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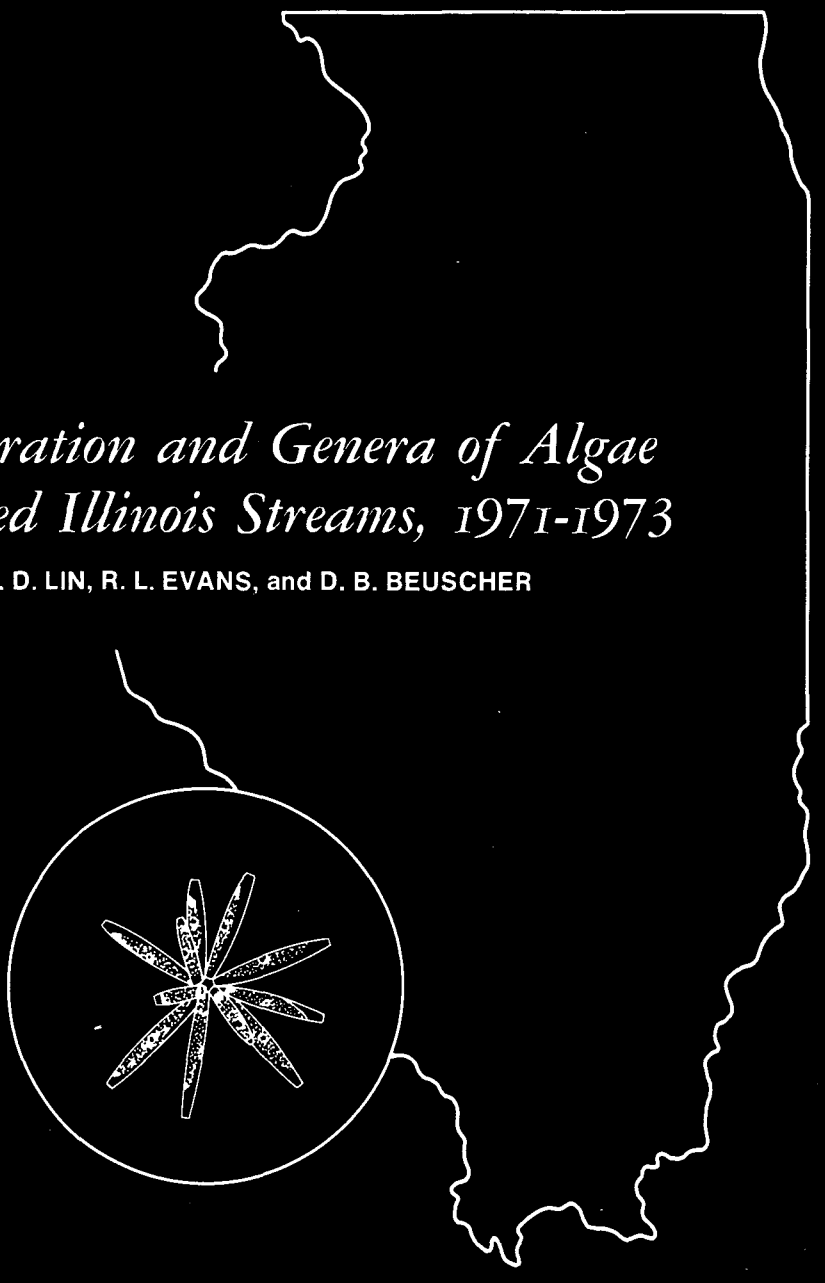
STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION



Concentration and Genera of Algae in Selected Illinois Streams, 1971-1973

by S. D. LIN, R. L. EVANS, and D. B. BEUSCHER

ILLINOIS STATE WATER SURVEY
URBANA
1975

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Abstract: During the period October 1971 to September 1973, samples of water from 35 Illinois streams at 41 locations were collected monthly and examined to determine the type, genera, and concentration of algae. Data for the 2-year period have been evaluated for algal density, composition, diversity indices, and seasonal succession for each location. Most stations had algal densities of from 500 to 2000 cts/ml, had between 15 and 24 different algal genera (41 genera total), and had a diversity index equal to or greater than 1.10. Stations on the Fox, Des Plaines, and Kaskaskia Rivers had algal densities in excess of 5000 cts/ml. This report should be useful to persons responsible for developing, regulating, or managing water resources in Illinois.

Reference: Lin, S. D., R. L. Evans, and D. B. Beuscher. Concentration and Genera of Algae in Selected Illinois Streams, 1971-1973. Illinois State Water Survey, Urbana, Report of Investigation 80, 1975.

Indexing Terms: Algae, diversity index, Illinois streams, water quality, seasonal succession.

STATE OF ILLINOIS
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INTRODUCTION

Since 1945 the Illinois State Water Survey, in cooperation with the Champaign District Office of the U. S. Geological Survey, has maintained a program designed to assess the mineral quality of selected surface waters in Illinois. The results of this continuing program have been reported in Water Survey Bulletins 45, 54, and 56.[1,2,3]

A new dimension was added to the program in October 1971. The samples collected at monthly intervals from the waters of 35 streams at 41 locations were examined for algal density and type as well as mineral quality. The sampling locations are shown on figure 1 and identified in table 1 by map numbers. The 15 low flow partial record sites were terminated at the end of a 2-year period because of lack of funds. The 26 other locations continue to be a part of a water quality sampling network.

Algae are part of the first trophic level in the aquatic ecosystem and are a principal food source for protozoa, rotifers, worms, crustaceans, fish, and other consumers.[4] Although it is difficult to establish a definitive relationship between algal density and/or types with mineral quality in running water, it is well known that changes in mineral quality are stimulated by algal activity. The preeminence of algae to the biotic balance of stream waters together with the need to incorporate other diagnostic procedures for assessing the trend of water quality in Illinois streams has led to the assembly of data on algal populations and distribution.

This report describes the enumeration and identification techniques used, the procedures followed in evaluating the data, and sets forth data summaries for each sampling location. The information should be useful to the individuals, companies, and agencies who have some responsibility for developing, regulating, or managing water resources in Illinois.

Acknowledgments

This report was prepared under the general administrative direction of Dr. William C. Ackermann, Chief of the Illinois State Water Survey. We are grateful to the staff of the U. S. Geological Survey, and especially to Mr. Charlie Sieber, for collecting the stream samples. We are also grateful to Miss Dorothy Richey for her assistance in data handling, to the late Katherine Shemas for typing the original manuscript, to Mrs. Patricia A. Motherway and Nancy S. Scott for editing the manuscript, to Mr. John Brother, Jr., for the graphic presentations, and to Mrs. Suzi S. O'Connor for composing the camera-ready copy.

Part 1. Field and Laboratory Procedures

The Illinois State Water Survey, in cooperation with the Champaign District Office of the U. S. Geological Survey and others, has maintained a continuous program of sampling and analysis of surface water sources since 1945. The program has been so arranged that consecutive monthly samples are collected from several locations throughout the state and analyzed for 5-year periods. The selection of sampling locations for this study was governed by the requirement of the water quality program. Some stations have been sampling sites during several 5-year periods. Stations at which algal samples are now being collected will serve that purpose for the 5-year period, 1971 through 1976.

Collection and Preservation

Samples were collected at monthly intervals at midstream and, when possible, 12 inches below the water surface. A volume of 380 ml of water was obtained as a grab sample in a small-mouth pint glass bottle. Experience has

