

ILLINOIS WATER AND CLIMATE SUMMARY

August 2003

August 2003 Overview (Bob Scott)

Temperatures in Illinois during August 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 were above median heights. Shallow groundwater levels were below long-term average depths for the twelfth consecutive month. Heavy precipitation occurred across much of Illinois between August 30 and September 1, a very dry month until that point. Due to the schedule required to collect report data, only precipitation data reflect some of those rain events.

Temperatures across Illinois (Figure 1) for August were uniformly above average (a +1.6-degree departure). Crop Reporting District (CRD) temperatures ranged from 1.1 degrees above average (east-southeast) to 2.1 degrees above average (northwest and northeast).

Precipitation amounts in Illinois for August were below average (Figure 1); however, regional rainfall varied considerably. The statewide average of 2.69 inches represents a -0.96-inch departure or 74 percent of average. The northwest CRD received the least rain, 1.35 inches or 31 percent of average, while the southwest CRD received the most rain, 3.72 inches or 111 percent of average.

Soil moisture in the 0- to 40-inch (0- to 100-centimeter) layer near the end of August was below normal (Figure 1). Topsoil moisture was well below normal across much of Illinois. Deeper layers in central Illinois were quite dry, while wet conditions dominated these layers in west-central and east-central Illinois.

Mean provisional streamflow statewide was above the median flow, 124 percent of median (Figure 1). Rivers in Illinois recorded mean discharges in the above to below normal range this month. Peak stages recorded were below flood stage at stations on the Illinois River, the Mississippi River at stations along the Illinois border, and on the Ohio River at Cairo.

Water surface levels at the end of August were below the normal pool/target operating level at 17 of 37 reporting reservoirs. Levels at Lake Shelbyville and Carlyle Lake were near target levels; Rend Lake was above its target operating level. Lake Michigan's mean level remains below the long-term average.

Statewide, and for the twelfth straight month, **shallow groundwater levels** were below normal (Figure 1). Deviations from normal averaged 2.0 feet below average. Levels were 1.5 feet lower than July levels and approximately 1.5 feet below August levels last year.

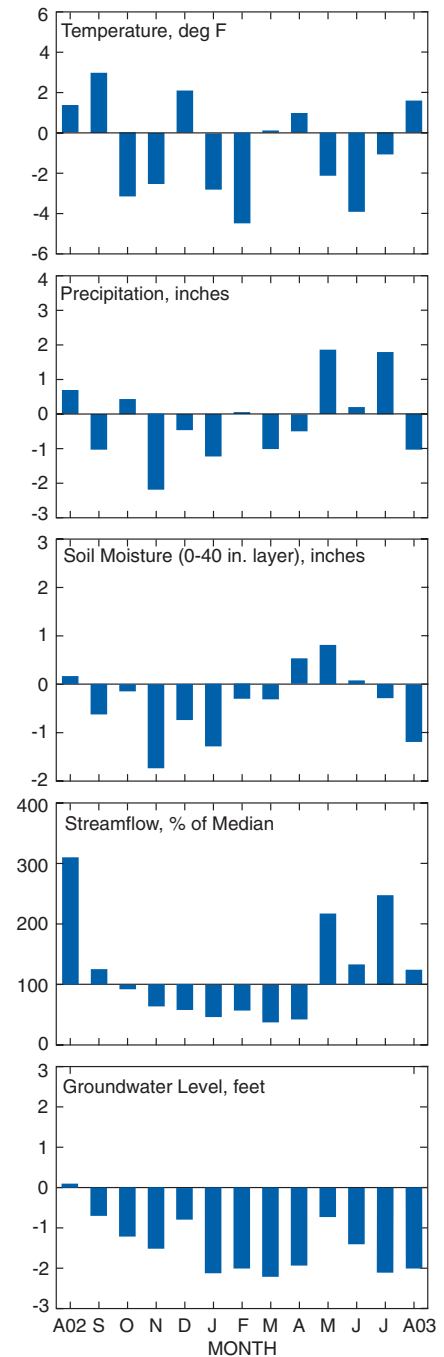


Figure 1.
Statewide departures from normal

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

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Weather/Climate Information (Jim Angel and Bob Scott)

Temperatures across Illinois for August were above average (Figure 2 and Table 1). The warmest temperature for the month, 104°F, was reported at Grand Tower on August 18. The coldest reading, 47°F, was observed at De Kalb on August 26. It was the 22nd warmest August, the 21st coolest climatological summer (June–August), and the 32nd coolest January–August since 1895.

