



DROUGHT UPDATE

www.isws.illinois.edu/hilites/drought

October 25, 2012

Summary

As a result of widespread and plentiful precipitation since August, especially in central and southern Illinois, observations indicate that soil moisture and streamflows in many areas of the state are in the recovery stage from this year's drought. However, more precipitation is needed for continued improvement in the deeper soil levels, lake levels, and shallow groundwater.

Precipitation and Temperature

Since the Drought Update of September 7, precipitation has been above-normal across much of central and southern Illinois. For the period September 8 to October 25, the wettest area was in south-central Illinois between I-70 and I-64 with precipitation totals in the range of 7 to 10 inches. Much of the rest of central and southern Illinois have received 5 to 7 inches of precipitation. Meanwhile, the northern third of the state have seen 3 to 5 inches. Figure 1 shows the accumulated precipitation for this period across the state.

While Illinois has received a considerable amount of precipitation in recent months, long-term precipitation deficits still remain across the state. The statewide average precipitation for January 1 to October 24 was 26.6 inches, 5.6 inches below normal. Figure 2 shows the distribution of precipitation deficits across the state since January. A few areas in far northern, far southern, and western Illinois are still 12 to 16 inches below normal. Meanwhile, areas east of St. Louis and north of Champaign are at or near normal precipitation, erasing the significant deficits accumulated from January through July.

The statewide average temperature from September 8 to October 24 was 57.5 degrees, 2.6 degrees below normal.

Soil Moisture

The ISWS maintains a soil moisture network of 19 sites in Illinois. Soil moisture values are reported as the fraction of water in the soil by volume. For example, a value of 0.4 means four-tenths, or 40 percent, of the soil is water by volume. Historically, soil moisture levels show good recover in the fall with the arrival of cooler temperatures, the harvesting of crops, and the general end of the growing season.

Figure 3 shows the observed soil moisture level at 4 inches on October 24. For most of the state the fraction of water by volume is in the range of 0.3 to 0.4, indicating moist soils. Similar results were found at the 8 and 20 inch levels. The one site near Havana in west-central Illinois with a report of 0.05 is in very sandy soils and therefore has little water holding capacity.

Agricultural Conditions

As of October 22, the USDA reported that 92 percent of the corn crop and 80 percent of the soybean crop were harvested. Pasture was rated as 29 percent poor to very poor. Statewide topsoil was rated at 35 percent poor to very poor and subsoil was rated 30 percent poor to very poor. More details can be found in the weekly Illinois Weather and Crops report published by the USDA.

Streams and Reservoirs

As illustrated in Figures 1 and 2, there has been considerable geographic variation in precipitation amounts, and the hydrologic pattern across Illinois generally reflects the cumulative deficit (or surplus) in precipitation that has occurred within each region. Some regions such as west-central Illinois have seen only moderate recovery in stream and reservoir levels whereas other locations – such as parts of south-central Illinois – are effectively fully recovered from the low stream and reservoir levels experienced earlier this summer. As of the preparation of this update, most Illinois rivers and streams have flows in the normal to above normal range for this time of year; however, much of this is directly influenced by runoff that occurred following October 13-14 rainfall. In another week or two, after this runoff has moved downstream, stream levels will more correctly reflect how much drought recovery has occurred in their watersheds. It is also important to note that October is the season when rivers and streams are typically at some of their lowest levels throughout the year; thus there may not be large amounts of flow in rivers and streams associated with the “normal” condition for October. In most regions, for example, the total volume of runoff following the October 13-14 rainfalls was equivalent to less than 0.1 inch of precipitation across the watershed.

