

## ILLINOIS WATER AND CLIMATE SUMMARY June 2004

### 2004 Overview (Bob Scott)

Temperatures and precipitation in Illinois during June were 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 below long-term average depths.

**Temperatures** across Illinois (Figure 1) for June were below average (a -1.9-degree departure). Crop Reporting District (CRD) temperatures ranged from 1.1 degrees below average (southeast) to 2.3 degrees below average (west and west-southwest).

**Precipitation** amounts for the state were below average (Figure 1). The statewide average of 3.57 inches represents a -0.51-inch departure or 87 percent of average. June totals were highest in the east CRD (5.63 inches, 136 percent of average) and lowest in the east-southeast CRD (2.59 inches, 64 percent of average).

**Soil moisture** in the 0- to 40-inch (0- to 100-centimeter) layer in Illinois at the end of June was slightly below average (Figure 1). Conditions were generally above average across northern Illinois, with several regions of dry soils in central and southern Illinois.

**Mean provisional streamflow** statewide was above the median flow, 251 percent of median (Figure 1). Rivers in Illinois recorded mean discharges in the much above to below normal range this month. Peak stages recorded on the Illinois River exceeded flood stage at all reporting stations, as did all stations along the Illinois border on the Mississippi River, except St. Louis. The Ohio River at Cairo also recorded a peak stage above flood stage.

**Water surface levels** at the end of June were below the normal pool/target operating level at 11 of 27 reporting reservoirs. Levels at Rend Lake, Lake Shelbyville, and Carlyle Lake were above target levels at the end of June. Lake Michigan's mean level remains below the long-term average.

Statewide, **shallow groundwater levels** continued to be below average for the 22nd consecutive month (Figure 1). Deviations from normal averaged 1.3 feet below normal, 1.4 feet lower than May levels, and approximately 0.1 feet above June levels one year ago.

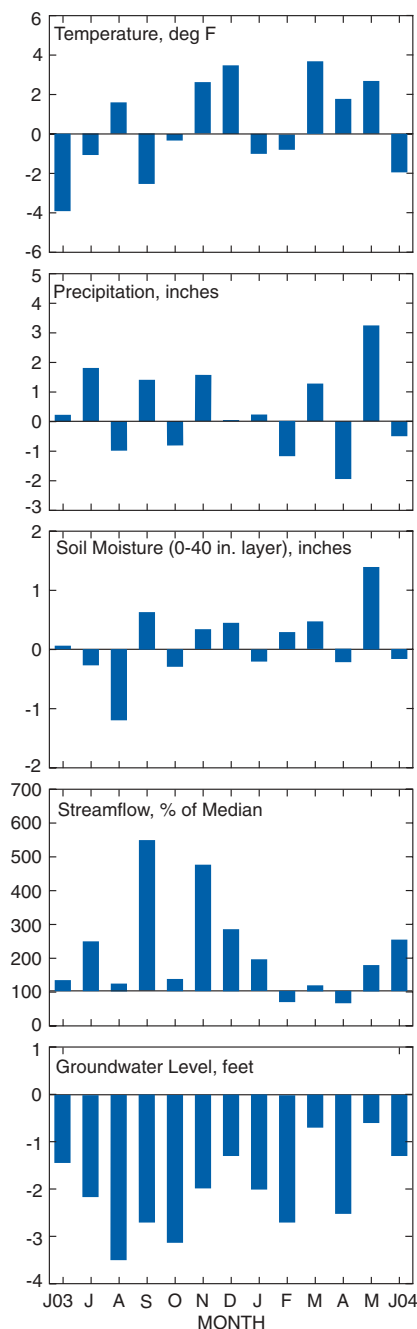


Figure 1.  
Statewide departures from normal

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

### Contact

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For more information, see [www.sws.uiuc.edu/warm](http://www.sws.uiuc.edu/warm)

## Weather/Climate Information (Jim Angel and Bob Scott)

**Temperatures** across Illinois for June were below average (Figure 2 and Table 1), the 30th coolest June since 1895. Extremes ranged from 96°F at Hutsonville on June 12 to 40°F at Mt. Carroll on June 26. Based on provisional data, statewide temperature departures for April–June (3-month) and January–June (6-month) were 1.1 and 1.0 degrees above normal, respectively, the 24th and 23rd warmest such periods since 1895. Temperatures from July 2003 to June 2004 (12-month) were 0.9 degrees above average, the 17th warmest such period since 1895.

