

ILLINOIS WATER AND CLIMATE SUMMARY October 2003

October 2003 Overview (Bob Scott)

Temperatures in Illinois during October were slightly below average, and precipitation was below average. Soil moisture within the top 40 inches of soil was slightly below the long-term statewide average. Mean streamflows were above median heights. Shallow groundwater levels were well below long-term average depths and below average for the 14th consecutive month. Deficit precipitation over the last 12 months in northwestern and northeastern Illinois is indicative of a moderate precipitation drought. Very low groundwater levels and below normal streamflows were observed in those areas.

Temperatures across Illinois (Figure 1) for October were slightly below average, a -0.3-degree departure. Crop Reporting District (CRD) temperatures ranged from 0.7 degrees below average (northwest and northeast) to 0.4 degrees above average (southwest).

Precipitation amounts for October were below average (Figure 1). The statewide average of 2.14 inches represents a -0.79-inch departure or 73 percent of average. Precipitation was greatest in the west-southwest CRD (2.61 inches or 92 percent of average) and lowest in the northwest CRD (1.71 inches or 60 percent of average).

Soil moisture in the 0- to 40-inch (0- to 100-centimeter) layer in Illinois at the end of October was slightly below normal. Near to above normal soil moisture conditions existed within all layers across west-central, east-central, and far southern Illinois. Dry to very dry soils continued in deeper layers across parts of central and southern Illinois.

Mean provisional streamflow statewide was above the median flow, 133 percent of median (Figure 1). Rivers in Illinois recorded mean discharges in the above normal to below normal range this month. Peak stages recorded were below flood stage at stations on the Illinois River, along the Illinois border on the Mississippi River, and on the Ohio River at Cairo.

Water surface levels at the end of October were below the normal pool/target operating level at 29 of 35 reporting reservoirs. Lake Shelbyville, Carlyle Lake, and Rend Lake were slightly below target operating levels. Lake Michigan's mean level remains below the long-term average.

Statewide, **shallow groundwater levels** continue to be below average for the 14th consecutive month. Deviations from average October levels were 2.9 feet below average. Levels averaged 0.2 feet lower than September levels and approximately 1.4 feet below October levels one year ago. Largest negative deviations occurred at Cambridge and Mt. Morris in the CRD where a climatological precipitation drought is occurring.

Note: Extended network descriptions appear in the January and July issues. Network maps are available upon request.

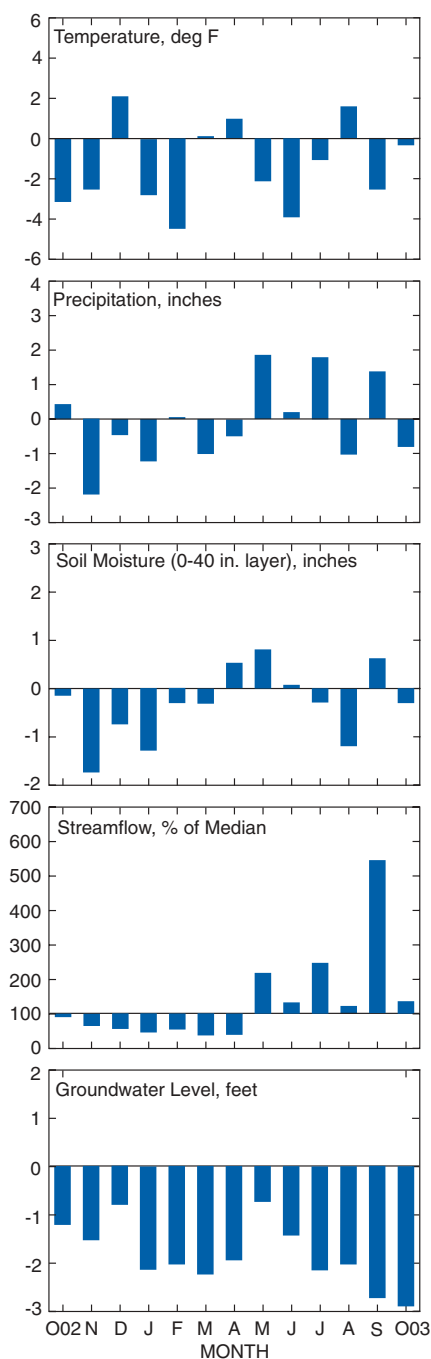


Figure 1.
Statewide departures from normal

Contact

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Weather/Climate Information (Jim Angel and Bob Scott)

Temperatures across Illinois for October were slightly below average (Figure 2 and Table 1), the 47th coolest October since 1895. Extremes ranged from 20°F on October 2 at Mt. Carroll to 90°F on October 20 at Kilbourne and on October 21 at Havana. Temperatures in recent months in Illinois have been relatively cold. This was the 20th coldest May–October, 25th coldest January–October, and 30th coldest November–October since 1895.

