ILLINOIS STATE WATER SURVEY
PRAIRIE RESEARCH INSTITUTE

DROUGHT UPDATE

www.isws.illinois.edu/hilites/drought

July 23, 2012

Over the past month, there have been two prominent features of the drought:

1) The geographic extent of drought conditions have expanded, causing the Illinois conditions to be part of a much greater drought episode for much of the Midwestern U.S. Our belief is that as dryness extends to more areas, including the region between Illinois and the Gulf of Mexico (which supplies moisture for precipitation), there is a much greater likelihood that the ongoing drought conditions will persist in future months.
2) Impacts of the drought on agriculture and streamflow conditions have rapidly accelerated. Crops and pasture conditions have declined rapidly due to the combination of a lack of rainfall and heat stress. Streamflows in central Illinois have fallen sharply over the past 4 weeks and in some regions are at or approaching low flow conditions that are expected to occur on average only once in 10 years. Streamflows are expected to continue their decline for all portions of Illinois and additional regions will likely experience 10-year low flows in the upcoming 1 or 2 weeks.

Precipitation and Temperature

For July so far, the statewide average precipitation is only 0.96 inches (Figure 1), 40 percent of normal. Rainfall amounts of 1 to 2 inches were common in northeast Illinois, southern Illinois south of Interstate 64, and western Illinois around Quincy. Even those amounts would be considered below normal for this time of year. Much of central Illinois north of Interstate 70 and along or just north of Interstate 74 reported amounts of less than ½ of an inch for July.

At this rate, this July is on course to be one of the driest months of July on record at 0.96 inches. The driest July was in 1930 with 1.01 inches. In recent years, 1983 was in 12th place at 1.93 inches. Even July 1988 was much wetter at 2.60 inches.

Based on available data, large areas of far southern Illinois and some areas in central Illinois are now 12 to 16 inches below normal for the year. Much of the rest of the state is 8 to 12 inches below normal. A few fortunate areas near Kankakee, east of St. Louis, and south of the Quad Cities have received more substantial rains that are a little closer to normal but still dry.

At this point in time, the year-to-date statewide precipitation is 13.54 inches, making it the second driest January-July period in the record and virtually tied with 1934 at 13.55 inches. Only in 1936 were conditions drier through July with 12.22 inches. By comparison, 1988 was in third place at 14.60 inches. The statewide records go back to 1895.

Temperatures have been much above-normal this month as well. Most areas have had extended periods of 90 degree weather with temperatures at or above 100 degrees on multiple days. Also problematic for crops is that night-time temperatures have remained high as well with lows only in the upper 60 and low to mid 70s, depending on where in the state. As of July 23, the statewide average temperature is 82.0 degrees, making it the second warmest July on record so far. The warmest July on record was in 1936 at 83.1 degrees.

In summary, Illinois is facing one of its hottest and driest July on record. In addition, it is experiencing one of its hottest and driest January-July periods on record.

Agricultural Conditions

This week it was reported that 66 percent of the corn crop, 49 percent of the soybean crop, and 91 percent of pasture was rated poor to very poor by the U.S. Department of Agriculture. Topsoil was rated at 91 percent poor to very poor and subsoil was rated 97 percent poor to very poor. More details can be found in the weekly Illinois Weather and Crops report published by the USDA.

Streamflows

Most Illinois streams are experiencing much-below normal flow levels (in the lowest 10^{th} percentile for this time of year), with the primary exceptions occurring in the very northern portions of the State, the Chicago metropolitan area, and the Little Wabash River watershed in southeastern Illinois that experienced a localized heavy rainfall event during this period. Many streams, particularly those in central Illinois have fallen sharply from their water levels in late June, with July flow rates being 20% or less of the flows experienced a month earlier. Streams in northern Illinois that have a high groundwater contribution are less prone to sharp declines in water level.

