ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Illinois State Water Survey

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ILLINOIS WATER AND CLIMATE SUMMARY
June 1999

June 1999 Overview (Bob Scott)

Temperatures across Illinois in June were near average, and precipitation was above average. Soil moisture within the top 40 inches of soil was above the long-term statewide average. Mean streamflows were above the median level. Shallow ground-water levels were above the long-term average.

Temperatures across Illinois for June (Figure 1) were near average (a +0.3-degree departure). Temperatures in crop reporting districts ranged from 0.3 degrees below average (west-southwest) to 1.2 degrees above average (northeast).

Precipitation amounts (Figure 1) were above the long-term average value for the month. The statewide average of 5.15 inches represents a +1.31-inch departure or 134 percent of average. District totals ranged from 3.69 inches (west) to 6.48 inches (east-southeast), 96 to 170 percent of average, respectively.

Soil moisture conditions across Illinois in the 0- to 40-inch (0- to 100-centimeter) layer at the end of June (Figure 1) were above normal, a +0.56-inch departure. Regionally, soil moisture was above normal over parts of southern Illinois and below normal in central and west-central areas. Actual soil moisture amounts decreased substantially during the month over central Illinois in all layers, but increased in the east and west near the surface. Elsewhere, conditions remained largely unchanged at all depths.

Mean provisional streamflow statewide was above the median flow, 242 percent of median (Figure 1). All stations in Illinois recorded mean flows in the normal to much above normal range. Peak stages recorded on the Illinois River were above flood stage. Stations on the Illinois side of the Mississippi River peaked above flood stage at most locations south of Quincy. The Ohio River at Cairo peaked well below flood stage.

Water surface levels at 39 reporting reservoirs at the end of June were at normal pool or target operating level (10 reservoirs), above normal pool (16 reservoirs), and below normal pool (13 reservoirs). At the end of June, the water surface level was just above the target operating level at Carlyle Lake and several feet above the target operating level at Lake Shelbyville. Rend Lake is still above the target operating level. **Lake Michigan**'s June mean level was below the long-term average.

Statewide, **shallow ground-water levels** were above average for June (a +0.9 foot departure). Greatest deviations above average occurred in northwestern and southwestern Illinois. Levels averaged about 0.6 feet below those of last month and were approximately 0.9 feet below June levels one year ago.

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

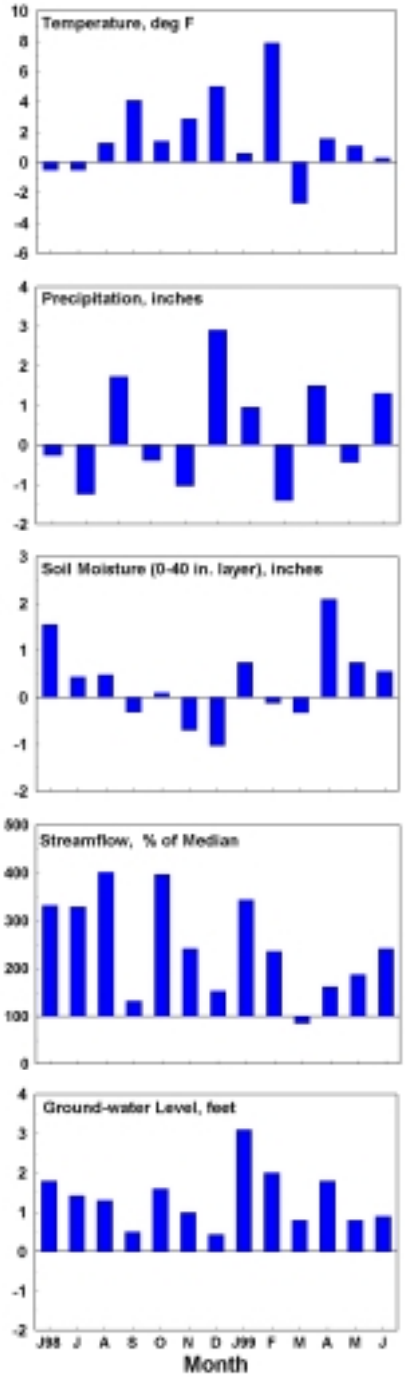

Figure 1.
Statewide departures from normal

Contact

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On the Web at www.sws.uiuc.edu/warm

