

ILLINOIS WATER AND CLIMATE SUMMARY October 2004

2004 Overview (Bob Scott)

Temperatures in Illinois during October were slightly above average, while precipitation was well above average. This was the 7th wettest October in Illinois since 1895 subsequent to the 4th driest September. Soil moisture within the top 40 inches of soil was above the long-term statewide average. Mean streamflows were above median heights. Shallow groundwater levels were above long-term average depths.

Temperatures across Illinois (Figure 1) for October were slightly above average (a +0.4-degree departure). Crop Reporting District (CRD) temperatures ranged from 0.3 degrees below average (west) to 1.9 degrees above average (southeast).

Precipitation amounts were well above average (Figure 1) and high across most of the state. The statewide average of 5.10 inches represents a +2.18-inch departure or 175 percent of average. Rainfall totals were lowest in the northeast CRD (2.94 inches or 106 percent of average) and highest in the east-south-east CRD (6.31 inches or 209 percent of average).

Soil moisture in the 0- to 40-inch (0- to 100-centimeter) layer at the end of October was above normal overall. Conditions near the surface were mostly above normal statewide, but dry soils dominated deeper layers in central and southern Illinois.

Mean provisional streamflow statewide was above the median flow in October, 242 percent of median (Figure 1). Beginning this month, a different method was used to calculate this percentage; the past year's values in Figure 1 have been revised accordingly. Rivers in Illinois recorded monthly mean discharges generally in the normal to above normal range this month. Peak stages on major rivers were below flood stage.

Water surface levels at the end of October were below the normal pool/target operating level at 15 of 34 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** were above normal for October. Deviations from normal averaged 0.4 feet above normal. Levels averaged 0.7 feet higher than September levels and approximately 1.4 feet above October levels one year ago.

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

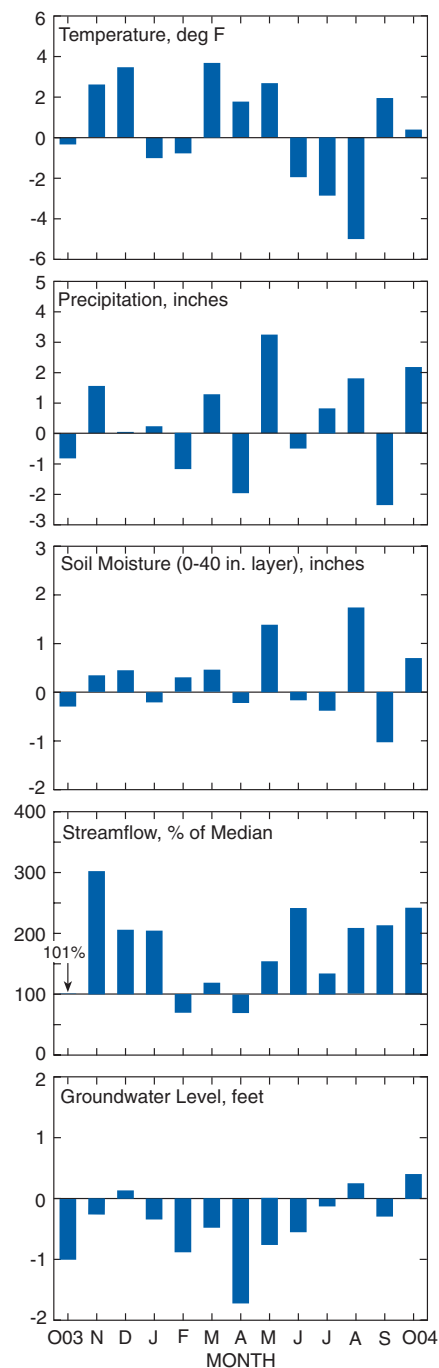


Figure 1.
Statewide departures from normal

Contact

Bob Scott: (217) 333-4966, email: rwscott1@uiuc.edu
For more information, see www.sws.uiuc.edu/warm

Weather/Climate Information (Jim Angel and Bob Scott)

Temperatures across Illinois for October were slightly above average (Figure 2 and Table 1). Extremes ranged from 24°F at Congerville on October 5 to 87°F at Carbondale on October 8.

