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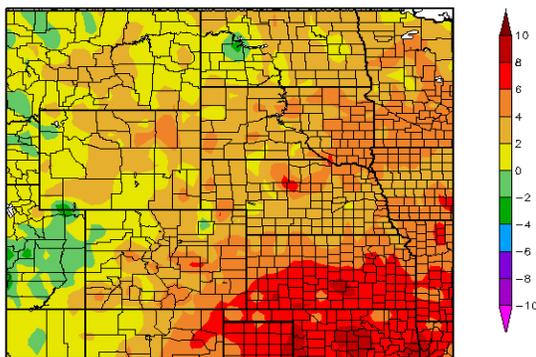
Rocky Mountain National Park - Photo by Holly Lussenden  
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# July 2011 Climate Summary

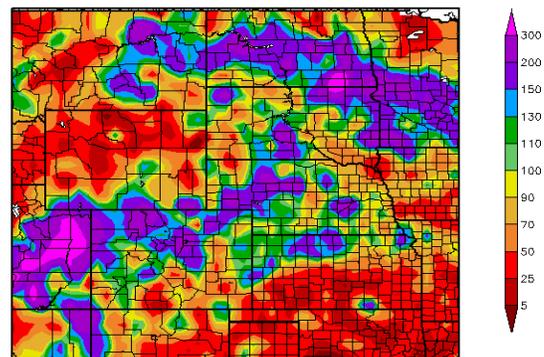
## Region Breakdown

July 2011 temperatures were higher than normal across the High Plains Region. Average monthly temperatures ranged from near normal to 10.0 degrees F (5.6 degrees C) above normal. The largest departures occurred in central and southern Kansas, where temperatures ranged from 6-10 degrees F (3.3-5.6 degrees C) above normal. The hot temperatures caused many locations to be ranked in the top 10 warmest Julys. Dodge City, Kansas continued to experience extreme temperatures this month and racked up a record 23 days at or above 100 degrees F (37.8 degrees C). In a typical year, Dodge City will have 10.5 days at or above 100 degrees F (37.8 degrees C) and by the end of July, this year's total already stood at 35. These hot days helped Dodge City set its 3rd hottest July on record with an average temperature of 86.9 degrees F (30.5 degrees C). The record of 87.3 degrees F (30.7 degrees C) was set in 1934 (period of record 1874-2011). The hot and humid weather had various impacts on crops and livestock this month. In Kansas, the near record heat coupled with ongoing drought conditions caused crop conditions to decline throughout the month. However, in the Dakotas, the hot and humid conditions helped push along row crop development, but severely stressed livestock. According to the *Aberdeen American News*, over a thousand cattle died in South Dakota due to the high heat and humidity.

Departure from Normal Temperature (F)  
 7/1/2011 - 7/31/2011



Percent of Normal Precipitation (%)  
 7/1/2011 - 7/31/2011

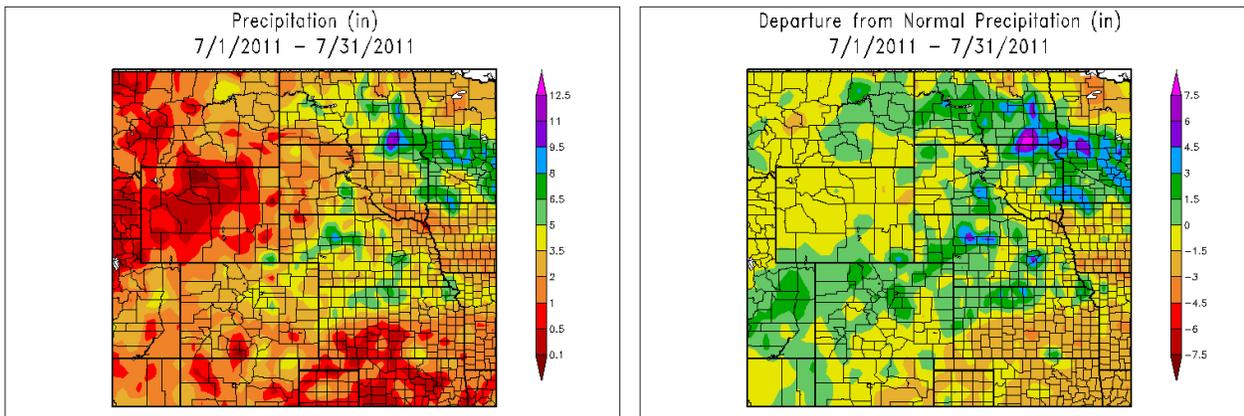


Departure from 1971-2000 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for July 2011 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

