WATER-RESOURCES ACTIVITIES OF THE U.S. GEOLOGICAL SURVEY IN ILLINOIS, 1992

Compiled by G.O. Balding

U.S. GEOLOGICAL SURVEY

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Urbana, Illinois
1994

U.S. DEPARTMENT OF THE INTERIOR
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WATER-RESOURCES ACTIVITIES OF THE U.S. GEOLOGICAL SURVEY IN ILLINOIS, 1992

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ORIGIN AND MISSION OF THE U.S. GEOLOGICAL SURVEY

The U.S. Geological Survey (USGS) was established by an Act of Congress on March 3, 1879, to provide a permanent Federal agency to conduct the systematic and scientific "classification of the public lands, and examination of the geological structure, mineral resources, and products of the national domain."

Since 1879, the research and fact-finding role of the USGS has grown and has been modified to meet the changing needs of the Nation it serves. The USGS, however, has remained an impartial scientific and technical agency without developmental or regulatory responsibilities. Today's programs serve a diversity of needs and users. The current mission of the USGS is to provide geologic, topographic, and hydrologic information that contributes to the wise management of the Nation's natural resources and that promotes the safety and well-being of the public. This information is provided to the public in many forms--including reports, maps, and data bases that provide descriptions and analyses of the water, energy, and mineral resources, the land surface, the underlying geologic structure, and the dynamic processes of the Earth. To accomplish its mission, the USGS:

- Conducts and sponsors research in geology, hydrology, mapping, and related sciences.
- Produces and updates geographic, cartographic, and remotely sensed information in graphic and digital forms.
- Describes the onshore and offshore geologic framework and develops an understanding of its formation and evolution.
- Assesses energy and mineral resources, determines their origin and manner of occurrence, and develops techniques for their discovery.
- Collects and analyzes data on the quantity and quality of surface water and ground water, on water use, and on quality of precipitation.
- Assesses water resources and develops an understanding of the impact of human activities and natural phenomena on hydrologic systems.
- Evaluates hazards associated with earthquakes, volcanoes, floods, droughts, toxic materials, landslides, subsidence, and other ground failures, and develops methods for hazards prediction.
- Participates in the exploration of space and prepares geologic and other maps of the planets and their satellites.
- Publishes reports and maps, establishes and maintains earth-science data bases, and disseminates earth-science data and information.
- Provides scientific and technical assistance for the effective use of earth-science techniques, products, and information.
- Coordinates topographic, geologic, and land-use mapping, digital cartography, and water-data activities.

- Develops new technologies for the collection, coordination, and interpretation of earth-science data.
- Provides scientific support and technical advice for legislative, regulatory, and management decisions.
- Cooperates with other Federal, State, and local agencies, and with academia and industry.

As the Nation's largest earth-science research agency, the USGS maintains a long tradition of providing accurate and impartial information to all, which underscores its continued dedication to "Earth Science in the Public Service."

MISSION OF THE WATER RESOURCES DIVISION

The USGS has the principal responsibility within the Federal Government to provide the hydrologic information and understanding needed by others to achieve the best use and management of the Nation's water resources. To accomplish this mission, the Water Resources Division in cooperation with other Federal, State, and local agencies:

- Systematically collects data needed for the continuing determination and evaluation of the quantity, quality, and use of the Nation's water resources.
- Conducts analytical and interpretive water-resources appraisals to describe the occurrence, availability, and physical, chemical, and biological characteristics of surface and ground water and their inter-relationship.
- Conducts supportive basic and problem-oriented research in hydraulics, hydrology, and related fields of science and engineering to improve the basis for field investigations and measurement techniques and to understand hydrologic systems sufficiently well to predict quantitatively their response to stress, either natural or manmade.
- Disseminates water data and the results of investigations and research through reports, maps, computerized information services, and other forms of public release.
- Coordinates the activities of all Federal agencies in the acquisition of certain water data.
- Provides scientific and technical assistance in hydrologic fields to State, local, and other Federal agencies, to licensees of the Federal Energy Regulatory Commission, and, on behalf of the U.S. Department of State, to international agencies.
- Acquires, develops, and disseminates information on water-related natural hazards such as droughts, floods, landslides, land subsidence, mudflows, and volcanoes.
- Administers the provisions of the Water Resources Research Act of 1984, which includes the State Water Resources Research Institutes and the Research Grants and Contracts programs.
- Supports the provisions of the National Environmental Policy Act of 1969 and manages USGS conduct of natural-resources surveys in response to the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund Act) of 1980.

The Water Resources Division is one of three program Divisions and two support Divisions within the USGS (fig. 1). Headquarters of the Water Resources Division is located at the USGS's National Center in Reston, Va., and consists of the Office of the Chief Hydrologist, the Offices of the Assistant Chief Hydrologists for Operations, Program Coordination and Technical Support, Research and External Coordination, Scientific Information Management, and Water Assessment and Data Coordination (fig. 2).

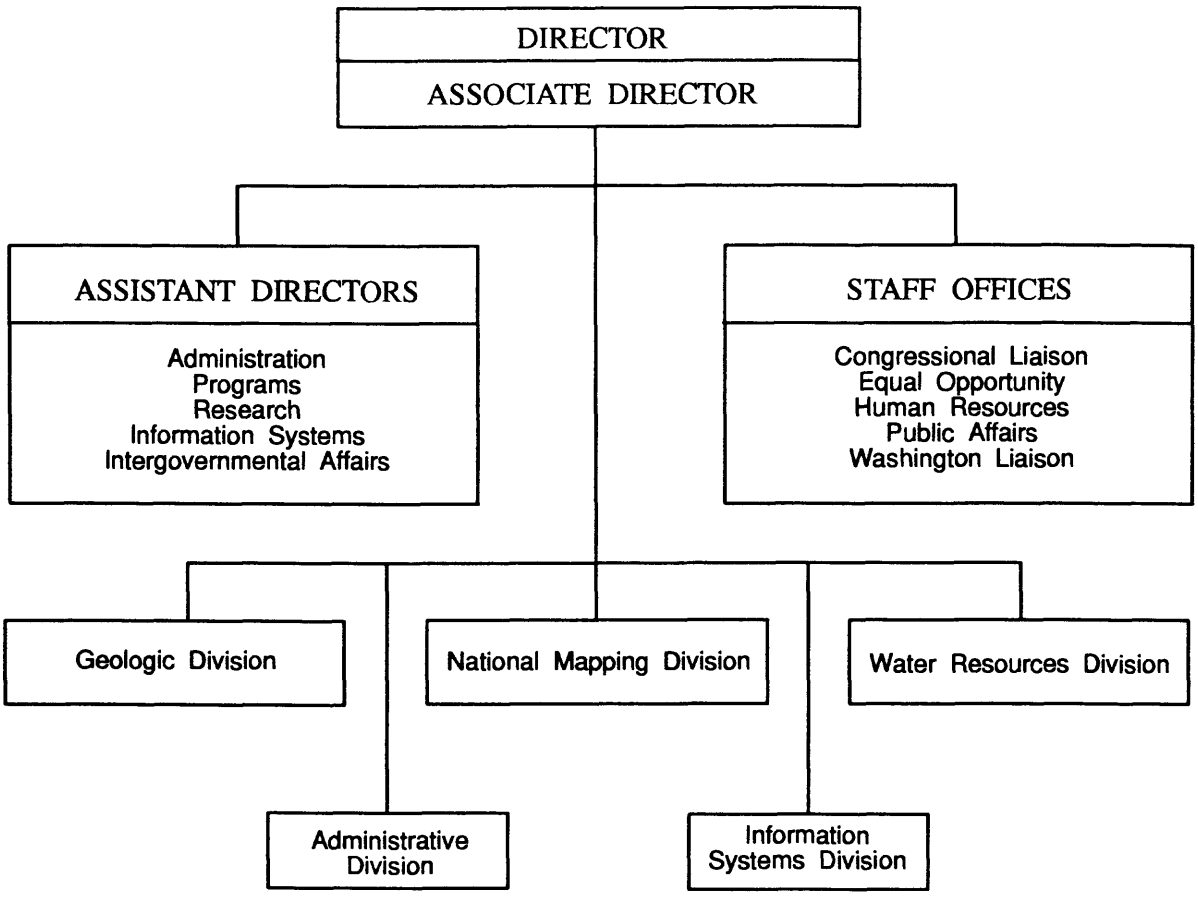


Figure 1. U.S. Geological Survey organization chart. Data from U.S. Geological Survey, 1992b.

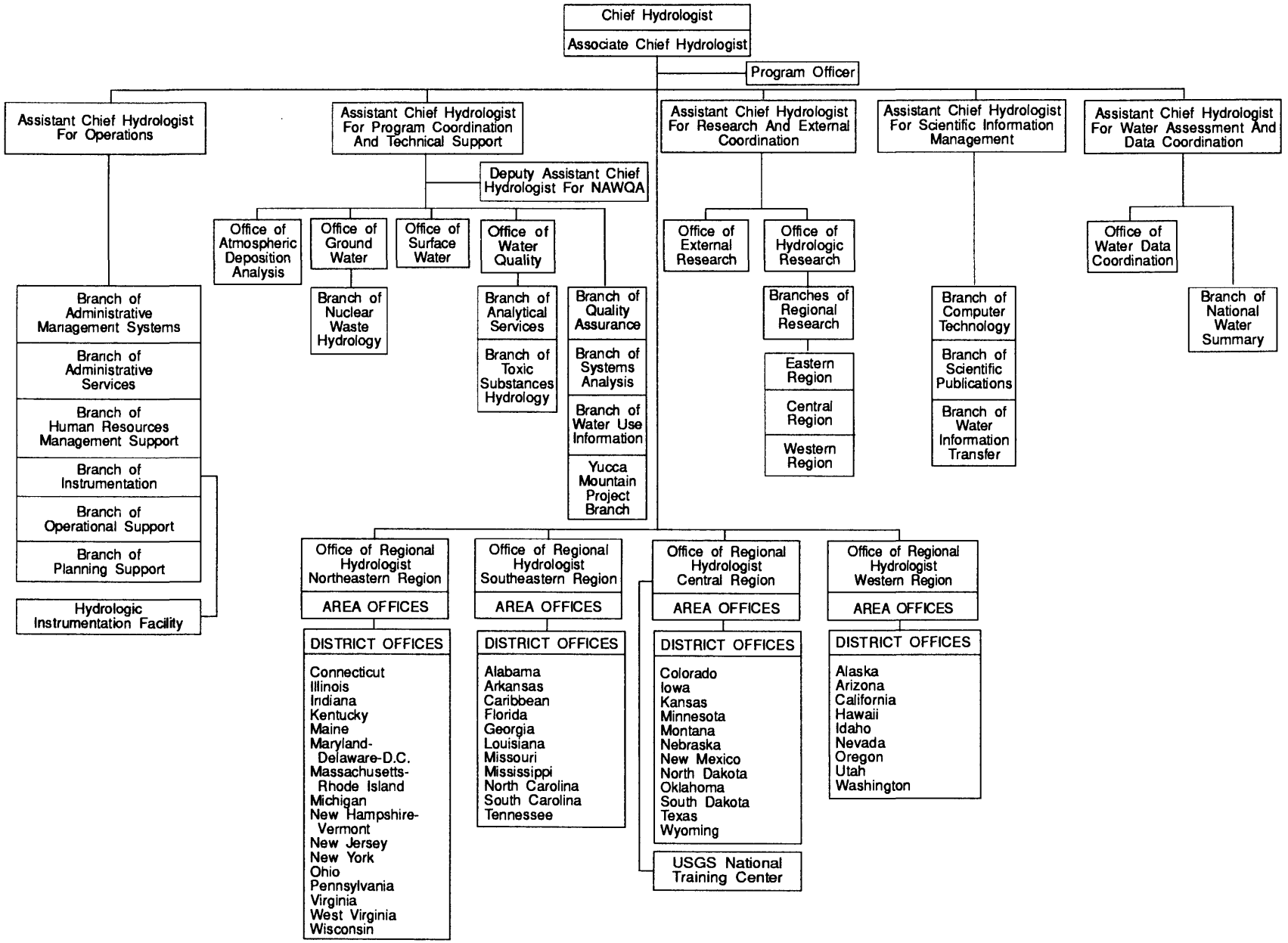


Figure 2. Water Resources Division organization chart. Data from U.S. Geological Survey, 1992b.

ILLINOIS DISTRICT ORGANIZATION

The Illinois District of the USGS, Water Resources Division, consists of two support units, a special-study unit, two operating sections, one Subdistrict Office, and two Field Headquarters (fig. 3). Personnel are based at the District Office in Urbana, the Subdistrict Office in De Kalb, and at Field Headquarters in Urbana and Mt. Vernon. The District operates with guidance from Regional and National offices in Reston, Va. Offices for research, training, equipment development, and laboratory services, located throughout the United States, provide technical assistance and advice to the District.

Administrative Unit

The Administrative Unit is responsible for the maintenance of and compliance with Federal acquisition regulations, Departmental manuals, and USGS and Division operating policies. The Unit provides support services in the areas of administrative management, budget formulation and execution, financial planning and accounting, personnel, procurement, space management, and general office procedures.

Publications and Data-Management Unit

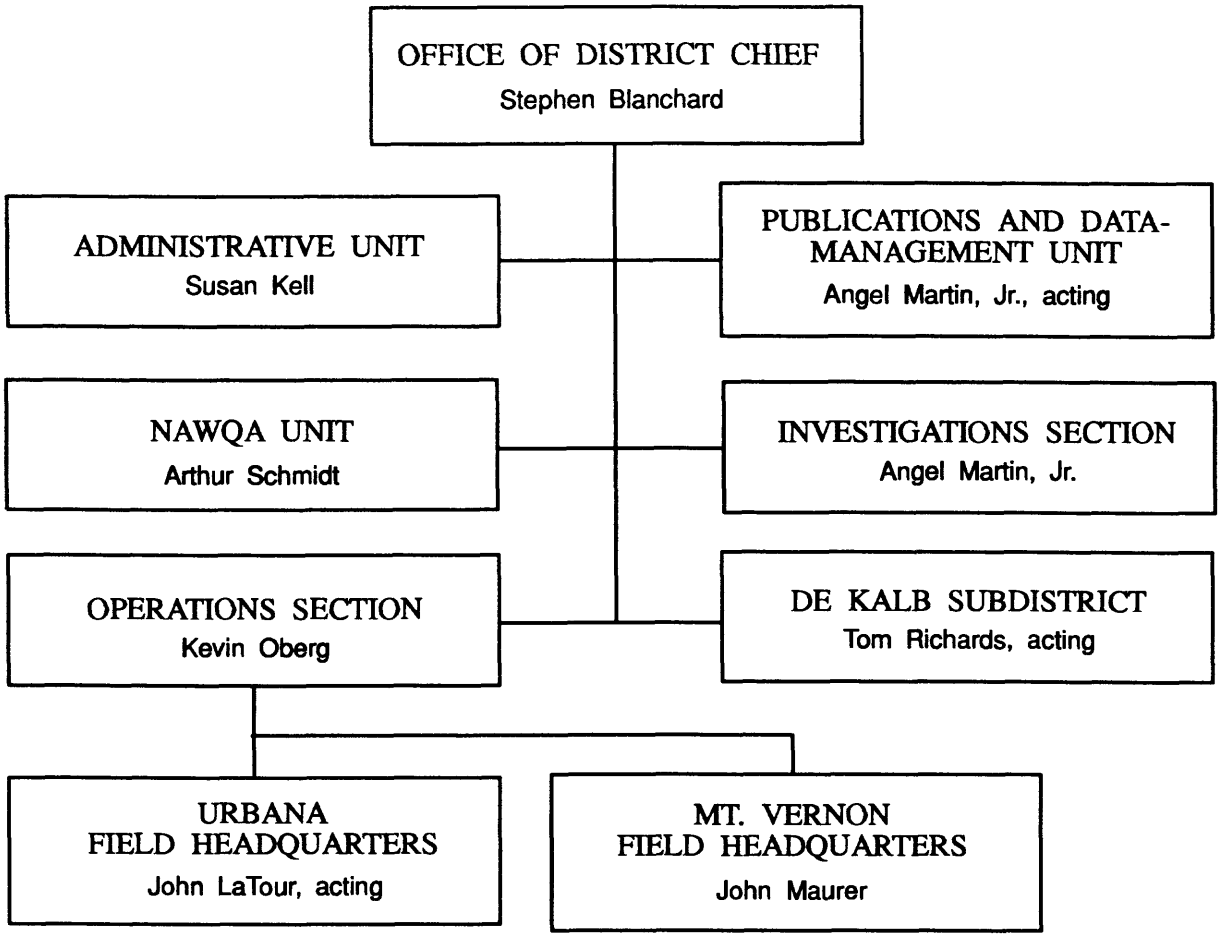
This support unit assembles reports for review, prepares camera-ready copy for publication, and maintains the District's data files and library. The Unit provides data processing services, maintains computer manuals and program catalogs, does computer programming, and assists hydrologists in program selection, application, and modification.

National Water-Quality Assessment Unit

The NAtional Water-Quality Assessment (NAWQA) unit is responsible for carrying out the goals of the NAWQA program for the upper Illinois River Basin NAWQA project. The goals of the NAWQA program are to (1) describe water-quality conditions and trends and (2) identify, describe, and explain causative factors for the observed conditions and trends. The upper Illinois River Basin project is one of seven NAWQA pilot studies that will test, and modify as necessary, concepts and approaches in preparation for full implementation of the NAWQA program in the future.

Investigations Section

The Investigations Section conducts multi-discipline hydrologic investigations to determine the quantity and quality of surface and ground water and to define and evaluate the extent and availability of water resources of drainage basins, counties, and the State. The Section conducts special hydrologic research studies on current water issues such as radiohydrology, sedimentation and erosion, urban hydrology, land-use mapping, rainfall-runoff modeling, ground-water quality, U.S. Environmental Protection Agency (USEPA) Superfund Site work, waste disposal, and stream quality. Special investigative techniques for water-resource evaluation include the use of test drilling, packer tests, tracers, surface and borehole geophysics, and ground-water and surface-water modeling of flow and solute movement. Personnel prepare and review reports of investigations for both scientific and lay audiences.



District Office	(217) 398-5353	U.S. Geological Survey 102 E. Main Street, 4th Floor Urbana, IL 61801
De Kalb Subdistrict Office	(815) 756-9207	U.S. Geological Survey 1420 Sycamore Road De Kalb, IL 60115
Urbana Field Headquarters	(217) 398-5570	U.S. Geological Survey 102 E. Main Street, 4th Floor Urbana, IL 61801
Mt. Vernon Field Headquarters	(618) 242-4495	U.S. Geological Survey Room 231, Federal Building 105 S. Sixth Street Mt. Vernon, IL 62864

Figure 3. Illinois District organization chart and office addresses.

Operations Section

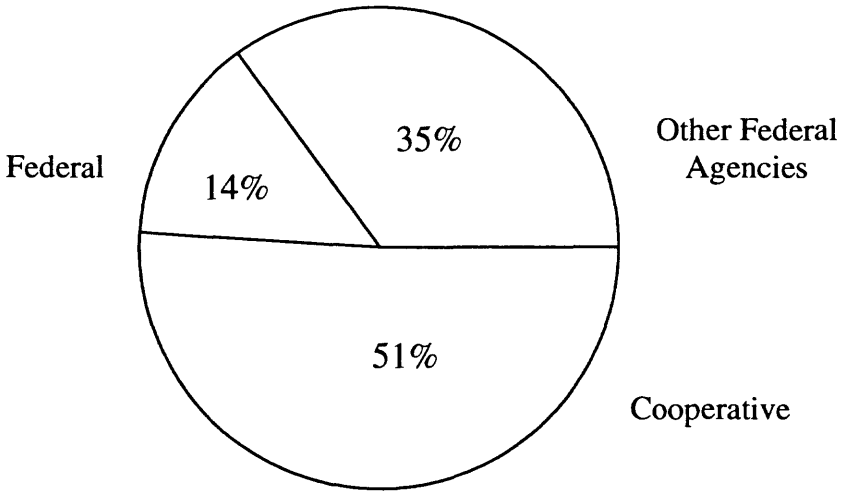
The Operations Section designs and implements a network of stream-gaging, water-quality, and sediment sites based on data needs. The Section directs the installation and maintenance of equipment, data collection and analysis, and compilation of records for publication in the annual data report. It maintains the drainage-area and water-use map files and all associated hydrologic-data files. The Section provides assistance in the collection of water-resources data in support of projects, conducts special data-collection efforts as needed or requested including major floods, low-flow measurements, and indirect measurements. The Section conducts special projects related to water use and coordinates the water-use program. Field offices are responsible for data collection in their designated areas (fig. 4) and report to the Chief, Operations Section.

De Kalb Subdistrict Office

The De Kalb Subdistrict Office conducts multi-discipline hydrologic investigations to determine the quantity and quality of surface and ground water and to define and evaluate the extent and availability of water resources of drainage basins and counties in the northern quarter of Illinois. The Subdistrict maintains a network of stream-gaging and surface-water-quality sites and directs the data collection, analysis, and compilation of records for publication in the annual data report.

ILLINOIS DISTRICT FUNDING SOURCES

Funds to support the work performed by the Illinois District, Water Resources Division, are derived from three principal sources--Federal Program, Federal-State Cooperative Program, and Other Federal Agencies Program. Funding from all sources in fiscal year 1992 amounted to about $4,140,000, which was distributed as follows:



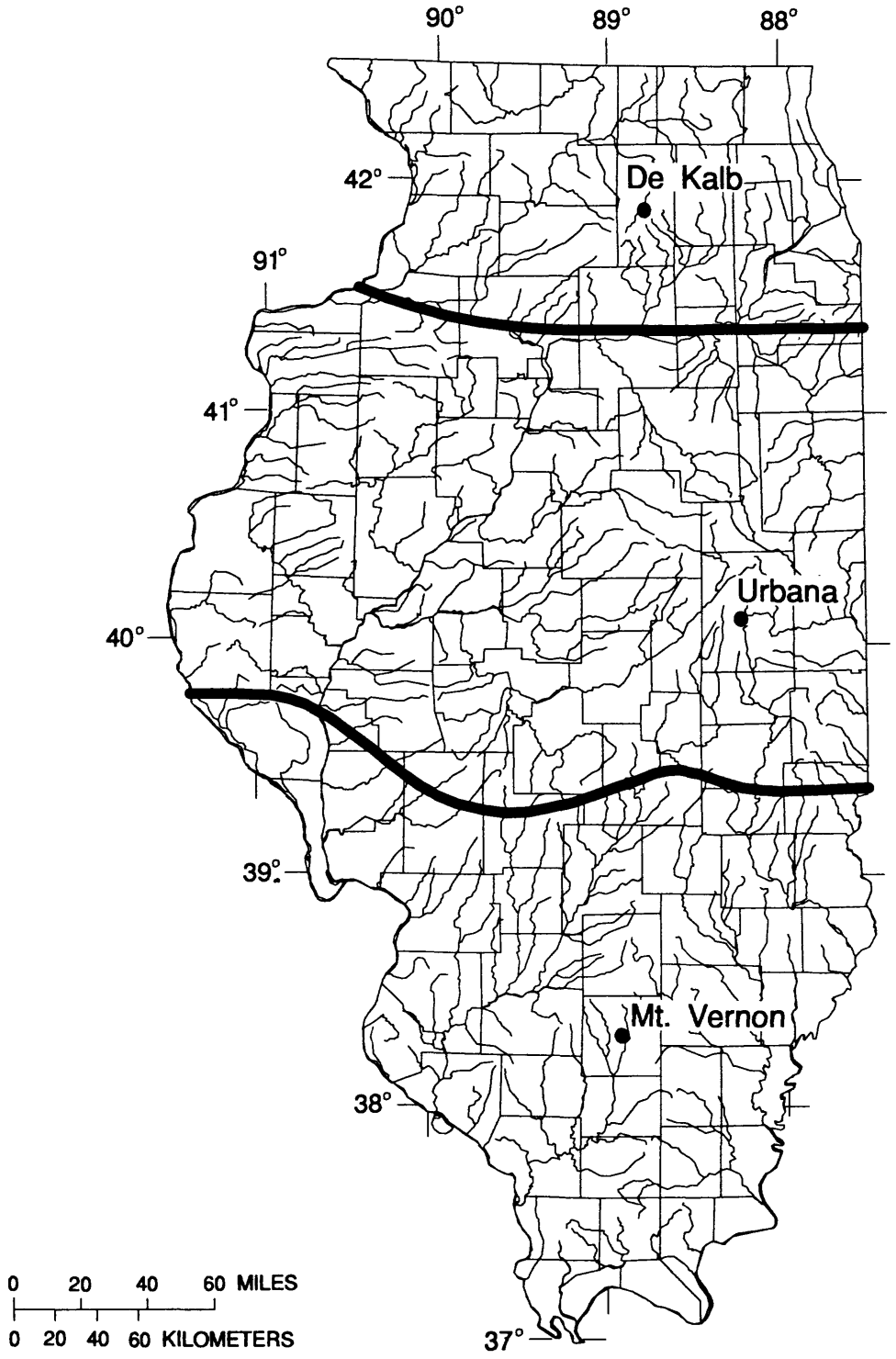
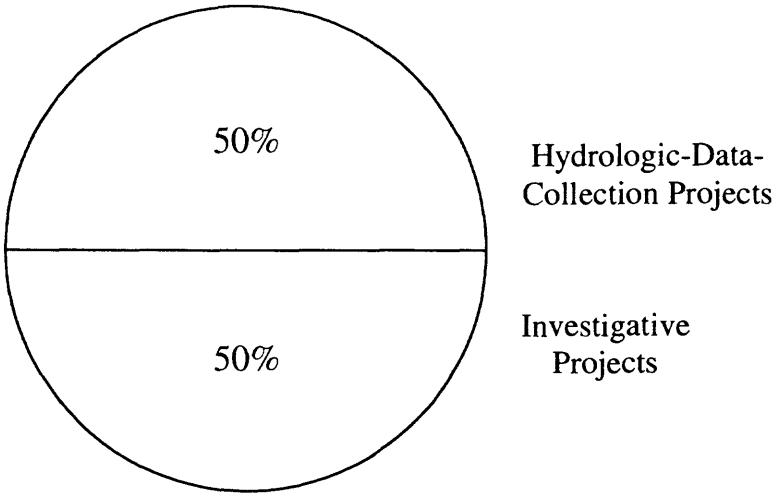


Figure 4. Subdistrict and field headquarters areas of responsibility.

The diagram below shows the percentage of the activities for fiscal year 1992 in each of the broad categories of hydrologic-data collection and water-resource investigations:



- The activities are directed toward obtaining the information needed by managers and planners to achieve the best use and management of the water resources in Illinois and the Nation.

Federal Program

Funds for the Federal Program are appropriated by Congress and are specifically identified in the annual USGS budget. These funds are used to support research, data collection, high-priority topical programs, the coordination of all Federal programs related to collection of water data, and internal support services.

