**Illinois Drought Update, December 1, 2005**
**DROUGHT RESPONSE TASK FORCE**
**Illinois State Water Survey, Department of Natural Resources**

For more drought information please go to http://www.sws.uiuc.edu/.

**SUMMARY**. The precipitation deficit has increased across northern Illinois and decreased in eastern and southern Illinois. The Northeast and Northwest climate divisions are experiencing their driest March-November periods on record, and the Central climate division is experiencing its 3rd driest on record. The water levels of many reservoirs in central Illinois are expected to drop over the next two months unless above-normal precipitation occurs, and the potential for drought impacts on water supplies could develop should dry conditions persist through winter and spring.

**1. DROUGHT STATUS**. According to the U.S. Drought Monitor (Figure 1), most of northern Illinois remains in a severe or extreme drought (categories 2 and 3 in their 4-category drought classification). Much of central Illinois remains in the categories of moderate drought or abnormally dry. Only southern Illinois is considered to be clear of drought. The Drought Monitor is updated each Thursday morning at 8am EDT and can be accessed via the Internet at http://www.drought.unl.edu/dm/monitor.html.

**2. PRECIPITATION.** Statewide precipitation since the last Drought Response Task Force meeting on September 29 has been 5.22 inches, which is 0.99 inches below normal. During that period, southern and eastern Illinois received close to normal precipitation. Meanwhile, northern and western Illinois received amounts that were 1 to 2 inches below normal, leading to worsening precipitation deficits in that region. On a state-wide monthly basis, October was very dry (1.41inches, 1.51 inches below normal) while November was much wetter (3.82 inches, 0.59 inches above normal). Statewide precipitation (Figure 2) since March 1 has been 23.58 inches (8.58 inches below normal). The area just to the north of Peoria is especially severe with precipitation deficits of 13 to 14 inches since March 1.

**3. LAST 100 YEARS.** Despite the occurrence of near normal statewide rainfall in four of the last 5 months, the precipitation total in Illinois during the March – November 2005 period is the 7th driest such period since 1895 (Figure 3). While March through May was uniformly dry statewide, considerable variability in rainfall totals is observed now on a climate division basis. Above normal rainfall across southern Illinois since June, largely due to an unusual number of tropical systems impacting the state, has brought much the southwest and southeast climate divisions out of drought. However, far northern and portions of central Illinois continue to report very dry precipitation totals. Specifically, the northwest and northeast climate divisions now report the driest March – November period on record (Figure 4), while the central, west, and west-southwest divisions report the third to fifth driest such period over the last 111 years.

**4. SOIL MOISTURE.** Normal precipitation in recent weeks and seasonal reduction in both evaporation and extraction of moisture by plant growth has allowed near surface soil moisture to return toward more normal levels. Nevertheless, moisture in deeper soils remains substantially dry in much of Illinois, observed by the overall pattern in a north-south band across the state

(Figure 5). Although near surface moisture will likely be sufficient during the early weeks next year's growing season, above normal precipitation will be needed through the winter and into spring to fully recharge soils in the deeper layers.

**5. GROUNDWATER.** Water levels at ISWS shallow observation wells at Fermi National Laboratory in DuPage County (15 feet deep) and Bondville in Champaign County (21 feet deep) continue to decline. The levels at both sites are, once again at their lowest readings ever recorded for any month since records began in November 1988 and March 1982, respectively. The water level at Fermi is currently 6.4 feet below normal and at Bondville, the level is 4.1 feet below normal.

The dry water table conditions within the central portion of the state are also reflected in the shallow wells stationed at the ICN sites. Of the sixteen wells, only the four centrally located wells have shown declines in water levels this month. All other sites have either leveled off or have reported slightly increased levels. Irrigation demand has stopped within the last few months in northwestern Illinois. As a result, groundwater levels in the deep buried, artesian Sankoty aquifer of Lee, Whiteside, Bureau, and Henry counties continued to recover during November. Meanwhile, groundwater levels in the surficial, water-table aquifer (the Tampico aquifer) continue to fall slowly - declines of 0.2 to 0.9 feet were common.