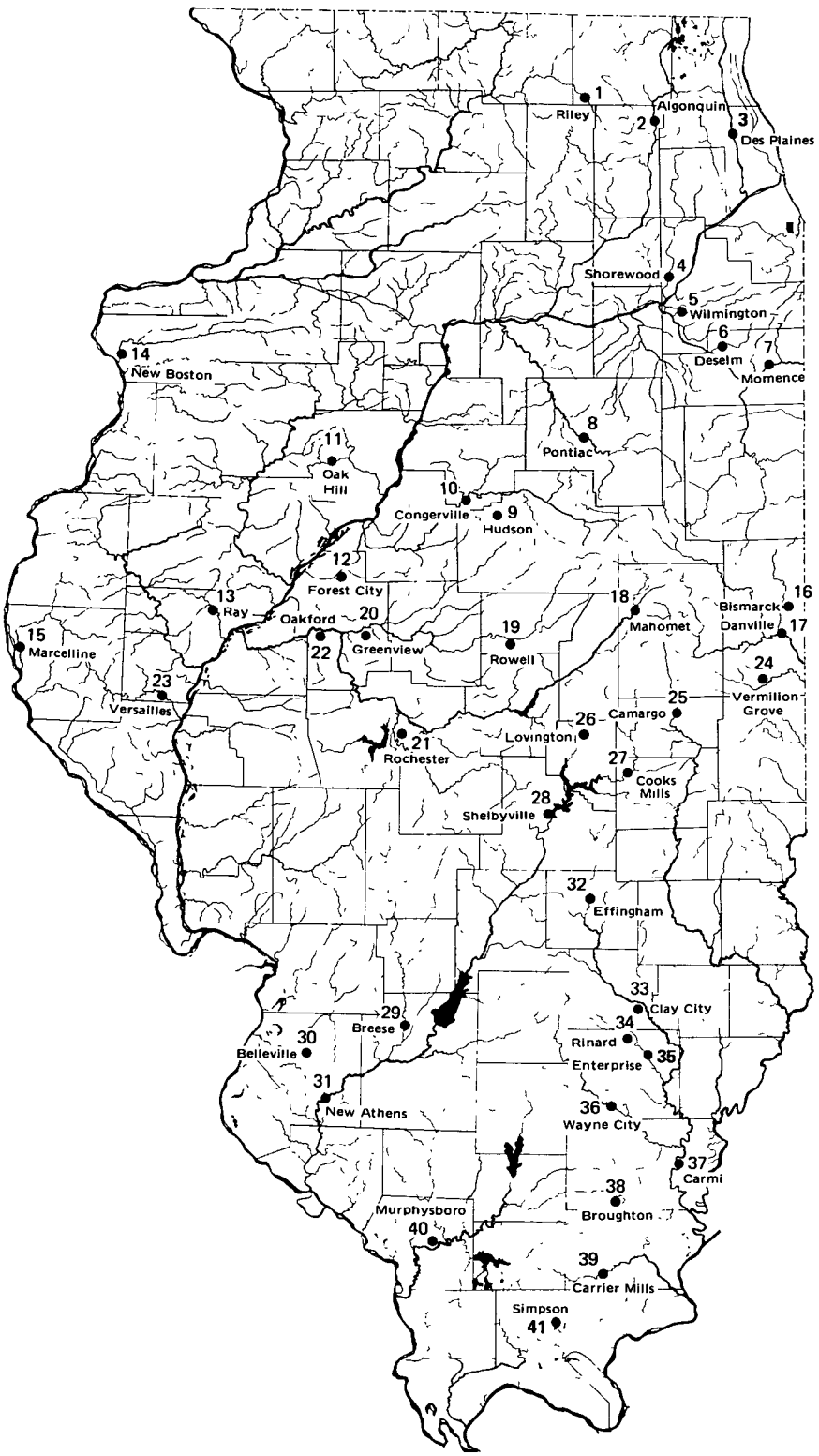

Figure 1. Sampling station locations and watersheds

Table 1. Sampling Station Locations and Drainage Areas

Map number (figure 1)	Sampling station	USGS station number	Drainage area *(sq mi)*
1	Coon Creek — Riley	5-4382.50	85.3
2	Fox River — Algonquin	5-5500.00	1402
3	Des Plaines River — Des Plaines	5-5290.00	359
4	Du Page River — Shorewood	5-5405.00	325
5*	Prairie Creek — Wilmington	5-5274.00	49.4
6*	Rock Creek — Deselm	5-5264.00	119
7	Kankakee River — Momence	5-5205.00	2340
8	Vermilion River — Pontiac	5-5545.00	568
9*	Sixmile Creek — Hudson	5-5657.00	18.9
10	Mackinaw River — Congerville	5-5675.00	764
11*	West Fork Kickapoo Creek - Oak Hill	5-5632.00	86.3
12*	Mason-Tazewell** — Forest City	5-5687.00	164
13*	Sugar Creek — Ray	5-5839.00	118
14	Edwards River — New Boston	5-4665.00	434
15	Bear Creek — Marcelline	5-4955.00	348
16*	North Fork Vermilion River — Bismarck	3-3387.80	262
17	Vermilion River — Danville	3-3390.00	1279
18	Sangamon River — Mahomet	5-5710.00	356
19	Salt Creek - Rowell	5-5785.00	334
20	Salt Creek — Greenview	5-5820.00	1800
21	South Fork Sangamon River — Rochester	5-5760.00	869
22	Sangamon River — Oakford	5-5830.00	5120
23*	McKee Creek — Versailles	5-5858.00	305
24*	Little Vermilion River — Vermilion Grove	3-3391.40	122
25	Embarras River — Camargo	3-3434.00	185
26*	West Okaw River — Lovington	5-5917.00	111
27	Kaskaskia River — Cooks Mills	5-5912.00	473
28	Kaskaskia River — Shelbyville	5-5920.00	1030
29	Shoal Creek — Breese	5-5940.00	760
30*	Loop Creek — Belleville	5-5946.50	7.07
31	Kaskaskia River — New Athens	5-5950.00	5220
32	Little Wabash River — Effingham	3-3786.35	240
33	Little Wabash River — Clay City	3-3795.00	1134
34*	Raccoon Creek — Rinard	3-3798.50	67
35*	Elm River — Enterprise	3-3799.00	154
36	Skillet Fork - Wayne City	3-3805.00	464
37	Little Wabash River — Carmi	3-3815.00	3111
38*	Contrary Creek — Broughton	3-3823.00	55.3
39	South Fork Saline River — Carrier Mills	3-3821.00	148
40	Big Muddy River — Murphysboro	5-5995.00	2154
41*	Max Creek — Simpson	3-3853.00	9.15

* Low flow — partial record sites
** Drainage ditch

shown that collection in this manner, in contrast to the use of a plankton net, provides samples containing a natural dispersion of aquatic organisms. The method of collection in midwestern streams is quite critical because small organisms generally predominate and care must be taken that sampling procedures do not favor one size over another. An interval of 30 days between collections is excessive simply because algal populations can change rapidly, especially during seasons of active biological growth. Sample frequency during this study was dictated by other considerations including the fact that the period of sampling was to extend over 5 years.

About 20 ml of acid Lugol's solution (10-mg iodine, 20-g potassium iodide, 20-ml glacial acid all in 200-ml distilled water) was placed in sampling bottles prior to collection. Experience with this preservative has been more satisfactory than the earlier use of formalin (40 percent aqueous solution of formaldehyde). Observations suggest that less contraction and distortion occurs with the advantage of the staining properties of the Lugol's solution. Samples were stored at room temperature in the dark before examination.

Identification

From the preserved samples, a 50-ml portion was passed through a Millipore HA filter (0.45 µ pore diameter). Residues were flushed from the filter by the filtrate into a test tube to a volume of 10 ml. A 1-ml portion from the test tube was pipetted into a Sedgwick-Rafter counting cell for microscopic examination. An inverted phase contrast microscope equipped with 10X eye-pieces and 20X objectives with a Whipple disc was used for identification and counting purposes. Counts were made from 10 fields. Generally, the procedures outlined in *Standard Methods*[5] were followed.

Algae were identified to genus by employing several keys[6-11] and were grouped in 5 main types, i.e., blue-greens, greens, diatoms, flagellates, and desmids.

Algae of the blue-green type, of which there are about 1500 species, are usually characterized by a bluish-green color caused by an accessory pigment in addition to chlorophyll. A red pigment is sometimes present also. Most blue-green algae grow in nonfilamentous colonies or in branched or unbranched filaments. They are widely distributed and occur in varied habitats, but when they occur in massive numbers (a bloom) they are found at the water surface. They are more frequently found in ponds or lakes rather than in the running waters of a stream.

The green algae group includes about 7000 species. Although a number live in saltwater, the group as a whole is more characteristic of freshwater. They may be either free-floating or attached and are usually either single cells or filamentous colonies that, if numerous, display a green cast to water.

Diatoms are generally unicellular and free-floating; however, some live attached to plants or inert objects. The cell wall is composed of two halves (valves) one overlapping the other like the top and bottom of a pill box. Although there is variation in shape, generally the cell is oblong to circular and made up mostly of silica. The number of species is about 16,000 and they vary in color from brown to green.

In several divisions of algae, including green, there are species that are unicellular and equipped with flagella which are whiplike organs that make mobility possible. These are flagellates. Depending upon the species, the cells range from spherical to ovoid. They are frequently found in organically enriched waters.

Desmids are aquatic free-floating green algae. Most desmids are characterized by a median constriction that divides the cell into two equal halves. There are numerous species of desmids and they are usually associated with ponds and lakes.

For enumeration, blue-green algae were counted by the number of trichomes. Green algae were counted by individual cells except *Actinastrum, Coelastrum,* and *Pediastrum* which were counted by each colony observed. *Scenedesmus* was recorded by each cell packet. Diatoms were counted as one organism regardless of their grouping or connections.

Data Evaluation

The data were evaluated solely on observed algal composition and density. No effort was made to develop causal relationships. In addition to composition and density, the diversity index of each collection station was computed and the occurrence of various density ranges was noted. These data are presented in tabular form along with a descriptive notation regarding algal succession at each station.

Algal Composition

During the 2-year study period, 41 algal genera were recovered from 866 samples taken at the 41 sampling locations. The genera included 3 blue-greens, 12 greens, 20 diatoms, 5 flagellates, and 1 desmid. The occurrence and type of algae found are shown in table 2. The number of genera per station ranged from 15 to 24.

As shown in table 2 the occurrence of blue-greens was not significant. Diatoms are clearly the dominant type of algae in Illinois streams. The most common diatoms observed were *Cyclotella* and *Navicula;* the diatoms *Surirella* and *Synedra* were also recovered frequently. The predominant green alga was *Scenedesmus.* The only flagellate of importance was *Euglena.* These 6 genera were observed at all sampling locations. On the other hand, there were 6 genera that were recovered only from a single sampling lo-

Table 2. The Occurrence and Type of Algae at Sampling Stations

(Percentage of time present at sampling stations)

Station numbers (figure 1)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	Number of stations
Algal type																																										
Blue-green algae																																										
Anabaena		4	4																									4														3
Anacystis							4																																			1
Aphanizomenon				4						4		5													4									14	10								6
Green algae																																										
Actinastrum	14	13		35	5	5	13	17	14	13	10	10	13	9	4	19	21	17	17	5	26	9	4	5	17	16	17	30	18		14	12	4	7	20	17		7	14	14	10	38
Ankistrodesmus	14	9	13	9		19	13	13	5	4	10		9	13	21	10	4	8	8	5	13	13	4	5	13	5	13	9	14	6	5	6	13		10	4	13	7	10	18	10	38
Chlorella					5	5		4							4		4	4		5			4				4				5			7		9				5		13
Closteridium				4		5																							5					7					7			5
Coelastrum	5	4	4		5	5	4	9	5	4				9				8		9	9		4		8	5		4		6		12	13		10		4	4	7	5		25
Crucigenia	5	4				5	4		10	4		5		4	4	5	8			5				5	4			4	5	6		6		7					10	9	21
Oocystis	5			4				4		4	5	5	4	4	4						4		13	10	4	5					9		4			4	4			5	19
Pediastrum	14	9			5		8	9	5	9			4				4	4	4	5		4	4		4		9	9				5		4	14	10	4	17	7	5	9		26
Scenedesmus	27	35	13	35	33	33	17	9	19	26	25	25	17	13	21	38	25	25	17	27	35	22	4	14	17	37	26	13	23	29	36	24	9	7	20	30	22	21	48	41	20	41
Spirogyra																																									10	1
Ulotbrix	18	17	17		19	14	8	9	14	30	10	5	9	22	25	4	13	4		14	4	4	13	24	21	32	4	4	14	6	14	6	9	36	40	13	17	7	14	9	30	39
Zygnema			4																	5									5										7			10	5
Diatoms																																										
Asterionella			4			5					10		4	4	4			4		5								4	14	6	9			7		4	4				10	16
Caloneis		13	4	13	5	24	21	4	14	13	10		4	4	8	19	4	21	13	9	9	17	13	5	8	5	17	4	5	6	14		14	7	10	9	9	7	5	5		37
Cocconeis					5									13						5																					3
Cymatopleura						5																																				1
Cymbella																									4								4									2
Cyclotella	45	48	61	52	52	48	54	43	57	48	50	14	43	39	50	52	46	38	50	59	48	48	43	57	58	26	52	43	41	35	59	29	39	29	30	39	39	36	33	45	40	41
Diatoma	5	17	17	9	5		17	4	5	4	15		9	4	4	10	17	4	4	18	9	4	9	19	4	16	22	13	5	12	5	18	17	14		4	13	14	5	14		37
Diploneis							4																																			1
Fragilaria	18	13	9	4	10	10	4		10				4		13		8	13	4	9	9	9	13		4	10	9	9	5	12		12	4	7		4	4			23	10	30
Gomphonema													4			5														6					10							4
Gyrosigma		22	13	9	10	10	25	13	5	4	10	10	4	13	8	5	13	17	8	5	4	13	22	19			17	4	18	12	5	12	9			13	9	21	10	32		35
Melosira	14	13	35	9	33	14	8	13	10	17		10	17	13	17	24	13	13	13	9	4	17	9	14	8	16	13	17	14	6	9	6	13	21	20	22	13	21	29	18	20	40
Navicula	45	39	61	52	43	81	63	43	52	70	65	67	48	65	58	76	63	50	67	59	57	61	52	33	54	58	18	61	59	71	59	59	52	43	60	52	57	57	38	68	50	41
Neidium																				5				5	4																	3
Nitzschia	14	17	17	17	33	10	13	17	10	13	5	14	9	26	17	10	21	4	21	23	22	26	13	19	25		9	35	18	24	23	29	30	14	20	17	26	7	10	18	20	40
Pleurosigma			4					4					4												4																	4
Stephanodiscus	5	4		4		5		4	5		5			4	4			8			13	4		5				4	9			6	4	14		4		14			20
Surirella	9	17	4	2	10	19	13	30	19	4	10	14	17	13	13	29	13	8	17	18	13	4	4	10	17	10	22	9	9	29	5	12	22	7	20	9	9	7	5	5	20	41
Synedra	18	17	9	22	10	24	13	13	14	13	15	29	35	9	25	14	8	17	25	23	4	22	22	10	4	21	9	13	5	12	14	18	13	7	10	17	17	36	10	5	20	41
Tabellaria	9	4		9	10		8		5	9	10	14		4	4	5	4	4	17	5		17	9	5	17	5	13	4	14	24	18	6	4				9		5		20	31
Flagellates																																										
Chlamydomonas				4			8		5					4								4			4					12			7		4				5		10
Dinobryon																															5											1
Eudorina								9						4				4																					5			4
Euglena	18	26	26	4	10	14	25	17	5	17	15	10	22	26	25	10	33	13	21	14	17	22	26	19	21	16	22	17	23	29	23	18	22	29	40	13	22	14	24	18	20	41
Pbacus		4						9		4	5				4		4	4								5			5			12		7			4				10	13
Desmid																																										
Desmidium																															5											1
Number of genera	19	22	19	20	19	21	22	21	21	22	18	15	20	23	22	17	20	23	16	24	18	19	20	19	24	17	18	22	22	20	21	19	21	22	16	22	20	19	19	20	17	
Number of samples	22	23	23	23	21	21	24	23	21	23	20	21	23	23	24	21	24	24	24	22	23	23	23	21	24	19	23	23	22	17	22	17	23	14	10	23	23	14	21	22	10	

cation. These included the blue-green *Anacystis,* the green alga *Spirogyra,* the diatoms *Cymatopleura* and *Diploneis,* the flagellate *Dinobryon,* and the desmid *Desmidium.* These appear to be selective in their habitat in Illinois streams.

