

National - Significant Events for September - November 2015

Highlights for the Basin

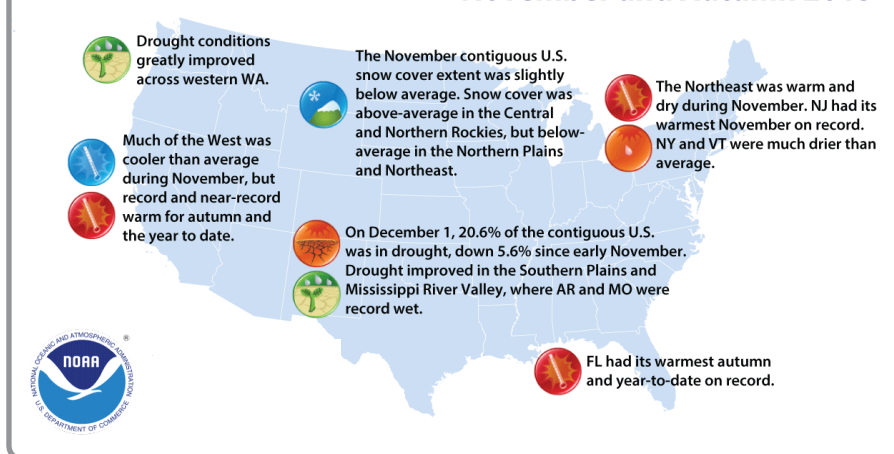
Every state in the Basin ranked in the top 10 warmest falls on record with Colorado, Nebraska, North Dakota, South Dakota, and Wyoming having their second warmest fall on record. Other top 10 rankings included Iowa (3rd), Kansas (4th), Missouri (5th), and Montana (7th).

Minimum temperatures were especially warm this fall, with Colorado, Nebraska, and North Dakota setting new records for warmest fall minimum temperatures on record.

October 11th was a particularly hot day across the region, with many locations setting new records for warmest October temperature. For instance, Fargo, ND had a high temperature of 97°F that day, which beat the previous October record by an impressive 4°F. Interestingly, this was also the warmest day of the year in Fargo, beating out all other high temperatures over the summer.

A late season tornado outbreak on November 16th spawned 21 confirmed tornadoes in Kansas. One tornado was particularly strong and, according to the Kansas Weather Data Library, was the strongest and widest tornado to ever be recorded during November in the state.

U.S. Selected Significant Climate Anomalies and Events November and Autumn 2015



The average U.S. temperature during November was 44.7°F, 3.0°F above average. The autumn U.S. temperature was 56.2°F, 3.3°F above average, and the warmest on record. November U.S. precipitation was 3.30 inches, 1.07 inches above average, and the fourth wettest on record. The autumn U.S. precipitation was 8.32 inches, 1.44 inches above average.

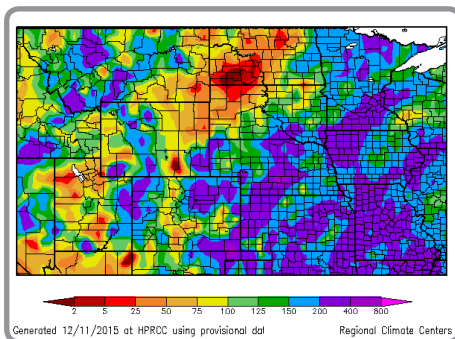
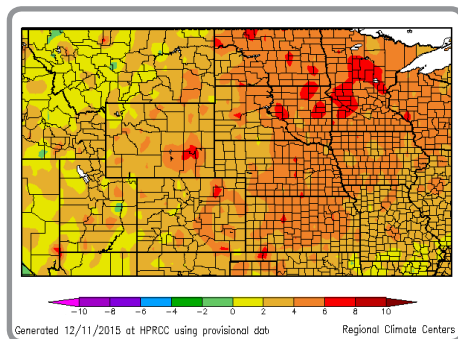
Please Note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: <http://www.ncdc.noaa.gov/sotc>

Regional - Climate Overview for September - November 2015

Temperature and Precipitation Anomalies

Departure from Normal Temperature (°F)
September 1 - November 30, 2015

Percent of Normal Precipitation (%)
November 2015

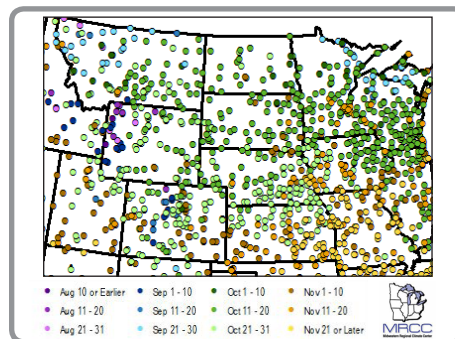


It was an extremely warm fall for the Missouri River Basin states as above-normal temperatures were a prominent feature each of the three months of the season. Overall, the majority of the region had seasonal temperature departures ranging from 2-6°F above normal, with the largest departures occurring across the Dakotas and Minnesota where some locations had temperature departures in excess of 6°F. Not only were these the largest departures for the region, but also for the entire contiguous U.S.

Generally, the fall started dry, with many locations receiving less than 50 percent of normal precipitation, and ended wet, with widespread totals in excess of 150 percent of normal. As much of the region moves into the driest time of the year, the above-normal precipitation did not overcome all the deficits that accumulated earlier in the fall, especially in places like central Kansas. Additionally, some areas of the region consistently missed out on precipitation, such as northeastern Wyoming through portions of the Dakotas.