The ISWS has received 6 reports over the last two months from homeowners that are experiencing well problems related to drought conditions. These reports have centered in Champaign and Vermilion counties and all have been using large-diameter bored wells which are particularly prone to problems during dry periods because of their shallow construction depths (typically 25 to 50 feet deep).

Groundwater levels are expected to continue their downward trend over the next few months which is typical for this time of the year. However, the previous dry periods are causing an increased decline especially in the north and central parts of the state.

**6. ILLINOIS STREAMFLOWS.** November streamflows in Illinois (Figure 6) ranged from much below normal in the northwest quadrant of the state, where precipitation deficits are greatest, to normal conditions in eastern Illinois and above normal conditions in southern Illinois. Streamflow rates reached their annual minima during the August through October time period, with many streams in northern Illinois experiencing flows below the 10-year low flow. With the growing season ended, most precipitation is now replenishing soil moisture and leading to increases in runoff and streamflow, following the normal seasonal pattern. However, much above normal amounts of precipitation will be needed over the winter and spring in the northwestern part of the state to return these flow conditions to a normal condition.

**7. WATER LEVELS AT PUBLIC WATER SUPPLY (PWS) RESERVOIRS**. Figure 7 provides November month-end water levels for 10 selected reservoirs in central Illinois for which the ISWS has recorded monthly levels for at least 16 years. There are relatively few water supply reservoirs located in the northern portion of the state where there precipitation deficit and drought impacts are greatest. The biggest concern for water supply reservoirs is in central Illinois with the possibility of having a dry winter and spring period in which already low reservoirs may not be able to recover to their normal (full) pool levels by the end of spring. Records from past droughts suggest that, without a substantial recovery in streamflow by the spring, we should not expect that Canton Lake, Lake Bloomington, and Lake Evergreen will

return to full pool (this may also be the case for other reservoirs in this region where monthly levels are not available). Although less likely, a markedly dry winter and spring could cause other reservoirs in central Illinois – such as near Springfield and vicinity – to lack a full recovery in water levels, similar to conditions experienced during the spring of the 1999-2000 drought.

- Altamont Lake, located near Effingham, is at its lowest November level in 23 years of record; however this lake is designed to provide water through a 4-year drought period and, as such, the low water levels are not yet a concern.
- Lake Decatur is now at full pool; pumping from the DeWitt well field was discontinued around November 1. Decatur took several proactive measures to mitigate potential drought impacts, and the Lake Decatur watershed also received timely rainfalls at critical periods throughout the drought to avoid major water supply concerns.

**8. FEDERAL RESERVOIRS.** Lake Shelbyville and Carlyle Lake are roughly 1.9 and 0.8 feet below their target pool levels, respectively, having risen slightly during November. Although the lakes are at a low seasonal level (their 2nd and 3rd lowest levels over the last 20 years at Shelbyville and Carlyle, respectively); the lake levels are still above the normal winter pool level, and water will be released in December to lower the lakes to their winter pools. Rend Lake is at an elevation of 405.3 feet, which is normal for this time of year.

**9. MISSISSIPPI AND OHIO RIVERS.** The water levels in the Mississippi and Ohio Rivers are presently at normal to slightly below-normal seasonal levels, which are representative of the overall precipitation conditions over the large watersheds of these rivers.

**10**. **ILLINOIS RIVER**. The flow amount in the Illinois River is around 6000 cubic feet per second, which is below normal for this time of year, but nearly double the near-record low levels that persisted throughout much of the summer and early fall. As discussed in previous updates, the near-record low flows on the Illinois were the results of both this year's drought conditions and the general reduction in the Lake Michigan diversion caused by water use conservation and the reduction of leakage through the Chicago Locks.

**11. LAKE MICHIGAN.** The level of Lake Michigan continues to drop, but at a slower rate during the month of November as a result of substantial rainfall amounts over portions of Michigan and Wisconsin. The average lake level for November 2005 was 577.2 feet, which is 1.6 feet below the long-term average for November and 0.9 feet above the lowest November conditions recorded in 1964. The level in Lake Michigan can be expected to continue dropping through mid-winter as part of its normal seasonal cycle, and potentially could reach low levels similar to those observed over the winter of 2002-2003, when the lake was only 0.5 foot above its record low.

