

ILLINOIS WATER AND CLIMATE SUMMARY  
 May 1998

May 1998 Overview (Bob Scott)

Temperatures across Illinois were much above average while precipitation was above average. Soil moisture within the top 40 inches was above the long-term statewide average. Mean streamflows were well above the median level. Shallow ground-water levels were above the long-term average.

**Mean temperatures** (Figure 1) were much above average for May (+4.5-degree departure) and yielded the eighth warmest May on record. Temperatures by crop reporting districts (Table 1) ranged from 4.1 degrees above normal (northwest) to 5.0 degrees above normal (northeast).

**Precipitation amounts** (Figure 1) during May were above the long-term mean value for the fifth straight month. The statewide average of 4.89 inches represents a +0.87-inch departure or 121 percent of average. District averages (Table 1) ranged from 3.20 inches (northwest) to 5.91 inches (east), 82 to 152 percent of normal, respectively.

**Soil moisture** (Figure 1) in the 0- to 40-inch (0- to 100-cm) layer at the end of May was above normal (a +1.59-inch departure). Nevertheless, actual soil moisture levels across much of the state remained largely unchanged during May (Table 2).

**Mean provisional streamflow** (Figure 1) statewide was well above the median flow, 273 percent of the median (Figure 1). Peak stages exceeded flood stage during mid-month along the Illinois River and during the first few days of May at stations along the Mississippi and Ohio Rivers.

**Reservoir levels (water surface levels)** from 41 reporting stations at the end of May were at normal pool (target operating level) at 14 reservoirs, above normal pool at 17 reservoirs, and below normal pool at 10 reservoirs. Carlyle Lake and Lake Shelbyville were several feet above their target operating levels at the end of May. Rend Lake also remains several feet above normal pool. **Lake Michigan** levels continue to exceed the long-term mean.

Statewide, **shallow ground-water levels** were above average for May (a +1.3-foot departure). Greatest deviations occurred in northwestern Illinois. Levels averaged about 0.5 feet below those of last month and were approximately 1.6 feet above May levels one year ago.

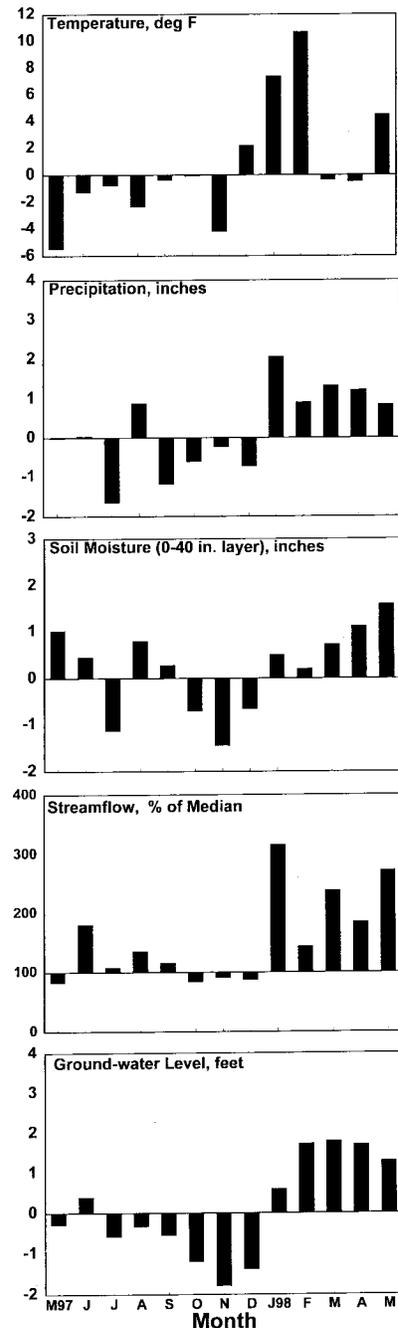


Figure 1. Statewide departures from normal

Note: The WARM Network maps will appear only in the January and July issues.