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

Cook County Precipitation. May precipitation (Figure 2) amounts were variable. Site values for the month ranged from 6.85 inches at site #15 (Lemont) to 2.43 inches at site #1 (Northbrook). Precipitation was heaviest in the southwestern part of the network and along the southern lakeshore and lightest in the northern region of the network. The May 1999 network average of 4.24 inches was about 115 percent of the nine-year (1990 - 1998) May network average of 3.70 inches.

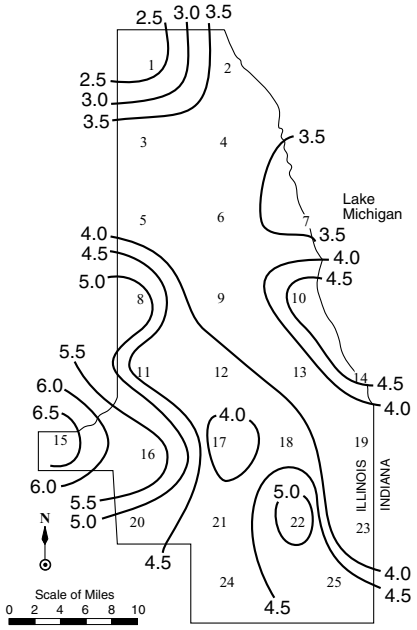

Figure 2.
Cook County precipitation (inches) during May 1999

Temperatures were near average for June statewide (Figure 3 and Table 1), although the northeast district was slightly above average. Nevertheless, wide temperature fluctuations were observed during the month. A short heat wave occurred in the second week of June, with many stations reporting highs in the 90s. District averages were 6-10° F above average. This was followed by a week of much below average temperatures statewide with lows in the middle 40s and district averages of 6-7.5° F below average. The warmest reading of the month, 97° F, occurred in Hutsonville (June 9) and the coolest, 42° F, occurred at Mundelein (June 18).

Precipitation in June averaged 5.15 inches statewide, 134 percent of the long-term average (Figure 3 and Table 1), and ranks as the 25th wettest June on record since 1895. Only the west district reported below average precipitation, 96 percent. The highest reported monthly precipitation total was at Rochelle (10.59 inches).

Severe weather in the form of tornadoes hit Illinois on June 1, 4, and 6. A total of 20 tornadoes and one death were reported on June 1 as an approaching cold front triggered a line of strong thunderstorms that moved out of Missouri and into Illinois. Heavy rainfall accompanied the system: 5.10 inches (Windsor) and 4.10 inches (Charles-

