North Dakota Monthly Climate Summary

March 2009

Precipitation:

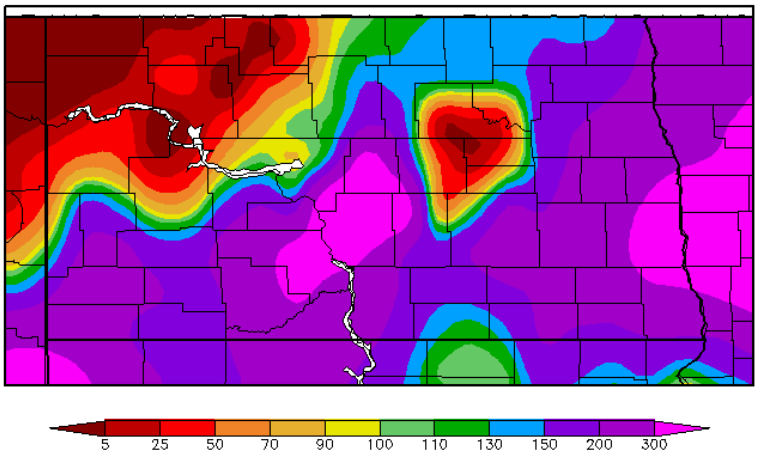

Figure 1. Precipitation Percent of Normal in March 2009 for North Dakota (High Plains Regional Climate Center)

March precipitation ranged from 0.1 inches to 5.0 inches plus. Amounts of less than a quarter inch were recorded in the northwest corner. Precipitation totals of greater than 3 inches were measured in the southwest and southeastern regions. Most of the percent of normal precipitation ranged from less than 25% to 300%. The area with less than normal precipitation was the northwest region. The areas with primarily 300% plus percent of normal precipitation were the southwest, south central, and southeastern regions (Figure 1, High Plains Regional Climate Center). There were three major precipitation events that occurred in March. The first was March 9-10 in which heavy snow fell mainly in the southeastern regions. The National Weather Service (NWS) recorded a two day total snowfall (9^{th} – 10^{th}) at Jamestown of 14.0 inches, Fargo of 10.1 inches, Fort Yates of 10.0 inches, and Linton of 10.0 inches. The second major precipitation event was March 22-26 in which heavy snow fell in the southwest, central, and eastern regions. During the second precipitation event, some of the higher amounts recorded by the NWS were 22.5 inches of snow at Marmarth, 18.0 inches at Dickinson, and 15.3 inches at Beulah. The third major precipitation event was March 29-31 in which heavy snow fell in the south central and eastern areas. The NWS recorded record breaking amounts of snowfall on the 30^{th} at Bismarck of 11.8 inches and Fargo of 5.8 inches. Fargo also had record breaking snowfall on the 31^{st} of 4.6 inches. NWS recorded Fargo as having a record breaking total March snowfall of 28.1 inches.

Temperature:

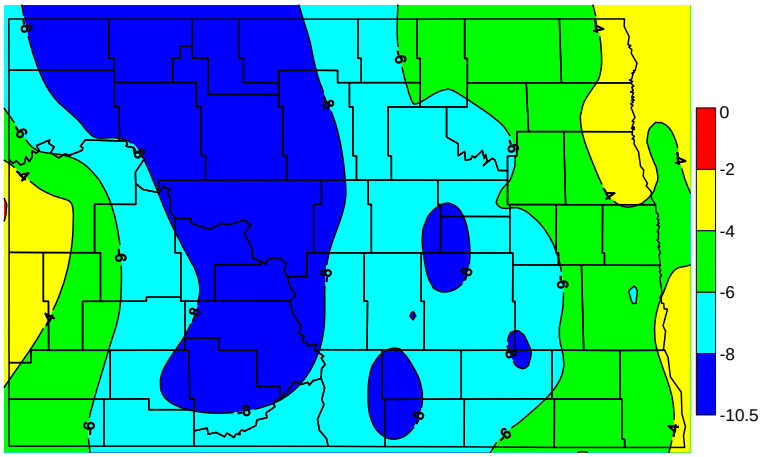

Figure 2. Temperature Departure from Normal in March 2009 for North Dakota (North Dakota State Climate Office)

The March average air temperatures ranged from 16°F primarily in the north to 27°F along the western central edge. The central regions had air temperatures of 18 to 20°F. The southwest, southeast, and eastern central regions had average air temperatures of 21 to 25°F. March had below normal temperatures across the State and ranged from -2 to -10 degrees. (Figure 2, North Dakota State Climate Office). The daily temperatures for the first half of March were far below normal with extreme low temperatures from 9^{th} through the 12^{th} of March. The daily temperatures for the second half of March were primarily below normal with a few days of above normal temperatures. The National Weather

Service (NWS) recorded record low maximum temperatures at Bismarck and Williston on March 10th. NWS also recorded a record low maximum temperature at Bismarck on the 11th. A record low minimum temperature was recorded at Jamestown on the 12th.

Flood:
Major flooding occurred in Fargo, Grand Forks, and Drayton along the Red River of the North; in Abercrombie on the Wild Rice River; in West Fargo, and Harwood on the Sheyenne River. The Federal Emergency Management Agency (FEMA) announced that federal disaster aid has been made available for 34 counties of North Dakota beginning on March 13, 2009 (http://www.fema.gov/news/newsrelease.fema?id=47796). Red River at the Fargo location reached a record high stage of 40.82 feet on Saturday, March 28 at around 00:15 AM. The previous record was 40.1' and set on April 7, 1897. The second highest crest occurred almost exactly 100 years after the 1897 flood on April 17, 1997 and was 39.57 feet. Any stage above 18 feet is considered as flood stage in Red River at Fargo location.

Among the several conditions that led to major flooding, 2.79" of rain fell in a 5-day period from March 22 through 26 with daily maximum temperatures as high as 53° is the most significant impact in this particular flood. Other factors were as significant and worth mentioning below:

- March 2009 was the wettest March in history since 1881 almost doubling the previous record that was set in March 1882.
- March 2009 was the snowiest March in history since 1881 topping March 1997 by 2" (The most memorable flood in Fargo and Grand Forks occurred in 1997).
- September through March period was the wettest September-March periods ever.

As of April 3, there is still a 7-inch depth snow on the ground in Fargo. Red River at Fargo is expected to have a secondary crest in April after the entire snow melts. The magnitude of the secondary crest will depend on the rate of melt and additional storm event.