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STATE OF ILLINOIS
DEPARTMENT OF ENERGY AND NATURAL RESOURCES

Illinois Benchmark Network Instream Suspended Sediment Monitoring Program, Water Year 1984

by D. Kevin Davie

ILLINOIS STATE WATER SURVEY
CHAMPAIGN
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Abstract: Beginning in Water Year 1981, the Water Survey's suspended sediment monitoring program evolved from the effort to gather data on sediment transport and sedimentation in Illinois waterways. In Water Year 1981, the program consisted of 50 stations throughout the state. However, by Water Year 1983 a series of cuts in funding reduced the number of stations to 18. In 1983, the suspended sediment monitoring program was combined with two other Water Survey monitoring programs under the program name of the Illinois Benchmark Network (IBN). Since that lime, the IBN has continued to maintain suspended sediment stations statewide. In Water Year 1984, 18 stations were maintained. The samples were collected and transported to the Inter-Survey Geotechnical Laboratory, Champaign, where they were analyzed for sediment concentration in parts per million, as well as for particle size distribution. All the techniques used in the data collection process and the laboratory analyses were based upon those used by the U.S. Geological Survey. All the data for Water Year 1984, including those pertaining to water discharge, suspended sediment load, and particle size distribution of the suspended sediment samples, are given in the appendices to this report. The appendices also include the statistical parameters for the regression equations relating water discharge and suspended sediment load data for Water Year 1984.

Reference: Davie, D. Kevin. Illinois Benchmark Network Instream Suspended Sediment Monitoring Program, Water Year 1984. Illinois State Water Survey, Champaign, Circular 171-84, 1988.

Indexing Terms: Data collection, Illinois Benchmark Network, particle size distribution, regression equations, rivers, sediment concentrations, streams, suspended sediment load.

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ILLINOIS BENCHMARK NETWORK
INSTREAM SUSPENDED SEDIMENT MONITORING PROGRAM, WATER YEAR 1984

by D. Kevin Davie

INTRODUCTION

During the 1970s, the federal government began to reduce a variety of data collection programs in Illinois, including programs for the collection of important water and climate data. In 1980-1981, Illinois State Water Survey researchers assessed their current data collection programs, as well as major state water and climate issues and needs for data. They determined that systematic monitoring was needed so that data could be obtained on suspended sediments in streams and on a number of climatic conditions, including solar radiation, soil moisture, and wind.

The Water Survey therefore established two new monitoring networks: the Illinois Instream Suspended Sediment Monitoring Network and the Illinois Climate Network. Initial funding for the sediment network was provided by the Illinois Environmental Protection Agency, the Illinois Department of Energy and Natural Resources, and the Division of Water Resources of the Illinois Department of Transportation. Initial funding for the climate network was provided by the Illinois Department of Energy and Natural Resources.

In 1983, the Water Survey combined the suspended sediment monitoring network, the climate network, and a preexisting ground-water observation well network into the Illinois Benchmark Network (IBN). The IBN is maintained at regional offices at Batavia (northern region), Peoria (west-central region), Champaign (east-central region), and Carbondale (southern region). IBN field activities are coordinated by a supervisor located at the Water Survey Research Center, Champaign. Each regional office has a full-time staff member who is responsible for collecting data and maintaining the sampling sites that fall within that area.

An advisory board oversees this program. It is made up of individuals from different sections of the Water Survey whose interests directly relate to the different programs of the network. The advisory board is responsible for steering the data collection efforts of the IBN toward addressing the needs of major state water and climate issues.

In 1984 basic data were collected regularly at 21 ground-water observation wells, 18 suspended sediment stations, and 16 climate sites (see figure 1 and table 1). The data collected pertained to ground-water levels, suspended sediment concentrations, wind and solar conditions, temperatures, relative humidity, precipitation, and soil moisture. This report summarizes the suspended sediment data collected for Water Year 1984.

History of the Suspended Sediment Monitoring Network

Sedimentation in Illinois lakes and sediment transport by Illinois streams are major pollution issues. The interactions between sediment and water are now recognized as major water resources problems. The magnitude of these problems has not yet been fully realized, and many of the physical and chemical aspects of sediments in rivers and lakes are not yet known or understood clearly.

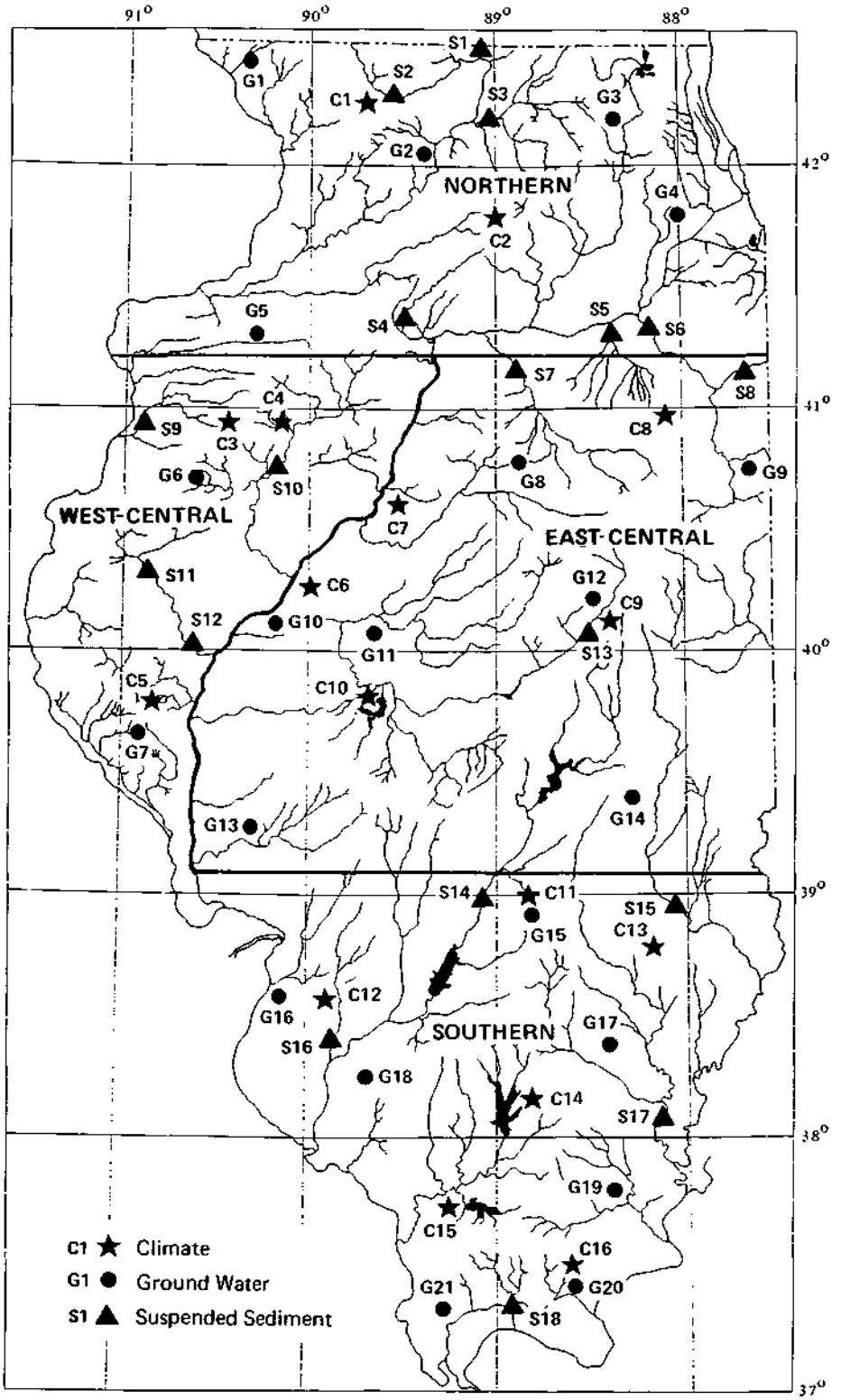

Figure 1. Illinois Benchmark Network, 1984

Table 1. Illinois Benchmark Network, 1984

Ground water	*Climate*	*Instream suspended sediment*
Northern District		
G1 Galena	C1 Freeport	S1 Rock R. at Rockton
G2 Mt. Morris	C2 DeKalb	S2 Pecatonica R. at Freeport
G3 Crystal Lake		S3 Kishwaukee R. near Perryville
G4 Fermilab		S4 Big Bureau Cr. at Princeton
G5 Cambridge		S5 Mazon R. near Coal City
		S6 Kankakee R. near Wilmington
West-Central District		
G6 Good Hope	C3 Monmouth	S9 Henderson Cr. near Oquawka
G7 Coffman	C4 Oakrun-Galesburg	S10 Spoon R. at London Mills
		S11 La Moine R. at Colmar
	C5 Orr-Perry	S12 La Moine R. at Ripley
East-Central District		
G8 Murray	C6 Havana	S7 Vermilion R. near Leonore
G9 Watseka	C7 Ill. Comm. Coll.-Peoria	S8 Kankakee R. at Momence
G10 Snicarte		S13 Sangamon R. at Monticello
G11 Middletown	C8 Stelle	
G12 Swartz	C9 Bondville	
G13 Greenfield	C10 Springfield	
G14 Janesville		
Southern District		
G15 St. Peter	C11 Brownstown	S14 Kaskaskia R. at Vandalia
G16SWS#2	C12 Belleville	S15 Embarras R. at Ste. Marie
G17 Boyleston	C13 Olney	S16 Silver Cr. near Freeburg
G18 Eden	C14 Rend Lake	S17 Little Wabash R. at Carmi
G19 Southeast College	C15 Carbondale	S18 Cache R. at Forman
G20 Dixon Springs	C16 Dixon Springs	
G21 Elco		

Correct answers to the many technological, scientific, and policy questions regarding sedimentation can come only from quality data of sufficient breadth, in both time and space, to allow adequate research as well as development of reliable answers. The Illinois State Water Survey's suspended sediment monitoring program is an attempt to fulfill this need. This program, begun in late 1980, is designed to generate and manage a long-term sediment data base which in turn is made available to all interested users.

During Water Year 1981, the primary goal of the Water Survey's Suspended Sediment Monitoring Network was the long-term monitoring of instream sediments at 50 stations throughout the state. Figure 2 shows the locations of the 50 monitoring stations for Water Year 1981, along with additional U.S. Geological Survey (USGS) monitoring stations. Table 2 lists the 50 stations along with their drainage areas.