# Precipitation Summary

Precipitation was highly variable this month. Unfortunately, drought stricken areas of southern Kansas and southern Colorado missed out on most of the precipitation. The majority of Wyoming also missed out on the precipitation and most of the northern half of the state had precipitation totals which were at most 50 percent of normal. One location which received little precipitation this month was Dodge City, Kansas which only received 19 percent of normal precipitation. While this was not low enough to break July records, the year-to-date precipitation was the lowest on record (period of record 1874-2011). So far this year, Dodge City has only received 3.95 inches (100 mm) of precipitation. The second driest January-July occurred in 2002, when 5.71 inches (145 mm) of precipitation fell.

July 2011 was not a dry month for the entire Region as some areas did receive above normal precipitation. Northern Colorado, portions of northern Kansas, a large part of the Nebraska panhandle, eastern South Dakota, and central North Dakota all had precipitation totals which were at least 150 percent of normal. A few locations even broke monthly precipitation records. Walden, Colorado, located in the north central part of the state, had its wettest July on record with 3.21 inches (82 mm) of precipitation. The old record of 3.06 inches (78 mm) was set in 1952 (period of record 1897-2011). Cheyenne, Wyoming had its second wettest July on record with 5.63 inches (143 mm). On July 12, severe storms brought heavy rain and large hail (up to 2 inches in diameter) to the Cheyenne area, and nearly half of the monthly precipitation total occurred that day. This set a new daily rainfall record for July 12 in Cheyenne with 2.43 inches (62 mm). The old record of 1.69 inches (43 mm) occurred in 1981 (period of record 1871-2011).



Above: Total precipitation (inches) (left) and Departure from Normal Precipitation (inches) (right) for July 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>.

## July 2011 Records - Highlights

Monthly Records			
Precipitation in inches / Temperature in degrees F			
Warmest	New Record	Old Record/Year	Period of Record
Alamosa, CO	68.4	68.2/2003	1906-2011
Colby 1SW, KS	80.7	tied/1980	1957-2011
Garden City Exp Stn, KS	84.9	83.1/1980	1956-2011
Wettest	New Record	Old Record/Year	Period of Record
Lakewood, CO	5.68	5.17/1965	1962-2011
Walden, CO	3.21	3.06/1952	1897-2011
Wilmot, SD	7.35	tied/1963	1943-2011

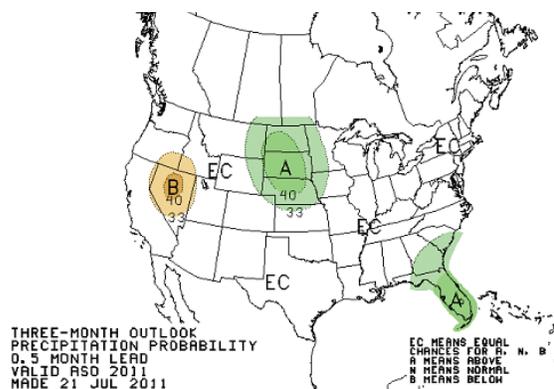
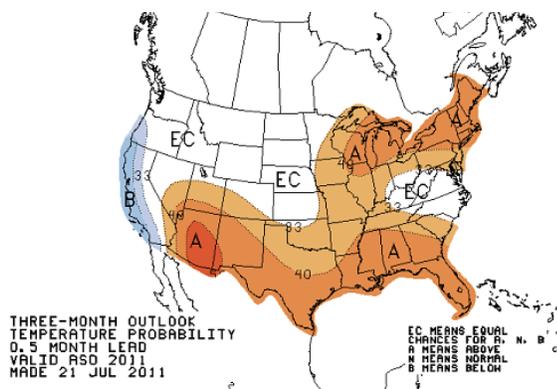
All Data are Preliminary and Subject to Change.  
 Source: National Weather Service Cooperative Observation Network Data

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.



