



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



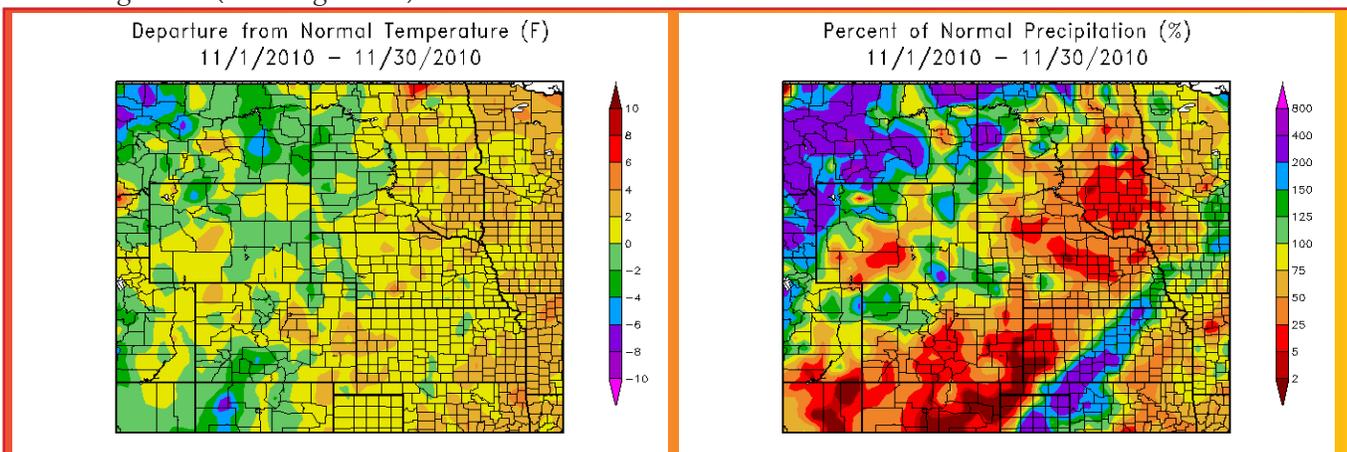
Rural eastern Nebraska - Photo by Ken Dewey
<http://www.nebraskaweatherphotos.org>

November 2010 Climate Summary

Region Breakdown

Average temperatures in November 2010 were generally near normal across the High Plains Region. Average temperatures which were up to 4 degrees F (2.2 degrees C) above normal occurred in central North Dakota, eastern South Dakota, eastern Kansas, and in isolated pockets of Nebraska, Colorado, and Wyoming. In central Colorado, several stations had average temperatures which were over 4 degrees F (2.2 degrees C) above normal; however this was not warm enough to even break into the top 10 warmest Novembers on record. Average temperatures were up to 4 degrees F (2.2 degrees C) below normal in southern Colorado, pockets of the western Dakotas, and the panhandle of Nebraska. In north-central Wyoming, average temperatures were up to 6 degrees F (3.3 degrees C) below normal and at least two locations ranked in the top 10 coolest Novembers on record.

After recording its 4th warmest October on record, Worland, WY recorded its 8th coolest November on record (period of record 1961-2010). The average temperature at Worland this month was 27.7 degrees F (-2.4 degrees C) which was 4.1 degrees F (2.3 degrees C) below normal. The coolest November on record occurred in 1985 with 15.8 degrees F (-9.0 degrees C).



