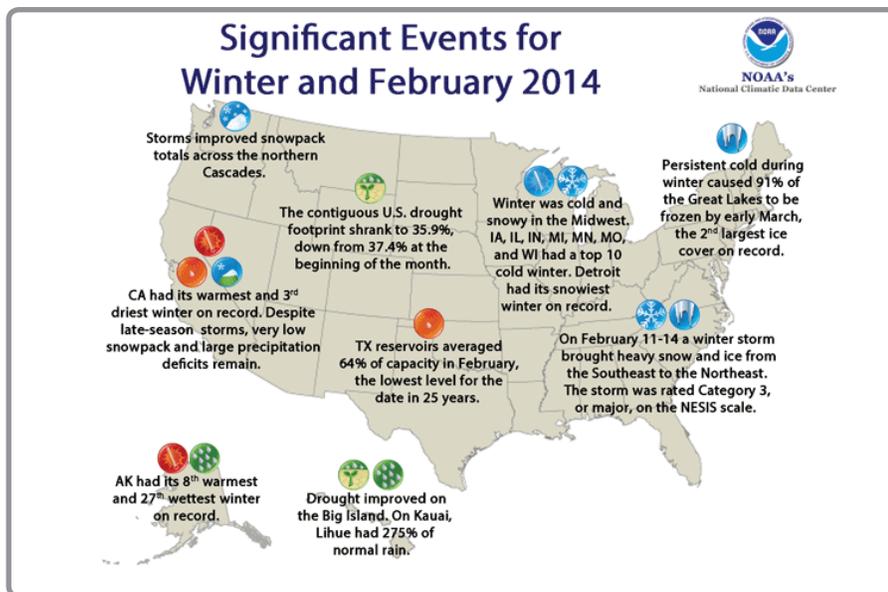


## National - Significant Events for December 2013 - February 2014



### Highlights for the Basin

Although one of the coldest winters in recent memory, only a few states broke into the top 10 rankings. North Dakota had its 8th wettest and 9th coldest December on record. Meanwhile, Montana and Wyoming had their 7th and 9th wettest February on record, respectively.

The largest temperature departures in the region were confined to eastern North Dakota and northeastern South Dakota where temperatures were up to 10°F below normal. Grand Forks, ND had its 3rd coldest winter on record with an average temperature of 0.4°F. Aberdeen, SD had its 5th coldest winter with an average temperature of 7.3°F.

This winter was particularly windy across the region. In January, Rapid City, SD had an average wind speed of 13.6 mph which was the windiest January since records began in 1970.

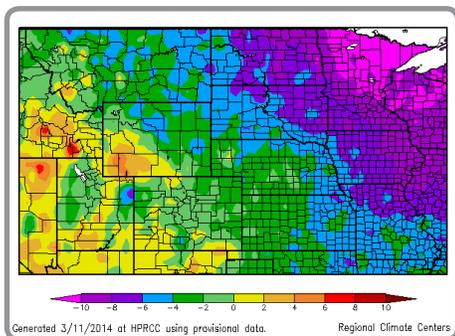
Although the mountain snow season extends well beyond the winter months, many locations fared well over the winter. One example is from the popular ski destination of Breckenridge, CO which had its 3rd snowiest winter on record with 131.6 inches.

The average U.S. temperature during February was 32.2°F, 1.6°F below average. The winter U.S. temperature was 31.3°F, 1.0°F below average. February U.S. precipitation was 2.12 inches, 0.01 inch below average. The winter precipitation total was 5.69 inches, 1.10 inches below average, and the ninth driest winter on record.

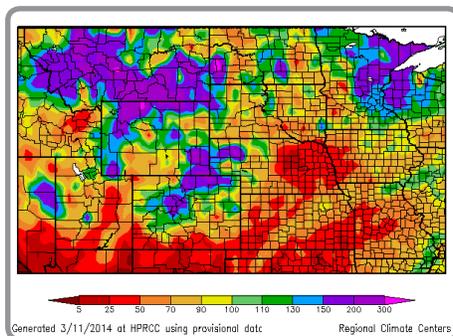
## Regional - Climate Overview for December 2013 - February 2014

### Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F)  
December 1 - February 28, 2014

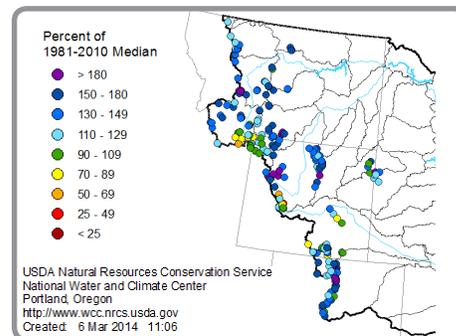


Percent of Normal Precipitation (%)  
December 1 - February 28, 2014



### Mountain Snowpack

Missouri Basin Mountain Snowpack  
03/01/2014



A strong ridge/trough pattern was present over the United States this winter, which resulted in cold, stormy weather in the east and dry, warm conditions in the west. Situated in the middle, the Missouri Basin states had both above and below normal temperatures. The northern and eastern sides averaged 4.0°F-10.0°F below normal while portions of Wyoming and Colorado were near normal and up to 6.0°F above normal. For some parts of the region, this was the coldest winter in 25-30 years.

Precipitation varied across the region this winter. Generally, the eastern half of the region had below normal precipitation and the western half had above normal precipitation. Montana had the highest departures in the region with much of the state receiving at least 200 percent of normal precipitation. However, lower portions of the basin, including Nebraska, Kansas, and Missouri were well below normal. Significant portions of these states received 50 percent of normal precipitation at best.