Precipitation was below average statewide during October (Figure 2 and Table 1), the 40th driest October since 1895. Charleston reported the highest one-day rainfall on October 14 (1.93 inches), and Alton reported the highest monthly total (3.42 inches). Illinois has experienced the 47th driest August–October, 33rd wettest May–October, 43rd driest January–October, and 30th driest November–October since 1895.

Over the last 12 months, precipitation recorded in the northwest and northeast CRDs was 70 and 79 percent of average, respectively, which qualifies as a moderate precipitation drought (70–80 percent of average precipitation over a 12-month period). A severe precipitation drought has precipitation totals of less than 70 percent of average over a 12-month period. Individually, these 12-month precipitation totals rank as each district’s 4th and 13th driest November–October periods, respectively, since 1895.

No **severe weather** was reported in Illinois during October.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for October (Figure 3) ranged from 3 mph at Dixon Springs to 9 mph at Bondville, Monmouth, and Stelle. The highest wind gust for the month was very widespread temporally. A 42-mph gust was recorded at Bondville on October 30, and 43-mph gusts occurred at DeKalb and Stelle on October 11 and October 20, respectively. The prevailing wind direction indicated predominately southwesterly winds statewide. Wind speeds in excess of 8 mph varied from approximately 45 hours at Rend Lake and Dixon Springs to nearly 415 hours at Monmouth. (October has 744 hours.) Average air temperatures ranged from the lower 50s in northern Illinois to the upper 50s in southern Illinois.

Solar radiation totals ranged from 358 Mega-Joules per meter squared (MJ/m²) at St. Charles to 448 MJ/m² at Belleville. Potential evapotranspiration observations ranged from a low of 2.7 inches at St. Charles to 3.6 inches at Belleville. Soil temperatures at the 4- and 8-inch levels ranged from the lower 50s to the lower 60s from north to south across the state.