# Climate Outlook

El Niño Southern Oscillation cycle (ENSO)-neutral conditions are present in the equatorial Pacific and are expected to continue into fall. The temperature outlook indicates a higher probability of above normal temperatures for southwestern Colorado, eastern Kansas, and extreme southeastern Nebraska. Equal chances of above, near, or below normal temperatures are predicted elsewhere in the Region. The precipitation outlook indicates a higher probability of above normal precipitation for North Dakota, South Dakota, the majority of Nebraska, the eastern half of Wyoming, northeast Colorado, and northern Kansas. 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, ENSO. 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

The U.S. Drought Monitor had both improvements and degradations this month. Heavy precipitation was able to alleviate abnormally dry conditions (D0) in southern Nebraska, northern Kansas, and northern Colorado. The areas which were designated as moderate (D1), severe (D2), and extreme (D3) drought remained largely the same. However, extreme heat coupled with dry conditions led to an expansion of exceptional drought conditions (D4) not only in southern and central Kansas, but also in south central Colorado. By the end of the month, North Dakota, South Dakota, and Wyoming remained drought free. According to the U.S. Seasonal Drought Outlook released July 21st drought conditions in Colorado and most of Kansas were expected to improve. Only the most southern portions of the drought conditions in Kansas were expected to persist.

### U.S. Drought Monitor High Plains

July 26, 2011  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)						
	Note	D0-D4	D1-D4	D2-D4	D3-D4	D4	
Current		79.57	20.43	15.17	11.97	6.64	2.31
Last Week (07/19/2011 map)		80.28	19.72	14.46	11.12	6.40	1.86
3 Months Ago (04/26/2011 map)		68.87	31.13	18.12	11.20	0.85	0.00
Start of Calendar Year (12/29/2010 map)		60.35	39.65	19.57	2.63	0.00	0.00
Start of Water Year (09/28/2010 map)		65.06	34.94	3.73	0.00	0.00	0.00
One Year Ago (07/25/2010 map)		89.17	10.83	1.42	0.00	0.00	0.00

**Intensity:**

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>

Released Thursday, July 28, 2011  
Brad Rippey, U.S. Department of Agriculture

### U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period  
Valid July 21, 2011 - October 31, 2011  
Released July 21, 2011

**KEY:**

- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely
- Persistence
- No Drought Posted/Predicted

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

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	87.2	49.5	68.4	4.3	92	07/16	37	07/01	0.14	-0.80	15
Akron Washington County Airport	90.5	62.0	76.3	2.5	98	07/31	55	07/03	3.65	0.72	125
Colorado Springs Municipal Airport	89.3	60.9	75.1	5.5	95	07/19	57	07/30+	4.90	2.05	172
Grand Junction Walker Field Airport	92.1	62.9	77.5	0.7	100	07/24+	52	07/01	1.71	1.05	259
Pueblo Memorial Airport	95.2	63.1	79.2	3.7	102	07/16	56	07/03	2.35	0.31	115

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	94.1	71.6	82.9	3.8	102	07/27+	63	07/08	5.38	1.18	128
Dodge City Regional Airport	102.4	71.4	86.9	7.1	109	07/27	62	07/04	0.61	-2.56	19
Goodland Renner Field	94.1	64.5	79.3	4.2	102	07/19	57	07/04	3.22	-0.32	91
Topeka Municipal Airport	97.8	74.6	86.2	7.8	106	07/27+	68	07/08	1.56	-2.27	41
Wichita Mid-Continent Airport	102.5	76.2	89.3	8.3	111	07/27+	68	07/04	1.45	-1.86	44

