

ILLINOIS WATER AND CLIMATE SUMMARY March 2000

March 2000 Overview (Bob Scott)

Temperatures across Illinois in March were well above average, and precipitation was below average. Soil moisture within the top 40 inches of soil was below the long-term statewide average. Mean streamflows were below median heights. Shallow ground-water levels were below long-term average depths. Lower than average precipitation across most of Illinois in March resulted in static conditions in the state's water resources as measured by soil moisture and streamflows; however, the deficit in shallow ground-water levels increased. Concern is high that if above average precipitation does not occur over the next several months, the impacts of drought conditions will begin to be felt in all water resources of Illinois.

Temperatures across Illinois (Figure 1) for March were well above average (a +4.1-degree departure), the 13th warmest March since 1895. By crop reporting districts, the range in temperature departures from average was considerable, from 1.6 degrees above average (southwest) to 6.4 degrees above average (northeast).

Precipitation amounts (Figure 1) were below the long-term average value for the month. The statewide average of 2.29 inches represents a -1.08-inch departure or 68 percent of average. District precipitation totals ranged from 1.15 inches (northwest) to 3.74 inches (southeast), while percent of average precipitation values ranged from 43 percent (northwest) to 84 percent (west-southwest). Despite near normal precipitation during the December 1999–February 2000 period, precipitation for the last nine months in Illinois (19.53 inches) ranks as the eighth driest July–March period since 1895.

Soil moisture across Illinois in the 0- to 40-inch (0- to 100-centimeter) layer at the end of March (Figure 1) was below normal (a -0.63-inch departure). Conditions were below normal to near normal in the near surface layers across the state. In deeper layers, near normal to above normal soil moisture was observed over much of the state, but conditions continued well below normal over portions of central and southwestern Illinois.

Mean provisional streamflow statewide was below the median flow, 42 percent of median (Figure 1). With few exceptions, stations throughout Illinois recorded mean flows ranging from below normal to much below normal. Peak stages on the Illinois River did not exceed flood stage. Stations on the Mississippi River along the Illinois border and the Ohio River station at Cairo also recorded peak stages below flood stage.

Water surface levels at the end of March were below the normal pool at 26 of 38 reporting reservoirs. Water surface levels at Carlyle Lake and Lake Shelbyville were above the target operating level. Rend Lake was 0.9 feet above the target level. **Lake Michigan's** mean level remains below the long-term average.

Note: The WARM Network maps and extended network descriptions appear in the January and July issues.

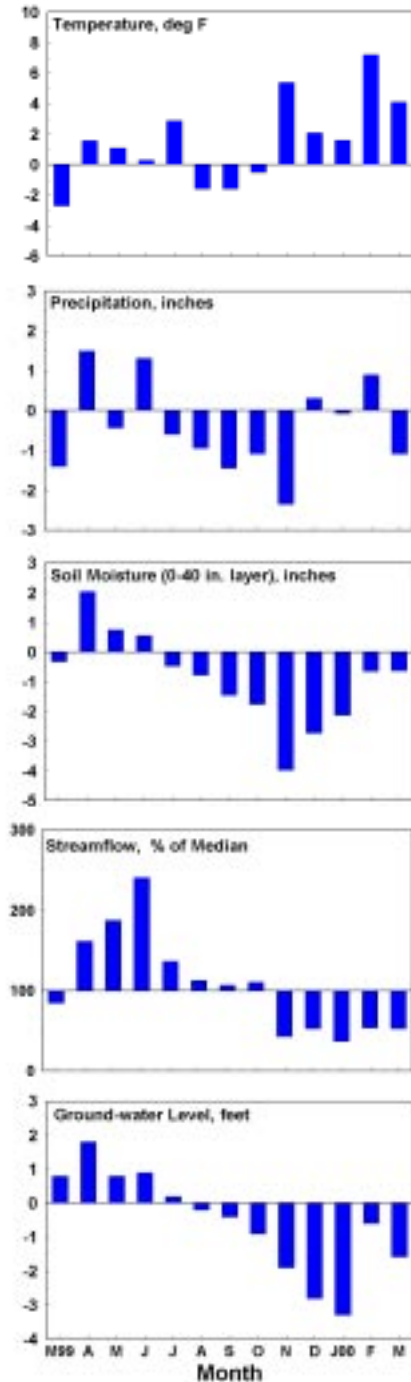


Figure 1.
Statewide departures from normal

Contact

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Statewide, **shallow ground-water levels** were 1.6 feet below average for March. Levels averaged 0.2 feet below those of last month and approximately 2.3 feet below March levels one year ago.

