Illinois Drought Update, January 6, 2006
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. Extreme to severe drought persists throughout most of northern Illinois and is evident in record low precipitation since March 2005, low streamflow, low soil moisture, and low groundwater levels. Dry conditions extend into west central, west southwest, and east southeast Illinois. Instead of recovery that normally is expected during fall and early winter, the drought has intensified. Although the drought has caused adverse impacts, the impacts on water supplies would have been much more severe if the same extreme drought had occurred in central or southern Illinois, where there is an increased reliance on reservoirs and lakes for water supplies. Above normal amounts of precipitation are needed into spring to end the drought.

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). This week the area along Lake Michigan was reduced from an extreme (category 3) to severe (category 2) drought. However, ISWS scientists did not concur with this change in status, based on indicators that showed no improvement in that area. Much of central Illinois remains in the categories of moderate drought or abnormally dry. Only southern Illinois is considered to be clear of drought. There is some concern with the recent intensification of drought in Texas, Oklahoma, and Arkansas. Early in the last growing season, dryness in that area joined with widespread dryness across Missouri and Illinois. 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 between the last DRTF meeting on December 1 and January 5, 2006, has been 1.72 inches, which is 1.37 inches below normal. Conditions were uniformly dry across the state with no area receiving close to normal precipitation. Statewide precipitation (Figure 2) since March 1, 2005, has been 25.17 inches (10.16 inches below normal and 71 percent of normal). Precipitation deficits at individual sites can be even more severe. Since March 1, Moline received only 14.77 inches (20.47 inches below normal); Chicago, 18.34 inches (14.87 inches below); Rockford, 19.62 inches (14.54 inches below); and Quincy, 20.25 inches (14.83 inches below). The deficit has worsened since the last DRTF meeting by 1.34 inches. At this time, no snow is reported on the ground in Illinois. As a result, there is no moisture storage available for release into the soil later on.

3. LAST 100 YEARS. Historic long-term precipitation deficits continue in the state, especially in northern Illinois. Statewide precipitation totals during the March - December period were the 3rd driest such period since 1895 (Figure 3). Current amounts are over an inch lower than during the same period of the last substantial drought in memory (1988). Regionally, totals during the last 10 months were the lowest ever recorded in the northwest and northeast climate divisions, and the second and third driest in the west and central divisions, respectively (Figure 4). The west-southwest and east-southeast divisions also have been considerably short on precipitation. Over the last month, divisional rankings of precipitation totals since March 2005 essentially have

remained the same in the northern two-thirds of the state, but have become drier in the east-southeast, southwest, and southeast divisions.

4. SOIL MOISTURE. Soil moisture totals in Illinois continue to indicate very dry conditions in a broad band from northeastern to central to southeastern Illinois (Figure 5). Although a few sites in the state report near normal conditions, the current lack of any snow cover or frozen ground in Illinois will allow drying of surface soils to continue. It is unusual for near-surface soil moisture to be insufficient for early agricultural needs in spring, but only the occurrence of substantial above normal rainfall over the next several months will be able to recharge the total soil moisture profile in the driest regions.

5. GROUNDWATER. Statewide, shallow groundwater levels continue to be below normal. Deviations from normal averaged 3.2 feet below, levels averaged 0.1 feet lower than November levels, and levels averaged approximately 5.0 feet below December levels one year ago.

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 level at Fermi is 6.2 feet below normal which is its lowest ever since its record began in November 1988. The level at Bondville is 4.6 feet below normal which is its lowest level for December since its record began in March 1982.

The ISWS has received 4 reports in December from homeowners that are experiencing well problems related to drought conditions. These reports have centered in Kane, Vermilion, and Peoria 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). We have also had reports of water hauling for large-diameter bored well groundwater supplies northwest of Peoria due to dry conditions.

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

6. ILLINOIS STREAMFLOWS. December streamflows in Illinois (Figure 6) were mostly in the below-normal range (10^{th} to 30^{th} percentiles), although the eastern edge of the State and parts of southern Illinois are experiencing flows in the normal range (30^{th} to 70^{th} percentile). There is a small region in north-central Illinois near Peoria that experienced much-below normal flows (less than 10^{th} percentile) for December, but flows in this region have risen following end-of-month rainfalls. With the continuing precipitation deficit, we do not anticipate a recovery in the overall low streamflow amounts in much of Illinois without significant reduction in the continuing precipitation deficit. At the same time, there would need to be an extended period of very low precipitation for flows to return to much-below normal status. Precipitation in early spring will likely be key in drought recovery or, on the other hand, in the advancement of drought conditions and water supply concerns.

