.7	-4.3	94	07/21	47	07/16	1.13	-2.19	34
North Platte Regional Airport	86.1	57.6	71.8	-2.5	100	07/24	44	07/15	0.14	-2.93	5
Omaha Eppley Airport	84.3	63.0	73.7	-3.0	97	07/21	50	07/15	1.72	-2.11	45
Valentine Miller Field	85.9	57.4	71.6	-2.9	105	07/21	41	07/15	0.58	-2.63	18

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	81.4	55.7	68.5	-2.6	96	07/05	44	07/28	0.73	-2.16	25
Fargo International Airport	80.5	58.3	69.4	-1.6	93	07/21+	49	07/15+	1.64	-1.15	59
Grand Forks International Airport	78.9	55.9	67.4	-1.2	92	07/20+	46	07/02	3.70	0.55	117
Theodore Roosevelt Airport	80.5	51.7	66.1	-3.1	93	07/05	40	07/15	1.11	-1.33	45
Williston International Airport	84.7	54.2	69.4	-0.7	99	07/05	43	07/15+	0.66	-1.88	26

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>.

July 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	79.6	55.0	67.3	-4.0	91	07/05	42	07/29	0.70	-2.32	23
Huron Regional Airport	81.7	57.9	69.8	-3.9	94	07/11	48	07/30+	3.67	0.75	126
Pierre Regional Airport	85.0	58.2	71.6	-3.8	104	07/21	46	07/15	0.87	-1.74	33
Rapid City Regional Airport	83.2	55.7	69.5	-3.1	96	07/21	45	07/15	1.94	0.09	105
Sioux Falls Joe Foss Field Airport	80.2	59.3	69.8	-3.2	92	07/06	47	07/16	0.80	-2.29	26

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	88.6	51.9	70.3	-0.2	100	07/23	38	07/02	1.17	-0.24	83
Cheyenne Municipal Airport	82.2	55.8	69.0	-0.4	93	07/05	43	07/02	3.24	1.05	148
Lander Hunt Field Airport	88.8	56.2	72.5	1.3	99	07/23	47	07/01	0.62	-0.16	79
Laramie Regional Airport	80.1	49.9	65.0	1.0	89	07/07	36	07/01	3.32	1.89	232
Rawlins Municipal Airport	86.0	52.5	69.3	2.3	96	07/23	39	07/01	0.50	-0.34	60
Sheridan County Airport	88.3	52.0	70.1	0.1	100	07/24	42	07/02	1.01	-0.17	86

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 - North Dakota

F. Adnan Akyüz - State Climatologist, Daryl Ritchison - Research Specialist
 North Dakota State Climate Office, North Dakota State University



Precipitation:

After an excessively wet June, almost all of North Dakota recorded below average precipitation during the month of July (Figure 1). The only exception was a few locations in the northeastern portion of the state. Using data from the North Dakota Agricultural Weather Network (NDAWN), the statewide average precipitation for the month of July was 1.47 inches. That is well below the July average of 2.87 inches which would rank July 2014 as the 14th driest on record. The U.S. Drought Monitor had less than 1% of North Dakota in abnormally dry conditions as of July 29, 2014.

Temperature:

July 2014 was the 10th straight month with below average temperatures in North Dakota. With the exception of a few areas near the Canadian border the colder than average temperatures were fairly uniform in the 2 to 4 degrees below normal range across the state (Figure 2). The NDAWN stations recorded an overall average temperature of 66.9 degrees which is 2.2 degrees below the 30 year average of 69.1 degrees for the month of July. That would rank July 2014 as tied for the 25th coldest July since such records began in 1895.

Notable Weather:

On Monday, July 21, 2014 during the late afternoon and evening hours, a derecho (a long-lived line of severe thunderstorms) moved across North Dakota. The strong wind associated with this event caused damage from near Dickinson to Grand Forks (Figure 3). The derecho continued into the early hours of July 22 extending all the way to Lake Superior before weakening. The most widespread damage in North Dakota occurred from Carrington to Grand Forks where several tornadoes developed along the bow echo. The top wind speed recorded at any of the NDAWN sites was a 73 mph wind gust at the McHenry station in eastern Eddy County (Figure 4).

The thunderstorms not only produced strong wind and some tornadoes, but also localized heavy rain. The National Weather Service office in Grand Forks recorded 2.74 inches of rain and the Michigan NDAWN station recorded 4.00 inches that day. It was the most widespread severe weather event of the season to date and also the biggest rain maker for the month of July in the state.

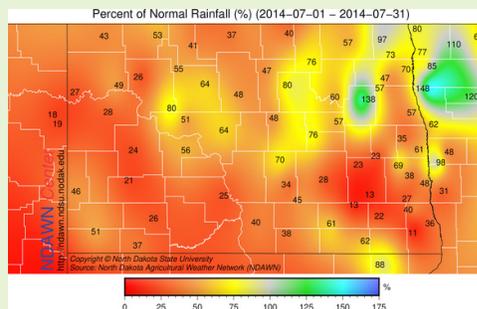


Figure 1. Percent of Normal Precipitation in July 2014 for North Dakota (NDSCO)

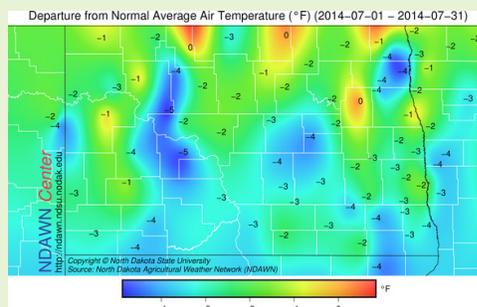


Figure 2. Temperature Departure from Normal in July 2014 for North Dakota (NDSCO)

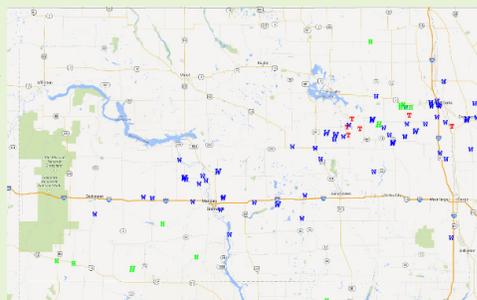


Figure 3. Severe weather reports from July 21 (Storm Prediction Center)

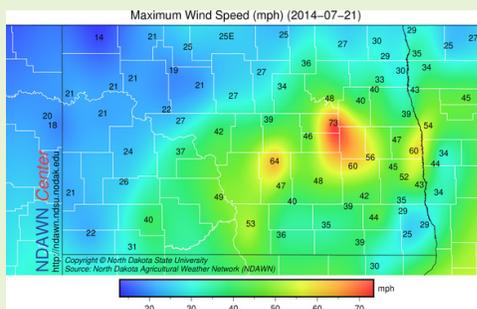


Figure 4. Peak wind gust from the North Dakota Agricultural Weather Network Sites on July 21

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