Contact

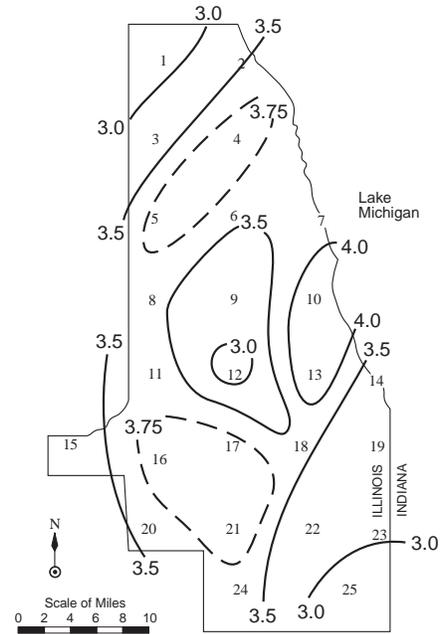
Bob Scott: (217) 333-4966, email: rscott5@uiuc.edu  
 On the Web at [www.sws.uiuc.edu/warm](http://www.sws.uiuc.edu/warm)

**Weather/Climate Information (Nancy Westcott, Steve Hilberg, and Bob Scott)**

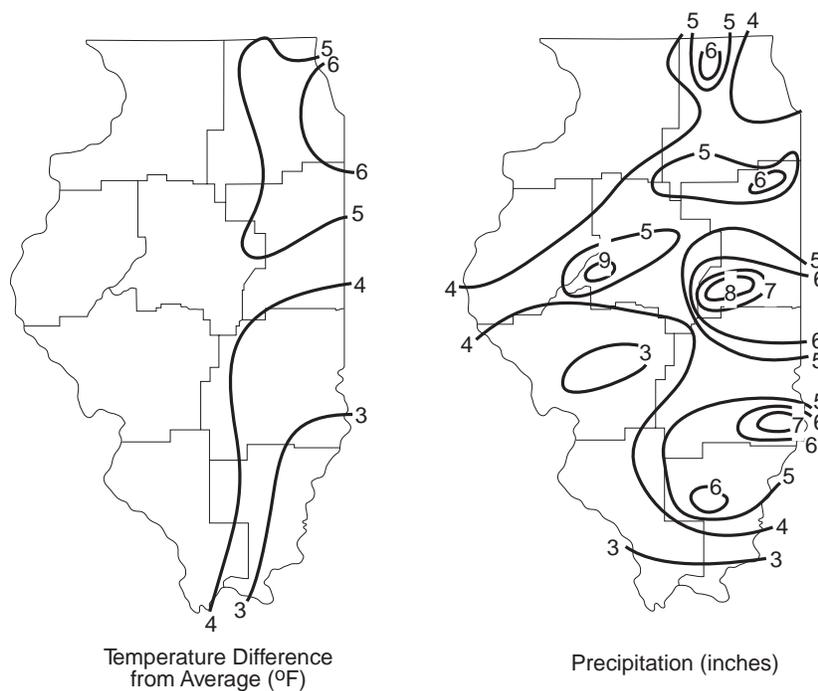
**Cook County Precipitation.** April precipitation amounts (Figure 2) were moderate. Site values for the month ranged from 4.21 inches at site #10 (26th Street) to 2.70 inches at site #1 (Northbrook area) and site #25 (Chicago Heights). Precipitation was heaviest in a north-south band through the downtown, near-lake region of the network and lightest in the far southeastern and northwestern corners of the network. The April 1998 network average of 3.46 inches was about 105 percent of the eight-year (1990 - 1997) April network average of 3.29 inches.

**Temperatures** across the state were much above average for May (Figure 3), ranging from three degrees above average in southeastern Illinois to six degrees above average in northeastern Illinois. This is the fourth month in a six-month period that temperatures have been above the statewide monthly average. The first half of May was slightly cooler than average, but warm summerlike weather characterized the last half of the month. Record or near record high temperatures occurred across much of Illinois on May 19, including record-high readings of 91°F (Elizabeth), 92°F (Champaign-Urbana), 93°F (Lincoln), 95°F (Morrisonville), and 97°F (Bloomington). For the spring season (March-May), the statewide average temperature departure was +1.2 degrees. Temperatures were generally warmer in the northeast and cooler in the west and southwest.

May was the fifth consecutive month with above average precipitation over Illinois (Figure 3). This abundant rainfall was the result of showers and thunderstorms triggered by a series of weather systems moving through the state. The eastern half of Illinois received the most rainfall with isolated amounts in excess of 8 inches. Almost half of this amount came during the first four days of the month from a very slow-moving upper level low-pressure system. Northwestern and southwestern Illinois were the driest areas where 3 to 4 inches of rain fell. Some of the heavier rainfall amounts were 9.73 inches (Havana), 8.36 inches (Monticello), 7.82 inches (Champaign-Urbana), and 7.26 inches (Newton).