7. WATER LEVELS AT PUBLIC WATER SUPPLY (PWS) RESERVOIRS. Figure 7 provides current water levels for 10 selected reservoirs in central Illinois for which the ISWS has monthly records for at least 16 years. There are relatively few water supply reservoirs located in the northern portion of the state where the precipitation deficit and drought impacts are greatest.

Low water levels often recover partially in winter months, but streamflows in December were not sufficient to replenish storage in most of the reservoirs shown in Figure 7. As a result, most of these 10 reservoirs have seen little overall change in water level since the end of November. In general, most of the reservoirs listed in Figure 8 are not as low as that experienced in the two previous drought periods of 1988-1989 and 1999-2000, but are noticeably lower than their normal (median) levels for this time of year. The biggest concern for water supply reservoirs is the possibility of having a continued dry winter and spring period in which already low reservoirs may not be able to recover to their full pool levels by the end of spring.

- Without a substantial turnabout in precipitation amounts, we do not expect that Canton Lake, Lake Bloomington, and Lake Evergreen will return to full pool this spring. For these reservoirs, the lowest water levels in past droughts have typically occurred in the year <u>following</u> the period of greatest precipitation deficit.
- Altamont Lake, located near Effingham, is at its lowest December 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.
- As reported last month, Lake Decatur has returned to full pool and is no longer a concern.

8. <u>FEDERAL RESERVOIRS</u>. There are no water supply concerns for any of the federal reservoirs. Since mid-December, water has been released from Lake Shelbyville and Carlyle Lake to bring their pool levels down to the target winter pool. Carlyle Lake has already reached its winter pool level and Lake Shelbyville is expected to reach its winter pool by mid-January. Rend Lake is at an elevation of 405.5 feet, which is moderately low for this time of year.

9. <u>MISSISSIPPI AND OHIO RIVERS</u>. The water levels in the Ohio River and the Mississippi River downstream of St. Louis have generally been in the normal range for most of December. In contrast, the Upper Mississippi River has been experiencing above-normal flows.

10. **<u>ILLINOIS RIVER</u>**. The Illinois River was low in December, with average flow levels near the lowest 10th percentile, but precipitation in early January has raised the average flow level of the river. The generally low flow condition on the Illinois River thus far into the winter is the combined results of persisting dryness in northern Illinois and the general reduction in the Lake Michigan diversion in recent years caused by water use conservation and the reduction of leakage through the Chicago Locks.

11. <u>LAKE MICHIGAN</u>. The water level for Lake Michigan during December 2005 fell at a normal seasonal rate, with an average water level of 577.0 feet. This is 0.2 feet lower than the average water level in November 2005, 1.6 feet below the long-term average for December, and 0.8 feet above the lowest December 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.

12. <u>OUTLOOK</u>. According to the National Weather Service, the weather over the next two weeks is expected to be warmer than average with the chance of precipitation improving through the period. Their outlook for January-February-March calls for an increased chance of above-normal temperatures; however, they provide no guidance on precipitation. Do not expect too much relief from drought concerns in January and February because they are normally the two

driest months of the year with 1.97 and 1.99 inches of precipitation respectively. Much of that precipitation in the northern and central portions of the state normally falls as snow.

Continuous above average precipitation will be needed over the next several months to mitigate the dryness. If current conditions persist, frequent and timely rainfall events in these regions will be much more important this year than is normal as the state moves into the next growing season.

13. <u>2005 SUMMARY</u>. Water resources in Illinois during the last year reveal the impacts of very low precipitation totals of last spring with sporadic wetter monthly totals since that time interspersed among additional dry monthly amounts (Figure 8). All other water resources responded to the initial dryness in a fairly short period of time with soil moisture most closely mirroring the rainfall deficit. Streamflow dropped quickly and has remained below median flow for 9 months. Shallow groundwater wells (water table levels) continue to decrease with the lack of substantial precipitation.

