

ILLINOIS WATER AND CLIMATE SUMMARY August 2004

2004 Overview (Bob Scott)

Temperatures in Illinois during August were well below average. This was the 5th coolest August and the 5th coolest summer (June–August) since 1895. Precipitation was well above average, the 9th wettest August 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. Shallow groundwater levels were below long-term average depths.

Temperatures across Illinois (Figure 1) for August were well below average (a -4.9-degree departure). Crop Reporting District (CRD) temperatures ranged from 4.2 degrees below average (southeast) to 5.6 degrees below average (west).

Precipitation amounts for the state were well above average (Figure 1). The statewide average of 5.45 inches represents a +1.80-inch departure or 149 percent of average. Some variability was observed across the state. Rainfall totals were highest in the west CRD (7.38 inches or 206 percent of average) and lowest in the northwest CRD (4.68 inches or 106 percent of average).

Soil moisture in the 0- to 40-inch (0- to 100-centimeter) layer in Illinois at the end of August was generally normal to above normal near the surface. Deeper soil layers were quite dry across much of central Illinois, however.

Mean provisional streamflow statewide was well above the median flow in August, 366 percent of median (Figure 1). Rivers in Illinois recorded mean discharges in the normal to much above normal range this month. Peak stages on major rivers were below flood stage.

Water surface levels at the end of August were below the normal pool/target operating level at 15 of 32 reporting reservoirs. Levels at Rend Lake, Lake Shelbyville, and Carlyle Lake were above their seasonal target levels. Lake Michigan's mean level remains below the long-term average.

Statewide, **shallow groundwater levels** continue to be below normal for the 24th consecutive month. Water-level deviations averaged 1.6 feet below normal, with water levels averaging a foot lower than July levels and approximately 1.6 feet above August levels one year ago.

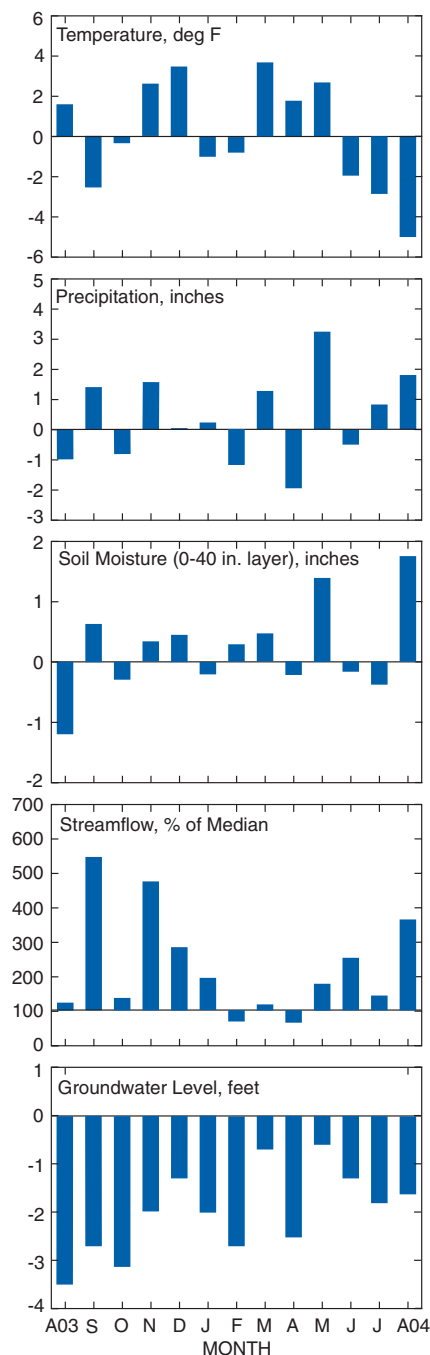


Figure 1.
Statewide departures from normal

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 much below average (Figure 2 and Table 1), the 5th coolest August since 1895. Eight of nine CRDs observed the 3rd or 4th coolest August since 1895. Extremes ranged from 40°F at Congerville on August 15 to 97°F at Kaskasia on August 19. Three months of temperatures below average (June–August 2004) ranked as the 5th coolest summer since 1895.