Precipitation in August was below average statewide (Figure 2 and Table 1). Carlyle reported the highest one-day rainfall total, 4.35 inches, and also the highest monthly total, 7.10 inches. It was the 34th driest August, the 30th wettest climatological summer, and the 53rd wettest January–August since 1895.

Severe weather included a tornado near Mendota (La Salle County) on August 1 and two others near Owaneca (Christian County) and near Bellair (Crawford County) on August 31. No damages or injuries were reported. Wind damage and hail were common in much of the state, including widespread reports on August 1 (northeastern Illinois), damaged roofs and windows on August 2 (central Illinois), numerous reports on August 3 (northeastern and southern Illinois), downed tree limbs and other wind damage on August 20 (northwestern Illinois, and on August 26 and 28 (western Illinois).

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for August (Figure 3) ranged from 3 mph at Dixon Springs to 6 mph at Stelle and Bondville. The highest wind gust for the month, 42 mph, occurred at Carbondale on August 3. The prevailing wind direction during August was predominately northerly to northeasterly in northern and central Illinois and southerly to southwesterly across southern Illinois. Wind speeds in excess of 8 mph varied from no hours at Dixon Springs and Rend Lake to nearly 197 hours at Bondville. (August has 744 hours.) Average air temperatures for the month ranged from the lower 70s at Bondville to middle to upper 70s in southern Illinois.

Solar radiation totals were quite uniform around the state and still near seasonal highs due to few days with rain. Values ranged from 627 Mega-Joules per meter squared (MJ/m²) at DeKalb to 680 MJ/m² at Rend Lake and Belleville.