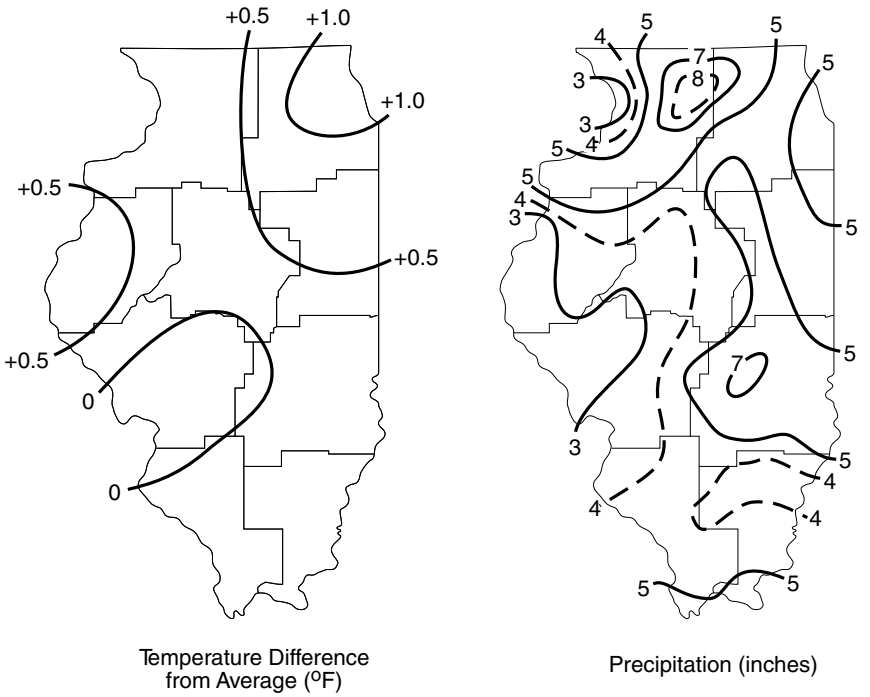

Figure 3. Illinois precipitation and temperatures during June 1999

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*		
	Jun 99 Amount	*% Avg*	*Temp Dev*	*Apr 99- Jun 99*	*% Avg*	*Temp Dev*	*Jan 99- Jun 99*	*% Avg*	*Temp Dev*	*Jul 98 - Jun 99*	*% Avg*	*Temp Dev*
Northwest	4.41	105	0.0	14.48	125	+0.9	19.50	117	+1.6	40.37	113	+2.2
Northeast	5.92	151	+1.2	16.18	143	+1.9	22.29	132	+2.0	40.01	111	+2.5
West	3.69	96	+0.5	12.33	107	+0.7	18.10	104	+1.1	36.55	98	+1.7
Central	4.94	129	+0.2	14.78	129	+0.8	21.06	119	+1.1	35.36	96	+1.7
East	4.88	130	+0.6	13.45	117	+1.3	21.05	118	+1.2	34.73	93	+1.9
West-southwest	4.65	127	-0.3	12.19	105	+0.7	19.45	106	+1.2	35.17	93	+1.9
East-southeast	6.48	170	+0.1	15.34	129	+0.7	27.84	140	+1.2	45.52	113	+1.7
Southwest	5.65	153	+0.1	14.84	123	+0.8	28.16	133	+1.4	45.19	107	+1.9
Southeast	5.64	147	+0.2	14.67	116	+0.7	28.53	125	+1.2	45.44	104	+1.7
State Average	**5.15**	**134**	**+0.3**	**14.25**	**122**	**+0.9**	**22.70**	**122**	**+1.3**	**39.70**	**103**	**+1.9**

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

ton). Minor damage was reported from 11 tornadoes on June 4 and four more during storms on June 6. On June 13, heavy thunderstorms in northeastern Illinois caused flooding along small streams and in urban areas.

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for July indicate equal chances of below, above, and normal precipitation and temperatures across the state, except for a slight chance of below normal precipitation along the Iowa border. July- September outlooks call for a slight chance of below normal temperatures over all of Illinois, especially in the northern half of the state. Precipitation outlooks for the same period call for equal chances of below, above, and normal precipitation over most of Illinois, except for a slight chance of above normal precipitation in northeastern areas.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for June (Figure 4) ranged from 3.0 mph at Dixon Springs to near 8.3 mph at Stelle. Highest wind gusts for the month were at Fairfield (52 mph on June 4). The prevailing wind direction was once again quite uniform across the state from the south-southeast to south. Wind speeds in excess of 8 mph displayed a considerable range, varying from 17 hours at Rend Lake to 310-320 hours at both Stelle and Monmouth. (June has 720 hours.) Average temperatures across the state showed mid-summer uniformity, ranging from 69° F at St. Charles to 74° F over south-central Illinois. Solar radiation was near early summertime maximums, varying little across the state from about 630 Mega-Joules per meter squared (MJ/m^2) at Brownstown to more than 700 MJ/m^2 at Wildlife Park. Potential evapotranspiration in June also showed small variations and ranged from 5.5 inches at Brownstown to nearly 6.3 inches at Wildlife Park. Soil temperatures at both the 4- and 8-inch levels showed a range in values of from 70°F in northeastern Illinois to the upper 70s in southeastern Illinois.