Precipitation for August was much above average statewide (Figure 2 and Table 1), the 9th wettest August since 1895. Regionally, the east and west CRDs observed the 3rd and 5th wettest August since 1895, respectively. Grayville reported the highest one-day precipitation total (6.87 inches on August 26), and Payson reported the highest monthly total (14.81 inches).

Severe weather, including five tornadoes, was reported widely in Illinois in August. Nickel-sized hail was observed in Will County on August 2. Hail was reported in Galva and Streator on August 3, while several counties in northern Illinois reported downed tree limbs and power lines. There was 1.5-inch hail in Logan County on August 9. Hail and wind damage were observed across northern Illinois on August 17, across central Illinois on August 18, and in southern Illinois on August 19. Five tornadoes were observed in DeKalb (2), Kane (2), and McHenry (1) Counties on August 24. However, no injuries were reported, and the only damage was to a barn and a house a mile southwest of McHenry. Wind damage was reported in Illinois near St. Louis on August 25 and across northern Illinois and near Quincy. Hail was seen near St. Louis on August 26, in central and northeastern Illinois on August 27, and in southeastern Illinois on August 28.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for August (Figure 3) ranged from 3 mph at Dixon Springs to near 7 mph at Stelle. The highest wind gusts for the month were recorded on August 3 at Big Bend (50 mph) and on August 27 at DeKalb (54 mph). The prevailing wind direction during August varied from southwesterly in western Illinois to westerly in northeastern and southeastern Illinois. Wind speeds in excess of 8 mph ranged from 7 hours at Rend Lake to approximately 237 hours at Stelle. (August has 744 hours.) Average air temperatures for the month ranged from the mid-60s in northern Illinois to the low 70s in southern Illinois.

Solar radiation totals in August varied from 562 Mega-Joules per meter squared (MJ/m²) at Springfield and Stelle to 668 MJ/m² at Rend Lake and Fairfield. Potential evapotranspiration observations varied from 4.8 inches at Big Bend and 4.9 inches at DeKalb and St. Charles to 5.9 inches at Rend Lake and Fairfield. Soil temperatures at the 4-level ranged from 68°F at St. Charles and DeKalb to 79°F at Carbondale. Soil temperatures at the 8-level ranged from 69°F at Stelle and St. Charles to 76°F at Rend Lake.