**Figure 2. Cook County precipitation (inches) during April 1998**



**Figure 3. Illinois precipitation and temperatures during May 1998**

**Table 1. Illinois Precipitation (inches) and Temperature (°F) by Crop Reporting District**

Crop Reporting District	Last Month			Last 3 Months			Last 6 Months			Last 12 Months		
	May 98	%	Temp.	Mar. 98-	%	Temp.	Dec. 97-	%	Temp.	June 97-	%	Temp.
	Amount	Avg.	Dev.	May 98	Avg.	Dev.	May 98	Avg.	Dev.	May 98	Avg.	Dev.
Northwest	3.20	82	4.1	11.91	118	1.4	18.59	129	4.4	34.06	95	1.6
Northeast	4.04	109	5.0	12.12	119	2.4	18.73	123	5.0	34.72	96	1.8
West	5.15	127	4.3	14.54	134	0.8	22.78	145	3.4	38.94	104	1.0
Central	5.49	144	4.5	14.27	133	1.4	21.16	129	4.2	39.30	106	1.3
East	5.91	152	4.8	15.33	141	1.9	21.35	127	4.6	39.34	105	1.4
West-southwest	5.62	137	4.5	15.93	141	0.7	24.53	140	3.5	39.47	104	1.1
East-southeast	5.66	136	4.3	16.19	136	1.0	23.52	121	3.6	40.18	100	1.1
Southwest	4.20	98	4.8	15.92	126	0.8	24.83	117	3.0	43.89	104	0.8
Southeast	4.77	105	4.3	16.15	120	0.7	24.70	108	2.9	42.87	98	0.6
<b>State Average</b>	<b>4.89</b>	<b>121</b>	<b>4.5</b>	<b>14.64</b>	<b>130</b>	<b>1.2</b>	<b>22.13</b>	<b>126</b>	<b>3.9</b>	<b>38.94</b>	<b>101</b>	<b>1.2</b>

**Note:** Data are provisional. Complete, quality controlled data are available about three months after a given month.

May was also an active month for severe weather. Numerous funnel clouds and large hail were reported over northern and central Illinois on May 12. Hail the size of softballs (4.5 inches) was reported near Littleton in Schuyler County. Severe thunderstorms developed again on May 19 across the same region. Heavy rainfall in excess of 5 inches over a three-hour period caused flash flooding in Vermilion and Edgar Counties. There were also several reports of tornadoes and damage due to high winds. Additional wind damage from severe thunderstorms occurred in southern Illinois (May 21), central and southern Illinois (May 22-23), and across northeastern Illinois (May 28).