Soil Moisture Information (Bob Scott)

Soil moisture conditions in the 0- to 6-inch layer at the end of June (Figure 5) were normal to well above normal over most of Illinois, but were below normal in west-central Illinois. Values ranged from more than 200 percent of normal near Olney to less than 50 percent of normal at Perry. A similar trend occurred in the 6- to 20-inch layer. The above normal moisture region totaled 150 percent of normal at Brownstown, while Perry remained at 50 percent of normal. Moisture in the 20- to 40- and 40- to 72-inch layers was 125 to 150 percent of normal over southern Illinois and 75 of percent normal in the center of the state. Overall, throughout the first 40 inches of depth, statewide soil moisture at the end of June averaged above the 1985-1995 mean for the month (Figure 1).

Compared to one month ago, soil moisture during June (Table 2) decreased greatly in all layers over much of central and western Illinois. Changes in the 0- to 6- and 6- to 20-inch layers showed a negative departure from 10 to 50 percent at individual sites, while decreases in the 20- to 40-inch layer totaled 15 to 20 percent. Moderate increases in moisture of approximately 20 percent were observed only in the 0- to 6-inch layer at northwestern, east-central, and far southern sites. Elsewhere, changes in all layers were generally ±5 percent.

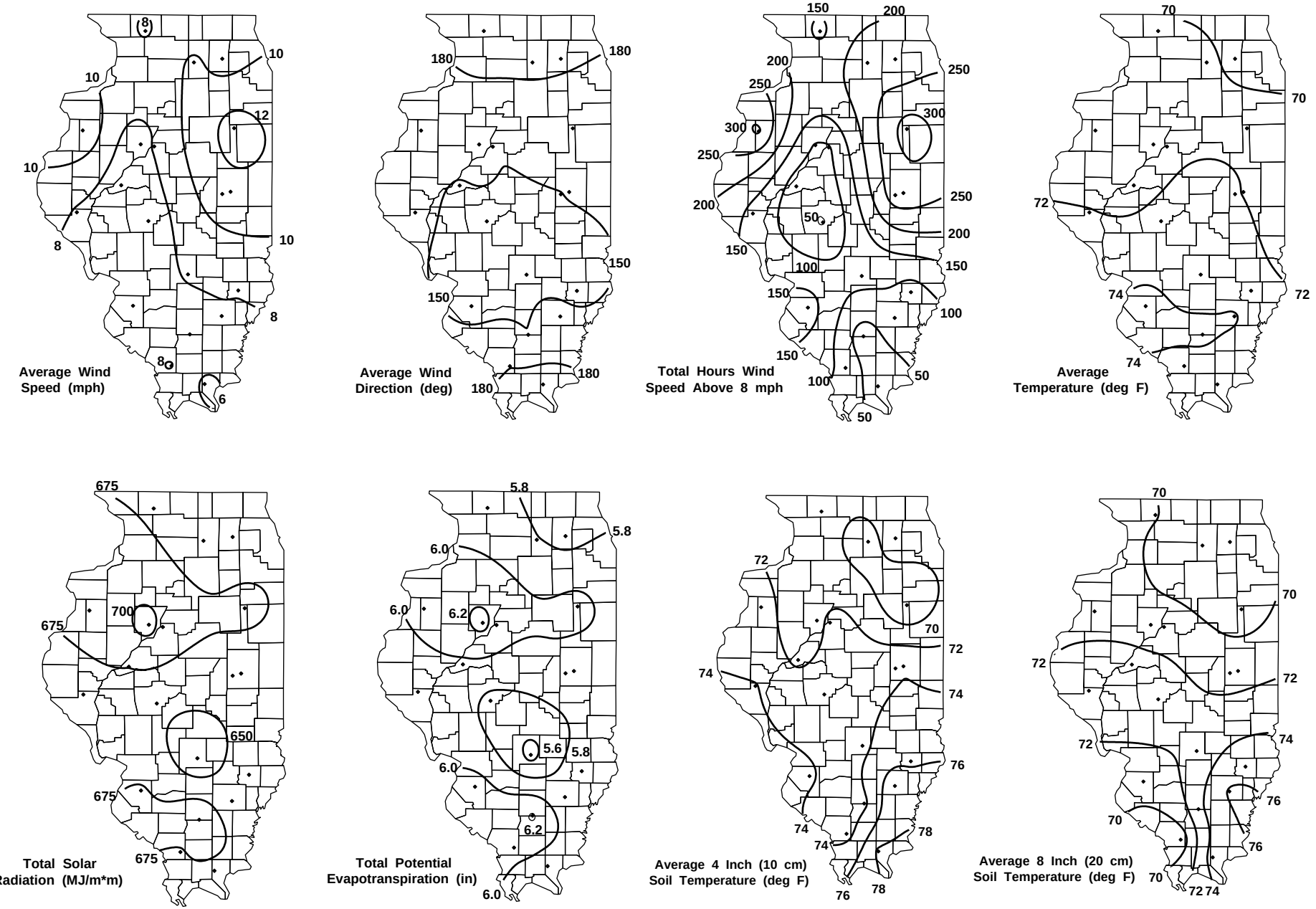

Figure 4. June monthly averages and totals as collected by the Illinois Climate Network

