ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Illinois State Water Survey

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ILLINOIS WATER AND CLIMATE SUMMARY
October **1998**

October 1998 Overview (Bob Scott)

Temperatures across Illinois in October were above average while precipitation was well above average. Soil moisture within the top 40 inches of soil was near the long-term statewide normal. Mean streamflows once again were well above the median level. Shallow ground-water levels were above the long-term average.

Temperatures across Illinois (Figure 1) were above average for October (a 1.4-degree departure). Temperatures by crop reporting districts (Table 1) ranged from 0.4 degrees above average (northwest) to 2.2 degrees above average (southwest).

Precipitation amounts (Figure 1) were well above the long-term average value across the state. The October statewide average of 4.60 inches represents a +2.86-inch departure, or 161 percent of average. District totals (Table 1) ranged from 3.48 inches (east) to 7.15 inches (northwest), 129 to 247 percent of average, respectively.

Soil moisture across Illinois in the 0- to 40-inch (0- to 100-cm) layer at the end of October (Figure 1) was near normal (a +O. lo-inch departure). Although large areas of the state reported normal to above normal moisture in all layers, dry soils continued near the surface in east-central and southwestern Illinois, and substantially dry conditions were found in deeper layers over central Illinois. Nevertheless, actual soil moisture levels across much of the state (Table 2) showed large increases in the near surface layers during October.

Mean provisional streamflow statewide was well above the median flow, 397 percent of the median (Figure 1). Due to relatively low values, typical for October, flows responded quickly to heavy precipitation events during the month. Stations in central and southern Illinois recorded flows in the normal to below normal range; however, measurements taken in northern Illinois revealed mean flows substantially higher than normal. Notable records for monthly mean flow were set for the Green River near Geneseo and the Edwards River near New Boston. Peak stages on the Illinois, Mississippi, and Ohio Rivers were below flood stage at all reporting stations, except the Mississippi River at Chester.

Water surface levels at 40 reservoirs reporting at the end of October were at normal pool (target operating level) at 8 reservoirs, above normal pool at 4 reservoirs, and below normal pool at 28 reservoirs. Water surface levels at Carlyle Lake, Lake Shelbyville, and Rend Lake decreased slightly last month. **Lake Michigan** levels continue to exceed the long-term mean.

Statewide, **shallow ground-water levels** were approximately 1.6 feet above average levels for October. The greatest deviations above average occurred in northwestern Illinois. Levels rose in October and, on average, were above those of September by about 0.9 feet, with slightly lower levels across central and south-central Illinois. Ground-water levels at all locations were above those of October 1997.