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

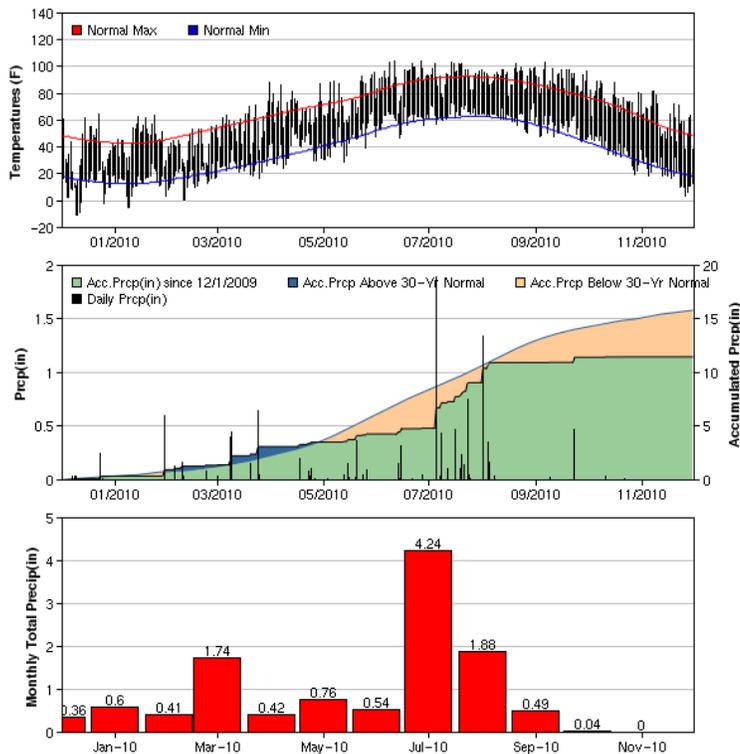
Precipitation Summary

November was drier than normal for most of the Region. Many locations across Colorado, western Kansas, central Nebraska, and eastern South Dakota received less than 25 percent of normal precipitation. In south-central Colorado, according to the U.S. Drought Monitor, ongoing dryness led to the development of severe drought conditions. Lamar, Colorado, located in southeastern Colorado on the Arkansas River, received no precipitation this month, which tied for the driest November on record (period of record 1893-2010). Also, by only receiving 0.53 inches (13 mm) of precipitation the past three months, Lamar recorded its 5th driest fall (September, October, and November) on record. The driest fall on record occurred in 1934 when no precipitation fell. The plots below (left) show the precipitation deficit for Lamar, Colorado. The accumulated precipitation below normal from December 1, 2009 to November 30, 2010 is in the tan shading. More graphs like this one may be found via the Station Search tool at: <http://www.hprcc.unl.edu/stations/>.

There were exceptions to the dryness in northwestern and southeastern Wyoming and a swath extending from south-central Kansas through southeastern Nebraska, where precipitation was 150 percent of normal or more. In Kansas, many locations ranked in the top 10 wettest Novembers on record. This month's wet spot was Ashland, Kansas which is located in the south-central portion of the state near the Oklahoma border. With 3.40 inches (86 mm) of precipitation, Ashland recorded its 7th wettest November on record (period of record 1900-2010). 2.36 inches (60 mm) of this precipitation fell on November 12 and set a new daily precipitation record. The previous record for that date was set in 1997 with 1.90 inches (48 mm) of precipitation.

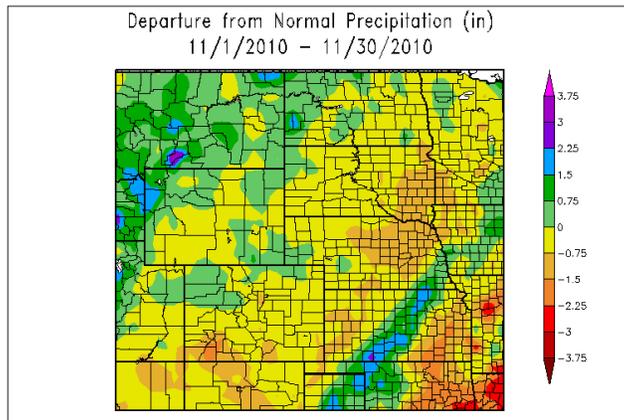
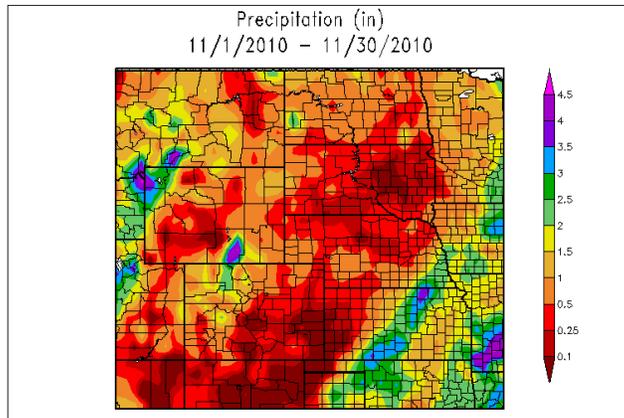
Snowfall in northwestern Colorado was a welcome sight as it helped alleviate abnormally dry conditions. Steamboat Springs, Colorado set its 8th snowiest November on record when it received 38.3 inches (97 cm) of snow this month (period of record 1893-2010). However, this was not nearly enough to beat the record 57.0 inches (145 cm) of snow that fell in November 1983.

