ILLINOIS DEPARTMENT OF NATURAL RESOURCES

Illinois State Water Survey

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ILLINOIS WATER AND CLIMATE SUMMARY
June 2006

June 2006 Overview (Bob Scott)

Temperatures and precipitation in Illinois during June were both below average. Soil moisture within the top 40 inches of soil was below the long-term statewide average. Mean streamflows overall were below median heights. Shallow groundwater levels continued to be below long-term average depths. Due to current mid-summer conditions of less than average rainfall, all water resources in the state are drier than they were in spring.

Temperatures across Illinois (Figure 1) for June were below average (a -0.5-degree departure). Crop Reporting District (CRD) temperatures ranged from 0.6 degrees above average (southwest) to 1.3 degrees below average (northwest).

Precipitation amounts for Illinois in June were below average (Figure 1). The statewide average of 3.49 inches represents a -0.57-inch departure or 86 percent of average. Totals varied from 2.58 inches (64 percent of average) in the central CRD to 4.23 inches (104 percent of average) in the southeast CRD.

Soil moisture in the 0- to 40-inch (0- to 100-centimeter) layer at the end of June was below normal across most of the state, and dry conditions increased with depth in central and southwestern Illinois. Soil moisture in east-central and northern Illinois was normal to slightly above normal. Averaged across the state, soil moisture is at its lowest level since last July.

Mean provisional streamflow statewide was below the median flow in June, 66 percent of median (Figure 1). Rivers in Illinois recorded monthly mean discharges in the much below normal to above normal range. Peaks on major rivers did not exceed flood stage.

Water surface levels at the end of June were below the normal pool/target operating level at 23 of 36 reporting reservoirs. At the end of the month, Lake Shelbyville was 0.4 feet below its target level, Carlyle Lake was 0.9 feet above its target level, and Rend Lake was 3.1 feet above its target level. Lake Michigan's mean level remains below the long-term average.

Statewide, **shallow groundwater levels** continue to be below normal. Deviations from normal averaged 2.1 feet below normal. Levels averaged 0.6 feet lower than May levels and approximately 0.5 feet below June levels last year.

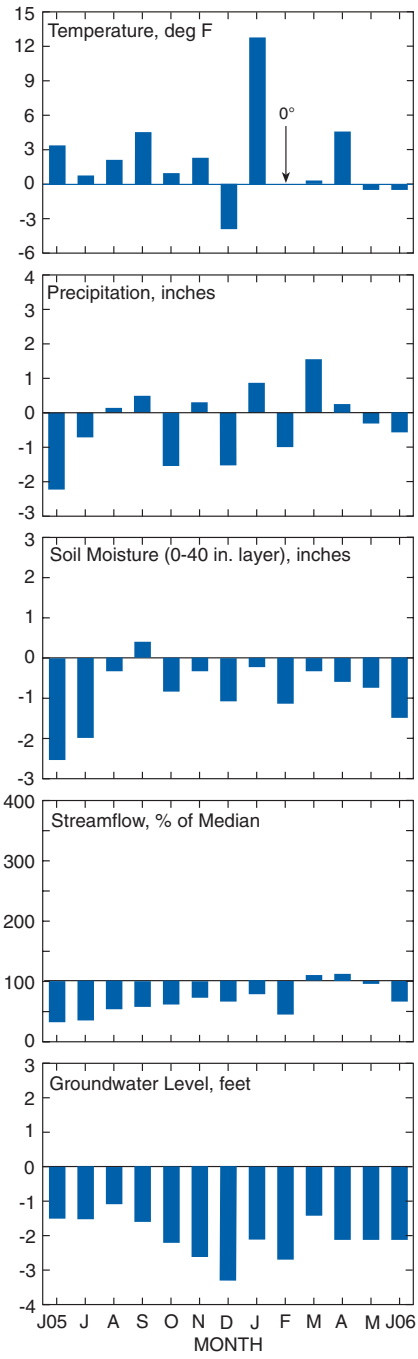

Figure 1.
Statewide departures from normal

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

Contact

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For more information, see www.sws.uiuc.edu/warm

Weather/Climate Information (Jim Angel and Bob Scott)

Temperatures across Illinois for June were below normal (Figure 2 and Table 1). Extremes ranged from 40 degrees on June 10 at Mt. Carroll to 98 degrees on June 21 at Hutsonville. Despite relatively cool June temperatures, it was the 11th warmest April–June, second warmest January–June, and third warmest July–June since 1895.