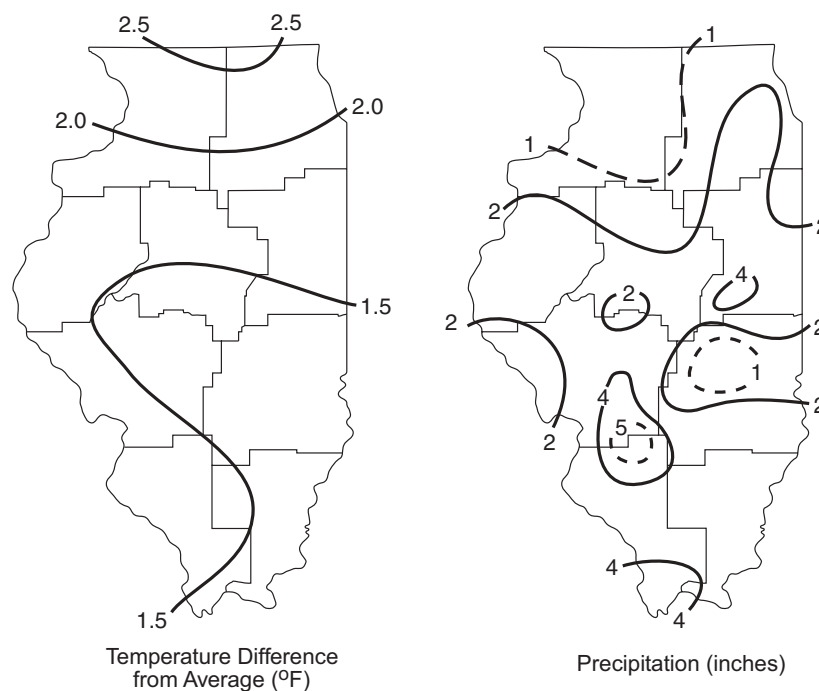


Figure 2. Illinois temperature and precipitation during August 2003

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		
	Aug 03 Amount	% Avg	Temp Dev	Jun 03- Aug 03	% Avg	Temp Dev	Mar 03- Aug 03	% Avg	Temp Dev	Sep 02- Aug 03	% Avg	Temp Dev
Northwest	1.35	31	2.1	9.54	76	-0.6	18.74	83	-0.7	25.54	70	-0.5
Northeast	2.09	50	2.1	10.65	89	-0.7	21.33	96	-0.9	28.60	78	-0.8
West	2.98	83	1.5	13.55	116	-1.0	23.12	102	-0.8	30.86	82	-0.9
Central	2.46	68	1.5	12.80	111	-1.0	21.93	98	-0.6	29.38	79	-0.9
East	3.58	95	1.7	15.79	132	-1.1	25.17	111	-0.4	33.77	90	-1.1
West-southwest	2.54	79	1.3	12.44	117	-1.2	23.60	107	-0.6	34.52	92	-1.1
East-southeast	2.77	82	1.1	10.94	95	-1.1	22.47	96	-0.3	36.19	88	-0.9
Southwest	3.72	111	1.9	12.58	114	-1.0	25.53	108	-0.3	42.73	100	-0.9
Southeast	3.45	105	1.5	11.72	106	-1.0	24.78	101	-0.2	46.52	105	-0.7
State Average	2.69	74	1.6	12.10	105	-1.0	22.77	100	-0.5	33.68	87	-0.9

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

Potential evapotranspiration observations ranged from a low of 5.7 inches at DeKalb and St. Charles to 6.3 inches at Belleville and Rend Lake. Soil temperatures at the 4-inch level ranged from the middle 70s in northeastern Illinois to the low 80s at Monmouth. Soil temperatures at the 8-inch level varied from the middle 70s in northeastern Illinois to 80°F at Belleville.

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for September and for climatological autumn (September–November) call for equal chances of above, below, and normal temperatures and precipitation across Illinois.

Soil Moisture Information (Bob Scott)

Soil moisture observations for this report were taken just prior to heavy rains that inundated much of Illinois at the end of August and do not reflect those events. Conditions in the 0- to 6-inch layer were below to well below normal statewide, except in far southern Illinois (Figure 4). Moisture values ranged from near 10 percent of normal at Freeport, Belleville, and Rend Lake to 124 percent of normal at Dixon Springs. Values in the 6- to 20-inch layer were below normal, except in west-central Illinois. Olney, Belleville, and Springfield reported only 10 percent of normal moisture in this layer, while Perry reported nearly 200 percent of normal moisture. Moisture in deeper layers was generally below normal over most of central Illinois and near to above normal elsewhere. Conditions 20 to 40 inches deep ranged from 10 percent of normal at Belleville to 134 and 166 percent of normal at Stelle and Perry, respectively. Conditions in the 40- to 72-inch layer were just 10 percent of normal at Brownstown, but 145 percent of normal at nearby Rend Lake. Overall, soil moisture in Illinois near the end of August was below normal (Figure 1).

Compared to last month, soil moisture decreased in each layer at most sites, except at Dixon Springs where increases were observed (Table 2). Moisture in the 0- to 6-inch layer was 20 to 45 percent lower across the northern two-thirds of Illinois, but 65 percent higher at Dixon Springs. Decreases in the 6- to 20-inch layer generally ranged from 10 to 30 percent, but Carbondale, Freeport, and Belleville had decreases between 45 and 86 percent, and Dixon Springs reported a 35 percent increase. Decrease measured in the 20- to 40-inch layer were less than 12 percent at most sites, although Belleville and Topeka reported decreases of 26 and 31 percent, respectively.