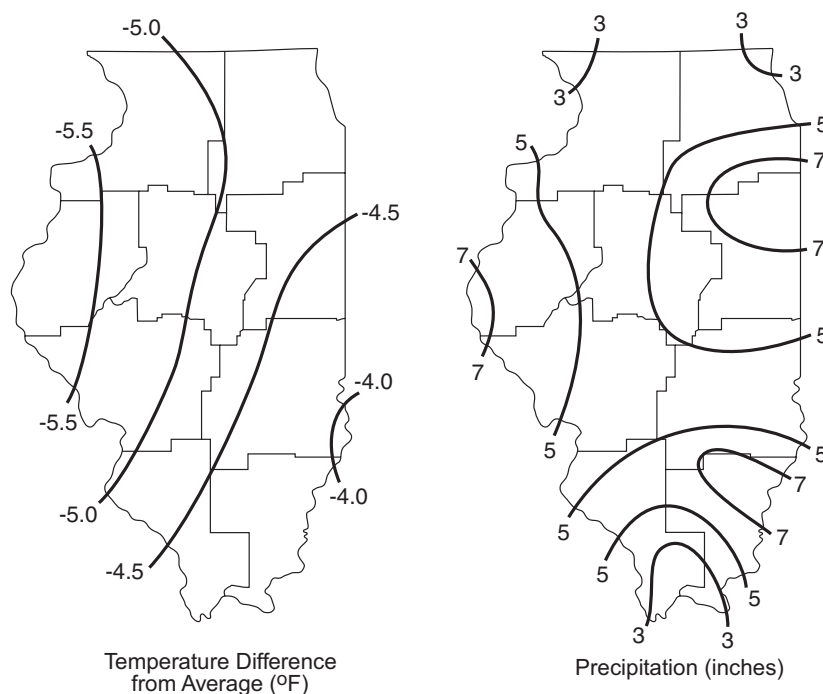


Figure 2. Illinois temperature and precipitation during August 2004

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

<i>Crop Reporting District</i>	<i>Last Month</i>			<i>Last 3 Months</i>			<i>Last 6 Months</i>			<i>Last 12 months</i>		
	<i>Aug 04 Amount</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Jun 04 Aug 04</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Mar 04 Aug 04</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Sep 03- Aug 04</i>	<i>% Avg</i>	<i>Temp Dev</i>
Northwest	4.68	106	-5.3	10.96	88	-3.0	24.54	108	0.0	37.55	103	0.5
Northeast	5.28	127	-5.0	12.20	101	-3.1	25.57	115	-0.3	38.20	104	0.1
West	7.38	206	-5.6	14.01	120	-3.6	24.39	107	-0.4	38.16	102	0.0
Central	5.30	147	-5.0	12.23	106	-3.3	23.99	108	-0.2	35.50	95	0.1
East	6.61	175	-4.5	16.14	135	-3.0	28.05	124	0.0	41.40	110	0.1
West-southwest	4.92	152	-5.3	11.70	110	-3.5	23.60	107	-0.2	38.50	102	0.0
East-southeast	4.81	142	-4.4	12.79	111	-2.8	25.74	110	0.2	44.89	109	0.3
Southwest	5.45	163	-4.5	13.74	124	-2.8	27.98	118	0.2	43.64	102	0.3
Southeast	5.20	159	-4.2	13.28	120	-2.4	27.76	113	0.4	44.08	99	0.5
State Average	5.45	149	-4.9	12.87	111	-3.1	25.57	112	-0.1	40.08	103	0.2

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 September call for temperatures below average across Illinois and equal chances of above, below, and average precipitation across the state. Outlooks for climatological autumn (September–November) call for equal chances of above, below, and average temperatures and precipitation across Illinois.

Soil Moisture Information (Bob Scott)

Moisture near the soil surface at the end of August was normal to above normal over all of Illinois, except for dry conditions in far southern Illinois (Figure 4). Values in the 0- to 6-inch layer ranged from more than 200 percent of normal (Stelle, Topeka, and south-central Illinois) to just 40 percent (Dixon Springs), with similar conditions in the 6- to 20-inch layer. Values in that layer exceeded 200 percent at Stelle and in south-central Illinois, but were just 45 percent at Bondville. Conditions in deeper layers also varied considerably. Soils in the 20- to 40-inch and 40- to 72-inch layers were generally moist along the state’s boundaries, but very dry in central Illinois. Values ranged from near 190 percent at Belleville in both layers to 23 percent at Mason (20- to 40-inch layer) and 10 percent at Brownstown (40- to 72-inch layer). Overall, soil moisture in Illinois was above normal at the end of August (Figure 1).

Compared to the end of last month, soil moisture in the 0- to 6-inch layer increased at most Illinois sites, with considerable increases (more than 100 percent) from Stelle to Brownstown (Table 2). Moisture in this layer decreased only at Carbondale and Dixon Springs. Increases dominated the 6- to 20-inch layer, maximizing at 80 percent or more at Stelle and Brownstown. Bondville reported a decrease of 29 percent, the largest reduction among the five scattered locations reporting decreases. Increases and decreases were smaller in northern and eastern Illinois in the 20- to 40-inch layer, and observations from southern Illinois indicated changes of generally less than 5 percent.