Precipitation for June was below normal statewide (Figure 2 and Table 1). Paris reported the highest one-day precipitation, 4.27 inches on June 19, and also the highest monthly total, 6.64 inches. Dry conditions from last year's drought are lingering. Over the last 16 months, most of northern and western Illinois have received only about 75 percent of normal precipitation, 12–15 inches less than average.

Severe weather was reported throughout Illinois in June, including a brief tornado touchdown in Tazewell County on June 22. No damage or injuries were reported with that event. Hail damage occurred throughout east-central Illinois on June 26, including significant crop damage in Richland and McLean Counties. Other hail and wind damage were reported throughout the state on June 2, 3, 10, 17–21, 25, 27, and 28, but damage was not significant.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for June (Figure 3) ranged from 2.8 mph at Dixon Springs to 8.2 mph at Stelle. Highest gusts recorded were at Fairfield (45 mph on June 22) and at Stelle (44 mph on June 17). The prevailing wind direction was northerly in eastern Illinois and southerly to westerly in southwestern Illinois. Wind speeds in excess of 8 mph varied from 5 hours at Rend Lake to approximately 335 hours at Stelle and Monmouth. (June has 720 hours.) Average air temperatures in June ranged from the upper 60s in northeastern Illinois to the middle 70s in southwestern Illinois.

Solar radiation totals in June approached seasonal highs and varied from 675 Mega-Joules per meter squared (MJ/m^2) at DeKalb and Big Bend to near 779 MJ/m^2 at Belleville. Potential evapotranspiration observations, also near annual maximums, varied from 5.9 inches at DeKalb and St. Charles to just over 7 inches at Belleville. Soil temperatures at the 4- and 8-inch levels ranged from the upper 60s in northern Illinois to the upper 70s in far southern Illinois.

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for July and for July–September call for a slight chance of above normal temperatures along (and west) of the Mississippi River. Temperature outlooks for the rest of the state and precipitation outlooks in both seasonal periods call for equal chances of below, above, and normal conditions across the state.