Precipitation for October was well above average statewide (Figure 2 and Table 1), the 7th wettest October on record since 1895. It was the 5th wettest October in the west and west-southwest CRDs, with 6.15 and 5.58 inches, respectively; the 6th wettest October in the east-southeast and southwest CRDs, with 6.31 and 5.81 inches, respectively; and the 8th wettest October in the southeast and central CRDs, with 5.98 and 5.06 inches, respectively. Newton reported the highest one-day precipitation total (3.29 inches on October 19). Robinson reported the highest monthly precipitation total (7.99 inches).

Severe weather reported in Illinois included two F2 tornadoes on October 18 as well as hail and wind damage in southern Illinois. The first tornado near Goreville injured two people and damaged several farm buildings and mobile homes. Similar damage but no injuries resulted from a second tornado near Tunnel Hill. There were also 35 reports of hail and wind damage to power lines and tree limbs across central and northern Illinois on October 29.

Illinois Climate Network (ICN) Data. Average daily wind speeds across Illinois for October (Figure 3) ranged from 4 mph at Dixon Springs to near 10 mph at Bondville, Stelle, and Monmouth. The highest wind gust for the month (67 mph) was recorded on October 29 at DeKalb. The prevailing wind direction varied from south-southeasterly in northwestern, western, and southern Illinois to west-southwesterly in northeastern and far southern Illinois. Wind speeds in excess of 8 mph ranged from 66 hours at Dixon Springs to 480 hours at Bondville and Stelle. (October has 744 hours.) Average air temperatures for the month ranged between the low 50s to the low 60s from north to south across the state.

Solar radiation totals in October varied from 300 Mega-Joules per meter squared (MJ/m²) at Big Bend to 338 MJ/m² at Bondville. Potential evapotranspiration observations varied from 2.3 inches at Big Bend to 2.7 inches at Dixon Springs and Bondville. Soil temperatures at the 4- and 8-inch levels ranged from the middle 50s in northern Illinois to the middle 60s in far southern Illinois.

Extended climate outlooks issued by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Climate Prediction Center for November call for equal chances of above, below, and normal temperatures across the state, but for a slight chance of below normal November–January temperatures in far southern Illinois. Outlooks call for above normal November precipitation in northwestern Illinois. November–January outlooks call for above normal precipitation statewide, especially in southeastern Illinois.