The recovery rate of the 16 most predominant algae at 39 locations is depicted on figure 2. Two locations, 35 and 41, have been excluded because of their small sample size. It is interesting that the diatom *Cyclotella* was not recovered more than 20 percent of the time at the Mason-Tazewell Drainage Ditch and the diatom *Navicula* was similarly not recovered in the Kaskaskia River at Cooks Mills.

A summary of average compositions for each algal type is included in table 3. Also shown is the maximum percent composition of blue-greens, greens, and flagellates for each sampling location. The maximum for diatoms was 100 percent at each station, i.e., at one time or another all algae in a water sample for each station consisted solely of diatoms.

The samples at many of the locations consisted solely of green algae on occasion. A sample from the Mason-Tazewell Drainage Ditch on December 14, 1971, contained only the blue-green alga *Apbanizomenon. Euglena,* a flagellate, was the only alga observed in a sample taken from the North Fork Vermilion River near Bismarck on April 7, 1973. As shown in table 3, however, diatoms accounted for 51 to 82 percent of the total algal population at all stations. About 12 to 37 percent of the total algal densities were green algae, and flagellates made up 1 to 12 percent of all algal counts.

Algal Density

An examination of the algal density data, expressed as cell counts per milliliter (cts/ml), for each station showed them to be generally distributed in a log-normal pattern. Therefore, the central tendency and dispersion of the data have been expressed in geometric terms. These data are summarized in Part 2 of this report.

The geometric mean (M_g) values at most locations were not significantly different from year to year, except when a sample did not contain algae. This happened frequently during winter months, especially during January and February. Also, the geometric standard deviation (a) becomes quite large if samples with no algae are included in the computations.

The maximum algal densities of 7100 cts/ml occurred in the Des Plaines River near Des Plaines on May 7, 1973, and in the Kaskaskia River at New Athens on June 6, 1972. If the samples in which algae were not detected are omitted from computation, the annual geometric mean for all stations ranges from 1100 cts/ml to 2000 cts/ml. There was no distinguishable difference in densities between northern and southern watersheds.

Evaluation of the density ranges for each sampling location, showed that most of the algal counts ranged from 500 to 2000 cts/ml. Only 5 stations had the majority of the densities ranging from 2000 to 5000 cts/ml. These stations are on the Fox, Du Page, and Embarass Rivers, and two on the Kaskaskia River. The major streams with algal densities recovered in excess of 5000 cts/ml include the Fox, Des Plaines, and Kaskaskia Rivers.

Generally, the number of samples examined for each location varied from 17 to 24. However, only 10 samples were obtained from the Elm River (35) and Max Creek (41), and only 14 samples were gathered from Raccoon Creek (34) and Contrary Creek (38).

The number and types of algae in running water depend upon many factors.[12-15] Among them are size and shape of the stream, temperature, stream velocity, depth, light penetration, nutrient availability, grazing animals, and human activity. Thus, it is extremely difficult to reasonably predict the population and composition of algae in streams.

Diversity Index

There have been many methods suggested for defining the structure of a biological community. The most widely used procedure is the diversity index and the one most commonly used is Shannon's diversity index[16] which was derived from information theory. For the purposes of this report the index for each station on each day of collection was determined by formula[17] as follows:

$$D = -\sum_{i-1}^{m} p_i \log_2 p_i$$

where $p_i = N_i/N_s$ is the probability of the occurrence of the *i*th genera, *N.* is the density of the *i* genera, N_s is the total algal density of the sample, and *m* is the number of genera per sample. For convenience log p. may be expressed as 1.44 In p_i. The index *D* has a minimum value when $m = 1$ and a maximum value when $m = N_s$.

The computed diversity indices are given in Part 2 of this report. The largest index developed was 2.48 for the Embarass River near Camargo on October 7, 1971. Seven algal genera were in the sample. Except for an average index of 0.87 at the Mason-Tazewell Drainage Ditch, the overall average at each location was equal to or greater than 1.10. The highest average index of 1.41 occurred at Elm and Big Muddy Rivers.

The application of diversity indices to stream waters based only on genera, in contrast to species identification, may be questioned. Nevertheless, similar application of the procedure to the Spoon[12] and Illinois[18] Rivers suggests the diversity index to be of no more value than genera occurrence or density as a parameter for assessing algal populations in Illinois streams.

Table 3. Summary of Average Composition of the Algal Types

	Station location (figure 1)	2-year average *(%)*					Maximum *(%)**		
		Blue-green	Green	Diatom	Flagellate	Desmid	Blue-green	Green	Flagellate
1	Coon Creek — Riley		28.5	64.5	7.0			100	80.0
2	Fox River — Algonquin	1.5	24.5	69.4	4.6		33.3	83.3	57.9
3	Des Plaines River — Des Plaines	0.9	15.8	77.3	6.0		20.0	80.0	71.5
4	Du Page River — Shorewood	1.0	27.9	69.1	2.0		23.1	100	26.3
5	Prairie Creek — Wilmington		19.4	79.5	1.1			84.2	15.8
6	Rock Creek — Deselm		24.8	70.2	5.0			94.4	50.0
7	Kankakee River — Momence	1.4	18.2	73.0	7.4		33.3	80.0	33.3
8	Vermilion River — Pontiac		25.3	66.9	7.8			92.3	50.0
9	Sixmile Creek — Hudson		20.8	78.6	0.6			87.5	11.7
10	Mackinaw River — Congerville	2.0	26.5	66.6	4.9		45.0	87.5	60.0
11	West Fork Kickapoo Creek - Oak Hill		22.5	72.9	4.6			88.9	50.0
12	Mason-Tazewell — Forest City	5.0	11.5	81.0	2.5		100	57.1	40.9
13	Sugar Creek — Ray		19.9	75.8	4.3			100	36.4
14	Edwards River — New Boston		19.7	75.7	4.6			100	33.3
15	Bear Creek — Marcelline		22.5	68.4	9.1			75.0	61.5
16	North Fork Vermilion River — Bismarck		15.6	77.1	6.3			100	100
17	Vermilion River — Danville		30.5	61.9	7.6			100	36.4
18	Sangamon River — Mahomet		25.7	70.5	3.8			100	30.0
19	Salt Creek - Rowell		15.6	78.7	5.7			66.7	57.1
20	Salt Creek — Greenview		14.3	81.8	3.9			90.9	14.3
21	South Fork Sangamon River — Rochester		30.5	63.6	5.9			100	66.7
22	Sangamon River — Oakford		17.1	75.2	7.7			80.0	63.6
23	McKee Creek — Versailles		14.8	80.3	4.9			75.0	28.5
24	Little Vermilion River — Vermilion Grove		21.1	74.3	4.6			80.0	33.3
25	Embarras River — Camargo	0.8	20.1	74.3	4.8		16.7	63.6	71.5
26	West Okaw River — Lovington		22.6	69.1	8.3			100	71.4
27	Kaskaskia River — Cooks Mills		20.4	75.2	4.4			100	71.4
28	Kaskaskia River — Shelbyville	1.1	13.4	82.4	3.1		23.1	46.2	25.0
29	Shoal Creek — Breese		22.2	67.5	10.3			60.0	55.6
30	Loop Creek — Belleville		17.7	75.2	7.1			71.4	28.6
31	Kaskaskia River — New Athens		19.8	75.8	2.9	1.5		50.0	60.0
32	Little Wabash River — Effingham		21.2	71.6	7.2			100	57.2
33	Little Wabash River — Clay City		15.7	79.4	4.9			100	45.5
34	Raccoon Creek — Rinard	3.3	31.6	52.8	12.3		33.3	90.0	60.0
35	Elm River — Enterprise	4.6	36.8	51.1	7.5		46.3	87.5	42.9
36	Skillet Fork - Wayne City		24.8	69.0	6.2			72.7	75.0
37	Little Wabash River — Carmi		22.6	72.8	4.6			100	37.5
38	Contrary Creek — Broughton		13.6	82.0	4.4			40.0	40.0
39	South Fork Saline River — Carrier Mills		35.7	59.2	5.1			85.0	25.0
40	Big Muddy River — Murphysboro		24.7	70.5	4.8			90.9	33.3
41	Max Creek — Simpson		28.4	63.9	7.7			71.4	41.2

* Maximum value for diatoms was 100 percent for all 41 stations

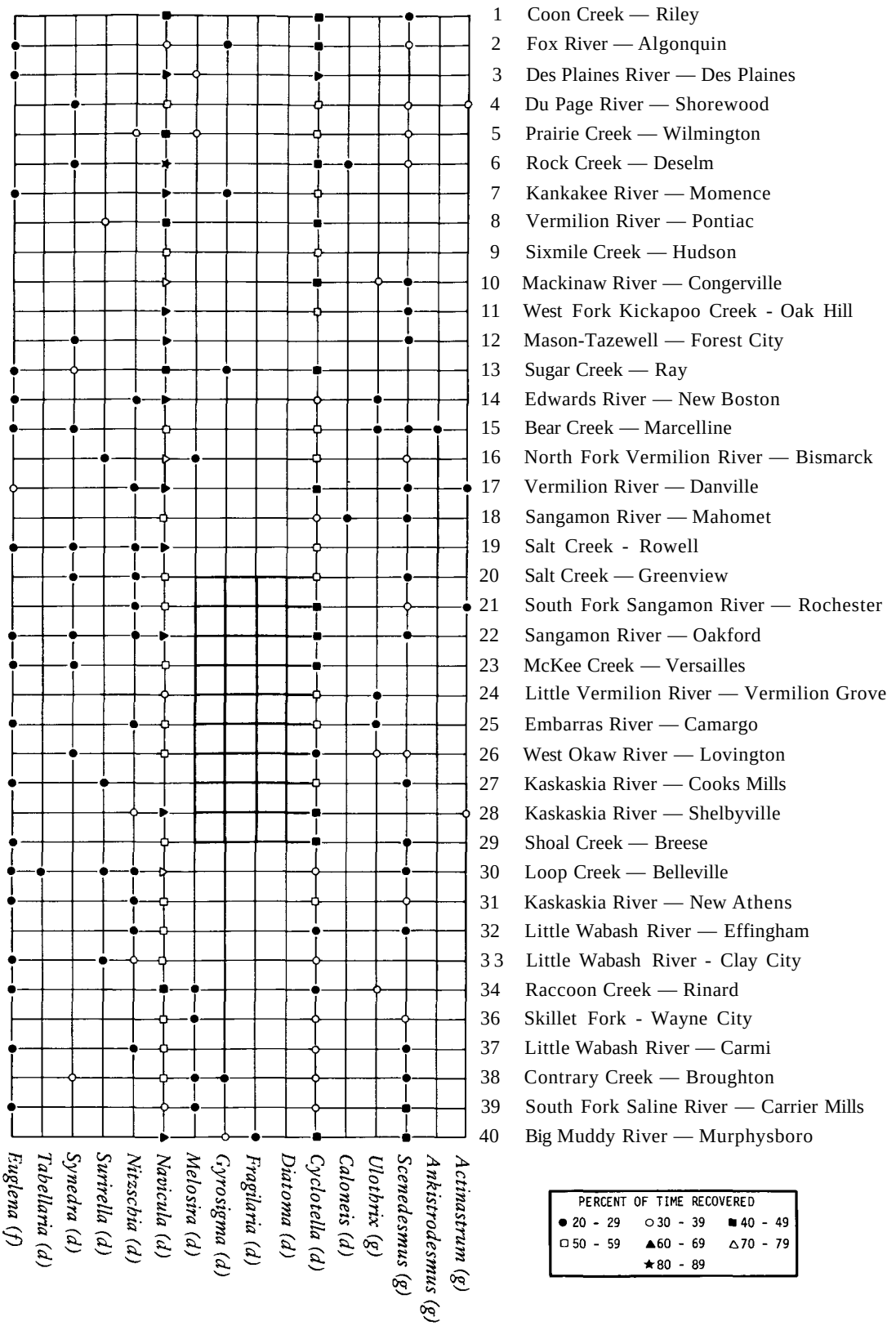

Figure 2. Occurrence of abundant algae in Illinois streams

Part 2. Data Summaries

1. COON CREEK AT RILEY

During 1972 the initial algal maximum occurred in May. The ratios of diatoms:greens: flagellates at that time were 2:2:1. Algal densities subsequently decreased during the summer. The next maximum occurred on August 10 with the diatoms *Navicula* and *Fragilaria* representing about 81 percent of the population. Algal densities decreased from that date and reached a winter low of 470 cts/ml on January 12, 1973.