**Precipitation** for June was below average statewide (Figure 2 and Table 1), but variability across the state was high. The northeastern and eastern CRDs were above average, with 104 and 136 percent of average precipitation, respectively. The eastern CRD had the 18th wettest June since 1895. Although the east-southeast and southeast CRDs were much below average, with 64 percent (22nd driest since 1895) and 68 percent (32nd driest since 1895), respectively, the 3-month precipitation totals for those two CRDs were still near average. Joliet reported the highest one-day precipitation in June (4.02 inches), and Hoopston reported the highest monthly precipitation (9.23 inches).

**Severe weather** was reported in Illinois on only six days, including six weak tornadoes in three counties on June 10, with no reports of deaths or injuries and relatively minor damage. Those tornadoes were in Bureau (4), Woodford (1), and Will (1) Counties. Hail was reported in far southern Illinois on June 1. There were scattered reports of hail in northeastern Illinois on June 11, and baseball-sized hail was reported in Johnson County on June 18. Both Union and Johnson Counties had wind damage from downed trees on June 12, and St. Clair County reported downed power lines on June 16.

**Illinois Climate Network (ICN) Data.** Average daily wind speeds across Illinois for June (Figure 3) ranged from 3 mph at Dixon Springs to 9 mph at Stelle. Fairfield recorded the month's highest wind gusts, 48 mph, on June 12. The prevailing wind direction was south-southwesterly in southwestern Illinois to west-southwesterly in northeastern and far southern Illinois. Wind speeds in excess of 8 mph varied from 6 hours at Rend Lake to 354 hours at Stelle. (June has 720 hours.) Average air temperatures ranged from 65°F at Peoria to 73°F at Rend Lake.

Solar radiation totals in June showed strong seasonal increases, ranging from 674 Mega-Joules per meter squared (MJ/m<sup>2</sup>) at Springfield and Stelle to near 759 MJ/m<sup>2</sup> at Olney. Potential evapotranspiration observations varied from 5.9 inches at scattered sites across the state to 6.7 inches at Olney. Soil temperatures at the 4-inch level ranged from 68°F at St. Charles and DeKalb to 78°F at Carbondale. Soil temperatures at the 8-inch level were similar and ranged from 68°F at DeKalb to 76°F at Carbondale.