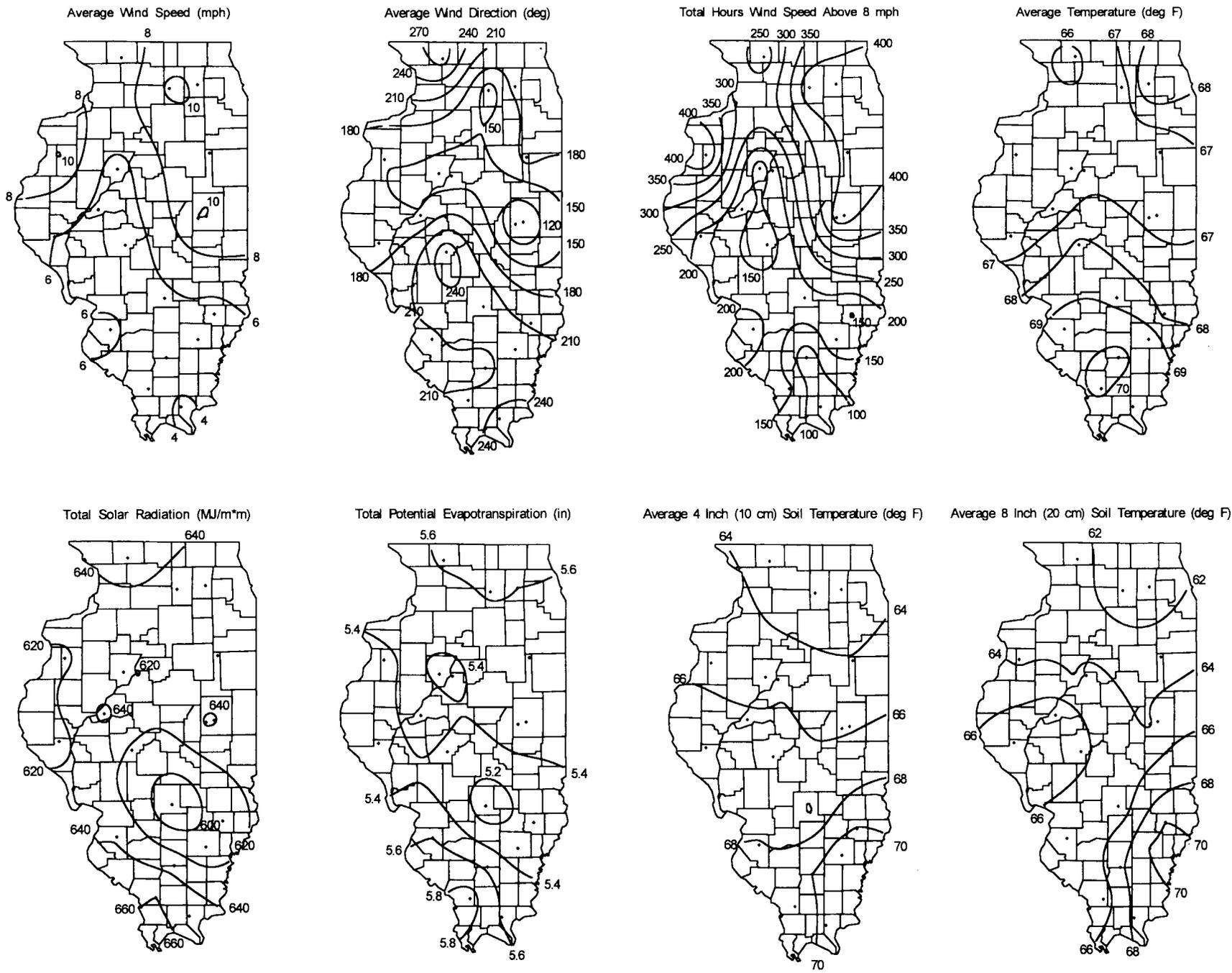
**Extended climate outlooks** issued by the U.S. Department of Commerce, National Atmospheric and Oceanic Administration, Climate Prediction Center for June call for equal chances of below, above, and normal temperatures over Illinois. The precipitation outlook suggests a slightly greater chance of above normal precipitation over northeastern Illinois. Outlooks for the summer (June-August) call for equal chances of below, above, and normal temperature and precipitation across the state.

**Illinois Climate Network (ICN) Data.** Average daily wind speeds for May (Figure 4) ranged from 3.7 mph at Dixon Springs to 10.4 mph at DeKalb. Bondville recorded the highest wind gust for the month, 58 mph, on May 19. The prevailing wind direction for May ranged from southeasterly across central Illinois to southwesterly over southern and far northwestern Illinois, likely a reflection of frequent fronts over the state during the month. Winds in excess of 8 mph ranged from 63 hours at Rend Lake to 456 hours at Monmouth. (May has 744 hours.) Average temperatures ranged from the mid-60s (north) to more than 70°F (southwest). Solar radiation continued its seasonal increase and totaled between 580 Mega-Joules per meter squared (MJ/m<sup>2</sup>) at Brownstown and 660 MJ/m<sup>2</sup> at Carbondale. Warmer temperatures also continue to yield higher potential evapotranspiration. Values ranged from a low of 5.1 inches at Brownstown to just over 5.9 inches at Carbondale. Soil temperatures at both the 4- and 8-inch levels continued to warm and ranged from the low to mid-60s (north) to more than 70°F (southeast).

### Soil Moisture Information (Bob Scott)

Soil moisture conditions across Illinois at the end of May were above normal near the surface and close to normal at greater depths. Soil moisture was generally above normal in the 0- to 6- and 6- to 20-inch layers across the state (Figure 5). Over the western two-thirds of Illinois, amounts exceeded 125 percent of normal. Values maximized at more than 200 percent of normal in the 0- to 6-inch layer at some central sites. Conditions in northeastern Illinois were near normal. In the 20- to 40-inch layer, conditions were near normal statewide. Soil moisture in the 40- to 72-inch layer was reported as normal over most of Illinois, but above normal conditions were observed across part of central and southern Illinois. Throughout the first 40 inches of depth, current statewide soil moisture conditions (Figure 1) were above the 1985-1995, 11-year average for June 1.