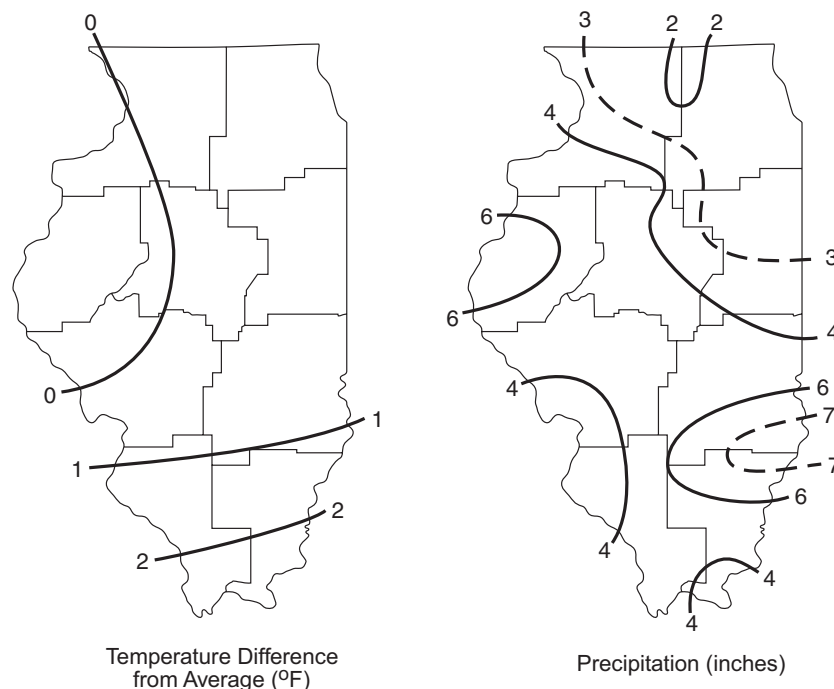


Figure 2. Illinois temperature and precipitation during October 2004

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>Oct 04- Amount</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Aug 04- Oct 04</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>May 04- Oct 04</i>	<i>% Avg</i>	<i>Temp Dev</i>	<i>Nov 03- Oct 04</i>	<i>% Avg</i>	<i>Temp Dev</i>
Northwest	4.46	155	0.1	9.92	94	-0.7	24.08	106	-0.7	38.98	107	0.9
Northeast	2.94	106	0.4	9.11	89	-0.7	24.35	110	-0.8	39.09	107	0.6
West	6.15	205	-0.3	14.63	144	-1.3	26.79	118	-1.1	40.51	108	0.4
Central	5.06	175	0.1	11.23	116	-1.2	24.70	113	-0.9	38.09	102	0.4
East	3.79	132	0.3	10.79	112	-0.9	26.60	122	-0.8	41.68	111	0.5
West-southwest	5.58	198	0.0	10.26	113	-1.5	22.30	108	-1.0	38.89	103	0.3
East-southeast	6.31	209	0.4	11.31	119	-0.9	26.45	121	-0.4	45.60	111	0.7
Southwest	5.81	191	1.7	10.88	114	-0.9	26.16	121	-0.4	45.23	106	0.6
Southeast	5.98	200	1.9	10.52	113	-0.4	26.31	121	0.1	44.80	101	0.9
State Average	5.10	175	0.4	10.89	112	-0.9	25.16	115	-0.7	41.27	106	0.6

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

Soil Moisture Information (Bob Scott)

Precipitation in Illinois during October was well above average statewide. Conditions were generally above to well above normal near the soil surface across Illinois (Figure 4). Moisture values in the 0- to 6-inch layer ranged from 86 percent of normal at DeKalb to more than 200 percent at Rend Lake and Topeka. A similar, but drier pattern was observed in the 6- to 20-inch layer, with values ranging from 44 percent at DeKalb to 179 percent at Monmouth. Conditions in deeper layers showed greater variability and reflected the low precipitation totals during late summer over central and far southern Illinois. Values in the 20- to 40-inch layer ranged from 12 percent at Peoria and less than 10 percent at Dixon Springs to 161 percent at Rend Lake and 182 percent at Monmouth. Soil moisture in the 40- to 72-inch layer varied from less than 10 percent at Brownstown to more than 200 percent at Rend Lake. Overall, soil moisture in Illinois at the end of October was above normal (Figure 1).

Compared to the end of last month, soil moisture in the 0- to 6-inch layer increased considerably at all Illinois sites from 50 percent to more than 300 percent (Table 2). Increases also dominated the 6- to 20-inch layer, with rises of 10–60 percent at most locations, but by more than 100 percent at Topeka, Carbondale, and Dixon Springs. Small changes, within just a few percent of no change, were prominent in the 20- to 40-inch layer. However, moisture in this layer increased by 13 percent at Bondville and by 52 percent in the sandy soils of Topeka.