Weather/Climate Information (Nancy Westcott, Jim Angel, and Bob Scott)

Cook County Precipitation. February precipitation amounts (Figure 2) were very light. February site values ranged from 1.59 inches at site #2 (Winnetka) to 0.64 inches at site #25 (east of Chicago Heights). Precipitation was heavier in a southwest to northeast band in the northern third of the network and also in the south and east-central regions of the network. Precipitation was lightest in the west-central region and in the far southern portion of the network. The February 2000 network average of 1.20 inches was 61 percent of the ten-year (1990–1999) February network average of 1.97 inches.

Temperatures across Illinois for March were much warmer than average statewide (Figure 3 and Table 1) with the northeast district reporting the warmest departure. This was the 13th warmest March on record in Illinois since 1895. However, March temperatures were highly variable. March began with considerable warmth. Temperatures the first nine days averaged 8°F to 15°F above average, including the warmest statewide reading for the month, 84°F at Kilbourne on March 8. Numerous record highs were set on March 7 (Peoria, Lincoln, and Chicago O’Hare, 78°F; Champaign, 79°F; Springfield, 81°F; and Flora, 82°F) and on March 8 (Champaign, 77°F; Chicago O’Hare, Peoria, and Lincoln, 78°F; and Moline and Springfield, 79°F). Cooler temperatures (1°F to 2°F below average) spread over the state March 10–18 and provided the coldest reading for the month, 7°F at Olney on March 13. Warm weather returned March 19–27 before temperatures dropped again for the rest of the month.

Precipitation across Illinois for March was below average across all districts (Figure 3 and Table 1), but not exceptionally so. This was only the 33rd driest March on record in Illinois since 1895. Southern Illinois received the