Federal-State Cooperative Program

Federal funds are appropriated by Congress and used to match those furnished by State and other tax-supported agencies on a 50-50 basis (Gilbert and Mann, 1992). These funds are used for a variety of hydrologic-data-collection activities and water-resources investigations in which the Water Resources Division represents the national responsibilities and the cooperating agencies represent State and local interests. Agencies supporting water-resources activities in Illinois during fiscal year 1992 are listed in table 1.

Other Federal Agencies Program

In this program, the funds are transferred to the USGS as reimbursement for work performed at the request of another Federal agency. These funds are used for a variety of hydrologic-data collection and water-resources investigations such as stream gaging, ground-water-quality assessments, and suspended-sediment monitoring in streams.

Table 1. Agencies supporting water-resources activities in Illinois during fiscal year 1992

State Agencies

Illinois Department of Transportation
    Division of Water Resources
Illinois Environmental Protection Agency
    Division of Water
Illinois Department of Energy and Natural Resources
    State Water Survey
Illinois Department of Conservation
Wisconsin Department of Natural Resources

Local Agencies

Bloomington and Normal Sanitary District
Forest Preserve District of Cook County
Forest Preserve District of Du Page County
Du Page County, Department of Environmental Concerns
Kane County Development Department
Kane County Forest Preserve District
Lake County Stormwater Management Commission
Vermilion County Conservation District
The Metropolitan Water Reclamation District of Greater Chicago
Danville Sanitary District
Northeastern Illinois Planning Commission
City of De Kalb
City of Decatur
City of Springfield
City of Monticello
City of Eureka
Kankakee Soil and Water Conservation District
Boneyard Creek Commission

Universities

Northern Illinois University

Federal Agencies

Department of the Army
    Corps of Engineers
        Rock Island District
        St. Louis District
        Louisville District
        Chicago District
U.S. Environmental Protection Agency, Region V

WATER CONDITIONS

Illinois generally has adequate supplies of water suitable for most uses. The mean annual precipitation for the 1961-90 period is shown in figure 5. Water is available from several major rivers and lakes within or bordering Illinois and from ground-water sources. In the northern one-third of the State, most municipal water supplies are obtained from ground water, whereas, in the remainder of the State, municipal supplies generally are obtained from surface-water sources. In the southern two-thirds of the State, potable ground water may be obtained locally from shallow alluvium-filled valleys that were eroded into the bedrock by ancestral streams.

During 1992, annual runoff was normal at the three long-term streamflow-gaging stations in the State (fig. 6). Annual runoff at Pecatonica River at Freeport was within the normal range (between the 25th and 75th percentile) at 119 percent of the long-term (1961-90) median for the year; monthly runoff ranged from 99 percent in August to 125 percent in February. Annual runoff at Sangamon River at Monticello was within the normal range at 92 percent of the median; monthly runoff was much above normal in July and August (715 and 880 percent, respectively) and below normal during May (44 percent). Annual runoff at Skillet Fork at Wayne City was within the normal range at 46 percent of the median; monthly runoff was above normal during October and November (1,050 and 680 percent, respectively) and below normal during February and March (25 and 40 percent, respectively), May and June (39 and 9 percent, respectively), and August (3 percent).

DATA COLLECTION

The USGS Water Resources Division is the principal Federal agency responsible for providing hydrologic information required for the best utilization and management of the Nation's water resources. The activities of the Illinois District are structured to provide data and information required to meet these needs.

Surface-Water Data Stations

Surface-water data are collected for general hydrologic purposes such as assessments of water resources, areal analyses, determination of long-term trends, research and special studies, or for management and operational purposes. The need for surface-water data in Illinois has varied over the years. In 1940, the USGS operated 46 continuous-record streamflow-gaging stations; by 1980, the streamflow-gaging-station network grew to 183 (fig. 7).

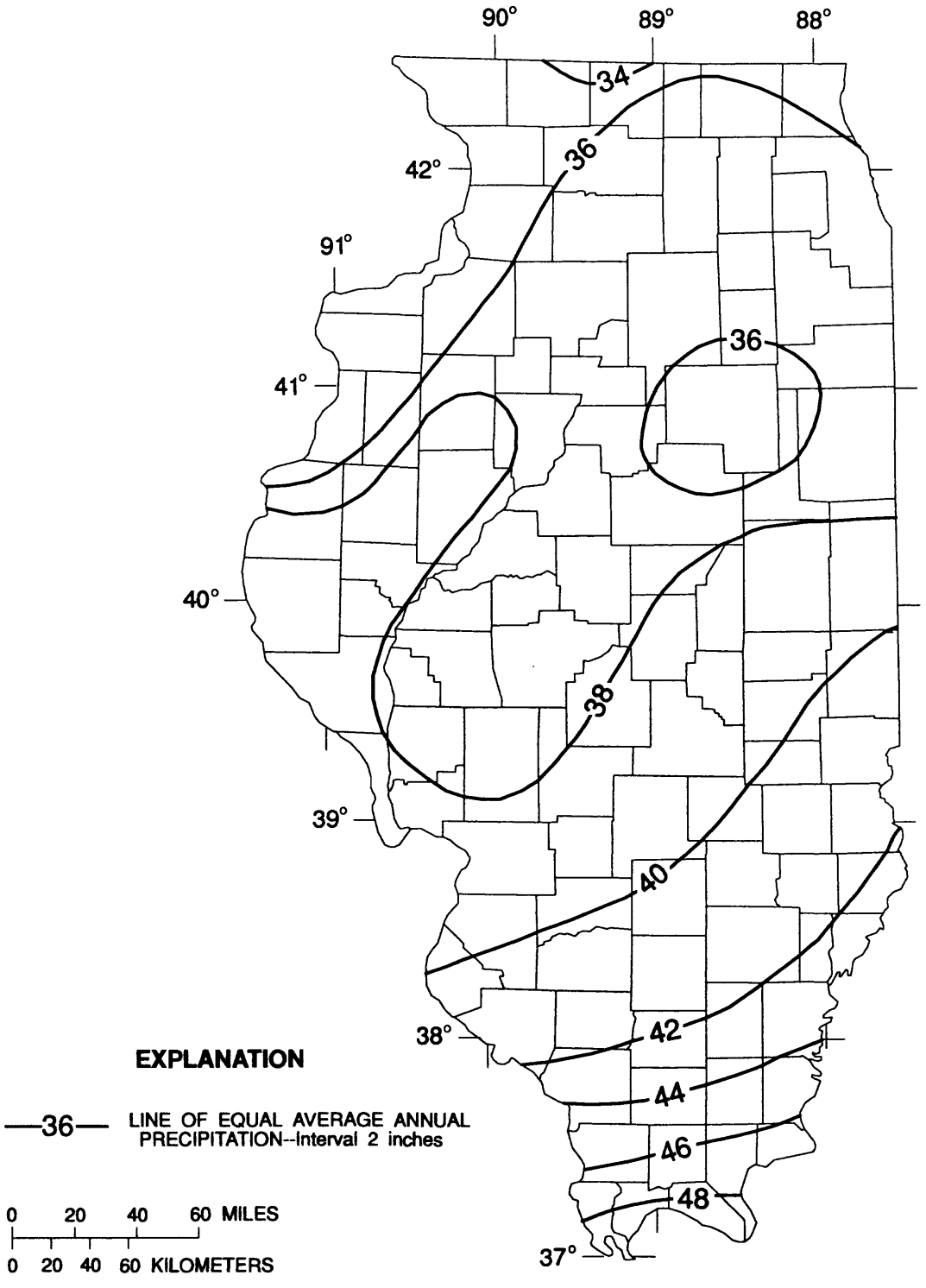


Figure 5. Average annual precipitation in Illinois, 1961-90. Data from Wendland and others, 1992.

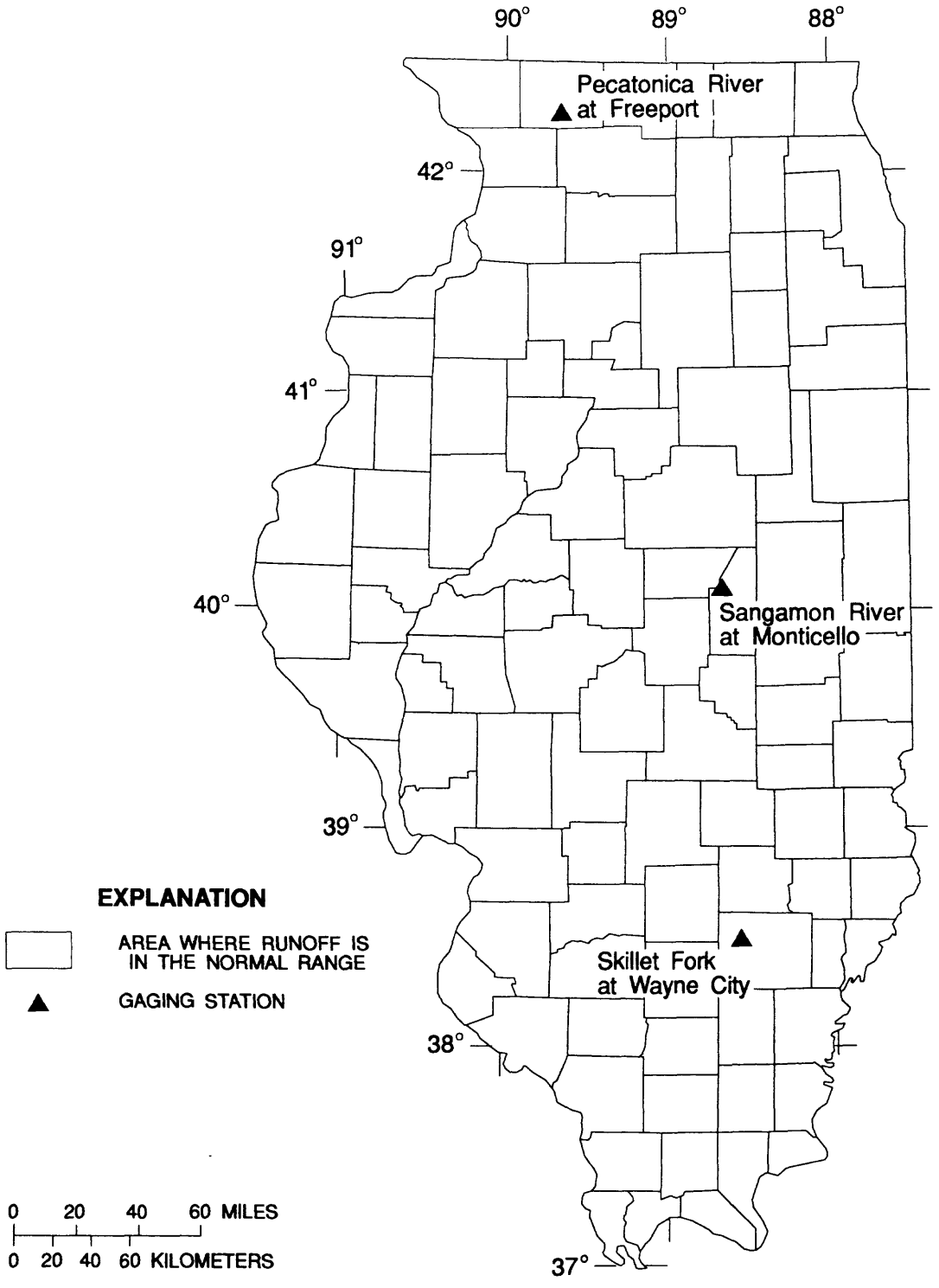


Figure 6. Runoff during 1992. Data from U.S. Geological Survey, 1992a.

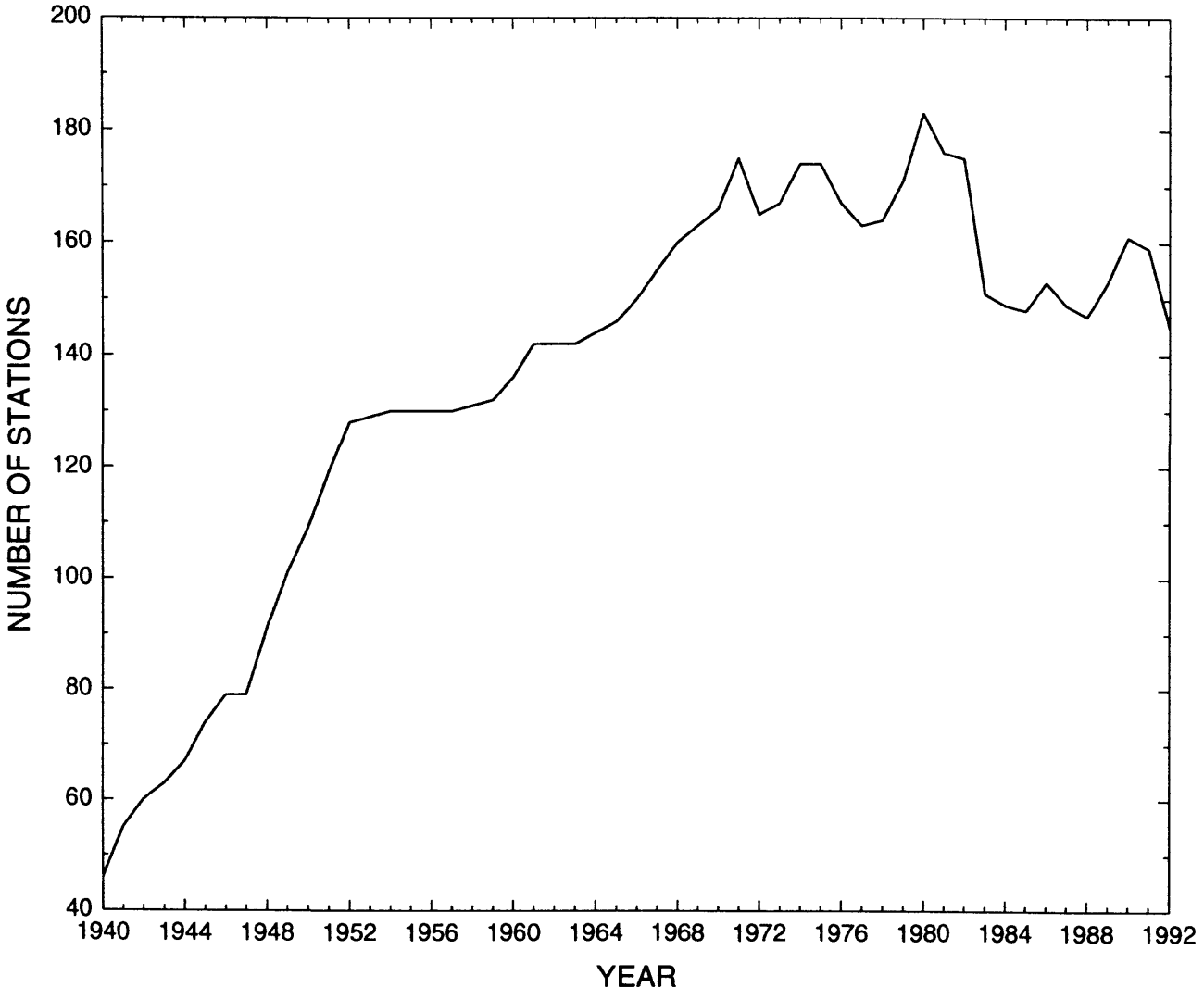


Figure 7. Number of continuous-record streamflow-gaging stations in Illinois, operated by the U.S. Geological Survey, since 1940.

Discharge and Stage Stations

Direct measurements of discharge (streamflow), to verify the stream stage-discharge relation (rating), are performed about every 8 weeks at each continuous-record discharge station. Stage data are recorded on digital tape every 15 minutes at each continuous-record gaging station; some stations are equipped with telemetry and transmit stage data on a near real-time basis. In 1992, data on discharge and stage in Illinois were published by the Illinois District for the following numbers of stations:

Station classification		Number of stations
Stream stations		176
Continuous record:		
Discharge	149	
Stage only	6	
Partial record:		
Peak (maximum) flow only	21	
Lake, reservoir, and subimpoundment stations		8
Stage and contents	3	
Stage only	5	
Total		184

Of the 149 continuous-discharge stations, 132 are part of the Illinois District surface-water network and the other 17 are used for special projects. The locations of sites where discharge or stage are collected are shown in figure 8, and the types of data collected at each station are shown in table 2 (at end of report). The discontinued surface-water-discharge or stage-only stations in Illinois are listed in table 3 (at end of report).

Water-Quality Stations

Data collected from 16 water-quality sampling stations, operated by the USGS during fiscal year 1992, are shown in figure 9 and are listed in table 2 (at end of report). The discontinued surface-water-quality stations operated by the Illinois District are listed in table 4 (at end of report).

Of the 16 stations, 6 stations are operated as part of the USGS's NAtional Stream Quality Accounting Network (NASQAN) program. Three stations are operated as part of the USGS's NAWQA program, two stations are part of the USGS's Midcontinent Herbicide Program, and the remaining five stations are a part of the USGS's cooperative program.

Water-quality samples were collected every 6 weeks except for the NASQAN stations where samples were collected quarterly or bimonthly. The water-quality constituents of interest include the cations, anions, and selected nutrients, trace metals, and organics. Daily or near-daily sediment samples were collected, and daily sediment records were computed at four additional stations. The various types of water-quality data were collected by the Illinois District at the following numbers of surface-water stations:

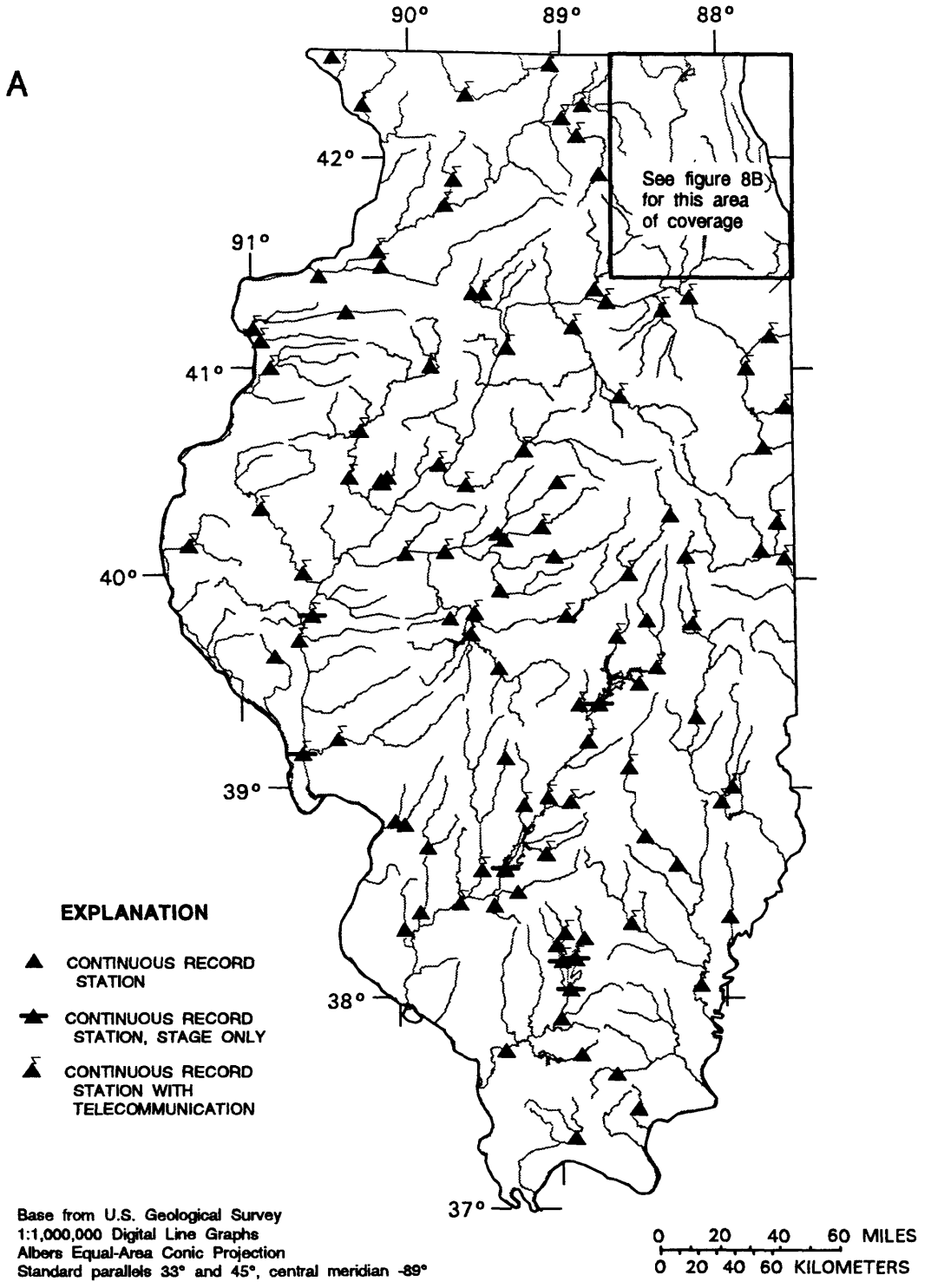
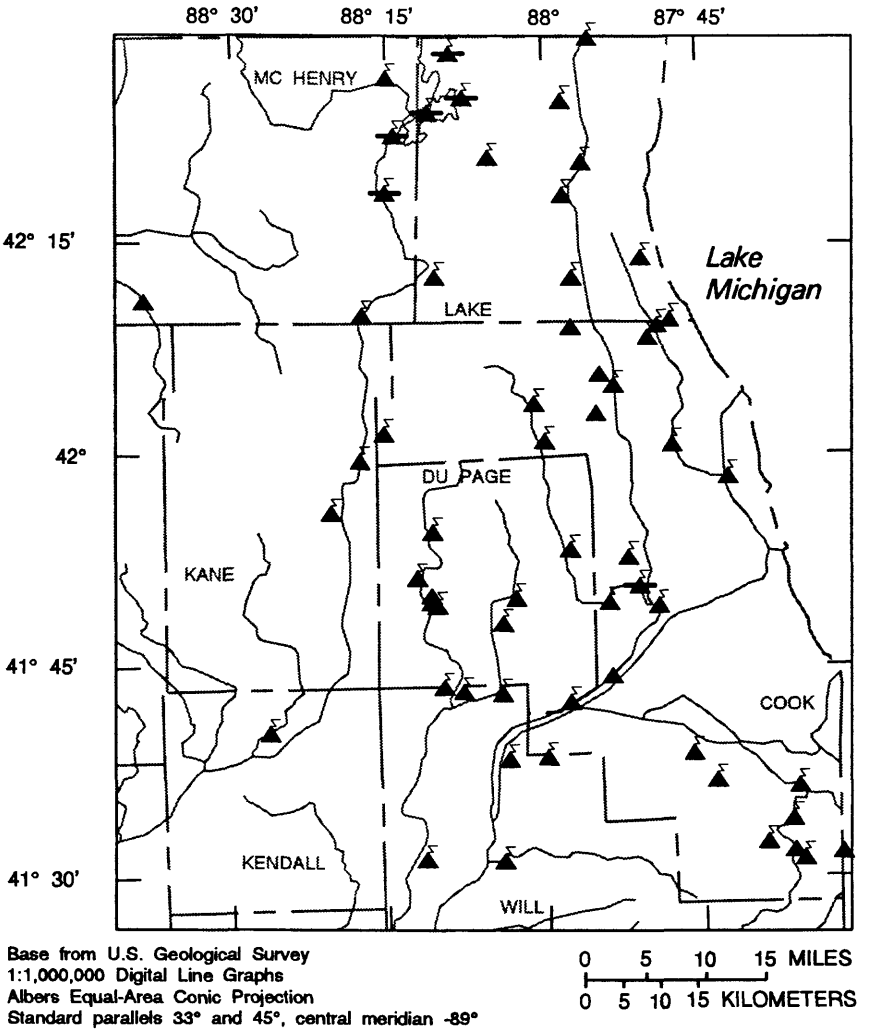


Figure 8. Discharge and stage stations in (a) Illinois except northeastern Illinois and (b) northeastern Illinois.

B



EXPLANATION

- CONTINUOUS RECORD STATION
- CONTINUOUS RECORD STATION, STAGE ONLY
- CONTINUOUS RECORD STATION WITH TELECOMMUNICATION

Figure 8. Continued.

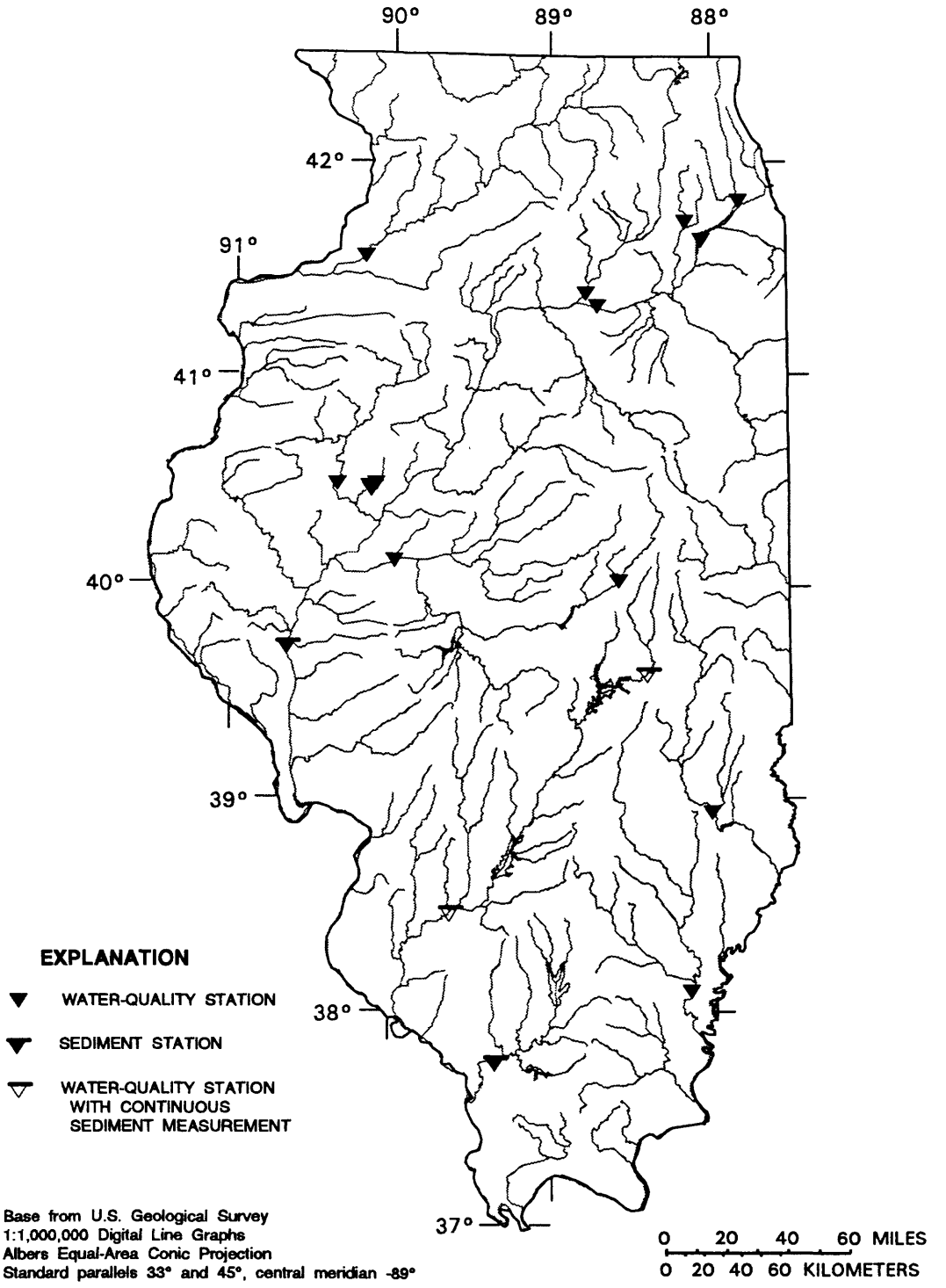


Figure 9. Water-quality stations in Illinois.