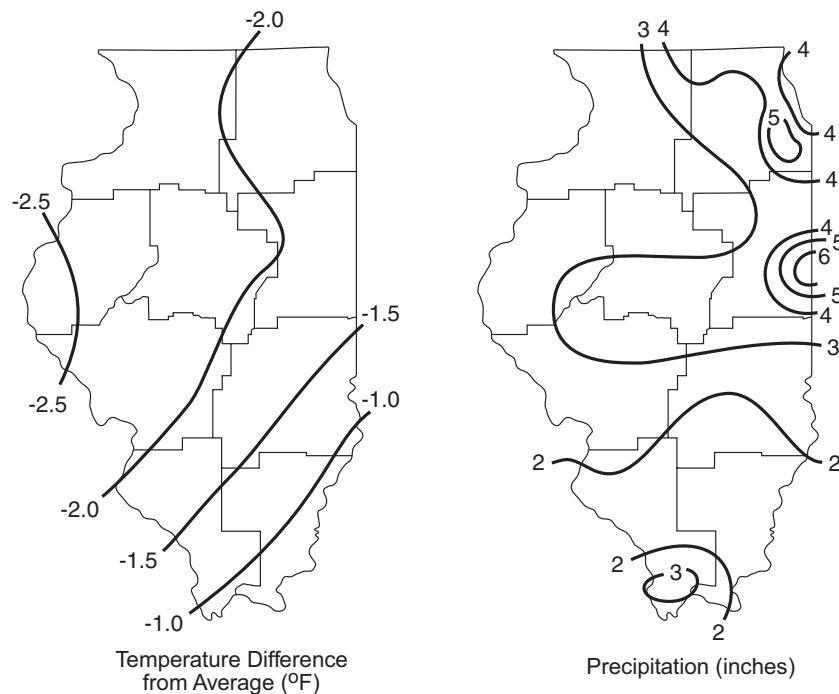


Figure 2. Illinois temperature and precipitation during June 2004

**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>Jun 04 Amount</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Apr 04- Jun 04</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Jan 04- Jun 04</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Jul 03- Jun 04</i>	<i>% Avg</i>	<i>Temp Dev</i>
Northwest	4.13	93	-2.0	13.64	113	0.7	19.78	113	1.1	37.61	104	1.2
Northeast	4.28	104	-1.9	13.78	117	0.3	19.54	112	0.6	39.54	108	0.8
West	3.34	84	-2.3	10.73	88	0.9	15.42	85	0.9	37.43	100	0.8
Central	3.32	82	-2.1	11.98	101	0.8	17.20	95	0.8	37.41	101	0.7
East	5.63	136	-2.0	13.40	114	1.0	20.10	110	0.8	44.79	119	0.7
West-southwest	2.90	76	-2.3	11.12	94	1.1	18.43	97	0.8	39.21	104	0.7
East-southeast	2.59	64	-1.6	11.42	93	1.7	21.21	103	1.2	44.52	108	0.9
Southwest	3.27	82	-1.4	13.33	105	1.4	22.41	103	1.1	38.62	90	1.0
Southeast	2.76	68	-1.1	13.47	101	1.8	22.39	95	1.3	39.17	88	1.2
<b>State Average</b>	<b>3.57</b>	<b>87</b>	<b>-1.9</b>	<b>12.49</b>	<b>103</b>	<b>1.1</b>	<b>19.55</b>	<b>102</b>	<b>1.0</b>	<b>39.88</b>	<b>103</b>	<b>0.9</b>

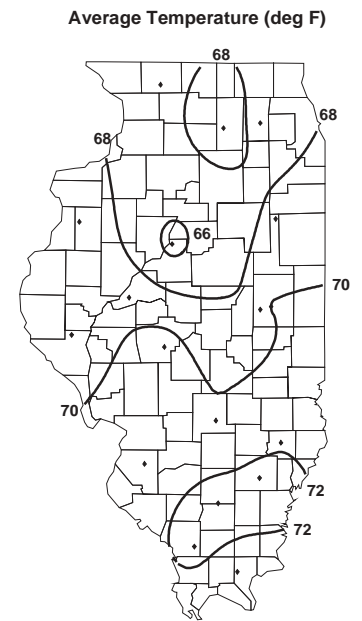
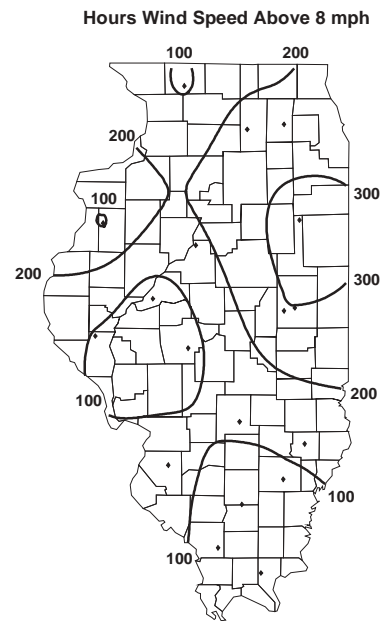
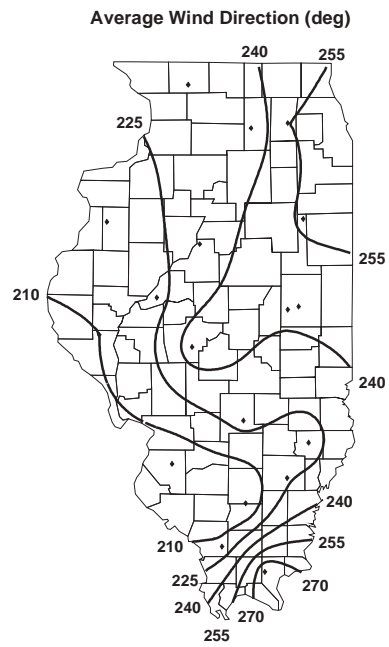
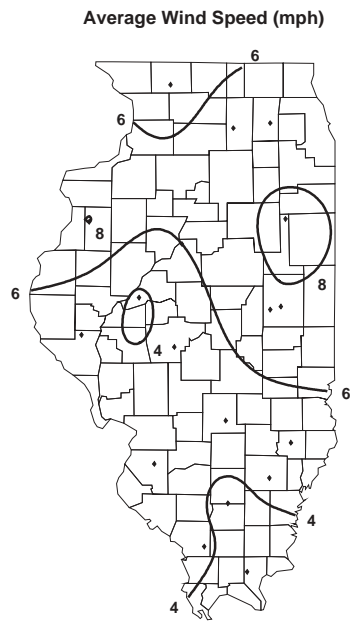
**Note:** Data are provisional. Complete, quality controlled data are available about six months after a given month.

**Extended climate outlooks** issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for July call for below average temperatures and equal chances of above, below, and average precipitation across the state. July–September outlooks call for below average temperatures across northern Illinois, and equal chances of above, below, and average precipitation across Illinois.