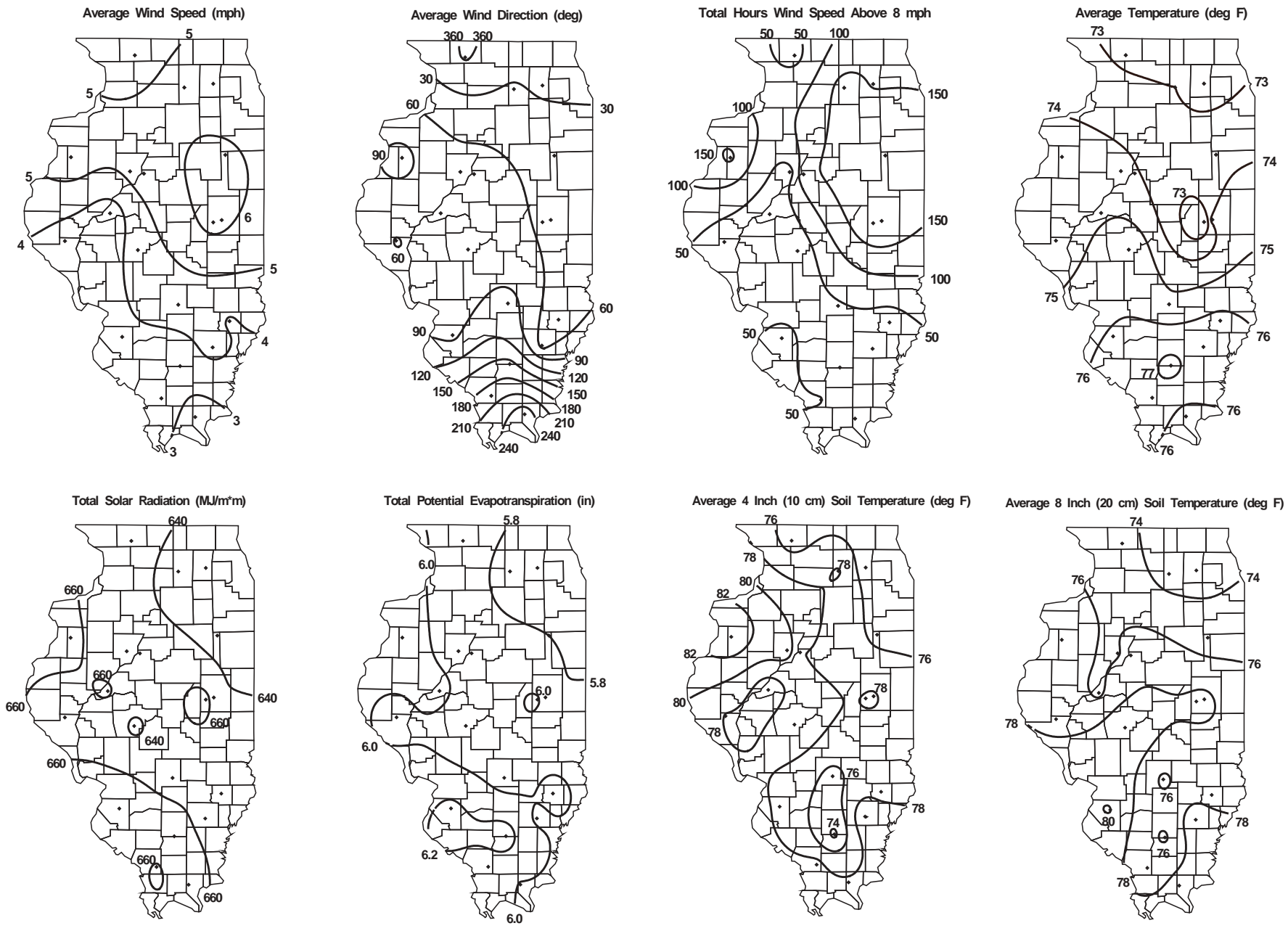


Figure 3. August monthly averages and totals as collected by the Illinois Climate Network