Despite the large areas of above normal soil moisture conditions near the surface, actual moisture amounts showed only small changes during May at nearly all sites and in all layers (Table 2). Decreases were dominant in the 0- to 6-inch layer, especially in northeastern and far southern Illinois where values were about 30 percent lower. A similar pattern was found in the 6- to 20-inch layer, but with smaller extremes. Moisture amounts were unchanged at most sites in the 20- to 40-inch layer. Nevertheless, changes in soil moisture from one month ago in all layers were less than 5 percent at the majority of sites.



4

Figure 4. May monthly averages and totals as collected by the Illinois Climate Network

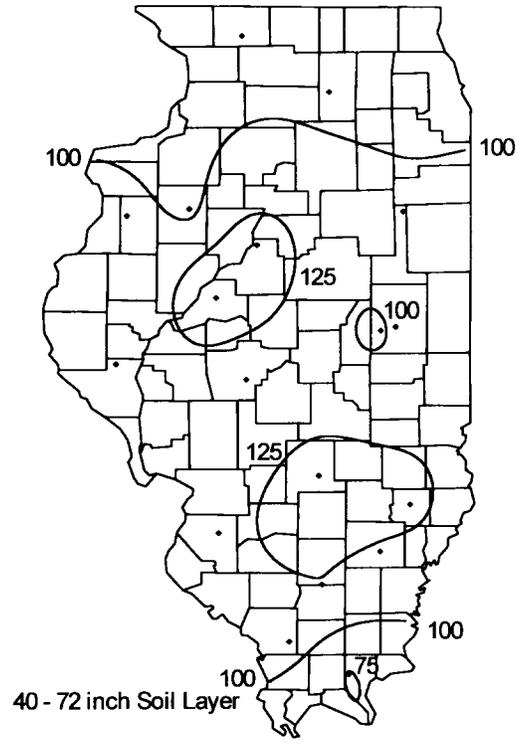
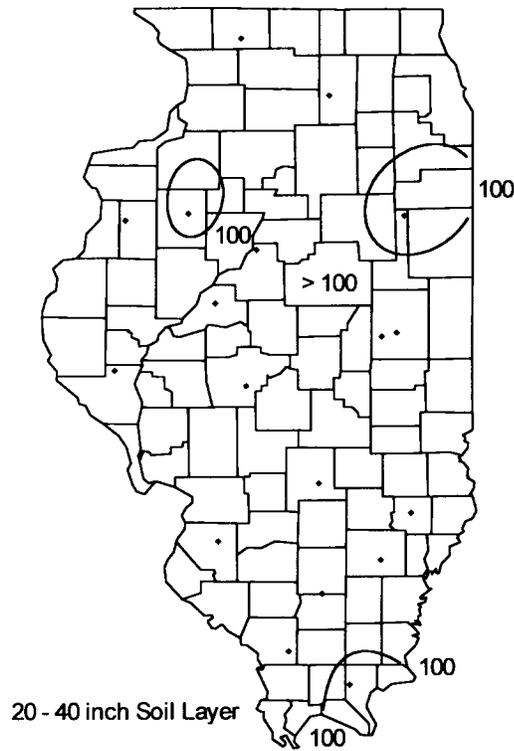
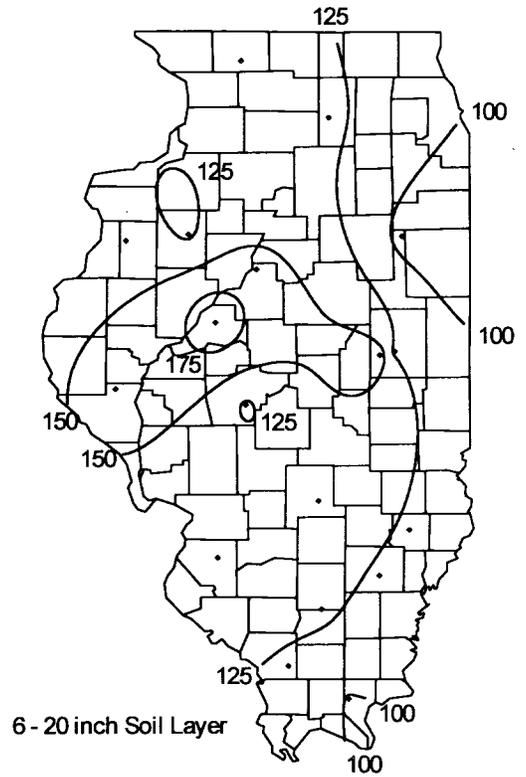
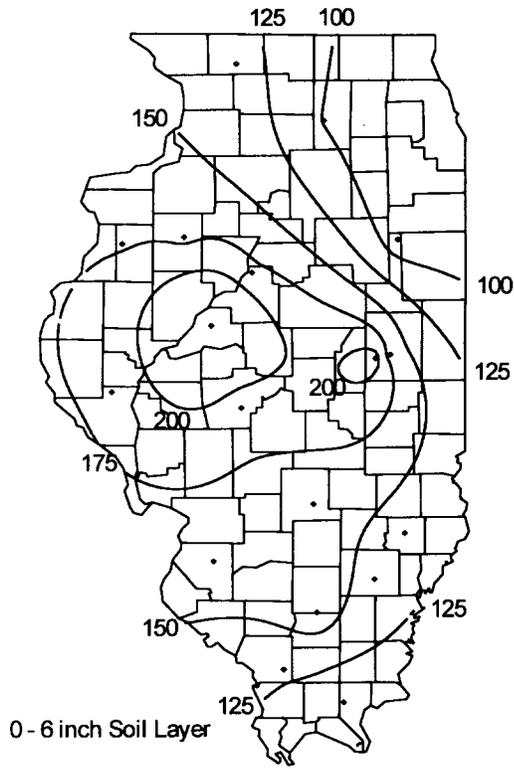