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	93.5	61.8	77.6	3.5	105	07/31	52	07/07	0.00	-2.11	0
Grand Island Airport	89.0	69.8	79.4	3.6	98	07/20+	63	07/02	4.37	1.23	139
Lincoln Municipal Airport	91.8	71.3	81.5	3.7	100	07/20+	63	07/04	1.55	-1.99	44
Omaha Eppley Airfield	90.1	73.8	81.9	5.2	100	07/20	67	07/04	3.33	-0.53	86
Norfolk Karl Stefan Airport	89.2	70.0	79.6	4.8	97	07/18	61	07/02	1.45	-2.29	39
North Platte Regional Airport	90.4	66.0	78.2	3.9	99	07/19+	58	07/07	3.45	0.28	109
Valentine Miller Field	91.3	65.2	78.3	4.5	103	07/19	55	04/02	3.08	-0.29	91

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	84.3	58.9	71.6	1.2	97	07/19	49	07/02	5.24	2.66	203
Fargo International Airport	85.2	63.9	74.5	3.9	95	07/19	55	07/13	4.35	1.47	151
Grand Forks International Airport	84.1	60.6	72.4	3.0	94	07/04	50	07/12	2.69	-0.37	88
Theodore Roosevelt Airport	82.8	56.9	69.9	0.5	96	07/19	48	07/02	2.44	0.33	116
Williston International Airport	85.0	58.1	71.6	2.3	99	07/19	46	07/02	2.34	0.06	103

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 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	87.0	66.0	76.5	4.3	100	07/19	58	07/11	6.63	3.71	227
Huron Regional Airport	89.0	68.1	78.5	5.2	100	07/19	59	07/06	3.49	0.63	122
Pierre Regional Airport	88.3	65.2	76.7	1.2	101	07/19	56	07/02	3.41	0.66	124
Rapid City Regional Airport	88.6	61.1	74.9	3.2	103	07/31	54	07/21	0.66	-1.37	33
Sioux Falls Joe Foss Field Airport	87.0	67.7	77.3	4.3	96	07/18	58	07/06+	5.76	2.83	197

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	90.5	55.6	73.1	3.1	98	07/25+	47	07/23	1.52	0.23	118
Cheyenne Municipal Airport	84.9	57.5	71.2	3.5	94	07/04	52	07/03	5.63	3.37	249
Lander Hunt Field Airport	89.4	57.4	73.3	2.4	97	07/25	50	07/01	0.07	-0.77	8
Laramie Regional Airport	82.4	50.2	66.3	3.1	89	07/25	44	07/07	1.17	-0.39	75
Rawlins Municipal Airport	85.2	51.9	68.6	0.7	93	07/25	43	07/16	1.18	0.28	131
Sheridan County Airport	89.7	55.1	72.4	3.6	100	07/25	47	07/21	0.50	-0.61	45

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>.

## Severe Weather Summary

July was a stormy month across the High Plains Region as severe weather was reported somewhere in the Region each day. Here is an overview of selected events:

- July 10: Tornadoes, high winds, and hail reported across southern North Dakota; according to the National Weather Service in Bismarck, the highest winds were estimated at 125 mph in Dickey County; damage occurred to homes, grain bins, power poles, and trees; a 200 foot radio station tower was destroyed; a large portion of the Oakes Airport hangar was destroyed; in addition, the high winds and hail destroyed thousands of acres of crops
- July 12: Large hail damaged aircraft at the Sky Harbor Air Service in Cheyenne, Wyoming; according to the *Wyoming Tribune Eagle*, the hail was 2-3 inches deep in places
- July 13: Large hail damaged aircraft at the Denver International Airport and caused numerous delays and cancellations; according to the *Denver Post*, this hail storm caused \$164.8 million in damages
- July 17: EF3 tornado in La Moure County, North Dakota caused significant damage to homes, outbuildings, power poles, and trees; according to the National Weather Service in Bismarck, only 1 injury was reported, however many farm animals were killed

### July 2011 - Storm Reports

July 2010 Totals in Parentheses

State	Tornado	Hail	Wind
Colorado	9 (3)	52 (59)	49 (42)
Kansas	1 (3)	33 (46)	182 (97)
Nebraska	3 (7)	64 (104)	126 (99)
North Dakota	41 (9)	79 (87)	105 (53)
South Dakota	5 (10)	102 (115)	153 (123)
Wyoming	4 (4)	43 (23)	29 (29)
<b>Total</b>	<b>63 (36)</b>	<b>373 (434)</b>	<b>644 (443)</b>



Oakes Municipal Airport - Photo courtesy Bismarck NWS Office

Storm report totals are preliminary and are provided by the NOAA Storm Prediction Center located in Norman, OK. For more information on storm reports and the Storm Prediction Center, please see: <http://www.spc.noaa.gov>.