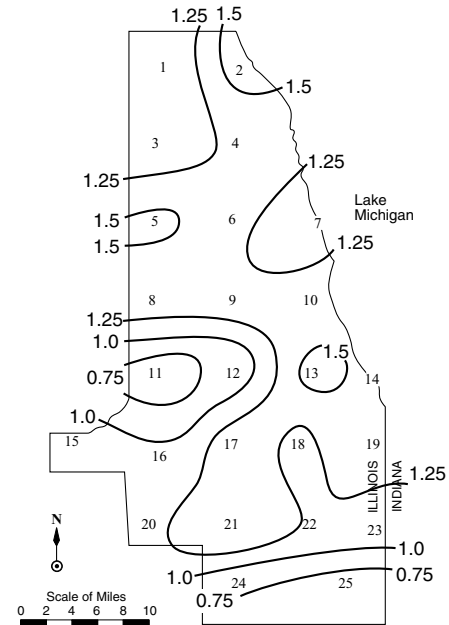


Figure 2.
Cook County precipitation
(inches) during February 2000

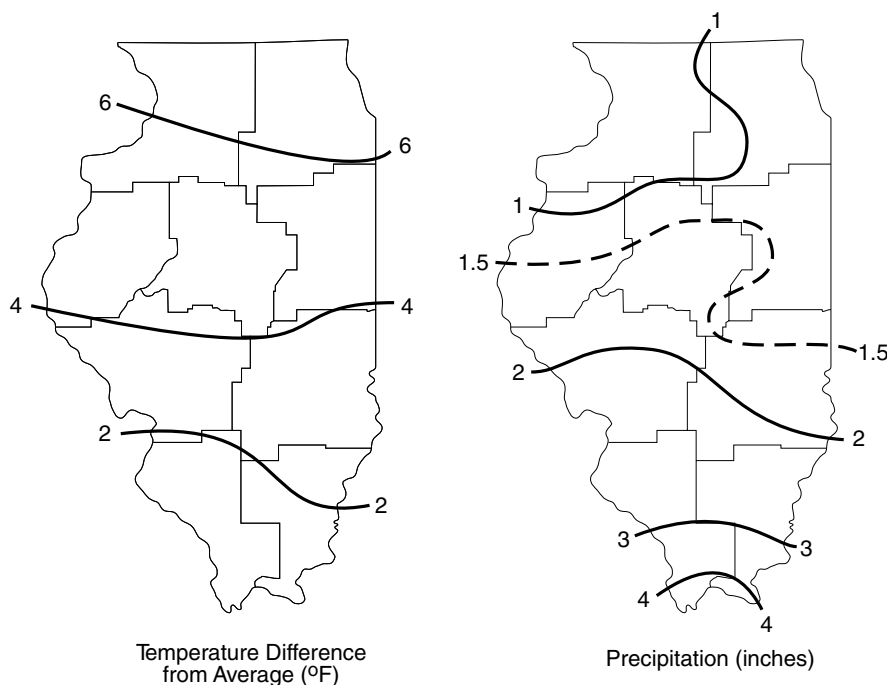


Figure 3. Illinois precipitation and temperatures during March 2000

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		
	Mar 00 Amount	% Avg	Temp Dev	Jan 00-Mar 00	% Avg	Temp Dev	Oct 99-Mar 00	% Avg	Temp Dev	Apr 99-Mar 00	% Avg	Temp Dev
Northwest	1.15	43	6.0	4.72	91	4.9	8.39	67	3.2	33.52	95	1.4
Northeast	1.25	46	6.4	4.28	77	5.0	8.32	62	3.3	33.49	93	1.9
West	2.43	79	4.6	6.13	104	5.0	10.29	74	3.7	32.02	86	1.7
Central	2.09	66	5.3	5.09	82	4.8	9.47	65	3.4	33.46	91	1.5
East	1.80	57	4.6	5.20	81	3.9	9.88	67	2.7	30.99	84	1.3
West-southwest	2.83	84	3.3	6.36	92	4.4	11.48	73	3.4	29.89	79	1.5
East-southeast	2.60	69	2.6	7.92	99	3.6	13.69	77	2.9	34.19	86	1.5
Southwest	3.21	76	1.6	9.01	100	3.5	15.55	79	3.1	35.03	84	1.5
Southeast	3.74	81	2.0	12.75	124	3.6	20.32	96	2.8	38.66	89	1.4
State Average	2.29	68	4.1	6.62	95	4.3	11.63	74	3.2	33.28	87	1.5

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

largest rainfall amounts, which is typical for this time of year. Cairo reported the largest monthly total (4.38 inches). With 19.53 inches, July 1999–March 2000 was the eighth driest July–March in Illinois since 1895; July 1930–March 1931 was the driest such period with 16.12 inches.

Severe weather accompanied the warm weather in northern Illinois on March 8. Hail from 3/4 to 1 inch in diameter was reported in northern Illinois and in Vermilion County. A low-pressure system moving through the northern Gulf states produced heavy snowfall across central and especially southern Illinois on March 11. Hutsonville reported 13.0 inches; Salem, 10.6 inches; St. Marie, 9.8 inches; and Lawrenceville, Newton, Dix, and Clay City, 8.0 inches. Thunder was reported with the snow in Carlyle.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for March (Figure 4) ranged from 5.2 mph at Dixon Springs to 11.1 mph at Monmouth. The highest wind gust for the month occurred at Monmouth, 51 mph on March 8. The prevailing wind direction across the state varied from the west-southwest to the west-northwest. Wind speeds in excess of 8 mph ranged from 133 hours at Dixon Springs to 475 hours at Bondville, Monmouth, and Stelle. (March has 744 hours.) Average temperatures across the state ranged from the middle 40s across northern Illinois to the lower 50s at Fairfield and Dixon Springs. Solar radiation ranged from 406 Mega-Joules per meter squared (MJ/m²) at St. Charles to 521 MJ/m² at Dixon Springs. Potential evapotranspiration varied from 2.7 inches at St. Charles to 3.8 inches at Dixon Springs. Soil temperatures at the 4- and 8-inch levels ranged from the middle 40s across northern Illinois to the lower 50s in southeastern Illinois.

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for April call for a moderate chance of above normal temperatures over all of Illinois and also a slight chance of below normal precipitation statewide, especially in southeastern Illinois. April–June outlooks suggest the same patterns.

Soil Moisture Information (Bob Scott)

Soil moisture conditions at the end of March (Figure 1) were normal to just below normal in the 0- to 6-inch layer. Values ranged between 65 and 105 percent of normal. Conditions in the 6- to 20-inch layer were near normal across the state. Dry soils reported in earlier summaries at 20 to 40 inches of depth had moistened, but soil moisture was still as low as 35 percent of normal at Belleville. Conditions elsewhere approximated normal to slightly above normal, reaching 115 percent of normal at Rend Lake. From 40 to 72 inches of depth, high spatial variability in soil moisture continued. Central and southwestern parts of the state were well below normal, while above normal soil moisture was observed in northwestern, east-central, and southeastern portions of Illinois. Overall, throughout the first 40 inches of depth, statewide soil moisture at the end of March averaged below the 1985–1995 mean for the month (Figure 1).