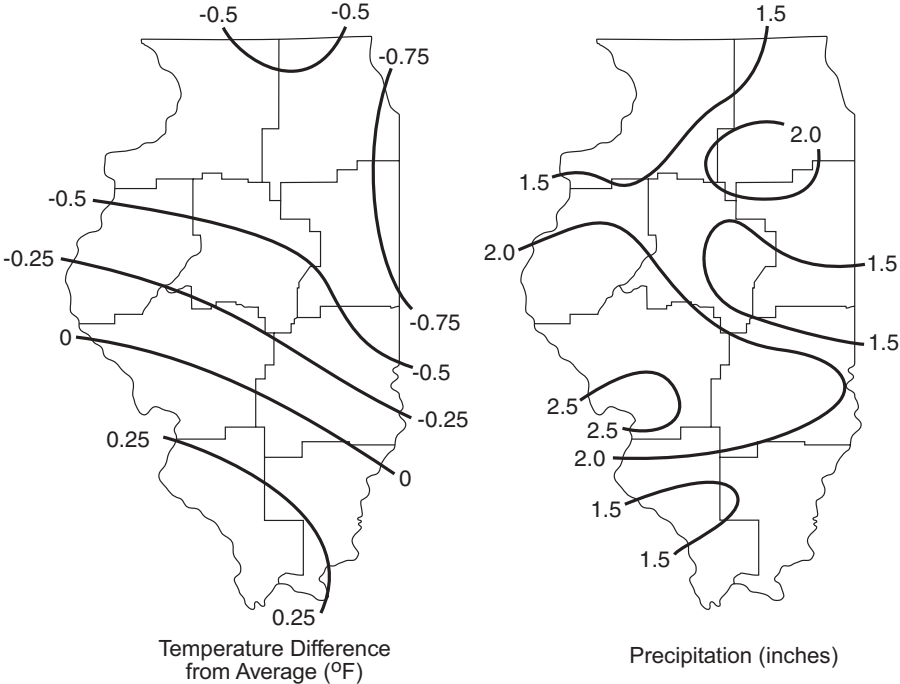


Figure 2. Illinois temperature and precipitation during October 2003

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 03 Amount	% Avg	Temp Dev	Aug 03- Oct 03	% Avg	Temp Dev	May 03- Oct 03	% Avg	Temp Dev	Nov 02- Oct 03	% Avg	Temp Dev
Northwest	1.71	60	-0.7	6.39	60	0.2	18.30	80	-0.8	25.39	70	-0.5
Northeast	2.01	72	-0.7	6.68	65	0.1	20.47	93	-1.1	28.85	79	-0.9
West	2.28	76	-0.4	10.53	104	-0.5	23.42	103	-1.2	33.04	88	-1.0
Central	2.11	73	-0.4	8.48	88	-0.5	22.69	104	-1.3	31.72	85	-1.1
East	1.98	69	-0.5	9.81	102	-0.4	26.23	120	-1.5	35.33	94	-1.3
West-southwest	2.61	92	-0.1	10.66	117	-0.9	24.67	119	-1.6	36.21	96	-1.2
East-southeast	2.22	74	-0.4	11.03	117	-0.6	24.68	113	-1.3	37.48	91	-1.3
Southwest	2.15	71	0.4	7.82	82	-0.1	21.98	101	-1.1	38.91	91	-1.1
Southeast	2.12	71	0.3	8.22	88	-0.1	21.55	99	-0.9	41.67	94	-1.0
State Average	2.14	73	-0.3	8.88	91	-0.3	22.66	103	-1.2	33.95	88	-1.0

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

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for November call for a slight chance of below average temperatures in southeastern Illinois and a high chance of above average precipitation across Illinois, especially in the south. November–January outlooks call for equal chances of above, below, and average temperatures and precipitation across Illinois.

Soil Moisture Information (Bob Scott)

At the start of the recharge season in Illinois, soil moisture conditions were near to above normal in the 0- to 6-inch layer across most of the state (Figure 4). Only sites in northern Illinois reported below normal conditions. Moisture values ranged from 80 percent of normal at DeKalb to more than 200 percent of normal at Topeka. Similar patterns were observed in the 6- to 20-inch layer. Near to above normal soil moisture conditions were common, except for minimum values at DeKalb and Freeport (31 and 60 percent of normal, respectively). Concurrently, moisture levels exceeded 150 percent of normal at Stelle and 200 percent of normal at Perry. Soil moisture 20 to 40 inches deep was below normal in north-central and southern Illinois (DeKalb, 33 percent; Belleville, 28 percent; and Olney, 26 percent), while Stelle and Perry reported values in excess of 150 percent of normal. Moisture values in the 40- to 72-inch layer were exceptionally dry in parts of central and southern Illinois: less than 15 percent of normal at Brownstown and Olney and less than 50 percent of normal at Peoria. Conversely, above normal conditions were observed at Perry (161 percent of normal), and at Stelle and Dixon Springs (135 percent of normal). Overall, soil moisture conditions across Illinois at the end of October were slightly below normal (Figure 1).

Compared to the end of last month, soil moisture in the 0- to 6-inch layer generally increased in northern Illinois and decreased in southern Illinois (Table 2). Peoria reported a 27 percent increase while Carbondale observed a 22 percent decrease. Moisture changes in the 6- to 20-layer were generally small decreases statewide. Freeport reported the largest decrease (25 percent). All sites reported small soil moisture changes in the 20- to 40-inch layer.