### **Soil Moisture Information (Bob Scott)**

Variable precipitation in Illinois resulted in quite variable soil moisture conditions at the end of June (Figure 4). Moisture values in the 0- to 6-inch layer ranged from just under 50 percent of normal at Olney and Monmouth to 157 percent of normal at Peoria. Conditions in the 6- to 20-inch layer were very moist at Peoria (200 percent of normal), very dry at Springfield (15 percent of normal), and more moderate elsewhere across the state. Dry conditions at Springfield also were observed in the 20- to 40-inch layer (33 percent of normal). However, moisture variability in that layer was low across the rest of the state, with values ranging from 73 percent of normal in western Illinois to 128 percent of normal at Stelle. Values in the 40- to 72-inch layer were generally moist, ranging from 70 percent of normal at Springfield to 184 percent of normal at Rend Lake. Overall, soil moisture in Illinois at the end of June was slightly below normal (Figure 1).

Compared to the end of last month, soil moisture in the 0- to 6-inch layer decreased considerably, with changes ranging from 20 to 60 percent across the state (Table 1). Soil moisture 6 to 20 inches deep dropped 10 to 30 percent everywhere except Peoria and Springfield, where changes were slight. Decreases in moisture also were predominant in the 20- to 40-inch layer, with most changes being less than 10 percent.



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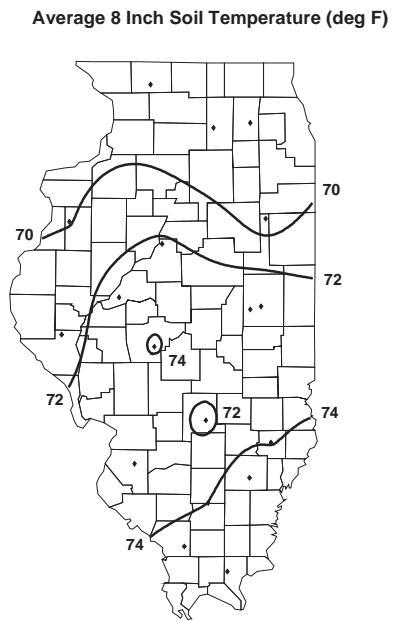
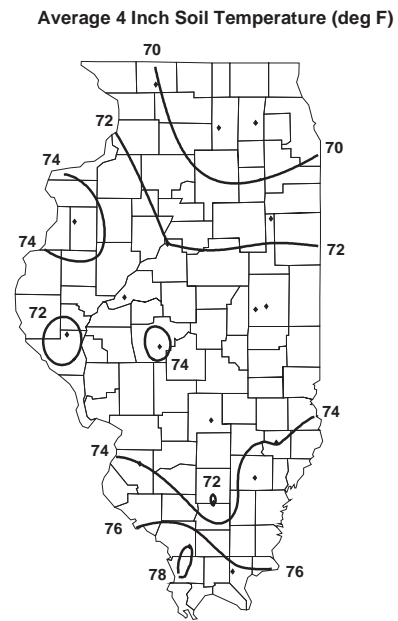
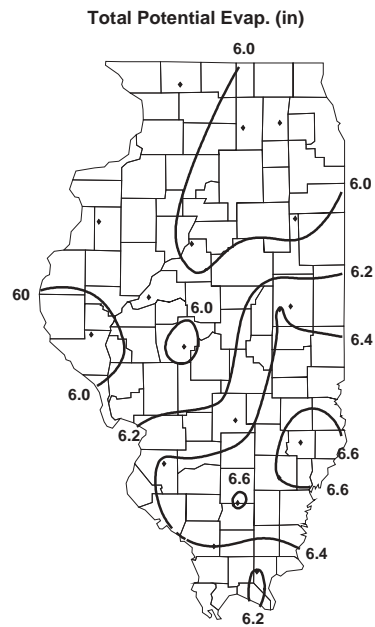
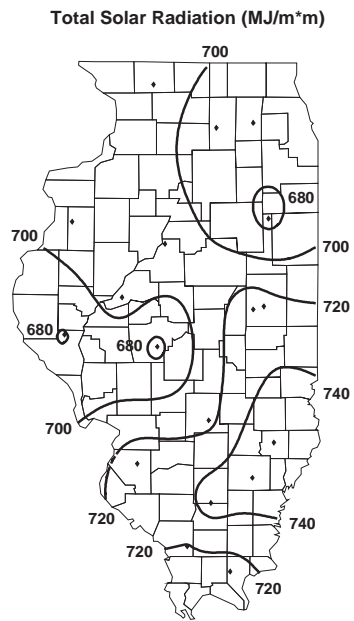


