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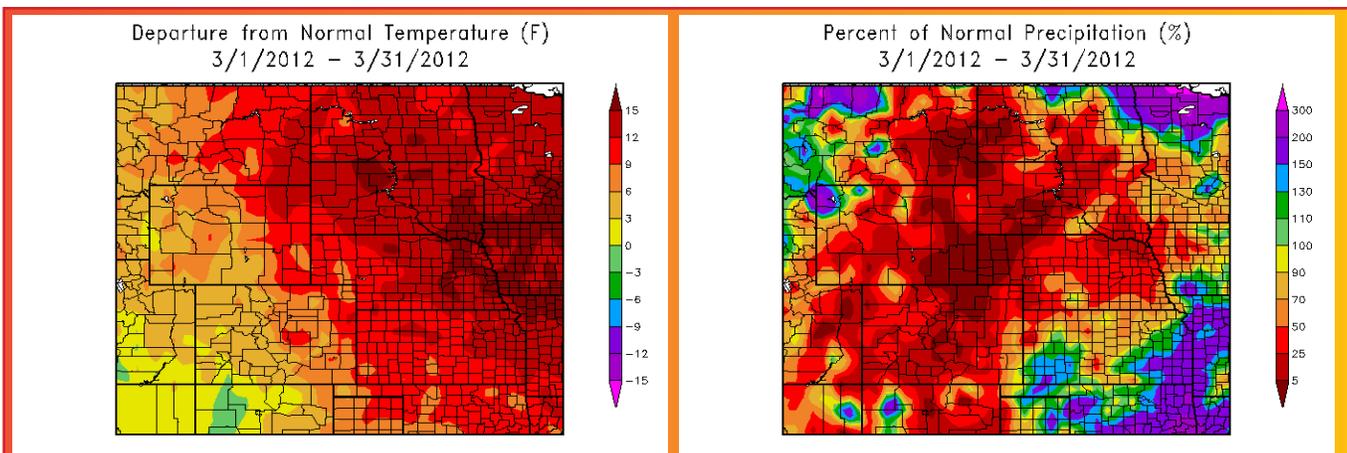
Lilacs blooming early in Lincoln, Nebraska - Photo by Holly Lussenden
<http://hprcc.unl.edu>

March 2012 Climate Summary

Region Breakdown

The High Plains Region was extremely warm and dry this month. On many days, temperatures were so warm across the Region it felt more like summer than early spring. Based on preliminary data, every station in the Region had above normal temperatures. Monthly temperature departures of 9.0-15.0 degrees F (5.0-8.3 degrees C) above normal were widespread, especially in the eastern portion of the Region. Average monthly temperature records were broken in locations in each state in the Region and most locations beat records that had been in place for over 100 years. For instance, Lincoln, Nebraska had an average temperature of 55.0 degrees F (12.8 degrees C), which was 15.6 degrees F (8.7 degrees C) above normal. Interestingly, this was also 3.8 degrees F (2.1 degrees C) above the April monthly normal temperature! The old March record of 53.4 degrees F (11.9 degrees C) occurred back in 1910 (period of record 1887-2012). For more monthly rankings, please see page 5.

In addition to setting monthly records, over 1,500 daily temperature records were tied or broken in the High Plains Region alone! The extended period of unseasonable warmth led to impressive records, a few of which are highlighted below. In North Dakota, some records were absolutely crushed. On March 16th, Bismarck, North Dakota had a record high of 81.0 degrees F (27.2 degrees C), which was 17.0 degrees F (9.4 degrees C) above the old



Departure from 1971-2000 Normal Average Temperature (left) and Percent of Normal Precipitation (right) for March 2012 in the High Plains Region. Maps produced by High Plains Regional Climate Center. Available at: <http://hprcc.unl.edu/maps/current>

March 2012 Climate Summary

record of 64.0 degrees F (17.8 degrees C), set in both 1894 and 1981 (period of record 1874-2012). Omaha, Nebraska reached 91.0 degrees F (32.8 degrees C) on March 31st which tied the record for the warmest temperature ever recorded in March (period of record 1871-2012). Minimum temperature records were also broken this month. For example, on March 18th, Fargo, North Dakota had a minimum temperature of 60.0 degrees F (15.6 degrees C), which was 40.0 degrees F (22.2 degrees C) above normal (period of record 1881-2012). The old record of 41.0 degrees F (5.0 degrees C) was smashed!