Although there is limited snowpack across the plains portion of the Missouri Basin states, above average mountain snowpack is present in the headwaters. This is in stark contrast to the past two years when the snowpack was well below normal. This snowpack may draw concern of a repeat of the 2011 flooding, however that is rather unlikely at this time. Keep in mind that record May precipitation in Montana greatly contributed to the flooding in 2011. Also, there is additional flood storage as a result of the 2012 drought.

## Regional - Impacts for December 2013 - February 2014

### Agriculture

Extended cold this winter had impacts on many aspects of agriculture. Propane shortages were a challenge for corn producers who still had corn in their fields waiting to be dried. Some livestock stress due to the cold was reported. Additionally, there are concerns over the winter wheat crop. After a cold and windy winter, producers will have to wait until the crop breaks dormancy to find out the extent of the damage.



Above: (Left) Winter wheat field in February in Ward County, North Dakota, courtesy AgWeb, (Center) Skiers in Breckenridge, Colorado in January, courtesy *The Denver Post*, (Right) January dust storm near La Junta, Colorado, courtesy Cimarron County NRCS.

### Tourism and Recreation

Not all the impacts due to the cold winter were negative. Outdoor recreation has increased this winter as many have been able to get out and enjoy ice fishing, snowmobiling, and skiing. Some ice fishing villages that have popped up in North Dakota are actually larger in population than the population of surrounding communities. Meanwhile, visitation to Colorado ski resorts has increased 22 percent over last season.

### Transportation

Transportation was impacted this winter as well. Frequent ground blizzards across the Dakotas caused hazardous travel and closed roads. Dust storms in Colorado and Kansas also closed roads and slowed travel. Rail traffic, including passenger trains, slowed throughout the region as cold weather increases the potential for cracked rails. The extended cold was particularly hard on North Dakota where rail traffic has increased due to oil extraction.

### Utilities

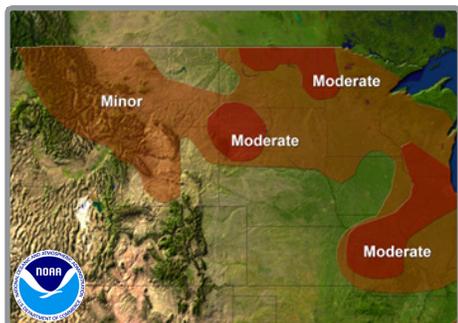
Utilities have been impacted by the bitter cold weather as well. Propane shortages and the resulting increase in prices was an issue, especially for those who rely on the fuel for warmth. At least one death in North Dakota was attributed to the shortage. The combination of a low snowpack early in the season and extended periods of cold weather has created a deep frost line. As a result, broken water mains and pipes have been reported.

## Regional - Outlook for Spring 2014

## MO River Basin Partners

### Missouri Basin Flood Outlook

Valid for Spring 2014

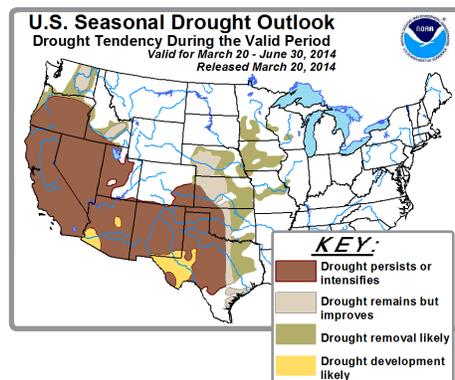


ENSO (El Niño/Southern Oscillation) neutral conditions were still present and are forecast to continue through spring, with a 50% chance of El Niño developing this summer or fall. There are no indications of either a wetter or drier than normal spring at this time, however northern areas of the basin should expect below normal temperatures.

Ice jam flooding has occurred on many rivers and is expected to continue into the spring. Minor to moderate flooding is projected for the northern plains based on the potential for snowmelt and rain-on-snow events. Minor to moderate flooding is also expected in Kansas and Missouri due to convective rainfall. This projected flooding is not atypical.

### U.S. Seasonal Drought Outlook

Valid for 03/20/2014 - 06/30/2014



Drought conditions have only changed slightly over the winter months. For the areas in this region dealing with drought, the winter is typically the driest part of the year. This means that significant changes in drought conditions (either improvements or degradations) would not be expected. The seasonal outlook indicates that much of the drought conditions in the region will either be erased or be improved. The area of drought encompassing the southeast corner of Colorado and the southwest corner of Kansas is expected to persist through June.

High Plains Regional Climate Center

[www.hprcc.unl.edu](http://www.hprcc.unl.edu)

National Oceanic and Atmospheric Administration

[www.noaa.gov](http://www.noaa.gov)

National Weather Service - Central Region

[www.crh.noaa.gov/crh](http://www.crh.noaa.gov/crh)

National Climatic Data Center

[www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

Missouri River Basin Forecast Center

[www.crh.noaa.gov/mbrfc](http://www.crh.noaa.gov/mbrfc)

Climate Prediction Center

[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

National Operational Hydrologic Remote Sensing Center

[www.nohrsc.noaa.gov](http://www.nohrsc.noaa.gov)

National Drought Mitigation Center

[www.drought.unl.edu](http://www.drought.unl.edu)

State Climatologists

[www.stateclimate.org](http://www.stateclimate.org)

South Dakota State University Extension

<http://igrow.org>

National Integrated Drought Information System (NIDIS)

[www.drought.gov](http://www.drought.gov)

U.S. Army Corps of Engineers - Missouri River Basin Water Management Division

[www.usace.army.mil](http://www.usace.army.mil)

USDA NRCS National Water & Climate Center

[www.wcc.nrcs.usda.gov](http://www.wcc.nrcs.usda.gov)

U.S. Geological Survey, Water Mission Area

[www.usgs.gov/water](http://www.usgs.gov/water)

Western Governors' Association

[www.westgov.org](http://www.westgov.org)