ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Illinois State Water Survey

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ILLINOIS WATER AND CLIMATE SUMMARY
October 2001

October 2001 Overview (Bob Scott)

Temperatures in Illinois during October were below average; however, precipitation ranked as the third wettest since 1895. Soil moisture within the top 40 inches of soil was above the long-term statewide average. Mean streamflows were well above median heights while shallow groundwater levels were above the long-term average depths. Recent precipitation amounts have largely mitigated dry conditions that persisted in some water resources across parts of central and northern Illinois.

Temperatures across Illinois (Figure 1) for October were below average (a -1.5-degree departure). Crop reporting district (CRD) temperatures ranged from one degree below average (southeast) to two degrees below average (west).

Precipitation (Figure 1) across Illinois was well above the average value for the month. The statewide average of 6.58 inches represents a +3.77-inch departure or 234 percent of average. District precipitation totals ranged from 4.71 inches (northwest) to 8.37 inches (southeast), 168 to 287 percent of average, respectively.

Soil moisture near the surface at the end of October was normal to much above normal over Illinois. In lower soil layers, moisture was below normal across northern and central Illinois, but normal to much above normal elsewhere.

Mean provisional streamflow statewide was well above the median flow, 1140 percent of median (Figure 1). The heavy October rainfall caused rivers throughout Illinois to record mean discharges in the above normal to much above normal range. Peak stages recorded along the Illinois River exceeded flood stage at three stations. Mississippi River stations along the Illinois border and the Ohio River at Cairo peaked below flood stage this month.

Water surface levels at the end of October were below the normal pool at 18 of 37 reporting reservoirs. Water surface levels at Carlyle Lake, Lake Shelbyville, and Rend Lake were above target levels. **Lake Michigan's** mean level remains below the long-term average.

Statewide, **shallow groundwater levels** were above average levels for October by 1.9 feet. Levels averaged 2.3 feet above levels last month and were approximately 1.2 feet above October levels one year ago.

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

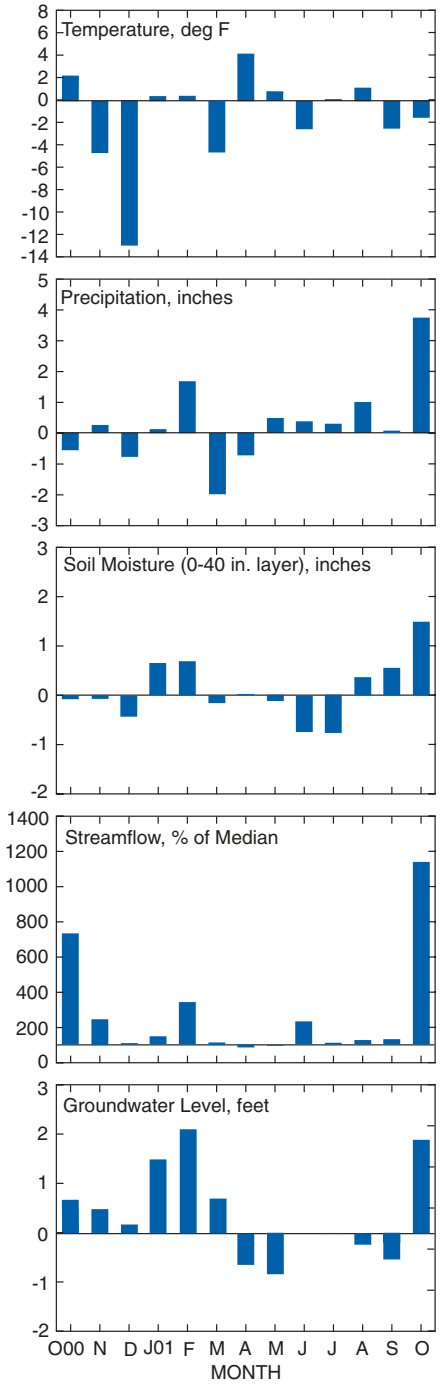

Figure 1.
Statewide departures from normal

Contact

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

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

Cook County Precipitation. September precipitation amounts (Figure 2) were large in the north, but much lighter in the south. Site values for the month ranged from 6.37 inches at site #1 (Northbrook) to 2.47 inches at site #21 (Tinley Park). Precipitation was heaviest in the northern part of the network and lightest in the southern half of the network. The September 2001 network average of 3.86 inches was about 127 percent of the 11-year (1990–2000) September network average of 3.04 inches.