**12. OUTLOOK.** According to the National Weather Service, the weather over the next two weeks is expected to be colder than average with normal to below-normal precipitation. Their outlook for December-January-February calls for an increased chance of above-normal temperatures; however, they provide no guidance on precipitation. It should be noted that December, January, and February, are normally the three driest months of the year with 2.74, 1.97, and 1.99 inches of precipitation respectively. Much of this precipitation in the northern and central portions of the state falls as snow.

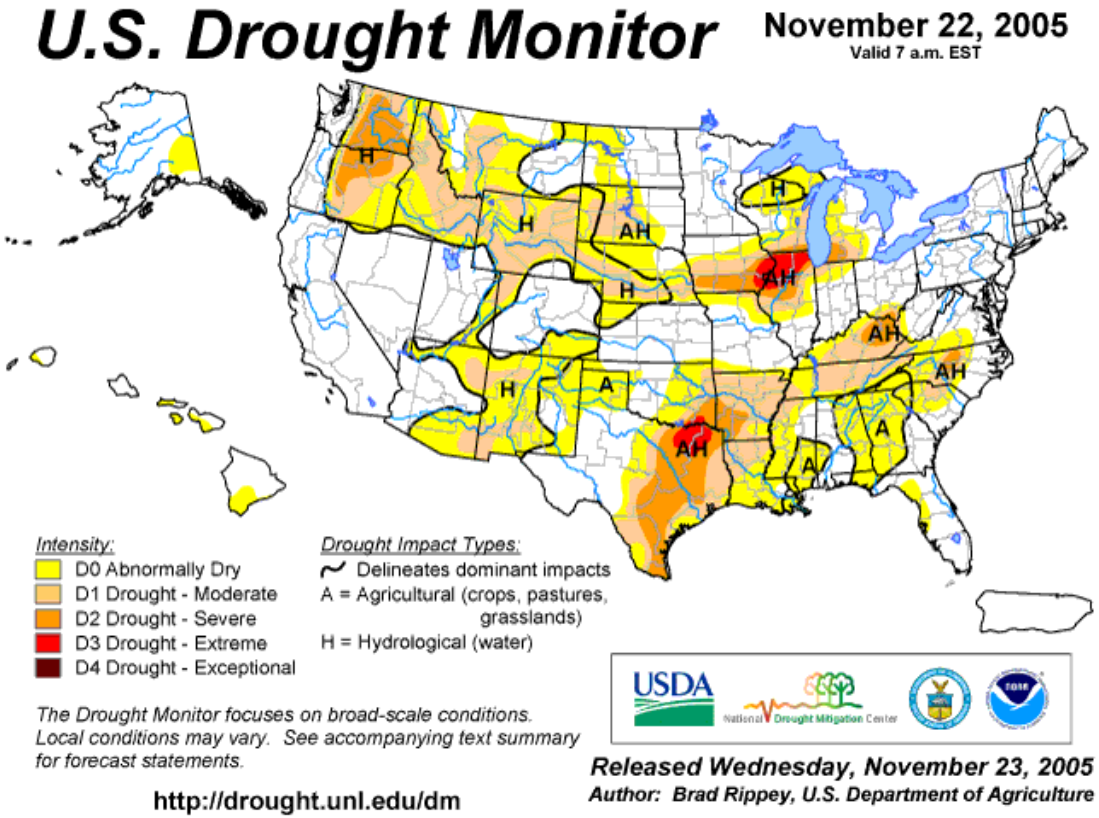



**Figure 1. U.S. Drought Monitor for November 22, 2005.**

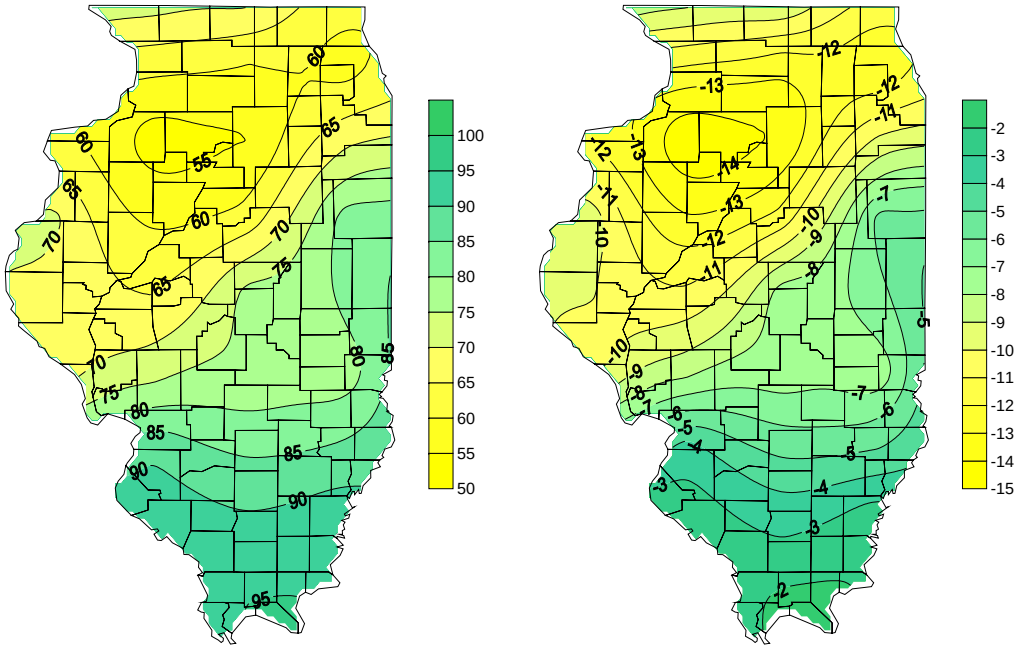



**Figure 2.** Precipitation for the period of March 1 to November 29, 2005, in terms of percent of normal (left) and departure from normal (right).

Source: Illinois State Water Survey

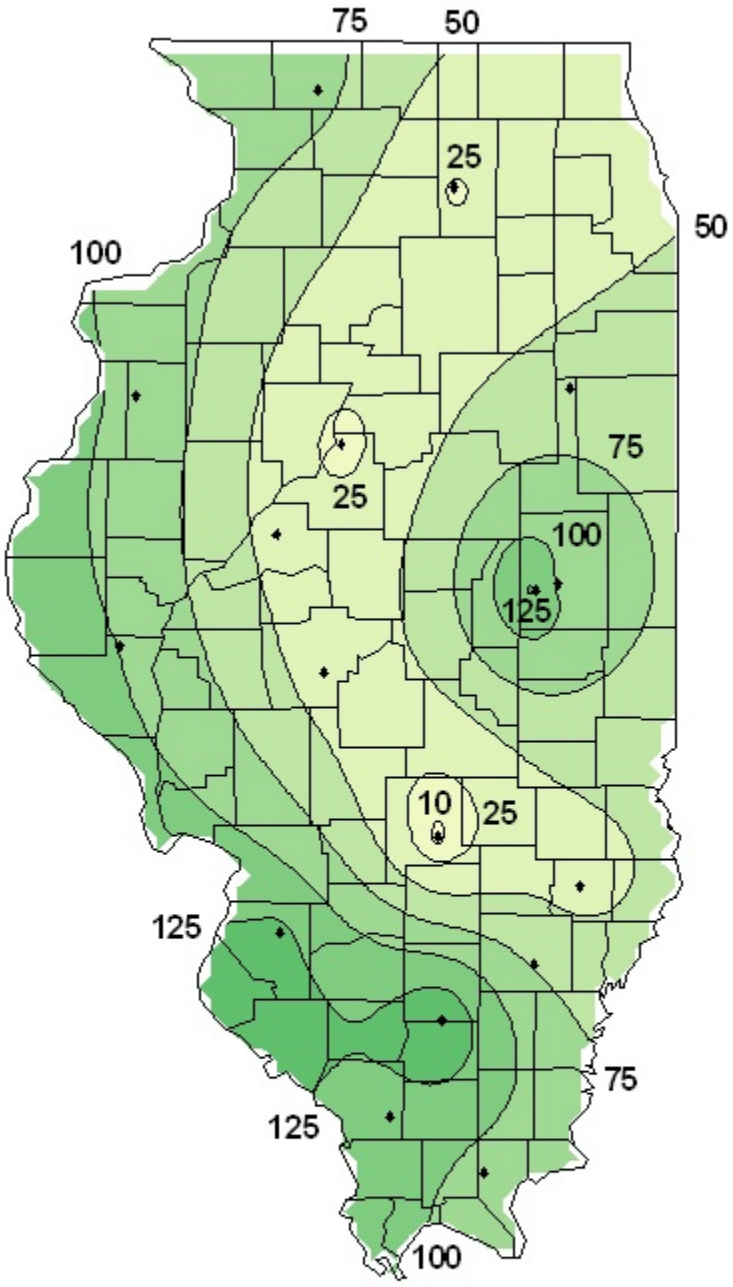
**Figure 3. Ten driest March through November periods in Illinois (since 1895)**

