THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

The science behind drought monitoring

By Darin Langerud

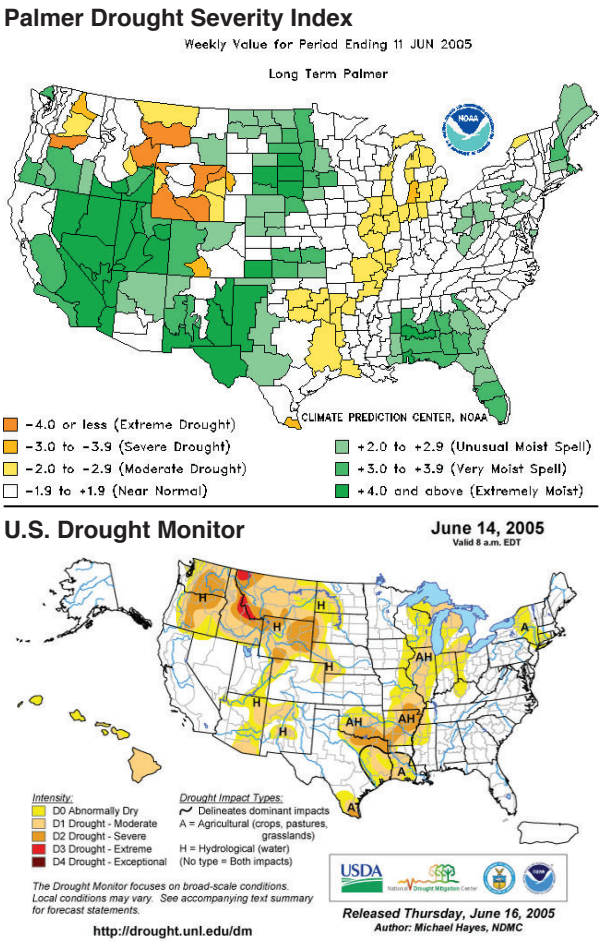
Monitoring drought is complicated as it involves many factors. After all, a lack of water affects almost everything we do in some way or another. The current drought has impacted North Dakota in many different ways; the most apparent manifesting itself as recent record low levels on Lake Sakakawea and subsequent municipal water supply problems in Parshall, Garrison, and Fort Yates to name a few.

Probably the two most familiar drought monitoring programs are the Palmer Drought Severity Index (PDSI) and the U.S. Drought Monitor. Each has its strengths and weaknesses: let's take a closer look.

The PDSI is computed by a complex formula devised by W.C. Palmer in 1965. Being the first comprehensive drought index in the U.S., it has been widely used, especially by government in triggering drought relief programs. Increasingly positive values indicate a moisture surplus, while increasingly negative values indicate more severe drought. The PDSI does well in delineating agricultural droughts (its base formula is a soil moisture algorithm), and provides a historical context to drought conditions, as it has been computed on historical precipitation data for every climate division in the country all the way back to 1895. On the down side, the PDSI tends to lag emerging droughts by several months and it does not factor in snowfall and snowpack in its calculations, an important part of streamflow and runoff in the western U.S. The PDSI can be found on the Internet at www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif.

The U.S. Drought Monitor takes a different approach than the PDSI. The summary map is a blend of six key indicators, with numerous supplementary indicators used depending on the region and time of year. Drought severity is classified in five categories of increasing intensity, D0 – abnormally dry, through D4 – exceptional drought. In addition to the intensity classification, areas are also identified according to the primary impacts, indicated by an "A" for Agricultural and "H" for Hydrological. The U.S. Drought Monitor does not assign a specific value for each climate division as the PDSI does, nor does it classify surplus moisture conditions, yet its advantages are many. Since it uses more varied data inputs, it generally indicates developing drought more quickly than the PDSI. It also incorporates snowfall and snowpack to provide the "big picture" of overall drought conditions in the U.S. at any given time. The U.S. Drought Monitor can be found on the Internet at www.drought.unl.edu/dm/monitor.html.

A wet spring statewide has lessened talk of drought in much of North Dakota and turned attention to flooding in some areas. Long-term impacts from the most recent drought are still being felt, however, and will likely continue for some time, especially as it relates to our Missouri River reservoirs. The PDSI and U.S. Drought Monitor will continue to be valuable tools for monitoring the seesaw nature of climatic precipitation.



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