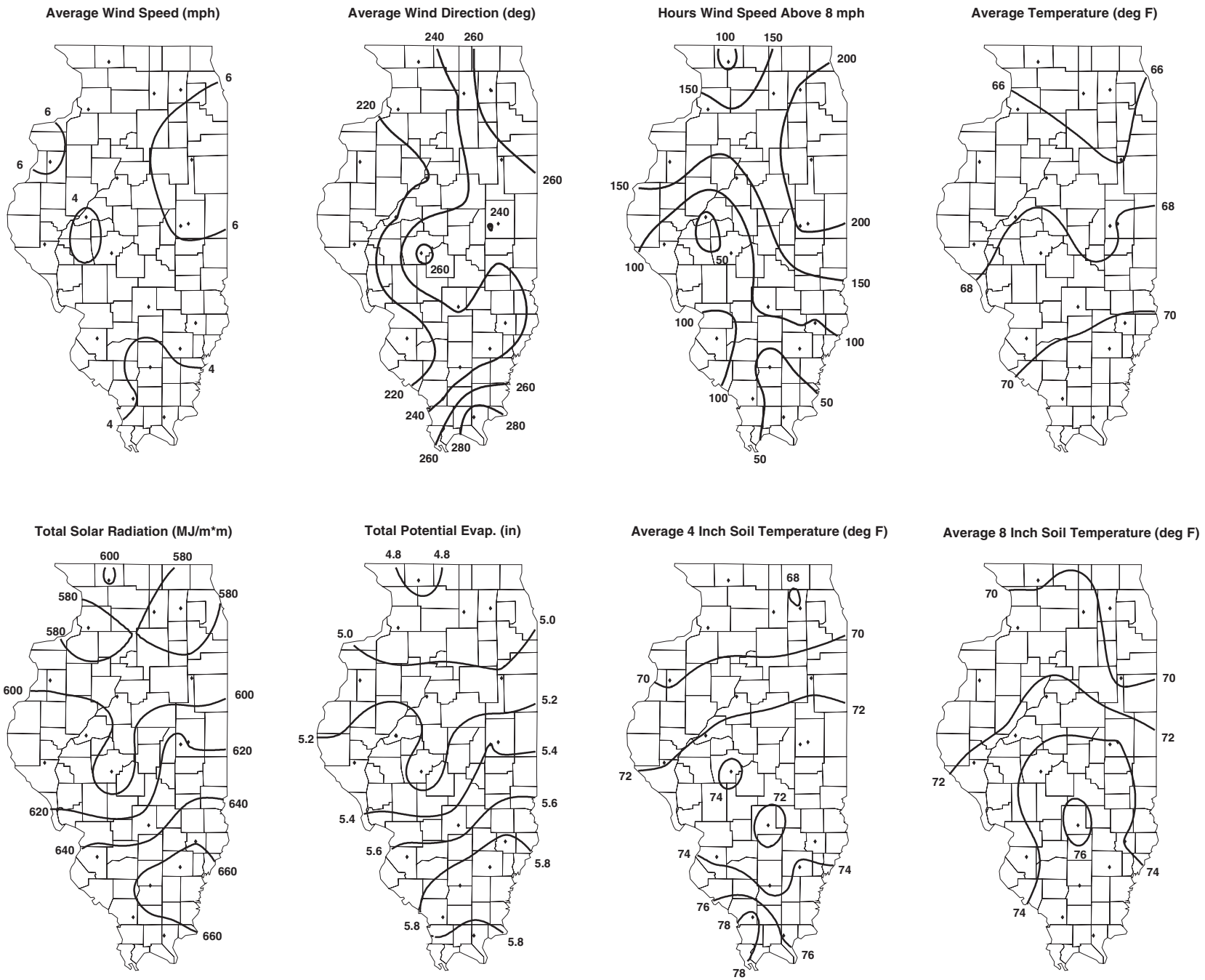


Figure 3. August monthly averages and totals as collected by the Illinois Climate Network