## State Spotlight - North Dakota

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



### Precipitation:

Percent of normal precipitation ranged from approximately 40% to 230% (Figure 1. North Dakota State Climate Office). Below normal precipitation fell in the northwest and southwest corners and along the northern edge with above normal precipitation falling most elsewhere. The North Dakota Agricultural Weather Network (NDAWN) July rainfall totals ranged from 1.19 inches at Crosby to 10.14 inches at Britton SD. July had scattered thundershowers throughout the month. Most of the daily rainfall events happened during the second half of the month. Minot recorded it's third wettest July since 1948 with 5.58 inches. Minot's wettest July was in 1993 with 7.39 inches. Bismarck tied the 1969 record for the fourth wettest July since 1874 with 5.24 inches. Bismarck's wettest July was in 1993 with 13.75 inches.

### Temperature:

NDAWN July average air temperatures ranged from 68 °F to 76 °F. NDAWN departure from normal temperatures ranged from 0 °F to 5 °F (Figure 2. North Dakota State Climate Office). Average daily air temperatures were near normal on most days. July's favorable temperatures and precipitation aided crop development across the state. There was a stretch of hot and humid days from the 15th through the 19th. Maximum air temperatures across the state reached in the 80's and 90's. Minimum air temperatures on the 18th and 19th were in the upper 60's to 70's for most of the state. Fargo's July average minimum air temperature of 63.9 °F ranked 5th warmest since 1881. Grand Fork's July average minimum air temperature of 60.6 °F ranked 6th warmest since 1890.

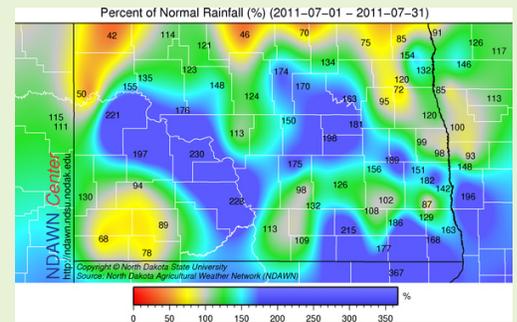


Figure 1. Percent of Normal Precipitation in July 2011 for North Dakota (North Dakota State Climate Office)

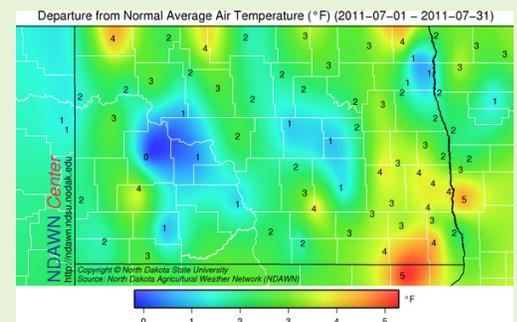


Figure 2. Temperature Departure from Normal in July 2011 for North Dakota (North Dakota State Climate Office)

## State Spotlight - South Dakota

Dennis Today - State Climatologist, Nathan Skadsen  
 South Dakota State Climate Office, South Dakota State University



### Synopsis

Very warm conditions with high dew points were the dominant feature during the month of July. The high heat indexes (reaching a peak of 125°F) made for very uncomfortable conditions across the whole state, focused mainly on the east, leading to cattle deaths and some potential crop issues. Precipitation was quite heavy in locations of the northeast, east central and central parts of the state. Dry conditions were not far away as the southeast experienced quite dry conditions along with areas around the Black Hills.