LAMAR, 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

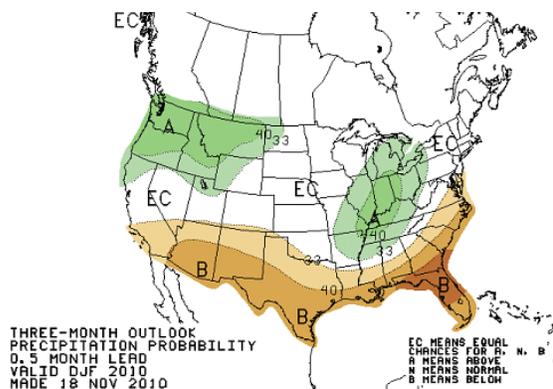
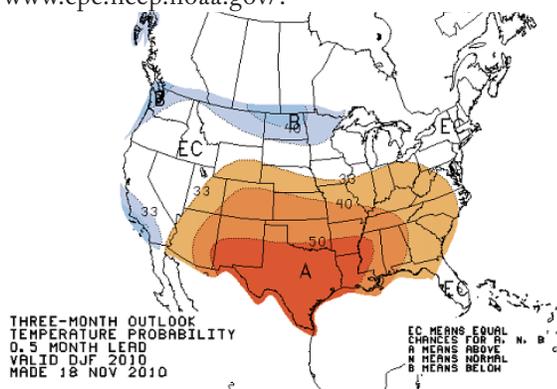


Above: Maximum, minimum, and normal temperatures, accumulated precipitation, and monthly total precipitation for Lamar, Colorado over the past year (top left). Total precipitation (inches) (top right) and Departure from Normal Precipitation (inches) (bottom right) for November 2010 in the High Plains 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>.

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

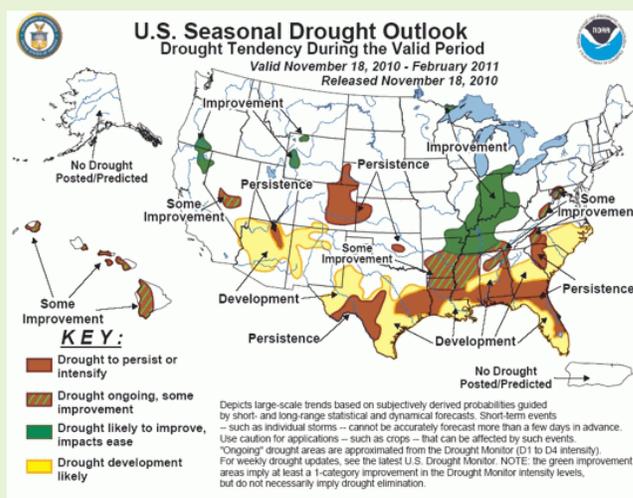
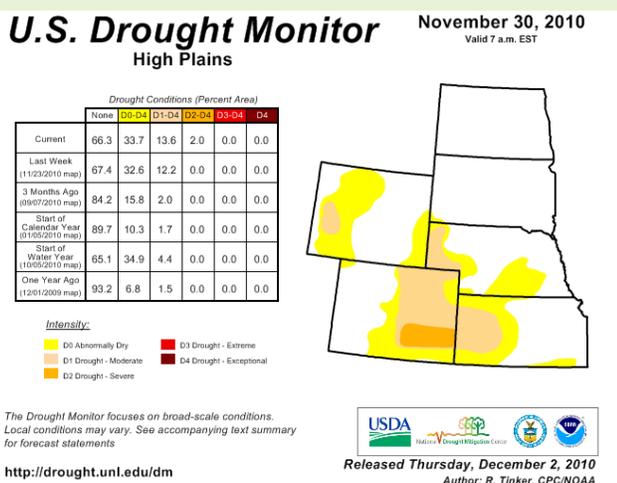
La Niña conditions were present across the equatorial Pacific this month and are expected to continue into spring 2011. The temperature outlook indicates a higher probability of above normal temperatures for Colorado, Kansas, most of Nebraska, and southern Wyoming. North Dakota and northern South Dakota have a higher probability of below normal temperatures. 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 western Wyoming and western North Dakota. Only southern Colorado has a higher probability of below normal precipitation. 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 cycle (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 showed both improvement and deterioration over the past month. Snowfall helped alleviate the moderate drought (D1) conditions in northern Wyoming and some of the abnormally dry conditions (D0) in western Colorado and northern and eastern Wyoming. However, D0 stretched into southeastern Kansas from Oklahoma and D1 spread from east-central Colorado to the east and into western Kansas. In addition, due to an ongoing lack of precipitation, severe drought conditions (D2) developed in southeast Colorado. According to the U.S. Seasonal Drought Outlook released November 18th, the D1 areas in western Wyoming were expected to improve and the drought areas in eastern Colorado, the panhandle of Nebraska, and far southeastern Wyoming were expected to persist through December 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 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	48.4	8.1	28.2	-0.1	65	11/06+	-8	11/30	0.02	-0.46	4
Akron Washington County Airport	49.7	24.7	37.2	0.5	76	11/06	4	11/25	0.43	-0.26	62
Colorado Springs Municipal Airport	52.6	23.6	38.1	1.9	74	11/06	3	11/25	0.07	-0.45	13
Grand Junction Walker Field Airport	50.2	27.9	39.0	0.9	69	11/03	8	11/25	0.45	-0.26	63
Pueblo Memorial Airport	57.4	18.8	38.1	-0.3	79	11/08	0	11/25	0.20	-0.38	34