Compared to one month ago, soil moisture during March (Table 2) generally decreased in the 0- to 6-inch layer, dropping 10 to 25 percent at many sites. While changes were generally small in the 6- to 20- and 20- to 40-inch layers, there were 15 to 20 percent increases in the 20- to 40-inch layer at some dry areas in central and southwestern Illinois.

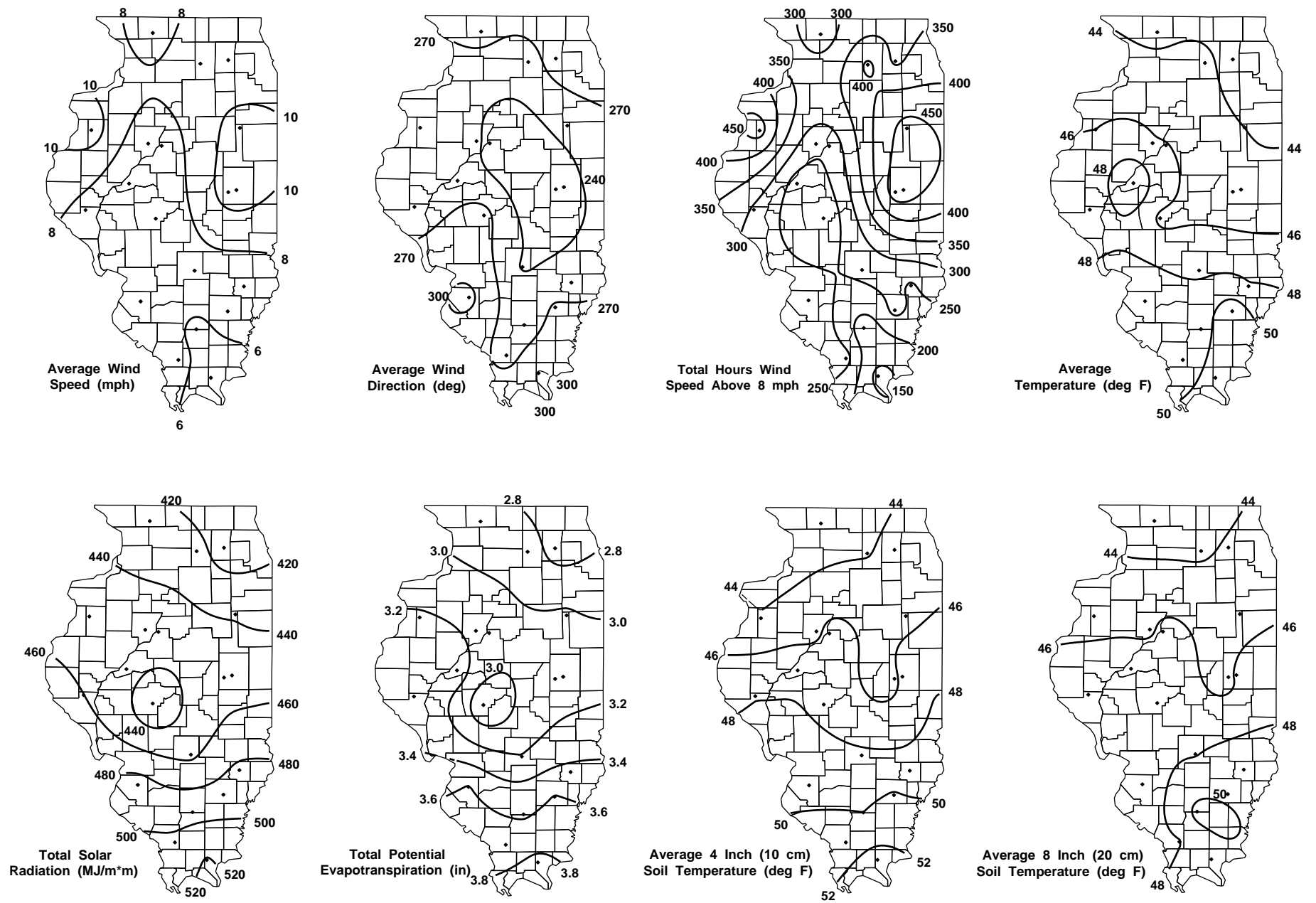


Figure 4. March monthly averages and totals as collected by the Illinois Climate Network