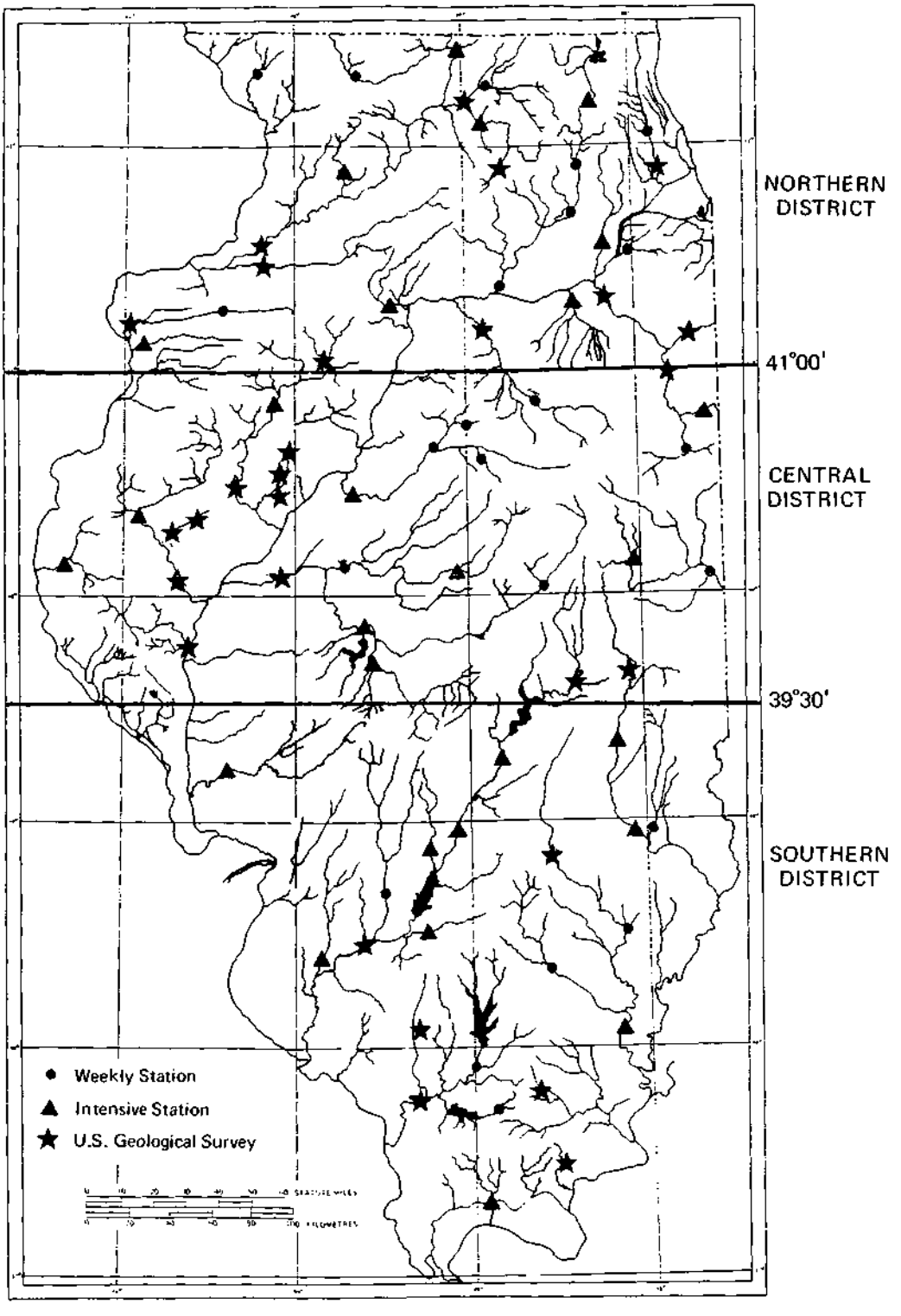

Figure 2. Suspended Sediment Monitoring Network for Illinois for Water Year 1981 (October 1980 through September 1981)

Table 2. Illinois State Water Survey Suspended Sediment Monitoring Network, Water Year 1981

USGS No.	*Station name*
Northern District	
05418950	Apple River near Elizabeth, IL (D.A. 207 sq mi)
05435500	Pecatonica River at Freeport, IL (D.A. 1326 sq mi)
*05437500	Rock River at Rockton, IL (D.A. 6363 sq mi)
05435800	Kishwaukee River at Belvidere, IL (D.A. 538 sq mi)
*05439500	South Branch Kishwaukee River near Fairdale, IL (D.A. 387 sq mi)
*05444000	Elkhorn Creek near Penrose, IL (D.A. 146 sq mi)
05466000	Edwards River near Orion, IL (D.A. 155 sq mi)
*05467000	Pope Creek near Keithsburg, IL (D.A. 183 sq mi)
05529000	Des Plaines River at Des Plaines, IL (D.A. 360 sq mi)
05539000	Hickory Creek at Joliet, IL (D.A. 107 sq mi)
*05540500	DuPage River at Shorewood, IL (D.A. 324 sq mi)
*05542000	Mazon River near Coal City, IL (D.A. 455 sq mi)
*05550000	Fox River at Algonquin, IL (D.A. 1403 sq mi)
05551200	Ferson Creek near St. Charles, IL (D.A. 51.7 sq mi)
05551540	Fox River at Montgomery, IL (D.A. 1732 sq mi)
05552500	Fox River at Dayton, IL (D.A. 2642 sq mi)
*05556500	Big Bureau Creek at Princeton, IL (D.A. 196 sq mi)
Central District	
*03336900	Salt Fork River near St. Joseph, IL (D.A. 134 sq mi)
03339000	Vermilion River near Danville, IL (D.A. 1290 sq mi)
*05495500	Bear Creek near Marcelline, IL (D.A. 349 sq mi)
*05525000	Iroquois River at Iroquois, IL (D.A. 686 sq mi)
05525500	Sugar Creek at Milford, IL (D.A. 446 sq mi)
05554490	Vermilion River at McDowell, IL (D.A. 551 sq mi)
05564400	Money Creek near Towanda, IL (D.A. 49.0 sq mi)
05566500	East Branch Panther Creek at El Paso, IL (D.A. 30.5 sq mi)
05567510	Mackinaw River below Congerville, IL (D.A. 776 sq mi)
*05568005	Mackinaw River below Green Valley, IL (D.A. 1092 sq mi)
*05569500	Spoon River at London Mills, IL (D.A. 1062 sq mi)
05572000	Sangamon River at Monticello, IL (D.A. 550 sq mi)
*05576022	South Fork Sangamon River below Rochester, IL (D.A. 870 sq mi)
*05576500	Sangamon River at Riverton, IL (D.A. 2618 sq mi)
*05578500	Salt Creek near Rowell, IL (D.A. 335 sq mi)
05582000	Salt Creek near Greenview, IL (D.A. 1804 sq mi)
*05584500	La Moine River at Colmar, IL (D.A. 655 sq mi)

Concluded on next page

Table 2. (Concluded)

USGS No.	*Station name*
Southern District	
*03344000	Embarras River near Diona, IL (D.A. 919 sq mi)
*03345500	Embarras River at Ste. Marie, IL (D.A. 1516 sq mi)
03346000	North Fork Embarras River near Oblong, IL (D.A. 318 sq mi)
03379600	Little Wabash River at Blood, IL (D.A. 1387 sq mi)
03380500	Skillet Fork at Wayne City, IL (D.A. 464 sq mi)
*03381500	Little Wabash River at Carmi, IL (D.A. 3102 sq mi)
*03612000	Cache River at Forman, IL (D.A. 244 sq mi)
*05587000	Macoupin Creek near Kane, IL (D.A. 868 sq mi)
*05592100	Kaskaskia River near Cowden, IL (D.A. 1330 sq mi)
*05592500	Kaskaskia River at Vandalia, IL (D.A. 1940 sq mi)
*05592800	Hurricane Creek near Mulberry Grove, IL (D.A. 152 sq mi)
*05593520	Crooked Creek near Hoffman, IL (D.A. 254 sq mi)
05594000	Shoal Creek near Breese, IL (D.A. 735 sq mi)
*05594800	Silver Creek near Freeburg, IL (D.A. 464 sq mi)
05597000	Big Muddy River at Plumfield, IL (D.A. 794 sq mi)
05597500	Crab Orchard Creek near Marion, IL (D.A. 31.7 sq mi)

*Intensively monitored station
D.A. = Drainage area

A 54 percent reduction in the funding of the Suspended Sediment Monitoring Network for Water Year 1982 had a severe impact on maintenance of the original network. The 1982 funding level allowed support for only 19 monitoring stations, covering only two-thirds of the state. Fortunately, the network was able to generate voluntary support from a variety of Water Survey projects, which allowed for the monitoring of an additional 12 sediment stations within the unsampled areas of the state. This brought the total coverage in the state for Water Year 1982 to 31 monitoring stations (figure 3 and table 3).

Of these 31 stations, only 3 stations, all in the Kankakee River Basin, were monitored on a daily basis for most of the water year. The remaining 28 stations were monitored weekly. The long-term effect of this type of sampling schedule is difficult to predict at the present time.

In addition to the 31 stations operated by the Water Survey for Water Year 1982, the U.S. Geological Survey also monitored a number of stations (see figure 3). The sediment records for these data can be found in the USGS publications entitled *Water Resources Data for Illinois, Water Year 1982,* Volumes 1 and 2 (U.S. Geological Survey, 1983).

For Water Year 1983, additional cuts reduced the number of stations to 18, with one full-time technician employed in the program. By the beginning of Water Year 1984, as mentioned previously, the suspended sediment monitoring network was combined with two other programs to be a part of the Illinois Benchmark Network. The IBN has maintained sediment stations since 1983, with four staff members located regionally throughout the state. The locations of the 18 stations maintained in Water Year 1984 are shown in figure 4, and additional information on the stations is given in table 4.