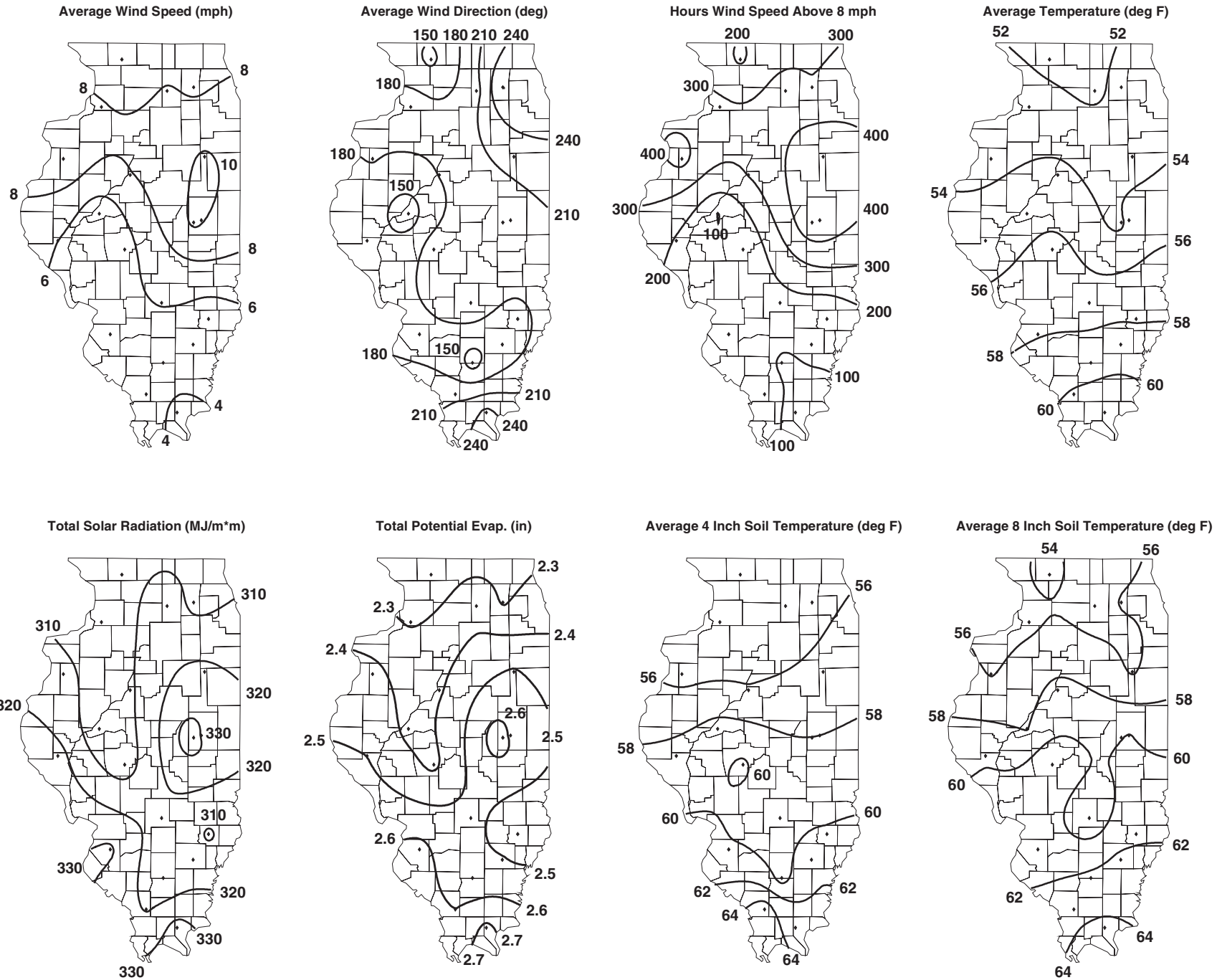


Figure 3. October monthly averages and totals as collected by the Illinois Climate Network