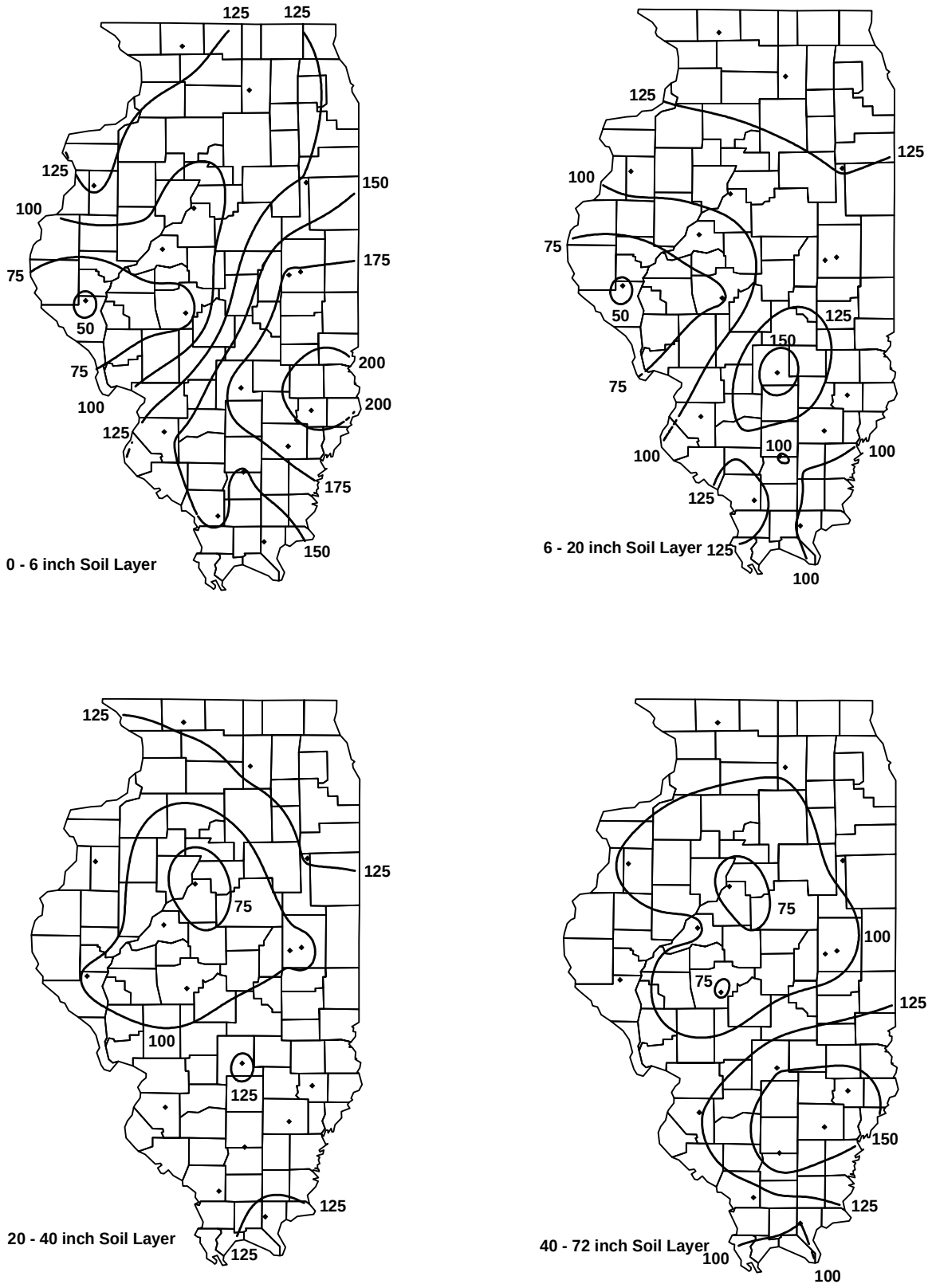

Figure 5. July 1 observed percent-of-normal soil moisture based on 1985-1992 mean

Table 2. Soil Moisture in Various Layers on July 1, 1999

Location	*Jul 1 0 - 6 (inches)*	*Change from Jun 1 (%)*	*Jul 1 6 - 20 (inches)*	*Change from Jun 1 (%)*	*Jul 1 20 - 40 (inches)*	*Change from Jun 1 (%)*
Freeport (NW)	1.8	19	4.5	5	7.2	10
DeKalb (NE)	1.7	-2	4.7	-2	7.5	1
Monmouth (W)	1.9	19	3.8	-18	6.3	-9
East Peoria (C)	1.1	-48	3.5	-29	6.7	-14
Topeka (C)	0.7	-33	1.8	-26	2.5	-20
Stelle (E)	1.8	12	4.6	5	6.9	5
Champaign (E)	2.1	-1	4.5	-10	5.9	-4
Bondville (E)	2.1	23	4.0	-3	7.4	-8
Perry (WSW)	1.1	-40	3.0	-40	7.1	-17
Springfield (WSW)	1.4	-16	4.4	-13	7.4	-6
Brownstown (ESE)	2.3	-10	4.3	-9	8.2	-2
Olney (ESE)	2.2	-2	4.5	-2	7.0	-2
Belleville (SW)	2.1	2	4.5	-5	8.1	-6
Carbondale (SW)	2.3	5	4.4	-0	7.6	-1
Ina (SE)	2.0	-9	4.8	-1	7.7	3
Fairfield (SE)	2.1	7	4.8	-2	7.4	-2
Dixon Springs (SE)	2.1	22	5.0	0	8.2	2

Surface Water Information (Sally McConkey)

River and stream discharge and stage data are obtained from gaging stations operated and maintained by the U.S. Geological Survey (USGS) or the U.S. Army Corps of Engineers (USACOE). 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 USACOE. 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 USACOE. Values reported do not reflect final or official discharges and stages.