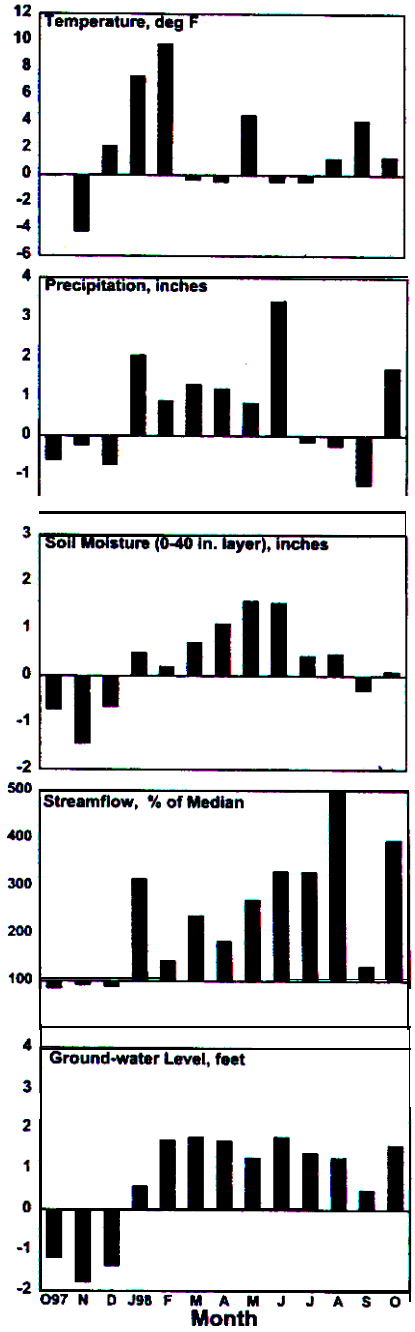

Figure 1.
Statewide departures from normal

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

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** amounts for September were moderate (Figure 2). Site values for the month ranged from 4.83 inches at site #11 (LaGrange) to 1.51 inches at site #2 (Winnetka). Precipitation was heaviest in the west-central portion of the network and lightest in the north and northeast, particularly along the Lake Michigan shoreline. The September network average (2.90 inches) was nearly equal to the eight-year (1990-1997) September network average (2.91 inches).

Temperatures across Illinois generally averaged 1 to 2°F above normal (Figure 3 and Table 1), creating a very mild and pleasant October. Maximum temperatures during the first week of the month reached the mid- to upper 80s in southern Illinois, with temperatures in the upper 70s and low 80s throughout the remainder of the state. Cairo recorded the high temperature for the month (87°F) on October 6. Most of the state experienced coldest temperatures on or near October 23, with many stations reporting lows in the upper 20s or lower 30s, including Mt. Carroll, the coldest spot, with a low of 25°F on October 22.

October precipitation was well above normal in Illinois, with the heaviest rainfall amounts being observed in the western and northern portions of the state (Figure 3 and Table 1). Most of this rain fell October I7- 18. Moline reported 4.13 inches on October 17, Streamwood reported 4.50 inches on October 18, and many other stations reported amounts between 1 and 4 inches. The state's average (16 1 percent of normal precipitation) for October alleviated some of the rather dry September conditions.

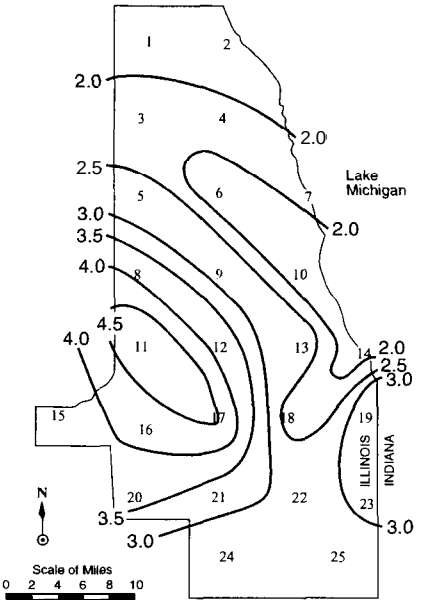

Figure 2. Cook County precipitation (inches) during September 1998

Severe thunderstorms developed on October 29 across much of western and central Illinois, with several reports of wind damage. Hail 1.75 inches in diameter was reported in Virginia (Cass County) and in Versailles (Brown County). A moving van containing 7000 pounds of furniture was blown over just north of Arcola (Douglas County).