Two pulses also occurred during May and August 1973. In May the predominant genera were *Ulothrix* and *Scenedesmus,* both greens. In August the predominant alga was the diatom *Melosira.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density *Range*	M_g	σ_g	Diversity index *Range*	*Avg*	σ	Algal density occurrence *(% of time)* *<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	11	470-5000	1600	2.00	0.72-2.19	1.43	0.50	9.1	54.5	27.3	9.1
10/72-9/73	11	470-4600	1300	1.98	0.81-1.40	1.13	0.19	9.1	63.6	27.3	0
2-year	22		1400	1.96		1.28	0.40	9.1	59.1	27.3	4.5

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-5	2400	1.29
12-6	790	0.72
1972		
1-5	470	0.92
2-10	1700	1.32
3-24	940	1.60
4-26	1900	2.10
5-31	3000	2.20
6-27	2200	1.72
7-12	790	0.72
8-10	5000	1.63
9-18	1900	1.56
10-19	790	0.97
11-9	630	0.81
12-5	1100	0.99
1973		
1-12	470	0.92
3-15	2400	1.23
4-11	1300	1.41
5-8	4600	1.20
6-9	1400	1.39
7-11	1700	1.10
8-14	3000	1.19
910	940	1.25

2. FOX RIVER AT ALGONQUIN

Algal genera and densities are influenced by the Fox Chain-of-Lakes. During the winter of 1971-1972 the diatom *Cyclotella* was dominant. In June 1972 a *Euglena* bloom developed followed by the blue-green *Anabaena* in July. A combination of blue-greens and the diatom *Melosira* made up about 97 percent of the 4700 cts/ml on July 10. An autumn pulse did not materialize.

In February 1973 densities of about 3100 cts/ml occurred consisting principally of the green alga *Crucigenia.* The diatom *Fragilaria* was predominant in April. The annual maximum density of 5000 cts/ml occurred in May and *Cyclotella* made up 50 percent of the population. The green alga *Coelastrum* was dominant among the greens.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	11	6304700	1900	1.79	0.44-2.29	1.54	0.59		36.4	63.6	
10/72-9/73	12	310-5000	1700	2.16	0.65-1.77	1.26	0.43	16.7	41.7	33.3	8.3
2-year	23		1800	1.97		1.39	0.52	8.7	39.1	47.8	4.4

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-5	3000	2.29
12-6	2000	1.88
1972		
1-3	630	0.81
2-7	1700	0.44
3-20	2200	2.12
4-26	2400	1.86
5-31	940	1.92
6-27	3000	1.72
7-10	4700	1.60
8-7	2500	0.87
9-21	1100	1.38
10-19	630	0.81
11-9	310	1.00
12-11	1700	1.69
1973		
1-15	940	0.65
2-12	3000	1.76
3-12	1900	1.33
4-10	2700	0.79
5-8	5000	1.77
6-8	1300	1.30
7-10	2800	1.50
8-15	2800	1.50
9-10	1900	0.82

3. DESPLAINES RIVER NEAR DESPLAINES

On November 3, 1971, algal counts were high (3300 cts/ml) because of *Cyclotella* development. From that date through all of 1972 there were no significant pulses. There were no spring or autumn maxima and the population consisted mostly of diatoms.

On April 5, 1973, another *Cyclotella* bloom occurred with the peak at 5700 cts/ml. A spring maximum of 7100 cts/ml occurred in May with the diatoms *Cyclotella* (3000 cts/ml) and *Asterionella* and the blue-green *Anabaena* dominating. Algal populations were sharply reduced during the summer and there was no autumn maximum.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	11	470-3300	1700	1.72	0.92-1.95	1.48	0.30	9.1	36.4	63.6	
10/72-9/73	12	790-7100	1800	2.07	0.37-1.98	0.98	0.45		58.3	25.0	16.7
2-year	23		1700	1.88		1.12	0.46	4.3	47.8	43.5	8.7

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-3	3300	1.12
12-9	470	0.92
1972		
1-11	940	1.46
2-2	1400	1.44
3-15	1400	1.35
4-26	1700	1.82
5-31	2200	1.95
6-27	2000	1.35
7-12	2400	1.64
8-3	2700	1.66
9-6	2000	1.56
10-4	790	0.72
11-9	2200	0.37
12-11	790	0.72
1973		
1-15	2000	0.39
2-12	940	1.25
3-6	1600	1.30
4-5	6400	0.77
5-7	7100	1.98
6-5	1100	1.15
7-5	2500	0.81
8-9	1400	1.35
9-5	1600	0.97

4. DU PAGE RIVER AT SHOREWOOD

Algal pulses were poorly developed during 1972. *Cyclotella* and *Navicula* were the predominant diatoms and *Actinastrum* was the dominant green alga. In 1973 a maximum count of 4100 cts/ml unexpectedly occurred in February. It consisted principally of the diatom *Melosira.* The second pulse of about 3500 cts/ml which occurred on June 18 also consisted mainly of *Melosira.* The dominant green alga during 1973 was *Scenedesmus.* Blue-green algae were not a significant factor in the river.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	11	310-2400	1300	1.82	0.97-1.85	1.41	0.30	9.1	54.5	36.4	
10/72-9/73	12	ND-4100	810	9.61	0-2.02	1.11	0.67	16.7	25.0	58.3	
2-year	23		1000	5.30		1.26	0.53	13.0	39.1	47.8	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-2	2200	1.69
12-7	1100	1.15
1972		
1-6	940	1.46
2-15	310	1.00
3-28	1700	1.32
4-28	1400	1.53
5-31	2400	1.24
6-29	1600	1.85
7-25	2000	1.78
8-15	790	0.97
9-14	2000	1.58
10-12	470	0
11-20	790	0.72
12-19	1600	1.16
1973		
1-17	ND	
2-7	4100	1.21
3-19	790	0.72
4-17	2800	1.46
5-14	2500	1.76
6-18	3500	1.02
7-16	3000	2.02
8-21	2700	1.50
9-18	2500	1.85

5. PRAIRIE CREEK NEAR WILMINGTON

Algal pulses were poorly developed over the 2-year study period. The stream mainly supported diatoms. On two occasions, in July 1972 and April 1973, the green alga *Ulothrix* made up a significant portion of the population. The principal diatoms in order of density were *Cyclotella, Navicula, Nitzschia,* and *Melosira.* The maximum algal densities of 3 300 cts/ml occurred on two dates, November 10, 1971, and August 15, 1973.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Aug*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	10	790-3300	1600	1.53	0-1.83	1.29	0.56		60.0	40.0	
10/72-9/73	11	790-3300	1800	1.66	0.50-2.12	1.26	0.46		45.5	54.5	
2-year	21		1700	1.59		1.28	0.50		52.4	47.6	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-13	1600	1.36
11-10	3300	1.81
12-1	940	1.25
1972		
1-10	790	0
2-29	1400	1.44
4-11	2200	1.10
5-25	2000	1.76
7-10	2000	1.83
8-10	1300	1.55
9-7	1700	0.85
10-9	1300	1.41
11-14	940	0.92
12-6	790	0.72
1973		
1-5	2200	1.43
2-7	1400	0.50
3-7	1100	1.45
4-4	3000	1.10
5-9	2800	1.48
7-10	2200	1.72
8-15	3300	1.05
9-10	2700	2.12

6. ROCK CREEK BELOW DESELM

In the spring of 1972 the algal population did not increase from the winter low, and the first large pulse, 5300 cts/ml, occurred on August 2. It consisted mainly of the diatoms *Cyclotella* and *Navicula.* On October 10 a maximum of 5200 cts/ml occurred and the principal diatoms *Melosira* and *Navicula* accounted for about 64 percent of the population and the green algae *Scenedesmus* and *Ulothrix* for almost all of the rest.

In February 1973 the green alga *Crucigenia* appeared in large numbers and represented about 58 percent of the algal population of about 3800 cts/ml. Another pulse occurred on August 16 at which time the green alga *Scenedesmus* represented 94 percent of the population. Generally, however, diatoms were the predominant algae detected in the stream.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density *Range*	M_g	σ_g	Diversity index *Range*	*Avg*	σ	Algal density occurrence *(% of time)* *<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	10	940-5300	1700	1.63	0.76-2.17	1.67	0.44		70.0	20.0	10.0
10/72-9/73	11	1100-5200	1900	1.70	0.31-2.07	1.36	0.48		54.5	36.4	9.1
2-year	21		1800	1.65		1.51	0.47		61.9	25.6	9.5

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	2500	1.82
11-15	2200	1.81
12-6	940	1.46
1972		
1-18	1400	1.22
3-2	1300	1.91
4-11	1600	2.17
5-26	1700	1.87
7-10	1300	2.16
8-2	5300	1.50
9-8	1400	0.76
10-10	5200	2.07
11-13	1100	0.99
12-7	1100	0.99
1973		
1-5	2500	1.68
2-6	3800	1.36
3-8	2200	1.26
4-3	1400	1.75
5-9	1100	1.38
7-3	1400	1.53
8-16	2800	0.31
9-10	1900	1.63

7. KANKAKEE RIVER AT MOMENCE

During 1972, maxima occurred on June 2 and September 8. In both instances diatoms made up more than 80 percent of the algal population and *Navicula* was the principal genus on each date. Although the blue-green *Anacystis* was detected in the July sample, neither blue-green nor green algae were in significant densities during 1972.

In 1973 a maximum population occurred on June 14 consisting mainly of diatoms with *Caloneis* being the predominant genus. With the exception of the green alga *Crucigenia* that occurred in relatively large numbers (1300 cts/ml) in March, no types other than diatoms were significant during 1973.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	12	470-3100	1600	1.75	0.72-2.47	1.59	0.48	8.3	50.0	41.7	
10/72-9/73	12	790-3300	1400	1.51	0.591.66	1.28	0.27		75.0	25.0	
2-year	24		1500	1.62		1.43	0.41	4.2	62.5	33.3	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	1700	2.19
11-15	1700	1.31
12-6	1600	1.76
1972		
1-18	470	0.92
2-7	940	1.46
3-2	2000	2.47
4-13	790	0.72
5-4	1400	1.53
6-2	2500	1.78
7-11	2400	1.69
8-1	2700	1.73
9-8	3100	1.52
10-13	1100	0.59
11-17	940	1.46
12-7	1600	1.36
1973		
1-2	2000	1.14
2-8	1400	1.22
3-8	2400	1.00
4-3	1100	1.38
5-15	1100	1.66
6-14	3300	1.36
7-3	1700	1.44
8-16	790	1.37
9-20	1400	1.39

8. VERMILION RIVER AT PONTIAC

The maximum density observed in 1972 was 3300 cts/ml on August 3. The diatom *Navicula* and the green alga *Actinastrum* were dominant. There were no other significant pulses during the year, and the diatoms *Navicula, Cyclotella,* and *Surirella* were the main genera. However, on December 1 a bloom (2700 cts/ml) of the green alga *Ulothrix* occurred and it was the only genus detected in the sample.