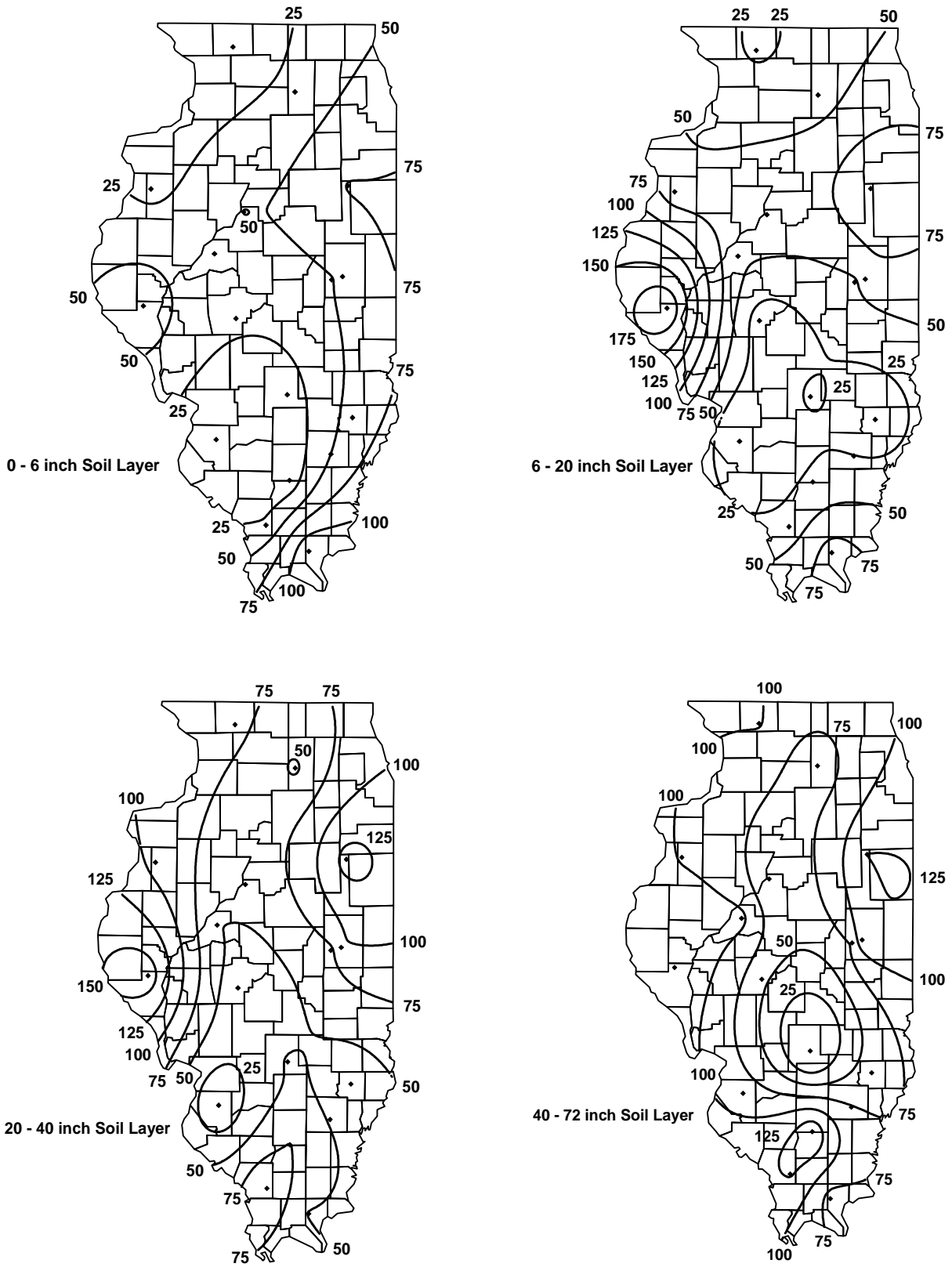


Figure 4. September 1 observed percent-of-normal soil moisture based on 1985-1995 mean

Table 2. Soil Moisture in Various Layers on August 29, 2003

<i>Location</i>	<i>Sep 1 0 - 6 (inches)</i>	<i>Change from Aug 1 (%)</i>	<i>Sep 1 6 - 20 (inches)</i>	<i>Change from Aug 1 (%)</i>	<i>Sep 1 20 - 40 (inches)</i>	<i>Change from Aug 1 (%)</i>
Freeport (NW)	0.6	-33	1.5	-53	5.5	-18
DeKalb (NE)	1.0	-21	2.7	-18	5.6	-8
Monmouth (W)	0.9	-25	2.9	-10	5.5	-3
East Peoria (C)	0.9	-41	3.4	-27	6.8	-11
Topeka (C)	0.4	-45	1.5	-25	2.0	-31
Stelle (E)	1.3	-28	3.9	-23	6.4	-8
Champaign (E)	1.2	-23	3.6	-28	5.4	-10
Bondville (E)	1.2	-39	2.9	-26	6.2	-13
Perry (WSW)	1.2	-40	5.3	-7	8.0	-4
Springfield (WSW)	1.1	-32	3.7	3	6.4	-8
Brownstown (ESE)	0.6	-44	1.5	-27	6.2	-9
Olney (ESE)	1.0	-7	3.2	-11	6.3	-6
Belleville (SW)	0.4	-46	0.2	-86	5.5	-26
Carbondale (SW)	0.7	-40	1.6	-45	6.3	-12
Ina (SE)	0.8	-17	3.9	-8	7.3	-4
Fairfield (SE)	0.8	-19	3.3	-14	7.0	-3
Dixon Springs (SE)	1.4	65	2.9	35	6.0	-11

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 (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 recorded peak stages below flood stage this month. The Mississippi River along the Illinois border recorded peak stages below flood stage, as did the Ohio River at Cairo on August 9.