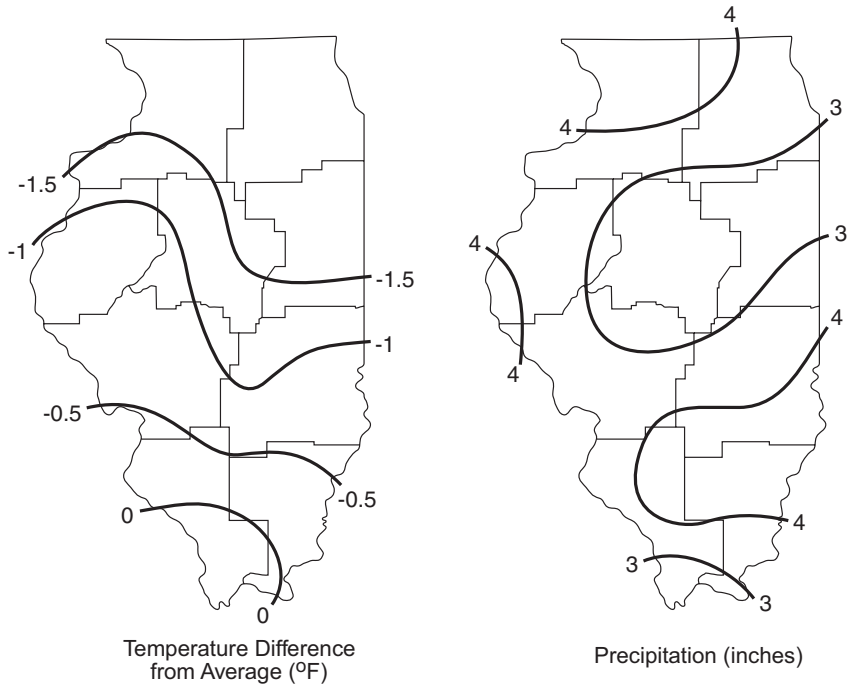

Figure 2. Illinois temperature and precipitation during June 2006

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

	Last Month			Last 3 Months			Last 6 Months			Last 12 Months		
Crop Reporting District	*Jun 06 Amount*	*% Avg*	*Temp Dev*	*Apr 06-Jun 06*	*% Avg*	*Temp Dev*	*Jan 06-Jun 06*	*% Avg*	*Temp Dev*	*Jul 05-Jun 06*	*% Avg*	*Temp Dev*
Northwest	4.02	90	-1.3	11.86	98	1.1	19.92	114	3.2	32.52	90	2.2
Northeast	3.64	88	-1.2	11.69	100	1.2	19.72	113	3.2	32.71	89	2.2
West	3.49	88	-0.4	8.93	74	1.6	16.68	92	3.2	30.29	81	2.2
Central	2.58	64	-0.7	10.52	89	1.2	17.83	98	3.1	32.08	86	2.1
East	2.70	65	-1.2	12.31	105	0.5	19.54	107	2.8	37.73	100	1.7
West-southwest	3.12	82	-0.4	8.70	73	1.5	15.87	84	3.0	31.19	83	2.0
East-southeast	3.80	94	-0.2	12.81	104	1.2	23.16	112	2.7	41.92	102	1.8
Southwest	3.93	98	0.6	11.42	90	1.9	23.40	107	2.9	45.50	106	2.0
Southeast	4.23	104	0.4	11.82	89	1.7	26.28	112	2.9	48.89	110	2.1
State Average	**3.49**	**86**	**-0.5**	**11.11**	**92**	**1.3**	**20.06**	**104**	**3.0**	**36.47**	**94**	**2.0**

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

Soil Moisture Information (Bob Scott)

Precipitation in west-central and southwestern Illinois since April has been below average, resulting in dry soil conditions in these areas. At the end of June, moisture near the soil surface was below normal from west-central through southern Illinois but above normal in east-central and northern Illinois (Figure 4). Values ranged from 27 percent of normal at Belleville to 134 percent at Bondville (0- to 6-inch layer), from less than 10 percent at Springfield to 126 percent at DeKalb (6- to 20-inch layer), and from 12 percent at East Peoria to 121 percent at Perry (20- to 40-inch layer). Soils 40 to 72 inches deep retained the most moisture from earlier months, ranging from 62 percent at East Peoria to 141 percent of normal at Rend Lake. Overall, soil moisture in Illinois at the end of June was below normal (Figure 1).

Compared to conditions at the end of May, soil moisture in June generally decreased across the state, especially in southern Illinois (Table 2). Nine sites in the 0- to 6-inch layer reported decreases in excess of 15 percent, including a decrease of 47 percent at Olney. Several sites in east-central and northern Illinois observed basically no change in soil moisture in that layer. Decreases also appeared to dominate the 6- to 20-inch layer. Four sites measured large changes, including a drop of 49 percent at Belleville, but most sites reported minimal decreases or no change in that layer. Moisture decreased at a few sites in the 20- to 40-inch layer, but no decrease exceeded 13 percent. Overall, no observation site measured notable increases in soil moisture in any layer in June.