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	52.4	30.6	41.5	0.7	73	11/07	15	11/25	2.91	1.46	201
Dodge City Regional Airport	56.7	29.1	42.9	0.5	80	11/07	13	11/26	1.27	0.26	126
Goodland Renner Field	54.0	23.0	38.5	1.1	81	11/06	6	11/25	0.17	-0.65	21
Topeka Municipal Airport	57.4	32.8	45.1	2.5	75	11/07	15	11/26	1.23	-1.08	53
Wichita Mid-Continent Airport	58.7	34.2	46.4	2.2	75	11/07	19	11/26	1.24	-0.58	68

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	47.8	17.6	32.7	-1.0	78	11/06	-11	11/23	0.01	-0.56	2
Grand Island Airport	50.1	25.8	37.9	1.5	79	11/08	6	11/25	0.44	-0.97	31
Lincoln Municipal Airport	51.2	27.1	39.1	1.0	74	11/08+	13	11/25+	1.97	0.39	125
Omaha Eppley Airfield	50.5	29.2	39.9	1.9	74	11/07	13	11/25	2.38	0.56	131
Norfolk Karl Stefan Airport	48.4	25.1	36.8	1.6	80	11/08	1	11/25	0.36	-1.08	25
North Platte Regional Airport	49.6	20.0	34.8	0.2	79	11/06	3	11/25	0.62	-0.14	82
Valentine Miller Field	48.4	19.6	34.0	1.0	82	11/07+	-8	11/25	0.15	-0.57	21

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	38.8	17.9	28.4	0.4	73	11/06	-16	11/23	0.75	0.05	107
Fargo International Airport	38.3	20.1	29.2	2.2	66	11/09	-8	11/23	0.73	-0.33	69
Grand Forks International Airport	35.8	17.4	26.6	0.8	61	11/09+	-13	11/27	0.58	-0.41	59
Theodore Roosevelt Airport	38.1	17.6	27.9	-1.1	73	11/06	-12	11/25+	0.33	-0.26	56
Williston International Airport	35.9	16.0	26.0	0.4	69	11/06	-15	11/23	1.20	0.55	185

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>.

November 2010 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	41.9	19.0	30.5	1.2	70	11/08	-6	11/25+	0.12	-0.63	16
Huron Regional Airport	43.8	22.9	33.4	2.1	71	11/08	0	11/25	0.07	-0.82	8
Pierre Regional Airport	44.2	22.5	33.3	0.0	71	11/06	-2	11/24	0.16	-0.54	23
Rapid City Regional Airport	44.1	19.3	31.7	-1.7	79	11/06	-11	11/23	0.42	-0.19	69
Sioux Falls Joe Foss Field Airport	43.6	24.2	33.9	2.6	71	11/08	2	11/25	0.47	-0.89	35