Figure 3. June monthly averages and totals as collected by the Illinois Climate Network

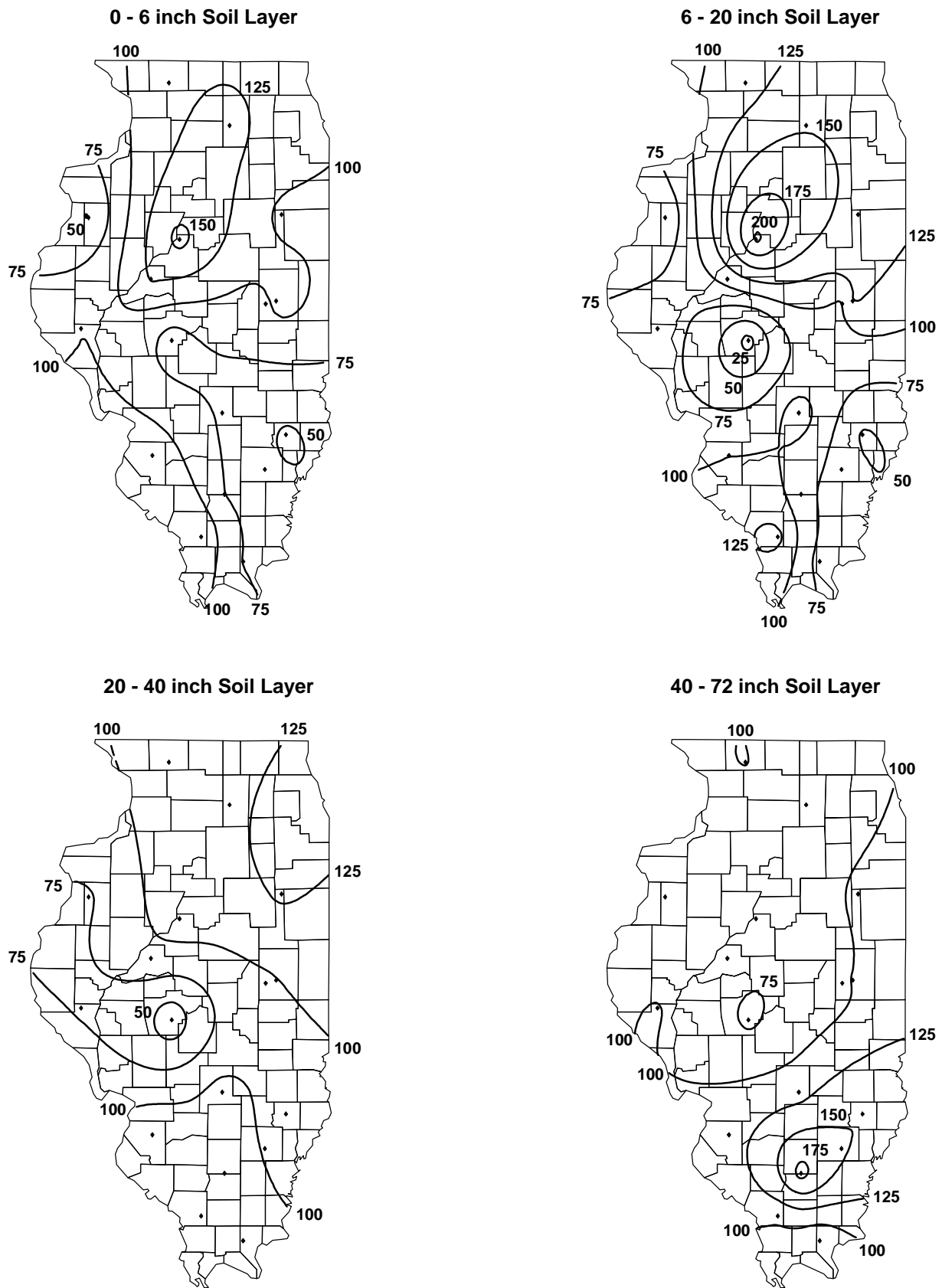


Figure 4. July 1 observed percent-of-normal soil moisture based on 1985-1995 mean