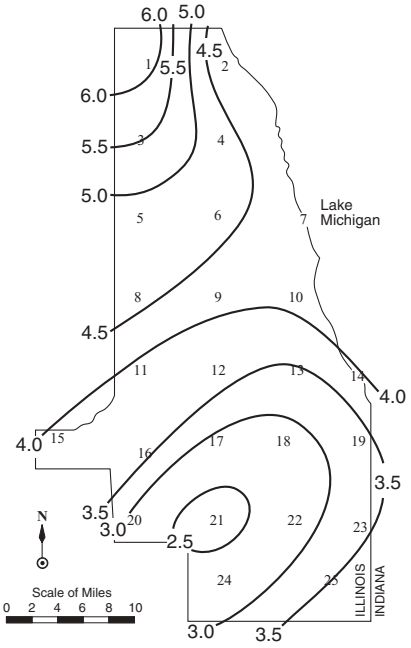

Figure 2.
Cook County precipitation (inches) during September 2001

Temperatures across Illinois for October were cooler than average (Figure 3 and Table 1). Temperatures were warmer than average for the first four days of the month and then alternated between above and below average temperatures for successive 4- to 5-day periods throughout October. Temperature changes were most dramatic on October 24 when warm, moist southerly air gave way to cold, dry northerly air, and temperatures at many locations dropped 15 to 20 degrees over a few hours. Brownstown reported the warmest reading for the month, 87°F on October 2. Freeport reported the coolest reading, 13°F on October 17.

Precipitation was well above the monthly average statewide (Figure 3 and Table 1) and ranked as the third wettest October on record since 1895. Unlike recent months, rainfall was uniformly above average across the state. Streamwood reported the highest daily precipitation amount, 4.75 inches on October 14. Chicago O'Hare Airport set a new daily precipitation record on October 13, 3.79 inches, beating the old record of 2.43 inches set in 1970. The highest monthly total in the state was 9.87 inches at Paris, followed closely by 9.75 inches at Olney. August–October was the 9th wettest (3-month) period since 1895, and May–October was the 17th wettest (6-month) period. However, dry months earlier in 2001 combined with more recent monthly precipitation totals to yield the 31st wettest January–October (year-to-date) since 1895.