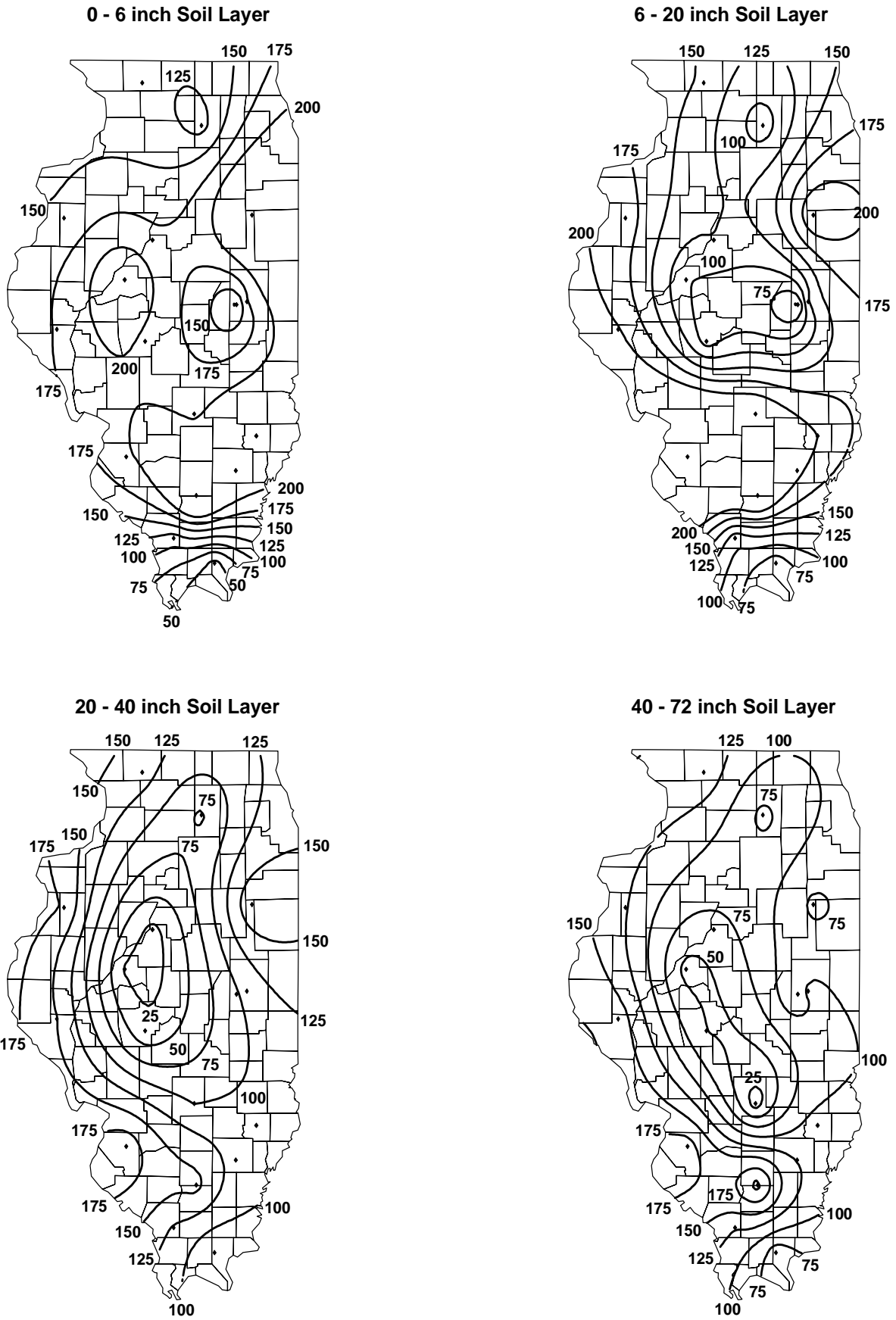


Figure 4. September 1 observed percent-of-normal soil moisture based on 1985-1995 mean

Table 2. Soil Moisture in Various Layers on September 1, 2004

<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)	1.9	17	4.6	12	6.9	1
DeKalb (NE)	1.9	19	3.8	-5	6.0	-2
Monmouth (W)	2.1	52	5.2	49	6.9	26
East Peoria (C)	2.2	124	4.4	36	6.3	-6
Topeka (C)	1.0	106	1.8	21	1.8	-10
Stelle (E)	2.6	104	5.9	80	7.0	16
Champaign (E)	2.0	20	4.7	-3	5.5	-5
Bondville (E)	1.9	29	2.9	-29	6.7	-14
Pery (WSW)	2.1	63	5.3	31	7.7	19
Springfield (WSW)	2.0	62	4.3	16	6.4	0
Brownstown (ESE)	2.1	175	4.1	86	7.0	0
Olney (ESE)	2.0	62	4.4	23	6.8	1
Belleville (SW)	2.2	42	5.0	43	7.9	0
Carbondale (SW)	1.2	-15	2.4	-18	6.6	-4
Ina (SE)	2.3	17	5.4	5	7.8	0
Fairfield (SE)	2.3	39	5.4	16	7.4	3
Dixon Springs (SE)	0.7	-47	2.5	-13	6.4	-9

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 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 readings posted by the National Weather Service and/or the USACE. August peak stages were below flood stage at all Table 3 stations.