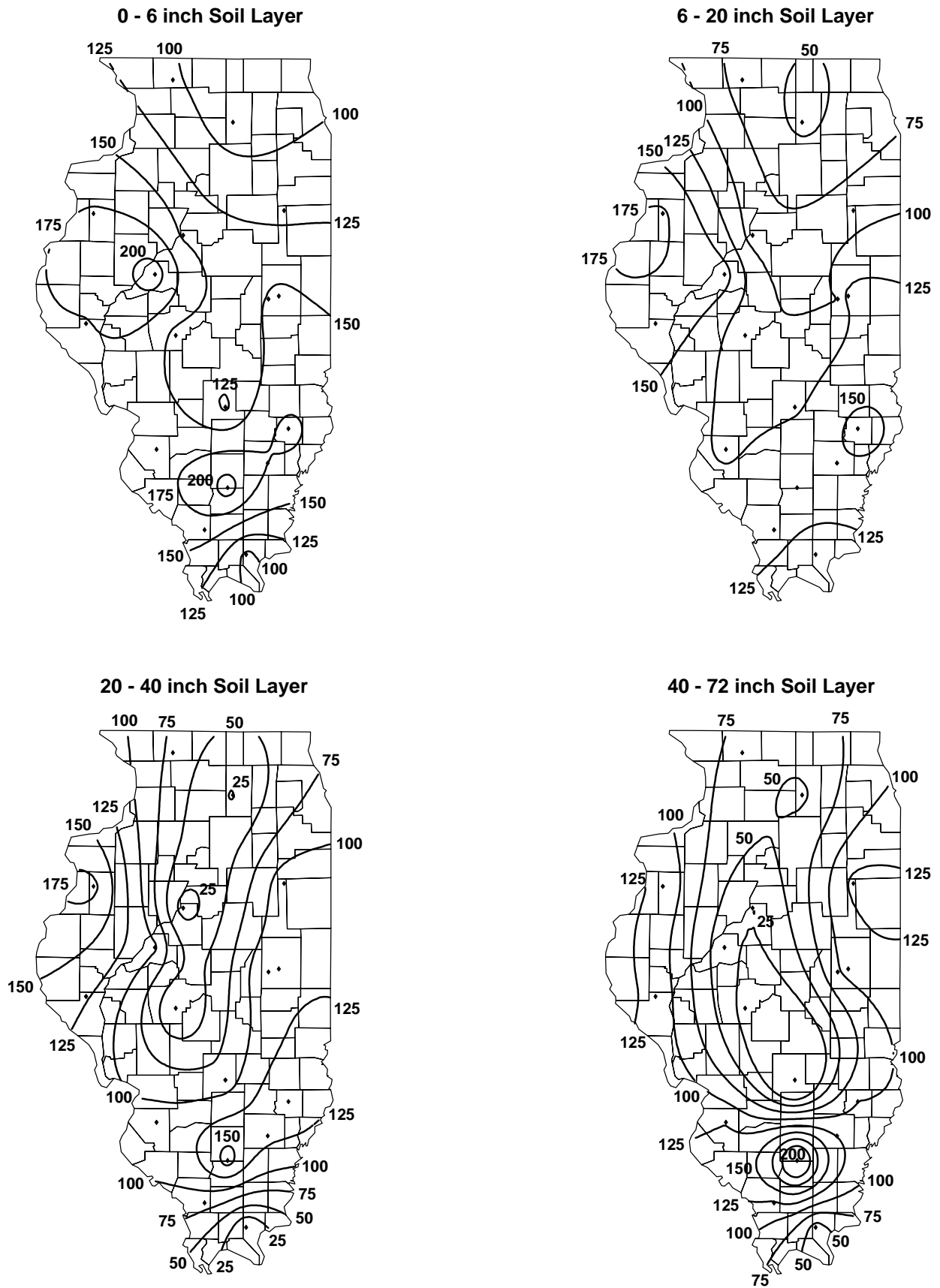


Figure 4. November 1 observed percent-of-normal soil moisture based on 1985-1995 mean

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

<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)	1.9	117	3.2	28	5.8	-7
DeKalb (NE)	1.7	50	3.1	12	5.3	-5
Monmouth (W)	2.3	61	4.8	13	6.9	6
East Peoria (C)	2.2	138	4.1	25	6.3	-1
Topeka (C)	1.4	212	2.8	115	2.7	52
Stelle (E)	2.0	59	4.4	20	6.2	-3
Champaign (E)	2.4	72	5.4	16	5.7	2
Bondville (E)	2.4	107	4.2	47	7.4	13
Pery (WSW)	2.3	105	5.3	21	7.3	-1
Springfield (WSW)	2.2	112	4.9	44	6.3	0
Brownstown (ESE)	1.8	162	3.4	61	6.7	2
Olney (ESE)	2.3	162	4.6	26	7.0	6
Belleville (SW)	2.2	184	3.4	46	6.9	-6
Carbondale (SW)	2.2	298	3.8	140	6.1	4
Ina (SE)	2.9	144	5.4	18	7.8	2
Fairfield (SE)	2.7	181	5.5	60	7.4	6
Dixon Springs (SE)	1.8	301	4.5	187	5.3	2