Most streams in Illinois do not experience their annual minimum flows until September, and in extremely dry years streamflows often continue to decline through October and even November before rebounding during the cool season. Thus, while certain streams are already close to their estimated 10-year low level, without substantial amounts of rain we expect streamflows will become even lower over the next 2-3 months. Currently, only certain streams in the Sangamon and Vermilion-Wabash watersheds are experiencing 10-year low flows, but given the present rate of flow recession we expect streams in many portions of central and southern Illinois to reach their 10-year low flow in the upcoming 2 weeks.

The environmental impacts to fish and wildlife are typically related to both water levels and temperatures. Thus, the end-of-summer period over the next 6-8 weeks (through early September) will likely have the greatest potential for fish kills and other environmental impacts.

Community Water Supplies

Communities that obtain water from surface water and shallow groundwater sources are typically the most vulnerable to drought impacts. Analysis of community surface water systems by the ISWS (www.isws.illinois.edu/data/ilcws/drought.asp) shows that most of these water supply systems are expected to have adequate resources during an extreme drought-of-record condition. Communities that withdraw water directly from large rivers are typically the most adequate, thus we do not expect immediate water supply concerns related to projected low streamflow amounts. However, 24 of the roughly 55 community reservoir systems in Illinois are considered to be at-risk during extreme drought. Many of these at-risk reservoirs are designed to endure drought periods lasting 18 months or longer, and are not threatened at this time. However, the Decatur reservoir is vulnerable to droughts lasting only 8-10 months in duration, and for this reason its situation needs to be closely monitored. In addition, most of Illinois' off-channel reservoirs (reservoirs that have been constructed through either excavation or embankments as opposed to the impoundment of streams), which often contain only a 180-day supply of water for the community, are considered vulnerable and there is often comparatively little information available for these systems.

The ISWS maintains long-term monthly records of water levels at over 30 water supply reservoirs located primarily in central and southern Illinois. The network provides valuable comparison to long-term hydrologic conditions to determine relative severity of drought impacts. As of the end of June, a majority of these reservoirs were slightly below normal. Typically, even during many drought years, these reservoirs remain at full pool into July. The drawdown rate at reservoirs is primarily impacted by streamflow inflow, withdrawals from the reservoir, and evaporation. The greatest amount of reservoir drawdown will occur as a result of a drought's persistence over many months, and less by the intensity or drawdown rate for any one or selected set of months. To this extent, it is still too early to project how this particular drought will affect most water supplies other than to indicate that it has occurred very early in the season (and thus is having noticeable agricultural impacts) and so far is as equally intense as severe droughts in the 1900s. For communities that are estimated to have vulnerable supplies, it may be prudent to respond by undertaking water conservation measures.

Shallow Groundwater

Statewide, shallow groundwater levels are below normal with an average departure of 2 feet as of the end of June. Shallow groundwater levels continue to decline in response to little precipitation recharge with an average decrease of 1.3 feet from last month. Levels are approximately 4.5 feet below that from June of last year. The ISWS Center for Groundwater Science is receiving calls from domestic well owners looking for alternate sources of groundwater due to dry conditions mainly from owners of shallow, large-diameter bored wells.

Concerns and requests for information related directly to drought conditions has currently come from six counties; Kane, Winnebago, Lake, Sangamon, Woodford, and Effingham.

Heavy irrigation in Lee, Whiteside, Bureau, Champaign, and Kankakee Counties has been reported, necessitating the lowering of domestic well pumps in areas surrounding the irrigation wells. In one instance (Champaign Co. north of Fisher) new deeper wells are currently being drilled because of water level declines below the current well systems. Observation wells in Lee/Whiteside/Bureau report declines from 16 to 30 feet from April.