In January 1973 diatoms once again made up most of the population and generally prevailed during the year. However, *Actinastrum* pulsed again on April 2 along with *Ulothrix* and together they made up 92 percent of the population. On May 8, at the time of the annual maximum, the diatoms *Cyclotella* and *Caloneis* made up 74 percent of the total algal density.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	a	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	11	790-3300	1400	1.46	0-1.84	1.37	0.53		81.8	18.2	
10/72-9/73	12	310-3600	1400	2.00	0-1.66	1.31	0.47	16.7	50.0	33.3	
2-year	23		1400	1.74		1.29	0.50	8.7	65.2	26.1	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-12	1400	1.84
11-8	1300	1.75
12-3	1700	1.49
1972		
1-12	1400	0
2-28	790	0.97
4-10	1100	1.38
5-5	1400	1.84
6-2	2200	1.56
7-5	1400	1.53
8-3	3300	1.62
9-11	1100	1.15
10-2	470	0.92
11-7	310	1.00
12-1	2700	0
1973		
1-2	2200	1.49
2-5	1100	0.99
3-5	1400	1.66
4-2	2000	1.30
5-8	3600	1.47
6-7	1300	1.56
7-9	1600	1.49
8-13	1900	1.65
912	1400	0.99

9. SIXMILE CREEK AT HUDSON

Nine of 21 samples collected consisted solely of diatoms and *Cyclotella* and *Navicula* were the main genera. They made up about 80 percent of the summer maximum (3900 cts/ml) that occurred on August 8, 1972. Green algae did not develop well in 1972 although *Ankistrodesmus* made up about 86 percent of the total density of about 1100 cts/ml on December 8.

A spring maximum occurred on April 20, 1973, at which time *Cyclotella* represented about 75 percent of the population. Samples were not collected in June or August, but the annual maximum occurred in September (3900 cts/ml) when *Ulothrix* with about 2700 cts/ml and *Synedra* with about 1100 cts/ml were the most prevalent.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	11	ND-3900	440	20.89	0.54-1.79	1.10	0.67	18.2	54.5	27.3	
10/72-9/73	10	160-3900	1400	2.56	0-1.81	1.10	0.57	10.0	50.0	40.0	
2-year	21		760	10.09		1.10	0.61	14.3	52.4	33.3	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-1	1600	0.72
11-3	1300	0.54
12-1	1600	1.30
1972		
1-10	ND	
2-24	ND	
4-6	790	1.37
5-10	2000	1.49
6-7	1700	1.79
7-6	2700	1.55
8-8	3900	1.69
9-11	1400	1.66
10-12	160	0
11-20	1300	1.75
12-8	1100	0.59
1973		
1-11	1100	0.99
2-6	2400	1.81
3-8	1300	1.30
4-20	3600	1.16
5-8	2700	1.66
7-5	940	0.65
9-25	3900	1.08

10. MACKINAW RIVER NEAR CONGERVILLE

A significant number of algae were detected on December 14, 1971. They consisted of the blue-green *Apbanizomenon* (1400 cts/ml), the flagellate *Euglena* (630 cts/ml), and 4 genera of diatoms. The blue-green algae originated from a newly formed impoundment upstream of the sampling location. In May and June 1972 *Ulotbrix* was abundant. Algal densities were recorded at 3800 cts/ml on August 9 and at 3900 cts/ml on September 6, 1972. The dominant genus in August was *Navicula;* in September it was *Cyclotella.*

The highest densities for 1973 occurred during April and May and *Cyclotella* once again prevailed. There were no significant pulses or changes in population make-up during the rest of the year.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	11	ND-3900	930	10.41	0.72-2.16	1.31	0.59	9.1	36.4	54.5	
10/72-9/73	12	790-3000	1400	1.58	0.65-1.87	1.39	0.35	8.3	66.7	33.3	
2-year	23		1200	5.09		1.35	0.47	4.3	52.2	43.5	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-8	1100	1.84
11-18	1300	1.41
12-14	3100	2.16
1972		
1-31	790	0.72
2-24	ND	
4-6	790	0.97
5-10	2400	1.38
6-6	2500	1.59
7-7	2000	1.20
8-9	3800	1.74
9-6	3900	1.41
10-13	940	1.46
11-27	790	0.97
12-29	1300	1.30
1973		
1-4	2200	1.49
2-7	940	0.65
3-8	1300	1.06
4-20	2500	1.70
5-8	3000	1.66
6-12	2000	1.46
7-27	790	1.37
8-23	1600	1.69
9-6	1700	1.87

11. WEST FORK KICKAPOO CREEK NEAR OAK HILL

Only diatoms were detected in samples collected from October 1971 through January 1972. No samples were collected in February, March, and September 1972. During 1972 the maximum density occurred on August 7 when the green alga *Ulothrix* made up about 75 percent of the total of 4200 cts/ml. All other collection dates reflected the prevalence of diatoms, especially *Navicula.*

In 1973 the spring maximum of 2700 cts/ml occurred on May 21. *Cyclotella* was the dominant alga. A maximum equal to that of the spring occurred on August 13; the diatom *Asterionella* was prevalent and *Cyclotella* was second in numbers.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	9	160-4200	1200	2.37	0-1.85	1.04	0.67	11.1	77.8	11.1	
10/72-9/73	11	470-2700	1300	1.78	0.81-1.89	1.30	0.42	9.1	63.6	27.3	
2-year	20		1200	2.02		1.22	0.55	10.0	70.0	20.0	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-14	1100	1.15
11-18	1300	1.30
12-14	940	0
1972		
1-11	160	0
4-3	1400	1.39
5-9	1300	1.41
6-5	1600	1.85
7-6	1600	1.85
8-7	4200	1.28
10-13	2400	1.78
11-28	470	0.92
12-14	1400	1.35
1973		
1-4	1100	1.67
2-8	630	0.81
3-12	1300	1.00
4-28	1700	1.79
5-21	2700	1.17
7-11	790	0.72
8-13	2700	1.22
9-14	1400	1.89

12. MASON-TAZEWELL DRAINAGE DITCH AT FOREST CITY

More than one-half the samples collected contained solely diatoms; however, a blue-green bloom of *Apbanizomenon* occurred on December 14, 1971, and it was the only type of alga detected at that time. *Navicula* was the prevalent diatom during 1972 and was responsible for the pulses that occurred in May and August. The second most important diatom was *Synedra.* Surprisingly, *Cyclotella* was found in only 3 of 21 samples collected.

Samples were not collected in June or August of 1973. In March *Navicula* was the only alga detected and in July *Melosira* was the sole representative. The maximum density of 3500 cts/ml occurred on September 26 and the green alga *Oocystis* and the flagellate *Euglena* were dominant.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	11	310-2200	1200	1.83	0-1.82	1.08	0.66	18.2	63.6	18.2	
10/72-9/73	10	ND-3500	490	10.28	0-1.91	0.63	0.73	30.0	60.0	10.0	
2-year	21		780	5.39		0.87	0.71	23.8	61.9	14.3	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-14	1700	0.44
11-2	1100	1.38
12-14	1600	0
1972		
1-14	310	0
2-23	470	1.59
4-10	1400	1.22
5-9	2200	1.29
6-5	1700	1.82
7-5	1300	1.81
8-7	2000	0.96
9-6	1100	1.38
10-30	470	0
11-21	160	0
12-13	790	0.72
1973		
1-4	1400	0.92
2-8	ND	
3-6	1600	0
4-6	1100	1.38
5-21	790	1.37
7-9	1900	0
9-26	3500	1.91

13. SUGAR CREEK NEAR RAY

In 1972 the dominant alga was the diatom *Navicula.* On July 17 it was the only diatom, and it made up about 83 percent of the 2800 cts/ml. On September 25, at a density of 3500 cts/ml, *Navicula* was absent and *Melosira* and *Cyclotella* were dominant.

The principal diatom during 1973 was *Cyclotella.* The green alga *Ulothrix,* however, represented about 93 percent of the population on February 12 and *Cyclotella* made up about 95 percent of the population during April. The spring maximum occurred on May 22 at a density of about 4200 cts/ml. The diatoms *Navicula* and *Asterionella* prevailed.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	12	ND-3500	930	9.06	0.80-2.13	1.35	0.56	8.2	50.0	41.7	
10/72-9/73	11	630-4200	1600	1.90	0-1.81	0.88	0.55		45.5	54.5	
2-year	23		1200	5.17		1.12	0.59	4.4	47.8	47.8	

• ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	940	1.46
11-11	1900	2.13
12-6	2000	1.53
1972		
1-5	630	1.50
2-14	ND	
3-27	2200	1.26
4-18	1700	2.12
5-8	1700	1.28
6-12	1300	1.30
7-17	2800	0.80
8-21	2400	1.38
9-25	3500	1.40
10-24	2200	1.38
11-20	1100	0.99
12-18	3000	1.24
1973		
1-8	1400	0.50
2-12	2200	0.37
3-12	630	0.81
4-9	3100	0.29
5-22	4200	1.81
7-19	790	0
8-14	2000	0.96
9-11	790	1.37

14. EDWARDS RIVER NEAR NEW BOSTON

The main diatoms observed in the stream were *Cyclotella* and *Navicula,* and the main greens were *Ulothrix* and *Ankistrodesmus.* During the 8 months from October 1971 through May 1972 only diatoms and *Euglena* were detected. A pulse onNovember 10, 1971, was made up mostly of the diatom *Cocconeis.* On April 20, 1972, *Navicula* predominated in an algal density of 4200 cts/ml. On July 18, 1972, an immense growth was detected with 13,000 cts/ml made up mainly of *Cyclotella* and *Gyrosigma* and the green alga *Ankistrodesmus.*

In 1973 algal growth was not as prolific. During winter and spring the diatoms *Cyclotella, Navicula,* and *Nitzschia* were dominant. There were no significant pulses until September when *Asterionella* (2200 cts/ml) was the prominent alga in a total density of 3900 cts/ml.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	11	790-13,000	1900	2.56	0.72-1.95	1.32	0.45		63.6	18.2	18.2
10/72-9/73	12	940-3900	1800	1.60	0-2.10	1.27	0.57		50.0	50.0	
2-year	23		1900	2.05		1.30	0.51		56.5	34.8	8.7

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-5	940	0.92
11-10	2800	1.14
12-8	1100	1.38
1972		
1-13	790	0.97
2-23	790	0.72
4-20	4200	1.93
5-11	1900	1.46
6-30	940	0.92
7-18	13,000	1.95
8-16	5500	1.23
9-20	1100	1.95
10-26	3500	1.22
11-30	1900	0
12-20	940	1.46
1973		
1-17	2200	0.59
2-15	1300	0.95
3-14	1300	0.95
4-25	2500	1.59
5-11	2400	1.57
6-12	2000	2.10
7-18	940	1.46
8-19	1400	1.75
9-19	3900	1.62

15. BEAR CREEK NEAR MARCELLINE

Two population pulses occurred in 1972. On June 15 (3300 cts/ml) the major types were *Navicula* (48 percent) and *Cyclotella* (24 percent); on December 20 (3300 cts/ml) the population consisted mainly of *Ulothrix, Melosira,* and *Navicula.*

In 1973 the spring maximum occurred on May 16 (3000 cts/ml) and consisted principally of *Ulothrix* and *Euglena.* The green alga *Chlorella* (53 percent) dominated during a pulse on September 13.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	12	ND-3300	790	9.37	0-2.03	1.26	0.70	16.7	50.0	33.3	
10/72-9/73	12	940-3300	1700	1.59	0.86-1.83	1.44	0.36		66.7	33.3	
2-year	24		1100	5.12		1.35	0.55	8.3	58.4	33.3	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-5	1900	1.00
11-8	940	1.46
12-9	1700	1.91
1972		
1-6	ND	
2-16	160	0
3-29	790	0.72
4-18	1300	1.55
5-10	1700	1.97
6-15	3300	2.03
7-18	2000	1.34
8-22	3000	1.63
9-27	2200	1.56
10-26	1100	0.86
11-22	940	1.00
12-20	3300	1.69
1973		
1-10	1100	1.45
2-14	1700	1.82
3-14	940	1.25
4-11	1600	0.92
5-16	3000	1.83
6-7	1400	1.66
7-17	2500	1.80
8-16	1900	1.33
9-13	3000	1.68

16. NORTH FORK VERMILION RIVER NEAR BISMARCK

The stream is not a productive one. There were no significant population pulses during 1972. The only green alga detected in significant numbers was *Actinastrum;* diatoms were the main genera.