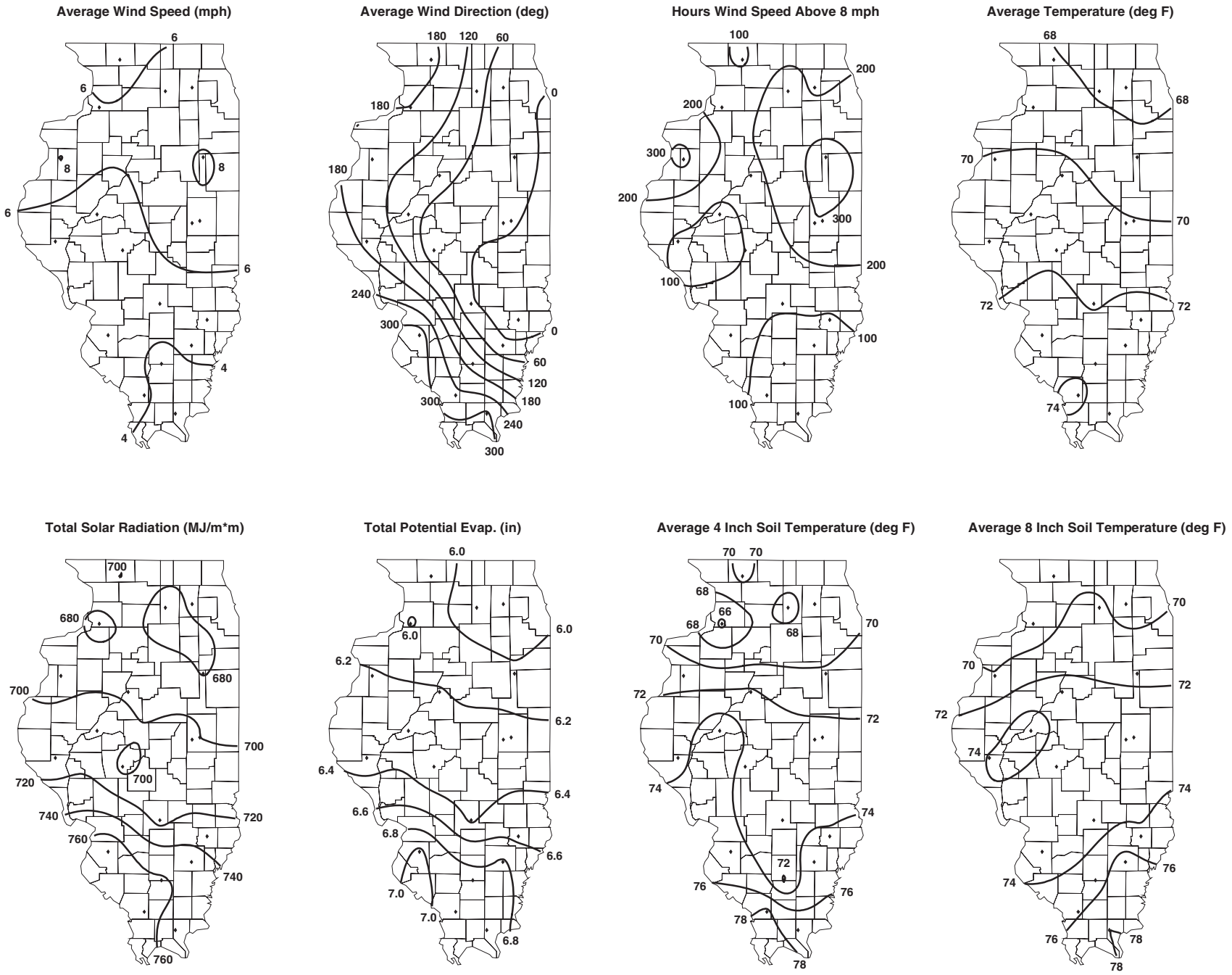

Figure 3. June monthly averages and totals as collected by the Illinois Climate Network