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	43.1	19.7	31.4	-0.6	71	11/06	-10	11/24	0.85	0.03	104
Cheyenne Municipal Airport	45.2	22.1	33.7	0.4	73	11/06	6	11/25	0.71	0.07	111
Lander Hunt Field Airport	44.4	21.0	32.7	2.4	70	11/06	-1	11/25	0.75	-0.24	76
Laramie Regional Airport	40.1	16.3	28.2	-0.2	66	11/06	-3	11/25	0.39	-0.25	61
Rawlins Municipal Airport	39.6	20.4	30.0	-1.5	66	11/09	-3	11/24	0.22	-0.43	34
Sheridan County Airport	41.9	17.5	29.7	-1.3	76	11/05	-17	11/24	0.52	-0.28	65

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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:

November's percent of normal precipitation ranged from roughly 25% to 300% of normal (Figure 1. High Plains Regional Climate Center). Most of the eastern part of the state and parts of the west central and southwestern part of the state had below normal precipitation. Most of the highest amounts fell along the western edge and north central regions. Precipitation amounts ranged from about 0.15 inches to 2.5 inches. Warm, dry weather stretched from the 1st through the 9th of November across the state. Light snow fell from the 10th through the 11th in western ND. The following days from the 12th through the 16th were relatively dry with scattered pockets of light snow. Western ND had snowfall on the 17th and 18th. On the 19th, snow fell across the upper northern part of the state and the 20th had snowfall in the southwest corner. A major storm system from the 21st through the 26th brought snowfall across the state with blowing snow and some areas receiving freezing drizzle. The storm system caused hazardous travel for many on the Thanksgiving holiday. Fargo was caught in a small band of heavy snow and received a record 12.6 inches on the 22nd. Following the 26th was a quiet two days but another state wide snowstorm on the 29th and 30th caused snow and blowing snow with wind gusts of 40 mph.

Temperature:

The North Dakota Agricultural Weather Network (NDAWN) November average air temperatures ranged from 24°F to 30°F. NDAWN departure from normal temperatures ranged from -2°F to 3°F (Figure 2. North Dakota State Climate Office). The eastern half of the state had above normal average temperatures and the western half had normal to slightly below normal average air temperatures. State wide above normal daily average air temperatures were enjoyed from the 1st through the 9th of November. Bismarck had a record high temperature of 73°F on the 6th. Grand Forks Airport and Fargo Airport had record high temperatures on the 9th of 61°F and 66°F, respectively. Average temperatures then hovered at near normal from the 10th through the 18th. From the 20th through the 25th average air temperatures for most were 10°F to 20°F below normal. The 26th through the 30th had below normal or near normal average air temperatures for most areas.

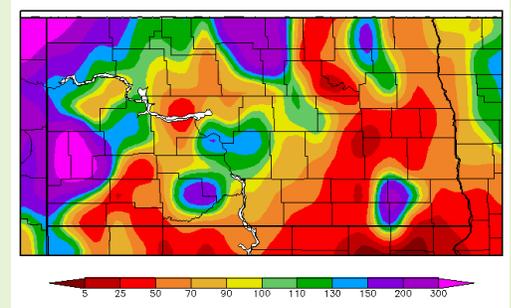


Figure 1. Percent of Normal Precipitation in November 2010 for North Dakota (High Plains Regional Climate Center)

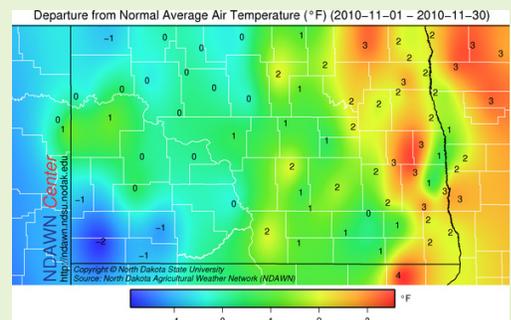


Figure 2. Temperature Departure from Normal in November 2010 for North Dakota (North Dakota State Climate Office)

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).

State Spotlight - Wyoming

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



November 2010 was marked by a series of strong snowstorms that brought significant precipitation to many high-elevation locations across Wyoming. Heavy snowfall totals were especially prominent in the northwestern corner of the state, but the Sierra Madre and Medicine Bow Mountains along the southeastern border of Wyoming also received significant precipitation. Much of this snowfall resulted from storms in the last two weeks of the month, and precipitation was often accompanied by high winds and frigid temperatures. Over the period from November 19 through 21, for example, multiple locations in Park and Teton counties in northwestern Wyoming received > 10 inches of snow. Locations in Yellowstone National Park were particularly hard hit on these days, with some stations reporting >20" accumulations. Snowfall continued through Thanksgiving, with locations around Jackson and Afton seeing an additional 15-20" by the 25th. In the southeastern mountains, some end-of-month precipitation totals exceeded 200% of historical average for the month.

