Drought Assessment - October 12, 2011 SWPTF Meeting

Summary

State Water Plan Task Force (SWPTF) members provided agency reports on the current drought conditions at their meeting on October 12. The U.S. Drought Monitor shows 43.72 percent of the state experiencing dry conditions, of which 30.59 percent of the state is experiencing a moderate drought and 14.68 percent of the state is experiencing a severe drought. The State Water Survey reported the dry conditions across the central portion of the state developed due to precipitation deficits running 8 to 10 inches below normal since July, with effects exacerbated by heightened temperatures causing above normal evapotranspiration. Thus, the current drought assessment for the impacted region is considered short in duration but intense across the central third of the state. The drought thus far has been considered mostly agricultural and not hydrological. The hydrologic impacts have been minimal as we entered this dry period with above normal precipitation and above normal storage in shallow groundwater. Only a few regions in the state are experiencing below-normal streamflow conditions.

The Department of Agriculture provided an agricultural summary. Corn and soybeans have mostly matured with approximately 50% having been harvested. Overall, the quality ratings for corn and soybeans are as follows: corn-5% very poor, 16% poor, 37% fair, 36% good and 6% excellent; soybeans-4% very poor, 11% poor, 35% fair, 42% good and 8% excellent. The IEPA Division of Public Water Supplies cited mandatory water restrictions occurring with the City of Decatur and wastewater recycling and other measures being considered. Decatur often experiences water restrictions due to the high water demands with respect to their storage capacity. New Berlin is also under watch with their reservoir down about 42-48 inches and pumping from the creek occurring every other day for about 6 hours/day. Water restrictions will be put in place when the reservoir is 60 inches down. The City of Springfield should not be a concern until early next spring if levels approach 5 feet below pool. The Department of Public Health has reported increases in water hauling along with some shallow "bored" wells in Monroe County going dry.

In summary, while the current hydrologic impacts have been minimal, the impacts may quickly elevate if the deficits continue across central Illinois. The current weather forecast provided by the NWS Climate Prediction Center calls for an increased chance of warmer and drier than normal conditions this fall across Illinois. However, their forecast for January-March calls for an increased chance of above-normal precipitation with near-normal temperatures across the state. The SWPTF will continue to closely monitor the drought conditions. SWPTF members will provide another assessment report in the first week of November.

Hydrologic Conditions (Streams, Reservoirs, and Groundwater)

Hydrologic conditions continue to be dry in a swath through central Illinois where the cumulative precipitation deficit since July is greater than 5 inches. Major rivers of the region, including the Sangamon, LaMoine, Spoon, Little Wabash, and Embarras Rivers, experienced "below normal" flows during the month of September, that being low flows in a range that occur only 10 to 30 percent of the time during September. Few or no streams in the region experienced "much below normal" flows (lowest 10^{th} percentile) that we would typically expect during a

drought condition; although the Sangamon River – at its 12th percentile for September – comes close to that range.

Most reservoir levels in the region are below full pool, but generally are typical for this time of year. The pool level at Lake Decatur is an exception, and the lake is at a low level (612.0 feet at the end of September) that might be expected to occur on average only once in 5 years.

Month-End Groundwater Levels for September 2011

September Overview Statewide, shallow groundwater levels were just above normal with an average departure of +0.1 feet. Combined with the change in normal monthly groundwater levels between July and September, a decrease of 0.4 feet in departures was observed from last month (Figure 1). Levels averaged 0.7 feet lower than August levels and were approximately 1.7 feet below September levels of last year.

Comparison to Average Levels. Shallow groundwater levels in 15 observation wells, which are remote from pumping centers, were above average for the month of September. Levels were just 0.1 feet above normal and ranged from 3.3 feet below to 3.8 feet above normal levels. The dry conditions responsible for a below normal band across the central portion of the state in August (5 observation wells), continued during September and expanded to include all the central Illinois wells (7). This included the Bondville observation well (Champaign County) which reported the lowest September level for its period of record.

Comparison to Previous Month**.** Shallow groundwater levels were below those of last month. Levels averaged 0.7 feet below and ranged from 2.7 feet below to 1.8 feet above levels of last month.

Comparison to Same Month, Previous Year. Shallow groundwater levels in September were below levels measured one year ago. Levels averaged 1.7 feet below and ranged from 10.0 feet below to 2.8 feet above this month than levels of September 2010.

Water Supply Impacts

According to the IEPA, two community water supply systems have been placed on their drought watch list: Decatur and New Berlin. A pipeline has recently been installed to interconnect the New Berlin system with Chatham, as part of the new South Sangamon Water Commission, such that the potential exists that New Berlin may be able to obtain water from Springfield (via Chatham) as early as November. Thus, New Berlin may not remain on the IEPA's watch list for long.