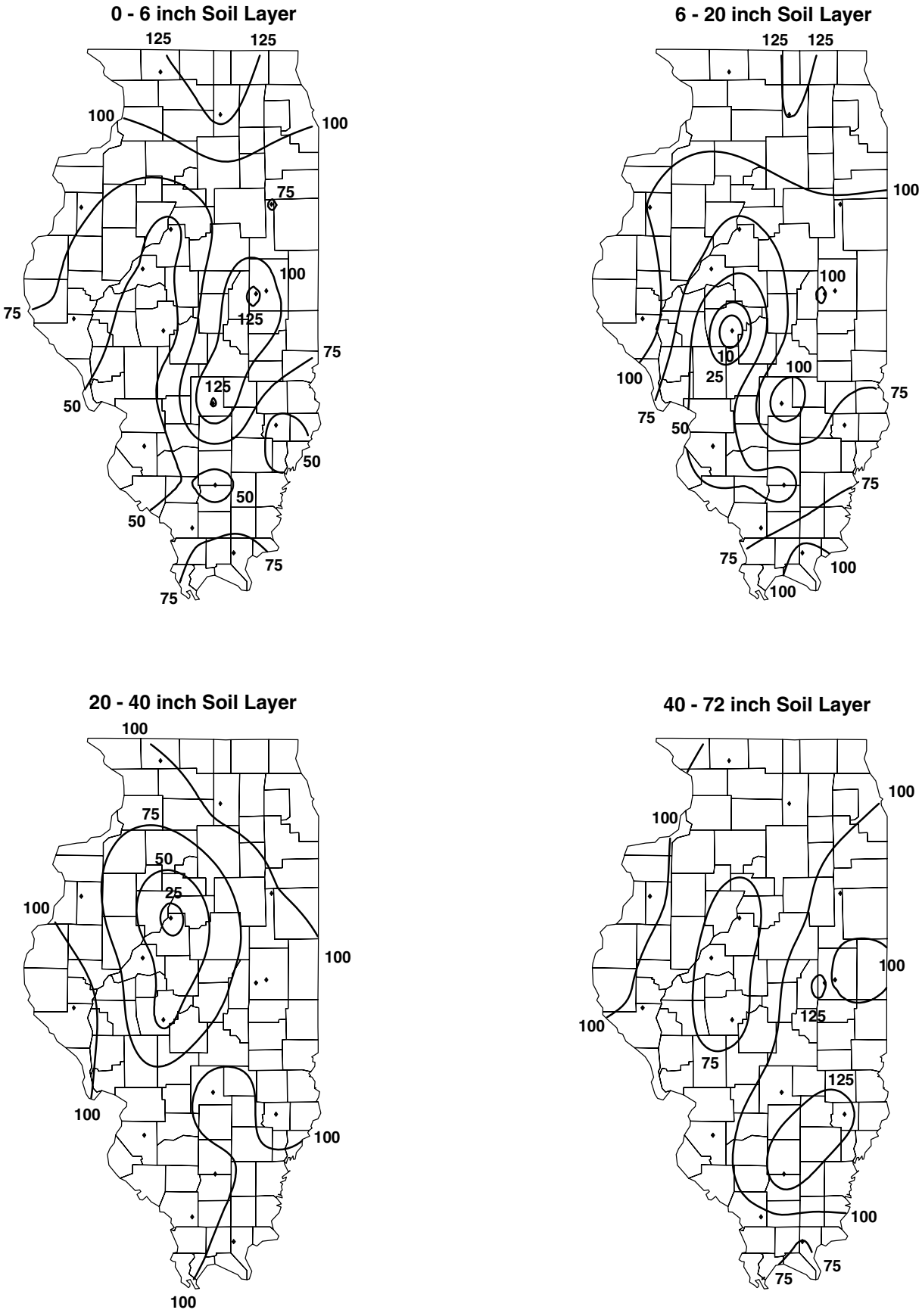

Figure 4. July 1 observed percent-of-normal soil moisture based on 1985-1995 mean

Table 2. Soil Moisture in Various Layers on July 1, 2006

Location	*Jul 1 0 - 6 (inches)*	*Change from Jun 1 (%)*	*Jul 1 6 - 20 (inches)*	*Change from Jun 1 (%)*	*Jul 1 20 - 40 (inches)*	*Change from Jun 1 (%)*
Freeport (NW)	1.6	-15	4.0	-3	6.3	-7
DeKalb (NE)	2.0	-6	4.4	-10	6.9	-3
Monmouth (W)	1.4	2	3.5	-3	5.9	-5
East Peoria (C)	0.7	-29	2.9	1	6.3	-6
Topeka (C)	0.5	-5	1.6	-7	2.2	-10
Stelle (E)	1.4	-38	3.9	-21	6.4	-12
Champaign (E)	1.6	0	3.7	0	5.7	0
Bondville (E)	1.8	0	4.0	0	7.1	0
Perry (WSW)	1.3	-10	4.4	0	7.6	1
Springfield (WSW)	1.1	-33	3.5	-9	6.7	-8
Brownstown (ESE)	1.7	-30	3.4	-24	7.8	-5
Olney (ESE)	0.9	-47	4.0	-9	6.8	-3
Belleville (SW)	0.7	-18	2.0	-49	6.8	-13
Carbondale (SW)	1.3	-28	2.8	-33	6.8	-11
Ina (SE)	1.1	-7	4.0	-9	7.4	-2
Fairfield (SE)	1.9	-12	5.1	-2	7.5	0
Dixon Springs (SE)	1.6	-23	5.4	-2	8.0	-1

Surface Water Information (Bill Saylor and Vern Knapp)

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 the provisional peak stage for the current month compared to flood stage at selected streamgaging stations located on the Illinois, Mississippi, and Ohio Rivers. The peak stage is determined from the daily morning readings posted by the National Weather Service and/or the USACE. Peak stages at the stations listed in Table 3 were below flood stage in June.

Provisional monthly mean flows for 26 streamgaging stations located throughout Illinois are shown in Table 4. Mean values posted by the USGS are listed if available; otherwise, daily mean discharge data posted by the USGS are used to estimate the mean flow for the month. The USGS publishes long-term mean flows for each month. 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.