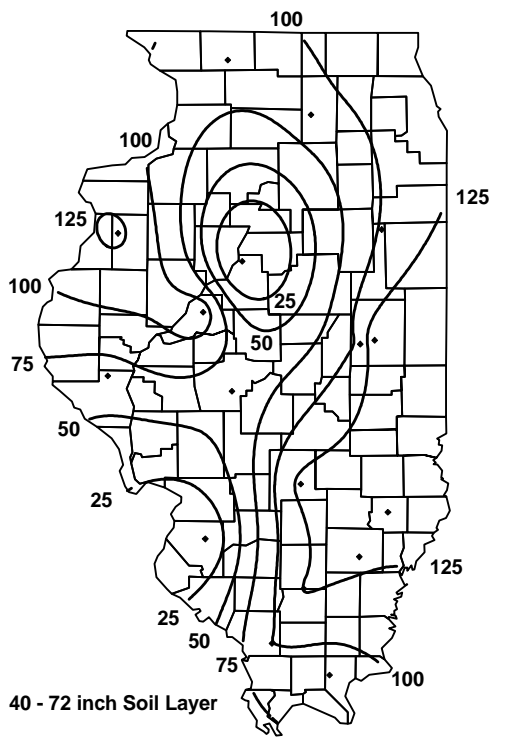
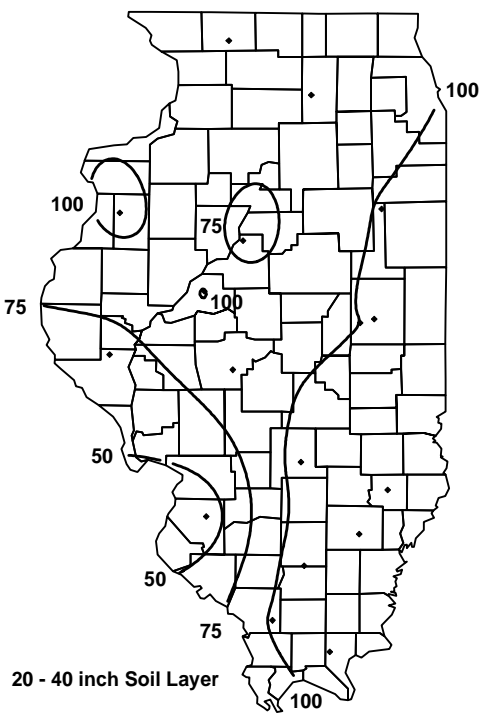
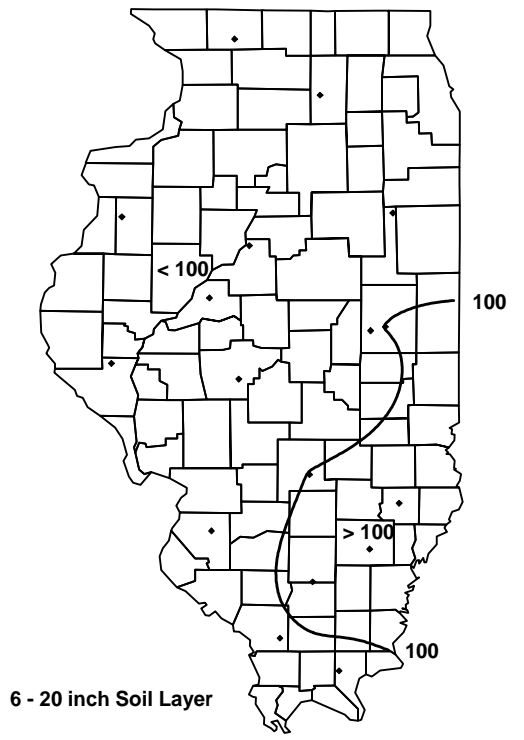
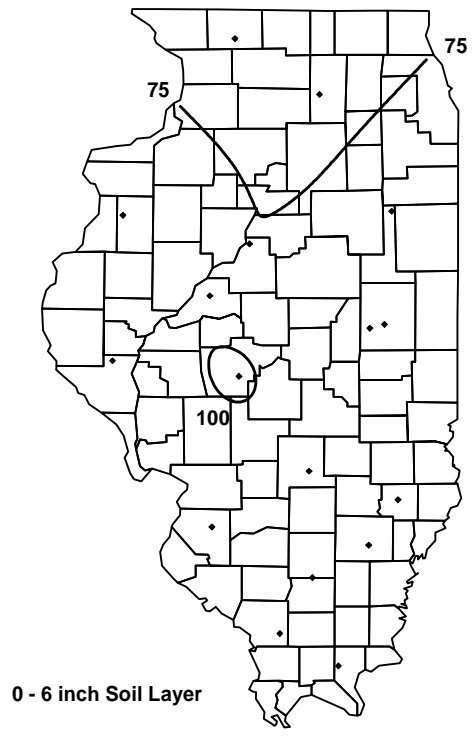