On October 3, Decatur began to implement mandatory water restrictions, as called for in their Community Drought Response plan once the level in Lake Decatur falls to 612.0 feet. The City has also been utilizing its supplemental water supplies, which includes pumping from their well field in DeWitt County and a local gravel pit, the latter of which is expected to supply at least 300 million gallons of additional water before it is exhausted.

Prognosis and Perspective

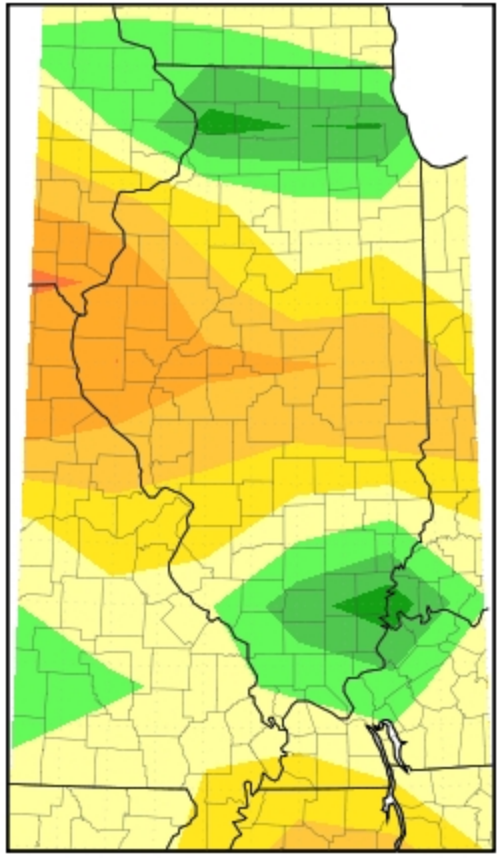
The current dry condition does not follow the typical pattern for most hydrologic (or water supply) droughts. Most historical water supply droughts have started with below-normal precipitation in the spring (March to May), with continued dry conditions that produced very low streamflow levels by the end of the summer. The most severe historical droughts all covered a large geographic region affecting many states, and persisted well into the latter half of the following year. According to hydrologic records, the three worst droughts to hit the Decatur region occurred in 1914, 1930, and 1953. Each of these droughts began in the spring and over the next 12 months the total precipitation was less than 25 inches, creating a 12-month cumulative precipitation deficit of more than 14 inches.

In contrast, the 2011 dry conditions in central Illinois began in July and the precipitation deficit over those three months is roughly 6 inches. Although drought is affecting other portions of the country (most notably in Texas and Oklahoma), the central Illinois drought conditions cover a relatively narrow band that extends only into southeastern Iowa, and thus is considered more of a localized drought condition. The 2011 conditions to date are more similar to the 1999-2000 drought, which was a locally intense drought also affecting roughly the same region in Central Illinois. That drought began late in 1999 but dry conditions continued through the spring of 2000, posing a genuine threat that water supply reservoirs in the region might not fill back up to normal pool before that summer.

As dry conditions persist, it will become more likely that shallow wells may be affected, leading to the need to haul water to supply some small community and domestic water users in the region. Most community surface-water (reservoir) supply systems in the region are designed to provide water over an extended multi-year drought. As with the 1999-2000 drought, these systems probably need not be concerned with the current dry conditions unless dry conditions persist into late winter and early spring, when continued dryness could potentially limit the runoff from spring rainfalls that typically fully replenish reservoir storages. Also for these reservoir systems, early implementation of voluntary water conservation measures (the first step in drought response) in the colder intervening months would likely have limited benefit, because such measures focus on outdoor water uses that are already low in winter.

Based on 100 years of hydrologic records, we would expect that Lake Decatur will be replenished by late winter or early spring of 2012; however, it is entirely possible that the next six months could be drier than in any previous year on record, and thus it is prudent that the City of Decatur manage their supply for that possibility. Although NOAA provides climatic outlooks for future months, it is impossible to predict with any reliability the future weather conditions and whether the region's dry conditions and drought will persist in upcoming months. A water budget model of the Lake Decatur system, developed by the ISWS, can be used to project future lake levels based on an assumed (hypothetical) set of future weather and streamflow conditions. Results from model simulations are generally consistent with intuition, and suggest that if the lake drawdown were to slow down substantially or level off in the upcoming months, then that would indicate that the Sangamon River watershed conditions are sufficiently moist to ensure reservoir replenishment by runoff by the spring. If the level in Lake Decatur were to fall to as low as 610.0 feet within the next 90 days, that would be a rate of decline consistent with some of the worst historical droughts and obviously be significant cause for concern.

Total Precipitation (inches): Departure from Mean
July 1, 2011 to October 13, 2011



−10 −8 −6 −4 −2 0 2 4 6

Midwestern Regional Climate Center
Illinois State Water Survey
University of Illinois at Urbana−Champaign