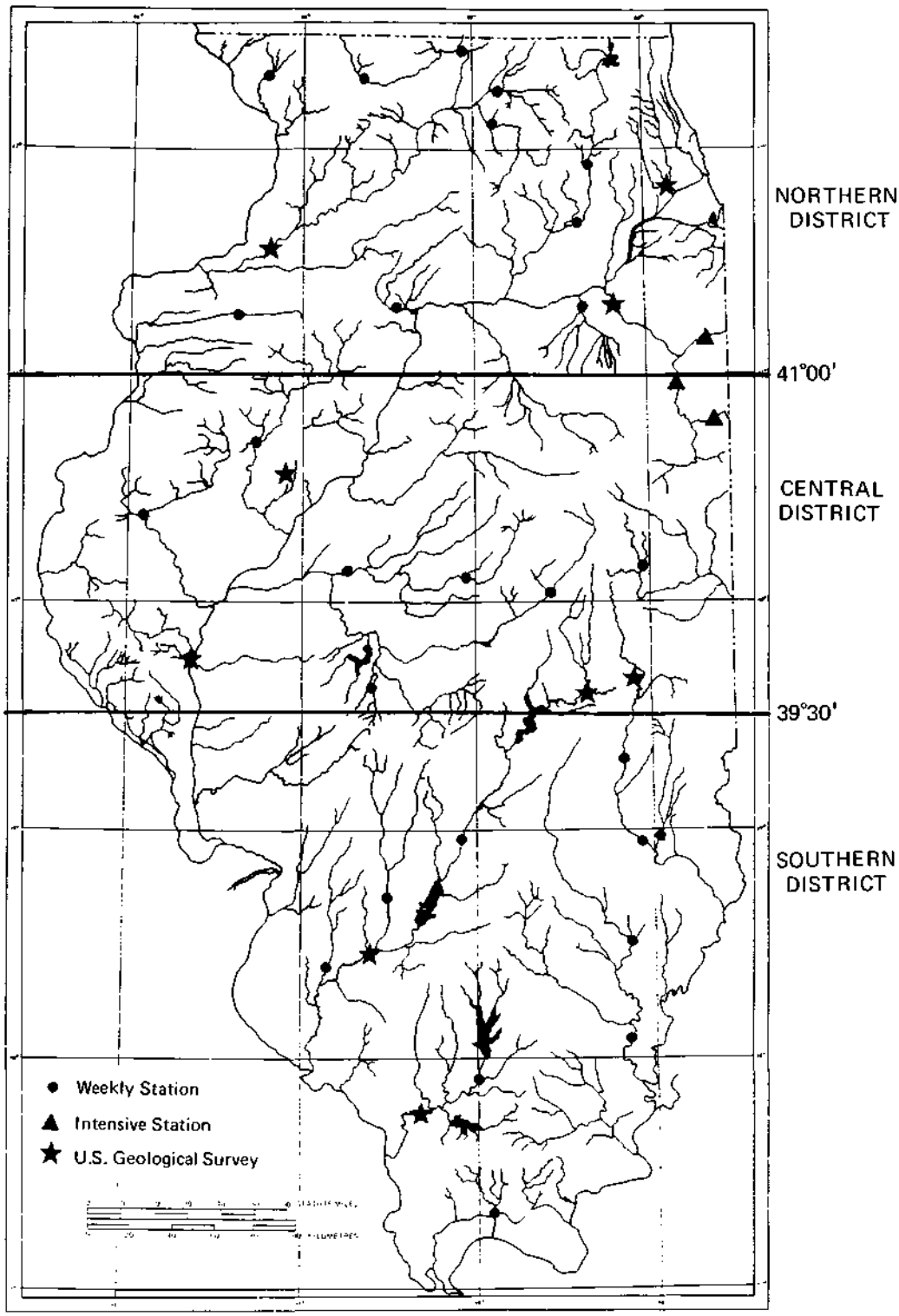

Figure 3. Suspended Sediment Monitoring Network for Illinois for Water Year 1982 (October 1981 through September 1982)

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05439500	South Branch Kishwaukee River near Fairdale, IL (D.A. 387 sq mi)
05466000	Edwards River near Orion, IL (D.A. 155 sq mi)
*05520500	Kankakee River at Momence, IL (D.A. 2294 sq mi)
05542000	Mazon River near Coal City, IL (D.A. 455 sq mi)
05551200	Ferson Creek near St. Charles, IL (D.A. 51.7 sq mi)
05551540	Fox River at Montgomery, IL (D.A. 1732 sq mi)
05556500	Big Bureau Creek at Princeton, IL (D.A. 196 sq mi)
Central District	
03336900	Salt Fork River near St. Joseph, IL (D.A. 134 sq mi)
*05525000	Iroquois River at Iroquois, IL (D.A. 686 sq mi)
*05526000	Iroquois River near Chebanse, IL (D.A. 2091 sq mi)
05569500	Spoon River at London Mills, IL (D.A. 1062 sq mi)
05572000	Sangamon River at Monticello, IL (D.A. 550 sq mi)
05576022	South Fork Sangamon River below Rochester, IL (D.A. 870 sq mi)
05576500	Sangamon River at Riverton, IL (D.A. 2618 sq mi)
05578500	Salt Creek near Rowell, IL (D.A. 335 sq mi)
05582000	Salt Creek near Greenview, IL (D.A. 1804 sq mi)
05584500	La Moine River at Colmar, IL (D.A. 655 sq mi)
Southern District	
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03612000	Cache River at Forman, IL (D.A. 244 sq mi)
05592500	Kaskaskia River at Vandalia, IL (D.A. 1940 sq mi)
05594000	Shoal Creek near Breese, IL (D.A. 735 sq mi)
05594800	Silver Creek near Freeburg, IL (D.A. 464 sq mi)
0559700	Big Muddy River at Plumfield, IL (D.A. 794 sq mi)

*Intensively monitored station
D.A. = Drainage area

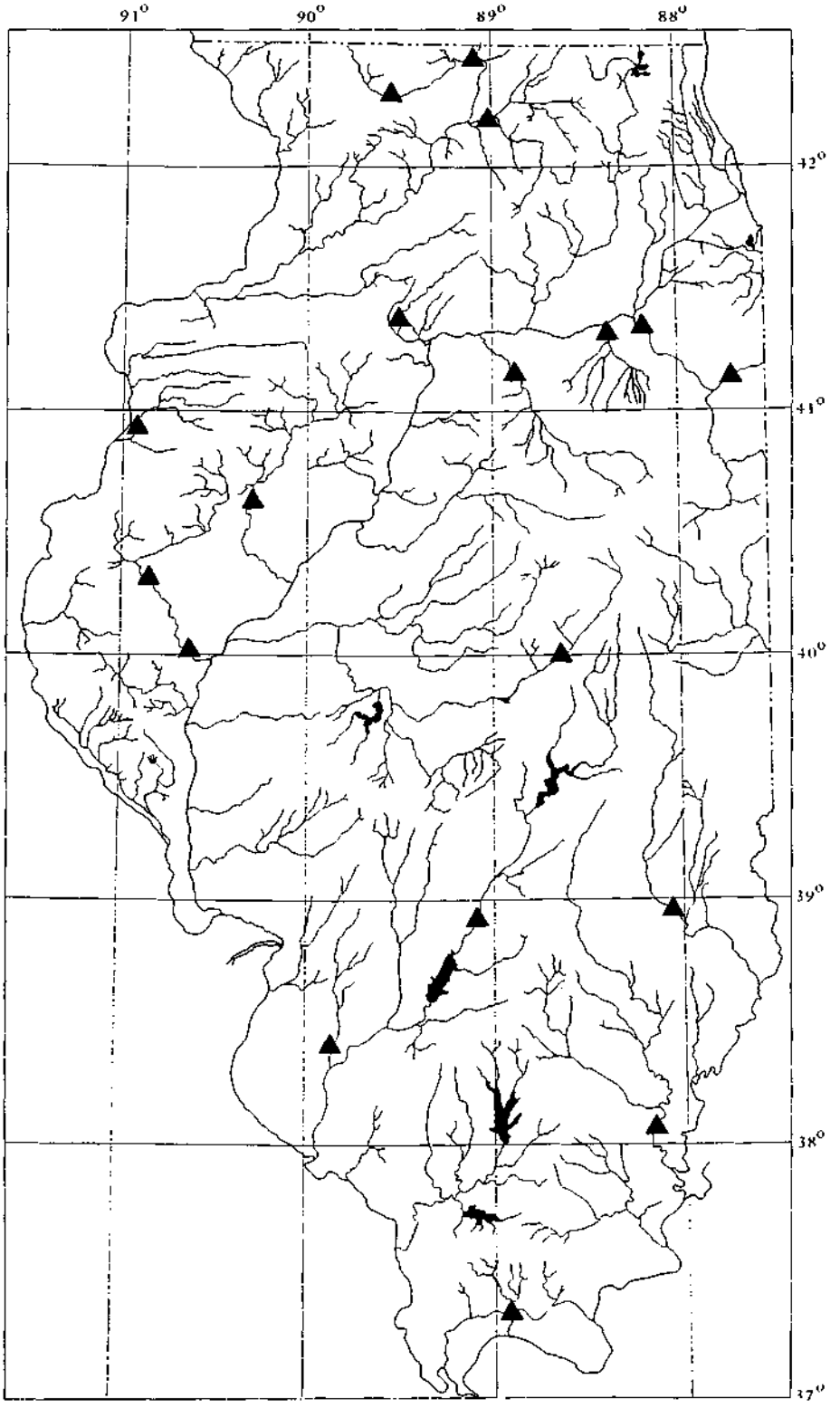

Figure 4. Illinois Benchmark Network suspended sediment stations for Water Year 1984 (October 1983 through September 1984)

Table 4. Illinois Benchmark Network Instream Suspended Sediment Monitoring Program, Water Year 1984

Station name	*USGS ID*	*ISWS ID*	*Drainage area (square miles)*	*ISWS period of record (water years)*	*County*
Northern District					
Pecatonica R. at Freeport	05435500	102	1326	1981 to Present	Stephenson
Rock R. at Rockton	05437500	103	6363	1981 to Present	Winnebago
Kishwaukee R. near Perryville	05438600	105	655	1983 to Present	Winnebago
Big Bureau Cr. at Princeton	05556500	118	196	1981 to Present	Bureau
Mazon R. near Coal City	05542000	123	455	1981 to Present	Grundy
Kankakee R. near Wilmington	05527500	124	5150	1983 to Present	Will
West-Central District					
Henderson Cr. near Oquawka	05469000	228	432	1983 to Present	Henderson
Spoon R. at London Mills	05569500	229	1062	1981 to Present	Fulton
La Moine R. at Colmar	05584500	242	655	1981 to Present	McDonough
La Moine R. at Ripley	05585000	245	1293	1983 to Present	Brown
East-Central District					
Vermilion R. near Leonore	05555300	122	1251	1981 to Present	La Salle
Kankakee R. at Momence	05520500	125	2294	1982 to Present	Kankakee
Sangamon R. at Monticello	05572000	249	550	1981 to Present	Piatt
Southern District					
Kaskaskia R. at Vandalia	05592500	361	1940	1981 to Present	Fayette
Embarras R. at Ste. Marie	03345500	362	1516	1981 to Present	Jasper
Silver Cr. near Freeburg	05594800	367	464	1981 to Present	St. Clair
Little Wabash R. at Carmi	03381500	370	3102	1981 to Present	White
Cache R. at Forman	03612000	378	244	1981 to Present	Johnson

Acknowledgments

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DATA COLLECTION AND ANALYSIS

The Water Survey's suspended sediment data collection network uses methods and instruments compatible with and similar to those used by the U.S. Geological Survey. This is necessary to insure that the data collected by the Water Survey have the same level of quality control and quality assurance as those collected by other state and federal agencies. Descriptions of these methods and instruments are contained in the U.S. Department of the Interior's series of publications entitled *Techniques of Water-Resources Investigations of the United States Geological Survey* (Buchanan and Somers, 1969; Guy, 1969; Guy and Norman, 1970; Porterfield, 1972).

Instrumentation

Three types of suspended sediment samplers are used in this program. All of them have been approved by the Federal Inter-Agency Sedimentation Project of the Inter-Agency Committee on Water Resources, located at the St. Anthony Falls Hydraulic Laboratory in Minneapolis, Minnesota, and are commonly used by the USGS. The three samplers are 1) the depth-integrating suspended sediment wading-type hand sampler, US DH-48 (figure 5); 2) the depth-integrating suspended sediment hand-type sampler, US DH-59 (figure 6); and 3) the point-integrating suspended sediment cable and reel sampler, also used for depth integration, US P-72 (figure 7).

