

ILLINOIS WATER AND CLIMATE SUMMARY
November 1998

November 1998 Overview (Bob Scott)

Temperatures across Illinois in November were 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 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 November (a 2.9-degree departure). By crop reporting districts (Table 1), temperatures ranged from 2.2 degrees above average (southeast) to 3.6 degrees above average (northeast). Unusually warm conditions occurred the last ten days of the month, during which statewide temperatures ranged from 9 to 13 degrees above average.

Precipitation amounts (Figure 1) for the state as a whole were below the long-term average value. The statewide average of 2.60 inches represents a -0.39-inch departure, or 87 percent of average. District totals (Table 1) ranged from 1.73 inches (northeast) to 3.85 inches (west), 66 to 153 percent of average, respectively.

Soil moisture across Illinois in the 0- to 40-inch (0- to 100-cm) layer at the end of November (Figure 1) was below normal (a -0.70-inch departure). Conditions near the surface were close to normal, but over much of central Illinois soils were progressively drier with depth. Regions of above normal soil moisture were confined largely to the deepest layer at sites in southeastern Illinois. Total soil moisture amounts across much of the state showed large increases during the month in the near surface layers (Table 2).

Mean provisional streamflow statewide was much above the median flow for the month, 242 percent of median (Figure 1). Stations in the northern and west-central parts of Illinois recorded mean flows above the normal range. However, most stations in southern Illinois recorded flows in the normal range. Peak stages on the Illinois, Mississippi, and Ohio Rivers were below flood stage at all reported stations, except at Chester on the Mississippi River.

Water surface levels at 37 reporting reservoirs at the end of November were at normal pool (target operating level) at 6 reservoirs, above normal pool at 7 reservoirs, and below normal pool at 24 reservoirs. Water surface levels at Carlyle Lake, Lake Shelbyville, and Rend Lake changed less than 1 foot from last month. Lake Michigan's November mean level was below the long-term average.

Statewide, **shallow ground-water levels** were above average for November (a +1.0-foot-departure). Greatest deviations occurred in the western part of the state. Levels averaged about 0.5 feet above those of last month and were approximately 2.9 feet above November levels one year ago.

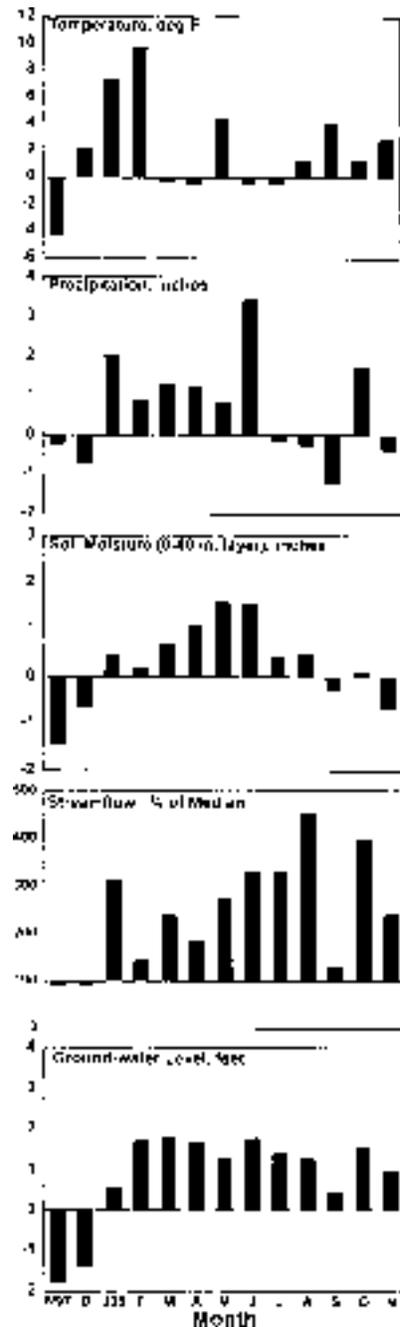


Figure 1. Statewide departures from normal

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

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

Cook County precipitation amounts for October were moderate (Figure 2). Site values for the month ranged from 5.63 inches at site 1 (Northbrook) to 2.25 inches at site 24 (Matteson). Heavier precipitation was found in the northwestern part of the network, and the lightest precipitation occurred in the southern portion. The October 1998 network average of 3.79 inches was about 110 percent of the nine-year (1989-1997) October network average (3.45 inches).