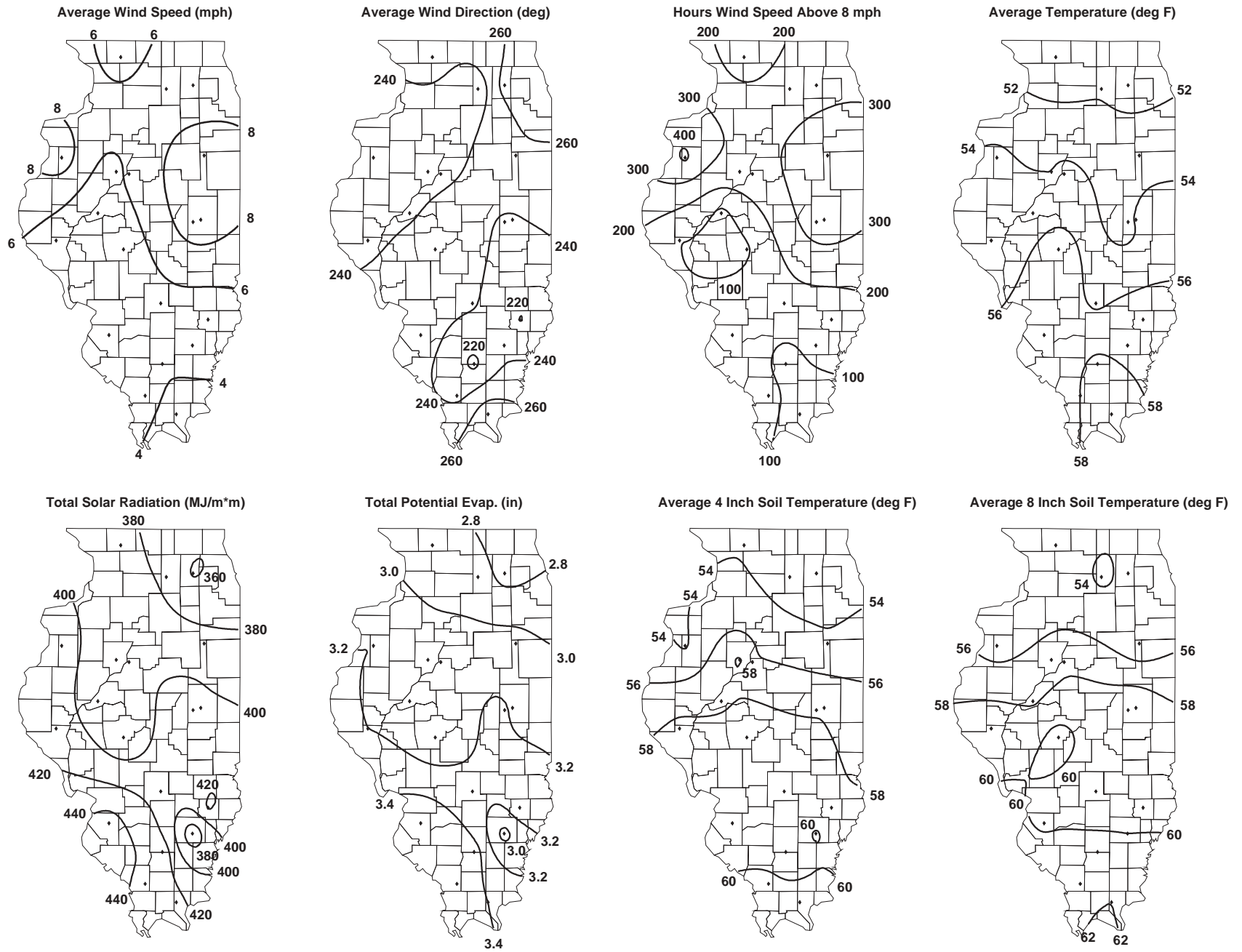


Figure 3. October monthly averages and totals as collected by the Illinois Climate Network