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

<i>Location</i>	<i>July 1 0 - 6 (inches)</i>	<i>Change from June 1 (%)</i>	<i>July 1 6 - 20 (inches)</i>	<i>Change from June 1 (%)</i>	<i>July 1 20 - 40 (inches)</i>	<i>Change from June 1 (%)</i>
Freeport (NW)	1.6	-19	3.9	-14	6.7	-7
DeKalb (NE)	1.9	-26	4.9	-15	7.3	-8
Monmouth (W)	1.2	-39	2.8	-24	5.4	-18
East Peoria (C)	1.6	-20	4.9	-1	7.6	0
Topeka (C)	0.7	-42	2.0	-27	2.5	-8
Stelle (E)	1.5	-37	4.8	-20	6.9	-5
Champaign (E)	1.7	-27	4.9	-10	6.0	-7
Bondville (E)	1.4	-24	3.8	-12	7.3	-9
Pery (WSW)	1.6	-29	3.8	-18	6.4	-17
Springfield (WSW)	1.4	-28	3.8	5	6.5	-7
Brownstown (ESE)	1.1	-49	3.2	-25	7.7	-4
Olney (ESE)	1.0	-59	3.7	-21	6.9	-4
Belleville (SW)	1.7	-30	4.1	-25	8.2	-6
Carbondale (SW)	1.9	-27	4.2	-17	7.6	-6
Ina (SE)	1.4	-52	4.6	-14	7.7	-2
Fairfield (SE)	1.3	-50	4.6	-17	7.4	-2
Dixon Springs (SE)	1.3	-43	3.9	-26	7.6	-8

**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 readings posted by the National Weather Service and/or the USACE. Stations on the Illinois River recorded peak stages above flood stage. Stations on the Mississippi River along the Illinois border recorded peak stages above flood stage except at St. Louis. The Ohio River at Cairo peaked above flood stage on June 7.

**Provisional monthly mean flows** for 26 streamgaging stations located throughout Illinois are shown in 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 June 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 (251 percent of the median) and above the mean (180 percent of the mean). Flows in northern Illinois were generally in the above normal to much above normal range this month. Provisional data indicate that the reported average flow for June was a new high for the Fox River at Dayton. Flows in central and southern Illinois were normal to much above normal. Macoupin Creek near Kane was the only station listed in Table 4 with an average monthly flow that was below normal.

**Table 3. Peak Stages for Major Rivers, June 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	16.8	13
	La Salle	224.7	20	24.0	14
	Peoria	164.6	18	19.1	18
	Havana	119.6	14	17.3	19
	Beardstown	88.6	14	17.4	21
Mississippi	Hardin	21.5	25	27.2	07
	Dubuque	579.9	17	18.6	19
	Keokuk	364.2	16	17.4	02
	Quincy	327.9	17	20.6	03
	Grafton	218.0	18	21.4	06
	St. Louis	180.0	30	27.7	04
	Chester	109.9	27	28.4	05
	Thebes	43.7	33	33.6	06
Ohio	Cairo	2.0	40	45.5	07

**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 (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 levels at the end of May at 27 reservoirs, by the end of June the water surface elevation had risen at 3 reservoirs, was the same as last month at 7 reservoirs, and had decreased at 17 reservoirs. Of the 27 reservoirs that reported observations at the end of June, 6 reservoirs were above normal pool (or target operating level), 10 reservoirs were at normal pool, and 11 reservoirs were below normal pool.

*Major Reservoirs.* Water levels decreased since last month at Carlyle Lake and rose at Lake Shelbyville, but both lakes remained above target level. The water level at Rend Lake also decreased but remained above normal pool.

**Great Lakes.** Current month mean and end-of-month values are provisional and are relative to International Great Lakes Datum 1985. The June mean level for Lake Michigan was 578.4 feet, compared to a mean level of 577.4 feet in 2003. The long-term average lake level for June is 579.4 feet, based on 1918–2002 data. Historically, the lowest mean level for Lake Michigan in June occurred in 1964 at 576.6 feet, and the highest level occurred in 1986 at 581.8 feet. The month-end level of Lake Michigan was 578.6 feet.