Temperatures across Illinois averaged 2 to 3°F above average for November (Figure 3 and Table 1), although readings during the month varied considerably. The month began with a relatively cool period. The first ten days of November averaged 3 to 6°F below average. Conversely, the last ten days of the month had temperatures that were quite warm seasonally, 9 to 13°F above average, and created an unusually mild end to the month. Numerous record high temperatures were set. New daily maximums occurred on November 28 at Rockford (65°F), Chicago and Quincy (67°F), and Springfield (68°F); on November 29 at Rockford (65°F), Champaign (66°F), Chicago (68°F), Moline (69°F), Springfield (70°F), and Cahokia (74°F); and on November 30 at Chicago (65°F), Moline (66°F), and Quincy (69°F). Temperatures at both Chicago and Champaign reached 60°F or more each day from November 26-30, exceeding and equaling, respectively, the record for the greatest number of consecutive days with readings at or above 60°F for so late in the season. Statewide extremes for the month were recorded at Hutsonville and Carbondale, 75°F on November 1 and 27, respectively. The lowest minimum temperature was 14°F at Mt. Carroll on November 21.

Precipitation was below average in November for most of Illinois, except for a narrow band of normal to above normal rainfall through the south-central portion of the state (Figure 3 and Table 1). Highest individual monthly totals were recorded at Casey with 4.78 inches and Greenup with 4.00 inches. Most precipitation occurred in conjunction with the passage of low pressure systems on November 3 and November 10. In general, the remaining periods of the month were quite dry. Some snow fell over northern Illinois on November 7, with Moline reporting 2.6 inches.

Severe weather passed through the state on November 10, and included a brief tornado near Junction (Gallatin County). However, much of the wind damage across the state from this storm (mostly to trees and power lines) was not