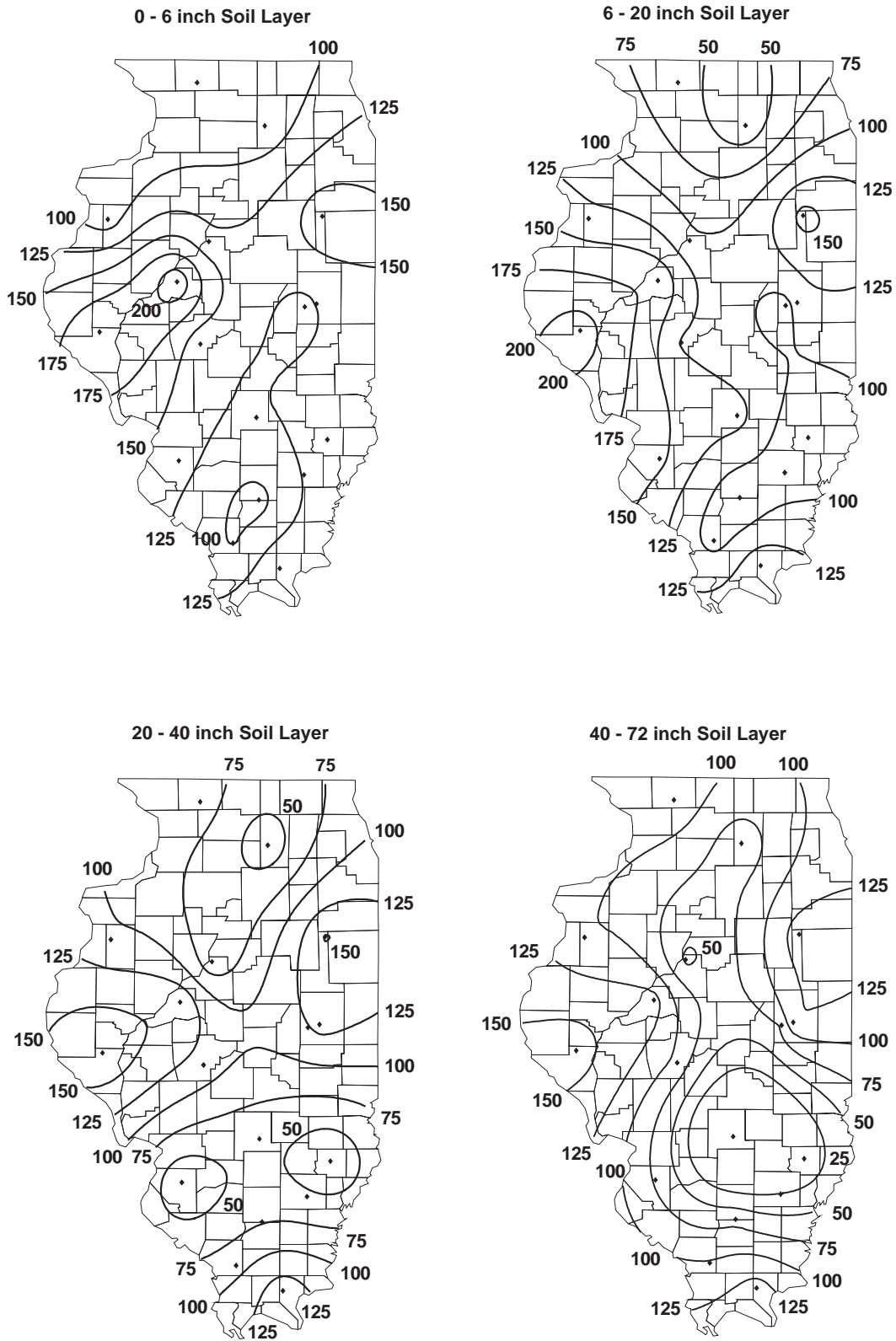


Figure 4. November 1 observed percent-of-normal soil moisture based on 1985-1995 mean

Table 2. Soil Moisture in Various Layers on November 1, 2003

<i>Location</i>	<i>Nov 1 0 - 6 (inches)</i>	<i>Change from Oct 1 (%)</i>	<i>Nov 1 6 - 20 (inches)</i>	<i>Change from Oct 1 (%)</i>	<i>Nov 1 20 - 40 (inches)</i>	<i>Change from Oct 1 (%)</i>
Freeport (NW)	1.5	10	2.7	-25	5.9	-3
DeKalb (NE)	1.5	4	2.6	7	5.4	1
Monmouth (W)	1.5	-17	4.0	-7	5.7	2
East Peoria (C)	1.8	27	4.1	-8	6.8	2
Topeka (C)	1.1	0	2.6	-1	2.9	9
Stelle (E)	2.0	16	4.9	9	6.3	0
Champaign (E)	1.9	-7	4.6	-4	5.9	1
Bondville (E)	1.8	10	3.6	-18	7.2	-1
Perry (WSW)	2.2	7	5.6	3	8.3	0
Springfield (WSW)	1.7	-5	4.7	-1	7.4	1
Brownstown (ESE)	1.4	-3	2.8	3	6.2	1
Olney (ESE)	1.6	-9	3.7	0	6.2	-1
Belleville (SW)	1.5	-13	3.3	-1	5.8	2
Carbondale (SW)	1.3	-22	2.5	-12	6.1	-2
Ina (SE)	1.6	-6	4.5	-4	7.3	-1
Fairfield (SE)	1.8	8	3.9	-4	6.8	-2
Dixon Springs (SE)	2.1	3	4.7	-1	7.4	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 the Illinois State Water Survey (ISWS), and the 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 peak stage is determined from the daily morning reading posted by the National Weather Service and/or the USACE. Stations on the Illinois River and on the Mississippi River along the Illinois border recorded peak stages well below flood stage. The Ohio River at Cairo peaked below flood stage on October 1.

Table 4 lists 26 streamgaging stations located throughout Illinois. Provisional monthly mean flows posted by USGS are listed if available; otherwise, daily mean 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 October mean flow for each year of record, and selecting the middle value, 50 percent exceedence probability.