**Table 4. Provisional Mean Flows, June 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	15,800	4578	4111	much above normal	3	30
Rock River near Joslin	9549	60	22,750	7661	6773	much above normal	5	20
Pecatonica River at Freeport	1326	84	2914	1044	898	much above normal	3	30
Green River near Geneseo	1003	64	1383	926	785	above normal	18	30
Edwards River near New Boston	445	65	811	450	337	above normal	18	30
Kankakee River at Momence	2294	85	3661	2221	2036	above normal	10	30
Iroquois River near Chebanse	2091	79	6871	2028	1516	much above normal	2	30
Fox River at Dayton	2642	83	6344	1970	1644	much above normal	1	28
Vermilion River at Pontiac	579	59	727	574	396	above normal	25	30
Spoon River at Seville	1636	86	1807	1642	1094	normal	36	30
LaMoine River at Ripley	1293	79	1072	1175	761	normal	39	30
Bear Creek near Marceline	349	58	291	290	120	above normal	30	30
Mackinaw River near Congerville	767	54	1077	780	470	normal	30	30
Salt Creek near Greenview	1804	61	2971	1873	1624	above normal	16	29
Sangamon River at Monticello	550	90	1651	504	367	much above normal	4	30
South Fork Sangamon near Rochester	867	53	592	899	531	normal	47	29
Illinois River at Valley City	26,743	64	47,324	30,530	27,373	above normal	20	29
Macoupin Creek near Kane	868	74	156	580	295	below normal	71	30
Vermilion River near Danville	1290	81	4455	1222	1008	much above normal	2	28
Kaskaskia River at Vandalia	1940	33	1268	1805	1694	normal	54	30
Shoal Creek near Breese	735	59	1105	524	299	above normal	13	30
Embarras River at Ste. Marie	1516	89	1401	1308	961	normal	34	30
Skillet Fork at Wayne City	464	83	278	304	108	normal	35	30
Little Wabash below Clay City	1131	88	1636	815	475	above normal	17	30
Big Muddy at Plumfield	794	32	834	728	563	above normal	29	25
Cache River at Forman	244	79	259	213	98	above normal	22	30

**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, June 2004**

**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](mailto: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 1.3 feet below average levels for June and ranged from 12.0 feet below average to 3.8 feet above average (Table 6).

**Comparison to Previous Month.** Shallow groundwater levels were below those of May. Levels averaged 1.4 feet lower and ranged from 16.0 feet below to 4.8 feet above May levels.

**Comparison to Same Month, Previous Year.** Shallow groundwater levels in June were above levels of a year ago. Levels averaged 0.1 feet higher and ranged from 4.0 feet lower to 8.8 feet above levels of last year.

**Table 6. Month-End Shallow Groundwater Level Data Sites, June 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	19.93	+0.12	+0.64	+0.40	+1.37
2	Mt. Morris	Ogle	55.00	23.11	-7.94	-6.19	+4.83	+8.84
3	Crystal Lake	McHenry	18.00	0.71	+3.20	+3.76	+0.78	+5.22
4	Cambridge	Henry	42.00	19.75*	-12.07	-11.97	-15.96	-1.93
5	Fermi Lab	DuPage	17.00	6.10	+0.04	+0.17	-0.29	+1.78
6	Good Hope	McDonough	30.00	5.29	-0.08	+0.99	-0.85	+0.17
7	Snicarte	Mason	42.00	37.86	-1.74	-1.61	+0.83	-0.63
8	Coffman	Pike	28.00	12.08	-3.20	-1.18	-2.62	-3.95
9	Greenfield	Greene	20.70	9.27	-0.20	+0.44	-1.33	+1.29
10	Janesville	Cumberland	11.00	5.80	-0.35	-0.23	-0.29	+0.20
11	St. Peter	Fayette	15.00	3.96	-1.16	-0.63	-3.01	-1.78
12	SWS #2	St. Clair	80.00	N/A	N/A	N/A	N/A	N/A
13	Boyleston	Wayne	23.00	6.52	-2.29	-1.73	-1.06	-3.61
14	Sparta	Randolph	27.00	4.80	-0.01	+1.71	+0.39	-1.53
15	SE College	Saline	10.19	5.78	-1.17	-1.08	-1.89	-1.91
16	Dixon Springs	Pope	8.63	5.50	-1.27	-1.97	-2.18	-1.77
17	Bondville	Champaign	21.00	4.98*	-1.33	-1.25	-0.80	-0.80
Averages					-1.84	-1.26	-1.44	+0.06

**Notes:**

N/A = Data not available.