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 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. October 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 October 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 above the median this month (242 percent of the median) and above the long-term mean (111 percent of the mean). The mean streamflows for the month were in the normal to above normal range at most Table 4 stations, except Bear Creek at Marceline and Skillet Fork at Wayne City where mean flows for the month were much above normal for October.

Table 3. Peak Stages for Major Rivers, October 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	6.0	31
	La Salle	224.7	20	12.2	30
	Peoria	164.6	18	12.6	25
	Havana	119.6	14	7.6	28
	Beardstown	88.6	14	10.8	24
	Hardin	21.5	25	20.8	29
Mississippi	Dubuque	579.9	17	9.2	01
	Keokuk	364.2	16	5.3	24
	Quincy	327.9	17	11.9	27
	Grafton	218.0	18	16.2	29
	St. Louis	180.0	30	5.3	30
	Chester	109.9	27	8.0	30
	Thebes	43.7	33	12.6	01
Ohio	Cairo	2.0	40	26.9	24

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.

**Peak stage based on daily a.m. readings, not instantaneous peak.

Note: This month (October 2004) is the first month for use of a new method of calculating the statewide percentages of historical mean and median flows. Accordingly, the percentage of median flows for the past 12 months shown in Figure 1 using this method were recalculated.

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 end-of-September levels at 34 reservoirs, by the end of October the water surface elevation had decreased at 4 reservoirs, had risen at 29 reservoirs, and was the same as last month at one reservoir. For the 34 reservoirs with observations reported at the end of October, 14 reservoirs were above normal pool (or target operating level), 5 reservoirs were at normal pool, and 15 reservoirs were below normal pool.

Major Reservoirs. Water levels at Lake Shelbyville, Rend Lake, and Carlyle Lake increased during October. At the end of the month, each of these three reservoirs was 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 October mean level for Lake Michigan was 577.9 feet, compared to a mean level of 577.0 feet in October 2003. The long-term average lake level for October is 579.0 feet, based on 1918–2003 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 577.9 feet.

Table 4. Provisional Mean Flows, October 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*</i>	<i>Median</i>			
				<i>(cfs)</i>	<i>(cfs)</i>			
Rock River at Rockton	6363	69	2483	3139	2724	normal	56	31
Rock River near Joslin	9549	61	3589	4586	4010	normal	56	31
Pecatonica River at Freeport	1326	85	685	700	590	normal	40	31
Green River near Geneseo	1003	65	160	384	216	normal	63	31
Edwards River near New Boston	445	66	166	140	47	above normal	25	31
Kankakee River at Momence	2294	86	1032	1204	909	normal	39	31
Iroquois River near Chebanse	2091	80	651	736	176	above normal	22	31
Fox River at Dayton	2642	84	672	1143	820	normal	59	29
Vermilion River at Pontiac	579	60	59	139	19	normal	31	31
Spoon River at Seville	1636	87	813	533	185	above normal	17	31
LaMoine River at Ripley	1293	80	1179	429	118	above normal	13	31
Bear Creek near Marceline	349	59	518	111	13	much above normal	8	31
Mackinaw River near Congerville	767	55	76	189	30	normal	33	31
Salt Creek near Greenview	1804	62	639	509	205	above normal	20	31
Sangamon River at Monticello	550	91	116	171	34	above normal	26	31
South Fork Sangamon near Rochester	867	54	253	197	25	above normal	18	30
Illinois River at Valley City	26,743	65	7613	12,710	8053	normal	58	31
Macoupin Creek near Kane	868	75	142	231	52	above normal	25	29
Vermilion River near Danville	1290	82	424	349	103	above normal	19	30
Kaskaskia River at Vandalia	1940	34	188	628	259	normal	56	31
Shoal Creek near Breese	735	60	195	179	43	above normal	19	31
Embarras River at Ste. Marie	1516	90	490	450	103	above normal	27	31
Skillet Fork at Wayne City	464	84	559	98	11	much above normal	6	31
Little Wabash below Clay City	1131	89	647	220	50	above normal	12	31
Big Muddy at Plumfield	794	33	181	111	57	above normal	20	31
Cache River at Forman	244	80	8.8	55	17	normal	61	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 2003.