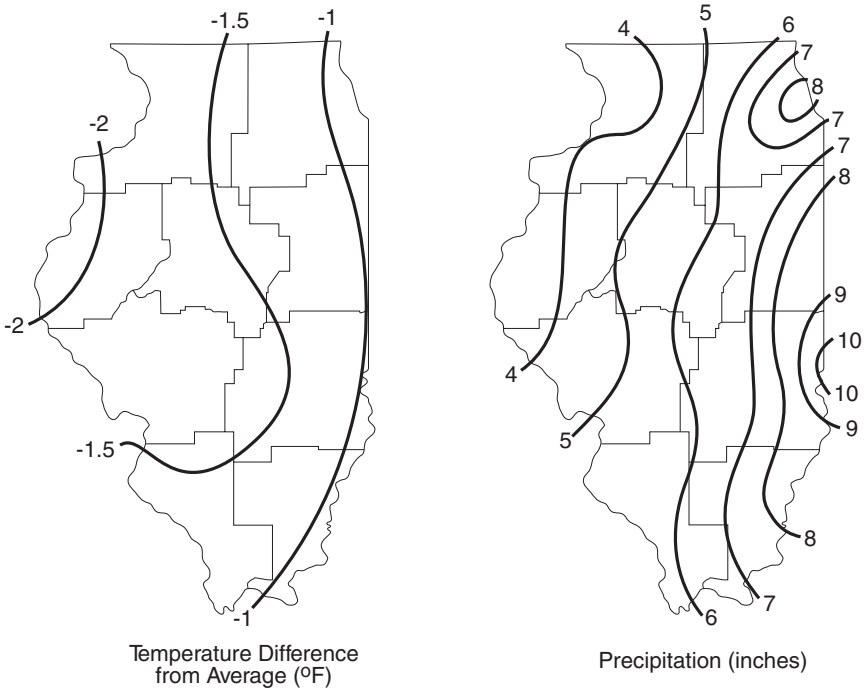

Figure 3. Illinois temperature and precipitation during October 2001

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 01 Amount	% Avg	Temp Dev	Aug 01-Oct 01	% Avg	Temp Dev	May 01-Oct 01	% Avg	Temp Dev	Nov 00-Oct 01	% Avg	Temp Dev
Northwest	4.71	168	-1.7	14.29	134	-1.1	26.38	117	-0.4	40.58	114	-1.3
Northeast	6.71	260	-1.1	16.81	165	-0.6	26.73	123	-0.1	40.60	113	-1.0
West	5.42	178	-2.0	13.43	125	-1.2	26.17	114	-0.7	41.66	112	-1.7
Central	6.12	220	-1.5	12.92	130	-1.0	24.19	112	-0.5	39.93	109	-1.4
East	7.84	297	-1.2	15.16	158	-0.9	26.43	124	-0.6	40.45	110	-1.4
West-southwest	5.86	207	-1.7	13.36	137	-0.9	25.37	118	-0.5	39.46	104	-1.5
East-southeast	7.92	278	-1.6	13.35	143	-0.8	26.27	123	-0.4	39.59	99	-1.3
Southwest	6.87	239	-1.4	13.33	140	-0.9	26.23	124	-0.4	40.90	98	-1.4
Southeast	8.37	287	-1.0	15.11	164	-0.5	26.96	126	-0.3	43.30	100	-1.2
State Average	**6.58**	**234**	**-1.5**	**14.17**	**143**	**-0.9**	**26.05**	**120**	**-0.4**	**40.58**	**106**	**-1.3**

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

Severe weather events in October were infrequent. Scattered thunderstorms on October 14 resulted in one report of golf-ball size hail at Ashkum. However, severe weather was quite extensive on October 23–24 when warm and cold fronts moved through Illinois. Thunderstorms on October 23 resulted in at least 22 reports of hail, primarily in northwestern Illinois, maximizing in size at 1.75 inches at Warren. Widespread severe weather on October 24 led to 43 reports of hail, 14 reports of wind damage, and a confirmed F2 tornado that destroyed or damaged several homes and buildings in Monticello. Strong straight-line winds estimated at 80–85 mph were observed in nearby Champaign and destroyed two businesses and severely damaged two homes.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for October (Figure 4) ranged from 4.1 mph at Dixon Springs to 11.4 mph at Bondville. The highest wind gust for the month occurred at Belleville, 54 mph on October 24. The monthly prevailing wind direction was from the southwest. Hours during the month with wind speeds in excess of 8 mph ranged from 80 hours at Dixon Springs and Rend Lake to 494 hours at Bondville. (October has 744 hours.)

Average air temperatures across the state ranged from 49°F at DeKalb to 59°F at Brownstown. Solar radiation showed a strong seasonal decline that totaled just less than 300 Mega-Joules per meter squared (MJ/m^2) over far northern Illinois while exceeding 425 MJ/m^2 at Belleville. Potential evapotranspiration decreased sharply from last month and varied between 2.2 inches at DeKalb and 3.3 inches at Dixon Springs. Soil temperatures at both the 4- and 8-inch levels ranged from the middle 50s in northern Illinois to the low 60s in southeastern Illinois.