Provisional monthly mean flows for 26 streamgaging stations located throughout Illinois are shown (Table 4). Data 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 (366 percent of the median) and above the mean (137 percent of the mean). Flows were in the above normal range this month in northwestern Illinois and at several south-central stations. Average monthly flows recorded were above normal to much above normal at several stations near the eastern edge of Illinois but normal at most other stations. No stations in Table 4 recorded average monthly flow below the normal range this month.

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 2004

<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	12.2	29
	La Salle	224.7	20	18.8	29
	Peoria	164.6	18	13.0	31
	Havana	119.6	14	11.1	31
	Beardstown	88.6	14	10.6	31
	Hardin	21.5	25	21.4	29
Mississippi	Dubuque	579.9	17	9.0	06
	Keokuk	364.2	16	5.3	08
	Quincy	327.9	17	12.1	28
	Grafton	218.0	18	16.0	29
	St. Louis	180.0	30	20.4	29
	Chester	109.9	27	21.8	30
	Thebes	43.7	33	25.3	31
Ohio	Cairo	2.0	40	26.5	31

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), and the number of years of record for each reservoir also is given (column 7). Most reservoirs serve as public water supplies, with the exceptions noted in the last column.

Compared to end-of-July levels at 30 reservoirs, by the end of August the water surface elevation had risen at 13 reservoirs, was the same as last month at 4 reservoirs, and had decreased at 13 reservoirs. For the 32 reservoirs with observations reported at the end of August, 7 reservoirs had water surface levels above the normal pool (or target operating level), 10 reservoirs were at normal pool, and 15 reservoirs were below normal pool.

Major Reservoirs. Water levels at Carlyle Lake and Rend increased during August and ended the month above their target levels. The water level at Lake Shelbyville increased slightly and ended the month just above its seasonal 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 578.5 feet, compared to a mean level of 577.5 feet in August 2003. The long-term average lake level for August is 579.4 feet, based on 1918–2003 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 578.5 feet.

Table 4. Provisional Mean Flows, August 2004

<i>Station</i>	<i>Drainage area (sq mi)</i>	<i>Years of record</i>	<i>2004 mean flow (cfs)</i>	<i>Long-term flows</i>		<i>Flow condition</i>	<i>Percent chance of exceedence</i>	<i>Days of data this month</i>
				<i>Mean* (cfs)</i>	<i>Median (cfs)</i>			
Rock River at Rockton	6363	68	4329	2908	2405	above normal	17	31
Rock River near Joslin	9549	60	6021	4424	3889	above normal	19	31
Pecatonica River at Freeport	1326	84	933	720	598	above normal	21	31
Green River near Geneseo	1003	64	193	386	238	normal	60	31
Edwards River near New Boston	445	65	81.1	163	78	normal	48	31
Kankakee River at Momence	2294	85	1805	1085	905	above normal	11	31
Iroquois River near Chebanse	2091	79	1613	466	236	much above normal	9	31
Fox River at Dayton	2642	83	969	937	611	normal	33	29
Vermilion River at Pontiac	579	59	103	124	34	normal	31	31
Spoon River at Seville	1636	86	217	529	320	normal	64	31
LaMoine River at Ripley	1293	79	632	357	194	above normal	21	31
Bear Creek near Marceline	349	58	470	93	53	much above normal	5	31
Mackinaw River near Congerville	767	54	61.5	178	60	normal	50	31
Salt Creek near Greenview	1804	61	421	670	361	normal	43	31
Sangamon River at Monticello	550	90	96.1	151	54	normal	32	31
South Fork Sangamon near Rochester	867	53	54.6	238	70	normal	52	31
Illinois River at Valley City	26,743	64	11,720	13,780	11,566	normal	47	31
Macoupin Creek near Kane	868	74	94.5	204	68	normal	41	31
Vermilion River near Danville	1290	81	511	422	148	above normal	20	30
Kaskaskia River at Vandalia	1940	33	451	903	545	normal	57	31
Shoal Creek near Breese	735	59	168	183	64	above normal	26	31
Embarras River at Ste. Marie	1516	89	409	427	180	normal	33	31
Skillet Fork at Wayne City	464	83	708	114	19	much above normal	7	30
Little Wabash below Clay City	1131	88	478	318	96	above normal	16	31
Big Muddy at Plumfield	794	32	217	215	168	normal	44	31
Cache River at Forman	244	79	12.1	72	23	normal	62	31