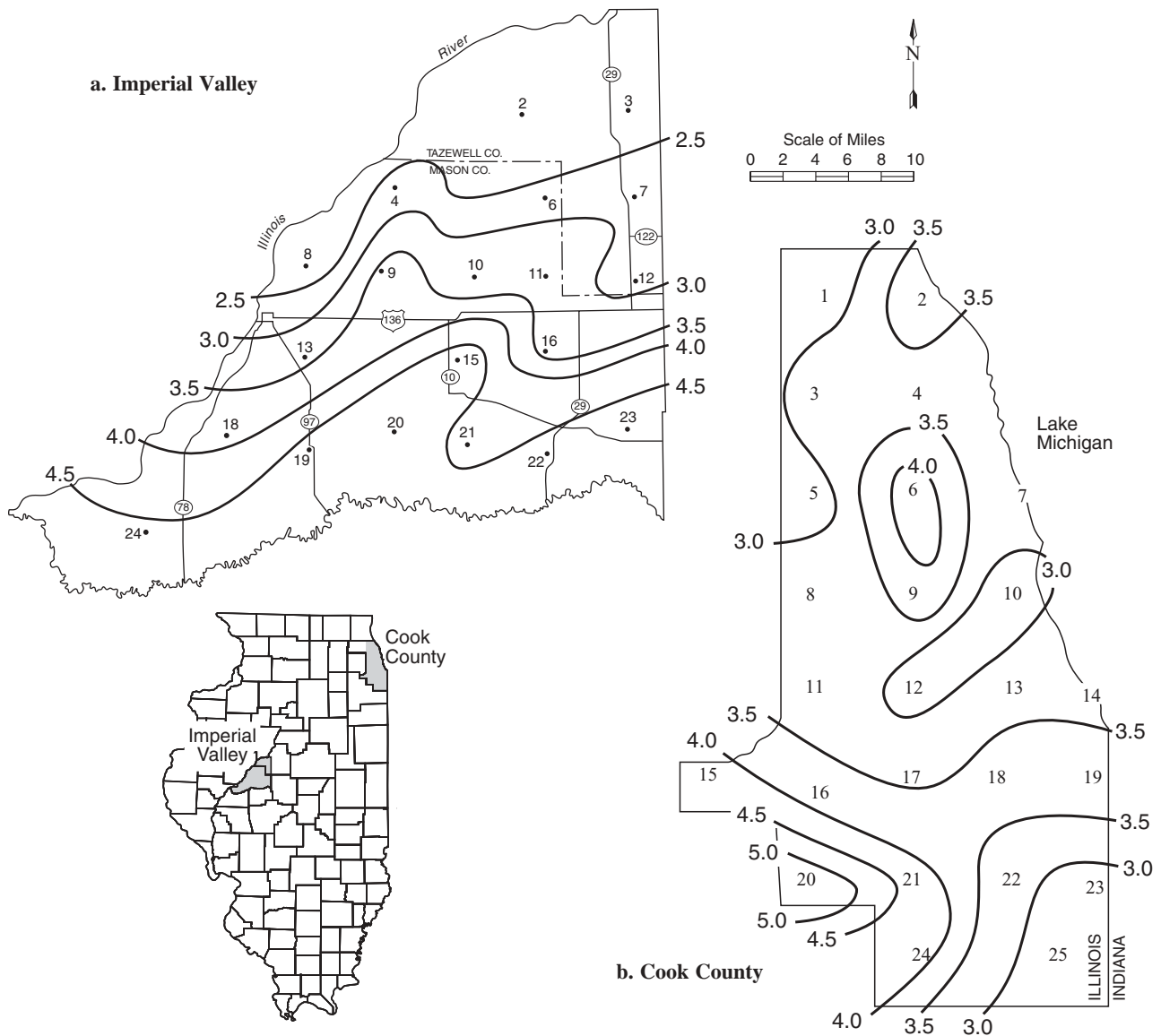
\* Lowest level of record for June.

## Addendum

### Long-Term Precipitation Networks (Nancy Westcott)

**Imperial Valley Precipitation.** 2004 precipitation amounts (Figure 5a) were moderate. Gage amounts were greatest along the southern border of the network and lightest in the northern region of the network. Individual gage totals ranged from 4.80 inches at site #23 to 2.21 inches at site #2. The 30-year, 1971–2000, average precipitation amounts for June at Havana and Mason City, are 3.85 and 3.70 inches, respectively. The June 2004 network average of 3.56 inches was about 87 percent of the 11-year, 1992–2002, June network average of 4.10 inches.

**Cook County Precipitation.** June 2004 precipitation amounts (Figure 5b) were moderate. Precipitation was greatest in the southwestern portion of the network and lightest in the northwestern and southeastern parts of the network. Precipitation values ranged from 5.41 inches at site #20 (Orland Park), to 2.59 inches at site #1 (Northbrook). The June 2004 network average of 3.50 inches was about 89 percent of the 14-year, 1990–2003, June network average of 3.94 inches.



**Figure 5. Long-term raingage network precipitation totals (inches) for June 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/>

Equal opportunity to participate in programs of the Illinois Department of Natural Resources (IDNR) and those funded by the U.S. Fish and Wildlife Service and other agencies is available to all individuals regardless of race, sex, national origin, disability, age, religion, or other non-merit factors. If you believe you have been discriminated against, contact the funding source's civil rights office and/or the Equal Employment Opportunity Officer, IDNR, One Natural Resources Way, Springfield, IL 62702-1271; 217/785-0067; TTY 217/782-9175.