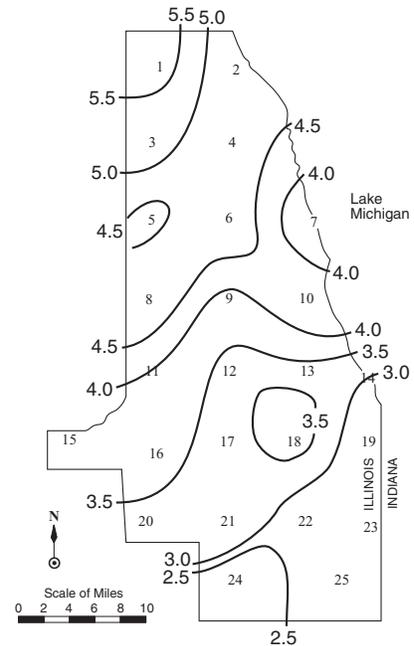


Figure 2. Cook County precipitation (inches) during October 1998

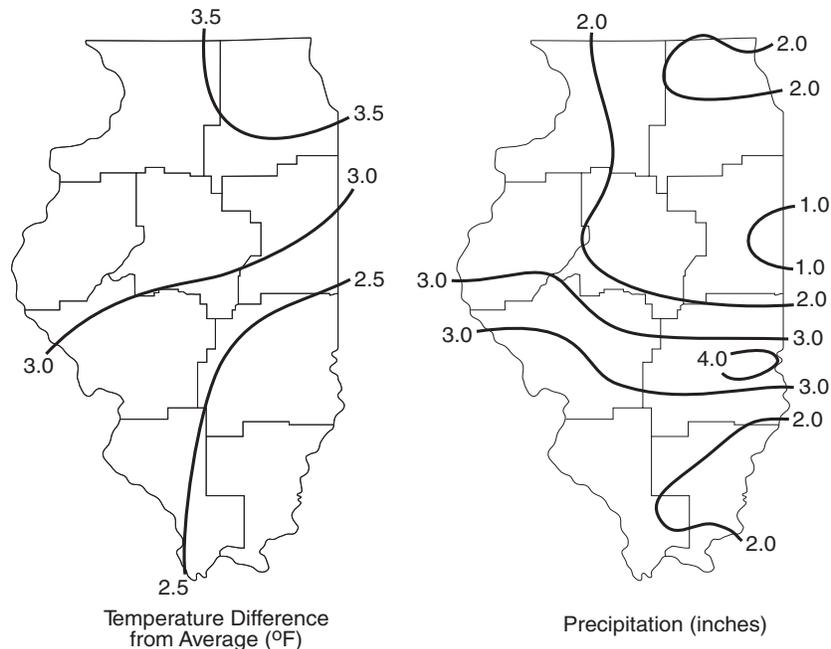


Figure 3. Illinois precipitation and temperatures during November 1998

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

Crop Reporting District	Last Month			Last Month			Last Month			Last month		
	Sta Wt	% Prec	Temp Dev	Sta Wt	% Prec	Temp Dev	Sta Wt	% Prec	Temp Dev	Sta Wt	% Prec	Temp Dev
Northwest	2.10	97	+1.1	12.20	138	+2.2	25.15	119	+1.0	43.88	127	+3.0
Northeast	1.73	66	+1.6	9.23	102	+2.8	21.28	102	+1.6	29.31	109	+3.4
West	3.85	151	+1.3	12.59	127	+2.9	25.06	116	+1.5	47.59	126	+2.4
Central	2.34	87	+1.1	8.21	89	+2.8	21.38	104	+1.4	43.29	114	+2.7
East	1.95	69	+1.1	6.95	77	+3.1	21.84	107	+1.6	43.13	116	+3.0
West-southwest	3.23	1.0	+2.8	3.93	106	+3.0	25.44	126	+1.6	46.97	124	+2.5
East-southeast	3.23	92	+2.3	3.02	95	+2.7	24.56	118	+1.5	46.81	116	+2.5
Southwest	2.51	65	+2.7	8.24	84	+3.1	24.52	116	+1.9	47.02	111	+2.5
Southeast	2.57	63	+2.2	8.55	84	+2.8	22.83	109	+1.6	46.52	106	+2.2
State Average	2.60	87	+2.9	9.51	101	+2.8	23.60	113	+1.5	44.78	117	+2.7

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

due to thunderstorms, but to the large-scale cyclonic wind flow. Peak gusts in excess of 60 mph were common (63 mph at Springfield, 62 mph at Lincoln, and 61 mph at Chicago). There were two reports of semi-tractor-trailers being blown over.

Extended climate outlooks issued by the U.S. Department of Commerce, National Atmospheric and Oceanic Administration, Climate Prediction Center for December are for equal chances of below, above, and normal temperatures and precipitation over all of Illinois, except for a slight chance of below normal temperatures in northeastern Illinois. The outlooks for winter (December-February) are for slight chances of above normal temperatures over far southern Illinois and above normal precipitation in eastern Illinois, with equal chances of below, above, and normal temperatures and precipitation elsewhere across the state.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for November were relatively high (Figure 4), ranging from 4.2 mph at Dixon Springs to 12.9 mph at Stelle. Highest wind gusts for the month were recorded on November 10 at DeKalb, Monmouth, and Freeport, with speeds in excess of 60 mph. The prevailing wind direction across the state was southwesterly. Wind speeds in excess of 8 mph ranged from 64 hours at Dixon Springs to more than 500 hours at Stelle and Monmouth. (November has 720 hours.) Average temperatures across the state ranged from the low to middle 40s over northern Illinois to 51°F at Belleville. Solar radiation continued the decline of daylight hours, ranging from about 190 Mega-Joules per meter squared (MJ/m²) over northern Illinois to 280 MJ/m² at Rend Lake. Potential evapotranspiration varied from a low of 1.25 inches at St. Charles to just under 2 inches across southwestern Illinois. Soil temperatures at both the 4- and 8-inch levels across the state ranged from the middle 40s over northern Illinois to the low and middle 50s in the far south.