Table 3 lists streamgaging stations located on the Illinois, Mississippi, and Ohio Rivers. Peak stage recorded this month along the Illinois River was above flood stage at all sites and occurred during the third week of the month, except at Hardin which was influenced by the Mississippi River. Illinois stations on the Mississippi River reported peak stage above flood stage from Quincy southward, except at St. Louis. Peaks occurred on the first day of June as river stages receded from heights recorded in May. The Ohio River at Cairo recorded a peak stage almost 8 feet below flood stage.

Table 4 lists 18 streamgaging stations located throughout Illinois. Provisional monthly mean flows posted by USGS are listed, if available; otherwise, daily discharge data posted by USGS were used to estimate the mean flow for the month. Long-term mean flows for each month for the period of record at each station are published by USGS. The month's median flow for each station listed in Table 4 is determined by ranking the June mean flow 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 as defined by the exceedence probability. Terms describing flow condition are defined in the notes following Table 4.

Flows have exceeded the median flows for the last several months. Stations in northern Illinois recorded flows in the much above normal range with the exception of the Kankakee River at Momence, which recorded flows in the normal range this month. The Kankakee River flows from east to west with its headwaters in Indiana. Flows recorded at stations in central Illinois were in the normal to above normal range. Flows in southern Illinois varied from normal to much above normal. The statewide average was above the median (242 percent of the median) and above the mean (207 percent of mean).

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

Table 3. Peak Stages for Major Rivers, June 1999

River	*Station*	*River mile**	*Flood stage (feet)**	*Peak stage (feet)***	*Date*
Illinois					
	Morris	263.1	13	14.3	14
	La Salle	224.7	20	23.2	15
	Peoria	164.6	18	18.1	18
	Havana	119.6	14	16.2	19
	Beardstown	88.6	14	16.9	20
	Meredosia	71.3	14	15.3	21
	Hardin	21.5	25	26.9	01
Mississippi					
	Dubuque	579.9	17	15.5	01
	Keokuk	364.2	16	15.2	01
	Quincy	325	17	18.3	01
	Grafton	218	18	21.2	01
	St. Louis	180	30	28.9	05
	Chester	109.9	27	30.0	01
	Thebes	43.7	33	33.1	01
Ohio					
	Cairo	2.0	40	32.1	08

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, June 1999

Station	*Drainage area (sq mi)*	*Year of record*	*1999 mean flow (cfs)*	*Long-term flows* *Mean** *(cfs)*	*Median (cfs)*	*Flow condition*	*Percent chance of exceedence*	*Days of data this month*
Rock River at Rockton	6,363	63	8,290	4,142	3,723	much above normal	06	30
Rock River near Joslin	9,549	55	16,280	6,906	6,683	much above normal	09	30
Pecatonica River at Freeport	1,326	80	2,238	966	861	much above normal	05	30
Green River near Geneseo	1,003	59	1,820	858	725	much above normal	08	30
Edwards River near New Boston	445	60	940	411	315	much above normal	09	21
Kankakee River at Momence	2,294	80	2,288	2,197	1,976	normal	37	30
Fox River at Dayton	2,642	79	4,585	1,852	1,515	much above normal	05	30
Vermilion River at Pontiac	579	54	960	546	365	much above normal	07	27
Spoon River at Seville	1,636	81	2,456	1,548	1,028	above normal	25	30
LaMoine River at Ripley	1,293	74	870	1,115	707	normal	42	30
Mackinaw River near Congerville	767	49	2,217	752	445	above normal	10	30
Sangamon River at Monticello	550	85	655	483	343	above normal	26	30
Vermilion River near Danville	1,290	54	1,300	1,171	1,057	normal	43	28
Kaskaskia River at Vandalia	1,940	28	2,527	1,656	1,153	above normal	23	30
Shoal Creek near Breese	735	54	617	487	256	above normal	23	30
Embarras River at Ste. Marie	1,516	84	2,666	1,242	911	much above normal	09	30
Skillet Fork at Wayne City	464	78	331	290	104	above normal	30	30
Big Muddy at Plumfield	794	83	467	702	306	normal	41	30

Notes:
*As reported in U.S. Geological Survey (USGS) Water Resources Data, Illinois, Water Year 1997.
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.

