

Hydro Talk

Hydro Expectations for Winter 2018-19

The official 2018-19 Winter Outlook has been in the news for a while now. Official estimates place the odds at 90% for a weak El Niño to form through the 2018-2019 winter and roughly a 55% chance it persists through early spring. For those who really delve into details, this year’s El Niño is expected to be of the Modoki nature where the warm sea surface anomalies are centered farther west, near the International Dateline. Local research at WFO-Bismarck suggests that El Niño’s of this variety favor temperatures a few degrees above average for the Dec – Feb “winter” season.

Importantly, climatologists who work with the effects of El Niño Southern Oscillation (ENSO) swings have not yet observed the ocean and atmospheric coupling to declare an El Niño. This helps explain our recent winter-like October and November. While there has been a slight moderation of the expectations, the updated temperature outlook for Dec – Feb in Figure 1 continues to favor a warmer than normal winter season.

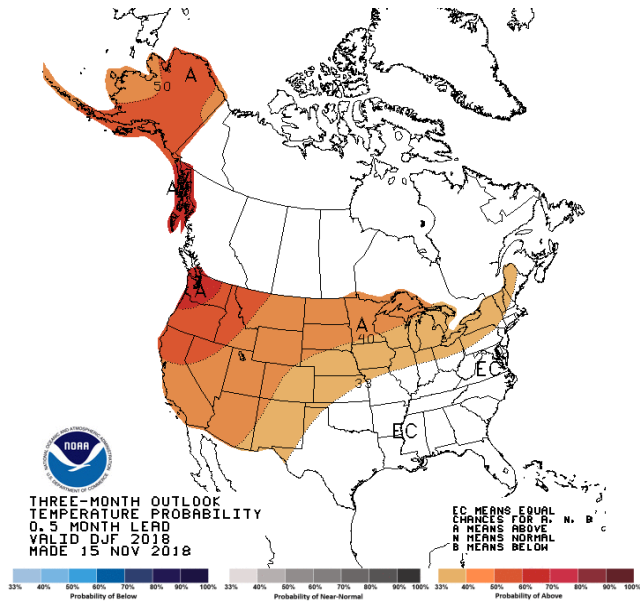


Figure 1. Temperature outlook for Dec - Feb.

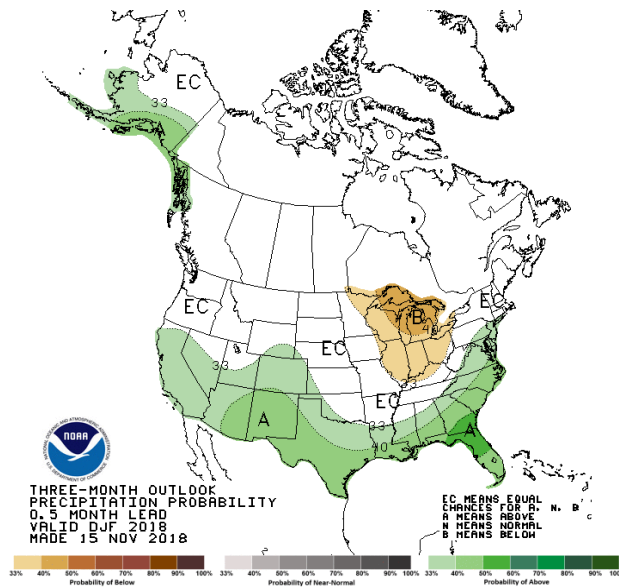


Figure 2. Precipitation outlook for Dec - Feb.

Somewhat of a significant change has taken place in the precipitation outlook for Dec – Jan shown in Figure 2. In the original winter outlook there was a strong signal for a drier than normal outcome in western North Dakota, Montana, and southern Canada. This has been replaced with the Equal Chances designation. The removal of this results from a lack of support from other climate tools. However, there are still some models, such as the well accepted CFSv2 that paints a picture of a warmer than normal and drier than normal December. So while there has been some tempering of the drier than normal expectations, there are still some indicators that lean towards this as the final outcome.

While we’ve covered the expectations for “winter”, we who live up in the Northern Great Plains know that the full definition of winter rarely ends for us in February. This makes the months of March and early April of interest to us as well, and when we look that far out during an El Niño affected winter/spring, we also tend to see a warmer than normal signature.

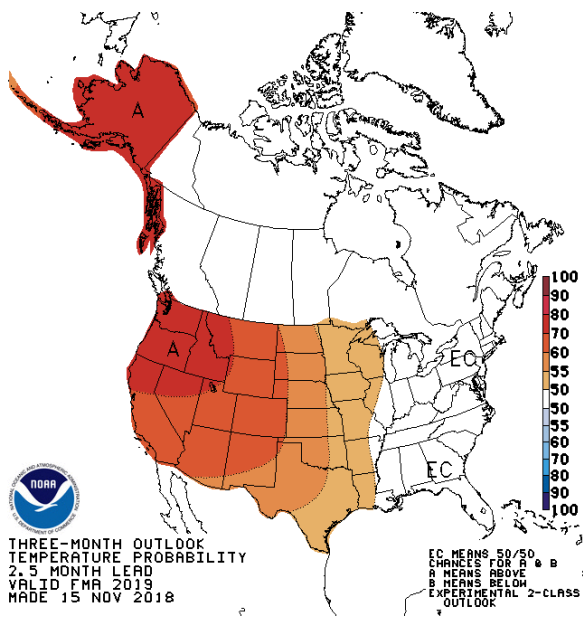


Figure 1. Temperature outlook for Feb - Apr.

This warm signal for Feb – Apr, as shown in Figure 3, is quite important to us as the expectations for higher temperatures increases as we go up into the Souris, Missouri, and Yellowstone basins. These headwaters are now expected to see not only warmer temperatures, but some indicators suggest an overall lower amount of moisture. When we combine these effects with what some may just refer to as an early spring (colloquially defined as the widespread melting of the accumulated snowpack). For example, local research puts the peak streamflow after an El Niño as being about 10 days earlier than normal on the Souris above Minot. Volumes and rate of runoff also tend to be relatively modest after El Niño winters, and while research on all the mechanisms that lead to this has been

inconclusive, some possible reasons are:

1. El Niño winters have longer and possibly more extreme periods of above freezing temperatures that lead to early melt and more sublimation and evaporation of available snowpack.
2. Overall less snow received during winter is also received in more numerous, but smaller events (trace to 1 or 2 inches) and that also increases evaporation and sublimation.
3. Earlier spring melts shorten the snow accumulation season and we miss out on stockpiling moisture from those heavy wet snows of late March and early April.
4. Early spring melts that occur in March have a much lower possibility of daytime temperatures getting into the 50-60 degree range which encourages much higher melt rates.

Despite having pre-wetted soils across central and western North Dakota which are one of the factors known to enhance/maximise runoff from a given snowpack, it looks like it will be difficult to build the kind of surplus snow that brought us the spring flooding of 2009-2011. Suffice to say that Mother Nature can always throw a curveball in the form of an over-powering Arctic Oscillation, or some other short-term influencer that overstates its welcome. However, my (ahem) long-range expectations for spring 2019 are rather tempered right now. In short, until something changes, I am expecting a relatively quiet spring flood season in 2019.