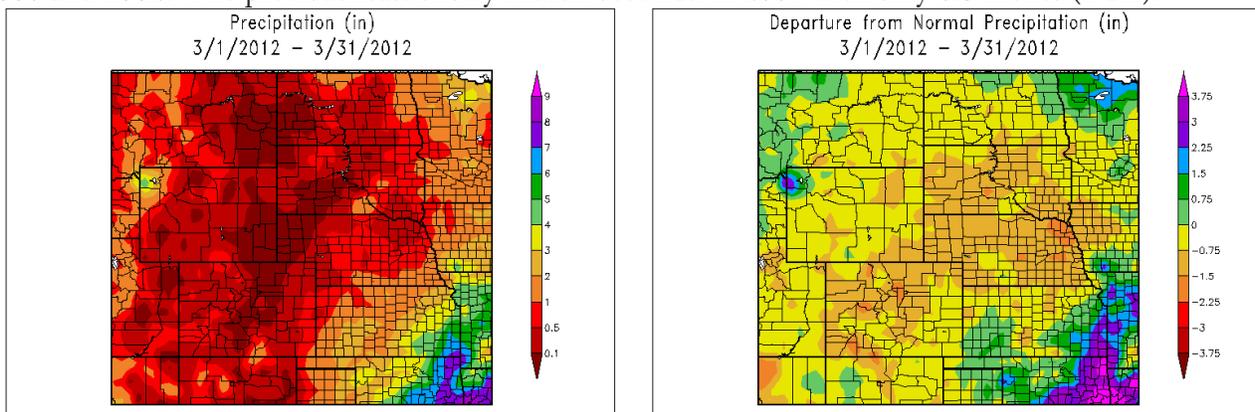
Impacts of the unprecedented warmth were varied. The warm weather allowed for a quick and very early green-up in some parts. The last freeze of the month in many locations in Nebraska and Kansas occurred on March 9th/10th. This left many wondering about the chances of another spring freeze. If the average last spring freeze dates of mid-April to early-May are any indication, these locations will likely experience another freeze. The warm and dry conditions this month even forced some ski resorts in Colorado to close early, according to the *Colorado Springs Gazette*. There were many reasons for the record warmth this month, including strong southerly winds, a lack of snowpack to the north, a jet stream pattern which kept the cold Arctic air north of the Region, and a positive North Atlantic Oscillation (NAO). When the NAO is positive, areas to the east of the Rockies are typically warmer than normal.

For a more details about the warm March, see www.esrl.gov/psd/csi/events/2012/marchheatwave/index.html.

Precipitation Summary

Overall, March 2012 was a dry month across the High Plains Region. A large area of the Region received less than 50 percent of normal precipitation including large areas of Colorado, Nebraska, South Dakota, and Wyoming. A swath extending from northern Colorado into eastern Wyoming, the panhandle of Nebraska, and southern South Dakota received only 5 percent or less of normal precipitation. The only exceptions were parts of southern Kansas and northern North Dakota which received 150 of normal precipitation.

Many locations in Colorado, Nebraska, South Dakota, and Wyoming ranked in the top 10 driest and least snowiest Marches on record. The dry conditions were quite unusual in some parts of Colorado and Wyoming where March is typically the snowiest month of the year. One impressive example of the lack of snowfall occurred in Winter Park, Colorado which only received 5.0 inches (13 cm) of snow this month. This snowfall total was 28.5 inches (72 cm) below normal and easily beat the old 2002 record of 11.0 inches (28 cm) of snowfall (period of record 1942-2012)! Many locations that typically receive snowfall in March actually received none, including Boulder, Colorado, Denver, Colorado, and Cheyenne, Wyoming. Interestingly, in Cheyenne, Wyoming, not a single March had gone by, since records began in 1871, without a measureable amount of snowfall – until this March. Cheyenne received no measureable precipitation or snowfall this month making this the driest and least snowiest March on record (period of record 1871-2012). The previous record of 0.06 inches (2 mm) of liquid precipitation occurred in both 1880 and 1882. The previous least snowy March occurred in 2004 with only 0.3 inches (1 cm).