Table 4 lists 26 streamgaging stations located throughout Illinois. Provisional monthly mean flows posted by the 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 August mean flow for each year of record, and selecting the middle value, 50 percent exceedence probability.

Mean provisional flow statewide was above the median this month (124 percent of the median) but below the mean (56 percent of the mean). Flows in northwestern Illinois were generally in the below normal range this month, but in the northeast, mean flow in the Kankakee River and the Vermillion River near Danville were above normal. Flows were generally in the normal range in central Illinois and varied from above to below normal in southern Illinois.

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

Table 3. Peak Stages for Major Rivers, August 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	8.0	04
	La Salle	224.7	20	14.8	04
	Peoria	164.6	18	13.5	01
	Havana	119.6	14	13.0	01
	Beardstown	88.6	14	12.2	01
	Hardin	21.5	25	20.8	01
Mississippi	Dubuque	579.9	17	8.1	06
	Keokuk	364.2	16	3.6	01
	Quincy	327.9	17	12.0	05
	Grafton	218.0	18	15.8	26
	St. Louis	180.0	30	6.2	02
	Chester	109.9	27	9.3	01
	Thebes	43.7	33	14.4	01
Ohio	Cairo	2.0	40	24.9	09

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.

reported in terms of their difference from normal pool (or target level). Reservoir levels 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 or 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 July at 37 reservoirs, by the end of August the water surface elevation had risen at 16 reservoirs, was the same as last month at 4 reservoirs, and had decreased at 17 reservoirs. For the 37 reservoirs reporting at the end of August, 12 reservoirs had water surface levels above the normal pool (or target operating level), 8 reservoirs were at normal pool, and 17 reservoirs were below normal pool. Coulterville and Sparta reservoirs, both in Randolph County, were more than 2 feet below normal pool.

Major Reservoirs. Water levels at Lake Shelbyville and Carlyle Lake were near their respective seasonal target levels. Rend Lake was above its target level.

Great Lakes. Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The August mean level for Lake Michigan was 577.5 feet, compared to a mean level of 578.5 feet in 2002. The long-term average lake level for August is 579.4 feet, based on 1918–1999 data. Historically, the lowest mean level for Lake Michigan in August occurred in 1964 at 576.7 feet, and the highest level occurred in 1986 at 582.0 feet. The month-end level of Lake Michigan was 577.4 feet.

Table 4. Provisional Mean Flows, August 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* (cfs)	Median (cfs)			
Rock River at Rockton	6363	67	1,771	2899	2402	normal	68	31
Rock River near Joslin	9,549	59	2,263	4407	3862	below normal	77	31
Pecatonica River at Freeport	1,326	83	372	714	596	below normal	82	31
Green River near Geneseo	1,003	63	131	386	236	below normal	79	31
Edwards River near New Boston	445	64	47	162	78	below normal	70	31
Kankakee River at Momence	2,294	84	1,344	1088	909	above normal	18	31
Iroquois River near Chebanse	2,091	78	882	455	233	above normal	18	31
Fox River at Dayton	2,642	82	543	934	595	normal	54	31
Vermilion River at Pontiac	579	58	43	122	34	normal	45	31
Spoon River at Seville	1,636	85	153	523	312	below normal	74	31
LaMoine River at Ripley	1,293	78	77	354	189	below normal	80	31
Bear Creek near Marceline	349	57	3	91	51	below normal	82	31
Mackinaw River near Congerville	767	53	97	176	59	normal	40	31
Salt Creek near Greenview	1,804	60	401	649	353	normal	45	31
Sangamon River at Monticello	550	89	72	149	52	normal	39	31
South Fork Sangamon near Rochester	867	52	116	242	73	normal	42	31
Illinois River at Valley City	26,743	63	13,600	13,780	11,548	normal	34	31
Macoupin Creek near Kane	868	73	38	203	68	normal	67	31
Vermilion River near Danville	1,290	58	641	401	148	above normal	20	31
Kaskaskia River at Vandalia	1,940	32	105	886	524	below normal	82	31
Shoal Creek near Breese	735	58	69	186	65	normal	38	31
Embarras River at Ste. Marie	1,516	88	207	430	180	normal	46	31
Skillet Fork at Wayne City	464	82	4	115	20	below normal	80	31
Little Wabash below Clay City	1,131	87	76	322	98	normal	60	31
Big Muddy at Plumfield	794	87	218	217	91	above normal	28	31
Cache River at Forman	244	78	75	73	24	above normal	28	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 2001.