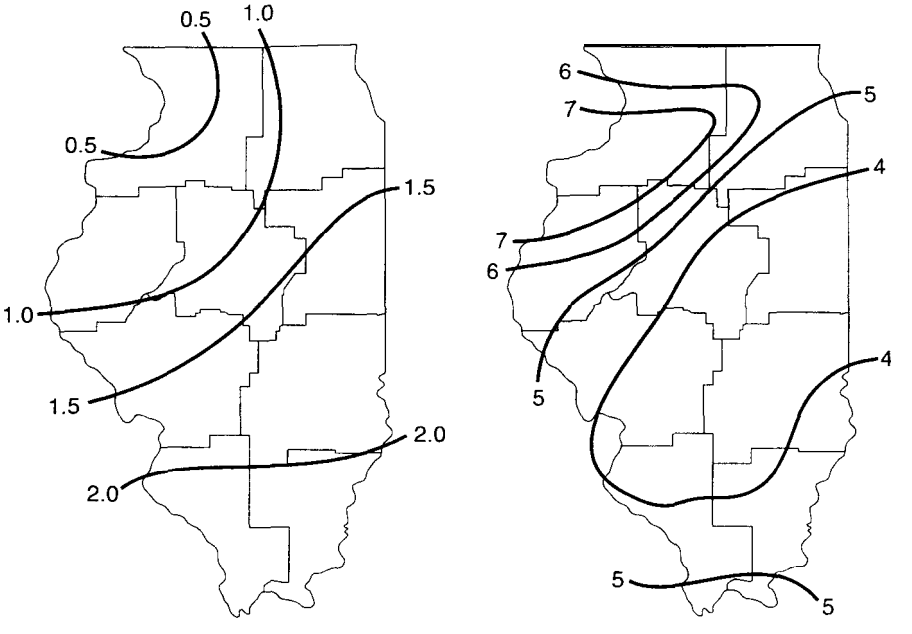

Figure 3. Illinois precipitation and temperatures during October 1998

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		
	Oct 98 Amount	% Avg	Temp Dev	Aug 98-Ocr 98	% Avg	Temp Dev	May 98- Oct 98	% Avg	Temp Dev	Nov 97-Oct 98	% Avg	Temp Dev
Northwest	7.15	247	0.4	14.34	**132**	**1.5**	26.39	115	1.3	**43.54**	122	2.4
Northeast	5.19	191	1.4	11.84	**114**	**2.1**	23.40	107	1.9	**39.23**	109	2.8
West	5.37	172	0.8	11.14	**102**	**2.4**	26.13	113	1.6	**46.20**	124	1.8
Central	4.21	149	1.0	9.38	**93**	**2.3**	24.08	111	1.6	**42.79**	116	2.1
East	3.48	129	1.7	7.54	**77**	**2.7**	25.54	118	1.9	**43.39**	116	2.4
West-southwest	3.99	141	1.6	10.19	**104**	**2.5**	26.66	124	2.0	**47.29**	124	1.9
East-southeast	3.67	129	1.9	9.25	**98**	**2.3**	26.58	124	1.8	**46.09**	115	2.0
Southwest	3.84	135	2.2	9.14	**94**	**2.5**	25.61	120	2.3	**46.99**	111	1.9
Southeast	4.12	140	2.1	**8.75**	**93**	**2.3**	**25.05**	**116**	**2.0**	**47.03**	107	1.7
State Average	4.60	161	1.4	**10.31**	**103**	**2.3**	**25.55**	**117**	**1.8**	**44.66**	116	2.1

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

Extended climate outlooks issued by the U.S. Department of Commerce, National Atmospheric and Oceanic Administration, Climate Prediction Center for November call for equal chances of below, above, and normal temperatures, and a slight chance of above normal precipitation over all of Illinois. The November-January outlooks call for equal chances of below, above, and normal temperatures and precipitation across the state.

Illinois Climate Network (ICN) **Data. Average daily wind** speeds across Illinois for October (Figure 4) ranged from 2.9 mph at Dixon Springs to 9.9 mph at Stelle. Highest wind gusts for the month were recorded at Stelle and Wildlife Park, 41 mph on October 16 and 18, respectively. The prevailing wind direction across the state was quite variable being from the southeast to southwest over most of the state, but with a stronger westerly component in far northeastern and southern Illinois. Wind speeds in excess of 8 mph ranged from about 30 hours at Dixon Springs and Rend Lake to 429 hours at Stelle. (October has 744 hours.)

Average temperatures across the state continued the seasonal cool down, varying from the middle 50s over the northern two-thirds of Illinois to 6 1°F at Belleville. Similarly, solar radiation reflected the decline of daylight hours and incident radiation, and ranged from 335 Mega-Joules per meter squared (MJ/m^2) over northern Illinois to 425 MJ/m^2 over southern Illinois. Potential evapotranspiration reflected the decreasing trends of solar radiation temperature and decreased as well. For October, it varied from a low of 2.5 inches at DeKalb, Monmouth, and St. Charles to 3.4 inches across southern Illinois. Soil temperatures at both the 4- and S-inch levels were quite similar across the state, ranging from 56°F over northern Illinois to the mid-60s in the far south.