Data classification	Number of stations
Physical data:	
Water temperature	16
Specific conductance	16
pH	16
Dissolved oxygen	16
Sediment data (daily)	4
Chemical data:	
Inorganic constituents	16
Organic constituents	16
Microbiological data	15

Ground-Water Stations

Water levels in wells, discharges of springs and wells, and water-quality analyses are used in assessing ground-water conditions and trends; hydrologic data, however, must be integrated with other observations and results of ground-water-system studies to understand ground-water conditions and trends. In Illinois, the USGS measures water levels in 11 observation wells. Four wells, three of which are piezometers, are at the same location but open at different depths. Water samples are collected for water-quality analysis from 1 of the 11 observation wells. Data also are collected from 46 public-supply wells in the State as part of an ongoing water-quality study in cooperation with the IEPA; water samples are collected annually from these wells. The types of data collected for observation and project wells are as follows:

Data type	Number of wells
Water levels	11
Physical data:	
Water temperature	47
Specific conductance	47
pH	47
Chemical data:	
Inorganic constituents	47
Volatile organic compounds	47
Synthetic organic compounds	47

The ground-water stations and types of data collected at each station are listed in table 5 (at end of report). The number of wells, by county, are shown in figure 10.

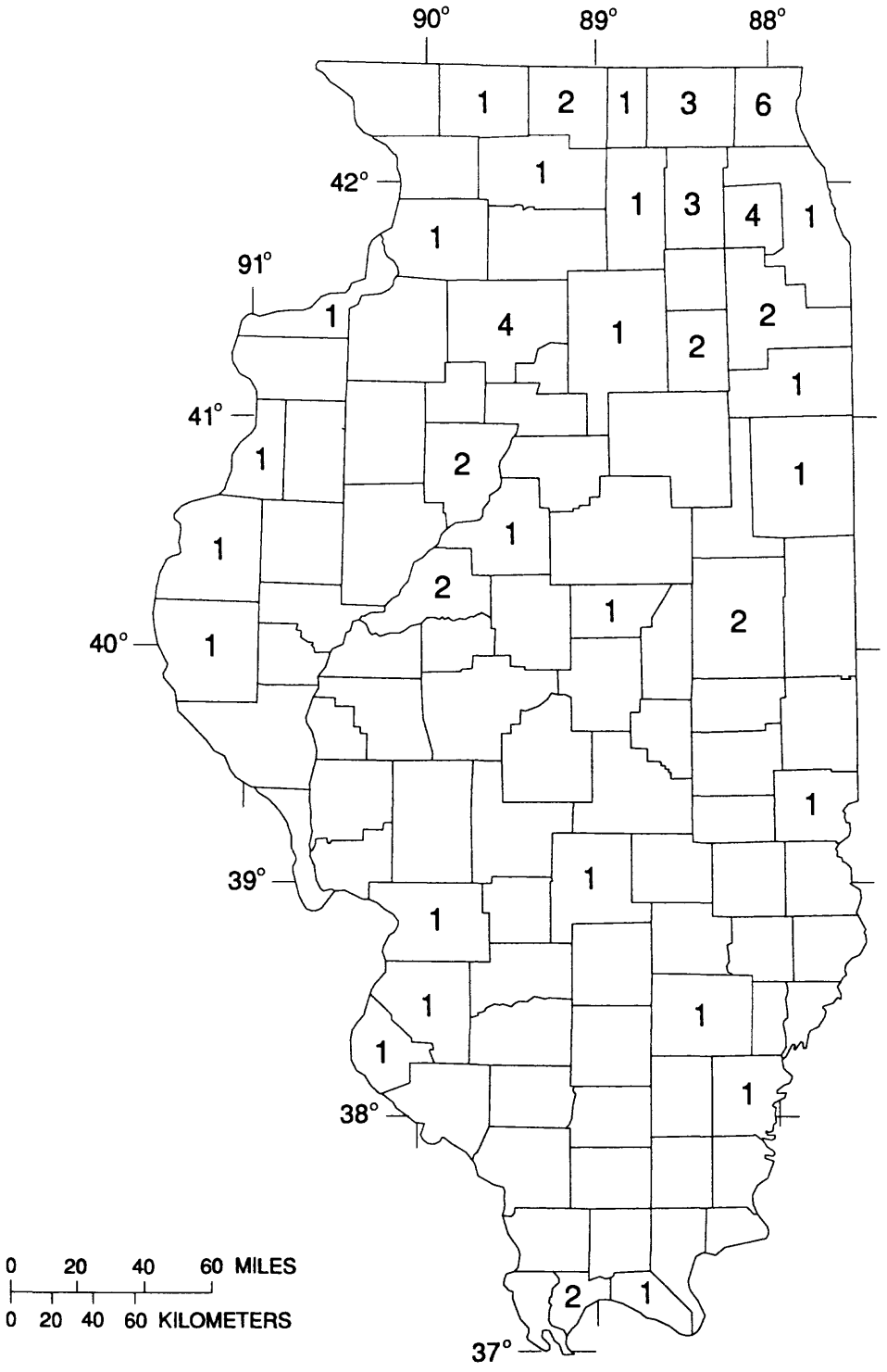


Figure 10. Ground-water stations in Illinois, by county.

DATA MANAGEMENT

The USGS Water Resources Division manages data from its own activities and from the activities of other water-oriented agencies.

National Water Data Storage and Retrieval System

The National WATer Data STOrage and REtrieval System (WATSTORE) of the USGS was established in November 1971 to computerize the water data of the USGS and to provide for more effective and efficient management of its data-related activities. The system is operated and maintained on the central computer facilities of the USGS at its National Center in Reston, Va., and on computers in District offices throughout the Nation as part of the Distributed Information System. Data may be obtained from WATSTORE through the 48 District Offices of the USGS Water Resources Division. General inquiries about WATSTORE may be directed to:

Chief Hydrologist
U.S. Geological Survey
437 National Center
Reston, VA 22092
(703) 648-5215

or

U.S. Geological Survey
Water Resources Division
102 East Main Street, 4th Floor
Urbana, IL 61801
Phone: (217) 398-5353

National Water-Data Exchange

The NAtional Water-Data EXchange (NAWDEX) is an interagency program to facilitate the exchange of water data and to promote the improvement of water-data handling procedures. Participants in the NAWDEX program are Federal, State, and local governments and interstate, academic, and private organizations that collect, store, and use water data. NAWDEX is managed by a Program Office, which is administered by the Water Resources Division. Information on sites for which water data are available, the types of data available, and the organizations that store the data is available from NAWDEX.

Services are available through the Program Office at the USGS National Center in Reston, Va., and a nationwide network of Assistance Centers in all 50 States, the District of Columbia, and Puerto Rico, which provide local and convenient access to NAWDEX facilities. A directory of assistance centers (Blackwell, 1990) that provides names of organizations and persons to contact, as well as addresses, telephone numbers, and office hours for each of these organizations, is available on request.

The NAWDEX program can assist any organization or individual in identifying and locating water data. To accomplish this service, NAWDEX maintains a computerized Master Water-Data Index that identifies sites for which water data are available, the type of data available for each site, and the organization retaining the data. The NAWDEX program also maintains a Water-Data Sources Directory identifying organizations from which water data may be obtained. In addition, NAWDEX has direct access to some large water-data bases of its members and has reciprocal agreements for the exchange of services with others. For additional information concerning the NAWDEX program or its services contact:

Program Office
National Water Data Exchange (NAWDEX)
U.S. Geological Survey
421 National Center
12201 Sunrise Valley Drive
Reston, VA 22092
Phone: (703) 648-6848
Hours: 7:00 to 4:30 eastern time

or

NAWDEX Assistance Center
Illinois
U.S. Geological Survey
Water Resources Division
102 East Main Street, 4th Floor
Urbana, IL 61801
Phone: (217) 398-5353
Hours: 8:00 to 4:30 central time

(PAGE 23 FOLLOWS)

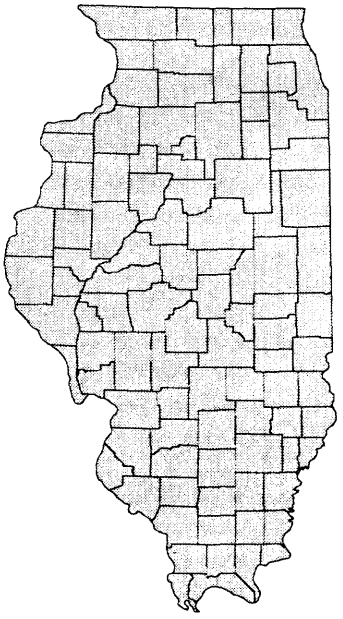
DESCRIPTIONS OF PROJECTS IN 1992

IL001 SURFACE-WATER STATIONS

LOCATION: Statewide

PROJECT CHIEF:
John K. LaTour
Urbana

PERIOD OF PROJECT:
Continuous since July 1930



COOPERATORS:
Illinois Department of Transportation, Division of Water Resources; Illinois Department of Energy and Natural Resources, State Water Survey; Illinois Environmental Protection Agency; The Metropolitan Water Reclamation District of Greater Chicago; Bloomington and Normal Sanitary District; Vermilion County Conservation District; Du Page County Department of Environmental Concerns; Forest Preserve District of Cook County; Forest Preserve District of Du Page County; Kane County Development Department; Danville Sanitary District; City of De Kalb; City of Decatur; City of Eureka; City of Monticello; City of Springfield; Boneyard Creek Commission; U.S. Army Corps of Engineers: Rock Island District, St. Louis District, Louisville District, Chicago District

PROBLEM: Surface-water information is needed for surveillance, planning, design, hazard warning, operation, and management, in water-related fields such as water supply, hydroelectric power, flood control, irrigation, bridge and culvert design, wildlife management, pollution abatement, flood-plain management, and water-resources development. An appropriate data base is necessary to provide this information.

OBJECTIVES: A. To collect surface-water data sufficient to satisfy information needs for current purposes, such as (1) assessment of water resources, (2) operation of reservoirs or industries, (3) forecasting, (4) disposal of wastes and pollution controls, (5) assessment of stream-water quality, (6) compact and legal requirements, and (7) research or special studies. B. To collect data necessary for analytical studies to define, for any location, the statistical properties of, and trends in, the occurrence of water in streams, lakes, etc., for use in planning and design.

APPROACH: Standard methods of data collection will be used as described in the report series, "Techniques of Water Resources Investigations of the United States Geological Survey." Partial-record gaging will be used instead of complete-record gaging where it serves the required purpose.

SUMMARY OF RESULTS: Routine data collection of surface-water information was done for 149 continuous-record stations, 21 partial-record stations, and 11 stage-only stations. Data published in the annual data report.

PLANS: Continue surface-water data collection with modifications to the data network. Install CR-10 data loggers and telephone modems with available funding. Renovate two gage-house structures. Develop

a network of gage observers through the "River Watchers," a statewide organization of over 100 high schools. Publish data in the annual data report.

PUBLISHED REPORTS:

Maurer, J.C., Sterling, J.M., Richards, T.E., and Hayes, P.D., 1992, Water resources data--Illinois, water year 1991, Volume 1. Illinois except Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-1, 425 p.

Richards, T.E., Hayes, P.D., and Sullivan, D.J., 1992, Water resources data--Illinois, water year 1991, Volume 2. Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-2, 515 p.

IL002 GROUND-WATER STATIONS

COOPERATOR:
Federal Program

LOCATION: Statewide

PROJECT CHIEF:
Charles F. Avery
Urbana

PERIOD OF PROJECT:
Continuous since April 1982

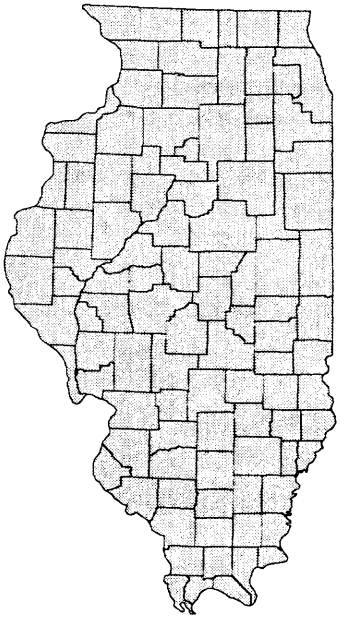
PROBLEM: Water-resource planning and ground-water quantity and quality assessment require a statewide base level of relatively standardized data. In Illinois, concentrated urbanization in the northeastern corner and intense farming and mining in much of the State require monitoring of ground water to assess the impact of man's activities on existing and potential water uses.

OBJECTIVES: To provide high quality data from a network of monitoring stations across the State and to achieve timely dissemination of data from this network, to all potential users, in a readily usable form.

APPROACH: Coordinate ground-water data-gathering efforts with State, local, and other Federal agencies in Illinois. Efforts will be directed to having all participants use current and uniform data collection and reporting procedures. Data collection is planned to meet site-specific needs and to provide a statewide baseline of information from which to evaluate the general status of the State's ground-water quantity and quality.

SUMMARY OF RESULTS: Measured water levels in one well in Du Page County, three piezometers and one well in Lake County, two wells in Bureau County, one well in Winnebago County, one well in Ogle County, one well in Kane County, and one well in Grundy County. Data published in the annual data report.

PLANS: Continue water-level data collection. Add one or two observation wells, to be measured quarterly, to the network.. Collect water samples for analysis at two or three sites. Publish data in the annual data report.



PUBLISHED REPORTS:

Maurer, J.C., Sterling, J.M., Richards, T.E., and Hayes, P.D., 1992, Water resources data--Illinois, water year 1991, Volume 1. Illinois except Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-1, 425 p.

Richards, T.E., Hayes, P.D., and Sullivan, D.J., 1992, Water resources data--Illinois, water year 1991, Volume 2. Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-2, 515 p.

IL003 QUALITY OF WATER STATIONS

COOPERATORS:

Illinois Environmental Protection Agency, Division of Water Pollution Control
The Metropolitan Water Reclamation District of Greater Chicago
Forest Preserve District of Du Page County

LOCATION:

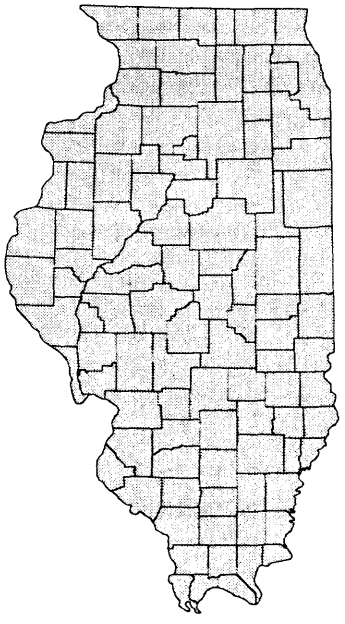
Statewide

PROJECT CHIEF:

Richard H. Coupe, Jr.
Urbana

PERIOD OF PROJECT:

Continuous since June 1967



PROBLEM: Water-resource planning and water-quality assessment require a statewide base level of relatively standardized data. In Illinois, dense urbanization, especially in the northeastern corner, and intense farming and mining in other parts of the State require monitoring to assess the impact of man's activities on existing and potential water uses.

OBJECTIVES: To provide high quality data from an extensive and coherent network of monitoring stations across the State. To achieve timely dissemination of data from this network, to all potential users, in a readily usable form.

APPROACH: Coordinate surface-water-quality data-gathering efforts among the USGS and State, local, and other Federal agencies in Illinois. Efforts will be directed toward having all participants use current and uniform sampling, analytical, and data-reporting procedures. Sampling and data collection are tailored to meet site-specific needs and to supply a baseline of information from which to evaluate the general nature of the State's surface-water quality.

SUMMARY OF RESULTS: Quality-assurance programs applied to field data collection and direct-service laboratory activities with Illinois Environmental Protection Agency (IEPA) have continued. All data from IEPA and USGS Water Resources Division laboratories have been reviewed and prepared for publication. Discharge values have been applied to the chemical data where possible. A report titled "Floating Sample-Collection Platform With Stage-Activated Automatic Water Sampler for Streams with Large Variation in Stage" was published. Data published in the annual data report.

PLANS: Collect water-quality data at six NASQAN stations and one cooperator site. Publish data in the annual data report.

PUBLISHED REPORTS:

Coupe, R.H., and Johnson, G.P., 1991, Triazine herbicides in selected streams in Illinois during storm events, spring 1990, in Mallard, G.E., and Aronson, D.A., eds., U.S. Geological Survey Toxic Substances Hydrology Program: U.S. Geological Survey Open-File Report 91-088, p. 65.

Maurer, J.C., Sterling, J.M., Richards, T.E., and Hayes, P.D., 1992, Water resources data--Illinois, water year 1991, Volume 1. Illinois except Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-1, 425 p.

Richards, T.E., Hayes, P.D., and Sullivan, D.J., 1992, Water resources data--Illinois, water year 1991, Volume 2. Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-2, 515 p.

Tarte, S.R., Schmidt, A.R., and Sullivan, D.J., 1992, Floating sample-collection platform with stage-activated automatic water sampler for streams with large variation in stage: U.S. Geological Survey Open-File Report 92-149, 14 p.

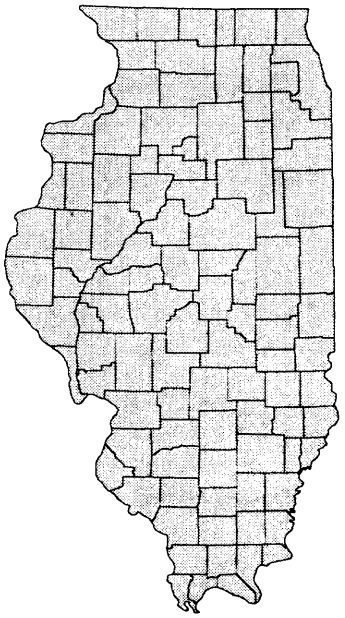
IL004 SEDIMENT STATIONS

COOPERATOR:
U.S. Army Corps of Engineers,
St. Louis District

LOCATION: Statewide

PROJECT CHIEF:
Richard H. Coupe, Jr.
Urbana

PERIOD OF PROJECT:
Continuous since January 1976



PROBLEM: Water-resource planning and water-quality assessment require a nationwide base level of information. Sediment concentrations and discharges in streams must be defined and monitored. A large percentage of the land in Illinois is devoted to agriculture whereby the land is exposed to erosion. Recent studies conducted under Section 208 of Public Law 92-500 have suggested sediment may be a major cause of water-quality degradation in Illinois. Other activities, such as highway construction and industrial and residential development, contribute sediment to streams. Planning and regulatory agencies need a data base to evaluate sediment transport in streams.

OBJECTIVES: To provide a data base for evaluating sediment problems in Illinois and a base from which the effectiveness of erosion control programs can be evaluated for their effect on water quality. To contribute to the national base of sediment data for use in broad Federal and State planning and action programs and to provide data for Federal management of interstate waters.

APPROACH: Establish and operate a network of sediment stations on Illinois streams to develop records of daily discharge of suspended sediment. Suspended-sediment stations will be located at long-term continuous-record surface-water discharge stations and will be used to establish relations between suspended-sediment discharge and surface-water discharge. These relations will be used to estimate long-term suspended-sediment yields of selected basins and predominant land-use areas. Supplementary information at most stations will include particle-size determinations of suspended-sediment and bed-material samples.

SUMMARY OF RESULTS: Suspended-sediment samples were collected and analyzed, and daily suspended-sediment concentrations and loads were computed for four continuous-streamflow sites. Published data in the annual data report.

PLANS: Continue sediment monitoring at four continuous-streamflow stations. Publish data in the annual data report.

PUBLISHED REPORTS:

Maurer, J.C., Sterling, J.M., Richards, T.E., and Hayes, P.D., 1992, Water resources data--Illinois, water year 1991, Volume 1. Illinois except Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-1, 425 p.

Richards, T.E., Hayes, P.D., and Sullivan, D.J., 1992, Water resources data--Illinois, water year 1991, Volume 2. Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-2, 515 p.

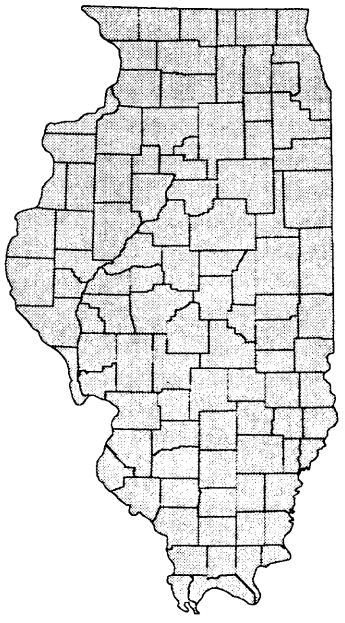
IL007 WATER USE

COOPERATORS:
Board of Trustees of the University of Illinois, State Water Survey
Illinois Environmental Protection Agency

LOCATION:
Statewide

PROJECT CHIEF:
John K. LaTour
Urbana

PERIOD OF PROJECT:
Continuous since March 1978



PROBLEM: A water supply is adequate or not depending upon present and future demands. Information is being collected in great detail describing the quantity and quality of available water in Illinois. However, water-use inventories generally have been conducted only intermittently or when a water supply has been adversely affected. Competing demands for water in Illinois dictate that adequate water-use information is essential for the proper management of available supplies.

OBJECTIVES: (1) Acquire water-use information throughout the State of Illinois as a basis for present analyses and future projections. (2) Develop and maintain a water-use data base that will be responsive to the data needs of users at local, State, and national levels. (3) Establish methods of estimating water use.

APPROACH: Responsibilities will be divided between the Illinois State Water Survey (ISWS), the Illinois Environmental Protection Agency (IEPA), and the USGS. The ISWS will obtain water-withdrawal and delivery data from questionnaires that they send to water users throughout the State. The ISWS and USGS will enter the data into a site-specific data base that is usable to both parties. The USGS will transfer the statewide data into the New State Water Use Data System (NEWSWUDS).

The IEPA will obtain return data by way of the National Pollutant Discharge Elimination System. The IEPA and USGS will enter the data into the IEPA's data base. The USGS will transfer the statewide data into the NEWSWUDS. The withdrawal, delivery, and return data will be aggregated by water-use category (water supply, commercial, industrial, fossil-fuel power, nuclear power, mining, hydroelectric, and sewage treatment) and location (county, hydrologic unit, and aquifer). Water uses by other categories (domestic, livestock, irrigation, and reservoir evaporation) will be estimated. The aggregations are done to meet State and national data needs.

SUMMARY OF RESULTS: In cooperation with the ISWS, 1991 withdrawal and delivery data were obtained. Data for 1989 were aggregated by category and location and entered into the Aggregated Water-Use Data System (AWUDS). In cooperation with the IEPA, 1991 return data were obtained and entered into the NEWSWUDS. A report titled "Contribution of Water Returns to Selected Streams in Illinois" has gone through colleague review.

PLANS: (1) Aggregate and enter 1990 water-use data into AWUDS. (2) Obtain 1990-91 site-specific withdrawal data. (3) Obtain 1992 return data. (4) Assign downstream-order numbers to return sites in NEWSWUDS for integration into the National Water Information System (NWIS) site file. (5) Integrate ISWS site-specific withdrawal data with return data and merge into NEWSWUDS.

PUBLISHED REPORTS:

Kirk, J.R.; Jarboe, Jacquelyn; Sanderson, E.W.; Sasman, R.T.; and Sinclair, R.A., 1979, Water withdrawals in Illinois, 1978: Illinois State Water Survey Circular 140, 34 p.

Kirk, J.R.; Jarboe, Jacquelyn; Sanderson, E.W.; Sasman, R.T.; and Lonnquist, Carl, 1982, Water withdrawals in Illinois, 1980: Illinois State Water Survey Circular 152, 47 p.

Kirk, J.R.; Sanderson, E.W.; and Sasman, R. T., 1984, Water withdrawals in Illinois, 1982: Illinois State Water Survey Circular 161, 43 p.

Kirk, J.R.; Hlinka, K.J.; Sasman, R.T.; and Sanderson, E.W., 1985, Water withdrawals in Illinois, 1984: Illinois State Water Survey Circular 163, 43 p.

Kirk, J.R., 1987, Water withdrawals in Illinois, 1986: Illinois State Water Survey Circular 167, 43 p.

LaTour, J.K., 1991, Determination of water use in Rockford and Kankakee areas, Illinois: U.S. Geological Survey Water-Resources Investigations Report 90-4166, 70 p.

IL075 UPPER ILLINOIS RIVER BASIN WATER-QUALITY ASSESSMENT

COOPERATOR:
Federal Program

LOCATION: Upper Illinois River Basin

PROJECT CHIEF:
Arthur R. Schmidt
Urbana

PERIOD OF PROJECT:
Continuous since April 1986

PROBLEM: Protecting the quality of the Nation's ground-water and surface-water resources is a priority national concern. The quality of the Nation's water resources has a direct impact on public health and on the economic success of agriculture, industry, and recreation. The impacts of degraded water quality on public health or economic success may be related to short-term or long-term effects. In 1986, the USGS initiated a NAtional Water-Quality Assessment (NAWQA) program to help address problems related to degraded water quality. This program is in a pilot phase that will test, and modify as necessary, concepts and approaches in preparation for possible full implementation in the future. The upper Illinois River Basin project is one of seven pilot water-quality studies initiated in the pilot phase of the NAWQA program.

OBJECTIVES: (1) To provide a description of existing surface-water-quality conditions. (2) Develop conceptual models that relate observed conditions to sources and causes. (3) Track long-term trends in water quality. (4) Improve the understanding of the linkage between causative factors and water quality.