Table 5. Reservoir Levels in Illinois, October 2004

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 15 observation wells, which are remote from pumping centers, were above average levels for October by 0.4 feet and ranged from 3.4 feet below average to 7.3 feet above average (Table 6).

Comparison to Previous Month. Shallow groundwater levels were above those of September. Levels averaged 0.7 feet higher and ranged from 0.8 feet lower to 3.4 feet higher than last month.

Comparison to Same Month, Previous Year. Shallow groundwater levels in October were above levels of a year ago. Levels averaged 1.4 feet higher and ranged from 3.9 feet below to 8.7 feet above last October's level.

Table 6. Month-End Shallow Groundwater Level Data Sites, October 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	21.36	-0.19	+0.03	-0.01	+0.85
2	Mt. Morris	Ogle	55.00	23.26	-3.69	-3.33	-0.75	+8.71
3	Crystal Lake	McHenry	18.00	5.86	-0.09	-0.06	-0.32	+1.31
4	Cambridge	Henry	42.00	N/A	N/A	N/A	N/A	N/A
5	Fermi Lab	DuPage	17.00	9.16	-1.65	-1.62	0.00	+1.75
6	Good Hope	McDonough	30.00	2.99	+6.76	+7.28	+3.43	+7.56
7	Snicarte	Mason	42.00	38.61	-1.67	-1.44	-0.22	+0.31
8	Coffman	Pike	28.00	10.35	+3.09	+3.82	+3.12	-0.44
9	Greenfield	Greene	20.70	15.71	-0.72	-0.38	+0.48	-3.89
10	Janesville	Cumberland	11.00	4.83	+1.21	+1.48	+1.96	+0.68
11	St. Peter	Fayette	15.00	2.44	+1.54	+1.77	+2.53	+1.37
12	SWS #2	St. Clair	80.00	N/A	N/A	N/A	N/A	N/A
13	Boyleston	Wayne	23.00	5.87	+1.41	+1.91	-0.21	+1.60
14	Sparta	Randolph	27.00	8.97	+0.92	+1.32	-0.39	+1.50
15	SE College	Saline	10.19	8.24	-0.40	-0.76	+0.97	-0.40
16	Dixon Springs	Pope	8.63	8.63*	-1.44*	-3.35	0.00	-0.24
17	Bondville	Champaign	21.00	6.40	-0.59	-0.77	-0.82	+0.53
Averages					+0.30	+0.39	+0.65	+1.41

Notes:

*Level below bottom of well.

N/A = Data not available.

Addendum

Long-Term Precipitation Networks (Nancy Westcott)

Imperial Valley Precipitation. October 2004 precipitation amounts (Figure 5a) were heavy. Gage amounts were greatest in southeastern and southwestern corners of the network and lightest along the northwestern border of the network. Individual gage totals ranged from 6.01 inches at site #23 to 4.55 inches at site #8. 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 2004 network average of 5.16 inches was about 224 percent of the 12-year (1993–2004) October network average of 2.31 inches.

Cook County Precipitation. October 2004 precipitation amounts (Figure 5b) were light. Precipitation was heaviest in the southeast corner of the network and lightest in the central portion of the network. Precipitation values ranged from 3.05 inches at site #25 (Chicago Heights), to 1.60 inches at site #8 (Westchester). The October 2004 network average of 2.20 inches was about 70 percent of the 15-year (1989–2003) October network average of 3.14 inches.