Even when streamflow levels have mostly recovered from dry conditions, it may take additional time for reservoirs to refill, particularly in the fall season when reservoir levels are often low during normal years. One of the biggest water supply concerns in Illinois during the 2012 drought has been low water levels at Lake Decatur. As a result of runoff from the October 13-14 rain event, it is projected that there will be substantial improvement in that lake’s level (Figure 4). Although additional inflow from the Sangamon River will be needed in upcoming months to keep the lake from declining again, the current rebound in lake level will likely be sufficient to avoid the need for the City to impose additional water restrictions in upcoming months. Because the Sangamon River has a large watershed contributing to its flow, a relatively small amount of runoff will be needed during the winter and/or spring seasons for the lake’s level to fully recover.

In contrast, the water level in Lake Springfield has not rebounded substantially from recent rains, although the lake level has also not declined much since the end of August (Figure 5). Compared to Lake Decatur, a greater amount of watershed runoff is needed to replenish the lake, as well as just to keep pace with water supply withdrawals from the lake. The primary water supply threat to Lake Springfield – and most water supply lakes in Illinois – is not what happens in 2012, but the potential that the lake level would not fully recover during the 2013 wet season (winter and spring) and begin the next summer season with depleted supplies. Below-normal rainfall in the next 6 months would be needed for that to occur. As suggested earlier, there is considerable variability in the water levels of Illinois’ reservoirs, but

the reservoirs generally located in western Illinois and the portion of central Illinois north of Decatur appear to have experienced the least recover to date and thus will have the greatest concerns leading into the winter and spring. The primary water supply concern in upcoming months remains the La Harpe off-channel reservoir, which is roughly 5 feet below its full pool and since June has lost half of its capacity.

When the 2012 drought began this past summer, the regions of primary impact and greatest precipitation deficit were central and southern Illinois. Since that time, precipitation in northern Illinois has been below normal, and the primary focus on drought has shifted to central and northern Illinois while much of southern and south-central Illinois has experienced above-normal rainfall amounts. Northern Illinois typically does not experience significant water supply concerns during drought episodes because the predominant sources of supply are deeper groundwater aquifers that are buffered from the impacts of drought. And although northern Illinois streams have been below normal this year, they have typically not yet experienced the very lowest conditions associated with severe drought.

Groundwater Supplies

Shallow groundwater is usually the last hydrologic component to see recovery following drought conditions. The ISWS maintains long-term records at 14 shallow groundwater wells in the State; most of those wells located in the southern half of Illinois have seen significant amounts of recharge since August, and for some the well levels are now above their long-term average for this time of year. In contrast, all of the wells in the northern half of the State have continued to decline, and there has thus yet been no recovery from the ongoing 2012 drought – consistent with what we have observed for surface water supplies. Data from these wells are included in the ISWS's Water and Climate Summary (<http://www.isws.illinois.edu/warm/climate.asp>). Similar results can be seen with the USGS's network of groundwater observation wells (<http://il.water.usgs.gov/>).