Soil Moisture Information (Bob Scott)

Soil moisture across Illinois during November (Figure 5) responded to below average rainfall amounts over most of the state with conditions in the 0- to 6-inch layer that were close to normal, except for slightly below normal conditions over east-central Illinois. A similar pattern was seen in the 6- to 20-inch layer, although the drier conditions to the northeast were more intense. Patterns at 20 to 40 inches of depth showed a westward expansion and deepening of the dry region, minimizing at near 25 percent of normal over northeastern Illinois. Conversely, regions of above normal soil moisture were observed in this layer at sites in the west and southeast. Measurements in the deepest layer (40 to 72 inches) continued to indicate very dry conditions over central Illinois (only 25 percent of normal soil moisture at Peoria). However, substantially wetter soils were observed over southern Illinois, and Rend Lake reported moisture levels greater than 175 percent of normal. Overall, throughout the first 40 inches of depth, statewide soil moisture at the end of November averaged below the 1985-1995 mean for the month (Figure 1).

Compared to one month ago, large increases in soil moisture occurred across the state during November in all layers (Table 2). In general, the greatest increases were found in eastern and central areas of the state near the surface, with many increases being in excess of 40 percent. Belleville was a major exception in western Illinois, with increases in the 0- to 6, and 6- to 20-inch layers in excess of 100 percent. Small decreases occurred only over central Illinois in the 0- to 6-inch layer. Although central Illinois reported increases in the 20- to 40-inch layer, values at most sites within this layer changed little from last month.