### Temperature

Average temperatures ranged from the low 70's Fahrenheit in northwestern South Dakota and the Black Hills to the low 80's in south central South Dakota. The highest average temperatures were recorded at Pickstown (81°F), Mitchell (80.8°F), and Vermillion 2SE (80.1°F). The highest temperature in the state, 106°F at Cottonwood 2E, was recorded on July 20th. The lowest average temperatures were recorded at Lead (69.5°F) and Pactola Dam (66.8°F). The lowest recorded temperature was 44°F on July 28th at the Sioux Falls Weather Forecast Office. For the first time this year, average temperatures across the state of South Dakota were all above normal. Many sites in eastern South Dakota experienced a departure from normal temperature greater than 5°F.

### Precipitation

During the month of July, precipitation across the state varied greatly with areas extreme northeastern and eastern South Dakota receiving more than 8 inches of precipitation while most of the rest of the state saw precipitation values less than 3 inches. A number of sites, including Timber Lake, McIntosh, Pierre, Highmore, Oelrichs, Eagle Butte, Takini, Caputa, and Gettysburg received less than an inch of precipitation. An automated station at Britton recorded the most precipitation with 10.1". Other sites in northeastern South Dakota recording more than 8" of precipitation include Columbia 1W, Victor 4NNE, and Roy Lake. These were all top 10 wettest July's. Murdo set a record for the wettest July at 7.26". A few locations came in top 20 driest. The Rapid City Airport was the 6th driest on record at 0.66".

### Agricultural Impacts

July conditions produced some contrasting influences across the state. The above average temperatures pushed along crop development, which was behind average from the cool-wet spring and early summer. Usually above average temperatures are not welcomed for corn particularly during July (when tasseling occurs). The additional development will help catch up some crop development. But the additional heat may have been taking some toll on yields. The additional heat may have reduced yield in some cases. The moist conditions likely helped reduce some stress. Areas of southeast South Dakota have started reporting some dryness impacts. While the northeast part of the state remained wet, as well as the area around Sioux Falls, locations just south received less than 2" of precipitation during the month. This led to some reports of firing of corn (<http://keloland.com/NewsDetail6162.cfm?Id=118801>). The excessive heat seen across the state of South Dakota for parts of July resulted in a number of cattle deaths across the state. As of July 22nd, the state veterinarian reported that about 1,700 head of cattle had died due to excessive heat and humidity. One individual rancher indicated a \$900,000 loss on cattle.

For more information about the South Dakota State Climate Office: <http://climate.sdstate.edu>

The SDSU's AWDN is a part of the High Plains Automated Weather Data Network (AWDN). Data are available through SDSU or the High Plains Regional Climate Center.

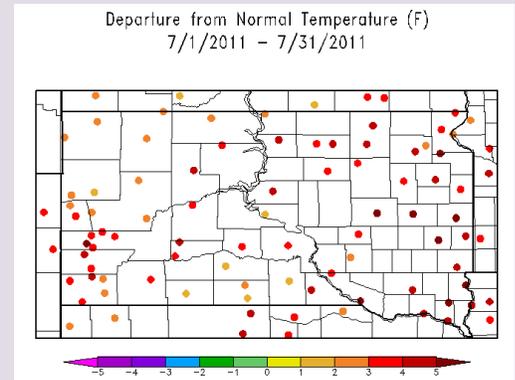


Figure 1. Departure from Normal Temperature in July 2011 for South Dakota (High Plains Regional Climate Center)

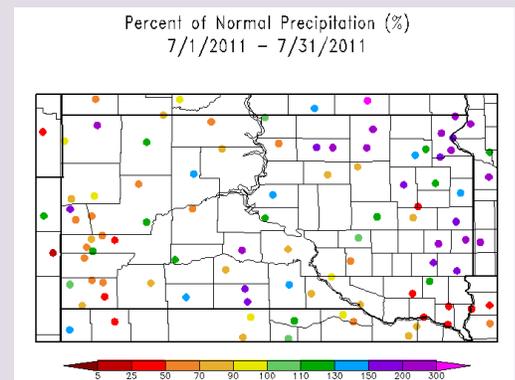


Figure 2. Percent of Normal Precipitation in July 2011 for South Dakota (High Plains Regional Climate Center)