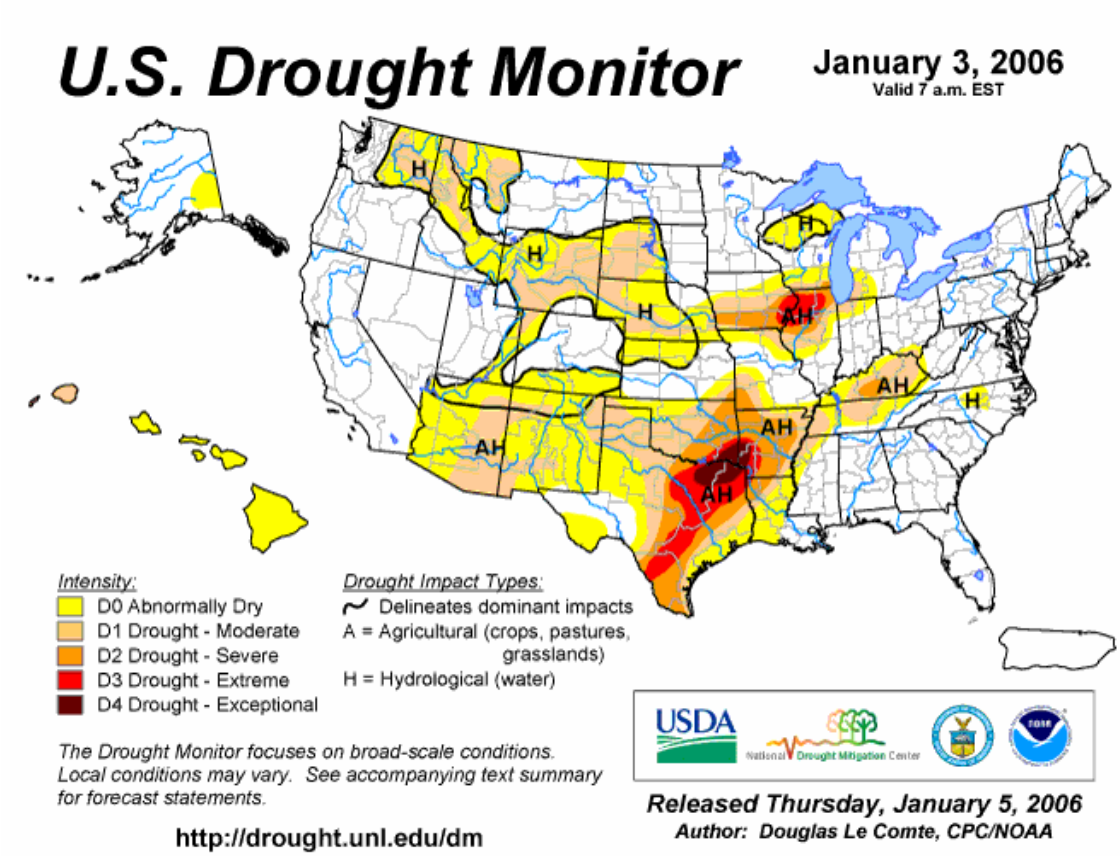
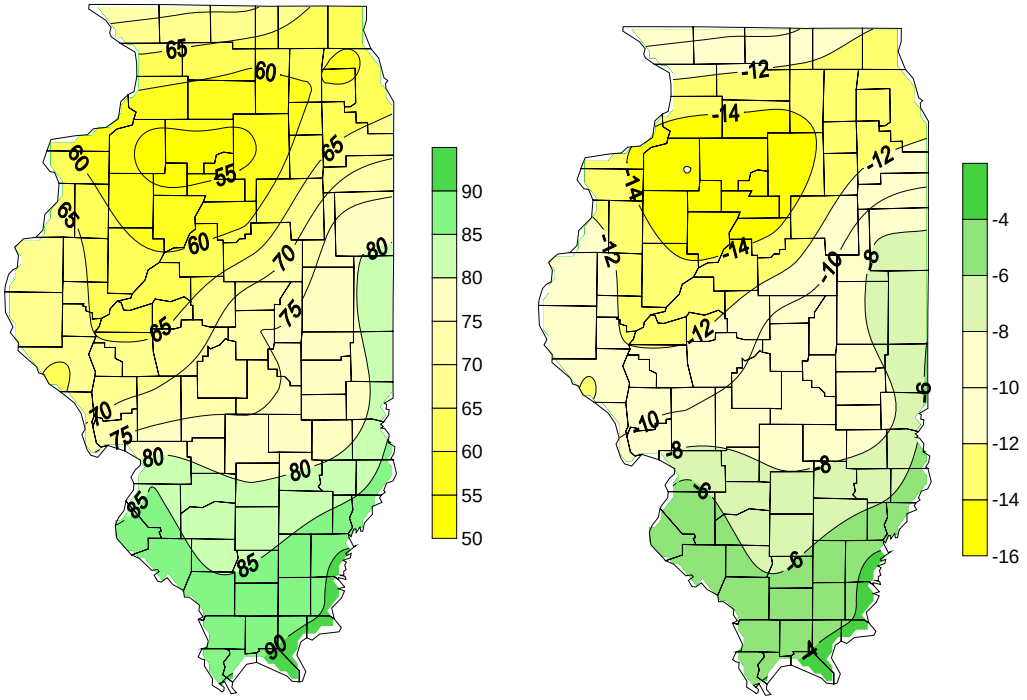


Figure 1. U.S. Drought Monitor for January 3, 2005.