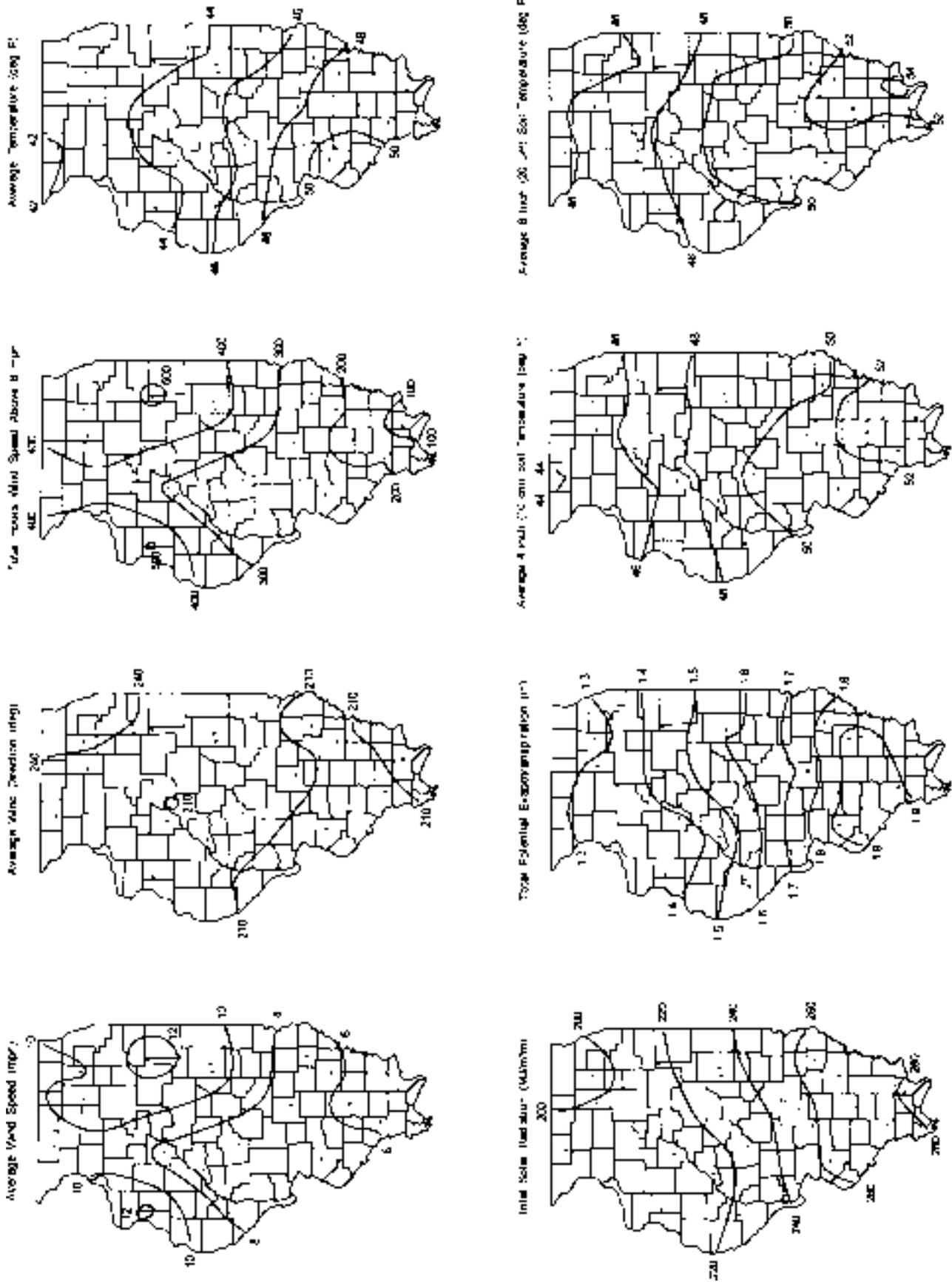


Figure 4. November monthly averages and totals as collected by the Illinois Climate Network