Soil Moisture Information (Bob Scott)

Soil moisture across Illinois began a recharge process due to large areas of substantial precipitation that fell during October. In the 0- to 6-inch layer (Figure 5), soil moisture levels maximized in excess of 150 percent of normal over all of west-central Illinois. Portions of east-central and southwestern Illinois reported being relatively dry (less than 75 percent of normal). Conditions were near normal elsewhere in this layer. A similar pattern occurred in the 6- to 20-inch layer, but dry regions were connected and stretched from St. Louis to Kankakee. Patterns at 20 to 40 inches of depth repeated last month’s standard with severe dryness over central and east-central Illinois, minimizing to less than 25 percent of normal moisture at East Peoria. At the same time, conditions were above normal in the far north and south, and especially to the west. Observations at depths of 40 to 72 inches were similar. Conditions in this lowest layer remained quite dry over central Illinois, while southern Illinois recorded high soil moisture for this layer, up to 175 percent of normal. Overall, throughout the first 40 inches of depth, statewide soil moisture at the end of October averaged very near the 1985-l 995 mean for the month (Figure 1).

Heavy rainfall totals across Illinois in October resulted in large increases in actual soil moisture in the 0- to 6- and 6- to 20-inch layers from one month ago (Table 2). Many sites reported increases in excess of 40 percent with soil moisture at Dixon Springs increasing by nearly 170 percent. Scattered decreases occurred over parts of southwestern Illinois. Moisture totals in the 20- to 40-inch layer changed little from last month, except conditions were wetter at some northern sites.