The purpose of suspended sediment samplers is to obtain a sample that is representative of the water-sediment mixture moving in the stream in the vicinity of the sampler. Suspended sediment samplers should:

- Allow water to enter the sample bottle through the nozzle at the same velocity as the surrounding stream velocity (isokinetic)
- Permit the sampler nozzle to reach a point as close to the stream bed as physically possible (about 3 inches for all the samplers)
- Minimize disturbance to the flow pattern of the stream, especially at the nozzle
- Be adaptable to support equipment already in use for streamflow measurement
- Be as simple and maintenance-free as possible

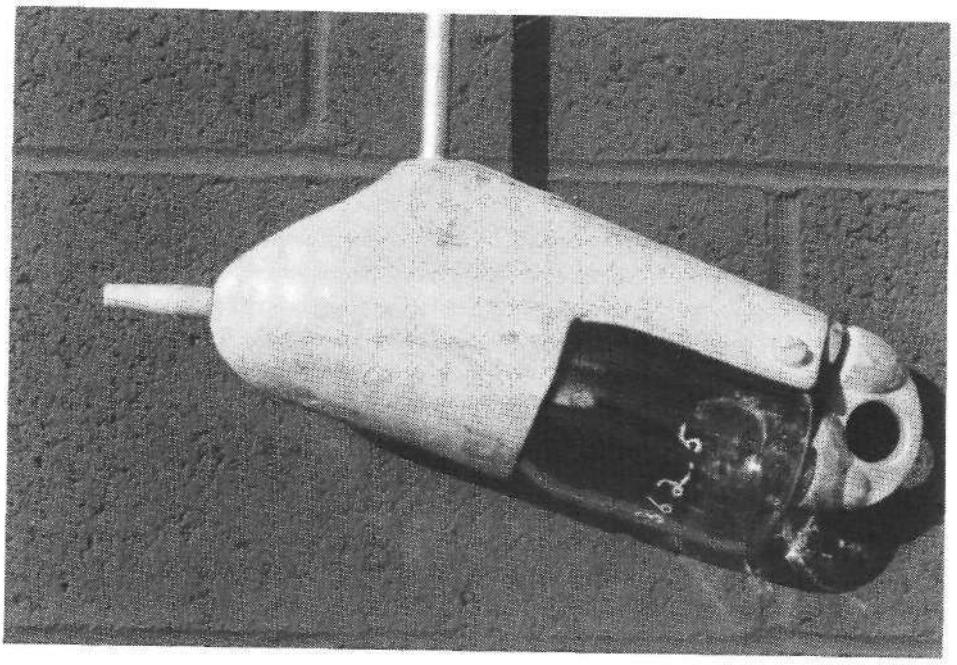

Figure 5. Hand-held suspended sediment sampler, US DH-48

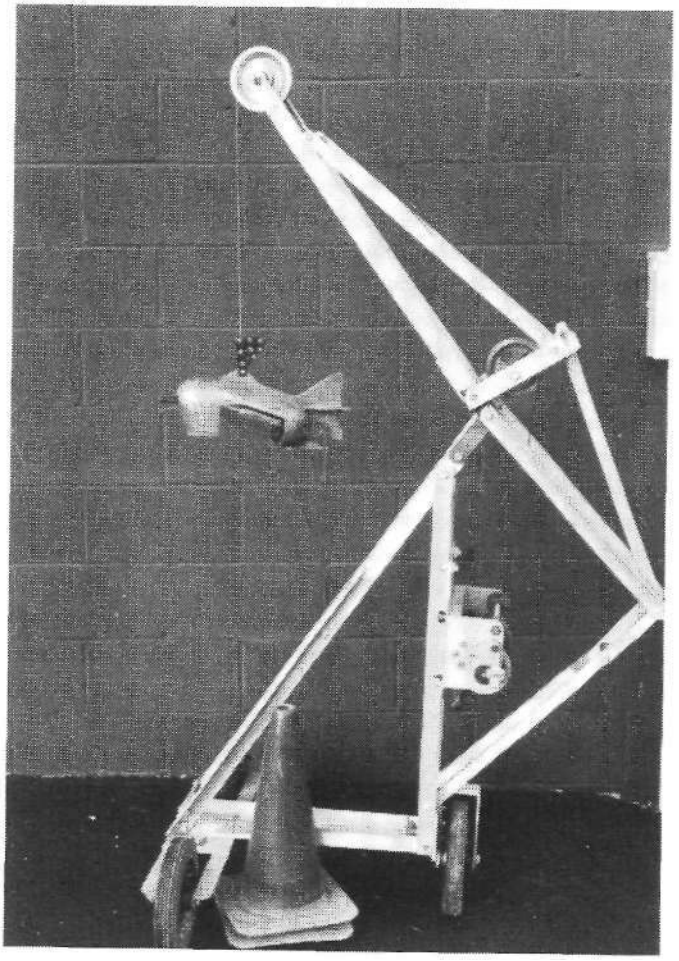

Figure 6. Depth-integrating suspended sediment sampler, US DH-59

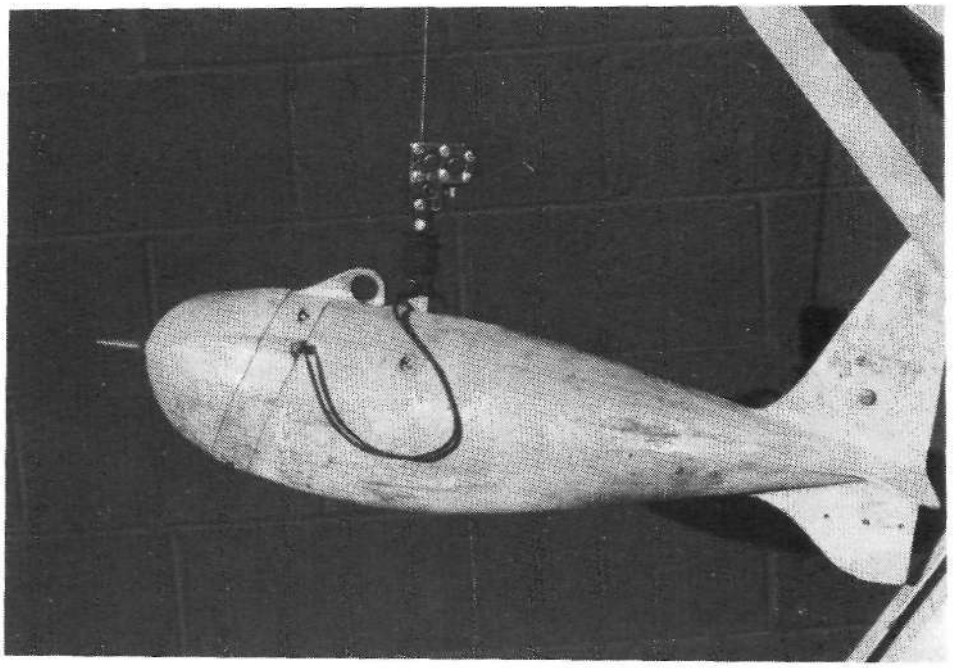

Figure 7. Point-integrating suspended sediment sampler, US P-72

When a suspended sediment sampler is submerged with the nozzle pointed directly into the flow (figure 8), a portion of the water-sediment mixture enters the sampler container through the nozzle, and air is exhausted through the vent.

The three samplers shown in figures 5 through 7 perform the same function but are designed for different stream conditions. The US DH-48 is used for wadable streams; the US DH-59 is used for medium-sized streams of approximately 16-foot maximum depths with moderate flow conditions; and the US P-72 is used in deep, fast flow conditions.

Of the 18 suspended sediment locations in Water Year 1984, 15 were monitored by locally hired observers who were trained by technicians. The observers were responsible for collecting a suspended sediment sample once a week, as near to the peak of the hydrograph for that week as possible. Most observer stations were equipped with units designed to increase the personal safety of the observers, assist the observers in their task, and help maintain consistency in the data they collected. The units consisted of a US DH-59 sampler or a US P-72 sampler suspended from a Stevens sounding reel (which is similar to a USGS Type A reel) by a 0.10-inch-diameter steel cable. This equipment was housed in a USGS California-type sediment sampling box installed on the stream side of the bridge railing at the "box site" (figure 9). The housing protected the instrument from weather and vandalism.

Field Sampling

Three types of sampling for suspended sediment concentrations were used in this program. First, all weekly samples were collected at a single location, or vertical, in each channel cross section. This location was termed the "box site."

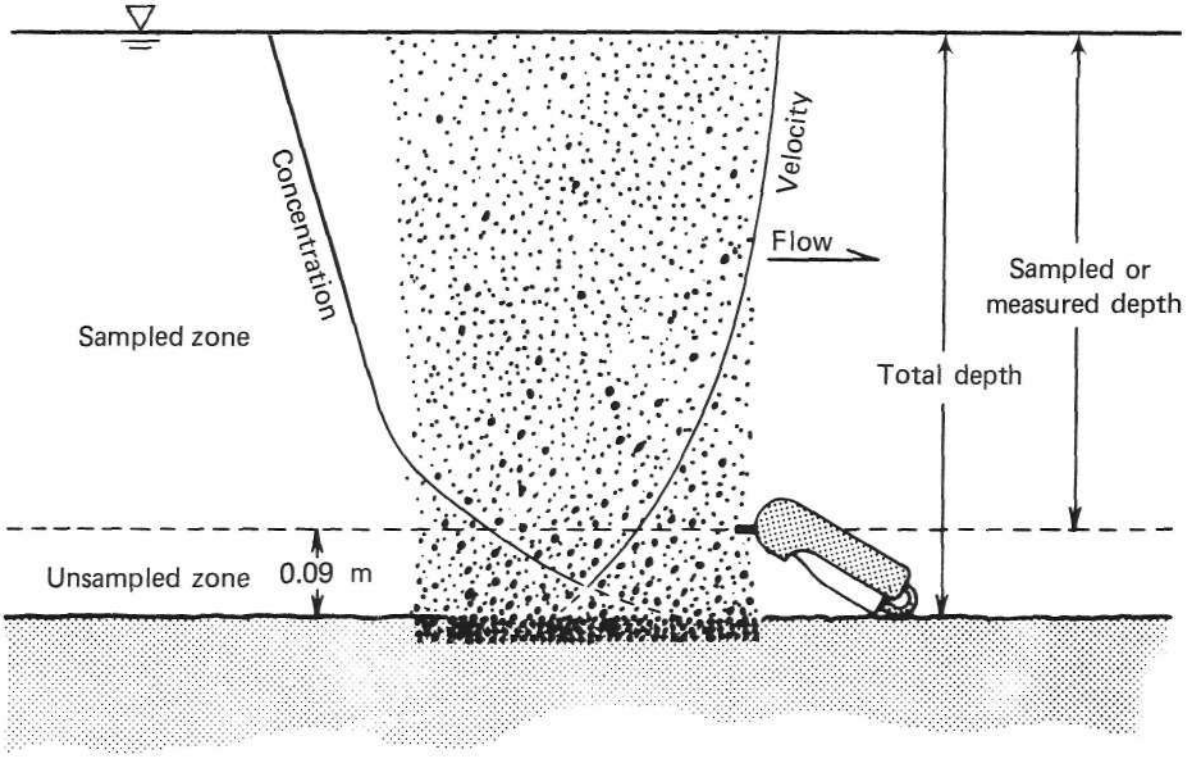

Figure 8. Measured and ummeasured sampling zones in a stream sampling vertical with respect to velocity of flow and sediment concentration (From Guy and Norman, 1970)

Figure 9. USGS California-type sediment sampling box

The second type of sediment sampling involved collecting suspended sediment samples at several verticals along the entire channel cross section approximately once every six weeks. The purpose of this sampling was to calibrate the samples taken at the box site to the average concentration in the entire cross section. This value may be used to adjust the concentration values at the box site so they better reflect the average suspended sediment concentration in the channel cross section. The cross section coefficient used to make such an adjustment is a ratio of the average sediment concentration in the cross section to the concentration determined by a fixed or box sample. The manner in which the coefficient is applied depends on the cause of the lateral variation in the distribution of sediment concentration.