March 1, 2005, to January 5, 2006
Precipitation Percent of Normal

March 1, 2005, to January 5, 2006
Precipitation Deficits (inches)

Figure 2. Precipitation for the period of March 1, 2005 to January 5, 2006, in terms of percent of normal (left) and departure from normal (right).

Source: Illinois State Water Survey

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

Rank	*Year*	*Precip (in)*
1	1930	21.20
2	1901	23.24
3	**2005**	**24.15**
4	1914	24.28
5	1953	24.72
6	1988	25.59
7	1976	25.69
8	1940	26.17
9	1963	26.64
10	1936	26.95

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

Climate divisions	*2005 rank*	*top 4 driest years*
Northwest	1	**2005**, 1988, 1930, 1910
Northeast	1	**2005**, 1962, 1930, 1956
West	2	1988, **2005**,1901, 1953
Central	3	1901, 1988, **2005**, 1930
East	16	1930, 1963, 1914, 1901
West-Southwest	5	1930, 1914, 1901, 1953
East-Southeast	7	1930, 1914, 1976, 1953
Southwest	23	1930, 1953, 1901, 1976
Southeast	20	1930, 1940, 1901, 1953

Source: Illinois State Water Survey

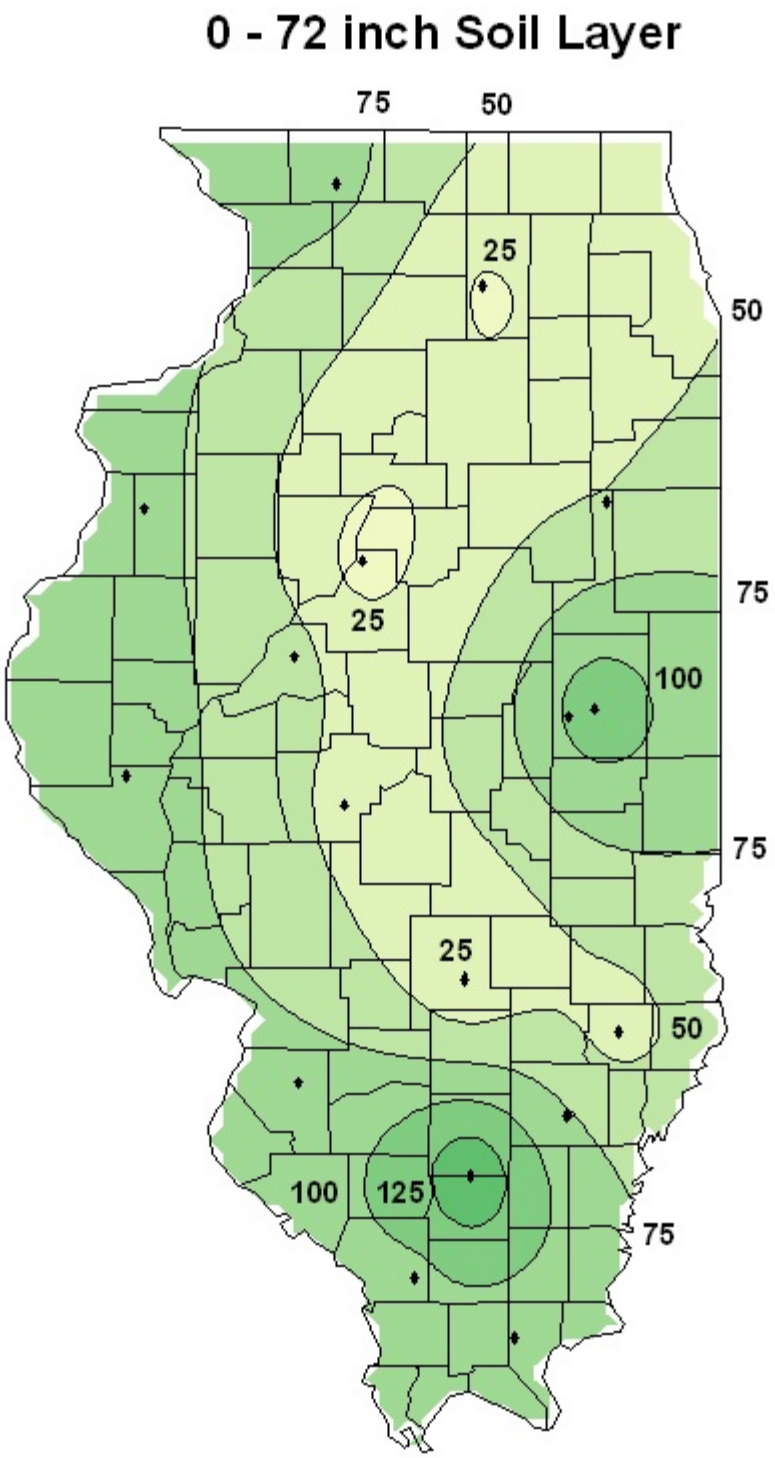


Figure 5. January 1, 2006 observed percent of normal soil moisture based on 1985-1995 mean.

Source: Illinois State Water Survey

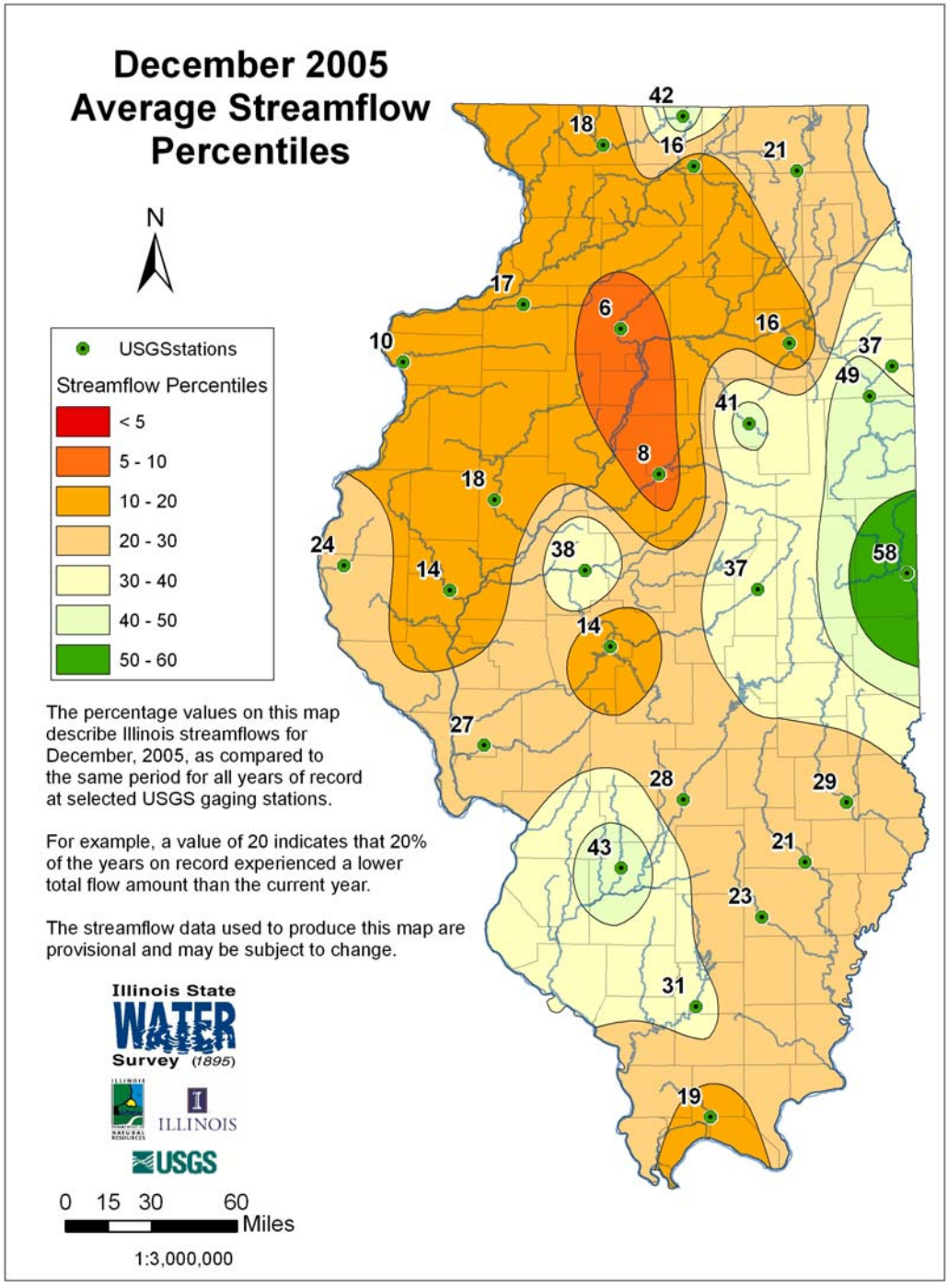


Figure 6. December 2005 Streamflow Percentiles.