Table 5. Reservoir Levels in Illinois, August 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 14 observation wells, which are remote from pumping centers, were below average levels for August by 2.0 feet and ranged from 11.7 feet below average to 1.1 feet above average (Table 6). Northern Illinois reported the largest deviations. This was the sixth consecutive month for a record monthly low at the Mt. Morris (Ogle County) well and the lowest level on record at the Crystal Lake (McHenry County) well.

Comparison to Previous Month. All but the Mt. Morris well reported levels below those in July. Levels averaged 1.5 feet lower than those of last month and ranged from 4.6 feet below to 0.01 feet above July 2003 levels.

Comparison to Same Month, Previous Year. Shallow groundwater levels in August were below levels of August 2002. Levels averaged 1.5 feet lower and ranged from 12.1 feet lower to 1.7 feet above levels of last year.

Table 6. Month-End Shallow Groundwater Level Data Sites, August 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	JoDaviess	25.00	N/A	N/A	N/A	N/A	N/A
2	Mt. Morris	Ogle	55.00	30.20*	-12.23	-11.71	+1.81	-12.08
3	Crystal Lake	McHenry	18.00	10.42**	-4.77	-4.88	-4.42	-4.82
4	Cambridge	Henry	42.00	N/A	N/A	N/A	N/A	N/A
5	Fermi Lab	DuPage	17.00	8.47	-0.54	-0.53	-0.47	-0.52
6	Good Hope	McDonough	30.00	8.94	-0.21	-0.07	-0.07	-0.07
7	Snicarte	Mason	42.00	38.86	-1.97	-2.03	-0.77	-2.15
8	Coffman	Pike	28.00	14.03	-0.31	-4.56	-4.56	-4.56
9	Greenfield	Greene	20.70	14.88	-0.65	-0.77	-1.99	-0.77
10	Janesville	Cumberland	11.00	6.71	-0.68	-0.33	-0.51	-0.10
11	St. Peter	Fayette	15.00	4.61	-0.42	-0.04	-1.05	+0.89
12	SWS #2	St. Clair	80.00	N/A	N/A	N/A	N/A	N/A
13	Boyleston	Wayne	23.00	6.12	+0.33	+0.65	-1.22	+0.56
14	Sparta	Randolph	27.00	8.01	+0.40	+1.11	-2.17	+1.16
15	SE College	Saline	10.19	7.94	-0.34	-0.67	-0.81	+1.68
16	Dixon Springs	Pope	8.63	8.28	-0.90	-3.03	-1.18	+0.35
17	Bondville	Champaign	21.00	6.31	-1.06	-0.99	-1.24	-0.93
Averages					-1.67	-1.99	-1.46	-1.53

Notes:

N/A = Data not available.

* Lowest level on record for August.

**Lowest of period of record.

Addendum

Long-Term Precipitation Networks (Nancy Westcott)

Imperial Valley Precipitation. August 2003 precipitation amounts (Figure 5a) were variable, with most precipitation falling over the last three days of the month. Gage amounts were greatest in the southeastern portion of the network, and precipitation was lightest in the northeastern corner of the network. Individual gage totals ranged from 6.54 inches at site #23 to 2.48 inches at site #3. The 30-year, 1971–2000, average precipitation amounts for August at Havana and Mason City, are 3.45 and 3.47 inches, respectively. The August 2003 network average of 4.43 inches was about 123 percent of the 10-year (1993–2002) August network average of 3.59 inches.