APPROACH: A liaison committee consisting of representatives of Federal, State, and local agencies will be formed to provide a forum for the USGS to inform interested parties of NAWQA plans and findings, to seek advice, to identify existing data and reports, and to establish collaborative efforts to supplement the NAWQA program. Existing data and reports will be compiled and summarized to provide a description of past and current trends in conditions. Descriptive information that may aid in the interpretation of trends will be compiled. Simple statistical methods, such as regression analysis, will be used to relate observed trends to the descriptive information. New data will be collected from the operation of a fixed-location river-sampling station network and from synoptic surveys. Reports describing project plans, data, and findings will be published.

SUMMARY OF RESULTS: The fixed-station sampling program was discontinued in April 1992. The reports on analysis of existing information, changes in wastewater treatment and water quality, and data on agricultural organic compounds were colleague reviewed and are being revised for Director's approval. Three reports were approved and covered the following subjects: (1) data on nonagricultural organic compounds, (2) spatial distribution on trace elements in sediment, and (3) sediment and water quality in the upper Illinois River Basin. The project liaison committee met once to discuss results to date and future plans.

PLANS: Continue to summarize and interpret water-quality data for the basin. Complete and publish all planned reports for the project.

PLANNED REPORTS:

Analysis of available water-quality information
Relation of changes in treatment plants to changes in water quality
Trace elements in water, sediment, and biota
Organic compounds in water, sediment, and biota
Nutrients, dissolved oxygen, and fecal-indicator bacteria

REPORTS IN PROCESS:

Surface-water quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Geochemical data report on major and trace elemental analyses of fine-fraction streambed sediments

Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Fixed-station network, water-quality data, April 1987 to September 1990

Spatial distribution of trace elements in the fine-fraction of streambed sediment in the upper Illinois River Basin, 1987

Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Data on agricultural organic compounds in water, April 1988 through August 1990

Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Data on manmade non-agricultural volatile and semivolatile organic compounds in water, May 1988 through March 1990

PUBLISHED ABSTRACTS AND PAPERS:

Terrio, P.J., 1987, Methods for selecting bottom-material sampling sites in the upper Illinois River Basin, in Program and Abstracts, Illinois State Section of the American Water Resources Association, 1987 Annual Conference, April 28-29, 1987, Champaign, Illinois, p. 32.

Blanchard, S.F., 1989, Surface-water quality of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin--analysis of existing information, in Pederson, G.L., and Smith, M.M., comps., U.S. Geological Survey Second National Symposium on Water Quality: U.S. Geological Survey Open-File Report 89-409, p. 5.

Ruhl, P.M., and Striegl, R.G., 1989, Relations between fish population and water quality in the upper Illinois River Basin in Illinois, Indiana, and Wisconsin--analysis of existing information, in Pederson, G.L., and Smith, M.M., comps., U.S. Geological Survey Second National Symposium on Water Quality: U.S. Geological Survey Open-File Report 89-409, p. 80-81.

Smith, S.M.; Sanzolone, R.F.; and Colman, J.A., 1989, Use of multivariate techniques for background and anthropogenic-source analysis of trace elements in Streambed materials in the upper Illinois River Basin in Illinois, Indiana, and Wisconsin, in Pederson, G.L., and Smith, M.M., comps., U.S. Geological Survey Second National Symposium on Water Quality: U.S. Geological Survey Open-File Report 89-409, p. 93.

Stanke, F.A., 1989, Using a geographic information system to relate human and natural factors to stream-water quality in the upper Illinois River Basin in Illinois, Indiana, and Wisconsin, in Pederson, G.L., and Smith, M.M., comps., U.S. Geological Survey Second National Symposium on Water Quality: U.S. Geological Survey Open-File Report 89-409, p. 96.

Terrio, P.J., 1989, Occurrence and distribution of nutrients and dissolved oxygen in the upper Illinois River Basin in Illinois, Indiana, and Wisconsin--results of a 1988 low-flow synoptic survey, in Pederson, G.L., and Smith, M.M., comps., U.S. Geological Survey Second National Symposium on Water Quality: U.S. Geological Survey Open-File Report 89-409, p. 100-101.

Terrio, P.J., 1991, Occurrence and distribution of nutrients, dissolved oxygen, and Escherichia Coli bacteria in the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Results of a 1988 low-flow synoptic survey, in Program and Abstracts, 1991 Annual Conference, Illinois State Section of the American Water Resources Association, October 21, 1991, Peoria, Illinois.

Schmidt, A.R., 1992, Sediment and water quality in the upper Illinois River Basin, in Proceedings, 1991 Governor's Conference on the Management of the Illinois River System, October 22-23, 1991, Peoria, Illinois, p. 78-87.

PUBLISHED REPORTS:

Mades, D.M., 1987, Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Project description: U.S. Geological Survey Open-File Report 87-473, 39 p.

Steffeck, D.W., and Striegl, R.G., 1989, An inventory and evaluation of biological investigations that relate to stream-water quality in the upper Illinois River Basin of Illinois, Indiana, and Wisconsin: U.S. Geological Survey Water-Resources Investigations Report 89-4041, 54 p.

Zogorski, J.S.; Blanchard, S.F.; Romack, R.D.; and Fitzpatrick, F.A., 1990, Availability and suitability of municipal wastewater information for use in a national water-quality assessment: A case study of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: U.S. Geological Survey Open-File Report 90-375, 68 p.

Colman, J.A., and Sanzolone, R.F., 1991, Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Geochemical data for fine-fraction streambed sediment from high- and low-order streams, 1987: U.S. Geological Survey Open-File Report 90-571, 108 p.

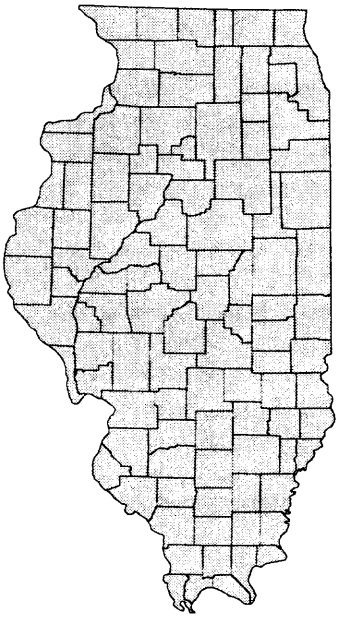
IL080 USGS/USEPA INTERAGENCY AGREEMENT PROJECTS

COOPERATOR:
U.S. Environmental Protection Agency, Region V

LOCATION: Statewide

PROJECT CHIEF:
Robert T. Kay
De Kalb

PERIOD OF PROJECT:
Continuous since March 1986



PROBLEM: The U.S. Environmental Protection Agency (USEPA), Region V, has requested that the USGS, Illinois District, provide technical assistance on several Superfund sites within the State. The technical assistance varies from reviewing technical reports submitted to USEPA by their consultants to designing and conducting hydrogeologic investigations at Superfund sites and regional areas of environmental concern.

OBJECTIVES: To provide technical consultation, training, and quality assurance and to conduct investigations for the USEPA under the conditions of the Joint Interagency Agreement.

APPROACH: Design, conduct, and analyze hydrogeologic and water-quality-data activities at the Southeast Rockford, Byron Salvage Yard, and Parson's Casket Superfund sites. Design and conduct area-wide hydrogeologic studies in the Belvidere area and northern Illinois and central Wisconsin. Analyze data collected during investigations at the ACME Solvents and Pagel's Pit sites. Provide technical review on results of work at the HOD Landfill, Superior Street, Tri-County Landfill, ACME Solvents, and Pagel's Pit sites. Write a report disclosing results of USGS data analysis of hydrogeologic conditions at ACME Solvents and Pagel's Pit.

SUMMARY OF RESULTS: (1) Provided technical review of reports and work plans at the Tri-County Landfill, Southeast Rockford, HOD Landfill, Superior Street, ACME Solvents, and Pagel's Pit sites. (2) Completed field work for study of ground-water/surface-water interactions, Byron Salvage Yard area. (3) Completed field work on studies of hydrogeology and contaminant distribution in fractured dolomite aquifers at Byron Salvage Yard and Parson's Casket sites. (4) Began field work and data analysis for Belvidere and Galena-Platteville area studies.

PLANS: (1) Complete report writing of Water-Resources Investigations Report for fractured-rock study at the Byron and Parson's Casket sites. (2) Finish data collection and analysis for area-wide studies at the Southeast Rockford site. Write report and submit for review. (3) Continue data collection for Belvidere and Galena-Platteville area studies.

PLANNED REPORTS:

Ground-Water/Surface-Water Interactions, Byron Salvage Yard Area
Hydrogeology, Aquifer Tests, Water-Quality Sampling, Byron Salvage Yard
Hydrogeology, Aquifer Tests, Water-Quality Sampling, Parson's Casket

PUBLISHED ABSTRACTS:

Kay, R.T.; Ryan, B.J.; Mears, E.J.; and Yeskis, D.J., 1987, Hydrogeology of the Byron/Johnson Salvage Yard Superfund site near Byron, Illinois, in Proceedings of the ASCE Water Resources Symposium, October 21-22, 1987, Rosemont, Illinois.

Ryan, B.J.; Kay, R.T.; and Wallace, K.A., 1987, Hydraulic testing in two aquifers at a superfund site near Byron, Illinois, in Program with Abstracts, 32nd Annual Midwest Ground Water Conference, October 28-30, 1987, Madison, Wisconsin

Avery, C.F.; Yeskis, D.J.; and Bolen, W.F., 1991, Interaction of ground water with the Rock River near Byron, Illinois, in Programs and abstracts, American Geophysical Union 1991 Fall Meeting, December 9-13, 1991, San Francisco, California

PUBLISHED REPORTS:

Kay, R.T.; Olson, D.N.; and Ryan, B.J., 1989, Hydrogeology and results of aquifer tests in the vicinity of a hazardous-waste disposal site near Byron, Illinois: U.S. Geological Survey Water-Resources Investigations Report 89-4081, 55 p.

Kay, R.T. and Earle, J.D., 1990, Determination of hydraulic properties in the vicinity of a landfill near Antioch, Illinois: U.S. Geological Survey Water-Resources Investigations Report 89-4124, 28 p.

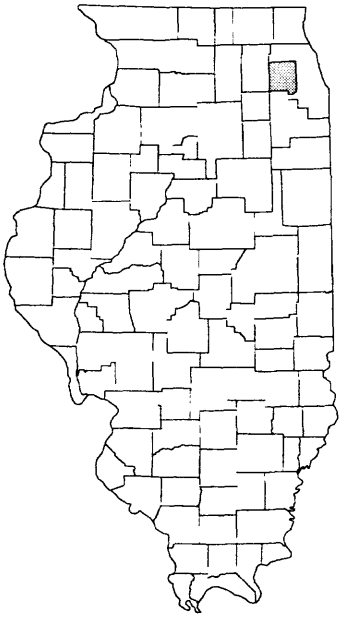
IL083 RAINFALL-RUNOFF RELATIONS IN THREE SMALL WATERSHEDS IN DU PAGE COUNTY

COOPERATOR:
Du Page County, Department of Environmental Concerns

LOCATION:
Du Page County, Illinois

PROJECT CHIEF:
James J. Duncker
Urbana

PERIOD OF PROJECT:
October 1987 through September 1994



PROBLEM: Little information about the variation in time and space of rainfall and corresponding storm runoff exists in Du Page County. The development of a comprehensive, county-wide storm-water-management program in Du Page County requires an understanding of rainfall-runoff relations. Actual runoff data are needed for developing rainfall-runoff relations.

OBJECTIVES: (1) Determine rainfall-runoff relations in three small watersheds using observed data and rainfall-runoff modeling. (2) Analyze differences in rainfall-runoff relations between watersheds and relate differences to causative factors such as land use.

APPROACH: Streamflow and meteorologic data will be collected in three small watersheds in northeastern Illinois. Continuous records of stage and discharge will be collected in each watershed. At least three rain gages per watershed will be installed. Other pertinent data, such as land use and soil type, will be obtained from existing sources. These data will be used to calibrate a continuous simulation rainfall-runoff model for each watershed. A subset of the data collected will be set aside for verification.

SUMMARY OF RESULTS: Streamflow and rainfall data-collection activities were continued throughout the year. A rainfall-data report was completed and received Director's approval. Rainfall-runoff modeling with the application of the Hydrological Simulation Program--Fortran (HSPF) model continued throughout the year.

PLANS: Data collection and analysis activities will continue throughout the 1993 water year. The HSPF model will be calibrated and verified to a revised landcover data set that the cooperator is providing. The rainfall-runoff modeling report will be completed and sent to colleague review during the 1993 water year.

REPORTS IN PROCESS:

Rainfall data collected during 1986-91 in Du Page County, Illinois
Rainfall-runoff relations in three small watersheds in Du Page County, Illinois

IL084 ANALYSIS OF EXISTING BIOLOGICAL DATA FOR THE UPPER ILLINOIS RIVER BASIN

COOPERATOR:
Federal Program

LOCATION:
Upper Illinois River Basin

PROJECT CHIEF:
Peter M. Ruhl
Urbana

PERIOD OF PROJECT:
January 1988 through September 1992

PROBLEM: Implementation of the surface-water component of the NAtional Water-Quality Assessment (NAWQA) program requires the use of biological information to aid in the interpretation of water-quality data and enhance the understanding of changes in stream quality. Although the incorporation of biological monitoring into water-quality assessments generally is accepted as being important, there is no consensus as to the specific kinds of biological information that are necessary to accurately evaluate changes in stream quality. Although descriptively accurate, biological information may be quantitatively intangible for evaluating changes in water.

OBJECTIVES: To analyze existing data to describe relations between the chemical measure of water quality and the distribution, abundance, community structure, and organism health of aquatic macrobiota. To obtain a better understanding of the kinds of biological information and analyses that might be useful for regional water-quality assessments.

APPROACH: Assemble existing biological data from some 200 different sources identified in an earlier inventory. Construct a computerized biological data base. Analyze the relation between biological information regarding distribution, abundance, community structure, organism health, and bioaccumulation of chemicals and water-chemistry data. Several techniques including ordination and classification of the biological data will be used. Interpret findings based on the physical habitat, toxicological information, and biological relations. Publish a report describing the project findings.

SUMMARY OF RESULTS: Analyses of fish community, water-quality, streambed-sediment quality, and habitat were completed. Results indicate that gradients in fish-community structure and composition are correlated to water- and sediment-quality characteristics typical of urban areas and wastewater and industrial discharges. Results from multivariate analyses of fish community composite and structure correlate strongly with results from the commonly used "Index of Biotic Integrity." Results also indicate gradients in fish community related to stream site and discharge. Project is completed except for the report.

PLANS: Complete and publish report.

PLANNED REPORT:

Fish community composition and structure and fish condition factors as related to water and sediment quality in the upper Illinois River Basin, Illinois, 1978-86

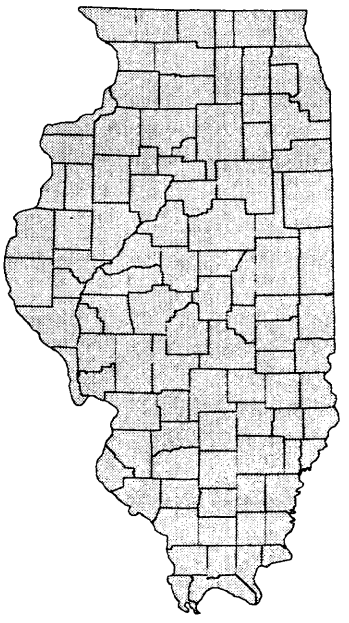
IL086 A STATISTICAL AND GRAPHICAL DESCRIPTION OF ILLINOIS GROUND-WATER QUALITY

COOPERATOR:
Illinois Environmental Protection Agency

LOCATION:
Statewide

PROJECT CHIEF:
Kelly L. Warner
Urbana

PERIOD OF PROJECT:
August 1988 through September 1993



PROBLEM: The public water-supply well information collected by the Illinois Environmental Protection Agency (IEPA) and USGS is the largest statewide ground-water water-quality data base. This information has never been statistically or graphically summarized. The new Illinois Ground Water Protection Act mandates new and continued assessment of Illinois ground-water quality.

OBJECTIVE: To statistically and graphically present ambient Illinois ground-water quality based on water-quality information from public water-supply wells.

APPROACH: The National Water Information System statistical packages and a Geographic Information System (GIS) will give accurate tabular and graphic representation of Illinois ground water. Other explanatory statistics may be applied. Correlations and spatial trends will be explored. A statewide ground-water-quality network will be designed and statistically evaluated.

SUMMARY OF RESULTS: Presented poster session and published abstract "Application of a Geographic Information System to a Ground-Water-Quality Assessment in Illinois." Finished design of a pesticide network for Illinois Environmental Protection Agency. Contracted Smyth Consulting to do statistics work. Reselected wells to substitute for wells that have been shut down. Continued sampling.

PLANS: Publish report on inorganics in public-supply wells in Illinois. Document statistical approach for pesticide network design. Continue water-quality sampling.

PLANNED REPORTS:

Selected inorganic constituent concentrations in public-supply wells in Illinois

Trends in ground-water-quality data for public-supply wells in Illinois

PUBLISHED ABSTRACT:

Warner, K.L., and Wolfe, M.A., 1992, Application of a geographic information system to a ground-water-quality assessment in Illinois, in Program and Abstracts, Fifth Annual Midwest/Great Lakes User Conference, October 23-25, 1991, Indianapolis, Indiana.

PUBLISHED REPORTS:

Maurer, J.C.; Sterling, J.M.; Richards, T.E.; and Hayes, P.D., 1992, Water resources data--Illinois, water year 1991, Volume 1. Illinois except Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-1, 425 p.

Richards, T.E.; Hayes, P.D.; and Sullivan, D. J., 1992, Water resources data--Illinois, water year 1991, Volume 2. Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-2, 515 p.

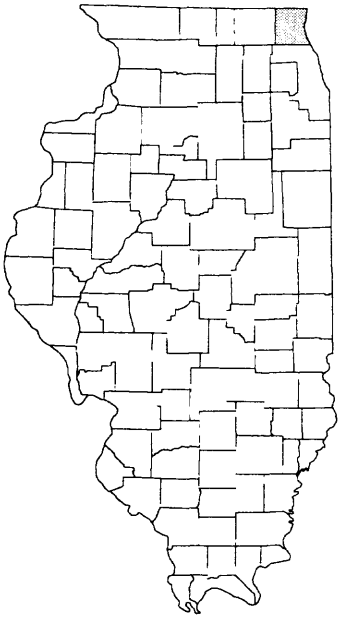
IL089 RAINFALL-RUNOFF RELATIONS IN EIGHT WATERSHEDS IN LAKE COUNTY, ILLINOIS

COOPERATOR:
Lake County Department of Planning, Zoning, and Environmental Quality

LOCATION:
Lake County, Illinois

PROJECT CHIEF:
James J. Duncker
Urbana

PERIOD OF PROJECT:
June 1989 through September 1993



PROBLEM: Lake County is an urbanizing county north of Chicago. State legislation, partly prompted by recent record flooding, has given the county responsibility for stormwater management. To address this responsibility, the county needs knowledge of the rainfall-runoff relations for its watersheds, and how these relations may be influenced by changing land-use and engineering constraints.

OBJECTIVES: (1) Determine the rainfall-runoff relations for eight watersheds in Lake County. (2) Define the rainfall-runoff relations for major land-use categories and soil types prevalent in the county.

APPROACH: (1) Establish a network of rainfall- and streamflow-gaging stations. (2) Calibrate and verify a distributed-parameter rainfall-runoff model using the collected data. (3) Relate the hydrologic and hydraulic characteristics of the watersheds to the rainfall-runoff relations of the watersheds with regression analysis.

SUMMARY OF RESULTS: Streamflow and rainfall data collection continued in five watersheds and four hydrologic response units throughout the water year. Land-cover analysis of the five watersheds from aerial photography continues. Assistance in the land-cover analysis is being provided by the Ideas Laboratory at the National Mapping Division, Rolla, Missouri. Calibration of the Hydrological Simulation Program--Fortran (HSPF) model has been completed for three of the four hydrologic response units.

PLANS: Continue data collection and analysis through the 1993 water year. Continue calibration of the HSPF model for the hydrologic response units and watersheds. Complete the aerial photo analysis.

PLANNED REPORTS:

Rainfall in and near Lake County, Illinois, 1989-92
Rainfall-runoff relations in Lake County, Illinois

IL091 TECHNIQUES FOR FLOOD-FREQUENCY ANALYSIS IN CHANGING WATERSHEDS

COOPERATORS:

Du Page County, Department of Environmental Concerns
Illinois Department of Transportation, Division of Water Resources

LOCATION:

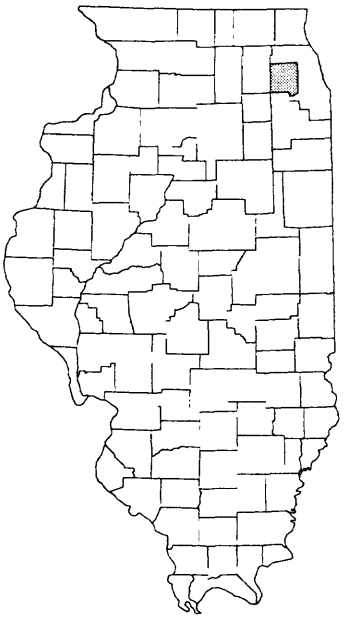
Du Page County, Illinois

PROJECT CHIEF:

Audrey L. Ishii
Urbana

PERIOD OF PROJECT:

October 1989 through June 1992



PROBLEM: Methods in flood-frequency analysis for planning and design in urbanizing and regulated watersheds rely on the use of state-of-the-art hydrologic and hydraulic models in order to avoid violating the assumptions in traditional frequency analysis methods. These techniques have not been thoroughly tested, and some results have indicated misleading and inconsistent results when applying log-Pearson Type III analysis to simulated flood peaks under various land-use scenarios. There is a need for developing new methodologies for frequency analysis and testing and verifying the new methods and required models.

OBJECTIVES: To explore, develop, and evaluate techniques for determining accurate flood-frequency estimates using hydrologic/ hydraulic models in rapidly changing urban watersheds.

APPROACH: This study will be a three-pronged effort. The modeling literature will be thoroughly reviewed in order to compare and contrast the available hydrologic and hydraulic models and flood-frequency analysis techniques including the stochastic generation of rainfall for input into a continuous simulation model. This will be carried out by scientists at the Illinois State Water Survey (ISWS). New techniques for flood-frequency analysis will be investigated by scientists at the University of Wisconsin. These will include developing flood recurrence intervals by continuous simulation of long streamflow record to produce a base condition (with calculated frequencies) and comparing alternative scenarios to the base condition by using the same set of storms under the new conditions, performing flood-frequency analysis on flood volumes, and relating flood peaks to volumes. These techniques are to be tested on actual field situations and through Monte Carlo simulations. Finally, the suitability of one-dimensional, unsteady flow modeling to flood-frequency analysis will be investigated. Streamflow record containing events that violate the implicit assumptions of a one-dimensional model will be obtained by (1) operating a dam on a major river in such a manner as to generate a relatively deep wave, and (2) collecting stage and discharge data at a culvert during changing flow conditions and during an overbank event. Dye data will be utilized in order to test the total flow field of the flow model by inputting it to a Langrangian transport model. All efforts will be coordinated in regular meetings with the cooperators and their contractees.

SUMMARY OF RESULTS: The project was completed with the publication of three reports. The first, by H.V. Knapp and others (1991) of the ISWS entitled "A Review of Rainfall-Runoff Modeling For Stormwater Management," is a literature review of rainfall-runoff methodologies. The second by A.A. Bradley and K.W. Potter (1991) entitled "Flood Frequency Analysis for Evaluating Watershed Conditions with Rainfall-Runoff Models," suggests a method of scaling rainfall-runoff events to a base condition using relations determined between flood quartiles for consistent flood-frequency estimates. The

third report, by A.A. Bradley and K.W. Potter (1992), entitled "Flood-Frequency Analysis of Simulated Flows," presents a total runoff volume method of determining flood frequencies. The data report for the dye and discharge synoptic has been moved to project IL099 at the request of the cooperator. Project is complete.

PUBLISHED REPORTS:

Knapp, H.V.; Durgunoglu, Ali; and Ortel, T.W., 1991, A review of rainfall-runoff modeling for stormwater management: Illinois State Water Survey Contract Report 516, 92 p.

Bradley, A.A., and Potter, K.W., 1991, Flood-frequency analysis for evaluating watershed conditions with rainfall-runoff models: American Water Resources Association, Water Resources Bulletin, v. 27, no. 1, p. 83-91.

Bradley, A.A., and Potter, K.W., 1992, Flood-frequency analysis of simulated flows: American Geophysical Union, Water Resources Research, v. 28, no. 9, p. 2375-2385.

IL093 USE OF CO-REGISTERED SLAR AND TM IMAGERY TO CLASSIFY AND MAP LAND COVER IN NORTHEASTERN ILLINOIS

COOPERATORS:

Illinois Department of Conservation
Du Page County, Department of Environmental Concerns
Kane County Forest Preserve District
Kane County Development Department
Northeastern Illinois Planning Commission

LOCATION:

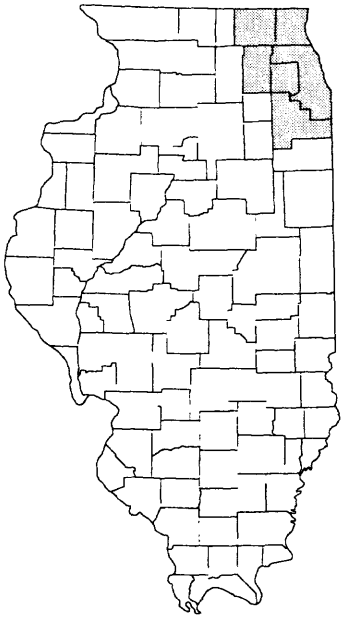
Northeastern Illinois

PROJECT CHIEF:

Robin B. King
Urbana

PERIOD OF PROJECT:

January 1991 through March 1993



PROBLEM: Wetlands and other land cover in the six-county Chicago metropolitan area in northeastern Illinois are undergoing rapid changes in response to substantial economic growth and a rapidly growing suburban population. This area is the site of numerous surface-water, ground-water, and water-quality investigations by both the Illinois District of the USGS and several Federal, State, and local agencies. Most current wetlands and other land cover digital data are outdated and of relatively poor spatial resolution. A critical need exists to update the digital land cover of northeastern Illinois at an improved spatial resolution in a format compatible with the appropriate geographic information system (GIS). This need is especially critical with respect to the wetlands of northeastern Illinois.

OBJECTIVES: (1) Create an updated digital data base of wetlands and other selected land-cover features of the six-county northeastern Illinois area at an improved resolution of approximately 0.22 acre per pixel (picture element). (2) Interface the updated land cover digital data base with a GIS that is compatible with the input requirements of District and (or) cooperator computer systems and hydrologic modeling programs.