Figure 5. April 1 observed percent-of-normal soil moisture based on 1985-1995 mean

Table 2. Soil Moisture in Various Layers on April 1, 2000

<i>Location</i>	<i>Apr 1 0 - 6 (inches)</i>	<i>Change from Mar 1 (%)</i>	<i>Apr 1 6 - 20 (inches)</i>	<i>Change from Mar 1 (%)</i>	<i>Apr 1 20 - 40 (inches)</i>	<i>Change from Mar 1 (%)</i>
Freeport (NW)	1.6	-25	4.4	-6	6.8	-5
DeKalb (NE)	1.8	-19	4.6	-14	7.2	-2
Monmouth (W)	2.0	-4	4.7	0	6.8	-2
East Peoria (C)	1.8	-15	5.1	-0	7.5	21
Topeka (C)	1.0	-14	2.5	-6	3.3	4
Stelle (E)	2.1	-4	5.3	7	6.9	7
Champaign (E)	2.2	-2	5.2	-0	6.7	-3
Bondville (E)	2.0	-13	4.9	-3	8.2	-1
Perry (WSW)	2.0	-5	5.0	0	6.8	18
Springfield (WSW)	2.0	8	4.8	-3	7.8	4
Brownstown (ESE)	2.4	-12	4.9	0	8.3	0
Olney (ESE)	2.2	-12	4.7	-3	7.2	-0
Belleville (SW)	2.0	-6	4.6	-3	6.7	15
Carbondale (SW)	2.4	-2	5.1	-8	8.1	1
Ina (SE)	2.4	5	5.3	-0	7.8	1
Fairfield (SE)	2.4	-14	5.6	1	7.5	0
Dixon Springs (SE)	2.2	-5	5.1	-7	8.3	-1

Surface Water Information (Sally McConkey)

River and stream discharge and stage data are obtained from gaging stations operated by the U.S. Geological Survey (USGS) or the U.S. Army Corps of Engineers (USACE). The USGS gaging station network is supported in part by the Illinois Department of Natural Resources Office of Water Resources and Illinois State Water Survey and USACE. Provisional discharge data are obtained from direct computer access to USGS. Peak stage data are obtained from readings posted on the Internet by USGS and USACE. Values reported do not reflect final or official discharges and stages.

Table 3 lists streamgaging stations located on the Illinois, Mississippi, and Ohio Rivers, flood stage, and the provisional peak stage for the current month. Peak stage occurred at most stations along the Illinois River during the first few days of the month and did not exceed flood stage. The Mississippi River peaked below flood stage at stations along the Illinois border. As a result of heavier rains east of Illinois, the Ohio River at Cairo recorded a peak stage on March 1 of 37.8 feet, 2.2 feet below flood stage.

Table 4 lists 18 streamgaging stations throughout Illinois. Provisional monthly mean flows posted by USGS are listed if available; otherwise, daily mean discharge data posted by USGS were used to estimate the mean flow for the month. Long-term mean flows for each month are published by USGS. The month's median flow for each station listed in Table 4 was determined by ranking the March mean flow for each year of record and selecting the middle value, the 50 percent exceedence probability.

Mean flows for March were below normal at all but three stations listed in Table 4: the Edwards River near New Boston, the Spoon River at Seville, and the Skillet Fork at Wayne City. Mean flows in the northern third of Illinois were within the normal to below normal range. Most stations in central and southern Illinois recorded mean flows in the much below normal range. The Shoal Creek gaging station near Breese (735-square-mile drainage area) has been experiencing problems. The discharge at this station (see Table 4) was estimated from the flow recorded for Shoal Creek near Pierron (678-square-mile drainage area). On the basis of the provisional streamflow data, three stations recorded new low flow records for March. The Mackinaw River at Congerville recorded a provisional mean flow of 21.4 cubic feet per second (cfs) compared to 68.1 cfs in 1956, the lowest mean flow on record at this station. For the period 1943–1998, the lowest March mean flow recorded for the Vermilion River at Pontiac was 23.7 cfs in 1964. This month's provisional mean flow may set a new record of 16 cfs. The Kaskaskia River at Vandalia reflects regulated flow releases from Lake Shelbyville. During the past 29 years of operation, the lowest mean flow for March was 517 cfs, recorded in 1981. The mean flow for March 2000 was 374 cfs. Mean provisional flow statewide this month was below the median (42 percent of the median) and below the mean (37 percent of mean).

