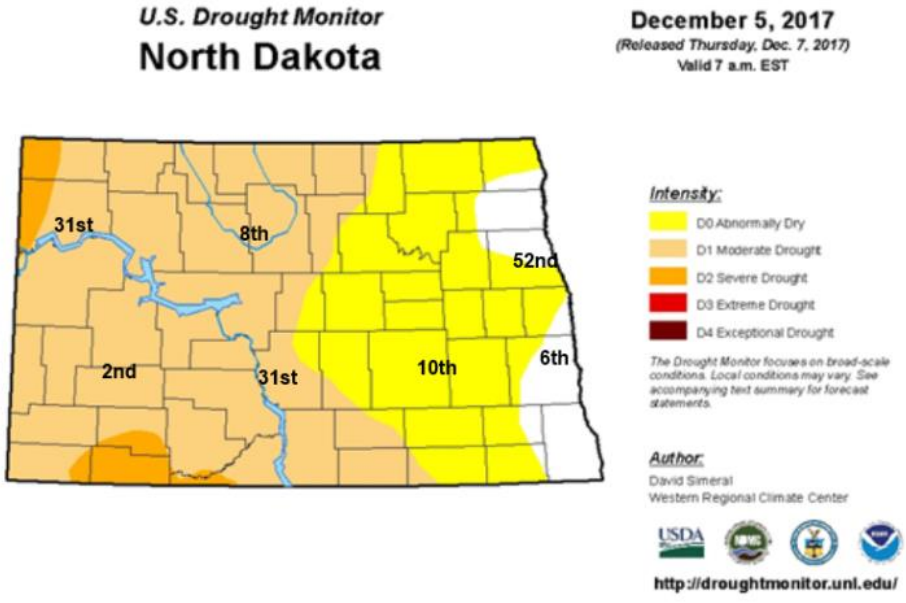
Drought Update for Western and Central North Dakota
Allen Schlag NWS Bismarck Hydrologist

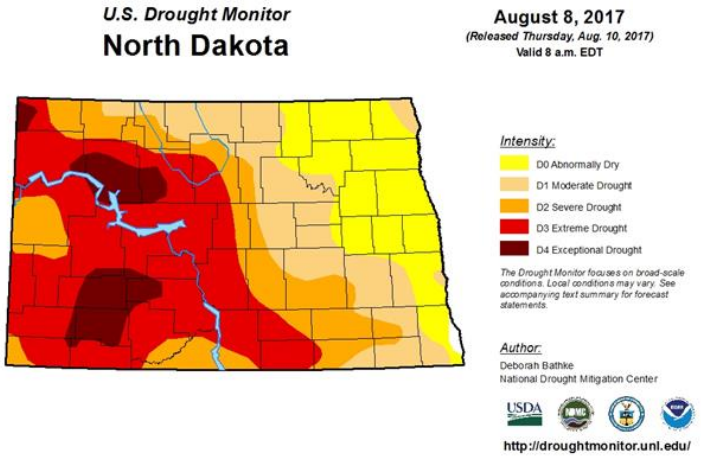
This past September I discussed in an article for the North Dakota Climate Bulletin how the drought rapidly evolved from a wet winter, to a dry spring (pleasant by most people's standards), to a debilitating drought that seriously harmed many crop producers during the critical June and July growing stages. A brief respite with some above normal moisture arrived in August and continued through early September. This lessened the blow to some crops, primarily row crops and late cuttings of alfalfa. However, a relatively wet August and September was not enough to ward off the negative effects of what would be a well below normal precipitation pattern for October and November. That pattern seems to have carried all the way up to my writing this article after the first full week of December. For example, the Minot Experiment Station with 10.91 inches of moisture thus far into the calendar year is the 8th driest on record and even with normal moisture for the rest of December, it will likely finish in the top 10 driest out of 112 years of data when years with significant missing data are eliminated. On the north side of Minot, the NWS operated ASOS station was even drier with a mere 7.55 inches of moisture being recorded thus far in 2017, making it the driest on record. It should be noted though that the period of record for this site only goes back to 1949 and ASOS stations can have a low bias for snow accumulation.

Out to the east, the Grand Forks area has fared considerably better with an even 19.0 inches of moisture so far, and that puts it right in the middle of the pack at about the 52nd driest year going back to 1893. Fargo hasn't kept pace with its neighbor a mere 70 miles to the north as its 14.67 inches of moisture ranks as the 6th driest going back to 1942. Working our way back west, the State Hospital in Jamestown with a record going all the way back to 1893 is the 10th driest with 12.54 inches of moisture so far in the year.

Bismarck appears to be a bit of an anomaly as it is currently tied for the 31st driest year on record going back to 1875 with 13.50 inches of moisture. Granted, 2017 would rank much worse for Bismarck if it weren't for August where 5.09 inches of water fell from the skies. Bismarck is a pretty good reflection of almost the entire Missouri River corridor through North Dakota as widespread beneficial rains fell from Williston to Sioux County over August and September. In the southwest part of the state, the Dickinson site currently ranks second driest on record with 10.23 inches of moisture going back to 1949. Lastly, Williston comes in at the 31st driest going back to 1894, although there are a couple of years with significant missing data.