APPROACH: (1) Merge Side-Looking Airborne Radar (SLAR) imagery with satellite-based Thematic Mapper (TM) imagery. (2) Classify the merged imagery with two techniques: (a) guided clustering and then (b) neural network analysis. Assess accuracy of classification. (3) Convert the classified raster-based imagery to a vector format and load to a GIS. The project will be executed in two distinct phases. The first phase will involve the guided clustering analysis. The second phase will involve the neural network analysis.

SUMMARY OF RESULTS: Phase one: Co-registration and rectification of the TM and SLAR is complete. Image classification (guided clustering) is complete. Annotated outline for the first planned report is complete and has been approved by the Northeastern Region. Phase two: Neural network simulations are 80 percent complete. Analysis and interpretation of results are 25 percent complete. An annotated outline for the second report is awaiting Regional approval.

PLANS: Perform accuracy assessment on phase one results; modify and reiterate analysis procedures as needed. Complete simulations and interpret results for phase two. Complete planned reports.

PLANNED REPORTS:

Classification of multisource remote sensor imagery for terrain characterization in northeastern Illinois
Sensitivity of an artificial neural network image classifier to selected training strategies

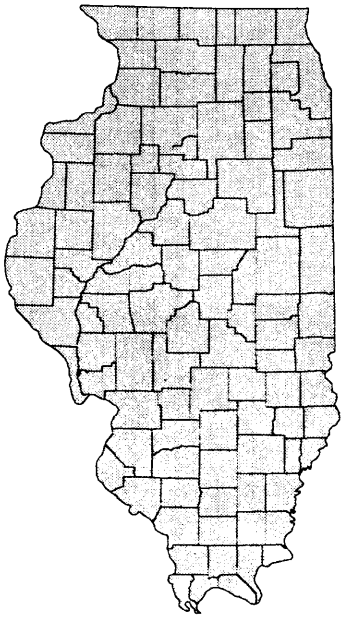
IL095 CHLORINE STABLE ISOTOPE COMPOSITION OF BRINES FROM THE LOWER PALEOZOIC SEDIMENTS OF THE ILLINOIS BASIN

COOPERATOR:
Northern Illinois University

LOCATION: Statewide

PROJECT CHIEF:
Angel Martin, Jr.
Urbana

PERIOD OF PROJECT:
June 1991 through September 1992



PROBLEM: In some parts of the Illinois Basin, surface water and shallow drinking water aquifers have been contaminated by saline waters from lower Paleozoic sediments. A recent study of saline formation waters in the Michigan Basin suggests that saline formation waters have a distinguishable chlorine isotope composition. If so, chlorine isotope composition could be used to trace saline formation waters in the Illinois Basin and other sedimentary basins in the Midwest.

OBJECTIVES: (1) To determine the isotopic variability in the Illinois Basin for purposes of tracing saline water contamination in fresh-water aquifers. (2) To search for characteristic isotope signatures for major formation groups. (3) To determine if formation waters of similar age in adjacent basins have the same chlorine isotope ratios.

APPROACH: (1) Literature review of chlorine isotopes and the Illinois Basin. (2) Collect about 20 formation-water samples from Paleozoic sediments and overlying aquifers. (3) Analyze the samples for major chemical constituents, trace elements, and strontium and chlorine isotopes. (4) Analyze about 15 saline-water samples, which were previously collected from the Alberta, Michigan, and Appalachian Basins, for chlorine isotopes. (5) Evaluate the results of the analyses and write a journal article.

SUMMARY OF RESULTS: Twenty spring- and formation-water samples were taken and analyzed for major chemical constituents, trace elements, and strontium and chlorine isotopes by X-ray fluorescence (XRF). The XRF is an effective technique but interference occurred between bromium and aluminum. An outline of the journal article describing study results has been completed. Chlorine isotope analysis is well underway. Project is complete except report.

PLANS: Complete chlorine isotope analysis currently being performed at the University of Waterloo. Write and submit article for publication in a refereed journal.

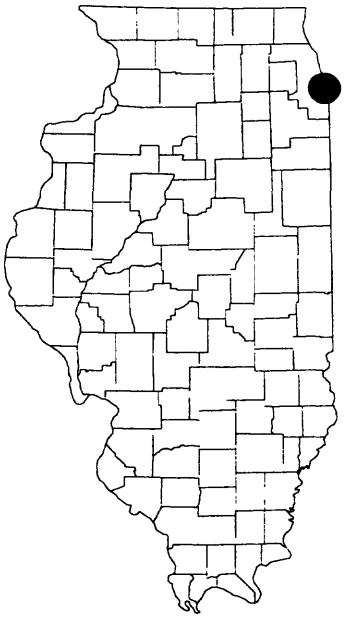
IL096 HYDROGEOLOGY AND CONTAMINANT ASSESSMENT IN THE SOUTHEAST CHICAGO AREA

COOPERATOR:
U.S. Environmental Protection Agency, Region V

LOCATION:
Southeast Chicago

PROJECT CHIEF:
Robert T. Kay
De Kalb

PERIOD OF PROJECT:
September 1991 through September 1993



PROBLEM: The U.S. Environmental Protection Agency, Region V, has requested that the USGS, Illinois District, conduct an investigation designed to define the hydrogeologic and water-quality conditions in the southeast Chicago area. This area has significant surface-water and ground-water contamination which presents a significant potential hazard.

OBJECTIVES: Characterize the hydrology of the surface-water and shallow ground-water system in the area of southeast Chicago. Characterize aquifer properties and water quality in the area. Identify the nature and extent of a potential non-aqueous phase liquid layer, if present, in the study area.

APPROACH: Conduct one or more synoptic water-level surveys in the study area. Conduct drilling, hydraulic testing, and water-quality sampling to determine the type of contamination present in the study area.

SUMMARY OF RESULTS: Completed the synoptic water-level survey in southeast Chicago and northwest Indiana. Water levels and the presence of non-aqueous phase liquids in over 700 wells were measured. About 10 monitoring wells were installed in areas of limited data. The annotated outline for the report describing study results has been written and approved.

PLANS: Conduct aquifer tests. Collect water-quality samples in selected wells. Compile and analyze data. Write report.

PLANNED REPORT:

Ground-water levels and directions of flow and presence of light non-aqueous-phase liquids in ground water in northwestern Indiana and the Lake Calumet area of northeastern Illinois

IL097 SEDIMENTATION OF THE KANKAKEE RIVER

COOPERATOR:
Kankakee Soil and Water Conservation District

LOCATION:
Kankakee River Basin (northeastern Illinois and northwestern Indiana)

PROJECT CHIEF:
Richard H. Coupe, Jr.
Urbana

PERIOD OF PROJECT:
May 1992 through September 1996

PROBLEM: Sedimentation in the Kankakee River in Illinois has been a major concern to Illinois residents for many years. Previous studies (Bhowmik and Bogner, Illinois State Water Survey, 1981; Gross and Berg, Illinois State Geological Survey, 1981) concluded that extensive drainage of the wetlands and channelization of the Kankakee River did cause increased sedimentation, but, by the early 1950's, the river had reached equilibrium and further sedimentation was not observed. However, during the 11 years since the State studies were completed, Illinois residents who use the river continue to be concerned about whether or not sedimentation has continued to increase.

OBJECTIVES: (1) Determine the long-term sedimentation rate in the flood plain and compare rates in channelized and natural reaches of the river, (2) determine changes in channel geometry and volume over the past 30 years from the dam at Kankakee to the State line, and (3) determine a suspended-sediment budget for the central portion of the Kankakee River Basin.

APPROACH: The study will build on and extend the previous work of the State Surveys and the Illinois Department of Transportation, Division of Water Resources. Long-term flood-plain sedimentation rates will be estimated using dendrogeomorphic techniques. The rate of sedimentation in the channel will be determined by measuring changes in channel geometry for selected reaches of the river over the past 30 years. A long-term sediment monitoring program will be initiated that will be used to calculate a sediment budget.

SUMMARY OF RESULTS: Data collection for the dendrogeomorphic work has been completed.

PLANS: Install sediment discharge stations and begin collecting sediment data at six sites in the Kankakee River Basin. A report summarizing the results of the dendrogeomorphic work will be written.

PLANNED REPORTS:

Dendrogeomorphic techniques used in estimating long-term flood-plain sedimentation rate along the Kankakee River

Evaluation of channel geometry investigation on the Kankakee River

Suspended-sediment data collected during 1992-95 on the Kankakee River

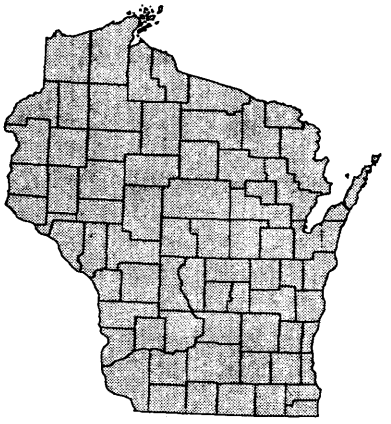
IL098 TRANSPORT AND FATE OF VOLATILE ORGANIC COMPOUNDS DURING LANDFILL-GAS MIGRATION THROUGH THE SUBSURFACE ENVIRONMENT

COOPERATOR:
Wisconsin Department of Natural Resources

LOCATION: Wisconsin

PROJECT CHIEF:
Robert T. Kay
De Kalb

PERIOD OF PROJECT:
October 1991 through September 1994



PROBLEM: The migration of carbon dioxide, methane, and volatile organic compounds (VOC's) from sanitary landfills can pose a serious health risk both to residents adjacent to the landfill site and to those who make use of ground water exposed to these compounds. At this time, little is known about the processes that control the concentration, distribution, and fate of these compounds.

OBJECTIVES: (1) Determine the effects of the interaction between landfill gases, microbiota, soil, soil water, condensate, and ground water on the concentration of contaminants, and (2) determine the effects of leachate migration on the migration of the different compounds.

APPROACH: To meet the objectives of this study, the general approach will consist of (1) characterization of the geological properties of the soil material; (2) identification of the type, concentration, and distribution of selected chemical constituents in ground water, soil water, soil particles, landfill leachate, condensate, and soil gas; (3) characterization of the microbiological communities in the unsaturated zone; and (4) development of a quantitative model of the system, involving contaminant migration in both the liquid and gaseous phases.

SUMMARY OF RESULTS: (1) Found an appropriate landfill site for evaluation near Madison, Wis. (2) Completed background data summary of transport of volatile organic compounds with landfill-gas migration. (3) Began monitoring ground-water and soil-gas quality before gas-extraction system was shut down.

PLANS: (1) Continue monitoring for water and landfill-gas quality. (2) Establish gas-sampling protocols with the Illinois Hazardous Waste Research Institute. (3) Monitor volatile organic compound migration after gas-extraction system is shut off. (4) Compile and analyze data. (5) Write report.

PLANNED REPORT:

Analysis of hydrologic, biologic, and chemical data from the Refuse Hideaway Landfill, Wisconsin

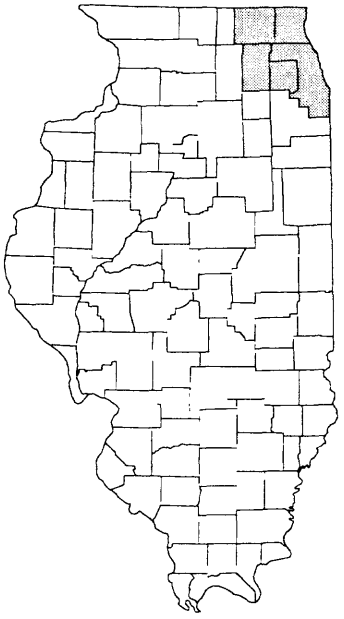
IL099 HYDRAULIC MODEL VERIFICATION AND DOCUMENTATION FOR UNSTEADY FLOW

COOPERATORS:
Illinois Department of Transportation, Division of Water Resources
Du Page County, Department of Environmental Concerns

LOCATION:
Northeastern Illinois

PROJECT CHIEF:
Audrey L. Ishii
Urbana

PERIOD OF PROJECT:
June 1992 through September 1995



PROBLEM: Steady-flow model computations may be inadequate for flood-plain delineation in many locations, particularly where river reaches have mild or flat slopes and extensive flood-plain flow and storage. Most unsteady-flow models are restricted from application at internal boundaries, such as bridges, dams, weirs, and culverts. There is a need for a verified and documented unsteady-flow model that includes internal boundaries in its overall solution scheme.

OBJECTIVE: To verify and document the one-dimensional, unsteady flow, Full EQuations (FEQ) hydraulic routing model and its companion utility program FEQUTL. The verification will be accomplished with a well-documented data set of measured flows and elevations under a variety of unsteady-flow conditions. The documentation will include a detailed description of the model governing equations, solution procedures, input and output requirements, and a guide to model applications.

APPROACH: The study has four main tasks: (1) data collection and documentation, (2) model calibration and verification, (3) model documentation, and (4) the preparation, testing, and revision of a user's guide. For the first task, discharge and stage data will be collected using continuous recorders on a small stream subject to overbank and backwater flow. Measurement of flows in the overbank and culvert sections will be made during floods, and elevations upstream and downstream from the culvert recorded. This data set and the dye, stage, and discharge data collected during a period of unsteady flow on the Fox River for project IL091 will be documented in an open-file report and used to verify the model. For the second task, models will be built or obtained for the Fox River, the small stream, and a laboratory sewer pipe for which unsteady-flow data are available. The models will be calibrated using data independent of the verification data sets. The induced or natural floodwaves will be routed through the models and the differences between the simulated and measured flows and elevations compared. For the Fox River model, the simulated flow field will be input to a transport model and the simulated dye concentrations compared to the measured dye concentrations. The model documentation (task 3) will result in a report documenting (a) river network visualization and schematization, flow-governing equations, and solution procedures used in FEQ; (b) governing equations and tabular representations used in the well-established features of FEQUTL; and (c) input formats for FEQ and FEQUTL. The report will be written by a contractor according to detailed specifications provided by the USGS. A detailed annotated outline will be prepared by the Illinois District and USGS specialists at every stage of its development. The final task is to provide a user's guide that describes a specific, typical application of the model in sufficient detail to provide guidance to first-time users and a ready reference of key features for experienced users. This guide will be tested on first-time users within the Illinois District and revised prior to publication.

SUMMARY OF RESULTS: Hydraulic models have been constructed and partly calibrated for all verification reaches. The effect of various boundary conditions have been studied. Gage-height datums have been leveled or re-leveled where necessary. A contract was awarded to complete the documentation of the one-dimensional unsteady-flow model as a draft report. Outlines for the data, documentation, and verification reports have been approved.

PLANS: The dye, stage, and discharge data collected during an unsteady flow period on the Fox River will be published. Model verification for the Fox River will be completed. The documentation report for FEQ and FEQUTL will be written.

PLANNED REPORTS:

Data-collection methods and data summary for verification of a one-dimensional, unsteady-flow model

A model of one-dimensional, unsteady flow in open channels

Verification of a one-dimensional, unsteady-flow model for the Fox River, Illinois

PUBLICATIONS

The USGS announces all its publications in a monthly catalog "New Publications of the U.S. Geological Survey." Free subscriptions to this list are available from U.S. Geological Survey, 582 National Center, Reston, VA 22092. All publications are for sale unless specifically stated otherwise. Prepayment is required and information on price and availability should be obtained before placing an order. The "U.S. Geological Survey Yearbook" provides a comprehensive description of the Federal Government's largest earth-science agency. Copies of the yearbook may be purchased at the address where professional papers are sold (see below).

Water-Resources Information

A monthly summary of the national water situation is presented in "National Water Conditions." It is available free, on request, from the Hydrologic Information Unit, U.S. Geological Survey, 419 National Center, Reston, VA 22092.

Beginning with the 1971 water year, a new publication series entitled "U.S. Geological Survey Water-Data Reports," combined under one cover streamflow data, water-quality data for surface and ground water, and ground-water-level data for each State. For Illinois, the title is "Water Resources Data for Illinois–Water Year 19XX: U.S. Geological Survey Water-Data Report IL-XX-1 and IL-XX-2" (XX represents water year published). Prior to the 1971 water year, records of streamflow, quality of water, and ground-water levels were published in U.S. Geological Survey Water-Supply Papers as explained below.

Streamflow Records

Records of daily flows of streams prior to 1971 were published in the Water-Supply Paper series "Surface-Water Supply of the United States," which were released in numbered parts as determined by natural drainage basins; until 1961 this was an annual series. Monthly and yearly summaries of these data were then compiled in two reports: "Compilation of Records of Surface Waters of the United States through September 1950" and "Compilation of Records of Surface Waters of the United States, October 1950 to September 1960." For the period 1961-70, 5-year compilations were published; data for Illinois are published in Parts 3, 4, and 5 of these reports.

Quality-of-Water Records

Data on quality of surface water, prior to 1971, were published annually in the Water-Supply Paper series "Quality of Surface Waters of the United States," which also was released in numbered parts as determined by natural drainage basins. Data for Illinois are in Parts 3, 4, and 5 of that series.

Ground-Water Records

Ground-water levels and artesian pressures in observation wells prior to 1975 were reported by geographic areas in a 5-year Water-Supply Paper series. Data for Illinois are in "Ground-Water Levels in the United States, North-Central States."

PUBLICATIONS PERTINENT TO ILLINOIS

The reports listed below represent selected references prepared by the USGS in cooperation with other agencies. The list contains reports that contribute to the understanding of the hydrology of the water resources in Illinois.

Professional Papers

Professional Papers are comprehensive formal reports of significant and lasting scientific interest and include results of resource studies and of geologic, hydrologic, or topographic investigations. Professional Papers are sold by the U.S. Geological Survey, Map Distribution, Box 25286, MS 306, Denver Federal Center, Denver, CO 80225 (phone 303-236-7477).

P 448-H Low-flow characteristics of streams in the Mississippi embayment in Tennessee, Kentucky, and Illinois, by P.R. Speer, W.J. Perry, J.A. McCabe, O.G. Lara, and others, with a section on Quality of the water by H.G. Jeffery. 1965.

P 813-A Summary appraisals of the Nation's ground-water resources--Ohio Region, by R.M. Bloyd, Jr. 1974.

P 813-B Summary appraisals of the Nation's ground-water resources--Upper Mississippi Region, by R.M. Bloyd, Jr. 1975.

P 813-J Summary appraisals of the Nation's ground-water resources--Great Lakes Region, by W.G. Weist, Jr. 1977.

P 1467 Floods of March 1982 in Indiana, Ohio, Michigan, and Illinois, by D.R. Glatfelter, U.S. Geological Survey; and E.H. Chin, National Weather Service, NOAA. 1988.

Water-Supply Papers

Water-Supply Papers are formal reports dealing with all aspects of hydrology, including quality, recoverability, and use of water resources; statistical reports on streamflow, floods, ground-water levels, and water quality; and collections of short papers on related topics. Water-Supply Papers are sold by the U.S. Geological Survey, Map Distribution, Box 25286, MS 306, Denver Federal Center, Denver, CO 80225 (phone 303-236-7477).

W 1370-B Floods of October 1954 in the Chicago area, Illinois and Indiana, by W.S. Daniels and M.D. Hale. 1958.

W 1669-O Ground-water conditions at Argonne National Laboratory, Illinois, 1948-60, by D.B. Kowles, W.J. Drescher, and E.F. LeRoux. 1963.

W 2002 Water in urban planning, Salt Creek Basin, Illinois, by A.M. Spieker. 1970.

W 2005 Model hydrographs, by W.D. Mitchell. 1972.

W 2078 Some chemical characteristics of mine drainage in Illinois, by L.G. Toler. 1982.

W 2226 Low-level radioactive-waste burial at the Palos Forest Preserve, Illinois: Geology and hydrology of the glacial drift, as related to the migration of tritium, by J.C. Olimpio. 1984.

W 2250 National Water Summary 1983--Hydrologic events and issues, by U.S. Geological Survey. 1984.

W 2262 A system for measuring surface runoff and collecting sediment samples from small areas, by J.R. Gray and M.P. deVries, in Meyer E.L., ed., Selected papers in the hydrologic sciences. 1984.

W 2269 Traveltime and longitudinal dispersion in Illinois streams, by J.B. Graf. 1986.

W 2275 National Water Summary 1984--Hydrologic events, selected water-quality trends, and ground-water resources, by U.S. Geological Survey. 1985.

W 2300 National Water Summary 1985--Hydrologic events and surface-water resources, by U.S. Geological Survey. 1986.

W 2301 Relations between quality of urban runoff and quality of Lake Ellyn at Glen Ellyn, Illinois, by R.G. Striegl and E.A. Cowan. 1987.

W 2325 National Water Summary 1986--Hydrologic events and ground-water quality, by U.S. Geological Survey. 1988.

W 2327 Evapotranspiration and microclimate at a low-level radioactive-waste disposal site in northwestern Illinois, by R.W. Healy, M.P. deVries, and A.M. Sturrock, Jr. 1989.

W 2333 Tritium migration from a low-level radioactive-waste disposal site near Chicago, Illinois, by J.R. Nicholas and R.W. Healy. 1988.

W 2350 National Water Summary 1987--Hydrologic events and water supply and use, by U.S. Geological Survey. 1990.

W 2362 Floods of December 1982 to May 1983 in the central and southern Mississippi River and the Gulf of Mexico Basins, by R.B. Stone and R.H. Bingham. 1991.

W 2367 Results of hydrologic research at a low-level radioactive-waste disposal site near Sheffield, Illinois, by B.J. Ryan. 1991.

W 2375 National Water Summary 1988-89--Hydrologic events and floods and droughts, by U.S. Geological Survey. 1991.

Circulars

Circulars contain technical or nontechnical information of popular interest including timely administrative or scientific information. Circulars may be ordered, free of charge, from the U.S. Geological Survey, Map Distribution, Box 25286, MS 306, Denver Federal Center, Denver, CO 80225 (phone 303-236-7477).

C 216 Water resources of the St. Louis area, Missouri and Illinois, by J.R. Searcy, R.C. Baker, and W.H. Durum. 1952.

C 601-C Flood hazard mapping in metropolitan Chicago, by J.R. Sheaffer, D.W. Ellis, and A.M. Spieker. 1970.

C 900 Guide to obtaining USGS information, by Kurt Dodd, H.K. Fuller, and P.F. Clarke. 1989.

C 953 Proceedings of the advanced seminar on sedimentation, August 15-19, 1983, Denver, Colorado, edited by G.D. Glysson. 1987.

Erosion and landform modification at a low-level radioactive-waste disposal facility near Sheffield, Illinois, by J.R. Gray.

Measurement of bedload discharge in nine Illinois streams with the Helley-Smith sampler, by J.B. Graf.

C 1004 Estimated use of water in the United States in 1985, by W.B. Solley, C.F. Merk, and R.R. Pierce. 1988.

C 1036 Safe disposal of radionuclides in low-level radioactive-waste repository sites; Low-level radioactive-waste disposal workshop, U.S. Geological Survey, July 11-16, 1987, Big Bear Lake, California, proceedings edited by M.S. Bedinger and P.R. Stevens. 1990.

Surface hydrology at the low-level radioactive-waste repository site near Sheffield, Illinois, by J.R. Gray.

Results of some geohydrologic studies at the low-level radioactive-waste repository site near Sheffield, Illinois, by R.W. Healy.

Hydrologic Investigations Atlases

Hydrologic Investigations Atlases may contain a wide range of hydrologic and hydrogeologic data of regional and national interest, such as streamflow, ground water, water quality, and extent of flooding. Hydrologic Investigations Atlases and other maps are sold by the U.S. Geological Survey, Map Distribution, Box 25286, Bldg. 810, Denver Federal Center, Denver, CO 80225 (phone 303-236-7477). The Hydrologic Investigations Atlases that pertain to stream basins in Illinois are as follows:

HA-39. Floods in the Little Calumet River Basin near Chicago Heights, [northeastern] Illinois. 1960.

HA-449. Floods on Loop Creek and Richland Creek near Belleville, [southwestern] Illinois, by J.D. Camp. 1972.

The Hydrologic Investigations Atlases (HA) listed below are all flood maps for quadrangles in Illinois. The information in the table can be used, as shown in the following example, to construct the full bibliographic reference. The example reference is as follows:

HA-67 Floods in Arlington Heights quadrangle, [northeastern] Illinois, by D.W. Ellis, H.E. Allen, and A.W. Noehre. 1963.