During 1973 there was a maximum winter pulse in February (2200 cts/ml) consisting of diatoms. In April the only algal type detected was *Euglena.* Two other maxima occurred, during the summer (July) and autumn (September). On July 13 *Cyclotella* and *Navicula* were the only algae detected in a density of 2800 cts/ml. Diatoms were not detected in the August sample, but on September 10 *Navicula* and *Cyclotella* made up over 76 percent of the 3300 cts/ml.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	11	470-2500	1200	1.78	0.92-2.13	1.58	0.45	18.2	63.6	18.2	
10/72-9/73	10	310-3300	1500	1.91	0-2.12	1.26	0.59	10.0	60.0	30.0	
2-year	21		1300	1.84		1.43	0.53	14.3	61.9	23.8	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-4	470	0.92
11-1	2500	1.50
12-1	1700	1.24
1972		
1-4	630	1.50
2-16	470	0.92
3-24	1400	1.98
5-8	1400	2.11
6-7	1700	1.94
7-10	1100	2.13
8-4	1100	1.84
9-6	2000	1.30
10-5	1100	1.66
11-20	1600	1.30
12-5	1300	1.00
1973		
1-12	1300	1.41
2-7	2200	2.12
3-5	1400	0.99
4-7	310	0
7-13	2800	0.85
8-13	1700	1.62
9-10	3300	1.70

17. VERMILION RIVER NEAR DANVILLE

Melosira and *Cyclotella* were the major genera in a population of 2500 cts/ml that occurred on November 2, 1971. In 1972 the spring maximum occurred on April 11 at which time a density of 4700 cts/ml was about equally divided between *Ulothrix* and the diatoms *Cyclotella* and *Navicula.* In November the diatom *Tabellaria* accounted for 84 percent of the density.

During 1973 a spring maximum consisting of the diatoms *Navicula* and *Nitzschia* along with the green alga *Scenedesmus* made up most of the density of 2700 cts/ml that occurred on April 17. A summer pulse of 2800 cts/ml occurred on July 13. *Chlorella* and *Cyclotella* were predominant.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	12	630-4700	1700	1.67	1.04-2.29	1.61	0.33		58.3	41.7	
10/72-9/73	12	ND-2800	790	9.47	0-2.04	1.16	0.66	16.7	41.7	41.7	
2-year	24		1200	5.17		1.40	0.55	8.3	50.0	41.7	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-5	1700	1.57
11-2	2500	1.27
12-7	1900	1.04
1972		
1-6	1300	1.81
2-17	630	1.50
3-22	2000	1.57
4-11	4700	1.83
5-8	1300	1.91
6-8	1600	1.72
7-10	2000	1.53
8-8	2400	2.29
9-11	940	1.25
10-10	630	1.50
11-20	1900	0.82
12-1	1400	1.53
1973		
1-12	2000	0.77
2-7	ND	
3-5	160	0
4-17	2700	1.90
5-16	1900	1.46
6-8	2400	2.04
7-13	2800	1.75
8-13	2200	0.59
9-10	1400	0.50

18. SANGAMON RIVER AT MAHOMET

In 1972 the spring maximum (2200 cts/ml) was made up of *Cyclotella* and *Stephanodiscus* and occurred on April 11. The summer maximum on July 7 consisted principally of *Navicula* and *Ulotbrix.*

The algal densities during the winter and spring of 1973 were low and a significant pulse did not occur until July. The diatom *Cyclotella* was the major genus of the population at that time. The high densities persisted in August at which time *Navicula* made up 78 percent of the population.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	12	310-3500	1200	2.34	0-2.26	1.32	0.60	25.0	33.3	41.7	
10/72-9/73	12	630-3300	1100	1.74	0-1.90	1.10	0.48	0	83.3	16.7	
2-year	24		1200	2.02		1.21	0.55	12.5	58.3	29.2	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	1100	1.38
11-3	1300	1.50
12-6	1900	1.78
1972		
1-7	310	1.00
2-14	310	1.00
3-23	310	0
4-11	2200	0.94
5-9	1600	1.36
6-7	2000	2.26
7-7	3500	1.55
8-2	2000	2.10
9-7	2000	0.99
10-6	630	1.50
11-21	630	0.81
12-8	790	0.72
1973		
1-8	790	1.37
2-5	790	0
3-6	790	1.37
4-11	1100	0.99
5-15	1100	1.15
6-4	1400	1.45
7-12	3300	0.96
8-8	2800	0.94
913	1600	1.90

19. SALT CREEK NEAR ROWELL

In November and December of 1971 diatom pulses produced densities of 3300 cts/ml and 2700 cts/ml, respectively. They consisted mainly of *Navicula* and *Cyclotella.* The occurrence of green algae was spotty during 1972 and *Euglena* counts were generally limited to May, June, and July. A summer maximum occurred on June 5 (2800 cts/ml) and was made up of *Euglena, Navicula,* and the green algae *Scenedesmus, Pediastrum,* and *Ankistrodesmus.*

During 1973 the only months of significant productivity were April and May. In April, at a density of about 3600 cts/ml a green alga *Actinastrum* was the prominent species. In May a density of 4400 cts/ml occurred consisting mainly of *Cyclotella.* During the months of June through September the only algae detected were diatoms.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	12	310-3300	1300	2.20	0-2.15	1.45	0.56	16.7	50.0	33.3	
10/72-9/73	12	ND-4400	780	8.86	0.72-1.91	1.19	0.50	16.7	66.7	16.7	
2-year	24		1000	5.07		1.32	0.53	16.7	58.3	25.0	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-14	630	1.50
11-4	3300	1.46
12-2	2700	1.28
1972		
1-4	310	0
2-14	630	1.50
3-21	1300	1.91
4-13	1900	1.46
5-4	1100	1.66
6-5	2800	2.15
7-5	2500	1.70
8-3	1900	1.90
9-5	470	0.92
10-2	1100	1.38
11-6	1400	1.53
12-15	1100	0.86
1973		
1-10	470	0.92
2-8	1900	1.56
3-1	ND	
4-3	3600	1.91
5-1	4400	1.35
6-2	1400	1.35
7-6	1600	1.36
8-15	1400	1.39
9-12	790	0.72

20. SALT CREEK NEAR GREENVIEW

With the exception of *Ulothrix* blooms in October and November of 1972, practically all of the algal types detected were diatoms during the 2-year study. During the maxima of June, July, and August diatoms represented 96, 80, and 95 percent, respectively, of the population. The principal diatoms during this 3-month period were *Cyclotella, Melosira,* and *Navicula.*

In 1973 *Cyclotella* and *Navicula* generally prevailed. A spring maximum of 2500 cts/ml occurred on April 3. On August 21 a maximum density of about 3800 cts/ml occurred consisting mainly of *Cyclotella* and *Asterionella.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	11	790-3900	2000	1.67	0.50-2.15	1.49	0.48		45.5	54.5	
10/72-9/73	11	1100-3800	1800	1.52	0.44-1.75	1.21	0.39		63.6	36.4	
2-year	22		1900	1.59		1.35	0.45		54.5	45.5	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	3100	1.79
11-8	2400	1.56
12-1	1400	1.66
1972		
1-11	1400	0.50
2-14	790	0.97
4-5	1600	1.96
5-1	2000	1.49
6-7	3500	2.15
7-12	3900	1.60
8-7	3300	1.69
9-14	1300	1.00
10-4	2800	1.22
11-13	1700	0.44
12-8	1400	0.99
1973		
1-3	1700	1.28
2-12	1100	0.59
3-1	1100	1.56
4-3	2500	1.75
5-9	2400	1.38
7-2	1300	1.41
8-21	3800	1.39
9-13	1300	1.30

21. SOUTH FORK SANGAMON RIVER NEAR ROCHESTER

Diatoms were the prevalent type of algae and *Scenedesmus* and *Actinastrum* were the predominant green types. There were no significant pulses during 1972. *Euglena* was detected only during June, July, and August 1972.

In 1973 a spring maximum of about 4900 cts/ml occurred on May 1 and about 97 percent of the population were diatoms. The principal ones were *Cyclotella* and *Navicula*. *Cyclotella* persisted in the June 6 collection making up about 60 percent of the total.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	11	310-2400	1400	1.77	0-1.97	1.31	0.63	9.1	72.7	18.2	
10/72-9/73	12	310-4900	1400	2.07	0-2.17	1.25	0.58	8.3	66.7	25.0	
2-year	23		1400	1.90		1.28	0.59	8.7	69.6	21.7	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-8	2000	1.83
11-11	2400	1.29
12-12	1700	1.87
1972		
1-12	790	0.72
2-16	310	0
4-4	1600	1.97
5-2	1600	1.90
6-7	1900	1.78
7-12	1900	0.92
8-11	1600	1.16
9-13	1300	1.00
10-11	940	0.65
11-10	310	0
12-7	1100	1.38
1973		
1-10	630	1.50
2-7	1300	0.95
3-2	1600	0.97
4-2	2400	1.23
5-1	4900	1.53
6-6	3100	1.35
7-2	1900	2.06
8-2	940	1.25
9-12	1600	2.17

22. SANGAMON RIVER NEAR OAKFORD

The stream site was not a particularly productive one. During the period October 1971 to April 1972 only diatoms were detected. They were principally *Cyclotella* and *Navicula.* On April 4, 1972, *Euglena* represented 64 percent of the population. The major pulses occurred during the period June through August and the diatoms *Navicula* and *Synedra* were dominant during June, *Cyclotella* during July, and *Melosira* and *Tabellaria* during August.

In 1973 diatoms continued to dominate and only the green algae *Scenedesmus* and *Ulothrix* provided some diversity. There were no singular pulses until June 2 when *Melosira* and *Ulothrix* were dominant.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density *Range*	M_g	σ_g	Diversity index *Range*	*Avg*	σ	Algal density occurrence *(% of time)* *<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	11	630-2800	1600	1.57	0.94-2.11	1.59	0.35	9.1	54.5	36.4	
10/72-9/73	12	160-3300	1200	2.13	0-1.79	1.28	0.47	8.3	75.0	16.7	
2-year	23		1400	1.89		1.42	0.43	8.7	65.2	26.1	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	1400	1.66
11-8	1900	1.28
12-1	2200	0.94
1972		
1-11	630	1.50
2-14	1100	1.38
4-4	1700	1.49
5-1	1300	1.91
6-14	2500	2.11
7-13	2400	1.89
8-7	2800	1.91
9-14	1100	1.38
10-4	790	1.37
11-15	1600	1.36
12-7	1400	0.99
1973		
1-3	790	1.37
2-12	160	0
3-1	1600	1.77
4-3	1900	1.46
5-9	1100	1.45
6-2	3300	1.46
7-3	940	1.00
8-31	2200	1.79
9-13	1300	1.30

23. McKEE CREEK NEAR VERSAILLES

Three significant population peaks occurred during 1972. In June and July densities of 2500 cts/ml were observed. The major contributors in June were *Navicula* and *Nitzschia;* in July they were *Cyclotella, Melosira,* and *Navicula.* On October 24 *Ulotbrix* made up about 75 percent of the 3100 cts/ml detected.