When a person overlays the data on a recent USDM image, the results are a little hard to make immediate sense of in the context of their historical rankings. A ranking of 52nd would suggest there should be no drought designation within miles of Grand Forks, and conversely, a ranking of 2nd overall driest would suggest the drought ranking does not adequately reflect how dry it has been. What is missing in a snapshot, like that to the right, is one of timeliness with the moisture received. This can also be the same thing that individuals miss when looking at a snapshot of time with precipitation deficits in mind. Perhaps the deficits fit a little better with an image from the USDM when the drought was

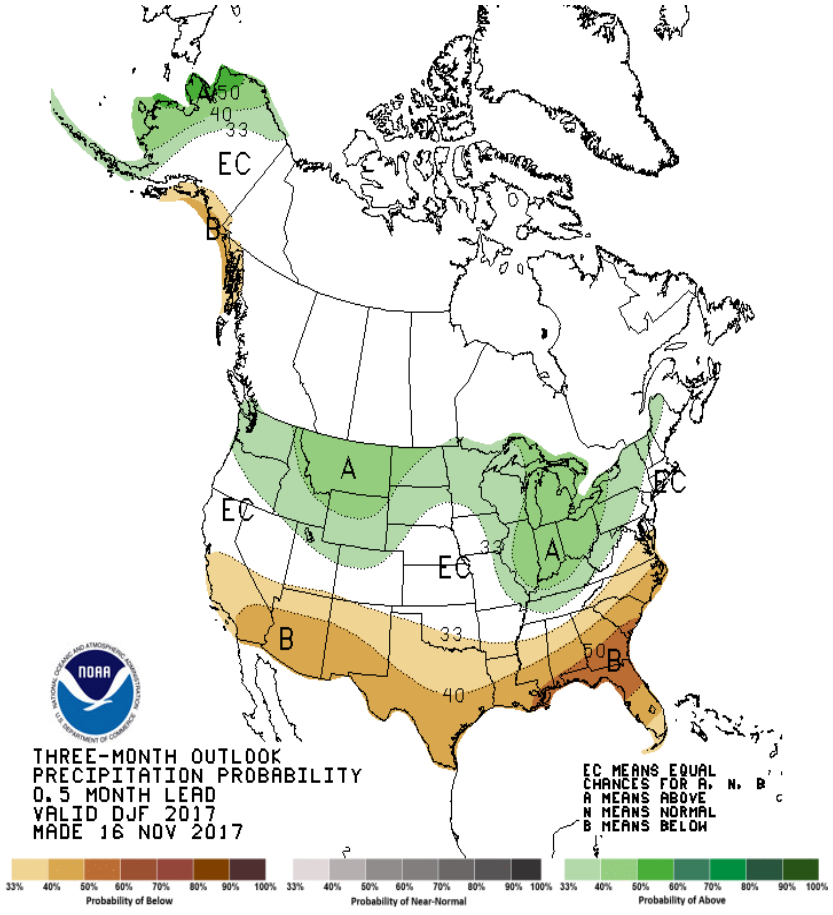




in full effect during this past summer as in the image to the left.

The best message on drought in North Dakota is that last spring's and early summer was brutal and there is likely going to be a hangover with impacts. Soil moisture levels remain below normal across most of North Dakota, as are stock dams and dugouts in western ND. Oftentimes we think of winter in ND as something akin to hitting the reset button on drought. However, the early part of winter this year continues on a path of below normal accumulation of snow. While many may not appreciate a snowy winter, the majority of the state could sure use an above normal snowpack come early March. Anything less than 2-3 inches of water equivalent is unlikely to reduce the current soil moisture deficits and fill a majority of the surface water features.

Now we are left with the question of: Is the drought going to improve or worsen as we go into spring? The best information we have to go on is the official Climate Prediction Center's winter outlook, shown to the right. The outlook covers the December, January and February timeframe and provides reason to be optimistic. However, the mean water equivalent received during this period for the Bismarck area is 0.51, 0.47, and 0.47 inches of water for December, January, and February, respectively. This winter season total of 1.44 inches of moisture does not reach the level of what I believe would significantly relieve the pressure of drought on the region. Even if we add in the 0.85 inches of moisture typically received in March, the resulting 2.29 inches of expected moisture between now and April 1st is at the lower end of what is probably necessary to relieve the pressure on our agricultural community.



The bottom line here is that while anything can happen, a mere return to normal this time of year is likely to leave some interests feeling the effects of a dry 2017. It would instead require a significantly above normal precipitation pattern combined with consistently cool temperatures to provide the necessary snow-water equivalent on the ground ahead of the spring melt season. This would suggest we need a fairly miserable second half of winter to help ward off a continuation of the drought come spring.