Accumulated Precipitation (in)
September 8, 2012 to October 25, 2012

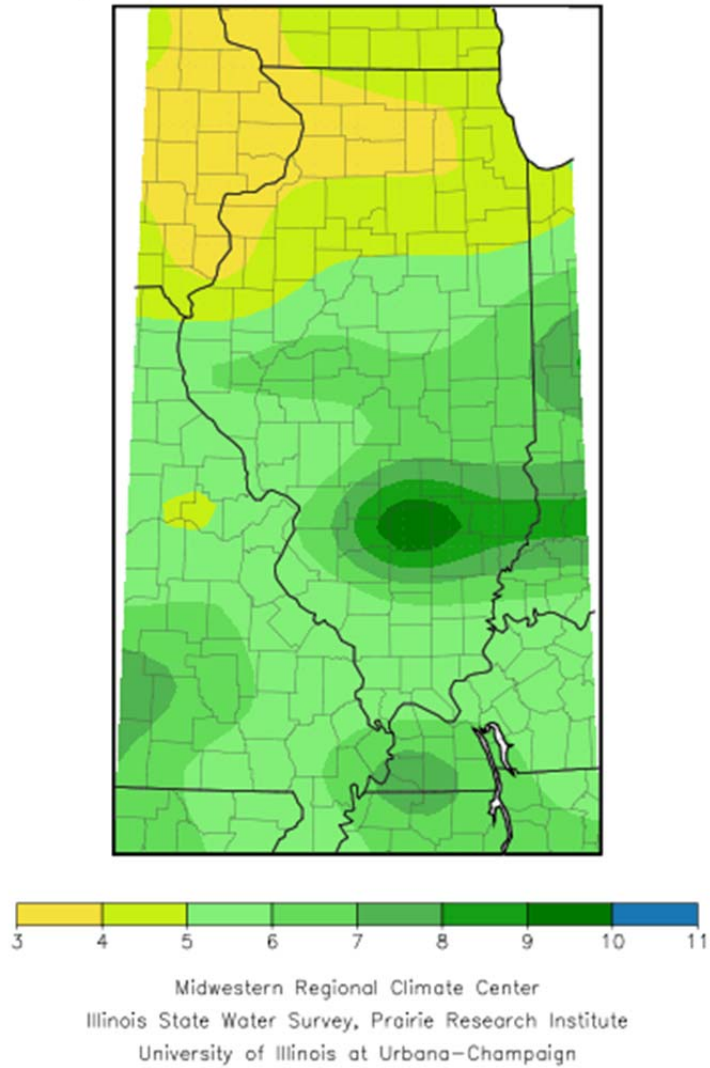


Figure 1. Shown are the accumulated precipitation amounts from September 8 to October 25, 2012. A lower resolution precipitation product was used due to the irregular reporting period of 47 days.