Figure 5. June 1 observed percent-of-normal soil moisture based on 1985-1992 mean

**Table 2. Soil Moisture in Various Layers on June 1, 1998**

<i>Location</i>	<i>June 1 0 - 6 (inches)</i>	<i>Change from May 1 (%)</i>	<i>June 1 6 - 20 (inches)</i>	<i>Change from May 1 (%)</i>	<i>June 1 20 - 40 (inches)</i>	<i>Change from May 1 (%)</i>
Freeport (NW)	1.8	-11	4.5	-1	7.0	-1
DeKalb (NE)	1.6	-33	4.7	-20	7.5	-1
Monmouth (W)	2.2	-0	4.5	-5	6.7	-2
Oak Run (W)	2.3	-4	4.6	-4	7.7	-4
East Peoria (C)	2.2	-0	5.3	3	8.2	4
Topeka (C)	1.4	-6	3.1	-2	3.2	1
Stelle (E)	1.6	-8	4.7	-14	6.5	2
Champaign (E)	2.3	-5	5.2	1	6.7	5
Bondville (E)	2.6	-5	5.6	-1	8.3	-0
Perry (WSW)	2.5	-1	5.8	4	8.4	1
Springfield (WSW)	2.1	-4	5.1	-4	8.1	-1
Brownstown (ESE)	2.6	3	4.8	6	8.5	4
Olney (ESE)	2.3	-4	4.7	-2	7.3	0
Belleville (SW)	2.5	2	5.3	3	8.8	1
Carbondale (SW)	2.3	-30	4.8	-19	8.1	-1
Ina (SE)	2.7	-1	5.3	1	7.7	1
Fairfield (SE)	2.4	-6	5.3	-4	7.5	1
Dixon Springs (SE)	1.9	-34	4.5	-22	7.6	-9

### Surface Water Information (Sally McConkey)

River and stream discharge and stage data are obtained from gaging stations equipped with telemetry. Most stations are operated and maintained by the U.S. Geological Survey (USGS) and supported in part by the U.S. Army Corps of Engineers, the Illinois Department of Natural Resources Office of Water Resources, and the Illinois State Water Survey. Provisional data are obtained through either direct computer access to the USGS or posts by the National Weather Service.

**Rivers and Streams.** Data are provisional, and values reported do not reflect final or official stages or discharges. Table 3 lists streamgaging stations located on the Illinois, Mississippi, and Ohio Rivers. The peak stage is determined from the daily morning reading posted by the National Weather Service.

Peak stages on the Illinois River were above flood stage for the third consecutive month. Peak stage occurred near mid-month at most stations and declined thereafter. Along the Mississippi River, peak stage occurred during the first few days of May, with Grafton, Chester, and Thebes being above flood stage. Similarly, the Ohio River at Cairo recorded a peak stage above flood stage on May 1.