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for November call for equal chances of above, below, and normal temperatures and precipitation over all of Illinois. Outlooks for November through January suggest a cooler than normal period over northern Illinois and equal chances of above, below, and normal precipitation statewide.

Soil Moisture Information (Bob Scott)

High rainfall totals during October greatly recharged soil moisture over much of Illinois. Moisture conditions in the 0- to 6-inch layer at the end of the month were normal to much above normal in nearly all areas (Figure 5). Totals ranged from 105 percent of normal at Freeport and Bondville to more than 175 percent of normal at Olney. Conditions at 6 to 20 inches of depth were similarly moist. Values ranged from near normal at DeKalb to almost 200 percent of normal at Carbondale. Scattered regions in the 20- to 40-inch layer still exhibit dryness from low regional rainfall totals during summer, generally in a band from Belleville to Bondville to DeKalb, where values were as low as 50 percent of normal. Elsewhere, however, moisture was plentiful, exceeding 175 to 200 percent of normal in parts of southern Illinois. Overall, average soil moisture in Illinois at the end of October was above normal (Figure 1).

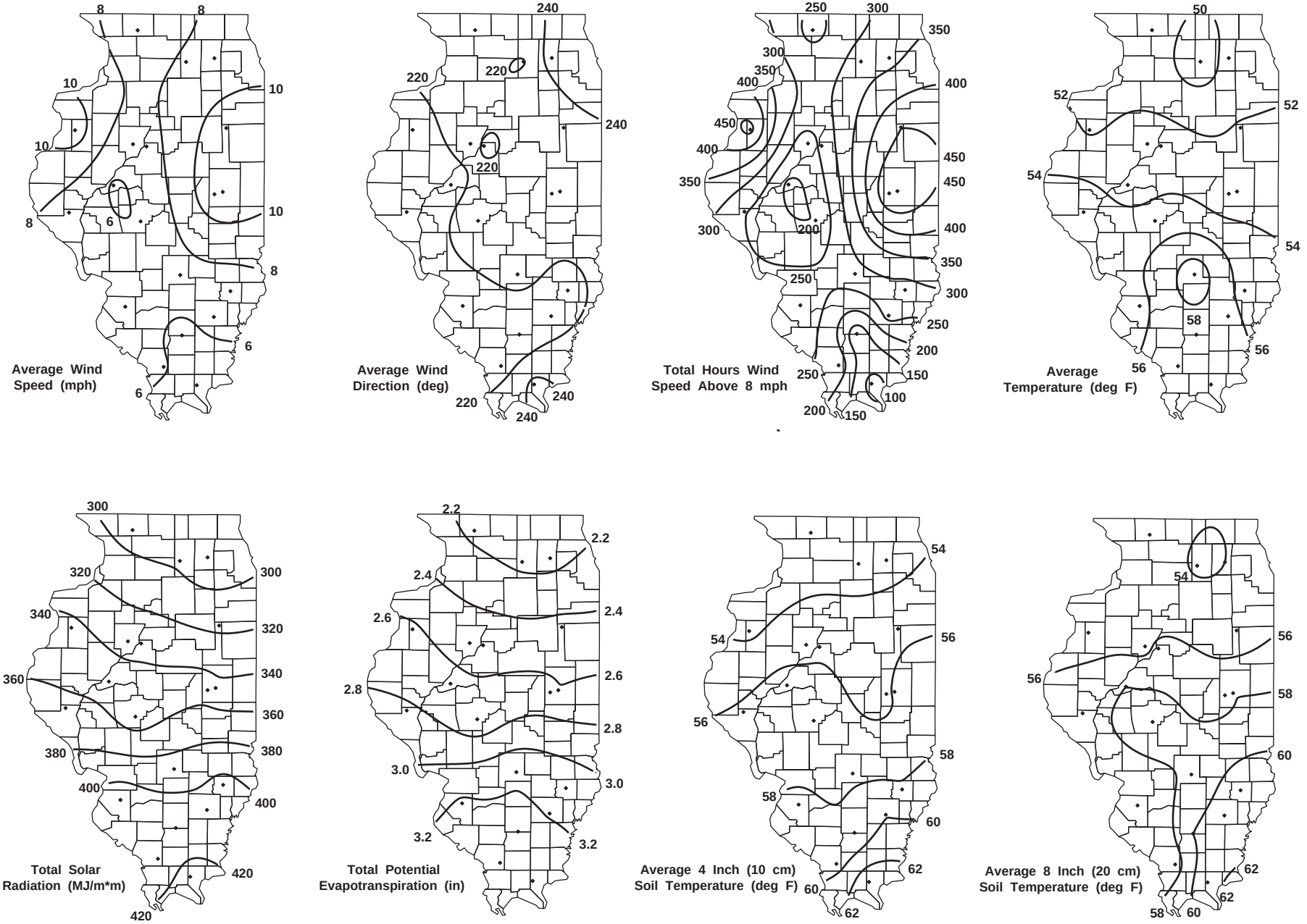

Figure 4. October monthly averages and totals as collected by the Illinois Climate Network