HA number	Quadrangle	Authors	Date
67	Arlington Heights	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1963
68	Elmhurst	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1963
69	Highland Park	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1963
70	Aurora North	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1963
71	Wheeling	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1963
85	Park Ridge	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1963
86	Hinsdale	Ellis, D.W., Allen, H.E., and Noehre, A.W.	1964
87	Palatine	Allen, H.E., Ellis, D.W., and Long, D.E.	1964
88	Libertyville	Noehre, A.W., Ellis, D.W., and Long, D.E.,	1964
89	Joliet	Allen, H.E., and Wyerman, T.A.	1964
90	Harvey	Allen, H.E., and May, V.J.	1964
142	Geneva	Noehre, A.W., and Walter, G.L.	1965
143	Lombard	Allen, H.E., and May, V.J.	1964
144	Wadsworth	Noehre, A.W.	1964
145	Palos Park	Noehre, A.W., and Mycyk, R.T.	1966
146	Romeoville	Noehre, A.W., and Walter, G.L.	1965
147	Elgin	May, V.J., and Allen, H.E.	1965
148	Wheaton	May, V.J., and Allen, H.E.	1965
149	Sag Bridge	Noehre, A.W., and Walter, G.L.	1966
150	Barrington	Noehre, A.W., Walter, G.L., and Allen, H.E.	1965

HA number	Quadrangle	Authors	Date
151	Fox Lake	Noehre, A.W., May, V.J., and Walter, G.L.	1965
152	Tinley Park	Allen, H.E.	1965
153	Blue Island	Allen, H.E.	1966
154	Naperville	Allen, H.E., and May V.J.	1965
202	West Chicago	Allen, H.E., and May V.J.	1965
203	Streamwood	May, V.J., and Allen, H.E.	1965
204	Mokena	Noehre, A.W.	1965
205	Lake Calumet	Allen, H.E.	1966
206	River Forest	May, V.J.	1966
207	Wauconda	Allen, H.E.	1966
208	Lake Zurich	Noehre, A.W., and Mycyk, R.T.	1966
209	Steger	Allen, H.E.	1966
210	Normantown	May, V.J.	1966
211	Manhattan	Allen, H.E., and Mycyk, R.T.	1966
226	Antioch	Noehre, A.W., and Walter, G.L.	1966
227	Sugar Grove	Allen, H.E.	1966
228	Plainfield	May, V.J., and Schafish, R.J.	1966
229	Elburn	Allen, H.E.	1966
230	Grayslake	May, V.J., Noehre, A.W., and Walter, G.L.	1967
231	Frankfort	Mycyk, R.T.	1967
232	Pingree Grove	Allen, H.E.	1967
233	Zion	May, V.J., and Mycyk, R.T.	1967
234	Waukegan	Mycyk, R.T., and May, V.J.	1967
251	Peotone	Allen, H.E.	1967
252	Berwyn	Noehre, A.W., and Walter, G.L.	1967
253	Crystal Lake	May, V.J., and Mycyk, R.T.	1967
254	Elwood	Allen, H.E., and Mycyk, R.T.	1967
255	McHenry	Mycyk, R.T., and Walter, G.L.	1968
256	Woodstock	Allen, H.E.	1968
257	Beecher West	Allen, H.E.	1968
301	Dyer	Allen, H.E.	1968
302	Beecher East	Allen, H.E., and Noehre, A.W.	1969
303	Richmond	Mycyk, R.T., and Walter, G.L.	1969
304	Wilton Center	Allen, H.E., and Noehre, A.W.	1969
305	Symerton	Allen, H.E., Noehre, A.W., and Hauth, L.D.	1970
306	Wilmington	Allen, H.E., and Noehre, A.W.	1971
361	Huntley	Walter, G.L., and Mycyk, R.T.	1971
362	Channahon	Allen, H.E., and Noehre, A.W.	1971
363	Hebron	Allen, H.E., and Grant, R.S.	1971
458	Maple Park	Mycyk, R.T., and Walter, G.L.	1972
459	Hampshire	Mycyk, R.T., and Duerk, M.D.	1972
463	Marengo South	Allen, H.E.	1972
464	Riley	Mycyk, R.T., and Grant, R.S.	1972
472	Big Rock	Mycyk, R.T., Walter, G.L., and McDonald, B.L.	1973
495	Marengo North	Allen, H.E., and Noehre, A.W.	1973
496	Harvard	Allen, H.E., and Noehre, A.W.	1973
497	Garden Prairie	Mycyk, R.T., and Grant, R.S.	1973
498	Capron	Grant, R.S., and Duerk, M.D.	1973

Hydrologic-Unit Maps

Hydrologic-Unit Maps have been developed for each State and depict the major hydrologic regions, subregions, accounting units, and cataloging units used for the collection and organization of hydrologic data. Hydrologic-Unit Maps and other maps are sold by the U.S. Geological Survey, Map Distribution, Box 25286, Bldg. 810, Denver Federal Center, Denver, CO 80225 (phone 303-236-7477).

U.S. Geological Survey, 1975, Hydrologic unit map of Illinois--1974.

Water-Resources Investigations Reports (WRI or WRIR)

Water-Resources Investigations Reports contain hydrologic information, mainly of local interest, intended for quick release to the public in book or map format. The following reports may be ordered, free of charge, while supplies last, from the District Chief, U.S. Geological Survey, 102 E. Main Street, 4th Floor, Urbana, IL 61801 (phone 217-398-5353).

WRI/NTIS

The following reports may be purchased either as microfiche or hard copy from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (phone 703-487-4650); the NTIS ordering number is given in parentheses at the end of the citation.

WRI 13-75. Drainage areas for Illinois streams, by K.M. Ogata, 1975. (PB 246298/AS)

WRI 77-104. Frequency analysis of Illinois floods using observed and synthetic streamflow records, by G.W. Curtis, 1977. (PB 277350/AS)

WRI 77-117. Technique for estimating magnitude and frequency of floods in Illinois, by G.W. Curtis, 1977. (PB 277255/AS)

WRI 78-22, 23, 24. Chemical analyses of surface water in Illinois, 1958-74, Volume I, Des Plaines River Basin and Lake Michigan; Volume II, Illinois River Basin and Mississippi River tributaries north of Illinois River Basin; Volume III, Ohio River tributaries and Mississippi River tributaries south of Illinois River Basin, by R.W. Healy and L.G. Toler, 1978. Three-volume set (PB 282673/AS)

WRI 78-78. Water quality in the Sugar Creek Basin, Bloomington and Normal, Illinois, by B.J. Prugh, Jr., 1978. (PB 288359/AS)

WRI 79-23, 24, 25. Chemical analyses of surface water in Illinois, 1975-77, Volume I, Des Plaines River Basin and Lake Michigan; Volume II, Illinois River Basin and Mississippi River tributaries north of Illinois River Basin; Volume III, Ohio River tributaries and Mississippi River tributaries south of Illinois River Basin, by David Grason and R.W. Healy, 1979. Three-volume set (PB 299911/AS)

WRI 79-36. Effects of urbanization on the magnitude and frequency of floods in northeastern Illinois, by H.E. Allen, Jr. and R.M. Bejcek, 1979. (PB 299065/AS)

WRI 79-110. River mileages and drainage areas for Illinois streams–Volume 1, Illinois except Illinois River Basin, by R.W. Healy, 1979. (AD A082472)

WRI 79-111. River mileages and drainage areas for Illinois streams–Volume 2, Illinois River Basin, by R.W. Healy, 1979. (AD A082473)

WRI 82-13. Time of concentration and storage coefficient values for Illinois streams, by J.B. Graf, George Garklavs, and K.A. Oberg, 1982. (PB 82-219320)

WRI 82-16. Hydrologic characteristics of surface-mined land reclaimed by sludge irrigation, Fulton County, Illinois, by G.L. Patterson, R.F. Fuentes, and L.G. Toler, 1982. (PB 83-124982)

WRI 82-22. A technique for estimating time of concentration and storage coefficient values for Illinois streams, by J.B. Graf, George Garklavs, and K.A. Oberg, 1982. (PB 82-218793)

WRIR/ESIC

The following reports are sold by the U.S. Geological Survey, Earth Science Information Center (ESIC), Open-File Report Section, Box 25286, MS 517, Denver Federal Center, Denver, CO 80225-0046 (phone 303-236-7476).

82-4047. Hydrologic effects of storing liquified sewage sludge on strip-mine land, Fulton County, Illinois, by G.L. Patterson, 1982.

82-4073. Runoff, sediment transport, and water quality in a northern Illinois agricultural watershed before urban development, 1979-81, by H.E. Allen, Jr. and J.R. Gray, 1984.

83-4048. Water in sand and gravel deposits in McHenry County, Illinois, by J.R. Nicholas and J.T. Krohelski, 1984.

83-4125. Hydrogeology of a low-level radioactive-waste disposal site near Sheffield, Illinois, by J.B. Foster, J.R. Erickson, and R.W. Healy, 1984.

83-4136. Measurement of bedload discharge in nine Illinois streams with the Helley-Smith sampler, by J.B. Graf, 1983.

83-4265. Runoff and water-quality characteristics of surface-mined lands in Illinois, by T.P. Brabets, 1984.

84-4003. Estimates of long-term suspended-sediment loads in Bay Creek at Nebo, Pike County, Illinois, 1940-80, by T.R. Lazaro, K.K. Fitzgerald, and L.R. Frost, Jr., 1984.

84-4037. Evaluation of a hydrograph-shifting method for estimating suspended-sediment loads in Illinois streams, by L.R. Frost, Jr. and L.J. Mansue, 1984.

84-4123. Cost effectiveness of the U.S. Geological Survey's stream-gaging program in Illinois, by D.M. Mades and K.A. Oberg, 1984.

84-4165. Hydrogeology of the Cambrian-Ordovician aquifer system at a test well in northeastern Illinois, by J.R. Nicholas, M.G. Sherrill, and H.L. Young, 1987.

84-4180. Quality of water in the alluvial aquifer, American Bottoms, East St. Louis, Illinois, by D.C. Voelker, 1984.

84-4183. Hydrogeologic setting east of a low-level radioactive-waste disposal site near Sheffield, Illinois, by J.B. Foster, George Garklavs, and G.W. Mackey, 1984.

84-4205. U.S. Geological Survey research in radioactive waste disposal, fiscal year 1982, by Robert Schneider and N.J. Trask, 1984. (Sheffield, Illinois, by J.B. Foster, R.W. Healy, and J.R. Gray, p. 90-93, and Argonne National Laboratory site, Illinois, by J.R. Nicholas, p. 93-95.)

84-4256. Hydrology of a surface coal mined area in Randolph County, Illinois, by J.V. Borghese and A.R. Klinger. 1984.

84-4311. Low-flow characteristics of streams in the Kishwaukee River Basin, Illinois, by H.E. Allen, Jr. and E.A. Cowan. 1985.

84-4355. A gazetteer of surface-mine lakes, Eastern Interior Coal Province, Illinois, by D.C. Voelker. 1985.

85-4228. Concepts and data-collection techniques used in a study of the unsaturated zone at a low-level radioactive-waste disposal site near Sheffield, Illinois, by R.W. Healy, M.P. deVries, and R.G. Striegl. 1986.

85-4344. Assessment of low-flow water quality in the Du Page River, Illinois, by W.O. Freeman, A.R. Schmidt, and J.K. Stamer. 1986.

86-4008. Estimating generalized skew of the log-Pearson Type III distribution for annual peak floods in Illinois, by K.A. Oberg and D.M. Mades. 1987.

86-4072. Evaluation of the U.S. Geological Survey's gaging-station network in Illinois, by D.M. Mades and K.A. Oberg. 1986.

86-4112. Channel-storage/discharge relations for the Peoria and La Grange Dams on the Illinois River in Illinois, by George Garklavs, A.R. Klinger, and D.M. Mades. 1986.

86-4153. Hydrogeology, ground-water flow, and tritium movement at a low-level radioactive-waste disposal site near Sheffield, Illinois, by George Garklavs and R.W. Healy. 1986.

86-4156. Technique for predicting ground-water discharge to surface coal mines and resulting changes in head, by L.S. Weiss, D.L. Galloway, and A.L. Ishii. 1986.

86-4182. Water use in the United States, 1980, by W.B. Solley, N.L. Barber, and C.F. Merk. 1986.

86-4323. Assessment of low-flow water quality in Richland Creek, Illinois, by W.O. Freeman and A.R. Schmidt. 1986.

87-4009. U.S. Geological Survey research in radioactive waste disposal, fiscal years 1983, 1984, and 1985, by G.A. Dinwiddie and N.J. Trask. 1986. (Sheffield, Illinois, by B.J. Ryan, J.R. Gray, R.G. Striegl, and R.W. Healy, p. 80-84, and Argonne National Laboratory site, Illinois, by J.R. Nicholas and A.M. Shapiro, p. 84-85.)

87-4024. Assessment of water quality and factors affecting dissolved oxygen in the Sangamon River, Decatur to Riverton, Illinois, summer 1982, by A.R. Schmidt and J.K. Stamer. 1987.

87-4106. Traveltime and dispersion in the Illinois River, Marseilles to Peoria, Illinois, by E.E. Zuehls. 1987.

87-4151. Investigation of techniques to estimate rainfall-loss parameters for Illinois, by L.S. Weiss and A.L. Ishii. 1987.

87-4207. Technique for estimating flood-peak discharges and frequencies on rural streams in Illinois, by G.W. Curtis. 1987.

87-4226. Discharge ratings for control structures at McHenry Dam on the Fox River, Illinois, by G.G. Fisk. 1988.

88-4025. Distribution of gases in the unsaturated zone at a low-level radioactive-waste disposal site near Sheffield, Illinois, by R.G. Striegl. 1988.

88-4111. Quality of water from public-supply wells in principal aquifers of Illinois, 1984-87, by D.C. Voelker. 1989.

88-4141. Assessment of processes affecting low-flow water quality of Cedar Creek, west-central Illinois, by A.R. Schmidt, W.O. Freeman, and R.D. McFarlane. 1989.

89-4027. A numerical solution for the diffusion equation in hydrogeologic systems, by A.L. Ishii, R.W. Healy, and R.G. Striegl. 1989.

89-4041. An inventory and evaluation of biological investigations that relate to stream-water quality in the upper Illinois River Basin of Illinois, Indiana, and Wisconsin, by D.W. Steffeck and R.G. Striegl. 1989.

89-4081. Hydrogeology and results of aquifer tests in the vicinity of a hazardous-waste disposal site near Byron, Illinois, by R.T. Kay, D.N. Olson, and B.J. Ryan. 1989.

89-4088. Storm runoff and its effects on the water quality and bottom-material quality of Cedar Creek, west-central Illinois, 1985-86, by W.O. Freeman, A.R. Schmidt, and R.D. McFarlane. 1989.

89-4106. Techniques for computing discharge at four navigation dams on the Illinois and Des Plaines Rivers in Illinois, by D.M. Mades, L.S. Weiss, and J.R. Gray. 1991.

89-4124. Determination of hydraulic properties in the vicinity of a landfill near Antioch, Illinois, by R.T. Kay and J.D. Earle. 1990.

90-4116. Changes in chloride concentration in water from municipal wells that tap aquifers in rocks of Cambrian and Ordovician age in northeastern Illinois, 1915-84, by G.O. Balding. 1991.

90-4166. Determination of water use in Rockford and Kankakee areas, Illinois, by J.K. LaTour. 1991.

91-4062. Floods of June 13-14, 1981, and December 2-12, 1982, in Illinois, by A.L. Ishii. 1991.

91-4084. U.S. Geological Survey research in radioactive waste disposal: fiscal years 1986-1990, N.J. Trask and P.R. Stevens, comps. 1991. (Sheffield, Ill., by P.C. Mills, p. 40-47.)

92-4095. Overview and bibliography of methods for evaluating the surface-water-infiltration component of the rainfall-runoff process, by R.B. King. 1992.

Open-File Reports (Earth Science Information Center)

Open-File Reports are informal manuscripts, maps, and other material made available to the public. The following reports may be ordered, free of charge, while supplies last, from the District Chief, U.S. Geological Survey, 102 E. Main Street, 4th Floor, Urbana, IL 61801 (phone 217-398-5353). The reports are sold by the U.S. Geological Survey, Earth Science Information Center, Open-File Reports Section, Box 25286, MS 517, Denver Federal Center, Denver, CO 80225 (phone 303-236-7476).

77-867. Sediment transport to the Fox Chain of Lakes, Illinois, by T.P. Brabets. 1977.

79-210. Water-table contour map of land reclamation site, Fulton County, Illinois, by R.F. Fuentes and G.L. Patterson. 1979.

79-1545. Preliminary report on the hydrogeology of a low-level radioactive-waste disposal site near Sheffield, Illinois, by J.B. Foster and J.R. Erickson. 1980.

80-775. Low-level radioactive-waste burial at the Palos Forest Preserve, Illinois, Part 1. Preliminary finite-difference models of steady state ground-water flow, by J.C. Olimpio. 1980.

81-1009. Stage-discharge relations at dams on the Illinois and Des Plaines Rivers in Illinois, by D.M. Mades. 1981.

82-692. Data for wells at the low-level radioactive-waste burial site in the Palos Forest Preserve, Illinois, by J.C. Olimpio. 1982.

82-693. Work Plan for the Sangamon River Basin, Illinois, by J.K. Stamer and D.M. Mades. 1983.

82-1001. Proceedings--Illinois Water-Data-Users Meeting, Peoria, Illinois, February 23-24, 1982, by L.G. Toler. 1982.

83-926. Geologic and hydrologic data collected during 1976-1984 at the Sheffield low-level radioactive-waste disposal site and adjacent areas, Sheffield, Illinois, by J.B. Foster, George Garklavs, and G.W. Mackey. 1984.

84-584. Illinois ground-water observation network - A preliminary planning document, by L.R. Frost, Jr., Michael O'Hearn, J.P. Gibb, and M.G. Sherrill. 1984.

84-603. Effects of urban runoff on Lake Ellyn at Glen Ellyn, Illinois, by R.G. Striegl. 1985.

84-856. Measurement of ground-water velocity using Rhodamine WT dye near Sheffield, Illinois, by George Garklavs and L.G. Toler. 1985.

85-629. Sources of climatologic, hydrologic, and hydraulic information in the Illinois River Basin, Illinois, Indiana, and Wisconsin, by G.W. Curtis. 1986.

86-416(W). Observation-well network in Illinois, 1984, by D.C. Voelker. 1986.

87-473. Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Project description, by D.M. Mades. 1987.

87-538. Water-quality data from the observation-well network in Illinois, 1985-87, by D.C. Voelker, D.J. Oberg, and M.J. Grober. 1988.

87-543. Data-collection methods and data summary for the assessment of water quality in Cedar Creek, west-central Illinois, by R.D. McFarlane, W.O. Freeman, and A.R. Schmidt. 1987.

88-143. U.S. Geological Survey ground-water studies in Illinois, by D.C. Voelker, J.R. Nicholas, and K.L. Norton. 1988. (Water Fact Sheet)

89-271. Water and tritium movement through the unsaturated zone at a low-level radioactive-waste disposal site near Sheffield, Illinois, 1981-85, by P.C. Mills and R.W. Healy. 1991.

90-375. Availability and suitability of municipal wastewater information for use in a National water-quality assessment: A case study of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin, by J.S. Zogorski, S.F. Blanchard, R.D. Romack, and F.A. Fitzpatrick. 1990.

90-382. Well-construction and hydrogeologic data for observation wells in the vicinity of a low-level radioactive-waste disposal site near Sheffield, Illinois, by L.J. Mansue and P.C. Mills. 1991.

90-571. Surface-water-quality assessment of the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Geochemical data for fine-fraction streambed sediment from high- and low-order streams, 1987, by J.A. Colman and R.F. Sanzolone. 1991.

91-065. Water movement and water chemistry in the unsaturated zone at a low-level radioactive-waste disposal site near Sheffield, Illinois, by P.C. Mills. 1992.

91-209. Development and organization of a geographic information system data base and its application to investigation of rainfall/runoff-model parameters in Illinois, by A.R. Schmidt and R.D. Romack. 1991.

91-220. Hydrogeologic information in the Great Lakes Basin, United States, and application of a geographic information system to public-supply wells and hazardous-waste sites, by K.L. Warner, J.D. Earle, and M.G. Sherrill. 1991.

92-149. Floating sample-collection platform with stage-activated automatic water sampler for streams with large variation in stage, by S.R. Tarte, A.R. Schmidt, and D.J. Sullivan. 1992.

92-452. Water resources activities of the U.S. Geological Survey in Illinois, 1991, by G.O. Balding. 1992.

Water-Resources Investigations/Open-File Reports

The following reports are available free of charge, while supplies last, from the District Chief, U.S. Geological Survey, 102 East Main Street, 4th Floor, Urbana, IL 61801 (phone 217-398-5353).

76-87. Index to water-resources data for Illinois, by D.E. Winget. 1976.

81-403. Hydrology of Area 35, Eastern Region, Interior Coal Province, Illinois and Kentucky, by E.E. Zuehls, G.L. Ryan, D.B. Peart, and K.K. Fitzgerald. 1981.

81-636. Hydrology of Area 25, Eastern Region, Interior Coal Province, Illinois, by E.E. Zuehls, G.L. Ryan, D.B. Peart, and K.K. Fitzgerald. 1981.

82-858. Hydrology of Area 29, Eastern Region, Interior Coal Province, Illinois, by K.K. Fitzgerald, C.A. Peters, and E.E. Zuehls. 1983.

82-1005. Hydrology of Area 30, Eastern Region, Interior Coal Province, Illinois and Indiana, by D.J. Wangsness and others. 1983.

83-544. Hydrology of Area 28, Eastern Region, Interior Coal Province, Illinois, by E.E. Zuehls, K.K. Fitzgerald, and C.A. Peters. 1984.

84-707. Hydrology of Area 27, Eastern Region, Interior Coal Province, Illinois, by E.E. Zuehls. 1987.

85-342. Hydrology of Area 31, Eastern Region, Interior Coal Province, Illinois and Indiana, by E.E. Zuehls. 1987.

Miscellaneous Reports

The following miscellaneous reports were developed in cooperation with other State of Illinois agencies and published by those agencies. The reports are available, for inspection only, at the Illinois District Office of the U.S. Geological Survey. Information about these reports may be obtained from the District Chief, U.S. Geological Survey, 102 East Main Street, 4th Floor, Urbana, IL 61801 (phone 217-398-5353).

Carns, J.M., 1973, Magnitude and frequency of floods in Illinois.

Curtis, G.W., 1969, Statistical summaries of Illinois streamflow data.

Kirk, J.R., 1987, Water withdrawals in Illinois, 1986.

Kirk, J.R., Jarboe, Jacquelyn, Sanderson, E.W., and others, 1979, Water withdrawals in Illinois, 1978.

Kirk, J.R., Jarboe, Jacquelyn, Sanderson, E.W., and others, 1982, Water withdrawals in Illinois, 1980.

Kirk, J.R., Sanderson, E.W., and Sasman, R.T., 1984, Water withdrawals in Illinois, 1982.

Kirk, J.R., Hlinka, K.J., Sasman, R.T., and Sanderson, E.W., 1985, Water withdrawals in Illinois, 1984.

Kirk, J.R., and Sanderson, E.W., 1982, Illinois water inventory program.

Lara, O.G., 1970, Low-flow frequencies of Illinois streams.

Mitchell, W.D., 1948, Unit hydrographs in Illinois.

----- 1950, Water-supply characteristics of Illinois streams.

----- 1954, Floods in Illinois--Magnitude and frequency.

----- 1957, Flow duration of Illinois streams.

Prugh, B.J., Jr., 1976, Depth and frequency of floods in Illinois.

Sieber, C.R., 1970, A proposed streamflow-data program for Illinois.

Visocky, A.P., Sherrill, M.G., and Cartwright, Keros, 1985, Geology, hydrology, and water quality of the Cambrian and Ordovician Systems in northern Illinois.

Water-Data Reports

The annual State Water-Data Report contains surface- and ground-water data for Illinois that has been collected by the USGS in cooperation with other Federal, State, and local agencies. These official USGS reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. The Illinois water-data reports are available free of charge, for every year beginning in 1971 while supplies last, from the District Chief, U.S. Geological Survey, 102 East Main Street, 4th Floor, Urbana, IL 61801 (phone 217-398-5353).

The reports may also be purchased as hard copy or microfiche from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161 (phone 703-487-4650).

The following are the most recently published water-data reports for Illinois. The NTIS ordering number is given in parentheses at the end of the citation:

Maurer, J.C., Sterling, J.M., Richards, T.E., and Hayes, P.D., 1992, Water resources data–Illinois, water year 1991, volume 1, Illinois except Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-1, 425 p. (PB 92-193093).

Richards, T.E., Hayes, P.D., and Sullivan, D.J., 1992, Water resources data–Illinois, water year 1991, volume 2, Illinois River Basin: U.S. Geological Survey Water-Data Report IL-91-2, 515 p. (PB 92-193028).

Conference Abstracts and Papers and Journal Articles

Abstracts and papers by Geological Survey personnel in the Illinois District are printed in non-Geological Survey publications. Typically, they summarize the principal conclusions of an author's current work but contain little supporting data. These publications are not available from the U.S. Geological Survey.

Abstracts published prior to 1991 are in OFR 92-452 listed under the heading, Open-File Reports (Earth Science Information Center), in this report. As of the beginning of 1991, the following abstracts have been published:

Use of a geographic information system in the upper Illinois River Basin pilot project of the National Water-Quality Assessment Program, by F.A. Fitzpatrick, in Workshop proceedings; Remote sensing and GIS applications to nonpoint source planning, U.S. Environmental Protection Agency, April 1991, p. 55-66.

Variability of an unsaturated sand unit underlying a radioactive-waste trench, by R.W. Healy and P.C. Mills, in Soil Science Society of America Journal, v. 55, no. 4, July-August 1991, p. 899-907.

Occurrence and distribution of nutrients, dissolved oxygen, and Escherichia Coli bacteria in the upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Results of a 1988 low-flow synoptic survey, by P.J. Terrio, in Program and Abstracts, 1991 Annual Conference, Illinois State Section of the American Water Resources Association, October 21, 1991, Peoria, Illinois.

Sediment and water quality in the upper Illinois River Basin, by A.R. Schmidt, in Proceedings, 1991 Governor's Conference on the Management of the Illinois River System, October 22-23, 1991, Peoria, Illinois, p. 78-87.

Application of a geographic information system to a ground-water quality assessment in Illinois, by K.L. Warner and M.A. Wolff, in Program and Abstracts, Fifth Annual Midwest/Great Lakes User Conference, October 23-25, 1991, Indianapolis, Indiana.

Interaction of ground water with the Rock River near Byron, Illinois, by C.F. Avery, D.J. Yeskis, and W.F. Bolen, in Program and Abstracts, American Geophysical Union 1991 Fall Meeting, December 9-13, 1991, San Francisco, California.

Enhancements for an improved, national-level understanding of the effect of changes in wastewater treatment on stream water quality, by J.S. Zogorski, P.J. Terrio, and W.G. Wilber, in Program and Abstracts, American Geophysical Union 1991 Fall Meeting, December 9-13, 1991, San Francisco, California.

WHERE TO OBTAIN ADDITIONAL INFORMATION ON U.S. GEOLOGICAL SURVEY PROGRAMS IN ILLINOIS

In addition to the reports and abstracts listed above, further information may be obtained regarding water, maps, and geology by contacting the following offices of the U.S. Geological Survey:

WATER

District Chief
U.S. Geological Survey
102 East Main Street, 4th floor
Urbana, Illinois 61801

Phone: (217) 398-5353

MAPS

Chief, Mid-Continent Mapping Center
Earth Science Information Center
U.S. Geological Survey
1400 Independence Road
Rolla, Missouri 65401

Phone: (314) 341-0851

GEOLOGY

Assistant Chief Geologist, Eastern Region
U.S. Geological Survey
953 National Center
Reston, Virginia 22092

Phone: (703) 648-6660

GENERAL INFORMATION

U.S. Geological Survey
Earth Science Information Center
507 National Center
Reston, Virginia 22092

Phone: (800) USA-MAPS

REFERENCES

Blackwell, C.D., 1990, Directory of assistance centers of the National Water Data Exchange (NAWDEX): U.S. Geological Survey Open-File Report 90-142, 37 p.

Gilbert, B.K., and Mann, W.B., 1992, The U.S. Geological Survey Federal-State cooperative water-resources program–fiscal year 1991: U.S. Geological Survey Open-File Report 92-128, 88 p.

U.S. Geological Survey, 1992a, National water conditions–December 1992: Reston, Va., 31 p.

----- 1992b, Water Resources Division information guide: Reston, Va., 21 p.

Wendland, W.M.; Kunkel, K.E.; Conner, Glen; and others, 1992, Mean 1961-1990 temperatures and precipitation over the upper Midwest: Illinois State Water Survey Miscellaneous Publication 136, 27 p.