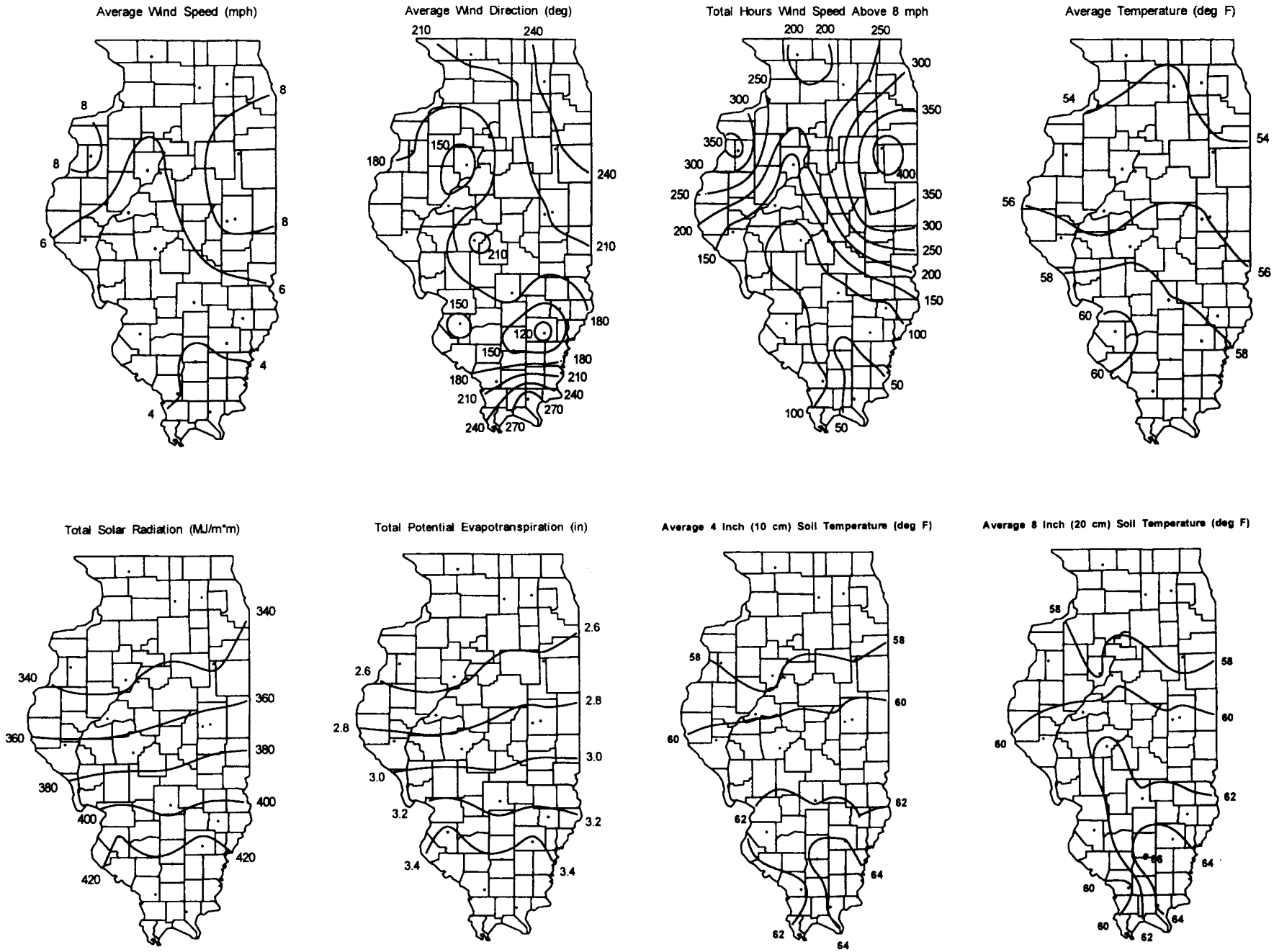

Figure 4. October monthly averages and totals as collected by the Illinois Climate Network