In addition to using the data for adjustment of the concentration values, coefficient analysis also may be used to re-evaluate the sampling methods and the location of the fixed sampling vertical at the station (Porterfield, 1972).

The third type of suspended sediment sampling involved collecting samples to be analyzed for particle-size distribution of the transported material. These samples, which were collected in the same manner as cross-sectional samples, were taken at several verticals along the entire channel cross section at different seasons throughout the year.

In almost all cases, the equal transit rate (ETR) method was used to collect the water-sediment samples. In the ETR method, cross-sectional suspended sediment samples are obtained through collection of a sample volume proportional to the amount of flow at each of several equally spaced verticals in the cross section. This equal spacing between verticals across the stream and an equal transit rate (lowering and raising of the sampler at the same rate in all verticals) yield a composite sample proportional to the total streamflow. This method is most necessary in shallow and/or sandbed streams where the distribution of water discharge in the cross section is not stable.

The number of verticals required for an ETR sediment discharge measurement depends on the streamflow and sediment characteristics at the time of sampling as well as on the desired accuracy of the results. The width of the segments to be sampled or the distance between verticals is determined by dividing the stream width by the number of verticals decided upon (Bhowmik, 1985).

Laboratory Analysis

Suspended Sediment Concentration

Suspended sediment samples were analyzed at the Inter-Survey Geotechnical Laboratory by the filtration method or evaporation dish method. The methods used have been described by Guy (1969).

1) Samples were checked into the laboratory after they were received from the field.

   a) Field information was transferred to laboratory forms, and a laboratory number was assigned.

   b) Bottles were weighed to the nearest 0.1 gram on a top-loading electronic balance for sample volume determination.

   c) Samples were stored in a cool dark room to inhibit evaporation and growth of algae or other organisms.

2) Samples were stored long enough to allow complete settling of all suspended sediment.

3) After solids had settled, the volume of liquid was reduced to approximately 80 ml by suction with a "J" tube.

4) The sample was vacuum-filtered through 934 AH glass fiber filters. (If the amount of sediment in a sample was too large for convenient filtering, the evaporation method was used.)

5) The weight of the sediment was determined by oven drying and weighing to the nearest 0.1 mg on an analytical balance.

6) Appropriate calculations were made to determine the sediment concentration, in ppm, of the samples.

Particle Size Distribution

Suspended sediment samples were analyzed for particle size by the pipet/sieve methods described in the *National Handbook of Recommended Methods for Water Data Acquisition* (U.S. Geological Survey, 1978). The analyses were performed at the Inter-Survey Geotechnical Laboratory. The procedures used were as follows:

Sieve Procedure:

1) Air-dried sand was put on the top screen of the appropriate sieve stack and sieved on a shaker with vertical motion for 15 minutes.

2) The material retained on sieves was weighed to the nearest 0.1 gram.

3) The percent finer values were calculated.

Pipet Procedure:

1) Colloidal organics were removed by the sodium hypochlorite method.

2) Organic-free samples were oven-dried, weighed, and dispersed by shaking the sample in a solution of hexametaphosphate (40 g/L) and sodium carbonate (8 g/L) for 12 hours.

3) Dispersed samples were transferred to pipet chambers and pipetted for 31, 16, 8, 4, and 2 microns according to a predetermined chart of sampling depths for given temperatures.

4) Pipetted samples were oven-dried, and the weight of the fraction was determined to the nearest 0.1 mg.

5) The percent finer values were calculated.

Data Analysis

After suspended sediment samples were analyzed at the Inter-Survey Geotechnical Laboratory, the data were transferred to a computer program format, and a computer printout was sent to the technician. The format allowed the technicians to check the data in the program for errors by making comparisons with the information on their field sheets. The technician's printout was returned to the supervisor, and any errors were corrected on a master copy. After all errors were corrected, the data were designated as "provisional data" (figure 10).

Provisional data were organized under the headings of month-day-year, river/city code (R/C), gage height, time of sample in 24-hour clock (for box samples) or sample identification number (for cross-sectional samples), and water temperature in degrees centigrade. This information was followed by laboratory information including specific conductivity, lab identification number, laboratory comments, sediment concentration in parts per million, overall sample net volume in milliliters, and sediment net weight in grams.

Data were extracted from the provisional data for statistical analysis and formatted according to date, time, stage, temperature, concentration, and instantaneous water discharge (Qw), taken from records supplied by the USGS.

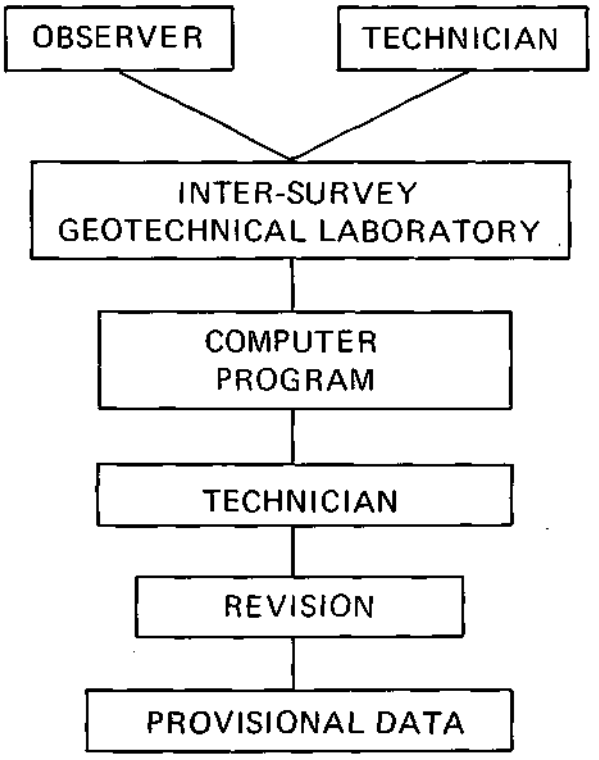

Figure 10. Data flow chart

Instantaneous suspended sediment load (Qs) was computed by the following equation:

$$Qs = Cs(Qw)k \quad (1)$$

where Cs is the suspended sediment sample concentration (ppm), Qw is the instantaneous water discharge (cfs), and k is a coefficient with the value 0.0027. Instantaneous suspended sediment load (Qs) was calculated for each sample collected.

The computed values of Qs and the values of Qw for Water Year 1984 for all the stations are given in Appendix A. Appendix B shows the total number of samples collected for analyses of suspended sediment concentration and particle size distribution.

Regression equations relating Qs and Qw for each station were developed for the data collected in Water Year 1984. The statistical parameters for the equations are given in Appendix C. The general regression equation is:

$$Qs = a(Qw)b \quad (2)$$

where a is a coefficient and b is slope.

Appendix D shows the results of the particle size analyses for the data collected in Water Year 1984.

SUMMARY

Beginning in Water Year 1981, the Water Survey's suspended sediment monitoring program evolved from the effort to gather data on sediment transport and sedimentation in Illinois waterways. In Water Year 1981, the program consisted of 50 stations throughout the state. However, by Water Year 1983 a series of cuts in funding reduced the number of stations to 18.

In 1983, the suspended sediment monitoring program was combined with two other Water Survey monitoring programs under the program name of the Illinois Benchmark Network (IBN). Since that time the IBN has continued to maintain suspended sediment stations statewide.

The 18 stations maintained in Water Year 1984 fell within four regions throughout the state: northern, west-central, east-central, and southern. Each station was maintained by an IBN technician, and in most cases each location was sampled on a weekly basis by a locally hired observer. The samples were collected and transported to the Inter-Survey Geotechnical Laboratory, Champaign. The laboratory analyzed the samples for sediment concentration in parts per million, as well as for particle size distribution. All the techniques used in the data collection process and the laboratory analyses were based upon those used by the U.S. Geological Survey.

All the data, including those pertaining to water discharge (Qw), suspended sediment load (Qs), and particle size distribution of the suspended sediment samples, are given in the appendices to this report. The appendices also include the statistical parameters for the regression equations relating water discharge and suspended sediment load data for Water Year 1984.

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Appendix A. Suspended Sediment Data, Water Year 1984

Explanation of data set:

Date	Day the sample was taken
Time	Time of sample in 24-hour clock
Stage	Gage height of stream at time of sampling, ft
Temp	Temperature of water in degrees Celsius at time of sampling
Cs	Concentration of suspended sediment, mg/L
Qw	Instantaneous water discharge, cfs
Qs	Instantaneous sediment load, tons/day

(Note: station locations can be found on figure 4, and additional information on the stations is given in table 4.)