Based on reports from NRCS-SNOTEL sites, most drainages in Wyoming were at or above historical average snowpack for this time of year. Of particular note was the Bear River basin in southwestern Wyoming, which reported >160% of historical average snowpack for end of November. A handful of SNOTEL sites in or near the Bear River basin reported snow water equivalent (SWE) values in the top 95th percentile of all historical observations. Similarly, two SNOTEL sites in the North Platte drainage fell within the top 95th percentile for end-of-month SWE. On the dry end of the spectrum, the Belle Fourche basin in the northeastern corner of the state showed only 73% of average snowpack. However, a shortage of monitoring sites and the relatively low elevations of its associated mountain ranges makes tracking early-season snowpack especially difficult in the Belle Fourche.

In contrast, many low-elevation sites experienced precipitation deficits for the month. Locations in southwestern Wyoming's Green River Basin generally reported < 60 % of historical average precipitation for November. Likewise, the Powder and Tongue River basins in the northeast corner of the state were relatively dry for the month. While this lowland dryness calls for vigilance, it should also be noted that historically November tends to be one of the driest months in many basin and valley locations. At the same time, large snowfall totals this early in the water year (i.e., October through September) are relatively poor predictors of spring and summer runoff.

In terms of temperatures averaged across the entire month, November brought conditions near historical norms. However, the first and second halves of the month were marked by very different temperature patterns. Early November was often warm, with several days being unusually so. Cheyenne, for example, experienced a record high of 73° F on November 6. The last two weeks of the month featured bitter cold in some cases, with average daily temperatures generally 5-10° F below historical values.

Finally, in its 3-month seasonal outlooks, the NOAA Climate Prediction Center is reporting an elevated probability of wetter-than-average conditions to continue in northwestern Wyoming (<http://www.cpc.noaa.gov/index.php>). This outlook is predicated on the presence of strong La Niña conditions in the Tropical Pacific. Such unusually cold waters along the equator have often brought greater-than-average snowpack to western Wyoming mountains. The connection between activity in Tropical Pacific and winter conditions becomes more tenuous heading into eastern and southern portions of the state, but La Niña may also bring warm and dry conditions to other Wyoming mountain ranges. In any case, the state's runoff picture for the coming year may depend, in large part, on the strength and persistence of the present La Niña event.

This report was prepared by the Wyoming State Climate Office, which is a division of the Wyoming Water Resources Data System at the University of Wyoming. More information can be found at: <http://www.wrds.uwyo.edu> and http://www.wrds.uwyo.edu/sco/climate_office.html. Special thanks to the National Weather Service's Cheyenne and Riverton Offices for supplying much of the data used in this report.

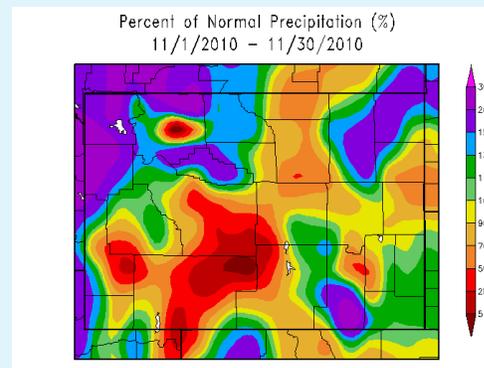


Figure 1. Map showing November 2010 precipitation as a percentage of historical averages (vs. 1971-2000 normal period) for Wyoming. Courtesy HPRCC.

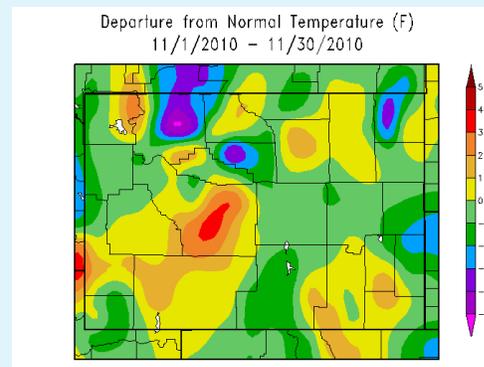


Figure 2. Map showing mean November 2010 temperatures from historical averages (vs. 1971-2000 normal period) for Wyoming. Courtesy HPRCC.

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

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