Notes:

N/A = not available

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, 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 16 observation wells, which are remote from pumping centers, were below average levels for August by 1.6 feet and ranged from 29.1 feet below average to 3.1 feet above average (Table 6).

Comparison to Previous Month. Shallow groundwater levels in August averaged a foot lower than those last month. Levels ranged from 9.2 feet lower to 2.6 feet higher than July levels.

Comparison to Same Month, Previous Year. Shallow groundwater levels in August were above levels of a year ago. Levels averaged 1.6 feet higher and ranged from 2.6 feet below to 8.4 feet above levels a year ago.

Table 6. Month-End Shallow Groundwater Level Data Sites, August 2004

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	20.92	+0.06	+0.40	-0.72	+1.84
2	Mt. Morris	Ogle	55.00	21.78	-4.12	-3.17	+0.13	+8.42
3	Crystal Lake	McHenry	18.00	4.74	+0.77	+0.78	-3.62	+5.68
4	Cambridge	Henry	42.00	40.88*	-27.25	-29.07	-9.16	-2.60
5	Fermi Lab	DuPage	17.00	8.30	-0.34	-0.34	-0.34	+0.17
6	Good Hope	McDonough	30.00	5.86	+1.80	+3.09	+0.10	+3.08
7	Snicarte	Mason	42.00	38.58	-1.82	-1.63	-0.57	+0.28
8	Coffman	Pike	28.00	13.23	+0.05	+0.66	-0.14	+0.80
9	Greenfield	Greene	20.70	14.59	-0.48	-0.47	-2.31	+0.29
10	Janesville	Cumberland	11.00	5.56	+0.48	+0.80	+0.30	+1.15
11	St. Peter	Fayette	15.00	1.81	+2.37	+2.69	+2.58	+2.80
12	SWS #2	St. Clair	80.00	N/A	N/A	N/A	N/A	N/A
13	Boyleston	Wayne	23.00	4.01	+2.17	+2.63	+1.84	+2.11
14	Sparta	Randolph	27.00	6.66	+1.55	+2.40	-0.05	+1.35
15	SE College	Saline	10.19	7.99	-0.30	-0.68	-1.91	-0.05
16	Dixon Springs	Pope	8.63	8.62	-1.07	-3.30	-1.21	-0.34
17	Bondville	Champaign	21.00	5.30	-0.13	-0.06	-1.62	+1.01
Averages					-1.64	-1.58	-1.04	+1.62

Notes:

N/A = Data not available.

*Lowest water level of record for August.

Addendum

Long-Term Precipitation Networks (Nancy Westcott)

Imperial Valley Precipitation. August 2004 precipitation amounts (Figure 5a) were average. Gage amounts were greatest in the southwestern region of the network and lightest through the central portion of the network. Individual gage totals ranged from 5.36 inches at site #24 to 2.51 inches at site #13. 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 2004 network average of 3.77 inches is nearly the same as the 11-year (1993–2003) August network average of 3.67 inches.

Cook County Precipitation. August 2004 precipitation amounts (Figure 5b) were variable. Precipitation was heaviest in the northeast, west-central, and southeastern portions of the network, and lightest in the northwestern and south-central portions of the network. Precipitation values ranged from 7.61 inches at site #15 (Lemont), to 3.41 inches at site #1 (Northbrook). The August 2004 network average of 5.25 inches is about 126 percent of the 14-year (1990–2003) August network average of 4.18 inches.