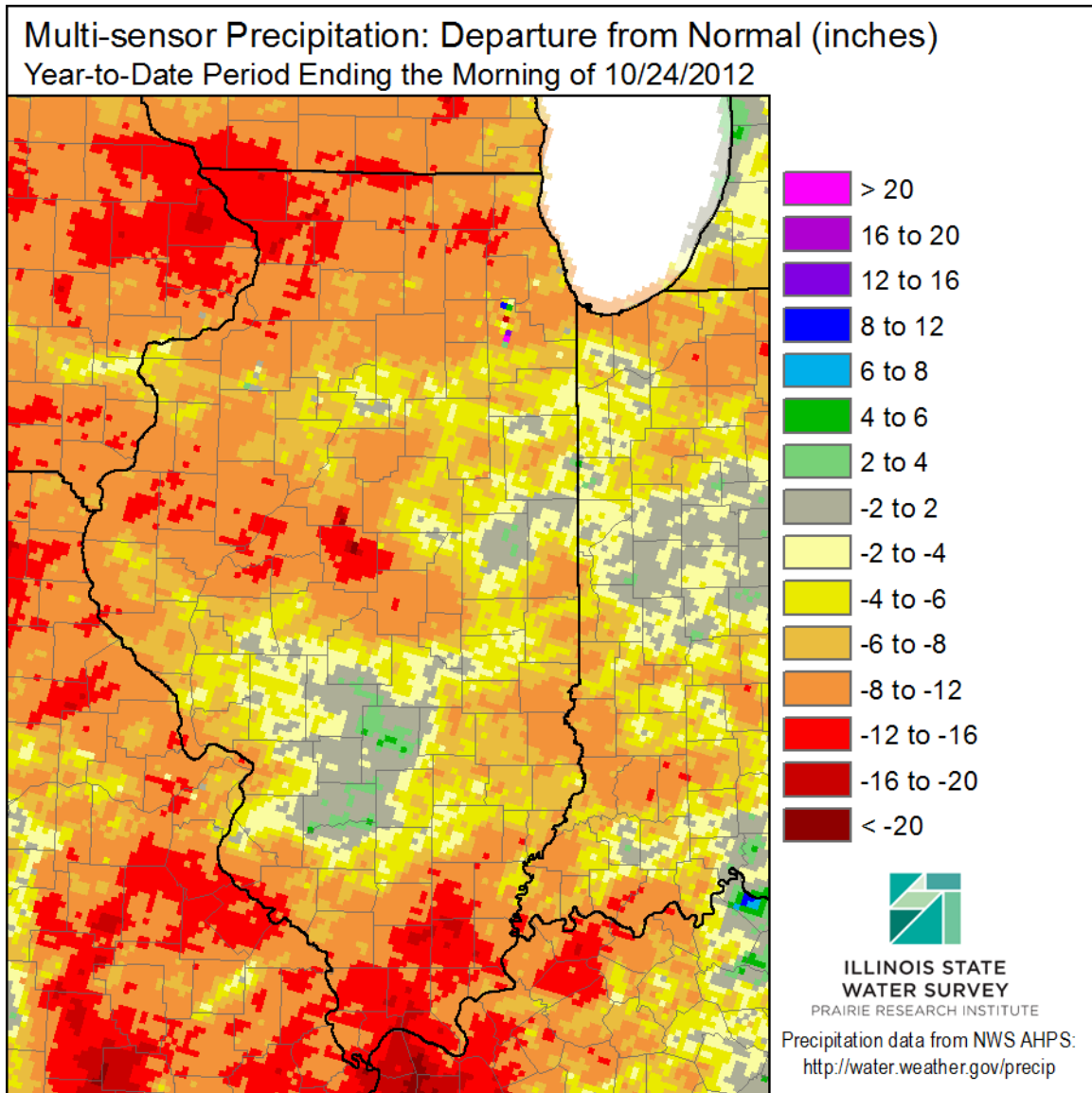


Figure 2. Shown are the January 1 to October 24, 2012, rainfall departures from normal, based on the radar/raingauge data from the Advanced Hydrologic Prediction Service (AHPS) of the NWS and prepared by the ISWS.

October 24, 2012

Daily 4-inch (10cm) Soil Moisture (water fraction by volume)