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PECATONICA R. at FREEPORT

Date	Time	Stage	Temp	Cs	Qw	Qs
02/08/84	1210	4.15	1	49	744	98
02/14/84	1500	9.39	1	88	2165	514
02/20/84	1520	9.10	2	78	2075	437
03/01/84	1415	5.23	1	32	1000	86
03/07/84	1050	4.52	0	27	830	60
03/15/84	1450	4.69	1	66	870	155
03/20/84	1255	4.49	2	45	823	100
03/29/84	1530	5.46	6	155	1055	441
04/06/84	1350	4.66	8	89	863	207
04/13/84	1215	4.49	8	128	823	284
04/20/84	1355	4.43	10	149	809	325
04/27/84	1245	5.45	15	75	1053	213
05/04/84	1240	8.49	11	259	1887	1320
05/09/84	1200	6.68	12	246	1370	910
05/15/84	1350	5.58	15	284	1012	776
05/23/84	1200	5.22	16	320	998	862
05/31/84	1430	7.21	14	176	1518	721
06/08/84	1455	5.55	22	323	1077	939
06/13/84	1500	9.69	21	323	2262	1973
06/22/84	1830	10.82	22	549	2647	3924
06/29/84	1430	6.41	20	433	1296	1515
07/06/84	1530	5.39	20	357	1038	1001
07/12/84	1350	9.80	22	569	2298	3530
07/20/84	1315	6.95	21	315	1445	1229
07/25/84	1200	5.31	23	381	1019	1048
08/03/84	1430	4.42	23	256	806	557
08/09/84	1100	4.88	25	302	916	747
08/15/84	1350	4.05	23	207	721	403
08/23/84	1430	4.02	20	226	715	436
08/31/84	1400	3.62	22	207	630	352
09/06/84	1510	3.54	17	163	613	270
09/13/84	1145	3.53	20	575	611	949
09/20/84	1445	3.30	18	134	563	204
09/28/84	1520	5.88	12	172	1160	539

ROCK R. at ROCKTON

Date	Time	Stage	Temp	Cs	Qw	Qs
10/07/83	1440	3.16	17	72	2499	486
10/19/83	1430	3.35	11	29	2777	217
10/27/83	1330	3.74	10	23	3379	210
11/03/83	1130	3.56	11	30	3094	251
12/01/83	1430	4.72	1	48	5052	655
12/12/83	1330	4.99	1	23	5537	344
01/06/84	1050	5.13	1	6	5786	94
01/13/84	1030	4.34	0	3	4383	35
01/26/84	1100	8.30	1	29	12140	951
02/08/84	1040	8.30	1	16	12140	524
02/14/84	1330	5.68	4	74	6793	1357
02/20/84	1100	7.08	2	64	9587	1657
03/01/84	1310	6.09	2	23	7582	471
03/08/84	0945	5.59	1	15	6624	268
03/15/84	1345	4.99	3	38	5537	568
03/20/84	1150	5.90	2	27	7213	526
03/29/84	1420	5.39	5	52	6254	878
04/06/84	1200	5.00	7	40	5555	600
04/13/84	1115	4.75	9	92	5105	1268
04/20/84	0900	4.71	9	90	5034	1223
04/27/84	1130	5.31	15	157	6110	2590
05/04/84	1130	6.82	13	171	9053	4180
05/09/84	1100	6.29	11	91	7978	1960
05/15/84	1230	5.77	14	76	6964	1429
05/23/84	1100	5.25	18	70	6001	1134
05/31/84	1325	6.42	15	125	8239	2781
06/08/84	1100	5.12	22	149	5768	2320
06/13/84	1400	5.97	22	114	7347	2261
06/22/84	1920	7.29	22	151	10020	4085
06/29/84	1330	6.14	21	114	7681	2364
07/06/84	1700	5.56	23	83	6567	1472
07/10/84	1330	6.09	22	111	7582	2272
07/20/84	1130	5.88	23	133	7174	2576
07/25/84	1100	4.85	24	109	5284	1555
08/03/84	1330	3.27	23	244	2659	1752
08/09/84	0945	4.19	25	106	4123	1180
08/15/84	1300	3.52	24	95	3031	777
08/23/84	1120	3.00	20	182	2270	1115
08/31/84	1300	3.02	22	87	2298	540
09/06/84	1300	3.78	18	131	3443	1218
09/13/84	1030	2.52	21	122	1629	537
09/17/84	1230	4.96	16	80	5482	1184
09/20/84	1130	2.68	19	101	1826	498
09/28/84	1415	4.09	13	95	3952	1014

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KISHWAUKEE R. near PERRYVILLE

Date	Time	Stage	Temp	Cs	Qw	Qs
10/07/83	1516	5.46	17	16	260	11
10/19/83	1515	5.48	11	17	269	12
10/27/83	1415	5.76	11	4	394	4
11/03/83	1000	5.83	10	22	428	25
12/01/83	1520	7.80	1	31	1736	145
12/12/83	1415	7.94	3	105	1850	524
01/13/84	0847	6.85	0	4	1019	11
02/08/84	1400	6.79	1	53	980	140
02/14/84	1045	14.70	3	159	8781	3770
02/15/84	1145	13.20	4	84	7009	1590
02/20/84	0930	9.44	3	54	3117	454
03/01/84	1150	6.84	2	14	1013	38
03/08/84	0815	6.37	0	93	719	181
03/15/84	1250	6.25	2	37	650	65
03/20/84	1050	6.74	2	22	947	56
03/29/84	1315	7.77	5	115	1712	532
04/06/84	1100	7.03	8	80	1142	247
04/13/84	1005	6.78	8	63	973	166
04/20/84	1630	6.74	11	72	947	184
04/27/84	1025	7.50	16	96	1500	389
05/04/84	1440	7.20	12	44	1267	151
05/15/84	1030	6.41	14	18	743	36
05/09/84	0930	6.67	9	90	902	219
05/23/84	0930	6.62	15	37	871	87
05/31/84	1200	8.32	15	125	2166	731
06/08/84	0930	7.35	21	239	1382	892
06/13/84	1300	6.47	23	134	779	282
06/22/84	2030	6.25	23	87	650	153
06/29/84	1215	6.02	19	85	524	120
07/06/84	1420	5.74	22	112	384	116
07/10/84	1030	5.70	21	76	366	75
07/20/84	0915	5.55	22	91	298	73
07/25/84	0915	5.45	22	70	256	48
08/03/84	1230	5.30	25	42	197	22
08/09/84	0830	5.35	23	75	216	44
08/15/84	1150	5.19	23	55	157	23
08/24/84	1100	5.16	18	129	147	51
08/31/84	1150	5.06	20	53	114	16
09/06/84	1130	5.08	17	38	121	12
09/13/84	0900	5.07	20	41	117	13
09/20/84	0930	5.09	18	67	124	22
09/28/84	1320	5.26	10	14	183	7

BIG BUREAU Cr. at PRINCTON

Date	Time	Stage	Temp	Cs	Qw	Qs
10/07/83	1215	2.56	15	20	90	5
10/19/83	1220	2.91	11	20	150	8
10/27/83	1130	2.89	10	16	146	6
11/02/83	1600	2.97	15	29	162	13
12/01/83	1245	3.30	1	39	242	25
12/12/83	1115	3.40	2	124	270	90
01/06/84	1430	2.89	1	4	146	2
01/13/84	1400	2.65	0	6	104	2
02/03/84	1030	2.47	1	6	78	1
02/13/84	1315	8.76	3	3020	3771	30749
02/22/84	1300	3.36	7	63	258	44
03/02/84	0910	2.86	1	25	140	9
03/09/84	1015	2.56	1	84	90	20
03/16/84	0900	3.69	1	570	368	567
03/21/84	1055	4.16	3	401	541	585
03/26/84	1100	3.67	4	168	362	164
04/03/84	1045	3.14	4	80	201	43
04/12/84	1100	3.05	10	105	180	51
04/19/84	0810	2.99	7	28	167	13
04/26/84	1245	3.36	16	70	258	49
05/03/84	0915	3.07	11	41	184	20
05/10/84	1300	2.85	13	57	138	21
05/17/84	0930	2.68	15	17	108	5
05/24/84	1400	3.26	19	65	231	41
05/29/84	1400	4.84	12	735	857	1700
06/06/84	1430	3.09	25	124	189	63
06/12/84	1045	3.04	22	148	178	71
06/23/84	1400	2.95	26	103	158	44
06/27/84	1230	2.65	24	50	104	14
07/05/84	1400	2.48	26	52	79	11
07/13/84	1300	2.23	29	67	50	9
07/19/84	1020	2.08	21	56	37	6
07/24/84	1100	2.09	26	45	38	5
08/02/84	1400	2.39	27	22	68	4
08/08/84	1300	2.41	29	20	70	4
08/17/84	1200	2.37	23	26	65	5
08/22/84	1100	2.35	25	56	63	10
08/28/84	0915	2.39	22	39	68	7
09/05/84	1130	2.43	19	39	73	8
09/12/84	1230	2.41	22	16	70	3
09/21/84	1120	2.42	19	12	71	2
09/26/84	1030	2.69	13	18	110	5

VERMILION R. near LEONORE

Date	Time	Stage	Temp	Cs	Qw	Qs
02/15/84	1250	17.18	3	219	12760	7545
03/06/84	1130	4.46	2	18	450	22
03/16/84	1100	8.03	3	1141	2500	7702
03/22/84	1230	12.88	3	182	7000	3440
03/29/84	1030	9.92	6	169	4000	1825
04/04/84	1005	7.07	7	180	1850	899
04/13/84	1645	5.45	11	98	940	249
04/19/84	1045	5.71	9	53	1080	155
04/24/84	1230	8.77	8	85	3076	706
04/30/84	1100	6.49	12	1054	1507	4289
05/17/84	1020	4.56	17	16	493	21
05/23/84	1200	15.06	18	2848	9734	74851
06/01/84	1130	8.01	17	133	2490	894
06/06/84	1000	5.79	22	109	1127	332
06/14/84	1130	5.24	24	90	814	198
06/21/84	1000	4.75	24	81	571	125
06/28/84	1045	4.27	24	38	362	37
07/06/84	1945	3.86	24	68	219	40
07/12/84	1200	3.60	27	72	155	30
07/27/84	1130	3.30	23	36	90	9
08/02/84	1200	3.05	26	34	46	4
08/16/84	1030	2.84	26	20	22	1
08/30/84	1045	2.75	27	20	16	1
09/11/84	1130	2.80	22	62	19	3
09/19/84	1115	2.72	20	66	15	3
09/24/84	0945	2.78	22	46	18	2

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MAZON R. near COAL CITY

Date	Time	Stage	Temp	Cs	Qw	Qs
10/07/83	1040	0.91	14	17	7	0
10/19/83	1030	0.95	11	15	8	0
10.27.83	1000	1.33	9	11	37	1
11/04/83	1100	1.29	10	9	33	1
11/30/83	1130	4.05	3	59	1010	161
12/13/83	1115	6.87	5	154	2952	1227
01/06/84	1640	2.53	1	0	310	0
02/03/84	1300	2.33	1	5	245	3
02/13/84	1545	16.20	3	782	15720	33191
02/16/84	0850	5.50	4	125	1900	641
02/22/84	1600	4.09	6	30	1031	84
03/02/84	1110	2.57	2	14	324	12
03/09/84	1230	2.55	1	66	317	57
03/16/84	1345	9.03	0	1604	5006	21680
03/21/84	1355	8.63	1	257	4564	3167
03/28/84	1445	5.66	6	142	2014	772
04/03/84	1300	3.09	4	44	541	64
04/12/84	1300	2.60	10	65	335	59
04/19/84	1030	2.67	8	33	361	32
04/26/84	0910	3.61	11	79	795	170
05/02/84	1510	2.83	13	22	425	25
05/10/84	1100	2.19	11	12	204	7
05/17/84	1225	1.91	17	21	133	8
05/24/84	1200	6.17	15	174	2394	1125
05/30/84	1630	4.89	14	114	1481	456
06/05/84	1100	2.89	20	98	450	119
06/12/84	1230	2.24	24	57	218	34
06/23/84	1620	1.72	26	39	94	10
06/28/84	1350	1.54	24	66	64	11
07/05/84	1100	1.33	24	57	37	6
07/11/84	1615	1.26	28	39	30	3
07/19/84	1240	0.97	25	14	9	0
07/26/84	1200	0.97	21	8	9	0
08/02/84	1200	0.91	26	10	7	0
08/08/84	0915	0.90	27	23	6	0
08/17/84	1000	0.87	23	32	6	0
08/21/84	1100	0.85	22	26	5	0
08/29/84	1245	0.73	26	13	2	0
09/05/84	1000	0.70	17	16	2	0
09/12/84	0950	0.91	20	16	7	0
09/21/84	1320	0.89	20	13	6	0
09/27/84	1640	0.88	13	10	6	0