The statewide percent of historical mean flow and percent of historical median flow are calculated by dividing the sum of the average flows this month at stations in Table 4 by the sum of the historical mean and median flows calculated for the month, respectively, at the same stations. This method is intended to weight individual observations proportionately in the aggregate comparison. (The Illinois River and Rock River stations are excluded from the statewide calculation because other rivers listed in Table 4 contribute to their flow.)

Mean provisional flow statewide was below the median value for June (66 percent of the median) and below the long-term mean (50 percent of the mean). Mean streamflow conditions for the month at Table 4 stations were below normal to above normal, except at Macoupin Creek near Kane, which had a monthly mean flow much below normal.

Table 3. Peak Stages for Major Rivers during June 2006

River	*Station*	*River mile**	*Flood stage (feet)**	*Peak stage (feet)***	*Date*
Illinois					
	Morris	263.1	16	7.8	01
	La Salle	224.7	20	16.1	01
	Peoria	164.6	18	13.6	01
	Havana	119.6	14	11.4	03
	Beardstown	88.6	14	10.9	05
	Hardin	21.5	25	21.2	03
Mississippi					
	Dubuque	579.9	17	10.2	01
	Keokuk	364.2	16	7.0	01
	Quincy	327.9	17	12.1	05
	Grafton	218.0	18	16.1	02
	St. Louis	180.0	30	11.8	03
	Chester	109.9	27	13.9	04
	Thebes	43.7	33	18.2	05
Ohio					
	Cairo	2.0	40	24.0	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, August 2004 (except as revised by the National Weather Service).
**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 obtained from a network of cooperating reservoir operators who are contacted each month by ISWS staff for the current water levels. Reservoir levels are reported in terms of their difference from normal pool (or target level). 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-May levels at 36 reservoirs, end-of-June water surface elevations had increased at 1 reservoir, had decreased at 28 reservoirs, and were the same as last month at 7 reservoirs. For the 36 reservoirs with observations reported at the end of June, 6 reservoirs were above normal pool (or target operating level), 7 reservoirs were at normal pool or spillway elevation, and 23 reservoirs were below normal pool.

Major Reservoirs. Compared to end-of-May water levels, end-of-June water levels decreased 0.8 feet at Lake Shelbyville, and decreased slightly at Rend Lake and Carlyle Lake. Rend Lake was 3.1 feet above its target level, Carlyle Lake was 0.9 feet above its target level, and Lake Shelbyville was 0.4 feet below 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 June mean level for Lake Michigan was 577.9 feet, compared to a mean level of 578.1 feet in June 2005. The long-term average lake level for June is 579.3 feet, based on 1918–2005 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 577.9 feet.

Table 4. Provisional Mean Flows, June 2006

Station	*Drainage area (sq mi)*	*Years of record*	*2006 mean flow (cfs)*	*Long-term flows Mean* (cfs)*	*Long-term flows Median (cfs)*	*Flow condition*	*Percent chance of exceedence*	*Days of data this month*
Rock River at Rockton	6363	70	4778	4731	4111	normal	38	30
Rock River near Joslin	9549	62	6904	7832	6773	normal	46	30
Pecatonica River at Freeport	1326	86	919	1053	898	normal	46	30
Green River near Geneseo	1003	67	353	924	785	below normal	76	30
Edwards River near New Boston	445	67	83	452	337	below normal	84	30
Kankakee River at Momence	2294	88	1473	2228	2036	below normal	71	30
Iroquois River near Chebanse	2091	81	1210	2085	1675	normal	61	30
Fox River at Dayton	2642	86	1681	2009	1644	normal	49	30
Vermilion River at Pontiac	579	61	240	574	398	normal	69	30
Spoon River at Seville	1636	88	530	1631	1094	below normal	75	30
LaMoine River at Ripley	1293	82	328	1163	761	below normal	72	28
Bear Creek near Marceline	349	61	76	286	120	normal	58	30
Mackinaw River near Congerville	767	56	208	778	470	below normal	79	30
Salt Creek near Greenview	1804	63	706	1890	1624	below normal	83	30
Sangamon River at Monticello	550	93	115	515	369	below normal	87	30
South Fork Sangamon near Rochester	867	55	211	887	558	below normal	79	30
Illinois River at Valley City	26,743	66	15,245	30,580	27,373	below normal	85	29
Macoupin Creek near Kane	868	76	36	573	295	much below normal	92	30
Vermilion River near Danville	1290	83	676	1260	1041	normal	64	30
Kaskaskia River at Vandalia	1940	35	894	1757	1673	normal	67	30
Shoal Creek near Breese	735	61	70	532	313	below normal	89	30
Embarras River at Ste. Marie	1516	91	676	1299	961	normal	63	30
Skillet Fork at Wayne City	464	85	461	306	136	above normal	26	30
Little Wabash below Clay City	1131	90	154	825	494	below normal	77	30
Big Muddy at Plumfield	794	34	907	760	575	above normal	26	30
Cache River at Forman	244	81	90	218	111	normal	52	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 2004.