Table 4 lists 18 streamgaging stations throughout Illinois. Provisional mean monthly flows posted by the USGS are listed if available; otherwise, USGS daily discharge data were used to estimate the mean flow for the month. Long-term monthly mean flows published by USGS represent the average flow every month at each station. Median flow values listed in Table 4 are determined by ranking the month's mean flow at each site for each year of record and selecting the middle value. The current month's flow condition (above normal to below normal) is determined on the basis of its rank relative to the historical record for the month and is defined in the notes following Table 4.

Throughout most of Illinois, May streamflows were above to much above normal. Flows recorded for the Rock River in northern Illinois were much above normal, as were flows for the La Moine, Mackinaw, Sangamon, and Vermilion Rivers in central Illinois, and the Embarras River in southern Illinois. The mean flow recorded for the Mackinaw River near Congerville appears to be the highest measured mean flow for May during the last 48 years. Flooding occurred in the south Chicago suburbs and in parts of central Illinois. May flows typically span the 30 to 70 percent chance of exceedence, but flows at every station listed in Table 4 exceeded this range.

**Water-Supply Lakes and Major Reservoirs.** Table 5 lists reservoirs in Illinois and their month-end water surface elevation, normal pool, and other data related to observed variations in water surface elevations. Normal pool elevation is the elevation of the spillway crest unless releases are controlled and/or adjusted to meet target

**Table 3. Peak Stages for Major Rivers, May 1998**

<i>River</i>	<i>Station</i>	<i>River mile*</i>	<i>Flood stage (feet)*</i>	<i>Peak stage (feet)**</i>	<i>Date</i>
Illinois	Morris	263.1	12.6	21.3	09
	La Salle	224.7	20	28.5	10
	Peoria	164.6	18	23.7	12
	Havana	119.6	14	20.9	15
	Beardstown	88.6	14	22.4	16
	Meredosia	71.3	14	21.1	16
	Hardin	21.5	25	27.9	24
Mississippi	Dubuque	579.9	17	11.1	01
	Keokuk	364.2	16	12.3	01
	Quincy	325	17	16.0	02
	Grafton	218	18	20.7	02
	St. Louis	180	30	28.4	03
	Chester	109.9	26.9	30.2	04
	Thebes	43.7	33	35.0	04
Ohio	Cairo	2.0	40	49.9	01

**Notes:**

\*River mile and flood stage from *River Stages in Illinois: Flood and Damage Data*, Illinois Department of Transportation, Division of Water Resources, May 1994.

\*\*Peak stages based on daily a.m. reading, not hourly data.

**Table 4. Provisional Mean Flows, May 1998**

<i>Station</i>	<i>Drainage area (sq mi)</i>	<i>Years of record</i>	<i>1998 mean flow (cfs)</i>	<i>Long-term flows</i>		<i>Flow condition</i>	<i>Days of data this month</i>	<i>Percent chance of exceedence</i>
				<i>Mean* (cfs)</i>	<i>Median (cfs)</i>			
Rock River at Rockton	6,363	62	8,671	5,135	4,583	much above normal	31	09
Rock River near Joslin	9,549	54	14,470	8,236	7,071	much above normal	31	10
Pecatonica River at Freeport	1,326	79	1,459	968	771	above normal	31	14
Green River near Geneseo	1,003	58	1,630	966	779	above normal	30	16
Edwards River near New Boston	445	59	751	469	317	above normal	31	18
Kankakee River at Momence	2,294	79	4,260	2,885	2,672	above normal	29	15
Fox River at Dayton	2,642	80	4,132	2,385	1,886	above normal	31	11
Vermilion River at Pontiac	579	53	1,230	723	680	above normal	26	11
Spoon River at Seville	1,636	80	2,931	1,692	1,198	above normal	31	17
LaMoine River at Ripley	1,293	73	3,348	1,387	757	much above normal	31	05
Mackinaw River near Congerville	767	48	2,484	877	701	much above normal	31	02
Sangamon River at Monticello	550	84	1,854	722	484	much above normal	31	07
Vermilion River near Danville	1,290	53	4,253	1,668	1,284	much above normal	31	05
Kaskaskia River at Vandalia	1,940	27	2,960	2,027	1,798	above normal	28	28
Shoal Creek near Breese	735	53	1,010	784	469	above normal	31	25
Embarras River at Ste. Marie	1,516	83	5,138	1,889	1,160	much above normal	31	09
Skillet Fork at Wayne City	464	77	1,149	635	242	above normal	31	15
Big Muddy at Plumfield	794	82	1,737	1,433	633	above normal	31	24

**Notes:**

\*As reported in U.S. Geological Survey (USGS) Water Resources Data, Illinois, Water Year 1994.