# State Spotlight - South Dakota

Dennis Today - State Climatologist, Nathan Skadsen  
South Dakota State Climate Office, South Dakota State University



### Flooding Impacts

As the month of July progressed, the high water levels on the Missouri River continued to cause problems. With the high water freeing many logs and other debris, much of the river remained closed to boating and the power plant at Gavins Point Dam was unable to run at full capacity. The community of Chamberlain continued to fight record river levels as the dike protecting the city became damaged by the high water and waves. In the community of Dakota Dunes, work continued along the levee as residents were told that they should expect to be out of their homes until fall.

Flooding continued to be an issue in many other parts of the state. Residents near Waubay did not find any relief from flooding as the area received above average precipitation again this month. Some residents began to enroll in a FEMA program that provided funds to move buildings out of the flood plain. Near the community of Roscoe, SD, flooding continued to be a problem as water had nowhere to go. A stretch of U.S. Highway 12 east of Roscoe was once again closed as water washed away parts of the built up road. A one-mile section of SD Highway 48 near the South Dakota/Iowa border was closed due to flooding from the Big Sioux River.

### Severe Weather - Selected Events

**July 1st Severe Storms:** On July 1st, severe weather pushed through southeastern South Dakota causing significant damage to many communities. Among the hardest hit was the town of Flandreau. Throughout the community, trees were uprooted, roofs were torn off, and buildings were destroyed by strong straight-line winds. The damage included the Flandreau Indian School which had the roofs torn off of two of its buildings. Damage was not just contained to the community of Flandreau. The community of Elkton also saw damage to trees and property. Along Interstate 29, numerous campers and semi-truck trailers were tossed about by the strong winds. In the community of Madison, heavy rain caused significant street flooding. Many people were without power as nearly 100 utility poles owned by East River Electric Power Cooperative were knocked down.

**July 5th Heavy Rain:** The morning of July 5th saw residents of Aberdeen awake to flooded streets and basements after heavy rain the previous night. The storm sewer system in the town had a hard time keeping up with the run off resulting in city officials being forced to pump water from the wastewater treatment plant directly into Moccasin Creek. Residents of the community were asked to limit their water consumptions as the treatment plant began receiving nearly double the amount of water it could handle.

**July 14th – 20th Extreme Heat:** Between the dates of July 14th and 20th, the entire state of South Dakota experienced excessive heat and well above average temperatures. This heat, combined with large dew point values, produced heat index values reaching well into the 100s on the 19th and 20th. While the extreme heat did not result in any human deaths, a number of cattle across the state passed away due to the extreme heat resulting in the loss of thousands of dollars for cattle producers. Also, the extreme heat caused power outages in many communities including Sioux Falls and caused many roads to buckle. All of the sites across South Dakota saw temperatures reach above 90°F at least once during the seven day period. The highest temperature recorded was 106°F at Cottonwood 2E. A temperature of 105°F was recorded at Oral, Philip, and Kennebec. In addition to the high temperatures, high dew points were seen across the state as well. The highest dewpoint recorded during the seven day period was 83°F in Sisseton. Aberdeen, Pierre, Mobridge, and Watertown all saw dewpoints of 80°F or slightly above during the heat wave. The dew point at Mobridge was the highest ever at that station. There is not an official state record dew point. A local review from the Aberdeen NWS office indicated that Pierre had recorded a dew point of 84 F in July 2000. As mentioned above, the high temperature and humidity values led to heat index values that reached past 100°F. The greatest heat index value was recorded at Leola and was 125°F. Aberdeen and Milbank were not far behind with heat index values reaching 121°F and 120°F. In total, twenty-four locations in South Dakota reported heat index values above 100°F, with some locations reaching above 100°F on multiple occasions.

For more information about the South Dakota State Climate Office: <http://climate.sdstate.edu>

The SDSU's AWDN is a part of the High Plains Automated Weather Data Network (AWDN). Data are available through SDSU or the High Plains Regional Climate Center.