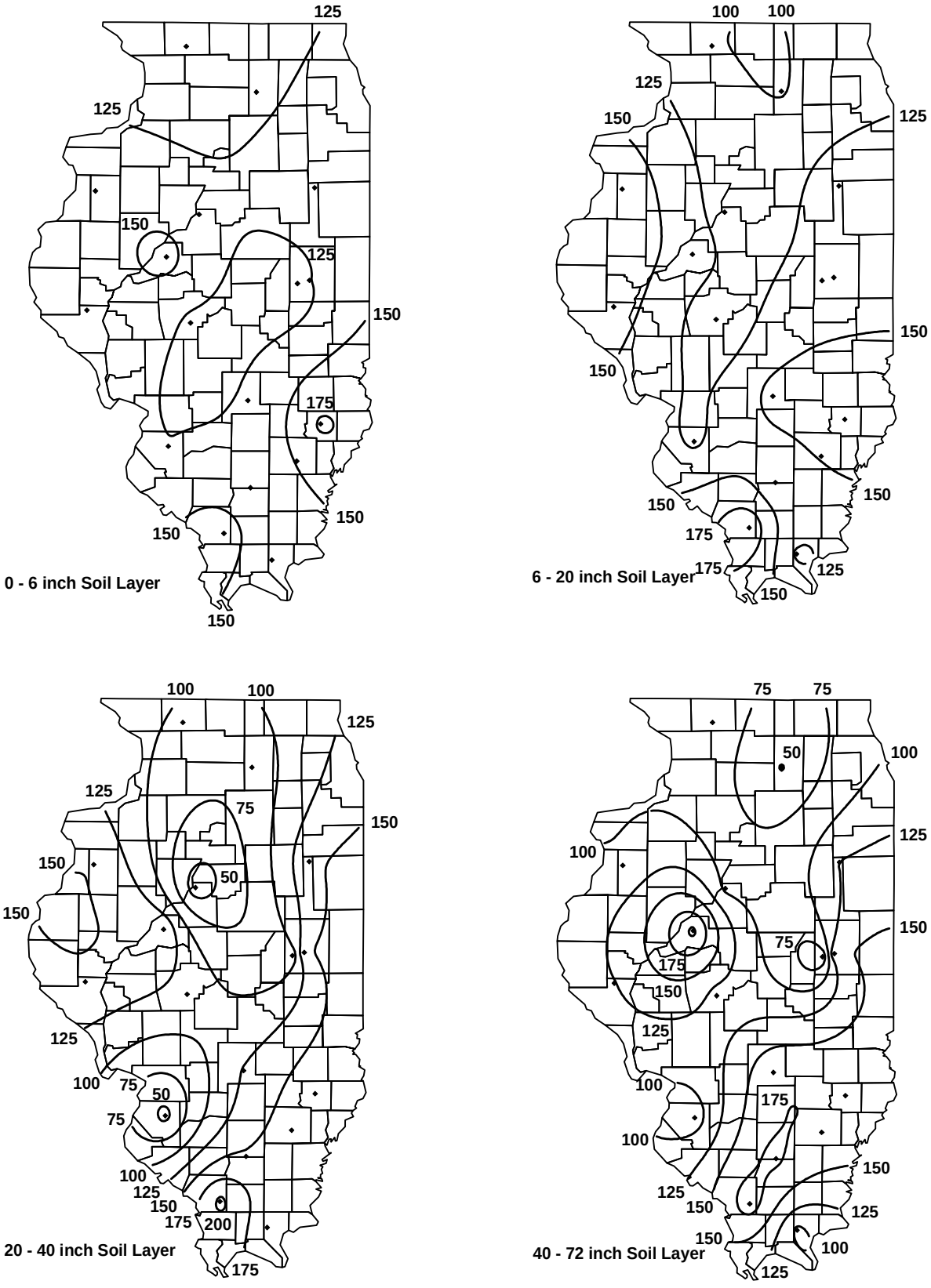

Figure 5. November 1 observed percent-of-normal soil moisture based on 1985-1995 mean

Table 2. Soil Moisture in Various Layers on November 1, 2001

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)	1.9	4	4.4	0	6.8	-4
DeKalb (NE)	2.1	20	4.6	1	6.5	23
Monmouth (W)	1.9	14	4.6	3	6.4	6
East Peoria (C)	2.0	6	4.8	23	6.6	29
Topeka (C)	1.1	13	2.6	50	3.1	90
Stelle (E)	2.3	20	5.4	2	6.7	3
Champaign (E)	2.1	43	5.2	15	7.1	2
Bondville (E)	1.9	85	4.8	76	6.6	4
Perry (WSW)	1.9	22	5.2	10	7.8	6
Springfield (WSW)	2.0	-2	5.0	1	7.8	-0
Brownstown (ESE)	1.9	139	4.2	115	7.3	12
Olney (ESE)	2.3	40	4.7	13	7.2	9
Belleville (SW)	1.7	37	3.3	119	6.0	-0
Carbondale (SW)	2.3	31	4.9	16	8.0	7
Ina (SE)	2.0	69	5.2	17	7.8	6
Fairfield (SE)	2.1	67	5.3	22	7.5	8
Dixon Springs (SE)	2.3	13	5.1	4	8.2	5

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 the USGS.

Table 3 lists selected streamgaging stations located on the Illinois, Mississippi, and Ohio Rivers, flood stage, and the provisional peak stage for the current month. The provisional peak stage is determined from the daily morning reading posted by the National Weather Service and/or USACE. The Illinois River exceeded flood stage at Morris, La Salle, and Havana by less than a foot. Mississippi River stations along the Illinois border from Dubuque to Thebes did not record peak stages above flood stage. Provisional data show that the Ohio River at Cairo peaked well below flood stage this month.

Mean provisional flow statewide is well above the median this month (1140 percent of the median) and above the mean (281 percent of the mean). Throughout Illinois, stations recorded above normal flows. In northeastern Illinois, the Kankakee, Iroquois, Fox, and Vermilion Rivers recorded mean flows that were much above normal. Stations in central Illinois recorded flows in the above normal range. Flows reported in southern Illinois were below normal for September, but this month's flows were much above normal, except for normal flows on the Green River at Geneseo and the Kaskaskia River at Vandalia (the latter of which is affected by controlled releases from Lake Shelbyville dam).