KANKAKEE R. near WILMINGTON

Date	Time	Stage	Temp	Cs	Qw	Qs
11/04/83	0945	2.59	9	14	6928	262
11/30/83	1100	4.43	3	163	18650	8208
12/13/83	1020	6.24	4	269	35100	25493
02/16/84	1230	7.47	3	159	38920	16708
02/22/84	1700	5.60	6	27	28750	2096
03/02/84	1200	3.83	2	5	14260	193
03/09/84	1330	3.62	1	51	12850	1769
03/16/84	1445	5.45	2	207	27340	15280
03/21/84	1610	7.63	2	174	50870	23899
03/28/84	1545	7.03	6	169	43740	19959
04/03/84	1330	5.05	6	55	23760	3528
04/12/84	1345	4.22	10	62	17060	2856
04/19/84	1235	4.46	8	19	18890	969
04/26/84	1000	5.31	10	120	26060	8443
05/02/84	1550	4.30	14	27	17660	1287
05/10/84	1015	3.93	12	18	14960	727
05/17/84	1415	3.71	17	9	13450	327
05/24/84	1130	7.02	17	292	43620	34390
05/30/84	1600	7.15	14	201	45130	24492
06/05/84	1325	4.75	21	98	21220	5615
06/12/84	1315	4.19	24	109	16830	4953
06/23/84	1640	3.88	26	179	14610	7061
06/28/84	1310	3.72	23	81	13510	2955
07/05/84	1155	3.23	24	66	10410	1855
07/11/84	1315	3.08	23	42	9539	1082
07/19/84	1320	2.80	25	62	8001	1339
07/26/84	1240	2.63	22	53	7127	1020
08/02/84	1125	2.64	26	33	7177	639
08/08/84	0814	2.59	27	22	6928	411
08/17/84	0930	2.45	25	26	6253	439
08/21/84	0840	2.38	23	41	5928	656
08/29/84	1145	2.26	27	36	6781	659
09/05/84	0905	2.28	19	49	5476	724
09/12/84	0900	2.27	21	38	5432	557
09/21/84	1400	2.35	21	27	5790	422
09/27/84	1610	2.34	14	59	5745	915

KANKAKEE R. at MOMENCE

Date	Time	Stage	Temp	Cs	Qw	Qs
11/04/83	1600	1.37	10	11	820	24
11/30/83	1500	2.00	3	32	1600	138
12/13/83	1535	2.74	3	36	2807	273
02/15/84	1540	3.45	6	52	4127	579
03/06/84	1215	2.25	2	11	1974	59
03/16/84	1420	2.78	3	352	2880	2737
03/22/84	1445	3.78	3	68	4776	877
03/29/84	1245	3.59	7	34	4398	404
04/04/84	1400	3.14	9	77	3550	738
04/13/84	1200	2.73	11	72	2789	542
04/19/84	1315	2.78	9	47	2880	365
04/24/84	0930	3.16	8	54	3586	523
04/30/84	1300	2.99	14	64	3280	567
05/17/84	1300	2.30	17	68	2053	377
05/23/84	1400	3.80	18	660	4816	8582
06/01/84	1345	3.43	18	34	4088	375
06/06/84	1230	2.79	23	88	2899	689
06/14/84	1415	2.33	25	128	2102	726
06/21/84	1300	2.12	25	107	1775	513
06/28/84	1345	2.48	23	67	2349	425
07/06/84	1200	1.98	23	98	1572	416
07/12/84	1400	1.89	26	152	1448	594
07/27/84	1330	1.56	23	54	1031	150
08/02/84	1400	1.46	26	79	917	196
08/16/84	1400	1.32	27	115	767	238
08/30/84	1245	1.17	27	53	620	89
09/11/84	1330	1.23	23	76	677	139
09/19/84	1415	1.26	20	75	707	143
09/24/84	1130	1.25	22	81	697	152

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HENDERSON Cr. near OQUAWKA

Date	Time	Stage	Temp	Cs	Qw	Qs
02/16/84	1345	16.65	6	215	502	291
03/01/84	1415	14.68	3	67	258	47
03/14/84	1345	13.92	3	54	179	26
03/23/84	1130	20.06	6	642	1149	1992
03/26/84	1540	17.88	6	212	698	399
04/03/84	1200	16.20	7	166	438	196
04/12/84	1200	16.45	13	153	473	195
04/16/84	1600	17.08	9	166	567	254
04/26/84	1645	17.86	18	215	694	403
05/01/84	1130	22.36	17	689	1949	3626
05/14/84	1600	16.09	18	127	422	145
05/24/84	1100	16.80	17	178	525	252
05/29/84	1530	18.24	13	317	761	652
06/05/84	1200	15.65	20	196	368	195
06/12/84	0900	15.87	21	262	394	279
06/20/84	1200	14.56	25	198	245	131
06/26/84	1530	14.26	25	205	213	118
07/05/84	1530	13.71	26	150	159	64
07/13/84	1315	13.53	26	110	141	42
07/26/84	1400	14.15	22	552	202	301
07/30/84	1445	12.97	25	114	92	28
08/14/84	1330	12.22	26	20	35	2
08/27/84	1230	12.13	23	52	30	4
09/12/84	1130	12.41	24	131	48	17
09/20/84	1230	12.10	20	62	28	5
09/25/84	1200	15.25	19	1883	321	1634

SPOON R. at LONDON MILLS

Date	Time	Stage	Temp	Cs	Qw	Qs
11/09/83	1008	3.89	9	105	395	112
12/15/83	0951	6.93	0	157	1350	572
02/16/84	1530	9.47	2	776	2262	4739
03/01/84	1545	5.96	3	168	1035	469
03/14/84	1520	5.33	2	96	814	211
03/23/84	1000	13.07	5	491	3709	4917
03/26/84	1200	11.52	6	339	3056	2797
04/03/84	1000	8.07	8	262	1750	1238
04/12/84	1030	7.90	13	219	1689	999
04/16/84	1245	9.51	9	745	2276	4578
04/26/84	1215	9.14	15	325	2148	1885
04/26/84	1345	9.09	15	327	2131	1881
05/01/84	1030	9.54	12	492	2287	3038
05/14/84	1200	5.72	18	124	948	317
05/24/84	1000	7.91	17	469	1692	2143
05/29/84	1215	8.66	13	470	1969	2499
06/05/84	1045	6.02	21	308	1056	878
06/12/84	1300	7.97	23	529	1714	2448
06/20/84	1245	5.36	26	265	824	590
06/26/84	1300	4.75	24	330	631	562
07/05/84	1630	4.06	26	170	440	202
07/13/84	1445	3.88	28	178	392	189
07/26/84	1500	3.53	24	111	307	92
07/30/84	1200	3.07	24	52	194	27
08/14/84	1130	2.51	25	79	77	16
08/27/84	1600	2.35	26	87	46	11
09/12/84	1015	2.36	23	142	48	18
09/20/84	1015	2.22	20	113	25	8
09/25/84	1600	3.02	20	113	184	56

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LA MOINE R. at COLMAR

Date	Time	Stage	Temp	Cs	Qw	Qs
11/09/83	1139	2.98	10	110	32	9
12/15/83	1215	8.87	0	84	777	176
02/16/84	1130	7.25	3	111	499	149
03/01/84	1745	5.36	3	79	241	51
03/14/84	1645	5.00	2	58	200	31
03/23/84	1300	14.19	6	888	2000	4795
03/26/84	1745	14.08	6	401	1971	2134
04/03/84	1405	7.51	8	97	539	141
04/12/84	1430	8.61	14	150	728	295
04/16/84	1720	8.03	10	72	625	122
04/26/84	1845	9.45	17	154	889	370
05/01/84	1300	18.51	18	997	3397	9144
05/14/84	1800	8.18	19	370	651	651
05/24/84	1230	16.11	18	488	2532	3336
05/29/84	1745	8.44	14	139	697	262
06/05/84	1300	6.08	23	112	330	100
06/12/84	0800	12.38	23	365	1541	1519
06/20/84	1630	5.84	26	167	299	135
06/26/84	1730	8.96	24	450	794	964
07/05/84	1400	4.64	24	141	162	62
07/13/84	1145	4.24	26	216	124	72
07/26/84	1300	11.12	22	3842	1244	12904
07/30/84	1330	4.22	24	165	122	54
08/15/84	1100	2.61	25	26	15	1
08/27/84	1045	2.37	23	73	6	1
09/13/84	1200	3.06	24	258	36	25
09/20/84	1430	2.29	21	48	3	0
09/25/84	1030	2.52	20	71	11	2

LA MOINE R. at RIPLEY

Date	Time	Stage	Temp	Cs	Qw	Qs
02/16/84	1000	10.31	3	210	1261	715
03/02/84	0730	8.18	2	68	647	119
03/14/84	1750	6.96	2	37	370	37
03/23/84	1415	17.91	5	302	4543	3704
03/27/84	0630	19.27	6	431	5284	6149
04/03/84	1500	11.68	8	210	1734	983
04/12/84	1600	11.50	13	204	1669	919
04/17/84	0815	10.66	10	92	1376	342
04/27/84	0740	12.43	16	222	2017	1209
05/01/84	1400	17.21	17	1636	4178	18455
05/14/84	1940	15.13	18	1846	3165	15775
05/24/84	1430	21.65	20	271	6669	4880
05/29/84	1845	11.91	15	265	1819	1301
06/05/84	1415	9.21	23	157	924	392
06/11/84	1700	18.68	25	536	4957	7174
06/20/84	1730	7.92	27	228	583	359
06/26/84	1830	10.09	24	1481	1190	4758
07/05/84	1200	6.49	24	182	279	137
07/13/84	1045	6.37	25	221	258	154
07/26/84	1200	8.07	24	2133	619	3567
07/31/84	1330	6.51	24	119	283	91
08/15/84	1230	5.05	25	63	75	13
08/28/84	1130	4.83	24	147	54	22
09/13/84	1300	6.57	23	251	294	199
09/20/84	1700	4.98	20	80	68	15
09/26/84	1030	5.33	16	90	104	25