Table 5. Reservoir Levels in Illinois, June 2006

For security considerations, statewide tabular reservoir data are not available on the Internet. Specific data requests may be made to Bill Saylor at: wsaylor@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 the 15th consecutive month. June levels were 2.1 feet below normal and ranged from 8.0 feet below to 1.6 feet above normal (Table 6). Two wells, Greenfield (Greene County) and Bondville (Champaign County), were at record lows for June. The Greenfield well is located in the west-southwest portion of the state, the area of dry conditions indicated by other water resources.

Comparison to Previous Month. Shallow groundwater levels were below those of May. Levels averaged 0.6 feet lower and ranged from 2.4 feet below to 2.7 feet above levels last month.

Comparison to Same Month, Previous Year. Shallow groundwater levels in June were below levels measured one year ago. Levels averaged 0.5 feet lower and ranged from 5.4 feet lower to 1.7 feet higher than during June 2005.

Table 6. Month-End Shallow Groundwater-Level Data Sites, June 2006

						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	25.00	21.79	-1.66	-1.16	-0.36	-0.15
2	Mt. Morris	Ogle	55.00	24.32	-8.11	-7.10	+0.66	-1.03
3	Crystal Lake	McHenry	18.00	5.09	-0.90	-0.60	+2.74	+0.18
4	Cambridge	Henry	42.00	40.84*	N/A	N/A	N/A	N/A
5	Fermi Lab	DuPage	17.00	7.95	-1.41	-1.45	-1.45	+0.55
6	Good Hope	McDonough	30.00	4.72	+0.49	+1.45	-1.13	+0.39
7	Snicarte	Mason	40.30	39.84	-3.51	-3.49	-0.62	-2.56
8	Coffman	Pike	28.00	15.72	-6.16	-4.69	+0.38	-3.07
9	Greenfield	Greene	20.70	17.96**	-8.18	-7.98	-0.75	-5.36
10	Janesville	Cumberland	11.00	5.28	+0.21	+0.30	-0.21	+0.79
11	St. Peter	Fayette	15.00	2.66	+0.18	+0.68	+0.02	+1.52
12	SWS #2	St. Clair	80.00	17.13	-4.21	-2.75	-0.88	N/A
13	Boyleston	Wayne	23.00	3.15	+0.92	+1.57	-0.66	+1.70
14	Sparta	Randolph	27.00	7.68	-2.74	-1.11	-2.08	+0.41
15	SE College	Saline	10.19	6.35	-1.46	-1.49	-1.82	+0.37
16	Dixon Springs	Pope	8.63	6.79	-2.33	-3.46	-2.39	-1.39
17	Bondville	Champaign	21.00	5.50**	-1.57	-1.64	-1.37	-0.25
				Averages	-5.53	-2.06	-0.62	-0.53

Notes:
N/A = Data not available.
*Well not used for analyses.
** Well currently at record monthly low.

Addendum (Nancy Westcott)

Imperial Valley Precipitation. June 2006 precipitation amounts (Figure 5a) were below average. Monthly gage totals were greatest in the central portion of the network, and precipitation was lightest in the southwestern region of the network. Individual gage amounts ranged from 2.92 inches at site #10 to 1.28 inches at site #18. 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 2006 network average of 1.82 inches was about 47 percent of the 13-year (1993–2005) June network average of 3.85 inches.