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. Reservoir levels are

Table 3. Peak Stages for Major Rivers, October 2001

River	*Station*	*River mile**	*Flood stage (feet)**	*Peak stage (feet)***	*Date*
Illinois					
	Morris	263.1	13	13.4	15
	La Salle	224.7	20	21.0	27
	Peoria	164.6	18	16.7	30
	Havana	119.6	14	14.5	31
	Beardstown	88.6	14	12.7	31
	Hardin	21.5	25	21.4	31
Mississippi					
	Dubuque	579.9	17	8.5	23
	Keokuk	364.2	16	6.4	24
	Quincy	325.0	17	12.1	27
	Grafton	218.0	18	15.9	28
	St. Louis	180.0	30	10.2	25
	Chester	109.9	27	12.2	26
	Thebes	43.7	33	16.5	27
Ohio					
	Cairo	2.0	40	27.3	27

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.

obtained from a network of cooperating reservoir operators who are contacted each month by Survey staff for the current water levels. Most reservoirs listed in Table 5 serve as public water supplies, with the exceptions noted in the last column.

Compared to levels at the end of September available for 34 reservoirs, the water surface elevation at the end of October had risen at 27 reservoirs, decreased at 5 reservoirs, and remained the same as last month at 2 reservoirs. For the 37 reservoirs reporting at the end of October, 12 reservoirs had water surface levels above the normal pool (or target operating level), 7 reservoirs were at normal pool, and 18 reservoirs were below normal pool. Ten reservoirs listed are between 1 and 3 feet below normal pool; only one reservoir is more than 3 feet below normal pool.

Major Reservoirs. Water levels at Carlyle Lake, Lake Shelbyville and Rend Lake increased this month. Water surface levels at all three lakes were above target levels.

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 577.5 feet, compared to a mean level of 577.4 feet in 2000. The long-term average lake level for October is 579.1 feet, based on 1918–1998 data. Historically, the lowest mean level for Lake Michigan in October occurred in 1964 at 576.4 feet, and the highest level occurred in 1986 at 582.3 feet. The month-end level of Lake Michigan was 577.6 feet.

Table 4. Provisional Mean Flows, October 2001

Station	*Drainage area (sq mi)*	*Years of record*	*2001 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	65	5,603	3,081	2,687	above normal	13	31
Rock River near Joslin	9,549	57	7,795	4,518	3,832	above normal	18	31
Pecatonica River at Freeport	1,326	81	1,061	693	586	above normal	17	31
Green River near Geneseo	1,003	61	349	389	215	normal	34	31
Edwards River near New Boston	445	62	131	142	45	above normal	29	30
Kankakee River at Momence	2,294	82	3,001	1,193	904	much above normal	07	31
Iroquois River near Chebanse	2,091	76	5,383	693	181	much above normal	04	31
Fox River at Dayton	2,642	80	3,168	1,121	806	much above normal	06	31
Vermilion River at Pontiac	579	55	637	135	19	much above normal	08	31
Spoon River at Seville	1,636	83	352	542	183	above normal	26	30
LaMoine River at Ripley	1,293	76	783	436	121	above normal	16	31
Bear Creek near Marceline	349	55	164	113	13	above normal	19	31
Mackinaw River near Congerville	767	51	231	194	30	above normal	20	31
Salt Creek near Greenview	1,804	58	394	521	185	above normal	30	29
Sangamon River at Monticello	550	87	226	174	32	above normal	17	31
So. Fork Sangamon near Rochester	867	50	220	173	24	above normal	19	31
Illinois River at Valley City	26,743	61	19,860	12,730	8,067	above normal	17	31
Macoupin Creek near Kane	868	71	216	220	44	above normal	20	31
Vermilion River near Danville	1,290	56	2,475	328	104	much above normal	05	31
Kaskaskia River at Vandalia	1,940	30	565	581	236	normal	36	31
Shoal Creek near Breese	735	56	369	168	33	above normal	15	31
Embarras River at Ste. Marie	1,516	86	2,345	407	100	much above normal	07	31
Skillet Fork at Wayne City	464	80	376	96	10	much above normal	07	31
Little Wabash below Clay City	1,131	85	1,319	200	50	much above normal	05	31
Big Muddy at Plumfield	794	85	419	104	44	above normal	10	31
Cache River at Forman	244	76	272	54	16	much above normal	06	31

Notes:
*As reported in U.S. Geological Survey (USGS) Water Resources Data, Illinois, Water Year 1999.
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.