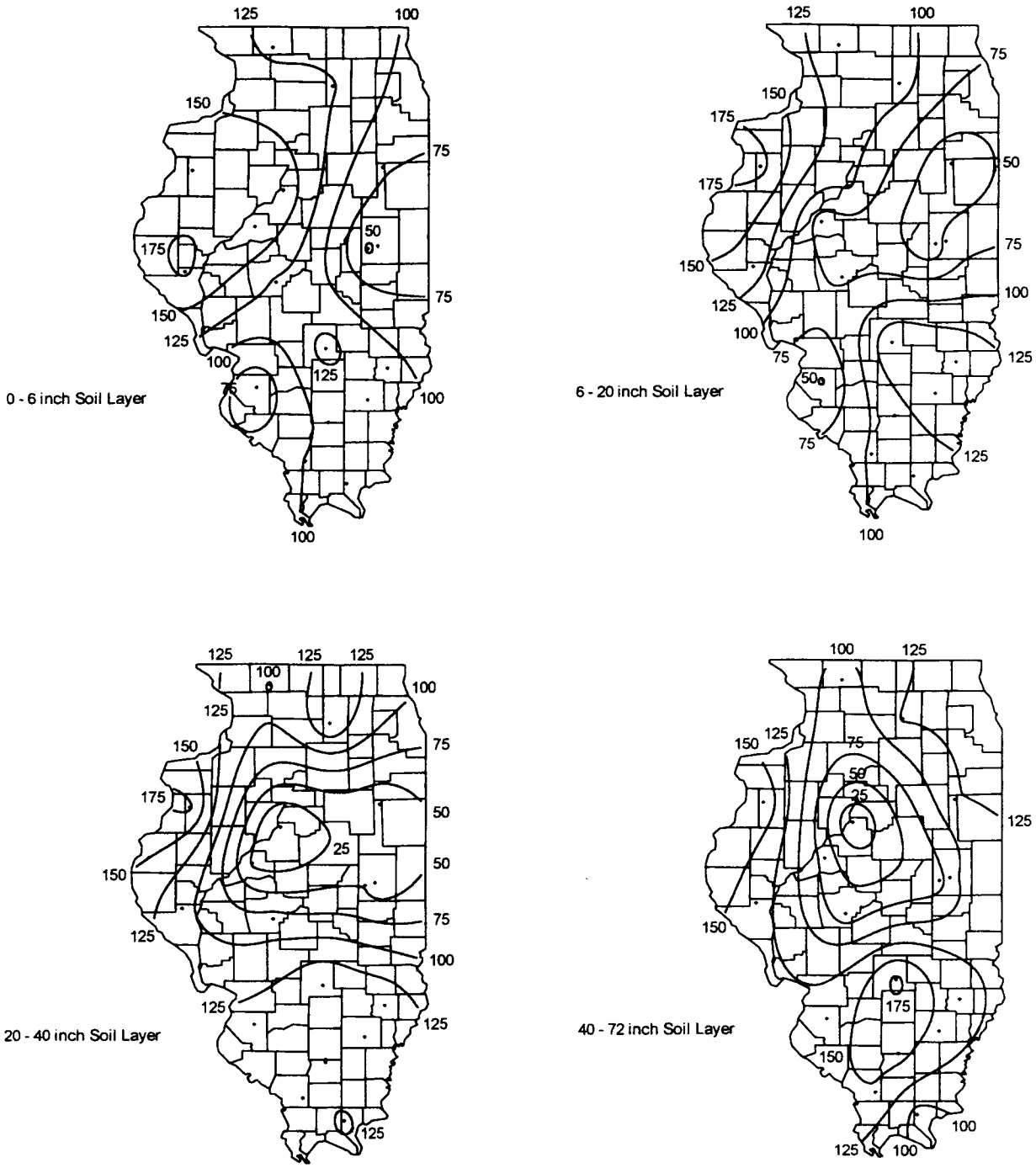

Figure 5. November 1 observed percent-of-normal soil moisture based on 1985-1992 mean

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

Location	Nov 1 0-6 (inches)	Change from Oct 1 (%)	Nov 1 6 - 20 (inches)	Change from Oct 1 (%)	Nov 1 20-40 (inches)	Change from Oct 1 (%)
Freeport (NW)	2.1	37	4.6	22	6.9	19
DeKalb (NE)	2.2	16	5.0	29	7.7	23
Monmouth (W)	2.1	37	4.8	45	6.9	29
East Peoria (C)	2.4	84	4.5	27	6.0	-5
Topeka (C)	1.2	68	1.8	15	1.8	4
Stelle (E)	1.6	57	3.1	15	4.8	4
Champaign (E)	1.4	13	3.8	13	4.5	2
Bondville (E)	1.2	12	2.7	-0	6.0	-2
Perry (WSW)	2.3	21	4.8	11	6.8	-3
Springfield (WSW)	2.0	40	4.5	-9	7.3	-3
Brownstown (ESE)	2.0	-1	3.9	0	7.7	-2
Olney (ESE)	1.6	9	4.5	7	7.0	1
Belleville (SW)	1.0	36	1.6	-18	7.1	-5
Carbondale (SW)	1.6	31	3.1	11	6.8	-1
Ina (SE)	1.8	49	5.0	12	7.6	-0
Fairfield (SE)	1.6	40	4.9	39	7.3	3
Dixon Springs (SE)	2.1	169	4.7	74	7.6	9

Surface Water Information (Sally McConkey)

Rivers and Streams. 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 (USACOE) and the Illinois Department of Natural Resources (Office of Water Resources and the Illinois State Water Survey). Provisional data are obtained from either direct computer access to the USGS or from readings posted on the Internet by USGS and USACOE. Values reported do not reflect final or official stages or discharges.

Table 3 lists streamgaging stations located on the Illinois, Mississippi, and Ohio Rivers. Along the Illinois River, peak stages were recorded at most stations during the third week of October and were well below flood stage. Stage observations at Illinois stations along the Mississippi River above St. Louis also peaked below flood stage during the third week of October, while those to the south at St. Louis, Chester, and Thebes recorded peak flows about ten days earlier. The peak flow was at flood stage at Chester. The peak stage recorded on the Ohio River at Cairo was well below flood stage near mid-month.