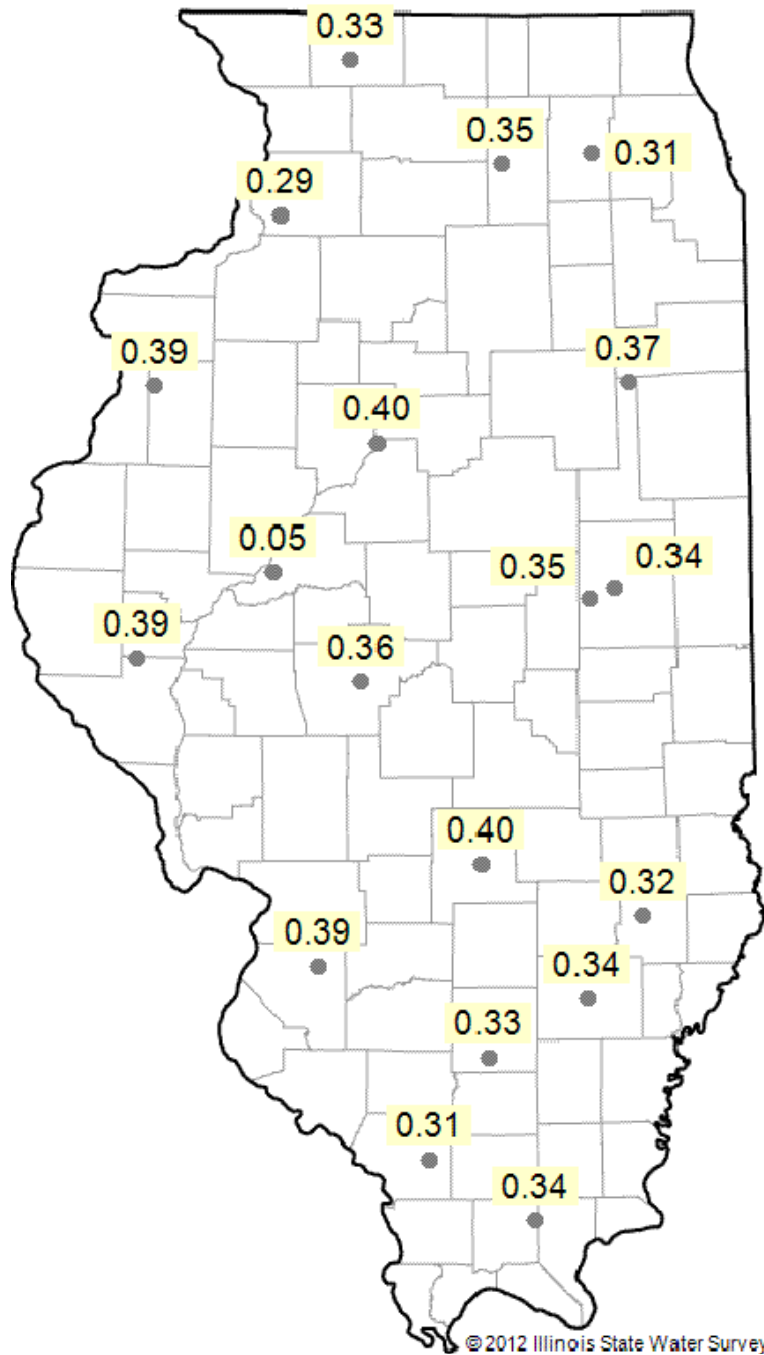


Figure 3. Shown are soil moisture conditions for October 24 at the 4-inch level from 19 ISWS sites across Illinois, expressed as a fraction of the entire volume of soil. A value in the 0.3 to 0.4 range is good for this time of year. Values in northern Illinois are lower. The 0.05 value near Havana is from a sandy soil with little water holding capacity.