Groundwater Information (Ken Hlinka)

Comparison to Average Levels. Shallow groundwater levels in 14 observation wells, which are remote from pumping centers, were above average levels for October by 1.9 feet and ranged from 1.4 feet below to 6.2 feet above average (Table 6).

Comparison to Previous Month. Shallow groundwater levels were above those of September. Levels averaged 2.3 feet above those of last month and ranged from 0.5 feet lower to 6.3 feet higher the earlier levels.

Comparison to Same Month, Previous Year. Shallow groundwater levels from the network in October were above levels of October 2000. Levels averaged 1.2 feet higher and ranged from 2.3 feet below to 4.7 feet above levels of last year.

Table 6. Month-End Shallow Groundwater Level Data Sites, October 2001

					Deviation from			
Number	*Well name*	*County*	*Well depth (feet)*	*This month's reading (depth to water, feet)*	*15-year avg. level (feet)*	*Period of record avg. (feet)*	*Previous month (feet)*	*Previous year (feet)*
1	Galena	JoDaviess	25.0	21.59	-0.12	-0.18	-0.01	+0.83
2	Mt. Morris	Ogle	55.0	NA	NA	NA	NA	NA
3	Crystal Lake	McHenry	18.0	NA	NA	NA	NA	NA
4	Cambridge	Henry	42.0	9.99	+0.50	+1.19	+4.77	-2.30
5	Fermi Lab	DuPage	15.0	3.21	+3.73	+4.07	+4.11	NA
6	Good Hope	McDonough	30.0	NA	NA	NA	NA	NA
7	Snicarte	Mason	42.0	37.74	-0.75	-0.79	+0.44	-0.52
8	Coffman	Pike	28.0	10.71	+3.92	+3.73	+2.56	+4.65
9	Greenfield	Greene	20.70	12.30	+3.35	+3.18	+2.54	-0.24
10	Janesville	Cumberland	11.0	4.58	+1.75	+1.82	+2.92	+0.67
11	St. Peter	Fayette	15.0	2.84	+1.42	+1.42	+2.43	-0.14
12	SWS #2	St. Clair	80.0	14.42	-0.16	+1.59	-0.25	-0.05
13	Boyleston	Wayne	23.0	1.99	+5.75	+6.20	+6.31	+4.59
14	Sparta	Randolph	27.0	6.42	+3.77	+4.03	+2.02	+3.31
15	SE College	Saline	10.19	6.63	+1.28	+0.78	+3.17	+2.55
16	Dixon Springs	Pope	8.63	4.61	+2.67	+0.53	+2.19	+3.76
17	Bondville	Champaign	21.0	6.86	-1.36	-1.42	-0.50	-1.77
				Averages	+1.84	+1.87	+2.34	+1.18

Note:
NA = not available.

Data sources for information in this publication include the following:
CPC - Climate Predication Center, http://www.cpc.ncep.noaa.gov/products/predictions/
ISWS - Illinois State Water Survey, http://www.sws.uiuc.edu/
MCC - Midwestern Regional Climate Center, http://mcc.sws.uiuc.edu/
NCDC - National Climate Data Center, http://www.ncdc.noaa.gov/
NWS - National Weather Service, http://www.nws.noaa.gov/
USACE - U.S. Army Corp of Engineers, http://water.mvr.usace.army.mil/
USGS - U.S. Geological Survey, http://water.usgs.gov/
WARM - Water and Atmospheric Resources Monitoring Program, http://www.sws.uiuc.edu/warm/