Table 3. Peak Stages for Major Rivers, March 2000

<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	13	5.9	02
	La Salle	224.7	20	13.4	01
	Peoria	164.6	18	12.8	02
	Havana	119.6	14	9.7	02
	Beardstown	88.6	14	11.1	03
	Meredosia	71.3	14	6.3	01
Mississippi	Hardin	21.5	25	20.3	01
	Dubuque	579.9	17	11.2	05
	Keokuk	364.2	16	7.2	08
	Quincy	325.0	17	12.0	02
	Grafton	218.0	18	15.9	18
	St. Louis	180.0	30	10.3	06
	Chester	109.9	27	12.2	06
Ohio	Thebes	43.7	33	17.8	02
	Cairo	2.0	40	37.8	01

Notes:*River mile and flood stage from *River Stages in Illinois: Flood and Damage Data*,

Illinois Department of Natural Resources, Office of Water Resources, July 1998.

**Peak stage based on daily a.m. readings, not instantaneous peak.

Table 4. Provisional Mean Flows, March 2000

<i>Station</i>	<i>Drainage area (sq mi)</i>	<i>Years of record</i>	<i>2000 mean flow (cfs)</i>	<i>Long-term flows</i>		<i>Flow condition</i>	<i>Percent chance of exceedence</i>	<i>Days of data this month</i>
				<i>Mean* (cfs)</i>	<i>Median (cfs)</i>			
Rock River at Rockton	6,363	64	4996	7,325	7,967	below normal	73	31
Rock River near Joslin	9,549	56	7,121	10,900	10,002	below normal	69	31
Pecatonica River at Freeport	1,326	81	866	1,779	1,772	below normal	78	31
Green River near Geneseo	1,003	60	566	1,046	878	below normal	74	31
Edwards River near New Boston	445	61	351	503	411	normal	59	18
Kankakee River at Momence	2,294	81	1,770	3,289	3,173	below normal	88	31
Fox River at Dayton	2,642	80	1,697	3,304	2,789	below normal	84	31
Vermilion River at Pontiac	579	55	16	757	674	much below normal	98	20
Spoon River at Seville	1,636	80	815	1,675	1,233	normal	67	31
LaMoine River at Ripley	1,293	75	384	1,336	878	below normal	83	31
Mackinaw River near Congerville	767	50	21.4	959	748	much below normal	98	31
Sangamon River at Monticello	550	86	113	716	605	much below normal	93	31
Vermilion River near Danville	1,290	55	348	1,728	1,515	much below normal	95	31
Kaskaskia River at Vandalia	1,940	29	374	3,153	2,627	much below normal	97	31
Shoal Creek near Breese	735	55	81**	1,011	880	much below normal	96	31
Embarras River at Ste. Marie	1,516	85	424	2,214	2,075	much below normal	92	30
Skillet Fork at Wayne City	464	79	465	792	743	normal	63	31
Big Muddy at Plumfield	794	84	470	1,316	1,086	below normal	77	31

Notes:

*As reported in U.S. Geological Survey (USGS) Water Resources Data, Illinois, Water Year 1998.

**Estimated.

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.

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. Water withdrawals from public water-supply reservoirs are reported for the previous month as available. Most reservoirs listed serve as public water supplies, with the exceptions noted in the last column of the table. Mt. Olive's new reservoir has been added, and the water elevation at this reservoir was 6 feet below the spillway.

Compared to levels at the end of February at 37 reservoirs, the water surface elevation at the end of March had risen at 22 reservoirs and had decreased at 9 reservoirs. The reported elevation was the same as last month at 6 reservoirs. For the 38 reservoirs reporting at the end of March, 8 reservoirs had water surface levels above the target operating level, 4 reservoirs were at normal pool, and 26 reservoirs were below normal pool. Four of the 8 reservoirs above the target pool elevation are not used for public water supply. Two reservoirs, Mauvaise Terre and Paris West, have remained at normal pool for the past five months. These reservoirs augment natural inflows with pumpage from a second, conjunctive use reservoir. Water levels at Decatur's reservoir and at Lake Vermilion serving Danville have risen slightly since the end of February. Lake Decatur was 0.5 feet below the target level, and Lake Vermilion was full. However, reservoirs serving the communities of Altamont, Bloomington, Carlinville, Mt. Olive, Pana, Paris, Sorrento, and Springfield were 3 feet or more below normal pool (spillway elevation). Of the 38 reservoirs reporting this month, 18 reservoirs were 1 foot or more below normal pool. Month-end average levels and current month-end levels were available for 34 reservoirs this month, of which 24 reservoirs ended March with water levels below their average month-end level for March.