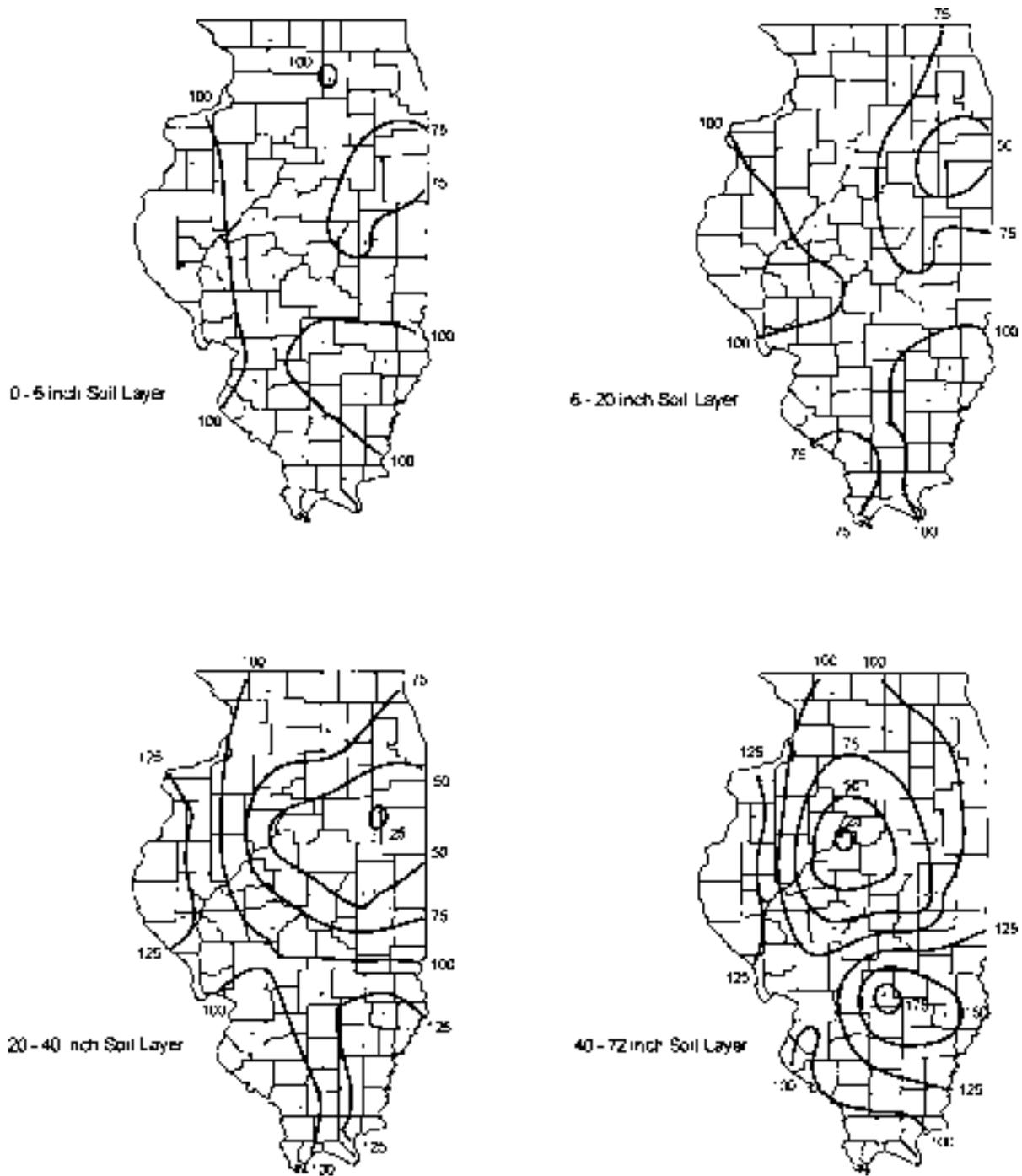


Figure 5. December 1 observed percent-of-normal soil moisture based on 1985-1992 mean

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

<i>Location</i>	<i>Dec 1 0 - 6 (inches)</i>	<i>Change from Nov. 1 (%)</i>	<i>Dec 1 6 - 20 (inches)</i>	<i>Change from Nov. 1 (%)</i>	<i>Dec 1 20 - 40 (inches)</i>	<i>Change from Nov. 1 (%)</i>
Fresport (NW)	1.9	-9	4.3	-7	6.9	-1
DeKalb (NE)	2.1	.5	4.8	3	7.3	5
Marionville (W)	2.2	1	4.5	-6	6.6	-4
East Peoria (C)	2.0	-18	4.9	10	6.8	14
Topeka (C)	1.0	-17	2.6	-25	2.8	5
Stelle (E)	1.5	2	3.1	0	4.8	0
Champaign (E)	1.9	39	5.0	30	5.2	16
Bondville (E)	1.7	41	3.8	43	6.1	1
Perry (WSW)	2.4	4	5.2	9	8.2	19
Springfield (WSW)	1.8	-12	5.2	11	7.9	7
Brownstown (ESE)	2.2	14	4.3	8	7.9	2
Olney (ESE)	2.2	34	4.7	4	7.2	3
Belleville (SW)	2.0	109	4.0	160	7.1	0
Carbondale (SW)	1.8	14	3.0	-3	6.7	-1
East (SE)	2.0	20	5.1	2	7.6	-0
Fairfield (SE)	2.2	-41	3.1	2	7.5	3
Dixon Springs (SE)	2.3	10	5.3	12	8.4	10

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 the 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 well below flood stage and were recorded at most stations during the second week of the month. Above St. Louis, Illinois sites along the Mississippi River peaked below flood stage, generally near mid-month; stations to the south recorded their peak flows during the month's first week. At Chester, peak stage was just above flood stage (last month the peak stage at Chester was at flood stage). The Ohio River at Cairo also recorded a peak stage during the first week of November and well 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 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 is 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. The terms describing flow condition are defined in the notes following Table 4.