## State Spotlight - Wyoming

Steve Gray - State Climatologist  
 Wyoming State Climate Office, University of Wyoming



### Snowpack and Streamflow

The record snowpack of this season still lingers at the high elevations although most of the SnoTel sites have all but melted out. There are still roads in the Snowies that are closed and which may not open this year. Streamflow is well above normal for this time of the year with a few exceptions such as Dinwoody Creek and Bull Lake Creek in Fremont County and South Piney Creek in Johnson County. Of the sites in the National Weather Service's Advanced Hydrologic Prediction Service, only the North Platte River near Henry was still in the Action Stage at the end of July.

### Precipitation

The dryness that began last month continued and increased in July. There were exceptions in a few places, however, with the southwestern corner of the state receiving in excess of 150% of Normal precipitation. The northeast corner was likewise wetter than most of the state and received above average for the month. Casper and Worland also were between 110% and 130% of Normal. Rawlins, which broke its record precipitation amount for the 5th, was also above the Normal for the month. Many stations throughout the rest of the state, however, received less than 50% of Normal precipitation with several of these being under 25%.

There was one other exception to the dryness in Wyoming this month. This was the southeast corner of the state, specifically Laramie County, where precipitation there caused the most significant weather event of the month. An intense storm on the night of 12 July unleashed a total of 2.43" of precipitation on the Cheyenne station. 1.46" of that fell within a 45-minute period. The daily total of 2.43" for the 12th of July broke the previous record rainfall amount of 1.69" for that date, which was set in 1981.

There were four CoCoRaHS reports for the storm that ranged from 3.19" to 3.82". The hail accompanying the storm was reported to be up to 2" in diameter in places and caused significant damage. Initial damage estimates put the possible total at greater than \$25 million.

While dryness prevailed throughout much of Wyoming this month, Cheyenne's 5.63" total made it the second wettest July since records began in 1871. Only July of 1896, with 6.35", was wetter.

### Temperature

Temperatures across the state for July were at or above Normal for most stations with the exceptions being near Flaming Gorge and near the southern edge of Yellowstone Park. While a handful of stations reported July temperatures within a degree above Normal, the rest were 1-5°F above Normal with most falling in the range of 2-4°F above Normal.

According to the US Drought Monitor (<http://www.drought.unl.edu/dm/monitor.html>) Wyoming remained "drought free" again for the month of July. Since January 2000 there have been less than 10 months total when the state has enjoyed a similar US Drought Monitor status. Heading into August 2011 the focus has shifted from the potential of flooding to keeping a watch on the dryness that has started to take precedence in portions of the state.

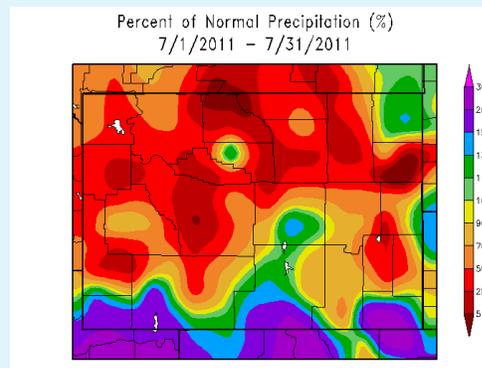


Figure 1. Map showing July 2011 precipitation as a percentage of historical averages (vs. 1971-2000 normal period) for Wyoming. Courtesy HPRCC.

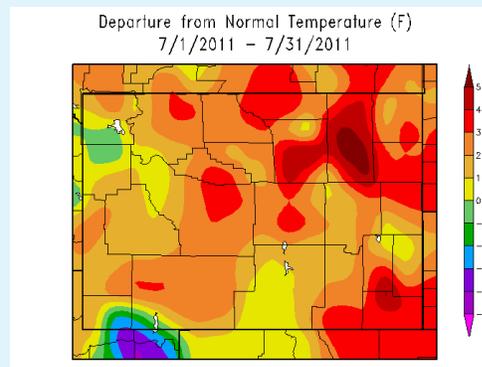


Figure 2. Map showing mean July 2011 temperatures from historical averages (vs. 1971-2000 normal period) for Wyoming. Courtesy HPRCC.

# 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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