Much below normal flow = 90-100% chance of exceedence.

Below normal flow = 70-90% chance of exceedence.

Normal flow = 30-70% chance of exceedence.

Above normal flow = 10-30% chance of exceedence.

Much above normal flow = 0-10% chance of exceedence.

Table 5. Reservoir Levels in Illinois

**For security considerations, statewide tabular reservoir data are not available on the Internet. Specific data requests may be made to Sally McConkey at: [sally@sws.uiuc.edu](mailto:sally@sws.uiuc.edu).**

operating levels. Water withdrawals from public water-supply reservoirs are reported for the previous month as available. Most of the reservoirs listed serve as public water supplies, with the exceptions noted in the last column in Table 5.

Compared to levels at the end of April from 41 reporting stations, the water surface elevation at the end of May rose at 5 reservoirs, remained the same at 6 reservoirs, and decreased at 29 reservoirs. At the end of May, 17 reporting stations were above the spillway crest or target operating level, 14 stations were at normal pool, and 10 stations were below normal pool.

*Major Reservoirs.* Carlyle Lake, Lake Shelbyville, and Rend Lake are all well above target operating levels. These three major reservoirs are the only reporting reservoirs where the month-end water level was more than one foot different than the normal/target operating level.

**Great Lakes.** Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The mean level for Lake Michigan was 580.41 feet compared to 580.94 feet in 1997. Based on data from 1918-1996, the long-term average lake level for May is 579.17 feet. Historically, the lowest mean level for Lake Michigan in May occurred in 1964 at 576.57 feet, and the highest level occurred in 1986 at 581.63 feet. The month-end level of Lake Michigan was 580.44 feet.

### Ground-Water Information (Bryan Coulson)

**Comparison to Average Levels.** Shallow ground-water levels in 16 observation wells remote from pumping centers were above average for May (Table 6). Levels averaged approximately 1.3 feet higher and ranged from 1.5 feet below to 11.7 feet above average levels for May. The greatest deviation occurred in northwestern Illinois.

**Comparison to Previous Month.** Statewide, shallow ground-water levels in May were below levels in April. Levels averaged approximately 0.5 feet lower and ranged between 5.9 feet above and 3.5 feet below last month's values. The greatest deviations above and below the average ground-water levels occurred in northern Illinois.

**Comparison to Same Month, Previous Year.** Shallow ground-water levels were above those of May 1997. Levels averaged about 1.6 feet higher and ranged from 2.5 feet below to 9.4 feet above those of May 1997.

**Table 6. Month-End Shallow Ground-Water-Level Data Sites, May 1998**

Number	Well name	County	This month's reading (depth to water, feet)	Deviation from		
				Average level (feet)	Previous month (feet)	Previous year (feet)
1	Galena	JoDaviess	20.13	+0.75	-0.13	+0.87
2	Mt. Morris	Ogle	5.10	+11.74	+5.90	+9.40
3	Crystal Lake	McHenry	5.19	-1.04	-1.80	-1.55
4	Cambridge	Henry	5.10	+1.00	-1.64	+2.55
5	Fermi Lab	DuPage	6.70	-1.54	-3.49	+0.70
6	Good Hope	McDonough	3.00	+3.44	-0.56	+4.97
7	Snicarte	Mason	36.00	+0.02	+0.67	+1.32
8	Middletown	Logan	NA	NA	NA	NA
9	Swartz	Piatt	NA	NA	NA	NA
10	Coffman	Pike	6.78	+2.19	-2.27	+2.11
11	Greenfield	Greene	5.78	+2.29	-0.28	+3.88
12	Janesville	Cumberland	5.33	-0.02	-0.51	+0.69
13	St. Peter	Fayette	1.59	+1.32	+2.64	+1.15
14	SWS #2	St. Clair	13.09	+0.76	+0.17	-0.28
15	Boyleston	Wayne	1.94	+2.13	+0.50	+2.17
16	Sparta	Randolph	4.59	+1.30	-1.02	+1.40
17	SE College	Saline	4.63	-1.43	-3.17	-1.12
18	Dixon Springs	Pope	3.91	-1.41	-3.19	-2.53