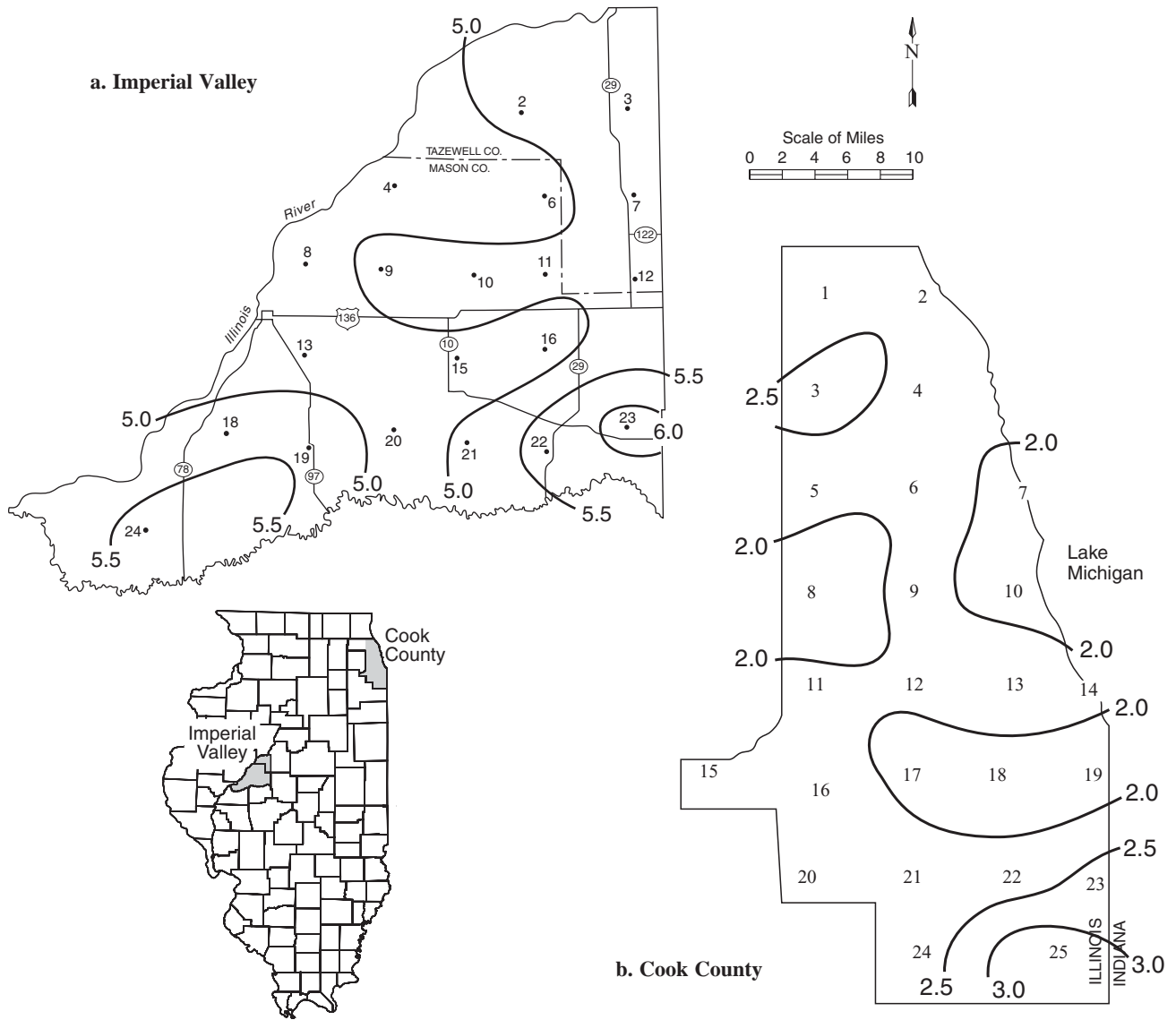


Figure 5. Long-term raingage network precipitation totals (inches) for October 2004

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 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/>

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.