River flows in Illinois generally continued to respond to the heavy precipitation across the state during October. In northern Illinois, flows of the Rock, Pecatonica, Green, Edwards, and Fox Rivers were in the above normal to much above normal range again this month. Central Illinois flows varied from above normal in the LaMoine River at Ripley and the Spoon River at Seville to below normal for the Vermilion River at Pontiac. In southern Illinois, flows were in the normal range, except for the Kaskaskia at Vandalia, which was affected by controlled water releases from Lake Shelbyville. The statewide average flow was well above the median, reflecting the very high flows in the northern part of the state.

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

Table 3. Peak Stages for Major Rivers, November 1998

River	Station	River mile*	Flood stage (feet)†	Peak stage (feet)†	Date
Illinois	Morris	263.1	13	7.0	11
	La Salle	224.7	20	13.3	11
	Peoria	164.6	18	12.8	34
	Havana	119.6	14	9.7	14
	Beardstown	88.6	14	10.8	14
	Meredosia	71.3	14	7.5	14
Mississippi	Hardin	21.5	25	31.3	64
	Dubuque	579.9	17	9.8	18
	Keokuk	364.2	16	8.7	11
	Quincy	325	17	12.3	11
	Grafton	218	18	16.6	11
	St. Louis	180	30	26.1	66
	Chester	169.9	27	27.3	67
Thones	137	13	29.6	67	
Ohio	Cairo	2.0	40	23.7	69

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, November 1998

Station	Discharge gpm	Index of exceed	1998 mean flow c.f.s.	Long term flow Mean c.f.s.	Median c.f.s.	Flow evaluation	Percent chance of occurrence	Days of data this month
Rock River at Rockton	6,061	63	4832	3,051	2,581	above normal	23	30
Rock River near Joslin	9,545	55	7872	5,169	4,821	above normal	19	30
Perdume River at Transport	1,026	80	923	747	581	above normal	38	30
Grain River near Geneseo	1,607	59	1,446	454	351	much above normal	69	29
Edwards River near New Haven	445	60	1,980	160	82	major above normal	65	29
Kankakee River at Monticello	7,754	40	956	1,574	1,182	normal	69	29
Fox River at Dayton	2,642	78	1,815	1,178	1,252	above normal	76	30
Verdun River at Fordia	579	54	17	140	54	below normal	39	29
Spoon River at Seyalls	16,76	81	1,391	608	301	above normal	17	30
LaMoine River at Repley	1,757	74	1,517	512	218	above normal	11	30
Mackinaw River near Campsville	767	49	41.2	281	63	normal	55	40
Sangamon River at Monticello	550	55	27.9	149	86	normal	69	30
Verdun River near Danville	1,280	54	436	566	314	normal	41	22
Kaskaskia River at Vandalia	1,540	75	141	1,054	848	below normal	77	28
St. Charles Creek near Boone	135	54	376	302	159	above normal	20	30
Embarras River at Ste. Marie	1,578	54	921	766	332	normal	71	30
Stillet Fork of Wayne Cr.	464	78	58.7	275	74	normal	51	30
Big Muddy at Plumfield	761	53	42.7	467	113	normal	68	30

Notes:

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

Much below normal flow = 50-100% chance of occurrence

Below normal flow = 70-90% chance of occurrence

Normal flow = 30-70% chance of occurrence

Above normal flow = 10-30% chance of occurrence

Much above normal flow = 0-10% chance of occurrence

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 October at 37 reporting reservoirs, the water surface elevation at the end of November had risen at 17 reservoirs, remained the same at 7 reservoirs, and decreased at 13 reservoirs. At the end of November for the 37 reservoirs reporting this month, 7 reservoirs reported water surface levels were above the spillway crest or target operating level, 6 reservoirs were at normal pool, and 24 reservoirs were below normal pool.