Mean provisional flow statewide is above the median this month (133 percent of the median) and below the mean (40 percent of the mean). Flows in the northwestern part of the state were generally in the below normal range this month, as were the Fox River at Dayton and the Spoon River at Seville. Most reporting stations in central and southern Illinois experienced normal flows. The Iroquois River near Chebanse, the Sangamon River at Monticello, and the Vermilion River near Danville recorded flows above normal, while the Illinois River at Valley City and the Big Muddy at Plumfield recorded flows below normal.

Table 3. Peak Stages for Major Rivers, October 2003

<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	6.3	28
	La Salle	224.7	20	11.6	15
	Peoria	164.6	18	12.6	30
	Havana	119.6	14	6.0	21
	Beardstown	88.6	14	10.2	09
	Hardin	21.5	25	20.0	30
Mississippi	Dubuque	579.9	17	7.4	02
	Keokuk	364.2	16	3.7	09
	Quincy	327.9	17	11.9	22
	Grafton	218.0	18	15.8	10
	St. Louis	180.0	30	0.3	18
	Chester	109.9	27	2.5	19
	Thebes	43.7	33	6.9	20
Ohio	Cairo	2.0	40	22.1	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.

Water-Supply Lakes and Major Reservoirs. Table 5 lists reservoirs in Illinois, their normal pool or target water surface elevation, and other data related to observed variations in water surface elevations. Reservoir levels are reported in terms of their difference from normal pool/target level, and are obtained from a network of cooperating reservoir operators who are contacted each month by ISWS staff for the current water levels. The average of the month-end readings for the period of record is reported in terms of the difference from normal pool/target level (column 6 of Table 5). The number of years of record for each reservoir also is given (column 7). Most of the 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 at 34 reservoirs, by the end of October the water surface elevation had risen at 8 reservoirs, was the same as last month at 5 reservoirs, and had decreased at 21 reservoirs. For the 35 reservoirs reporting at the end of October, 3 reservoirs had water surface levels above the normal pool/target operating level, 3 reservoirs were at normal pool, and 29 reservoirs were below normal pool. Five reservoirs are more than 2 feet below normal pool. Water reserves of Salem and Nashville reservoirs were supplemented with water pumped from other sources.

Major Reservoirs. The water levels at Lake Shelbyville, Carlyle Lake, and Rend Lake are slightly below their respective seasonal 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 577.0 feet, compared to a mean level of 577.9 feet in 2002. The long-term average lake level for October is 579 feet, based on 1918–1999 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 576.9 feet.

Table 4. Provisional Mean Flows, October 2003

Station	Drainage area (sq mi)	Years of record	2003 mean flow (cfs)	Long-term flows		Flow condition	Percent chance of exceedence	Days of data this month
				Mean*	Median			
				(cfs)	(cfs)			
Rock River at Rockton	6363	68	1558.0	3127.0	2708	below normal	76	31
Rock River near Joslin	9549	60	2191.0	4579.0	3954	below normal	73	31
Pecatonica River at Freeport	1326	84	387.0	697.8	588	below normal	74	31
Green River near Geneseo	1003	64	76.8	387.3	217	below normal	89	31
Edwards River near New Boston	445	65	19.4	141.8	47	below normal	84	31
Kankakee River at Momence	2294	85	922.0	1210.0	914	normal	47	31
Iroquois River near Chebanse	2091	79	485.0	744.4	181	above normal	27	31
Fox River at Dayton	2642	83	335.0	1147.0	832	below normal	88	31
Vermilion River at Pontiac	579	59	13.6	141.4	19	normal	59	31
Spoon River at Seville	1636	86	77.2	537.5	187	below normal	83	31
LaMoine River at Ripley	1293	79	79.3	433.4	121	normal	61	31
Bear Creek near Marceline	349	58	36.4	112.8	13	normal	40	31
Mackinaw River near Congerville	767	54	28.5	191.5	30	normal	54	31
Salt Creek near Greenview	1804	61	205.0	513.3	202	normal	49	31
Sangamon River at Monticello	550	90	98.6	172.8	34	above normal	29	31
South Fork Sangamon near Rochester	867	53	53.0	200.9	26	normal	42	31
Illinois River at Valley City	26743	64	5967.0	12820.0	8067	below normal	82	30
Macoupin Creek near Kane	868	74	24.2	233.1	52	normal	58	31
Vermilion River near Danville	1290	81	737.0	351.7	103	above normal	13	31
Kaskaskia River at Vandalia	1940	33	97.0	640.3	281	normal	57	31
Shoal Creek near Breese	735	59	38.8	181.1	43	normal	51	31
Embarras River at Ste. Marie	1516	89	313.0	454.9	105	normal	34	31
Skillet Fork at Wayne City	464	83	4.6	98.7	12	normal	66	31
Little Wabash below Clay City	1131	88	98.0	222.0	51	normal	40	31
Big Muddy at Plumfield	794	32	37.0	112.7	58	below normal	82	31
Cache River at Forman	244	79	6.2	55.6	16	normal	65	31

Notes:

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.