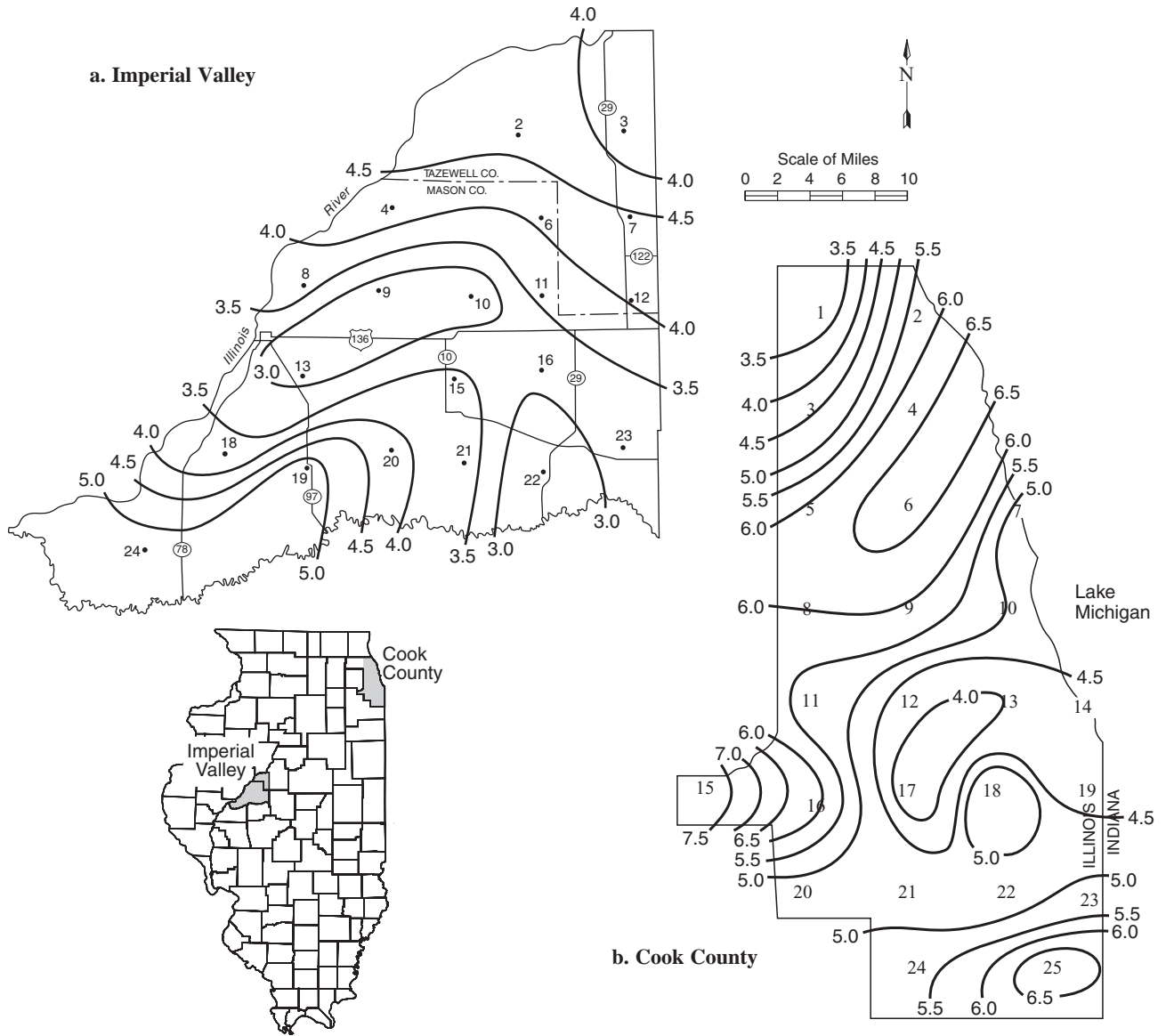


Figure 5. Long-term raingage network precipitation totals (inches) for August 2004

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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