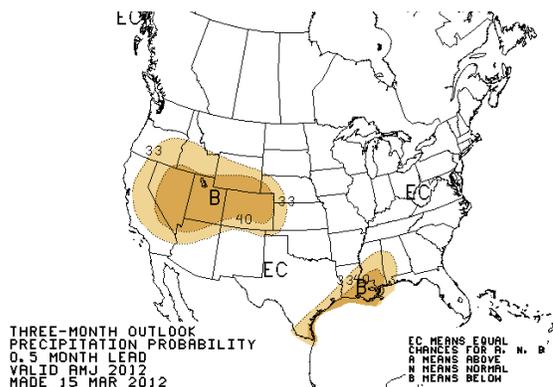
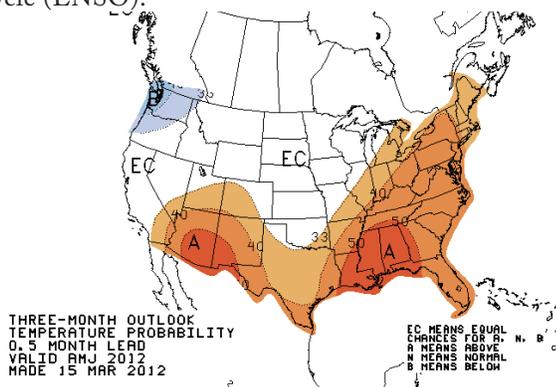
Above: Total precipitation (inches) (left) and Departure from Normal Precipitation (inches) (right) for March 2012 in the High Plains Region. These maps are produced by HPRCC and can be found on the Current Climate Summary Maps page at: <http://hprcc.unl.edu/maps/current>.

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 weakening in the equatorial Pacific and are expected to transition to neutral conditions by the end of April. The temperature outlook indicates a higher probability of above normal temperatures for roughly the southwestern half of Colorado and there are no enhanced probabilities for below normal temperatures. The precipitation outlook indicates a higher probability of below normal precipitation for Colorado, the majority of Wyoming, western Kansas, and western Nebraska. 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

There were many changes to the U.S. Drought Monitor this month. The extreme drought conditions (D3) in southwestern Kansas and extreme southeastern Colorado were nearly entirely downgraded to severe drought conditions (D2). Only a small sliver of D3 remained near the Kansas/Colorado border. Eastern Kansas also had improvements as above normal precipitation led to the erasure of all drought conditions in the eastern half of the state. By the end of the month, only a small area of abnormally dry conditions (D0) remained. Other areas that had improvements included north-central North Dakota, where part of the D0 area was eliminated, eastern South Dakota where the D2 area was trimmed, and northeastern Nebraska and west-central Colorado where moderate drought conditions (D1) were downgraded to D0. While many areas had improvements, other had degradations. A large area of D1 was introduced in western South Dakota and a small area of D2 developed in northwest Colorado. In addition, D0 expanded to include northwestern Kansas, northeastern Colorado, and most of the panhandle of Nebraska. According to the U.S. Seasonal Drought outlook, drought conditions were expected to improve in Kansas and the Dakotas. Drought conditions in Colorado were expected to persist or develop.

U.S. Drought Monitor

High Plains

March 27, 2012
Valid 7 a.m. EST

	Drought Conditions (Percent Area)						
	Note	D0-D4	D1-D4	D2-D4	D3-D4	D4	
Current		39.82	60.18	19.85	4.02	0.09	0.00
Last Week (03/20/2012 map)		42.85	57.15	20.23	4.68	1.44	0.04
3 Months Ago (12/27/2011 map)		61.66	38.34	18.12	7.22	2.07	0.04
Start of Calendar Year (12/27/2011 map)		61.66	38.34	18.12	7.22	2.07	0.04
Start of Water Year (09/27/2011 map)		70.09	29.91	17.44	11.97	6.22	2.96
One Year Ago (03/22/2011 map)		62.73	37.27	16.67	9.67	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://droughtmonitor.unl.edu>

Released Thursday, March 29, 2012
Eric Luebchen, USDA

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period
Valid for March 15 - June 30, 2012
Released March 15, 2012

KEY:

- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely
- Improvement
- Development
- 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	58.9	15.8	37.4	4.7	76	03/31	-2	03/03	0.10	-0.36	22
Akron Washington County Airport	63.6	33.2	48.4	9.4	81	03/26	17	03/08	0.11	-0.93	11
Colorado Springs Municipal Airport	63.7	32.3	48.0	10.2	78	03/31	9	03/03	0.06	-1.00	6
Grand Junction Walker Field Airport	63.0	33.2	48.1	4.7	80	03/31	15	03/03	0.20	-0.80	20
Pueblo Memorial Airport	68.1	29.3	48.7	6.9	84	03/31	1	03/03	0.11	-0.86	11

Kansas	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Concordia Municipal Airport	70.1	43.1	56.6	14.1	87	03/31	20	03/03	1.61	-0.74	69
Dodge City Regional Airport	68.7	39.7	54.2	9.9	84	03/16	19	03/03	2.67	0.83	145
Goodland Renner Field	68.2	33.3	50.7	10.9	85	03/17	16	03/03	0.60	-0.60	50
Topeka Municipal Airport	71.2	47.5	59.3	15.1	85	03/31	26	03/09+	3.46	0.90	135
Wichita Mid-Continent Airport	69.5	46.4	57.9	12.0	81	03/31+	26	03/03	4.03	1.32	149

Nebraska	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Chadron Municipal Airport	67.5	29.2	48.3	12.1	83	03/31+	17	03/09+	0.00	-0.91	0
Grand Island Airport	69.2	39.0	54.1	15.8	88	03/31	21	03/03	0.83	-1.21	41
Lincoln Municipal Airport	69.5	40.4	55.0	15.6	91	03/31	18	03/01	0.89	-1.32	40
Omaha Eppley Airfield	69.1	43.8	56.4	17.1	91	03/31	22	03/05	1.12	-1.01	53
Norfolk Karl Stefan Airport	68.1	38.0	53.0	16.0	88	03/31	19	03/05	0.58	-1.39	29
North Platte Regional Airport	69.2	30.4	49.8	11.8	86	03/31+	13	03/08	0.82	-0.42	66
Valentine Miller Field	65.2	32.5	48.9	13.6	87	03/26	6	03/03	0.31	-0.80	28

North Dakota	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	% Norm
Bismark Municipal Airport	58.0	28.5	43.2	13.5	81	03/16	12	03/03	0.53	-0.32	62
Fargo International Airport	52.9	30.3	41.6	14.4	78	03/18	-5	03/04	0.78	-0.39	67
Grand Forks International Airport	49.4	26.7	38.0	12.3	74	03/19+	-8	03/04	1.79	0.90	201
Theodore Roosevelt Airport	59.8	27.8	43.8	13.4	79	03/18	4	03/03	0.04	-0.65	6
Williston International Airport	56.4	25.9	41.2	12.5	77	03/16	-4	03/03	0.10	-0.64	14

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>.

March 2012 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	57.9	29.6	43.8	13.1	85	03/19	6	03/05+	0.38	-0.96	28
Huron Regional Airport	61.7	34.5	48.1	15.5	88	03/18	12	03/03+	0.99	-0.68	59
Pierre Regional Airport	62.9	33.7	48.3	13.6	88	03/18	14	03/01	0.09	-1.10	8
Rapid City Regional Airport	64.6	30.5	47.6	12.7	83	03/03	13	03/02	0.05	-0.98	5
Sioux Falls Joe Foss Field Airport	63.5	36.1	49.8	17.2	85	03/18	15	03/04+	0.77	-1.04	43

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	58.7	29.4	44.1	9.1	77	03/31	9	03/02	0.33	-0.57	37
Cheyenne Municipal Airport	59.4	29.8	44.6	10.4	74	03/31+	12	03/08+	0.00	-1.05	0
Lander Hunt Field Airport	58.9	29.5	44.2	8.7	76	03/31	13	03/08	0.36	-0.88	29
Laramie Regional Airport	53.7	23.7	38.7	8.7	71	03/31+	3	03/02	0.00	-0.79	0
Rawlins Municipal Airport	53.6	25.3	39.4	5.6	73	03/31	6	03/02	0.07	-0.58	11
Sheridan County Airport	61.8	29.2	45.5	10.2	80	03/31	12	03/07	0.54	-0.46	54

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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>.