| *Rank* | *Year* | *Precip (in)* |
|---|---|---|
| 1 | 1901 | 20.30 |
| 2 | 1930 | 20.52 |
| 3 | 1914 | 21.89 |
| 4 | 1971 | 22.78 |
| 5 | 1953 | 22.93 |
| 6 | 1988 | 23.23 |
| **7** | **2005** | **23.58** |
| 8 | 1936 | 24.04 |
| 9 | 1940 | 24.09 |
| 10 | 1895 | 24.45 |

**Figure 4. Rankings of driest March through November periods within Illinois climate divisions (since 1895)**

| *Climate divisions* | *2005 rank* | *top 4 driest years* |
|---|---|---|
| Northwest | 1 | **2005**, 1988, 1910, 1895 |
| Northeast | 1 | **2005**, 1971, 1962, 1956 |
| West | 5 | 1988, 1901, 1953, 1936 |
| Central | 3 | 1901, 1988, **2005**, 1914 |
| East | 16 | 1895, 1930, 1901, 1988 |
| West-Southwest | 5 | 1914, 1901, 1930, 1953 |
| East-Southeast | 18 | 1930, 1914, 1901, 1954 |
| Southwest | 34 | 1901, 1930, 1953, 1914 |
| Southeast | 42 | 1930, 1901, 1936, 1940 |