Table 4 lists 18 streamgaging stations located throughout Illinois. Provisional monthly mean flows posted by the USGS are listed if available; otherwise, daily discharge data posted by the USGS were used to estimate the mean flow for the month. Long-term mean flows for each month are published by the USGS. The month's median flow for each station listed in Table 4 was determined by ranking the month's 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 for Table 4.

Flows along the Rock, Pecatonica, Green, Edwards, and Fox Rivers in northern Illinois were in the above normal to much above normal range. Provisional mean flows for the Green River at Geneseo and the Edwards River at New Boston were the highest October flows for the period of record. Flows in central Illinois varied from above normal (LaMoine River at Ripley) to below normal (Sangamon River at Monticello). Flows were in the normal range in southern Illinois, except for the Kaskaskia River at Vandalia, which was affected by controlled water releases from Lake Shelbyville. The statewide above average median flow was dominated by exceptionally high flows in northern Illinois.

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 reservoirs listed serve as public water supplies, with the exceptions noted in the last column of Table 5.

Compared to levels at 40 reporting reservoirs at the end of September, the water surface elevation at the end of October had risen at reservoirs, remained the same at 2 reservoirs, and decreased at 23 reservoirs. At the end of October, 4 reservoirs reported water surface levels above the spillway crest or target operating level, 8 reservoirs were

Table 3. Peak Stages for Major Rivers, October 1998

River	Station	River mile*	Flood stage (feet)*	Peak stage (feet)**	Date
Illinois					
	Morris	263.1	13	7.88	18
	La Salle	224.7	20	14.68	19
	Peoria	164.6	18	13.09	22
	Havana	119.6	14	9.91	22
	Beardstown	88.6	14	10.42	20
	Meredosia	71.3	14	6.71	22
	Hardin	21.5	25	20.81	21
Mississippi					
	Dubuque	579.9	17	9.04	21
	Keokuk	364.2	16	10.71	19
	Quincy	328	17	14.21	19
	Grafton	218.0	18	16.06	21
	St. Louis	180.0	30	26.29	08
	Chester	109.9	27	26.98	09
	Thebes	43.7	33	29.45	10
Ohio					
	Cairo	2.0	40	28.40	11

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, October 1998

Station	Drainage area (sq mi)	Years of record	1998 mean flow (cfs)	Long-term flows Mean (cfs)	Long-term flows Median (cfs)	Flow condition	Percent chance of exceedence	Days of data this month
Rock River at Rockton	6363	63	5016	3052	2683	above normal	17	31
Rock River near Joslin	9549	55	8200	4474	3767	above normal	16	29
Pecatonica River at Freeport	1326	80	1196	687	586	above normal	13	31
Green River near Geneseo	1003	59	2230	368	213	much above normal	02	28
Edwards River near New Boston	445	60	1330	128	43	much above normal	02	29
Kankakee River at Momence	2294	80	920	1204	899	normal	48	29
Fox River at Dayton	2642	81	1710	1121	763	above normal	22	30
Vermilion River at Pontiac	579	54	11	142	27	normal	67	29
Spoon River at Seville	1636	81	980	544	166	normal	16	29
LaMoine River at Ripley	1293	74	470	445	122	above normal	21	29
Mackinaw River near Congerville	767	49	32	204	30	normal	49	27
Sangamon River at Monticello	550	85	12	179	34	below normal	76	31
Vermilion River near Danville	1290	54	180	337	105	normal	38	29
Kaskaskia River at Vandalia	1940	28	50	634	286	below normal	90	27
Shoal Creek near Breese	735	54	50	176	38	normal	45	29
Embarras River at Ste. Marie	1516	84	100	419	108	normal	52	28
Skillet Fork at Wayne City	464	78	30	99	11	normal	33	29
Big Muddy at Plumfield	794	83	100	109	43	normal	30	29

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 = IO-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.

at normal pool, and 28 reservoirs were below normal pool. Lake Taylorville remains drawn down for construction of silt basins.