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TABLES 2-5

Table 2. Surface-water stations operated by the Illinois District for which data are published

[C, Crest stage - peak-stage and peak-discharge record only; CQ, Chemical quality; D, Discharge - continuous record of stage and discharge; DS, Discharge with auxiliary slope gage - continuous record of stage and discharge; R, Lake contents - furnished by U.S. Army Corps of Engineers, St. Louis District; S, Stage - continuous record of stage; S/8-Stage at 0800 hours; SD, Suspended sediment]

Station Number	Station name	Type of data
03336645	Middle Fork Vermilion River above Oakwood, Ill.	D
03337000	Boneyard Creek at Urbana, Ill.	D
03338780	North Fork Vermilion River near Bismarck, Ill.	D
03339000	Vermilion River near Danville, Ill.	D
03343400	Embarras River near Camargo, Ill.	D
03344000	Embarras River near Diona, Ill.	C
03345500	Embarras River at Ste. Marie, Ill.	D,CQ
03346000	North Fork Embarras River near Oblong, Ill.	D
03378000	Bonpas Creek at Browns, Ill.	D
03378635	Little Wabash River near Effingham, Ill.	D
03378900	Little Wabash River at Louisville, Ill.	C
03379500	Little Wabash River below Clay City, Ill.	D
03380500	Skillet Fork at Wayne City, Ill.	D
03381495	Little Wabash River at Main Street at Carmi, Ill.	CQ
03381500	Little Wabash River at Carmi, Ill.	DS
03382100	South Fork Saline River near Carrier Mills, Ill.	D
03384450	Lusk Creek near Eddyville, Ill.	D
03385000	Hayes Creek at Glendale, Ill.	C
03612000	Cache River at Forman, Ill.	D
05414820	Sinsinawa River near Menominee, Ill.	D
05419000	Apple River near Hanover, Ill.	D
05435500	Pecatonica River at Freeport, Ill.	D
05437500	Rock River at Rockton, Ill.	D
05438250	Coon Creek at Riley, Ill.	C
05438500	Kishwaukee River at Belvidere, Ill.	D
05439000	South Branch Kishwaukee River at De Kalb, Ill.	D
05439500	South Branch Kishwaukee River near Fairdale, Ill.	D
05440000	Kishwaukee River near Perryville, Ill.	D
05443500	Rock River at Como, Ill.	D
05444000	Elkhorn Creek near Penrose, Ill.	D
05446000	Rock Creek at Morrison, Ill.	C
05446500	Rock River near Joslin, Ill.	D,CQ
05447500	Green River near Geneseo, Ill.	D
05448000	Mill Creek at Milan, Ill.	D
05466000	Edwards River near Orion, Ill.	D
05466500	Edwards River near New Boston, Ill.	D
05467000	Pope Creek near Keithsburg, Ill.	D
05468500	Cedar Creek at Little York, Ill.	C
05469000	Henderson Creek near Oquawka, Ill.	D
05495500	Bear Creek near Marcelline, Ill.	D

Table 2. Surface-water stations operated by the Illinois District for which data are published—Continued

Station Number	Station name	Type of data
05502020	Hadley Creek near Barry, Ill.	C
05512500	Bay Creek at Pittsfield, Ill.	D
05520500	Kankakee River at Momence, Ill.	D
05525000	Iroquois River at Iroquois, Ill.	D
05525500	Sugar Creek at Milford, Ill.	D
05526000	Iroquois River near Chebanse, Ill.	D
05527500	Kankakee River near Wilmington, Ill.	D
05527800	Des Plaines River at Russell, Ill.	D
05527950	Mill Creek at Old Mill Creek, Ill.	D
05528000	Des Plaines River near Gurnee, Ill.	D
05528030	Bull Creek near Libertyville, Ill.	D
05528230	Indian Creek at Prairie View, Ill.	D
05528500	Buffalo Creek near Wheeling, Ill.	D
05529000	Des Plaines River near Des Plaines, Ill.	D
05529500	McDonald Creek near Mount Prospect, Ill.	D
05530000	Weller Creek at Des Plaines, Ill.	D
05530990	Salt Creek at Rolling Meadows, Ill.	D
05531300	Salt Creek at Elmhurst, Ill.	D
05531500	Salt Creek at Western Springs, Ill.	D
05532000	Addison Creek at Bellwood, Ill.	D
05532300	Salt Creek at Brookfield, Ill.	S
05532500	Des Plaines River at Riverside, Ill.	D,CQ
05533000	Flag Creek near Willow Springs, Ill.	D
05533400	Sawmill Creek near Lemont, Ill.	D
05534500	North Branch Chicago River at Deerfield, Ill.	D
05535000	Skokie River at Lake Forest, Ill.	D
05535070	Skokie River near Highland Park, Ill.	D
05535500	West Fork of North Branch Chicago River at Northbrook, Ill.	D
05536000	North Branch Chicago River at Niles, Ill.	D
05536105	North Branch Chicago River at Albany Avenue at Chicago, Ill.	D
05536215	Thorn Creek at Glenwood, Ill.	D
05536235	Deer Creek near Chicago Heights, Ill.	D
05536255	Butterfield Creek at Flossmoor, Ill.	D
05536265	Lansing ditch near Lansing, Ill.	D
05536275	Thorn Creek at Thornton, Ill.	D
05536290	Little Calumet River at South Holland, Ill.	D
05536340	Midlothian Creek at Oak Forest, Ill.	D
05536500	Tinley Creek near Palos Park, Ill.	D
05536995	Chicago Sanitary and Ship Canal at Romeoville, Ill.	D,CQ
05537500	Long Run near Lemont, Ill.	D
05539000	Hickory Creek at Joliet, Ill.	D
05539900	West Branch Du Page River near West Chicago, Ill.	D
05540060	Kress Creek at West Chicago, Ill.	D
05540091	Spring Brook at Forest Preserve near Warrenville, Ill.	D
05540095	West Branch Du Page River near Warrenville, Ill.	D

Table 2. Surface-water stations operated by the Illinois District for which data are published—Continued

Station Number	Station name	Type of data
05540130	West Branch Du Page River near Naperville, Ill.	D
05540160	East Branch Du Page River near Downers Grove, Ill.	D
05540195	St. Joseph Creek at Route 34 at Lisle, Ill.	D
05540250	East Branch Du Page River at Bolingbrook, Ill.	D
05540275	Spring Brook at 87th Street near Naperville, Ill.	D,CQ
05540500	Du Page River at Shorewood, Ill.	D
05542000	Mazon River near Coal City, Ill.	D
05543500	Illinois River at Marseilles, Ill.	D,CQ
05547000	Channel Lake near Antioch, Ill.	S
05547500	Fox Lake near Lake Villa, Ill.	S
05547755	Squaw Creek at Round Lake, Ill.	D
05548000	Nippersink Lake at Fox Lake, Ill.	S
05548280	Nippersink Creek near Spring Grove, Ill.	D
05548500	Fox River at Johnsburg, Ill.	S
05549000	Boone Creek near McHenry, Ill.	C
05549500	Fox River near McHenry, Ill.	S
05549850	Flint Creek near Fox River Grove, Ill.	D
05550000	Fox River at Algonquin, Ill.	D
05550500	Poplar Creek at Elgin, Ill.	D
05551000	Fox River at South Elgin, Ill.	D
05551200	Ferson Creek near St. Charles, Ill.	D
05551700	Blackberry Creek near Yorkville, Ill.	D
05552500	Fox River at Dayton, Ill.	D,CQ
05554000	North Fork Vermilion River near Charlotte, Ill.	C
05554500	Vermilion River at Pontiac, Ill.	D
05555300	Vermilion River near Leonore, Ill.	D
05556500	Big Bureau Creek at Princeton, Ill.	D
05557000	West Bureau Creek at Wyanet, Ill.	C
05557500	East Bureau Creek near Bureau, Ill.	C
05558300	Illinois River at Henry, Ill.	D
05563000	Kickapoo Creek near Kickapoo, Ill.	C
05563500	Kickapoo Creek at Peoria, Ill.	C
05567000	Panther Creek near El Paso, Ill.	C
05567500	Mackinaw River near Congerville, Ill.	D
05568000	Mackinaw River near Green Valley, Ill.	D
05568500	Illinois River at Kingston Mines, Ill.	DS
05568800	Indian Creek near Wyoming, Ill.	D
05569500	Spoon River at London Mills, Ill.	D
05570000	Spoon River at Seville, Ill.	D,CQ
05570360	Evelyn Branch near Bryant, Ill.	D,CQ
05570370	Big Creek near Bryant, Ill.	D,CQ
05570380	Slug Run near Bryant, Ill.	D,CQ
05570910	Sangamon River at Fisher, Ill.	D
05572000	Sangamon River at Monticello, Ill.	D,CQ
05573540	Sangamon River at Route 48 at Decatur, Ill.	D

Table 2. Surface-water stations operated by the Illinois District for which data are published—Continued

Station Number	Station name	Type of data
05575500	South Fork Sangamon River at Kincaid, Ill.	C
05576000	South Fork Sangamon River near Rochester, Ill.	DS
05576500	Sangamon River at Riverton, Ill.	D
05577500	Spring Creek at Springfield, Ill.	D
05578500	Salt Creek near Rowell, Ill.	D
05579500	Lake Fork near Cornland, Ill.	D
05580000	Kickapoo Creek at Waynesville, Ill.	D
05580500	Kickapoo Creek near Lincoln, Ill.	C
05580950	Sugar Creek near Bloomington, Ill.	D
05581500	Sugar Creek near Hartsburg, Ill.	C
05582000	Salt Creek near Greenview, Ill.	D
05583000	Sangamon River near Oakford, Ill.	D,CQ
05584400	Drowning Fork at Bushnell, Ill.	C
05584500	La Moine River at Colmar, Ill.	D
05585000	La Moine River at Ripley, Ill.	D
05585500	Illinois River at Meredosia, Ill.	S/8
05586000	North Fork Mauvaise Terre Creek near Jacksonville, Ill.	C
05586100	Illinois River at Valley City, Ill.	D,CQ,SD
05586500	Hurricane Creek near Roodhouse, Ill.	C
05587000	Macoupin Creek near Kane, Ill.	D
05587060	Illinois River at Hardin, Ill.	S/8
05587900	Cahokia Creek at Edwardsville, Ill.	D
05588000	Indian Creek at Wanda, Ill.	D
05590800	Lake Fork at Atwood, Ill.	D
05591200	Kaskaskia River at Cooks Mills, Ill.	D,SD
05591550	Whitley Creek near Allenville, Ill.	D
05591700	West Okaw River near Lovington, Ill.	D
05591950	Lake Shelbyville near Shelbyville, Ill.	R
05592000	Kaskaskia River at Shelbyville, Ill.	D
05592050	Robinson Creek near Shelbyville, Ill.	D
05592100	Kaskaskia River near Cowden, Ill.	D
05592500	Kaskaskia River at Vandalia, Ill.	D
05592575	Hickory Creek near Brownstown, Ill.	D
05592800	Hurricane Creek near Mulberry Grove, Ill.	D
05592900	East Fork Kaskaskia River near Sandoval, Ill.	D
05592990	Carlyle Lake near Carlyle, Ill.	R
05593000	Kaskaskia River at Carlyle, Ill.	D
05593520	Crooked Creek near Hoffman, Ill.	D
05593575	Little Crooked Creek near New Minden, Ill.	D
05593900	East Fork Shoal Creek near Coffeen, Ill.	D
05594000	Shoal Creek near Breese, Ill.	D
05594100	Kaskaskia River near Venedy Station, Ill.	D,SD
05594450	Silver Creek near Troy, Ill.	D
05594800	Silver Creek near Freeburg, Ill.	D,S/8
05595200	Richland Creek near Hecker, Ill.	D,S/8

Table 2. Surface-water stations operated by the Illinois District for which data are published—Continued

Station Number	Station name	Type of data
05595700	Big Muddy River near Mt. Vernon, Ill.	S
05595730	Rayse Creek near Waltonville, Ill.	D,S/8
05595765	Big Muddy Subimpoundment near Waltonville, Ill.	S/8
05595820	Casey Fork at Mt. Vernon, Ill.	D,S/8
05595860	Casey Fork Subimpoundment near Bonnie, Ill.	S/8
05595950	Rend Lake near Benton, Ill.	R
05597000	Big Muddy River at Plumfield, Ill.	DS
05597500	Crab Orchard Creek near Marion, Ill.	D
05599500	Big Muddy River at Murphysboro, Ill.	DS,CQ,SD
05600000	Big Creek near Wetaug, Ill.	C

Table 3. Discontinued surface-water-discharge or stage-only stations operated by the Illinois District for which data were published

[d, discharge; e, elevation (stage only]

The following continuous-record surface-water-discharge or stage-only stations (gaging stations) in Illinois have been discontinued. Daily streamflow or stage records were collected and published for the period of record, expressed in water years, shown for each station. Those stations with an asterisk (*) after the station number are currently operated as crest-stage partial-record stations. Discontinued project stations with less than 3 years of record have not been included. Information regarding these stations may be obtained from the District office at the address given on the back side of the title page of this report.

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
OHIO RIVER BASIN				
Wabash River Basin				
Vermilion River Basin				
Bluegrass Creek at Potomac, Ill.	d	03336500	35.0	1950-71
Salt Fork near St. Joseph, Ill.	d	03336900	134	1959-91
Saline Branch at Urbana, Ill.	d	03337500	68.0	1936-58
Salt Fork near Homer, Ill.	d	03338000	340	1945-58
Vermilion River near Catlin, Ill.	d	03338500	959	1940-58
Embarras River Basin				
Embarras River near Oakland, Ill.	d	03343500	518	1910-15
Embarras River at State Highway 133 near Oakland, Ill.	d	03343550	542	1979-82
Embarras River near Diona, Ill.	d	03344000*	919	1939-40, 1944-47, 1971-82
Range Creek near Casey, Ill.	d	03344500*	7.61	1951-82
Embarras River near Newton, Ill.	d	03345000	1,392	1939-45
Embarras River at Lawrenceville, Ill.	d	03346500	2,333	1930-34
Little Wabash River Basin				
Little Wabash River at Louisville, Ill.	d	03378900*	745	1965-82
Little Wabash River near Clay City, Ill.	e	03379000	801	1909-13
Little Wabash River at Blood, Ill.	e	03379600	1,387	1973-82
Little Wabash River near Golden Gate, Ill.	e	03380000	1,792	1908-13, 1973-80
Skillet Fork near Iuka, Ill.	d	03380350	208	1966-82
Horse Creek near Keenes, Ill.	d	03380475	97.2	1959-90
Skillet Fork near Mill Shoals, Ill.	e	03381000	874	1909-13, 1975-78
Saline River Basin				
Brushy Creek near Harco, Ill.	d	03382170	13.3	1968-82
Middle Fork Saline River near Harrisburg, Ill.	d	03382200	225	1924-32
North Fork Saline River near Ridgway, Ill.	d	03382350	423	1965-69
Saline River near Junction, Ill.	d	03382500	1,051	1940-71
Eagle Creek near Equality, Ill.	d	03382510	8.51	1966-82

Table 3. Discontinued surface-water-discharge or stage-only stations operated by the Illinois District for which data were published—Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Bay Creek Basin				
Hayes Creek at Glendale, Ill.	d	03385000*	19.1	1949-75
Lake Glendale Inlet near Dixon Springs, Ill.	d	03385500	1.05	1954-63
Lake Glendale Outlet near Dixon Springs, Ill.	d	03386000	1.98	1955-63
Sugar Creek near Dixon Springs, Ill.	d	03386500	9.93	1950-71
GREAT LAKES BASIN				
Streams Tributary to Lake Michigan				
Wolf Lake at Chicago, Ill.	e	04092500	--	1940-82
UPPER MISSISSIPPI RIVER BASIN ABOVE THE ILLINOIS RIVER				
Galena River Basin				
Galena River at Galena, Ill.	d	05416000	196	1935-38,
	e			1939
Plum River Basin				
Plum River near Savanna, Ill.	d	05419500	162	1935-41
Plum River below Carroll Creek near Savanna, Ill.	d	05420000	230	1941-77
Rock River Basin				
Cedar Creek near Winslow, Ill.	d	05435000	1.31	1951-71
Pecatonica River at Shirland, Ill.	d	05437000	2,550	1940-58
Coon Creek at Riley, Ill.	d	05438250*	85.1	1961-82
Killbuck Creek near Monroe Center, Ill.	d	05440500	117	1940-71
Leaf River at Leaf River, Ill.	d	05441000	103	1940-58
Rock River at Oregon, Ill.	d	05441500	8,205	1940-49
Kyte River near Flagg Center, Ill.	d	05442000	116	1940-51
Rock Creek near Coleta, Ill.	d	05445000	82.8	1040-42
Rock Creek near Morrison, Ill.	d	05445500	158	1943-58
Rock Creek at Morrison, Ill.	d	05446000*	164	1940-42,
				1978-86
Green River at Amboy, Ill.	d	05447000	201	1940-58
Henderson Creek Basin				
Henderson Creek near Little York, Ill.	d	05467500	151	1941-58
North Henderson Creek near Seaton, Ill.	d	05468000	67.1	1941-51
Cedar Creek at Little York, Ill.	d	05468500*	132	1941-71
South Henderson Creek at Biggsville, Ill.	d	05469500	82.9	1940-71
Hadley Creek Basin				
Hadley Creek near Barry, Ill.	d	05502020	40.9	1956-66
Hadley Creek at Kinderhook, Ill.	d	05502040	72.7	1940-86
Hadley Creek near Shinn, Ill.	d	05502080	73.6	1941-46
The Sny Basin				
The Sny at Atlas, Ill.	d	05512000	451	1940-42
Bay Creek Basin				
Bay Creek at Nebo, Ill.	d	05513000	148	1940-86

Table 3. Discontinued surface-water-discharge or stage-only stations operated by the Illinois District for which data were published—Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
ILLINOIS RIVER BASIN				
Kankakee River Basin				
Terry Creek near Custer Park, Ill.	d	05526500	12.1	1949-75
Kankakee River at Custer Park, Ill.	d	05527000	4,810	1915-34
Des Plaines River Basin				
Willow Creek near Park Ridge, Ill.	d	05530500	19.7	1950-58
Salt Creek near Arlington Heights, Ill.	d	05531000	32.1	1950-71, 1973
Des Plaines River at Lemont, Ill.	d	05533500	684	1915-44
Thorn Creek near Chicago Heights, Ill.	d	05536210	17.2	1964-79
North Creek near Lansing, Ill.	d	05536270	16.8	1948-79
Little Calumet River at Harvey, Ill.	d	05536325	252	1917-33
Chicago Sanitary and Ship Canal at Lockport, Ill.	d	05537000	740	1900-84
Des Plaines River at Joliet, Ill.	d	05538000	1,503	1915-32
Spring Creek at Joliet, Ill.	d	05538500	19.6	1925-35
Du Page River Basin				
St. Joseph Creek at Lisle, Ill.	d	05540200	11.8	1986-89
Fox River Basin				
Boone Creek near McHenry, Ill.	d	05549000*	15.5	1948-82
Vermilion River Basin				
North Fork Vermilion River near Charlotte, Ill.	d	05554000*	186	1943-62
Vermilion River at Streator, Ill.	d	05555000	1,084	1914-30
Vermilion River at Lowell, Ill.	d	05555500	1,278	1931-71
Big Bureau Creek Basin				
West Bureau Creek at Wyanet, Ill.	d	05557000*	86.7	1936-66
East Bureau Creek near Bureau, Ill.	d	05557500*	99.0	1936-66
Big Bureau Creek at Bureau, Ill.	d	05558000	485	1941-51
Crow Creek (West) Basin				
Crow Creek (West) near Henry, Ill.	d	05558500	56.2	1949-71
Gimlet Creek Basin				
Gimlet Creek at Sparland, Ill.	d	05559000	5.66	1946-47, 1951-71
Crow Creek Basin				
Crow Creek near Washburn, Ill.	d	05559500	115	1945-71
Illinois River Main Stem				
Illinois River at Peoria, Ill.	d	05560000	14,165	1903-06, 1910-39
Farm Creek Basin				
Farm Creek at Farmdale, Ill.	d	05560500	27.4	1949-85
Ackerman Creek at Farmdale, Ill.	d	05561000	11.2	1954-80
Fondulac Creek near East Peoria, Ill.	d	05561500	5.54	1948-85
Farm Creek at East Peoria, Ill.	d	05562000	61.2	1943-80

Table 3. Discontinued surface-water-discharge or stage-only stations operated by the Illinois District for which data were published—Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Kickapoo Creek Basin				
Kickapoo Creek near Kickapoo, Ill.	d	05563000*	119	1945-62
Kickapoo Creek at Peoria, Ill.	d	05563500*	297	1942-71
Mackinaw River Basin				
Money Creek near Towanda, Ill.	d	05564400	49.0	1958-82
Money Creek above Lake Bloomington, Ill.	d	05564500	53.1	1933-58
Hickory Creek above Lake Bloomington, Ill.	d	05565000	9.81	1939-58
Money Creek at Lake Bloomington, Ill.	d	05565500	69.1	1931-58
East Branch Panther Creek near Gridley, Ill.	d	05566000	6.30	1950-60
East Branch Panther Creek at El Paso, Ill.	d	05566500	30.5	1950-82
Panther Creek near El Paso, Ill.	d	05567000*	93.9	1950-60
Spoon River Basin				
Brush Creek at Lake Bracken near Galesburg, Ill.	d	05569000	9.11	1932-58
Big Creek at St. David, Ill.	d	05570350	28.0	1972-86
Illinois River Main Stem				
Illinois River at Havana, Ill.	d	05570500	18,299	1922-27, 1985-89
Sangamon River Basin				
Sangamon River at Mahomet, Ill.	d	05571000	362	1948-78
Goose Creek near De Land, Ill.	d	05571500	47.9	1951-59
Friends Creek at Argenta, Ill.	d	05572450	111	1967-82
Sangamon River near Oakley, Ill.	d	05572500	774	1951-77
South Fork Sangamon River near Nokomis, Ill.	d	05574000	11.0	1951-75
Flat Branch near Taylorville, Ill.	d	05574500	276	1949-82
South Fork Sangamon River near Taylorville, Ill.	d	05575000	434	1908-17
South Fork Sangamon River at Kincaid, Ill.	d	05575500*	562	1917-34, 1945-61
Horse Creek at Pawnee, Ill.	d	05575800	52.2	1968-85
Brush Creek near Divernon, Ill.	d	05575830	32.4	1974-82
Salt Creek near Kenney, Ill.	d	05579000	390	1908-13
Kickapoo Creek near Lincoln, Ill.	d	05580500*	306	1945-71
Sugar Creek near Hartsburg, Ill.	d	05581500*	333	1945-71
Crane Creek near Easton, Ill.	d	05582500	26.5	1950-75
Illinois River Main Stem				
Illinois River at Beardstown, Ill.	d	05584000	24,277	1921-38
La Moine River Basin				
Drowning Fork at Bushnell, Ill.	d	05584400*	26.3	1960-82
Illinois River Main Stem				
Illinois River at Meredosia, Ill.	d	05585500	26,028	1939-89
Mauvaise Terre Creek Basin				
North Fork Mauvaise Terre Creek near Jacksonville, Ill.	d	05586000*	29.1	1950-75

Table 3. Discontinued surface-water-discharge or stage-only stations operated by the Illinois District for which data were published—Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Hurricane Creek Basin				
Hurricane Creek near Roodhouse, Ill.	d	05586500*	2.30	1951-75
Macoupin Creek Basin				
Otter Creek near Palmyra, Ill.	d	05586800	61.1	1960-80
UPPER MISSISSIPPI RIVER BASIN BELOW THE ILLINOIS RIVER				
Cahokia Canal Basin				
Long Lake at Stallings, Ill.	d	05589000	5.00	1939-49
Canteen Creek at Caseyville, Ill.	d	05589500	22.6	1940-82
Kaskaskia River Basin				
Kaskaskia Ditch at Bondville, Ill.	d	05590000	12.4	1949-90
Kaskaskia River near Pesotum, Ill.	d	05590400	109	1965-79
Kaskaskia River at Ficklin, Ill.	d	05590500	126	1954-64
Kaskaskia River near Arcola, Ill.	d	05591000	375	1908-13
Asa Creek at Sullivan, Ill.	d	05591500	8.05	1950-82
Wolf Creek near Beecher City, Ill.	d	05592300	47.9	1959-82
Hickory Creek near Bluff City, Ill	e	05592600	77.8	1980-88
Martin Branch near Centralia, Ill.	d	05593500	7.08	1932-43, 1949-55
Crooked Creek near Posey, Ill.	d	05593525	344	1968-74
Blue Grass Creek near Raymond, Ill.	d	05593600*	17.3	1960-82
Sugar Creek at Albers, Ill.	d	05594090	124	1973-82
Mud Creek near Marissa, Ill.	d	05594330	72.4	1971-82
Silver Creek near Lebanon, Ill.	d	05594500	324	1908-15
Kaskaskia River at New Athens, Ill.	d	05595000	5,181	1910-21, 1935-71,
	e			1972-74
Marys River Basin				
Marys River near Sparta, Ill.	d	05595500	17.8	1949-71
Big Muddy River Basin				
Sevenmile Creek near Mt. Vernon, Ill.	d	05595800	21.1	1961-82
Casey Fork at Route 37 near Mt. Vernon, Ill.	e	05595830	87.7	1980-85
Big Muddy River near Benton, Ill.	d	05596000	502	1946-70
Tilley Creek near West Frankfort, Ill.	d	05596500	3.87	1939-46, 1949-55
Crab Orchard Lake near Carterville, Ill.	e	05598000	--	1953-79
Beaucoup Creek near Pinckneyville, Ill.	d	05598500	231	1909-15
Beaucoup Creek near Matthews, Ill.	d	05599000	292	1946-82
Cache River Basin				
Big Creek near Wetaug, Ill.	d	05600000*	32.2	1941-71

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published

[c, chemical; b, biological; and m, microbiological are all periodic records; t, temperature; sc, specific conductance; and s, sediment are all continuous records]

The following are discontinued stations for which continuous records or periodic (collection frequency not less than quarterly) records of surface-water quality were published. The period of record for each type of data collected is expressed in water years. Discontinued project stations with short periods of record have not been included.