Major Reservoirs. Water levels at Carlyle Lake, Lake Shelbyville, and Rend Lake have increased since the end of February. At the end of March, the water surface level at Carlyle Lake was 1 foot above target operating level and Lake Shelbyville was 0.1 feet above target level. The water surface level at Rend Lake was 0.9 feet above the spillway notch.

Great Lakes. Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The March mean level for Lake Michigan was 577.1 feet, compared to a mean level of 578.22 feet in 1999. The long-term average lake level for March is 578.61 feet, based on 1918–1998 data. Historically, the lowest mean level for Lake Michigan in March occurred in 1964 at 576.05 feet, and the highest level occurred in 1986 at 581.10 feet. The month-end level of Lake Michigan was 577.1 feet.

Ground-Water Information (Ken Hlinka)

Comparison to Average Levels. Shallow ground-water levels were below average for March (Table 6) in 15 observation wells that are remote from pumping centers. Levels averaged 1.6 feet below the March average and ranged from 8.1 feet below to 2.0 feet above average. One well, SE College (Saline County) is currently at its record low ground-water level for March. As in previous months, the largest deviations from normal occurred in the west-southwest crop reporting district along the western edge of Illinois.

Although levels were down, sporadic precipitation throughout the state was reflected by above average levels mixed with below average levels within the same district. Dramatic increases are not uncommon in large-diameter bored wells in response to precipitation recharge. These wells typically tap thin lenses of water-bearing silt, sand, or gravel only a few inches thick and also very near the surface. The proximity of these lenses to the surface, the connection of the lens to the bored well casing, and the duration of the rainfall event affect the movement of shallow ground-water into wells of this type. Spotty rainfall events were reflected in this month's readings.

Comparison to Previous Month. Shallow ground-water levels from most of the state were below those of last month, except in the west-southwest and northwest parts of the state. Levels averaged 0.2 feet lower and ranged from 3.2 feet below to 1.5 feet above February levels.

Comparison to Same Month, Previous Year. Shallow ground-water levels in March, except for the east and east-southeast districts, were below levels for March 1999. Levels averaged 2.3 feet lower and ranged from 8.2 feet below to 0.2 feet above levels of last year.

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.

Table 6. Month-End Shallow Ground-Water Level Data Sites, March 2000

<i>Number</i>	<i>Well name</i>	<i>County</i>	<i>Well depth (feet)</i>	<i>This month's reading (depth to water, feet)</i>	<i>Deviation from</i>			
					<i>15-year avg. level (feet)</i>	<i>Period of record avg. (feet)</i>	<i>Previous month (feet)</i>	<i>Previous year (feet)</i>
1	Galena	JoDaviess	25.0	21.63	-0.42	-0.10	-0.03	-0.15
2	Mt. Morris	Ogle	55.0	17.00	+0.34	+1.95	+0.60	-3.35
3	Crystal Lake	McHenry	18.0	-	-	-	-	-
4	Cambridge	Henry	42.0	5.33	+0.32	+1.35	-2.48	-0.06
5	Fermi Lab	DuPage	15.0	7.43	-3.01	-3.31	-3.17	-2.83
6	Good Hope	McDonough	30.0	-	-	-	-	-
7	Snicarte	Mason	42.0	38.17	-1.67	-1.36	-0.10	-2.91
8	Coffman	Pike	28.0	15.20	-7.69	-6.14	+0.75	-8.05
9	Greenfield	Greene	20.70	15.29	-7.47	-8.11	+1.50	-8.17
10	Janesville	Cumberland	11.0	5.31	-0.52	-0.78	-0.05	+0.24
11	St. Peter	Fayette	15.0	1.66	+0.10	+0.12	+0.51	+0.17
12	SWS #2	St. Clair	80.0	15.74	-3.21	-1.72	+0.07	-4.15
13	Boyleston	Wayne	23.0	1.89	+0.27	+0.32	-0.40	+0.22
14	Sparta	Randolph	27.0	7.69	-3.82	-2.98	+0.33	-4.27
15	SE College	Saline	10.19	3.62	-2.27	-2.46	-0.15	-1.80
16	Dixon Springs	Pope	8.63	2.26	-0.53	-0.75	-0.82	-0.06
17	Bondville	Champaign	21.0	2.22	+0.42	+0.28	-0.09	+0.22