SANGAMON R. at MONTICELLO

Date	Time	Stage	Temp	Cs	Qw	Qs
10/11/83	1028	3.68	10	41	8	1
10/25/83	0907	6.76	10	100	255	69
11/08/83	0923	4.64	16	22	45	3
02/17/84	0815	12.89	6	35	2747	260
03/05/84	1630	8.13	2	33	470	42
03/15/84	1645	7.67	5	82	394	87
03/23/84	1715	12.65	6	77	2510	522
03/28/84	1640	12.96	6	107	2819	814
04/06/84	1430	10.20	10	99	973	260
04/13/84	1810	8.85	12	116	605	189
04/18/84	0915	9.26	8	85	696	160
04/27/84	1630	10.46	18	101	1086	296
05/01/84	1645	8.78	14	97	591	155
05/16/84	1000	6.75	15	40	254	27
05/24/84	1830	12.86	19	63	2716	462
05/31/84	1700	12.17	17	100	2102	568
06/05/84	1645	8.99	21	146	633	249
06/11/84	0900	10.19	23	1056	969	2763
06/22/84	1400	6.63	25	141	237	90
06/27/84	1830	6.35	24	264	201	143
07/05/84	2000	5.93	23	156	153	64
07/13/84	0745	5.02	24	154	71	29
07/26/84	0900	4.71	24	103	49	14
08/01/84	0800	4.37	23	107	31	9
08/13/84	1615	4.02	26	40	17	2
08/31/84	0800	3.73	21	152	9	4
09/13/84	1800	4.05	23	114	18	6
09/21/84	0800	3.81	19	96	11	3
09/27/84	1645	3.86	15	66	12	2

KASKASKIA R. at VANDALIA

Date	Time	Stage	Temp	Cs	Qw	Qs
10/12/83	1220	2.39	13	46	87	11
10/21/83	1045	5.49	12	591	726	1158
12/14/83	1300	22.28	2	162	12550	5489
01/24/84	1330	11.14	2	97	2555	669
02/02/84	1304	8.04	3	53	1446	207
02/08/84	1230	10.39	0	88	2253	535
03/07/84	1211	16.02	2	125	5164	1743
03/14/84	1330	10.41	3	50	2261	305
03/19/84	1210	17.54	3	167	6301	2841
03/27/84	1200	16.52	7	153	5509	2276
04/02/84	1013	12.02	7	212	2910	1666
04/19/84	0942	8.59	10	129	1618	564
04/26/84	1255	12.41	16	248	3101	2076
04/30/84	1150	13.96	13	630	3927	6680
05/18/84	1141	8.97	20	110	1740	517
05/30/84	1300	7.88	16	135	1397	509
06/04/84	1151	9.35	22	139	1870	702
06/14/84	1045	9.00	25	107	1750	506
07/24/84	1215	7.48	28	169	1277	583
08/16/84	1315	2.97	30	87	177	42
09/12/84	1300	3.25	23	254	227	155
09/26/84	1314	5.55	19	304	741	608

ISWS 362

EMBARRAS R. at STE. MARIE

Date	Time	Stage	Temp	Cs	Qw	Qs
10/20/83	1230	2.05	11	1630	170	748
12/06/83	1330	14.02	2	342	4911	4535
01/26/84	1244	3.29	3	64	426	74
02/03/84	1230	9.85	0	711	2829	5431
02/09/84	1300	6.60	0	106	1450	415
03/08/84	1414	6.75	0	107	1506	435
03/15/84	1245	4.98	8	46	894	111
03/20/84	1508	17.33	5	595	6937	11144
03/28/84	1215	14.02	7	372	4911	4933
04/04/84	1417	10.95	10	801	3362	7271
04/23/84	1425	23.43	8	798	30080	64810
05/02/84	1309	9.14	16	289	2500	1951
05/15/84	1300	7.61	18	446	1843	2219
05/22/84	1348	5.18	22	154	958	398
05/31/84	1234	10.47	18	470	3125	3966
06/05/84	1300	4.90	24	166	869	390
08/14/84	1416	1.27	28	98	57	15
09/13/84	1254	1.18	23	72	47	9
09/27/84	1325	2.70	16	180	294	143

SILVER Cr. near FREEBURG

Date	Time	Stage	Temp	Cs	Qw	Qs
10/21/83	0900	8.94	13	1065	1138	3272
12/14/83	1030	17.23	2	202	5106	2785
01/24/84	1030	1.67	0	50	69	9
02/02/84	1109	3.93	1	64	290	50
02/08/84	1015	3.42	0	32	230	20
03/07/84	1512	13.70	2	101	2406	656
03/14/84	1100	3.80	1	48	274	36
03/19/84	1515	11.65	4	269	1804	1310
03/27/84	1005	13.31	8	235	2285	1450
04/03/84	1100	7.10	10	386	778	811
04/20/84	1030	2.96	13	151	180	73
04/26/84	1050	14.61	16	126	2912	991
05/01/84	1114	4.23	16	191	329	170
05/18/84	1424	2.06	22	76	98	20
05/24/84	1030	1.94	21	137	88	33
05/30/84	1100	4.66	16	353	387	369
06/04/84	1427	1.65	25	109	67	20
06/18/84	1050	0.96	28	62	27	4
07/24/84	0950	0.63	28	93	11	3
08/16/84	1030	0.52	25	47	7	1
09/12/84	1020	6.15	22	632	618	1055
09/26/84	1030	8.09	19	258	961	669

ISWS 370

LITTLE WABASH R. at CARMI

Date	Time	Stage	Temp	Cs	Qw	Qs
10/20/83	1030	2.57	14	86	176	41
12/06/83	1030	27.74	4	48	13220	1713
01/26/84	1047	10.14	2	167	2457	1108
02/03/84	1031	11.46	0	85	2981	684
02/09/84	1100	11.17	0	89	2863	688
03/08/84	1133	22.98	2	115	9108	2828
03/15/84	1000	15.94	5	64	4968	858
03/20/84	1234	24.65	7	404	10380	11322
03/28/84	1020	27.92	8	116	1342	420
04/04/84	1138	29.80	10	133	15590	5598
04/23/84	1140	24.96	9	464	10630	13317
05/15/84	1100	20.20	19	67	7242	1310
05/22/84	1112	13.68	21	181	3867	1890
05/31/84	1030	7.44	19	122	1503	495
06/05/84	1030	4.22	23	140	555	210
06/19/84	0900	3.03	27	91	266	65
08/14/84	1148	2.27	26	16	126	5
09/13/84	1015	3.12	24	33	285	25
09/27/84	1050	7.36	19	198	1477	790

CACHE R. at FORMAN

Date	Time	Stage	Temp	Cs	Qw	Qs
10/18/83	1025	4.79	13	56	258	39
10/27/83	1045	1.59	11	20	11	1
11/17/83	1015	1.68	6	11	14	0
02/01/84	1418	1.91	3	44	23	3
02/10/84	1416	8.25	2	1259	724	2462
03/09/84	1600	8.00	4	88	685	163
03/16/84	1407	11.38	8	772	1281	2670
03/20/84	0930	13.91	7	435	1858	2182
03/29/84	1030	13.70	7	310	1809	1514
04/18/84	1115	5.60	12	72	351	68
04/25/84	0928	7.00	14	136	536	197
05/08/84	0940	14.49	12	278	1996	1498
05/17/84	1230	10.67	17	34	1139	105
05/29/84	1357	2.46	20	75	53	11
06/11/84	0912	1.66	24	63	13	2
07/27/84	1030	1.37	25	45	5	1
09/11/84	1355	3.17	22	273	104	77
09/24/84	0917	3.15	20	385	102	106

Appendix B. Suspended Sediment Sample Record, Water Year 1984

No. of Samples Collected

ISWS I.D.	Suspended Sediment	Particle Size
102	70	22
103	72	22
105	70	22
118	64	10
122	50	10
123	66	18
124	87	32
125	66	16
228	44	13
229	54	12
242	59	12
245	56	17
249	54	13
361	36	8
362	27	5
367	35	5
370	28	5
378	31	5
Totals	969	247

Appendix C. Statistical Parameters for Annual Regression Equations, Water Year 1984

$$Qs = a Q_w^{\ b}$$

Station Name	ISWS ID	Coefficient (a)	Slope (b)	Correlation Coefficient
Pecatonica R. @ Freeport	102	0.01410	1.50313	0.62488
Rock R. @ Rockton	103	1.51318	0.74389	0.37268
Kishwaukee R. near Perryville	105	0.03935	1.19359	0.82421
Big Bureau Cr. @ Princeton	118	0.00066	2.07041	0.89148
Vermilion R. near Leonore	122	0.02153	1.39732	0.94989
Mazon R. near Coal City	123	0.01705	1.36016	0.95850
Kankakee R. near Wilmington	124	0.00007	1.80049	0.84561
Kankakee R. @ Momence	125	0.05805	1.15122	0.68790
Henderson Cr. near Oquawka	228	0.02122	1.55561	0.92741
Spoon R. @ London Mills	229	0.04363	1.39830	0.97070
Lamoine R. @ Colmar	242	0.06266	1.36195	0.95316
Lamoine R. @ Ripley	245	0.04341	1.40304	0.91372
Sangamon R. @ Monticello	249	0.19537	1.04645	0.94180
Kaskaskia R. @ Vandalia	361	0.17523	1.10831	0.89036
Embarras R. @ Ste. Marie	362	0.07427	1.30990	0.92628
Silver Cr. near Freeburg	367	0.08015	1.27253	0.94962
Little Wabash R. @ Carmi	370	0.04003	1.25443	0.94195
Cache R. @ Forman	378	0.03668	1.41242	0.94549

Note: Qs in tons/day, Q_w in cfs

Appendix D. Particle Size Analyses,
Water Year 1984

ISWS ID	DATE	NO. BOTTLES*	% < 62.5**	Cs***
102	04/20/84	10	95.32	149.44
102	07/12/84	12	99.69	569.28
103	04/20/84	10	97.90	89.97
103	07/10/84	12	93.02	111.02
105	08/24/84	10	37.45	128.71
105	05/04/84	12	95.80	43.48
118	03/16/84	4	87.92	569.55
118	07/19/84	6	-	-
122	05/17/84	5	89.47	16.14
122	08/16/84	5	91.82	20.47
123	08/08/84	10	98.81	22.16
123	03/21/84	8	96.34	257.45
124	04/19/84	19	97.51	19.34
124	07/11/84	13	94.02	42.36
125	08/16/84	8	54.53	114.92
125	05/23/84	8	99.24	660.17
228	05/14/84	8	92.61	127.40
228	08/14/84	5	92.63	19.04
229	05/14/84	7	86.81	123.54
229	08/14/84	5	-	-
242	08/15/84	5	95.80	25.52
242	05/24/84	7	99.39	487.63
245	08/15/84	8	97.21	63.19
245	05/24/84	9	98.96	271.19
249	05/16/84	6	90.32	40.32
249	08/13/84	7	97.79	39.34
361	03/27/84	8	90.92	153.14
362	05/15/84	5	95.03	445.83
367	05/24/84	5	83.85	136.92
370	05/15/84	5	98.84	66.60
378	03/29/84	5	92.49	310.09

* Represents number of bottles composited for each determination of particle size distribution

** Percent finer than 62.5 microns

*** Concentration of suspended-sediment in ppm for the respective number of composited samples