Cook County Precipitation. June 2006 precipitation amounts (Figure 5b) were moderate. Precipitation was greatest in the central and southwestern portion of the network and lightest in the southeastern region of the network. Precipitation values ranged from 4.55 inches at site #15 (Lemont), to 2.09 inches at site #18 (near 119th Street). The June 2006 network average of 2.99 inches was about 80 percent of the 16-year (1990–2005) June network average of 3.75 inches

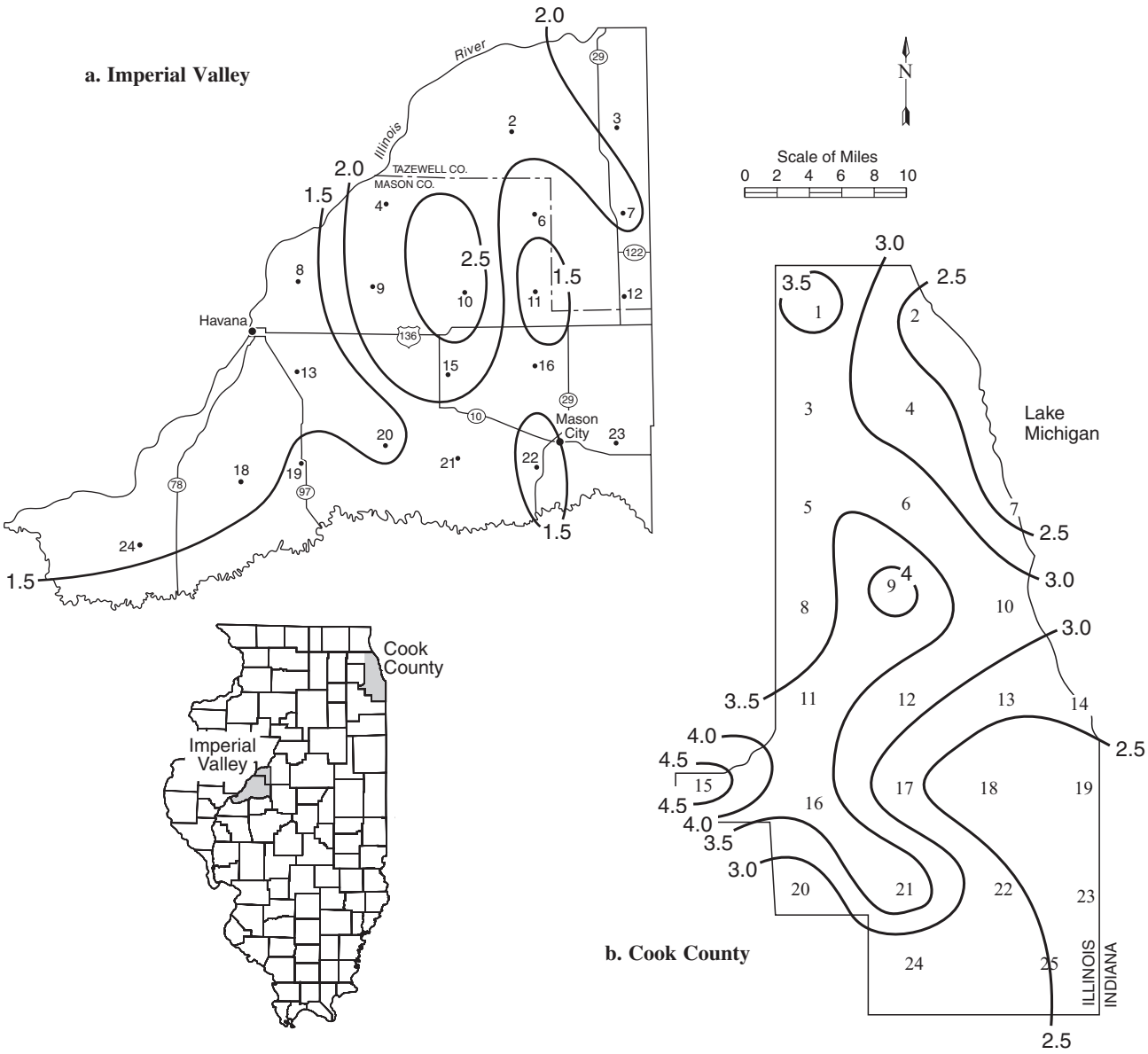

Figure 5. Long-term raingage network precipitation totals (inches) for June 2006

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/
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 Corps of Engineers, http://www.rivergages.com
USGS - U.S. Geological Survey, http://water.usgs.gov/
WARM - Water and Atmospheric Resources Monitoring Program, http://www.sws.uiuc.edu/warm/