*As reported in U.S. Geological Survey (USGS) Water Resources Data, Illinois, Water Year 2002.

Table 5. Reservoir Levels in Illinois, October 2003

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 15 observation wells, which are remote from pumping centers, were below average levels for October by 2.9 feet and ranged from 28.8 feet below average to 4.4 feet above average (Table 6). Once again, largest deviations were reported in northern Illinois at Cambridge (Henry County) and Mt. Morris (Ogle County). This is the fifth and eighth consecutive month for a record monthly low at Cambridge and Mt. Morris, respectively.

Comparison to Previous Month. Shallow groundwater levels were slightly below those of September. Levels averaged 0.2 feet below those of last month and ranged from 2.0 feet below to 5.1 feet above last month's levels.

Comparison to Same Month, Previous Year. Shallow groundwater levels in October were below levels of last year. Levels averaged 1.4 feet lower and ranged from 13.8 feet lower to 4.5 feet above levels of last year.

Table 6. Month-End Shallow Groundwater Level Data Sites, October 2003

Number	Well name	County	Well depth (feet)	This month's reading (depth to water, feet)	Deviation from			
					15-year avg. level (feet)	Period of record avg. (feet)	Previous month (feet)	Previous year (feet)
1	Galena	JoDavie	25.00	N/A	N/A	N/A	N/A	N/A
2	Mt. Morris	Ogle	55.00	31.97*	-12.19	-12.09	-0.81	-10.26
3	Crystal Lake	McHenry	18.00	7.17	-1.36	-1.36	-0.28	-1.37
4	Cambridge	Henry	42.00	41.06*	-27.30	-28.79	-0.18	-13.77
5	Fermi Lab	DuPage	17.00	10.91	-3.53	-3.53	-1.17	-1.80
6	Good Hope	McDonough	30.00	10.55	+0.50	-0.18	-0.10	-1.39
7	Snicarte	Mason	42.00	38.92	-2.10	-1.97	+0.06	-1.58
8	Coffman	Pike	28.00	9.91	+4.03	+4.40	-0.74	+4.23
9	Greenfield	Greene	20.70	11.82	+3.33	+3.50	+5.13	+4.54
10	Janesville	Cumberland	11.00	5.51	+0.59	+0.84	-0.37	+1.73
11	St. Peter	Fayette	15.00	3.81	+0.30	+0.45	+0.15	+2.15
12	SWS #2	St. Clair	80.00	N/A	N/A	N/A	N/A	N/A
13	Boyleston	Wayne	23.00	7.47	+0.04	+0.41	-0.52	+1.29
14	Sparta	Randolph	27.00	10.47	-0.48	-0.15	-0.93	-1.67
15	SE College	Saline	10.19	7.84	0.00	-0.40	-0.43	+0.46
16	Dixon Springs	Pope	8.63	8.39	-1.30	-3.18	-1.95	-2.95
17	Bondville	Champaign	21.00	6.93	-1.35	-1.39	-0.37	-0.76
Averages					-2.72	-2.90	-0.17	-1.41

Notes:

N/A = Data not available.

*Lowest level of record for October.

Addendum

Long-Term Precipitation Networks (Nancy Westcott)

Imperial Valley Precipitation. October 2003 precipitation amounts (Figure 5a) were relatively light. Gauge amounts were greatest along the western, northeastern, and southern edges of the network, and precipitation was lightest in the central portion of the network. Individual gauge totals ranged from 1.91 inches at site #8 to 1.27 inches at site #16. The 30-year, 1971–2000, average precipitation amounts for October at Havana and Mason City are 2.86 and 2.73 inches, respectively. The October 2003 network average of 1.56 inches is about 66 percent of the 11-year (1992–2002) October network average of 2.37 inches.

Cook County Precipitation. October 2003 precipitation amounts (Figure 5b) also were relatively light. Precipitation was greatest in the southeastern corner of the network and lightest in the south-central portion of the network. Precipitation values ranged from 2.81 inches at site #25 (Chicago Heights) to 1.29 inches at site #17 (Alsip). The October 2003 network average of 1.81 inches is about 56 percent of the 14-year (1989–2002) October network average of 3.24 inches.