Shipman Reservoir and Ashley Lake were each taken off-line as public water supplies in October. Water for the communities formerly served by these supplies is now provided by the respective county water distribution plant. Shipman Water Works will continue to report the water surface level of the reservoir. Ashley Lake was operated by a contractor whose services have ended with the community. There are no plans for continued monitoring of Ashley Lake, and its entry has been dropped from Table 5.

Major Reservoirs. At the end of November, water surface levels at Rend Lake, Carlyle Lake, and Lake Shelbyville were all within 1 foot of target operating levels. The water level at Carlyle Lake was the same as at the end of October. Rend Lake and Lake Shelbyville were both slightly below target levels for November.

Great Lakes. Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The November mean level for Lake Michigan was 578.69 feet, compared to a mean level of 580.35 feet in 1997. The long-term average lake level for November is 578.87 feet, based on data from 1918 through 1996. Historically, the lowest mean level for Lake Michigan in November occurred in 1964 at 576.28 feet, and the highest level occurred in 1986 at 581.96 feet. The month-end level of Lake Michigan was 578.59 feet.

Ground-Water Information (Ken Hlinka)

Comparison to Average Levels. Shallow ground-water levels in 14 observation wells (Table 6), which are remote from pumping centers, were above normal levels for November in all but the southern portion of the state. Levels averaged 1.0 foot above, and ranged from 3.5 feet below to 6.1 feet above. The greatest deviations above normal levels occurred in the western part of the state, and the greatest deviations below normal were found in the extreme south-eastern portion of Illinois.

Comparison to Previous Month. Statewide, shallow ground-water levels during November 1998 were above those of last month. Levels averaged 0.5 foot above, and ranged from 1.0 foot below to 2.1 feet above. Levels in the southern and extreme northwestern portions of Illinois were slightly below those of last month, whereas the central portion of the state showed higher water levels than those observed during October.

Comparison to Same Month, Previous Year. Shallow ground-water levels this month throughout Illinois were above levels of November 1997. Levels averaged 2.9 feet above and ranged from 0.4 to 8.5 feet above ground-water levels one year ago.

Table 6. Month-End Shallow Ground-Water-Level Data Sites, November 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	Jackson	20.96	+0.60	+0.25	+1.19
2	Mt. Morris	Ogle	13.63	-6.13	-0.77	+2.47
3	Crystal Lake	McHenry	NA	NA	NA	NA
4	Cambridge	Henry	4.93	-5.31	-1.91	+8.51
5	Flornu Lab	DuPage	NA	NA	NA	NA
6	Good Hope	McDonough	6.67	-3.09	-1.83	+6.72
7	Snicarte	Mason	36.00	+1.00	+0.63	+3.62
8	Coffman	Pike	11.60	-1.33	+2.14	+4.98
9	Greenfield	Greene	13.60	-0.34	+1.87	+3.78
10	Janesville	Combsland	6.14	-0.72	+3.60	+0.40
11	St. Peter	Fayette	2.52	-0.27	+1.03	+2.84
12	SW5 #2	St. Clair	12.17	+1.66	+0.14	+0.84
13	Boyleston	Wayne	7.62	0.67	-0.73	-1.21
14	Sparta	Randolph	9.70	-0.08	-0.78	+0.42
15	St. College	Saline	7.63	2.90	+0.49	-2.07
16	Dixon Springs	Pope	6.84	-3.45	-0.72	+1.78

Note:
NA = not available.