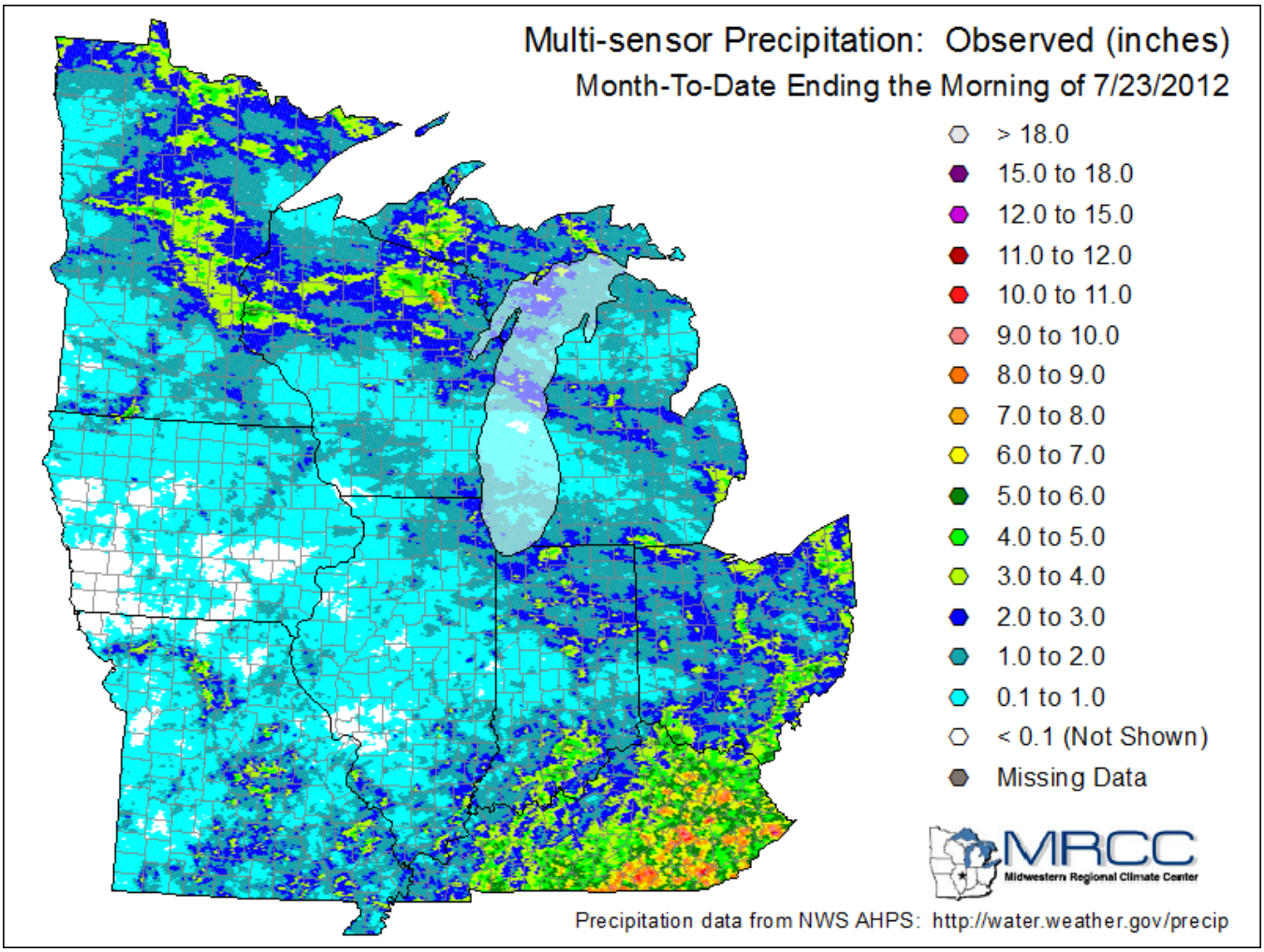

Figure 1. Precipitation totals across the Midwest for the month of July, ending on the morning of July 23. The data are derived from radar estimates calibrated with rain gauge measurements.