March 2012 Temperature Records - Highlights

Seasonal Records			
Temperature in degrees F			
Location	New Record	Previous Record/Year	Period of Record
Colorado Springs, CO	48.0	47.4/1910	1894-2012
Concordia, KS	56.6	55.6/1910	1885-2012
Goodland, KS	50.7	48.8/1907	1895-2012
Topeka, KS	59.3	57.2/1910	1887-2012
Grand Island, NE	54.1	52.7/1910	1895-2012
Lincoln, NE	55.0	53.4/1910	1887-2012
Norfolk, NE	53.0	50.5/1910	1893-2012
Omaha, NE	56.4	54.5/1910	1871-2012
Bismarck, ND	43.2	tie/1910	1874-2012
Fargo, ND	41.6	40.9/1910	1881-2012
Grand Forks, ND	38.0	35.4/1973	1893-2012
Huron, SD	48.1	40.7/1946	1881-2012
Rapid City, SD	47.6	44.3/2007	1942-2012
Sioux Falls, SD	49.8	49.2/1910	1893-2012
Casper, WY	44.1	42.8/1986	1939-2012
Cheyenne, WY	44.6	44.4/1910	1872-2012
Lander, WY	44.2	44.1/1986	1891-2012
Sheridan, WY	45.5	45.2/1910	1907-2012

All Data are Preliminary and Subject to Change.

* indicates multiple records, latest year is listed

Source: National Weather Service Cooperative Observation Network Data

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) March percent of normal precipitation was less than 50% for most of North Dakota including western, southern, and east central regions (Figure 1. High Plains Regional Climate Center). The driest regions of less than 5% to 25% fell mostly west of the Missouri River plus parts of Emmons, McIntosh, Logan, Kidder and Dickey Counties. The highest amounts of 150% to 200% fell in the north central and northeast corner. According to the National Weather Service, a snow storm on the 1st through the 3rd produced up to 6 inches of snow in the northeast. The remainder of the months precipitation fell primarily as rain with the heaviest amounts falling in the central region with up to 6 tenths of an inch. The USDA, National Agricultural Statistics Service, North Dakota Field Office reported that there was nearly no snow cover on March 25th. The US Drought Monitor March 27, 2012 report had abnormally dry conditions for most of the state. The report listed the north central with no drought conditions and the northeast with severe dry conditions.

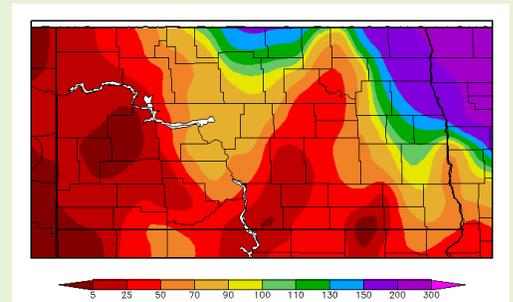


Figure 1. Percent of Normal Precipitation in March 2012 for North Dakota (High Plains Regional Climate Center)

Temperature:

NDAWN March monthly average air temperatures ranged from 35 °F to 45 °F. NDAWN departure from normal average temperatures were above normal across the state and ranged from 12 °F to 16 °F (Figure 2. North Dakota State Climate Office). Daily average air temperatures were primarily below normal at most locations for the first nine days of March. The remainder of the month had above normal to far above normal average air temperatures. The National Weather Service from the 10th through the 23rd recorded breaking a maximum air temperature and/or a high minimum air temperature at several locations nearly every day. According to the Applied Climate Information System (ACIS), the Grand Forks International Airport had the warmest March on record with an average air temperature of 38.0 °F which broke the previous record of 35.4 °F set in 1973. Fargo also had the warmest average air temperature for March with 41.6 °F breaking the previous record of 36.0 °F set in 1973. Bismarck tied the 1910 warmest March average air temperature with 43.2 °F.