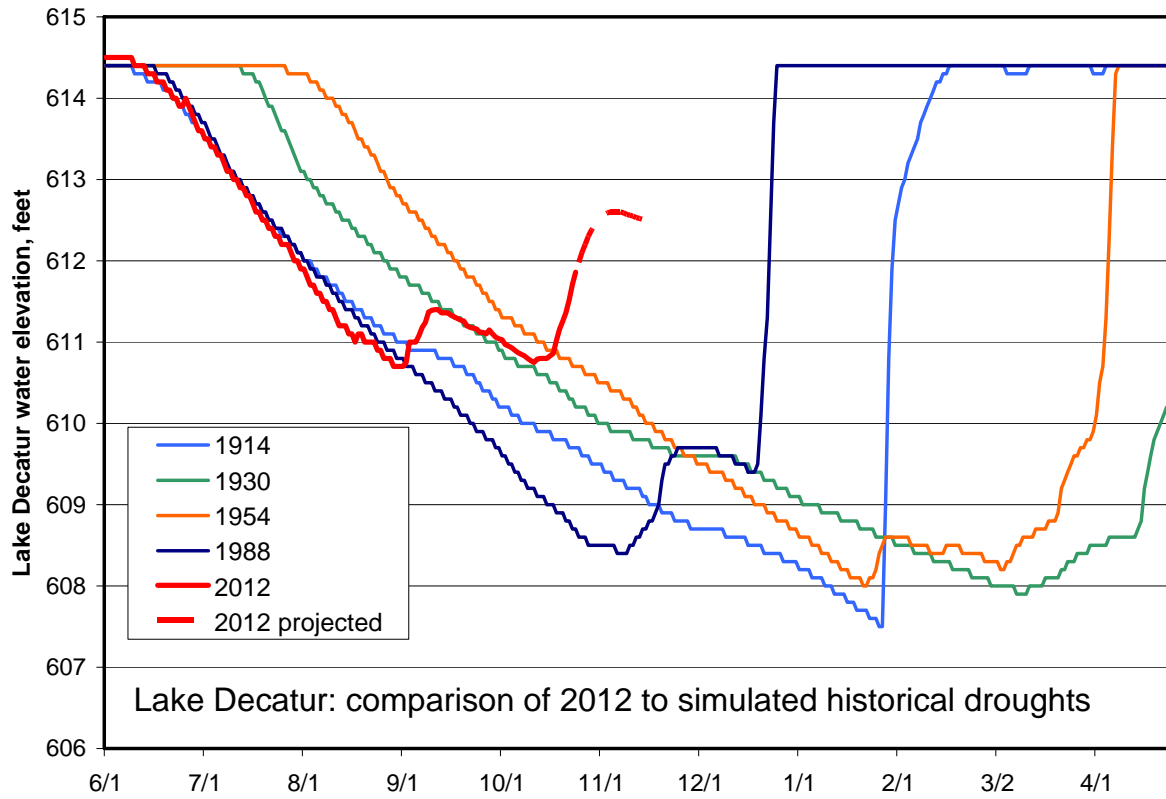


Figure 4. Water level in Lake Decatur in 2012 compared to simulated levels illustrating how Decatur’s current water system would react if faced with conditions similar to major historical droughts.

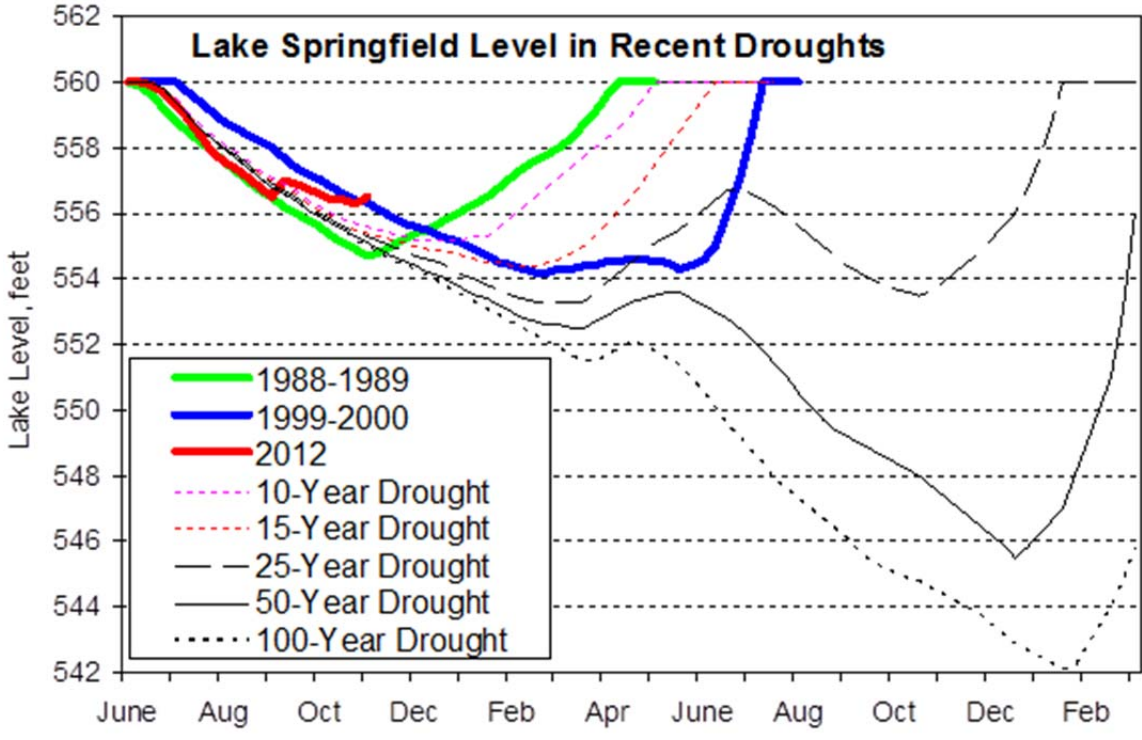


Figure 5. Water level in Lake Springfield in 2012 compared to: a) that from recent drought episodes, and b) estimated impacts of major droughts of varying severity or frequency.