Compared to levels at the end of May at 39 reservoirs, the water surface elevation at the end of June had risen at 7 reservoirs, remained the same at 11 reservoirs, and decreased at 21 reservoirs. Most reservoirs are at or above water levels typically reported at the end of June. Month-end levels for the 39 reservoirs reporting this month show that 16 reservoirs were above the spillway crest or target operating level, 10 reservoirs were at normal pool, and 13 reservoirs were below normal pool.

Major Reservoirs. The water level at Carlyle Lake rose 0.6 feet compared to the end of May. The water level at Lake Shelbyville rose 4.3 feet. Since the end of May, the level at Rend Lake level decreased 0.9 feet and was 2 feet above the spillway notch elevation at the end of June.

Great Lakes. Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The June mean level for Lake Michigan was 578.5 feet, compared to a mean level of 580.38 feet in 1998. The long-term average lake level for June is 579.40 feet, based on 1918-1996 data. Historically, the lowest mean level for Lake Michigan in June occurred in 1964 at 576.64 feet, and the highest level occurred in 1986 at 581.79 feet. The month-end level of Lake Michigan was 578.6 feet.

Ground-Water Information (Ken Hlinka)

Comparison to Average Levels. Shallow ground-water levels in 16 reporting observation wells in Illinois, remote from pumping centers, were above average levels for June (Table 6). Levels averaged 0.9 feet above average and ranged from 2.6 feet below to 7.3 feet above average. The greatest deviation above average occurred in northwestern Illinois.

Comparison to Previous Month. Statewide, shallow ground-water levels during June were below those of last month. Levels averaged 0.6 feet lower and ranged from 3.2 feet below to 2.3 feet above last month's levels. The west-central part of the state was the only area where departures were uniformly negative or positive.

Comparison to Same Month, Previous Year. Shallow ground-water levels this month were below the levels for June 1998 throughout Illinois. Levels averaged 0.9 feet lower and ranged from 9.3 feet below to 10.7 feet above levels of last year.

Table 6. Month End Shallow Ground-Water Level Data Sites, June 1999

				Deviation from		
Number	*Well name*	*County*	*This month's reading (depth to water, feet)*	*Avg. level (feet)*	*Previous month (feet)*	*Previous year (feet)*
1	Galena	JoDaviess	19.22	+1.65	-0.61	+10.71
2	Mt. Morris	Ogle	9.45	+7.34	+0.60	+1.05
3	Crystal Lake	McHenry	7.10	-2.59	NA	-4.06
4	Cambridge	Henry	6.39	+0.98	-0.83	-3.64
5	Fermi Lab	DuPage	6.86	-0.88	-3.04	+0.35
6	Good Hope	McDonough	NA	NA	NA	NA
7	Snicarte	Mason	34.23	+2.01	-0.28	+1.38
8	Coffman	Pike	12.28	-1.27	-3.17	-9.32
9	Greenfield	Greene	8.49	+1.34	-1.58	-5.12
10	Janesville	Cumberland	5.56	+0.03	+0.01	-1.06
11	St. Peter	Fayette	3.71	-0.31	-1.49	-1.29
12	SWS #2	St. Clair	13.17	+1.19	+0.02	-0.30
13	Boyleston	Wayne	3.20	+1.88	0.00	+0.58
14	Sparta	Randolph	1.91	+5.02	+2.32	+2.96
15	SE College	Saline	5.34	-0.88	-0.60	-3.28
16	Dixon Springs	Pope	4.54	-1.18	+0.06	-0.38
17	Bondville	Champaign	4.11	-0.49	-0.29	-3.58

Note:
NA - Information not available