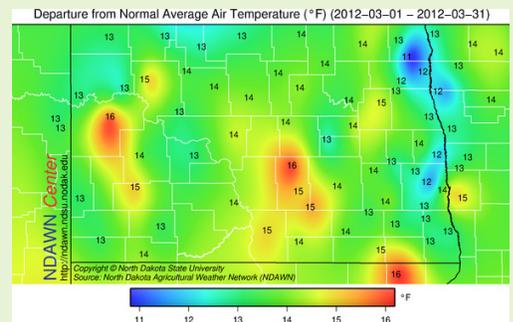


Figure 2. Temperature Departure from Normal in March 2012 for North Dakota (North Dakota State Climate Office)

State Spotlight - Wyoming

Tony Bergantino - Assistant State Climatologist
Wyoming State Climate Office, University of Wyoming



Snowpack

With the exception of the extreme northwest part of the state (Madison-Gallatin and Yellowstone basins) snowpack declined statewide in March. Some basins lost only a few percentage points compared to normal, but the northeastern basins like the Powder, Tongue, Belle Fourche, and Cheyenne a significant amount. In the south central part of the state, the Little Snake went from 84% to 53%. At the end of the month, the following table represents the conditions for the state.

Basin	%Normal	Basin	%Normal
Snake	89	Upper North Platte	59
Madison-Gallatin	98	Sweetwater	71
Yellowstone	95	Lower North Platte	89
Wind	77	Laramie	64
Bighorn	96	South Platte	76
Shoshone	94	Little Snake	53
Powder	87	Upper Green	84
Tongue	92	Lower Green	70
Belle Fourche	*	Upper Bear	62
Cheyenne	5		

Precipitation

Dry was the order of the month for most of Wyoming. The southeast, especially, saw very little precipitation with several stations reporting 0" or T for the entire month. There were a few exceptions in the northwest quarter of the state, but even there many stations reported monthly totals that were less than 50 percent of Normal. Exceptions to this were Clark and Powell in Park County, Ten Sleep in Washakie County, and Old Faithful and Lake Yellowstone in Yellowstone National Park.

Temperature

Going with the dryness, warmth spread over all of the state in March and, without exception, all stations reported average monthly temperatures that were above normal. Afton in Lincoln County was the lowest in the state with respect to its normal and, even that, was slightly above. The northeast part of the state was the highest above normal with some stations greater than 10°F above normal. Going to the southwest and west the temperatures generally lessened but still remained 5°F above normal.

The D0 (Abnormally Dry) category introduced to the southern and southwest portion of the state as well as the northeastern corner of Crook County remained in place during March. The D0 portion was extended across southern Carbon County and a little ways into southwestern Albany County. A small section of D0 was introduced to the very northern part of Campbell County as well as a small section in eastern Niobrara County and the southeast part of Laramie County. The D1 (Moderate Drought) in southeast Sweetwater/southwest Carbon counties remained as well, although the D2 (Severe Drought) that was introduced to the extreme southwest corner of Uinta county on 21 February was removed. Following the very dry and warm March, look to see D0 begin to emerge in the eastern tiers of counties from Colorado up to the Montana border.

This report was prepared by the Wyoming State Climate Office, which is part 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 Riverton and Cheyenne Offices and the NRCS Casper Office for supplying much of the data and information used in this report.

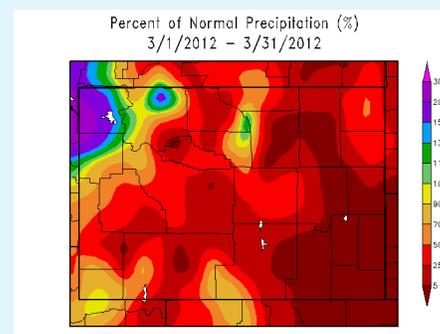


Figure 1. Map showing March 2012 precipitation as a percentage of historical averages (vs. 1971-2000 normal period) for Wyoming. Courtesy HPRCC.

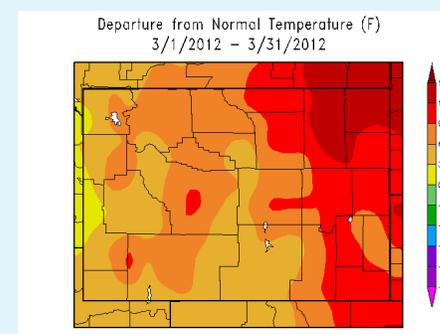


Figure 2. Map showing mean March 2012 temperatures from historical averages (vs. 1971-2000 normal period) for Wyoming. Courtesy HPRCC.

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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