In 1973 pulses occurred on April 9 and August 14. The April sample consisted almost wholly of *Cyclotella;* the August sample was about 59 percent *Navicula* and 30 percent *Cblorella.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	*M*	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	12	470-2500	1300	1.73	0-2.13	1.34	0.69	8.3	58.3	33.3	
10/72-9/73	11	630-3100	1700	1.69	0-1.57	0.98	0.50	0.0	45.5	54.5	
2-year	23		1500	1.72		1.17	0.62	4.3	52.2	43.5	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-6	790	0.97
11-11	1600	0.97
12-7	1700	1.50
1972		
1-5	630	0.81
2-15	470	0
3-27	1100	1.84
4-18	2000	1.83
5-8	1600	1.85
6-13	2500	2.13
7-17	2500	1.92
8-21	1100	1.84
9-25	2200	0.37
10-24	3100	0.99
11-20	1100	0.99
12-18	1100	1.45
1973		
1-8	1100	0.99
2-12	2200	1.29
3-12	2200	1.20
4-9	3100	0.29
5-22	1600	1.57
7-19	2400	0.57
8-14	2700	1.45
9-12	630	0

24. LITTLE VERMILION RIVER NEAR VERMILION GROVE

There were no green or blue-green algae in any samples collected from October 1971 through June 1972 except a single instance of a *Scenedesmus* on March 22. Most of the algae were *Cyclotella.* A *Melosira* bloom in combination with *Euglena* was the cause for a peak during July. Another peak during September developed principally from the presence of *Ulothrix* and *Cyclotella.*

In 1973 the spring maximum occurred in the April sample and *Cyclotella* and *Ulothrix* were the major genera. There were no significant peaks during the rest of the year and the population was about equally divided between greens and diatoms.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	10	630-3500	1700	1.81	0-1.84	1.32	0.54	0.0	50.0	50.0	
10/72-9/73	11	ND-4100	450	21.15	0.72-2.02	1.24	0.42	18.2	54.5	18.2	
2-year	21		850	9.96		1.28	0.48	9.5	52.4	33.3	

• ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-5	2000	1.55
11-1	2200	1.84
12-1	1900	1.46
1972		
1-4	630	0
2-16	630	0.81
3-22	2200	1.61
5-7	1400	1.35
7-10	3300	1.38
8-4	1900	1.73
9-6	3500	1.50
10-3	790	0.72
11-22	1100	0.86
12-1	1300	0.95
1973		
1-15	ND	
2-9	ND	
3-9	2000	1.14
4-16	4100	1.54
5-15	2700	2.02
7-18	1900	1.62
8-14	1900	1.28
9-10	1700	0.99

25. EMBARRAS RIVER NEAR CAMARGO

Comparatively, the stream site is a very productive one. With two exceptions, algal densities of 800 cts/ml were equaled or exceeded during every sample collection. Although diatoms were the dominant algal type, green algae were present in significant numbers during spring and summer. The major green genera included *Scenedesmus, Ulothrix,* and *Actinastrum.*

The major peak during 1972 occurred on August 16 (4700 cts/ml). It consisted mainly of *Cyclotella, Ulothrix,* and *Scenedesmus.* The high counts persisted in the September sample (4400 cts/ml), but were made up mostly of *Navicula* and *Ulothrix.*

During 1973 a *Melosira* bloom was detected in the January sample. Algal peaks occurred in April, July, and September. The April population was made up of *Navicula, Surirella,* and *Ulothrix.* In July the greens *Oocystis, Crucigenia,* and *Actinastrum* were in greater numbers than the diatoms, but in September the diatom *Cyclotella* prevailed.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	12	ND-4700	1100	10.71	0.87-2.48	1.55	0.70	8.3	33.3	58.3	
10/72-9/73	12	470-3900	1700	1.96	0-2.23	1.10	0.61	8.3	41.7	50.0	
2-year	24		1400	5.37		1.32	0.68	8.3	37.5	54.2	

• ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-5	2800	2.48
11-10	2000	2.13
12-1	1300	1.30
1972		
1-12	ND	
2-9	2500	0.87
4-4	1300	1.55
5-15	1100	1.15
6-1	2700	2.12
7-13	2000	1.57
8-16	4700	1.88
9-8	4400	2.00
10-6	790	0.72
11-3	470	0
12-14	940	0.65
1973		
1-9	2000	0.39
2-6	1100	0.99
3-19	3000	1.72
4-11	3900	1.43
5-14	1900	1.48
6-6	2500	1.01
7-11	3500	2.23
8-7	1100	1.15
9-11	2800	1.46

26. WEST OKAW RIVER NEAR LOVINGTON

From October 1971 through April 1972, diatoms were the only algae detected except for the single occurrence of *Euglena* in December 1971. An annual maximum for 1972 occurred in July with *Ulothrix* and *Scenedesmus* representing the greens and *Navicula* and *Synedra* making up the diatoms.

In 1973 *Ulothrix* was the sole alga detected in January. Two peaks occurred during the year. In March (2800 cts/ml) and May (3000 cts/ml) the predominant genus was *Cyclotella.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	10	470-2500	1200	1.75	0-1.99	1.28	0.74	20.0	60.0	20.0	
10/72-9/73	9	630-3000	1500	1.80	0-1.52	0.91	0.49	11.2	44.4	44.4	
2-year	19		1300	1.76		1.11	0.65	15.8	52.6	31.6	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-5	470	0
11-4	1600	1.76
12-1	1400	1.35
1972		
1-7	470	0
2-24	1.300	1.06
5-16	1300	1.75
6-9	2200	1.99
7-17	2500	1.88
8-23	1400	1.75
9-19	1300	1.30
10-12	630	1.50
11-6	940	0.53
12-18	2200	0.74
1973		
1-11	2500	0
2-5	1100	1.15
3-19	2800	0.76
5-14	3000	1.23
7-5	1600	1.52
9-10	790	0.72

27. KASKASKIA RIVER AT COOKS MILLS

The maximum density at this site during the study period occurred on December 8, 1971, when a bloom of the diatom *Fragilaria* made up 72 percent of the 5000 cts/ml. *Cyclotella* and *Navicula* were generally the dominant species. During 1972 peaks persisted during June and July. *Navicula* was most numerous in June and *Cyclotella* prevailed in July. In December another pulse occurred consisting mainly of the diatom *Melosira.*

In 1973 there were no significant pulses until August when *Cyclotella* and *Navicula* accounted for most of the 2800 cts/ml. Although greens were detected, their diversity was limited and *Scenedesmus* and *Actinastrum* prevailed in April and May, respectively.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*000*	*500 to 2000*	*2001 to 5000*	*>5000*
10/71-9/72	11	630-5000	1800	2.09	1.12-2.46	1.66	0.41	0.0	54.5	36.4	
10/72-9/73	12	470-4400	1200	1.94	0.50-1.74	1.22	0.41	16.7	58.3	25.0	
2-year	23		1500	2.03		1.43	0.46	8.7	56.5	30.4	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-6	4100	1.45
11-5	2500	2.13
12-8	5000	1.12
1972		
1-7	790	1.37
2-23	630	1.50
4-13	940	1.46
5-16	1900	1.95
6-5	3100	2.02
7-17	3300	1.41
8-21	1900	2.46
9-13	790	1.37
10-17	790	0.97
11-8	1100	0.59
12-6	4400	1.58
1973		
1-11	470	0.92
2-12	470	1.59
3-5	940	1.46
4-4	1600	1.16
5-4	2000	1.74
6-14	1100	1.15
7-5	1100	1.45
8-14	2800	1.57
9-10	1400	0.50

28. KASKASKIA RIVER AT SHELBYVILLE

The diatoms *Cyclotella, Navicula,* and *Nitzschia* were the most numerous algae at the site. On January 6, 1972, a population peak of 3000 cts/ml developed solely from *Melosira* and *Cyclotella.* The spring maximum of 2800 cts/ml occurred in May and was made up mainly of *Fragilaria.* A summer pulse in August of 3000 cts/ml was caused mainly by *Cyclotella.* Green algae were more numerous during summer months, but there were no significant densities of them.

In January 1973 the diatoms *Cyclotella, Navicula,* and *Surirella* were solely responsible for 2500 cts/ml. Another pulse consisting mainly of *Navicula* occurred in March. *Cyclotella* and *Diatoma* prevailed in the population densities that occurred on July 9.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
10/71-9/72	11	310-3000	1400	2.27	0-2.26	1.42	0.62	27.3	27.3	45.4	
10/72-9/73	12	ND-2700	890	8.96	0.88-1.93	1.35	0.53	16.7	41.7	41.7	
2-year	23		1100	5.27		1.38	0.56	21.7	34.8	43.5	

• ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
10-7	1400	1.66
11-5	2000	1.46
12-3	470	0.92
1972		
1-6	3000	0.98
2-21	310	0
4-13	1400	1.53
5-11	2800	1.79
6-5	1900	2.12
7-13	2400	2.26
8-21	3000	1.30
9-20	470	1.59
10-13	940	1.59
11-7	470	0.92
12-11	1600	0.88
1973		
1-15	2500	1.48
2-13	ND	
3-15	2500	1.59
4-18	2000	1.83
5-15	1900	1.46
6-20	1700	1.32
7-9	2700	1.93
8-21	1600	1.72
9-13	2000	1.46

29. SHOAL CREEK NEAR BREESE

Cyclotella showed up in most of the samples during 1971 and 1972, but appeared only once in 1973. *Euglena* and *Melosira* were responsible for the 1972 summer maximum of 5200 cts/ml on July 20. *Ulothrix* dominated the autumn peak on October 5.

Algal densities during 1973 ranged from 1300 to 2000 cts/ml during January through August. There were no significant pulses during this period. A relatively high 2800 cts/ml occurred in September consisting mainly of *Asterionella, Fragilaria,* and *Nitzschia.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	10	310-5200	1600	2.34	0-2.20	1.34	0.64	20.0	20.0	50.0	10.0
10/72-9/73	12	1100-3100	1800	1.35	0.78-1.86	1.40	0.35	0.0	66.7	33.3	0.0
2-year	22		1700	1.82		1.37	0.49	9.1	45.5	40.9	4.5

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-4	2500	1.98
12-7	1400	0.99
1972		
1-21	470	0.92
2-18	310	0
4-11	2500	2.20
5-25	1300	1.75
6-6	2800	1.75
7-20	5200	1.35
8-14	2200	1.44
9-12	2000	0.90
10-5	3100	1.60
11-10	1100	1.15
12-5	1600	0.88
1973		
1-8	2000	0.78
2-5	1900	1.86
3-8	1900	1.65
4-6	1300	1.00
5-11	1600	1.57
6-18	2000	1.61
7-13	1600	1.52
8-10	1700	1.68
9-18	2800	1.50

30. LOOP CREEK NEAR BELLEVILLE

Navicula was found in 12 of the 17 samples collected. This alga developed to its peak density of 2500 cts/ml in the August 1972 sample, which had the summer's maximum total algal density of 3100 cts/ml.