Late Hard Freeze

Date of First Hard Freeze (28°F)
Fall 2015



An extended warm period this fall caused many locations across the Basin to have some of the latest hard freezes on record. A hard freeze is marked by a minimum temperature at or below 28°F and is sometimes referred to as a "killing freeze." Some locations did not reach 28°F until a month after the average first hard freeze. One impressive record occurred in Fort Collins, CO, which had its first hard freeze of the season on November 7th - beating the old record by nearly a week (period of record 1893-present).

Regional - Impacts for September - November 2015

Late Freezes Extended Growing Season

A late end to the growing season had varied impacts across the Basin. On one hand, late season freezes led to a delay in the killing of insects and extended the pollen season. But, on the other hand, the growing season was extended for gardens, flowers, and trees. In areas with these late freezes, gardeners were able to harvest vegetables well into November. Additionally, flowers were spotted late in the season in places like Lincoln, NE where daylilies were blooming in mid-November.



Above: (Left) Asters blooming at Lauritzen Gardens in Omaha, NE, courtesy Natalie Umphlett; (Center) Canada geese in Lincoln, NE on a snowy day, courtesy Ken Dewey; and (Right) open water on Rainy Lake at the beginning of December, located on the Minnesota/Canada border, courtesy Laura Edwards.

Warm Fall Delays Bird Migrations

Bird migrations were delayed this fall due to warm conditions. The warm fall provided plenty of food and open water for the birds, making it possible for them to stay in their northern locations. This impacted outdoor recreation as some birds arrived rather late in their respective hunting seasons. For instance, local reports indicated that the Sandhill Crane migration was delayed and appreciable numbers did not arrive in North Dakota until the very week the crane hunting season closed.

Monitoring Water Resources Across the Basin

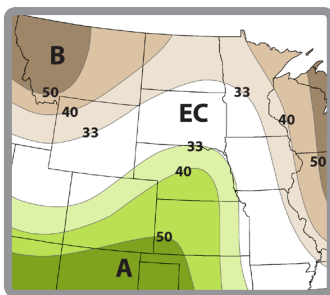
According to the U.S. Army Corps of Engineers, 2015 runoff for the Missouri River Basin above Sioux City is forecast to be right at the average of 25.3 million acre feet. At this time, snowpack in the upper portions of the Basin is on the lower side and outlooks indicate a continuation of dry conditions through the early spring. To the south, high flows this season due to heavy precipitation in Colorado have reservoirs running high in the Platte River Basin. For instance, at the end of September, the inflows into Lake McConaughy in Nebraska ranked as the 11th highest on record since 1941. With the possibility of a higher than average snowpack in Colorado, as described below, winter snowpack and the subsequent spring runoff will need to be monitored as there will be a potential for lowland flooding next spring.

Regional - Outlook for January - March 2016

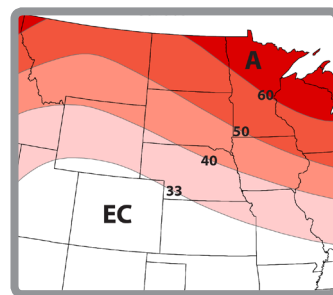
MO River Basin Partners

3-Month Precipitation and Temperature Outlooks

Valid for January - March 2016



Precipitation



Temperature

EC: Equal chances of above, near or below normal, A: Above normal, B: Below normal

According to the Climate Prediction Center, El Niño conditions continued this fall and are expected to remain strong through the winter. These conditions are forecast to continue into the spring with a transition to neutral conditions in the late spring or early summer.

As El Niño impacts typically peak in the mid to late winter, the outlooks through March are important. Over the next three months, the outlooks favor increased chances for above-normal temperatures for much of the Basin. Consistent with previous outlooks and the typical El Niño pattern, the highest probabilities for above-normal temperatures are located across the northern tier of the region, including portions of Montana and North Dakota. Meanwhile, the precipitation outlook shows increased chances for below-normal precipitation for upper parts of the Basin, in areas of Montana, Wyoming, and the Dakotas, and above-normal precipitation for most of the central and southern parts of the Basin, including much of Colorado, Kansas, and Nebraska. This potential precipitation pattern could result in an above-normal snowpack in southern portions of the Rockies and a below-normal snowpack in the headwaters of the Missouri River.

For more information about potential impacts this winter, please see this report on El Niño in the Missouri River Basin: <http://www.drought.gov/media/pdfs/ENSO-MOBasin-2015-Final.pdf>

High Plains Regional Climate Center

www.hprcc.unl.edu

National Drought Mitigation Center

www.drought.unl.edu

National Integrated Drought Information System

www.drought.gov

National Oceanic and Atmospheric Administration

National Weather Service - Central Region

www.crh.noaa.gov/crh

National Centers for Environmental Information

www.ncdc.noaa.gov

Missouri River Basin Forecast Center

www.crh.noaa.gov/mbrfc

Climate Prediction Center

www.cpc.ncep.noaa.gov

National Operational Hydrologic Remote Sensing Center

www.noahrs.noaa.gov

North Central Climate Science Center

<http://revampclimate.colostate.edu>

South Dakota State University Extension

<http://igrow.org>

State Climatologists

www.stateclimate.org

U.S. Army Corps of Engineers - Missouri River Basin

Water Management Division

www.usace.army.mil

U.S. Bureau of Reclamation

www.usbr.gov

U.S. Department of Agriculture

Natural Resources Conservation Service

www.nrcs.usda.gov

NRCS National Water & Climate Center

www.wcc.nrcs.usda.gov

Regional Climate Hubs

www.usda.gov/oce/climate_change/regional_hubs.htm

U.S. Geological Survey, Water Mission Area

www.usgs.gov/water

Western Governors' Association

www.westgov.org