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

Reservoir	Current reservoir drawdown	Beginning of ISWS lake record (year)	Rank	Lowest December level on record (year)**	Median December level
Altamont Lake	-6.3 ft	1983	1	-6.3 ft (2005)	-2.1 ft
Canton Lake	-6.1 ft	1989	2	-11.3 ft (1989)	-2.5 ft
Lake Pittsfield	-2.0 ft	1988	2	-2.7 ft (1999)	0.0 ft
Lake Bloomington*	-10.7 ft	1983	3	-11.9 ft (1988)	-1.9 ft
Paris East Lake	-1.2 ft	1983	4	-5.9 ft (1999)	0.0 ft
Carlinville Lake	-2.0 ft	1983	4	-3.5 ft (1999)	0.0 ft
Evergreen Lake*	-5.4 ft	1988	5	-24.0 ft (1989)	-2.2 ft
Lake Pana	-3.2 ft	1983	5	-5.0 ft (1999)	-0.2 ft
Lake Springfield	-3.7 ft	1983	6	-4.9 ft (1999)	-1.2 ft
Spring Lake (Macomb)	-0.7 ft	1983	9	-5.2 ft (1989)	0.0 ft

*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

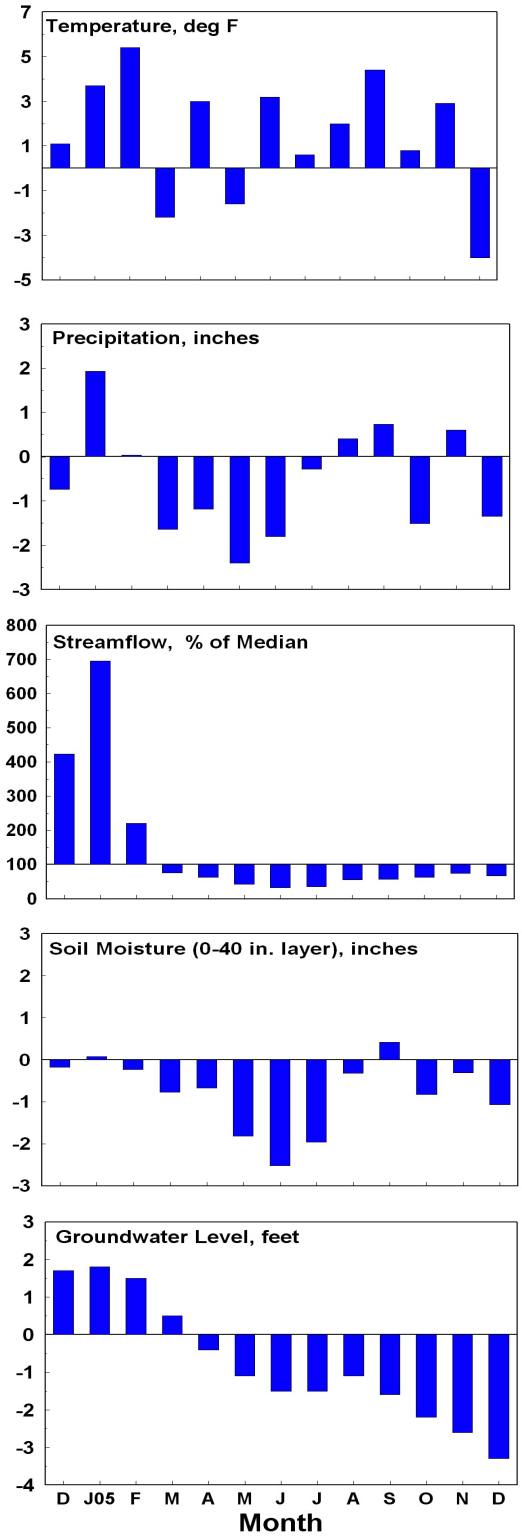


Figure 8. Illinois statewide departures from normal.

Source: Illinois State Water Survey