Cook County Precipitation. August 2003 precipitation amounts (Figure 5b) were quite variable. Precipitation was greatest in the south-central and north-central regions of the network, and lightest in the northern portion of the network. Precipitation values ranged from 5.70 inches at site #16 (Palos Park) to 0.57 inches at site #2 (Winnetka). The August 2003 network average of 2.90 inches was about 68 percent of the 13-year (1990–2002) August network average of 4.28 inches.

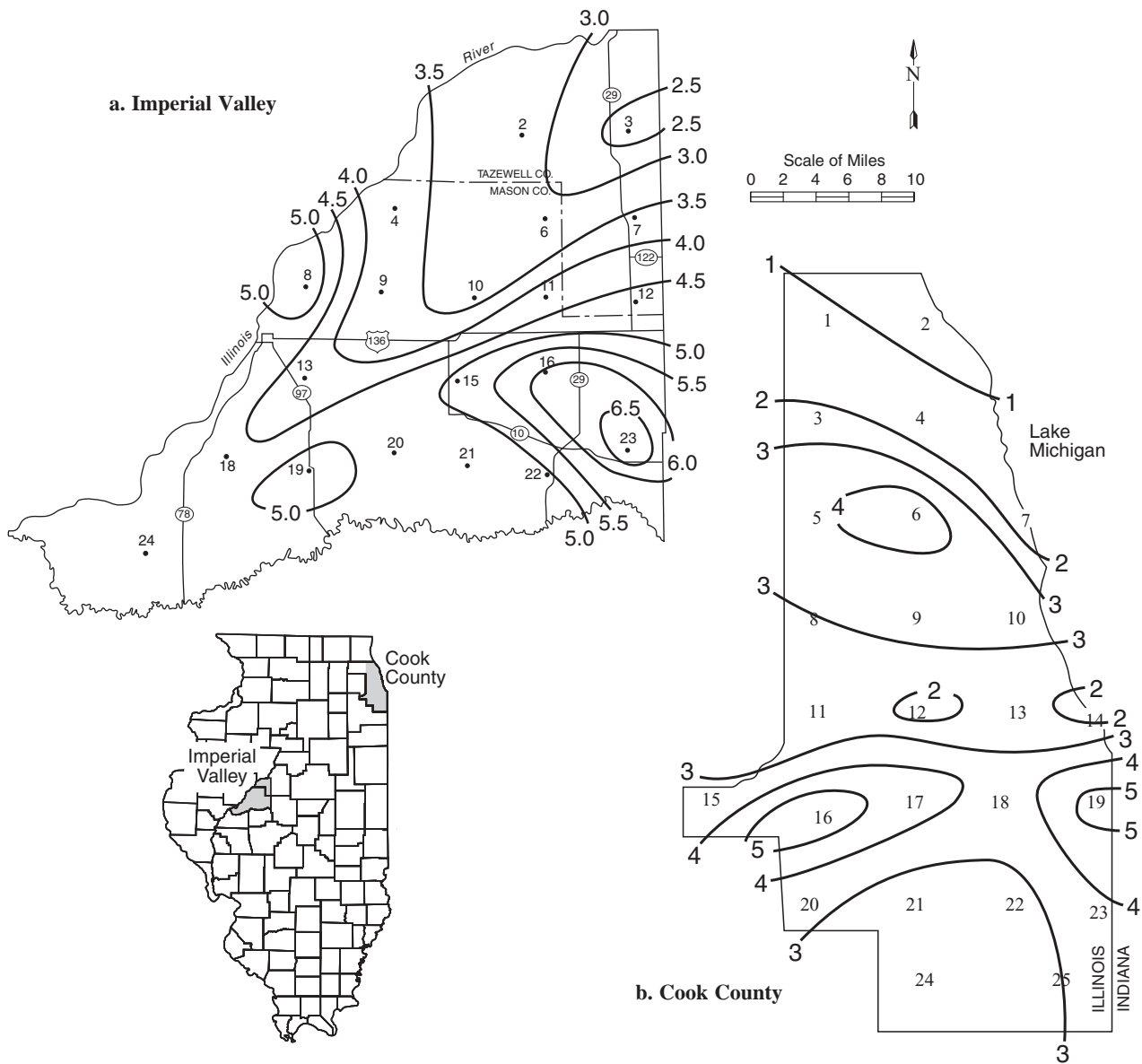


Figure 5. Long-term raingage network precipitation totals (inches) for August 2003

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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