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
OHIO RIVER BASIN				
Wabash River				
Vermilion River Basin				
Middle Fork Vermilion River above Oakwood, Ill.	c,m	03336645	432	1978-91,
	sc, t			1979
Salt Fork near St. Joseph, Ill.	c,m	03336900	134	1959-62,
				1978-91
Saline Branch near Mayview, Ill.	c,m	03337700	82.1	1978-90
Salt Fork near Oakwood, Ill.	c,m	03338097	489	1978-90
North Fork Vermilion River near Bismarck, Ill.	c,m	03338780	262	1978-91
Vermilion River near Danville, Ill.	c,m	03339000	1,290	1906-07,
				1978-91
Little Vermilion River near Georgetown, Ill.	c,m	03339147	191	1979-90
Brouillets Creek Basin				
Brouilletts Creek near St. Bernice, Ind.	c,m	03341414	260	1978-90
Sugar Creek Basin				
Sugar Creek near Elbridge, Ill.	c,m	03341540	61.0	1978-90
Wabash River Main Stem				
Wabash River at Hutsonville, Ill.	c	03341920	12,986	1969-73,
				1978-91
Sugar Creek Basin				
Sugar Creek at Palestine, Ill.	c,m	03342050	35.8	1979-87
Embarras River Basin				
Embarras River at Camargo, Ill.	c,m	03343395	180	1978-91
Embarras River at State Highway 133 near Oakland, Ill.	s	03343550	542	1979-82
Embarras River near Diona, Ill.	c,m	03344000	919	1971-76,
				1978-91,
	sc,t			1971-76
North Fork Embarras River near Oblong, Ill.	c	03346000	319	1978-91
Embarras River near Billett, Ill.	c,m	03346550	2,403	1978-87
Bonpas Creek Basin				
Bonpas Creek at Browns, Ill.	c,m	03378000	228	1978-91

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Little Wabash River Basin				
Little Wabash River near Effingham, Ill.	c,m	03378635	240	1979-91
Little Wabash River at Louisville, Ill.	c,m	03378900	745	1971-91,
	sc,t			1971-79,
	s			1977-81
Little Wabash River below Clay City, Ill.	c,m	03379500	1,131	1979-91
Little Wabash River at Blood, Ill.	c,m	03379600	1,387	1978-90
Elm River near Toms Prairie, Ill.	c,m	03379950	265	1979-87
Skillet Fork near Iuka, Ill.	c,m	03380350	208	1974-76,
				1979-87,
	sc,t			1973-76,
Skillet Fork at Wayne City, Ill.	c,m	03380500	464	1978-91,
	sc,t			1979
Skillet Fork near Carmi, Ill.	c,m	03381400	1,058	1978-87
Little Wabash River at Carmi, Ill.	c,b,m,sc,t	03381500	3,102	1978-79
Ohio River				
Ohio River Main Stem				
Ohio River at Old Shawneetown, Ill.	t	03381700	--	1975-77
Saline River Basin				
South Fork Saline River near Crab Orchard, Ill.	c,m	03382055	83.2	1983-87
Sugar Creek near Stonefort, Ill.	c,m	03382090	35.4	1978-88
South Fork Saline River near Carrier Mills, Ill.	c	03382100	147	1977-91,
	sc,t,s			1980-81
Brushy Creek near Harco, Ill.	c,sc,s	03382170	13.3	1980-81,
	t			1980
Bankston Fork near Dorris Heights, Ill.	c,m	03382185	77.7	1979-87
Middle Fork Saline River near Pankeyville, Ill.	c,m	03382205	233	1978-87
North Fork Saline River near Texas City, Ill.	c,m	03382325	249	1978-87
Saline River near Gibsonia, Ill.	c,m	03382530	1,062	1978-87
Lusk Creek Basin				
Lusk Creek near Eddyville, Ill.	c,m	03384450	42.9	1978-91,
	sc,t,s			1980-81
Cache River Basin				
Cache River at Forman, Ill.	c,m	03612000	244	1978-91
GREAT LAKES BASIN				
Streams Tributary to Lake Michigan				
Calumet River at Chicago, Ill.	t	04092490	--	1974-77
Lake Michigan				
Lake Michigan at Calumet Park at Chicago, Ill.	t	04092550	--	1974-77

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
UPPER MISSISSIPPI RIVER BASIN ABOVE THE ILLINOIS RIVER				
Galena River Basin				
Galena River at Galena, Ill.	c,m	05416000	196	1979-87
Apple River Basin				
Apple River near Elizabeth, Ill.	c,m	05418950	207	1978-91
Plum River Basin				
Plum River at Savanna, Ill.	c,m	05420100	273	1978-90
Mississippi River Main Stem				
Mississippi River at Dam 13 near Fulton, Ill.	t	05420400	85,600	1969-77
Mississippi River at Dam 14 near Hampton, Ill.	t	05422400	88,400	1973-77
Rock River Basin				
Pecatonica River Basin				
Pecatonica River at Freeport, Ill.	c,m	05435500	1,326	1978-91
Yellow Creek near Freeport, Ill.	c,m	05435680	192	1979-87
Pecatonica River at Harrison, Ill.	c,m	05435800	1,788	1978-90
Rock River Main Stem				
Rock River at Rockton, Ill.	c,m	05437500	6,363	1978-91
Kishwaukee River Basin				
Kishwaukee River at Garden Prairie Road at Garden Prairie, Ill.	c,m	05438201	222	1978-90
Coon Creek at Riley, Ill.	c,m	05438250	85.1	1979-91
Kishwaukee River above South Branch near Perryville, Ill.	c,m	05438600	655	1978-91
South Branch Kishwaukee River at De Kalb, Ill.	s	05439000	77.7	1980-81
South Branch Kishwaukee River near Fairdale, Ill.	c,m	05439500	387	1978-91
Kishwaukee River near Perryville, Ill.	c,m	05440000	1,099	1978-91
Killbuck Creek near New Milford, Ill.	c,m	05440520	136	1979-90
Rock River Main Stem				
Rock River at Byron, Ill.	c,m	05440700	7,990	1978-88
Rock River at Oregon, Ill.	t	05441500	8,205	1975-77
Kyte River Basin				
Kyte River at Daysville, Ill.	c,m	05442020	179	1979-90
Rock River Main Stem				
Rock River at Grand Detour, Ill.	c,m	05442200	8,502	1978-88
Rock River at Como, Ill.	c,m	05443500	8,755	1906-07, 1978-91
Elkhorn Creek Basin				
Elkhorn Creek near Penrose, Ill.	c,m	05444000	146	1979-91
Rock Creek Basin				
Rock Creek near Erie, Ill.	c,m	05446100	237	1979-87

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Rock River Main Stem				
Rock River near Joslin, Ill.	sc,t	05446500	9,549	1976-81,
	s			1980-82
Green River Basin				
Green River near Deer Grove, Ill.	c,m	05447100	322	1978-90
Green River near Geneseo, Ill.	c,m	05447500	1,003	1978-91,
	s			1978-81
Edwards River Basin				
Edwards River near New Boston, Ill.	c,m	05466500	445	1978-91,
	s			1979-81
Henderson Creek Basin				
Henderson Creek near Oquawka, Ill.	c,m	05469000	432	1978-91,
	s			1978-81
Bear Creek Basin				
Bear Creek near Marcelline, Ill.	c	05495500	349	1978-91
Bay Creek Basin				
Bay Creek at Nebo, Ill.	c,m	05513000	161	1978-90
ILLINOIS RIVER BASIN				
Kankakee River Basin				
Kankakee River at Momence, Ill.	c,m	05520500	2,294	1975-91,
	t			1975-77,
	s			1979-81
Iroquois River at Iroquois, Ill.	c,m	05525000	686	1978-91,
	s			1979-80
Sugar Creek at Milford, Ill.	c,m	05525500	446	1978-91
Iroquois River near Chebanse, Ill.	c,m	05526000	2,091	1978-91,
	s			1979-81
Kankakee River near Wilmington, Ill.	c,m	05527500	5,150	1973-91,
	t			1973-77,
	s			1979-82
Des Plaines River Basin				
Des Plaines River at Russell, Ill.	c,m	05527800	123	1978-91
Des Plaines River near Gurnee, Ill.	c	05528000	232	1977-91
Des Plaines River near Des Plaines, Ill.	c,m	05529000	360	1978-91
Des Plaines River near Schiller Park, Ill.	c,m	05530590	444	1978-90
Salt Creek at Western Springs, Ill.	c,m	05531500	114	1978-91
Addison Creek at Bellwood, Ill.	c,m	05532000	17.9	1979-91
Des Plaines River at Riverside, Ill.	s	05532500	630	1979-82
Des Plaines River at Romeoville, Ill.	t	05534000	696	1974-77
Des Plaines River at Lockport, Ill.	c,m	05534050	700	1978-90
North Branch Chicago River at Deerfield, Ill.	c,m	05534500	19.7	1978-91
North Branch Chicago River at Niles, Ill.	c,m	05536000	100	1978-91,
	s			1985-86,

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Des Plaines River Basin--Continued				
Chicago Sanitary and Ship Canal at Ashland Ave at Chicago, Ill..	t	05536135	--	1975-77
Little Calumet River at Munster, Ind.	c,m	05536195	90.0	1978-91
Thorn Creek at Thornton, Ill.	c,m	05536275	104	1979-91
Calumet Sag Channel at Blue Island, Ill.	t	05536368	292	1975-77
Calumet Sag Channel at Sag Bridge, Ill.	c,m	05536700	389	1978-87
Chicago Sanitary and Ship Canal at Romeoville, Ill.	t	05536995	739	1974-77
Chicago Sanitary and Ship Canal at Lockport, Ill.	c,m	05537000	740	1978-91
Des Plaines River at Route 53 at Joliet, Ill.	c,m	05537980	1,502	1982-87
Des Plaines River at Rockdale, Ill.	t	05538010	1,506	1974-77
Hickory Creek at Joliet, Ill.	c,m	05539000	107	1979-91
Des Plaines River at Channahon, Ill.	t	05539670	1,711	1973-77
Du Page River Basin				
West Branch Du Page River near West Chicago, Ill.	c,m	05539900	28.5	1979-91
West Branch Du Page River near Warrenville, Ill.	c	05540095	90.4	1977-91
East Branch Du Page River at Route 34 at Lisle, Ill.	c,m	05540210	57.0	1978-91
Du Page River near Naperville, Ill.	c,m	05540290	220	1978-90
Du Page River at Shorewood, Ill.	c,m	05540500	324	1964-76, 1978-91,
	t			1964-76
Illinois River Main Stem				
Illinois River at Dresden Island, Ill.	t	05541500	7,278	1967-77
Aux Sable Creek Basin				
Aux Sable Creek near Morris, Ill.	c,m	05541710	172	1979-87
Mazon River Basin				
Mazon River near Coal City, Ill.	c,m	05542000	455	1978-91
Illinois River Main Stem				
Illinois River at Marseilles, Ill.	sc,t	05543500	8,259	1973-81
Fox River Basin				
Fox River near Channel Lake, Ill.	c,m	05546700	871	1976-91
Nippersink Creek near Spring Grove, Ill.	c,m	05548280	192	1976-91
Fox River at Burtons Bridge, Ill.	c,m	05549600	1,278	1979-87
Fox River at Algonquin, Ill.	c,m	05550000	1,403	1978-91
Poplar Creek at Elgin, Ill.	c	05550500	35.2	1977-91
Fox River at South Elgin, Ill.	c,m	05551000	1,556	1978-91
Fox River at Montgomery, Ill.	c,m	05551540	1,732	1978-90
Blackberry Creek near Yorkville, Ill.	c,m	05551700	70.2	1978-91
Somonauk Creek at Sheridan, Ill.	c,m	05551995	83.3	1979-87
Illinois River Main Stem				
Illinois River at Starved Rock, Ill.	t	05553700	11,056	1967-77

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Vermilion River Basin				
Vermilion River at McDowell, Ill.	c,m	05554490	551	1978-91
Vermilion River near Leonore, Ill.	c,m	05555300	1,251	1978-91,
	s			1980-81
Little Vermilion River at La Salle, Ill.	c,m	05555950	125	1979-87
Illinois River Main Stem				
Illinois River at Hennepin, Ill.	c,m	05556200	12,756	1978-91
Big Bureau Creek Basin				
Big Bureau Creek at Princeton, Ill.	c,m	05556500	196	1978-91
West Bureau Creek at Wyanet, Ill.	c,m	05557000	86.7	1979-91
Illinois River Main Stem				
Illinois River at Henry, Ill.	s	05558300	13,543	1983-86
Illinois River at Lacon, Ill.	c,m	05558995	12,953	1978-91
Illinois River at Water Company at Peoria, Ill.	c,m	05559900	13,900	1970-72,
				1978-91
Farm Creek Basin				
Farm Creek at Camp Street Bridge at East Peoria, Ill.	c,m	05562010	61.3	1979-87
Kickapoo Creek Basin				
Kickapoo Creek at Bartonville, Ill.	c,m	05563525	304	1979-87
Illinois River Main Stem				
Illinois River at Lock and Dam at Peoria, Ill.	t	05563600	14,550	1974-77
Illinois River at Pekin, Ill.	c,m	05563800	14,585	1978-91
Mackinaw River Basin				
Mackinaw River below Congerville, Ill.	c,m	05567510	776	1978-91,
	s			1983-86
Mackinaw River below Green Valley, Ill.	c,m	05568005	1,092	1978-91
Illinois River Main Stem				
Illinois River at Kingston Mines, Ill.	t	05568500	15,818	1975-77
Spoon River Basin				
Spoon River near Wyoming, Ill.	c,m	05568775	197	1979-87
Indian Creek near Wyoming, Ill.	c	05568800	62.7	1978-91,
	sc,t,s			1981
Spoon River near Dahinda, Ill.	c,m	05568915	762	1979-87
Spoon River at London Mills, Ill.	c	05569500	1,062	1978-91
Spoon River at Seville, Ill.	s	05570000	1,636	1981
Big Creek at St. David, Ill.	c	05570350	28.0	1975-86,
	sc,t			1972-83,
	s			1972-80

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Spoon River Basin--Continued				
Evelyn Branch near Bryant, Ill.	sc,t	05570360	5.78	1972-80
Big Creek near Bryant, Ill.	sc,t	05570370	41.2	1972-83,
	s			1972-87
Slug Run near Bryant, Ill.	sc,t	05570380	7.12	1975-80,
	s			1976-80
Illinois River Main Stem				
Illinois River at Power Company at Havana, Ill.	c	05570520	18,300	1978-91
Sangamon River Basin				
Sangamon River at Fisher, Ill.	c,m	05570910	240	1979-91
Sangamon River at Mahomet, Ill.	c,m	05571000	362	1978
Sangamon River at Allerton Park near Monticello, Ill.	c,m	05572125	573	1979-91
Sangamon River at Lake Decatur Water Intake at Decatur, Ill.	c,m	05573504	927	1980-87
Sangamon River at Route 48 at Decatur, Ill.	c,m	05573540	938	1979-91
Sangamon River near Niantic, Ill.	c,m	05573650	1,054	1978-90
Sangamon River at Roby, Ill.	c,m	05573800	1,264	1978-90
Flat Branch near Taylorville, Ill.	c,m	05574500	276	1979-90
South Fork Sangamon River at Kincaid, Ill.	c,m	05575500	562	1978-91
Sangchris Lake near New City, Ill.	c,m	05575570	--	1980-87
South Fork Sangamon River below Rochester, Ill.	c,m	05576022	867	1978-91
Sugar Creek near Springfield, Ill.	c,m	05576250	270	1979-87
Sangamon River at Riverton, Ill.	c,m	05576500	2,618	1978-91
Spring Creek at Burns Lane Bridge at Springfield, Ill.	c	05577505	109	1979-91
Sangamon River at Petersburg, Ill.	c,m	05578000	3,063	1978-90
Salt Creek near Rowell, Ill.	c,m	05578500	335	1978-91
Lake Fork near Cornland, Ill.	c,m	05579500	214	1978-91
Kickapoo Creek at Waynesville, Ill.	c,m	05580000	227	1978-91
Kickapoo Creek near Lincoln, Ill.	c,m	05580500	306	1978-91
Sugar Creek near Hartsburg, Ill.	c,m	05581500	333	1978-91
Salt Creek near Greenview, Ill.	c	05582000	1,804	1978-91
Sangamon River near Oakford, Ill.	t	05583000	5,093	1976-77,
	sc,t			1979-81,
	s			1981
Sugar Creek near Frederick, Ill.	c,m	05583915	162	1979-87
La Moine River Basin				
La Moine River at Colmar, Ill.	c,m	05584500	655	1975-91
La Moine River at Ripley, Ill.	c,m	05585000	1,293	1975-91,
	sc,t			1979,
	s			1981
Illinois River Main Stem				
Illinois River at Lock and Dam at La Grange, Ill.	t	05585100	25,648	1968-77
Indian Creek Basin				
Indian Creek at Arenzville, Ill.	c,m	05585275	164	1978-90
McKee Creek Basin				
McKee Creek at Chambersburg, Ill.	c,m	05585830	341	1979-87

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Mauvaise Terre Creek Basin				
Mauvaise Terre Creek near Merritt, Ill.	c,m	05586040	146	1978-90
Illinois River Main Stem				
Illinois River at Valley City, Ill.	sc,t	05586100	26,742	1975-81
Apple Creek Basin				
Apple Creek near Eldred, Ill.	c,m	05586600	404	1978-87
Macoupin Creek Basin				
Macoupin Creek near Macoupin, Ill.	c,m	05586690	304	1979-90
Macoupin Creek near Kane, Ill.	c	05587000	868	1978-91
Illinois River Main Stem				
Illinois River at Hardin, Ill.	c	05587060	28,690	1973-91,
	t			1973-77
UPPER MISSISSIPPI RIVER BASIN BELOW THE ILLINOIS RIVER				
Wood River Basin				
Wood River at East Alton, Ill.	c,m	05587700	121	1978-87
Cahokia Canal Basin				
Cahokia Creek at Edwardsville, Ill.	c	05587900	212	1978-91
Cahokia Canal near Collinsville, Ill.	c,m	05589490	--	1978-87
Canteen Creek near Collinsville, Ill.	c,m	05589510	--	1978-87
Prairie Du Pont Creek Basin				
Harding Ditch at East St. Louis, Ill.	c,m	05589785	--	1978-87
Kaskaskia River Basin				
Kaskaskia River near Pesotum, Ill.	c,m	05590400	109	1978-79
Kaskaskia River near Tuscola, Ill.	c,m	05590420	113	1979-87
Kaskaskia River at Cooks Mills, Ill.	c,m	05591200	473	1977-91
Kaskaskia River at Allenville, Ill.	c,m	05591300	506	1980-87
Jonathan Creek near Sullivan, Ill.	c,m	05591400	54.7	1980-87
Asa Creek at Sullivan, Ill.	c,m	05591500	8.05	1978-90
West Okaw River near Lovington, Ill.	c,m	05591700	112	1980-91
Kaskaskia River at Shelbyville, Ill.	c,m	05592000	1,054	1906-07,
				1978-91
Kaskaskia River near Cowden, Ill.	c,m	05592100	1,330	1978-91
Beck Creek at Herrick, Ill.	c,m	05592195	97.0	1979-88
Kaskaskia River at Vandalia, Ill.	c,m	05592500	1,940	1978-91
Hickory Creek near Bluff City, Ill.	c,m	05592600	77.6	1978-88
Hurricane Creek near Mulberry Grove, Ill.	c,m	05592800	152	1978-91
East Fork Kaskaskia River near Sandoval, Ill.	c,m	05592900	113	1978-91
North Fork Kaskaskia River near Patoka, Ill.	c,m	05592930	39.1	1978-87
Kaskaskia River below Carlyle, Ill.	c,m	05593010	2,734	1978-91
Crooked Creek near Odin, Ill.	c,m	05593505	89.2	1978-88
Crooked Creek near Hoffman, Ill.	c	05593520	254	1979-91
Shoal Creek near Walshville, Ill.	c,m	05593785	281	1982-90
Shoal Creek near Panama, Ill.	c,m	05593800	286	1978-82
Shoal Creek near Breese, Ill.	c	05594000	735	1979-91

Table 4. Discontinued surface-water-quality stations operated by the Illinois District for which data were published--Continued

Station name	Type of data	Station number	Drainage area (mi^2)	Period of record
Kaskaskia River Basin--Continued				
Sugar Creek at Albers, Ill.	c,m	05594090	124	1978-90
Kaskaskia River near Venedy Station, Ill.	c,b,m sc,t	05594100	4,393	1975-91, 1975-81
Silver Creek near Troy, Ill.	c,m	05594450	154	1978-91
Silver Creek near Freeburg, Ill.	c,m	05594800	464	1978-91
Richland Creek near Hecker, Ill.	c,m	05595200	129	1978-91
Plum Creek near Baldwin, Ill.	c,m	05595280	60.9	1979-87
Kaskaskia River at Roots, Ill.	c,m	05595400	5,790	1978-87
Marys River Basin				
Marys River at Welge, Ill.	c,m	05595540	113	1978-90
Big Muddy River Basin				
Big Muddy River near Mt. Vernon, Ill.	c,m	05595700	71.9	1978-90
Rayse Creek near Waltonville, Ill.	c,m	05595730	88.0	1978-91
Casey Fork at Route 37 near Mt. Vernon, Ill.	c,m	05595830	87.7	1978-91
Rend Lake near Benton, Ill.	c,m	05595950	488	1979-87
Middle Fork Big Muddy River near Benton, Ill.	c,m	05596400	152	1978-87
Big Muddy River at Plumfield, Ill.	c,m	05597000	794	1978-91
Pond Creek at West Frankfort, Ill.	c,m	05597040	33.1	1978-88
Little Muddy River near Elkville, Ill.	c,m	05597280	213	1978-88
Crab Orchard Creek near Marion, Ill.	c,m	05597500	31.7	1978-91
Crab Orchard Creek below Crab Orchard Lake near Carterville, Ill.	c,m	05598050	201	1978-90
Crab Orchard Creek near Carbondale, Ill.	c,m	05598245	272	1978-88
White Walnut Creek near Pinckneyville, Ill.	c,sc,t	05598480	16.5	1980-81
Beaucoup Creek near Vergennes, Ill.	c,m	05599200	478	1978-88
Big Muddy River at Murphysboro, Ill.	sc,t	05599500	2,169	1975-81
Kinkaid Creek near Murphysboro, Ill.	c,m	05599540	60.2	1980-87
Cedar Creek near Pomona, Ill.	c,m	05599565	34.5	1980-87
Cache River Basin				
Cache River at Sandusky, Ill.	c,m	05600150	234	1978-87
Mississippi River Main Stem				
Mississippi River at Kellogg, Ill.	t	07020125	706,300	1974-77

Table 5. Ground-water stations in Illinois, by county, for which data are published by the Illinois District

[L, Ground-water level measurement; Q, Ground-water quality determination]

Station number	Local well name	Ownership	Type of data
	ADAMS COUNTY		
400026091242401	Clayton-Camp Point PWD Well No. 1	Private	Q
	BOONE COUNTY		
421649088513801	Belvidere Well No. 9	Municipal	Q
	BUREAU COUNTY		
412220089280301	16N9E-16.8e1	Private	L
412232089275101	Princeton Well No. 5	Municipal	Q
412242089125101	Ladd Well No. 1	Municipal	Q
412325089293701	16N9E-7.2g1	Municipal	L
	CHAMPAIGN COUNTY		
400832088190601	Champaign Well No. 54	Private	Q
401841088094701	Rantoul Well No. 7	Municipal	Q
	CLARK COUNTY		
392822087594101	Westfield Well No. 7	Municipal	Q
	COOK COUNTY		
420432088114101	Hoffman Estates Well No. 22	Municipal	Q
	DE KALB COUNTY		
415424088462501	De Kalb Well No. 12	Municipal	Q
	DE WITT COUNTY		
400647088481101	Weldon Well No. 5	Municipal	Q
	DU PAGE COUNTY		
414217087592801	37N11E-9.8c1	Federal	L
414633088080501	Naperville Well No. 5	Municipal	Q
415149088061701	Wheaton Well No. 2	Municipal	Q
415614088095701	Carol Stream Well No. 5	Municipal	Q
	FAYETTE COUNTY		
390759089073102	Ramsey Well No. 6	Municipal	Q
	GRUNDY COUNTY		
411112088180601	Gardner Well No. 2	Municipal	Q
412720088153201	34N8E-1.3e1	Municipal	L,Q
	HANCOCK COUNTY		
401407091034101	Bowen Well No. 2	Municipal	Q
	HENDERSON COUNTY		
405512090573601	Galesburg Well No. 74-3	Municipal	Q
	IROQUOIS COUNTY		
404629087453801	Watseka Well No. 7	Municipal	Q

Table 5. Ground-water stations in Illinois, by county, for which data are published by the Illinois District--Continued

Station number	Local well name	Ownership	Type of data
	KANE COUNTY		
415257088202001	Geneva Well No. 6	Municipal	Q
420507088325501	41N6E-9.1g2	Municipal	L
420720088154601	Carpentersville Well No. 6	Municipal	Q
	KANKAKEE COUNTY		
410127087425201	St. Anne Well No. 3	Municipal	Q
	LAKE COUNTY		
421537088082101	Wauconda Well No. 2	Municipal	Q
422044088014301	Grayslake Well No. 4	Municipal	Q
422803087475301	46N12E-14.6g1	Federal	L
422803087475302	46N12E-14.6g2	Federal	L
422803087475303	46N12E-14.6g3	Federal	L
422803087475304	46N12E-14.6g4	Federal	L
	LA SALLE COUNTY		
413255089064801	Mendota Well No. 3	Municipal	Q
	MADISON COUNTY		
385117090063701	Wood River Well No. 6	Municipal	Q
	MASON COUNTY		
401754090032001	Havana Well No. 5	Municipal	Q
401811089361801	San Jose Well No. 4	Municipal	Q
	MASSAC COUNTY		
370843088435301	Metropolis Well No. 2	Municipal	Q
	MCHENRY COUNTY		
421034088164601	Algonquin Well No. 1	Municipal	Q
421335088204601	Crystal Lake Well No. 6	Municipal	Q
422525088361401	Harvard Well No. 6	Municipal	Q
	MONROE COUNTY		
381749090185301	Valmeyer Well No. 4	Municipal	Q
	OGLE COUNTY		
420453089172601	24N10E-13.6e2	Federal	L
	PEORIA COUNTY		
404511090004001	Elmwood Well No. 3	Municipal	Q
405536089300401	Chillicothe Well No. 7	Municipal	Q
	PULASKI COUNTY		
371637089105401	Ullin Well No. 1	Municipal	Q
373617089120301	Mounds Well No. 1	Municipal	Q
	ROCK ISLAND COUNTY		
412555090265401	Coal Valley Well No. 3	Municipal	Q

Table 5. Ground-water stations in Illinois, by county, for which data are published by the Illinois District--Continued

Station number	Local well name	Ownership	Type of data
	ST. CLAIR COUNTY		
383916090023501	Mound PWD Well No. 1	Municipal	Q
	STEPHENSON COUNTY		
421813089373901	Freeport Well No. 4	Municipal	Q
	TAZEWELL COUNTY		
404222089243201	Washington Well No. 7	Municipal	Q
	WAYNE COUNTY		
383036088255001	Cisne Well No. 3	Municipal	Q
	WHITE COUNTY		
380549088042101	Carmi Well No. 3	Municipal	Q
	WHITESIDE COUNTY		
413922090044101	Erie Well No. 2	Municipal	Q
	WILL COUNTY		
413238088084601	Joliet Rooney Site	Municipal	Q
413514088011901	Lockport Well No. 5	Municipal	Q
	WINNEBAGO COUNTY		
422723089034001	Rockton Well No. 5	Municipal	Q
422930089023201	46N2E-6.2d1	Private	L