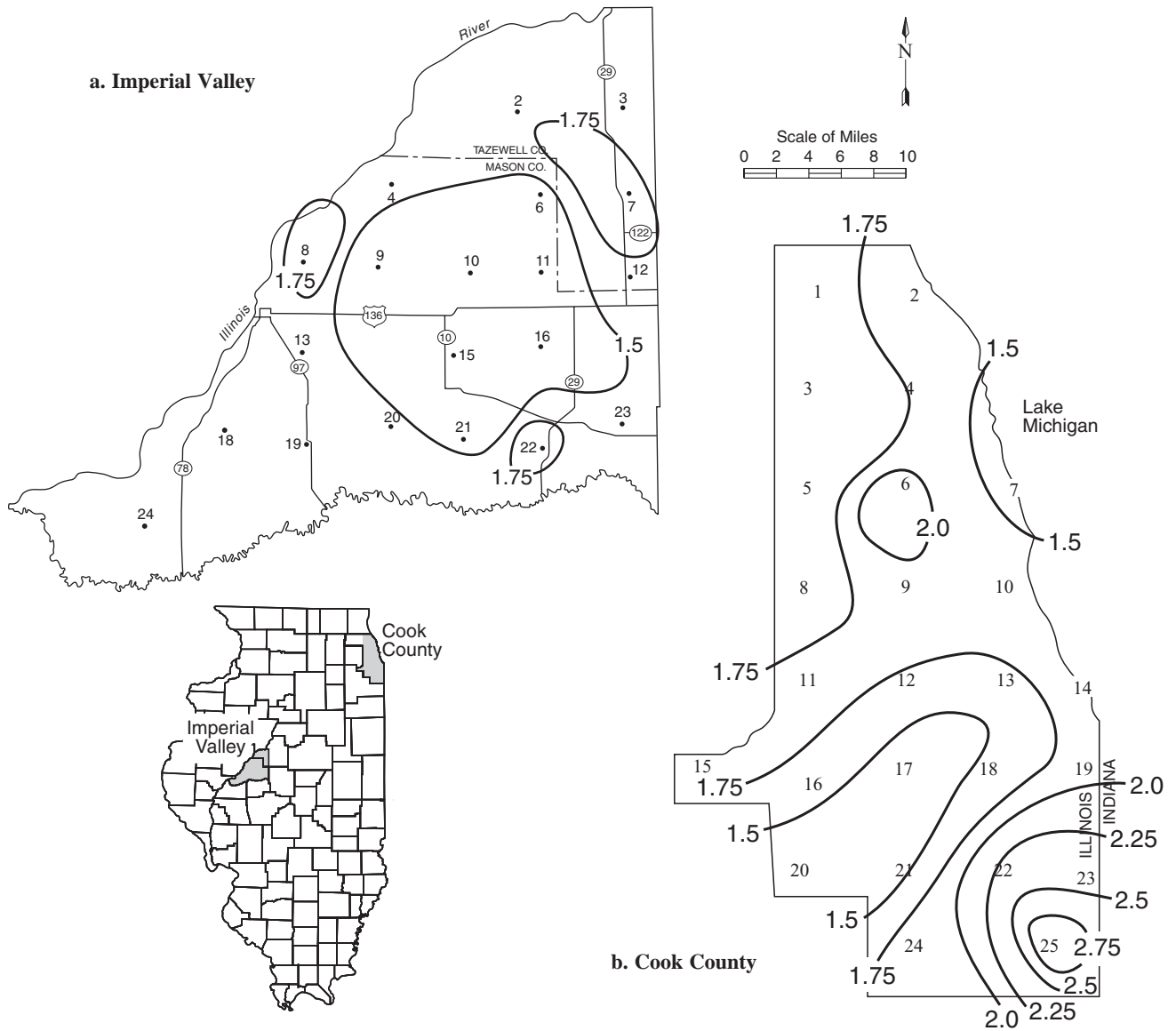


Figure 5. Long-term raingage network precipitation totals (inches) for October 2003

Data sources for information in this publication include the following:

CPC - Climate Prediction Center, <http://www.cpc.ncep.noaa.gov/products/predictions/>

ISWS - Illinois State Water Survey, <http://www.sws.uiuc.edu/>

MRCC - Midwestern Regional Climate Center, <http://mrcc.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/>

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