# 0 - 72 inch Soil Layer




**December 1, 2005 observed percent of normal soil moisture based on 1985-1995 mean.**

Source: Illinois State Water Survey

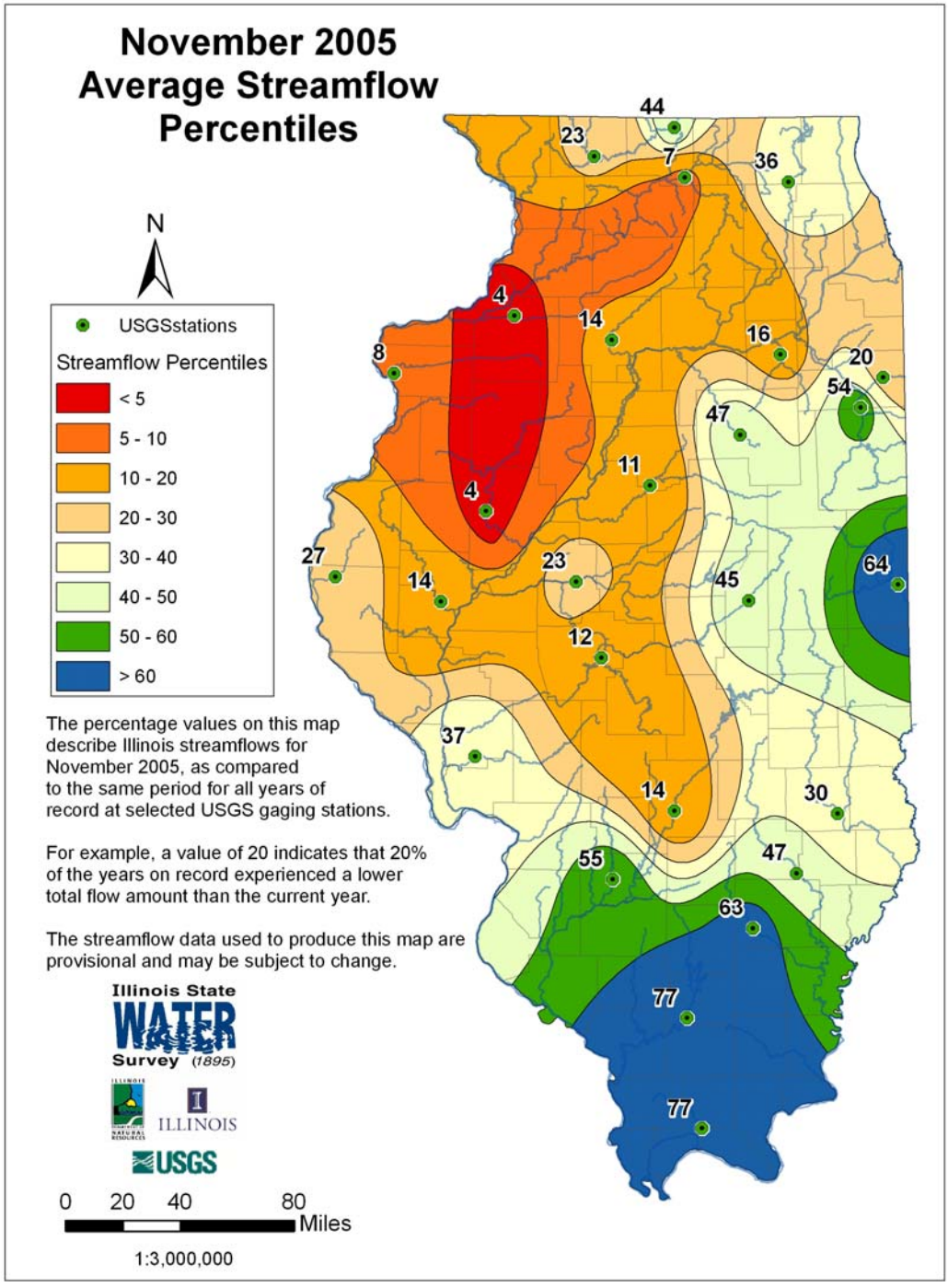



**Figure 6. November 2005 Streamflow Percentiles**

**Figure 7. November 2005 End-of-Month Water Levels at Selected PWS Reservoirs**

| Reservoir | Current reservoir drawdown | Beginning of ISWS lake record (year) | Rank | Lowest November level on record (year)** |
|---|---|---|---|---|
| Altamont Lake | -5.7 ft | 1983 | 1 | -5.7 ft (2005) |
| Canton Lake | -6.0 ft | 1989 | 2 | -13.2 ft (1989) |
| Lake Pittsfield | -2.2 ft | 1988 | 2 | -2.6 ft (1999) |
| Lake Bloomington* | -11.2 ft | 1983 | 3 | -12.2 ft (1988) |
| Evergreen Lake* | -4.2 ft | 1988 | 5 | -22.3 ft (1989) |
| Lake Pana | -3.2 ft | 1983 | 5 | -5.0 ft (1999) |
| Paris East Lake | -2.3 ft | 1983 | 6 | -3.7 ft (1999) |
| Carlinville Lake | -2.5 ft | 1983 | 6 | -3.7 ft (1987) |
| Lake Springfield | -3.7 ft | 1983 | 7 | -4.6 ft (1988) |
| Spring Lake (Macomb) | -1.0 ft | 1983 | 7 | -5.4 ft (1989) |

Four other water supply reservoirs with more than 16 years of record are at full pool:
Lake Decatur, Highland Silver Lake, Kinkaid Lake, Lake Vermilion

*Paired reservoirs - the amount of total reduction in reservoir storage for the combination of Lake Bloomington and Evergreen Lake is the 4th lowest for November since records began in the 1980s (behind 1988, 1989, and 2000).

**Although some water level records are available for historical droughts such as during the 1950s drought of record, these older values are usually not directly comparable to modern records because of substantial changes over time in either water use, normal pool elevation, or in additional sources of supply.

Source: Illinois State Water Survey