Two public water supplies were taken off-line in October (Shipman Reservoir and Ashley Lake), and the respective county water distribution plants will provide water for those communities. Shipman Water Works will continue to report the water surface level of the reservoir. There are no plans to continue monitoring Ashley Lake, so it will be deleted from Table 5 in future reports.

The ISWS was notified in October of a revised spillway elevation for Lake Carlinville. The revision results from a corrected benchmark elevation from which the spillway elevation was originally calculated. New measurements have determined the present spillway elevation to be 570.64 feet (National Geodetic Vertical Datum or NGVD 1988), revised from 573.0 feet (NGVD 1929) as reported previously in this newsletter. This change reflects a corrected measurement, ***not*** a physical modification to the spillway. Beginning this month, normal pool elevation and month-end average values have been revised to reflect this correction.

Major Reservoirs. At the end of October, water surface levels at Rend Lake, Carlyle Lake, and Lake Shelbyville were all within 0.5 feet of target operating levels. Water levels at each lake have decreased since the beginning of the month.

Great Lakes. Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The October mean level for Lake Michigan was 579.08 feet, compared to 580.77 feet in October 1997. The long-term average lake level for October is 579.07 feet, based on data from 19 1 8- 1996. Historically, the lowest mean level for Lake Michigan occurred in October 1964 (576.44 feet), and the highest mean level occurred in October 1986 (582.35 feet). The Lake Michigan month-end level was 578.89 feet.

Ground-Water Information (Ken Hlinka)

Comparison to Average Levels. Shallow ground-water levels in 16 observation wells that are remote from pumping centers were above average levels for October in all but the east-central and extreme southern portions of the state (Table 6). Levels averaged 1.6 feet higher and ranged from 1.2 feet below to 7.5 feet above average levels. Greatest deviations above average occurred in northwestern Illinois, and the greatest deviations below average occurred in extreme southeastern Illinois.

Comparison to Previous Month. Statewide, shallow ground-water levels during October averaged 0.9 feet higher than September levels and ranged from 1.6 feet lower to 7.9 feet higher. Water levels in central Illinois were slightly below September levels, while levels in both northern and southern Illinois exceeded September levels.

Comparison to Same Month, Previous Year. Shallow ground-water levels throughout Illinois during October exceeded October 1997 levels. Levels averaged 2.8 feet higher and ranged from 0.5 to 10.9 feet above ground-water levels one year ago.

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

				Deviation from		
Number	*Well name*	County	*This month's reading (depth to water, feet)*	*Avg. level (feet)*	*Previous month (feet)*	*Previous year Cfeet)*
1	Galena	JoDaviess	20.73	+0.67	+0.04	+0.54
2	Mt. Morris	Ogle	14.40	+5.32	+2.10	+3.60
3	Crystal Lake	McHenry	5.53	+0.27	+0.31	+0.85
4	Cambridge	Henry	3.92	+7.51	+7.87	+10.91
5	Fermi Lab	DuPage	4.45	+2.93	+3.61	+3.75
6	Good Hope	McDonough	8.50	+2.38	NA	+4.04
7	Snicarte	Mason	36.63	+0.32	-0.15	+2.83
8	Coffman	Pike	13.74	+0.64	-0.14	+2.64
9	Greenfield	Greene	15.47	+0.09	-0.37	+1.65
10	Janesville	Cumberland	6.74	-0.20	-0.15	+4.31
11	St. Peter	Fayette	3.55	+0.73	-0.65	+1.80
12	sws #2	St. Clair	12.25	+3.89	+0.03	+1.58
13	Boyleston	Wayne	6.89	+1.52	-1.62	+1.30
14	Sparta	Randolph	9.32	+1.17	-0.95	+0.64
15	SE College	Saline	8.12	-1.08	+0.74	+1.26
16	Dixon Springs	Pope	6.12	-1.16	+2.30	+2.50

Note:
N/A = not available.