Only 5 samples were collected in 1973. *Ulothrix* and *Cyclotella* were abundant in the June sample. A *Crucigenia* pulse occurred on September 14.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	10	310-3100	1700	1.88	0-2.46	1.49	0.73	10.0	40.0	50.0	
10/72-9/73	7	470-4900	1600	2.03	0.92-1.81	1.32	0.31	14.3	57.1	28.6	
2-year	17		1600	1.90		1.42	0.58	11.8	47.0	41.2	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-12	1900	2.06
12-9	310	0
1972		
1-11	2000	1.14
2-23	1900	2.46
3-29	2200	2.18
5-24	2000	1.53
6-6	.1400	1.89
7-20	2400	1.60
8-11	3100	1.02
9-14	1900	0.98
10-6	1100	1.15
11-8	1600	1.36
1973		
2-8	470	0.92
4-12	1400	1.66
6-7	4900	1.17
8-9	2200	1.81
9-14	1900	1.19

31. KASKASKIA RIVER AT NEW ATHENS

Productivity was generally stable during November and December 1971 and the early months of 1972. During June, July, and August, however, algal densities were 7100, 3100, and 6400 cts/ml, respectively. The June maximum consisted solely of diatoms, principally *Cyclotella* and *Navicula.* In July *Navicula* and *Scenedesmus* prevailed, while in August pulses of *Ulothrix* coupled with *Navicula* were the dominant algae. Algal densities did not exceed 1400 cts/ml during the remainder of the year. In 1973 there was a single pulse of *Melosira* in January; thereafter, *Cyclotella* and *Navicula* were the principal diatoms. The annual maximum of 5500 cts/ml occurred in April and consisted mostly of *Cyclotella.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	10	1400-7100	2600	1.75	0.72-2.31	1.51	0.51		30.0	50.0	20.0
10/72-9/73	12	630-5500	1900	1.92	0.54-1.79	1.24	0.42		41.7	50.0	8.3
2-year	22		2200	1.86		1.36	0.47		36.4	50.0	13.6

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-19	1600	1.49
12-10	2000	1.83
1972		
1-26	2400	2.31
3-8	1600	0.72
4-12	2400	1.89
5-24	2500	1.92
6-6	7100	0.91
7-10	3100	1.68
8-11	6400	1.00
9-11	1400	1.39
10-6	940	0.92
11-29	790	1.52
12-11	630	0.81
1973		
1-9	3300	1.52
2-2	1300	0.54
3-7	3300	0.82
4-4	5500	1.13
5-1	2200	1.79
6-18	2700	0.98
7-10	2200	1.58
8-16	1700	1.50
9-11	2700	1.71

32. LITTLE WABASH RIVER NEAR EFFINGHAM

Sample collection was limited to only 8 samples during 1972. Two pulses were detected during the year. *Navicula* was primarily responsible for 2800 cts/ml in July and *Cyclotella* accounted for most of the population in November.

In 1973 two peaks also occurred. *Cyclotella, Synedra,* and the green alga *Coelastrum* were prevalent during the March pulse. On September 11, *Melosira* and *Navicula* were prevalent. The occurrence of green algae was generally sporadic as was the case with flagellates.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range *	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
12/71-7/72	7	ND-2800	500	16.99	0-2.50	1.23	1.04	28.6	42.8	28.6	
11/72-9/73	10	630-4900	1700	1.85	0-2.06	1.19	0.59	0	60.0	40.0	
2-year	17		1100	6.72		1.20	0.77	11.8	52.9	35.3	

• ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
12-8	310	0
1972		
1-12	1400	1.66
2-29	ND	
4-4	2400	2.50
5-16	1900	1.96
6-5	1400	1.98
7-7	2800	0.50
11-3	3000	0.59
12-5	1400	0.92
1973		
1-9	1100	1.56
3-7	3500	1.54
4-4	2200	0.95
5-9	1400	2.06
6-6	1100	1.38
7-11	1700	1.50
8-7	630	0
9-11	4900	1.36

33. LITTLE WABASH RIVER BELOW CLAY CITY

Algal densities at this site were relatively low. There were no significant peaks during 1972 and the diatom *Navicula* generally was the dominant genus. On two occasions during 1972 green algae prevailed in samples. On August 8 *Scenedesmus* was most abundant, and on November 10 *Ulothrix* prevailed.

During 1973 diatoms were dominant in all samples except one. Generally, *Navicula* or *Cyclotella* was the most prevalent, but in February *Melosira* made up about 88 percent of the 2500 cts/ml. The sample in which diatoms were not the major algae was collected in July when the green alga *Ankistrodesmus* was dominant.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	*a*	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	11	940-2400	1600	1.30	1.06-1.76	1.45	0.22	0	72.7	27.3	
10/72-9/73	12	160-3000	1200	2.36	0-2.27	0.97	0.73	8.3	50.0	41.7	
2-year	23		1400	1.91		1.20	0.59	4.3	60.9	34.8	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-15	2000	1.76
12-10	2400	1.40
1972		
1-3	1300	1.06
2-16	940	1.46
3-22	1600	1.36
4-25	2000	1.15
5-11	1600	1.76
6-6	1900	1.50
7-11	1400	1.35
8-8	1400	1.66
9-14	1700	1.49
10-5	1100	0.99
11-10	630	0
12-14	940	1.79
1973		
1-15	160	0
2-22	2500	0.67
3-19	2500	1.41
4-13	1700	1.35
5-15	2500	1.27
6-11	2400	1.24
7-20	940	0.65
8-9	630	0
9-18	3000	2.27

34. RACCOON CREEK NEAR RINARD

The green alga *Ulotbrix* was the most abundant alga at this location. Pulses of this genus occurred on December 10, 1971 (2200 cts/ml, 70 percent of the total population), on August 8, 1972 (2500 cts/ml, 80 percent of the total population), and on September 18, 1973 (2500 cts/ml, 52 percent of the population). Although *Navicula* was observed in 6 of the 14 samples, its density never exceeded 630 cts/ml.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
12/71-9/72	8	160-3100	1100	2.93	0-1.91	1.25	0.61	25.0	37.5	37.5	
10/72-9/73	6	790-4900	1500	2.04	0.59-1.92	1.38	0.59	0	66.7	33.3	
2-year	14		1300	2.52		1.30	0.58	14.3	50.0	35.7	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
12-10	3100	1.16
1972		
1-13	310	1.00
2-16	160	0
3-22	1300	1.91
5-11	1300	1.75
6-6	2200	1.69
7-11	940	1.46
8-8	3100	1.02
1973		
1-15	1100	0.59
2-22	1700	1.87
4-13	790	0.71
7-20	790	1.92
8-9	2400	1.78
9-18	4900	1.40

35. ELM RIVER AT ENTERPRISE

Only 10 samples were collected during the 24-month period and the data are somewhat meager. An unusual occurrence developed on July 11, 1972, when a blue-green algal bloom made up mostly of *Aphanizomenon* appeared along with *Ulotbrix* and *Melosira* for a total population of 6400 cts/ml.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	σ	Algal density occurrence (% of time) <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	8	1100-6400	1700	1.77	0.97-1.94	1.50	0.34		75.0	12.5	12.5
10/72-9/73	2	1300-1700			1.06-1.69	1.37	0.45		100	0	0
2-year	10		1700	1.77		1.48	0.34		80.0	10.0	10.0

Data Summary

Date	Algal density (cts/ml)	Diversity index
1971		
11-15	2000	1.30
1972		
1-13	1300	1.56
2-16	1600	0.97
3-22	1100	1.56
5-11	1600	1.69
7-11	6400	1.94
8-8	1700	1.87
917	1100	1.15
1973		
2-27	1700	1.69
8-9	1300	1.06

36. SKILLET FORK AT WAYNE CITY

The 1972 maxima were poorly marked and diatoms, as usual, generally prevailed. *Scenedesmus* was the prominent green alga. The highest population detected for total algae was 2400 cts/ml on August 11.

After the winter low counts, a significant *Cyclotella* bloom (2400 cts/ml) and an *Ulothrix* bloom (2200 cts/ml) occurred on March 6, 1973. A summer maximum of 3500 cts/ml consisting mostly of *Navicula* occurred on June 20. The highest algal count for the 24-month period occurred on September 28, 1973. It was composed mainly of *Scenedesmus* (2400 cts/ml) and *Asterionella* (1400 cts/ml).

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	11	470-2400	1300	1.71	0.37-1.85	1.31	0.47	9.1	63.6	27.3	
10/72-9/73	12	160-4900	1600	2.53	0-1.97	1.15	0.53	8.3	50.0	41.7	
2-year	23		1400	2.13		1.23	0.50	8.7	56.5	34.8	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-12	2200	0.37
12-7	2400	1.05
1972		
1-11	940	1.25
2-22	630	0.81
3-16	1100	1.84
4-14	1700	1.57
5-18	1600	1.85
6-6	470	0.92
7-7	1300	1.56
8-11	2400	1.52
9-12	1700	1.68
10-5	790	0.72
11-15	940	0.65
12-9	1700	0.99
1973		
1-5	1700	1.32
2-1	160	0
3-6	4700	1.18
4-5	2000	1.35
5-8	1300	1.41
6-20	3500	1.09
7-5	1400	1.35
8-7	2400	1.97
9-28	4900	1.82

37. LITTLE WABASH RIVER AT CARMI

This is a typical diatom-dominating site. However, on 3 separate occasions green algae were a significant portion of the total algal population. On August 7, 1972, *Scenedesmus* constituted a major portion of the 2700 cts/ml total. On April 12, 1973, *Ulothrix* represented about 41 percent of the 4200 cts/ml. This was the annual maximum for 1973. On September 13 the green alga *Pediastrum,* an alga occurring infrequently in Illinois streams, bloomed and represented about 67 percent of the 2400 cts/ml detected.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	11	790-2800	1700	1.46	0.97-1.85	1.58	0.27	0	63.6	36.4	
10/72-9/73	12	ND-4200	810	8.88	0-1.82	1.12	0.60	16.7	50.0	33.3	
2-year	23		1100	5.00		1.34	0.52	8.7	56.5	34.8	

• ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-10	790	0.97
12-1	2200	1.48
1972		
1-6	1600	1.85
2-14	1900	1.73
3-28	1700	1.68
4-20	1400	1.75
5-26	2200	1.78
6-6	2800	1.22
7-17	1300	1.56
8-7	2700	1.57
9-15	1300	1.75
10-6	940	0
11-9	470	0.92
12-7	1100	0.99
1973		
1-12	ND	
2-8	1100	1.45
3-21	2200	1.48
4-12	4200	1.82
5-16	1600	0.97
6-26	2500	1.63
7-18	1400	1.75
8-10	1300	1.31
9-13	2400	1.16

38. CONTRARY CREEK NEAR BROUGHTON

Only 14 samples were collected during the study period. The annual maximum for 1972 occurred on August 15 and was composed mainly of *Navicula, Melosira,* and *Scenedesmus.* In 1973 the maximum population occurred on April 19. Its principal constituents were *Navicula* and *Actinastrum.*

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	8	940-2500	1500	1.41	0.92-1.77	1.39	0.32	12.5	62.5	25.0	
10/72-9/73	6	160-3000	1200	2.86	0-1.79	1.18	0.65	16.7	50.0	33.3	
2-year	14		1300	2.04		1.30	0.48	14.3	57.1	28.6	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-12	1700	1.49
1972		
1-7	1400	0.99
2-16	1700	1.32
4-3	1400	1.75
6-6	940	1.25
7-7	2000	1.58
8-15	2500	1.77
9-2	940	0.92
1973		
2-12	940	1.25
4-19	3000	1.37
6-7	1600	1.69
7-9	160	0
8-7	2200	1.79
9-12	1600	0.97

39. SOUTH FORK SALINE RIVER NEAR CARRIER MILLS

Two high population peaks occurred in 1972 and in each case green algae were not present. The density on June 5 (2800 cts/ml) was made up mainly of *Navicula* and *Melosira.* On July 5 the same diatoms were prevalent.

In 1973 the spring maximum on April 20 was composed mainly of the green algae *Scenedesmus* and *Actinastrum.* The summer maximum on July 24 consisted almost solely of a *Ulotbrix* bloom and *Scenedesmus.* In addition the flagellate *Chlamydomonas* was detected.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range *	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
11/71-9/72	10	ND-4400	330	24.11	0-1.85	1.07	0.85	30.0	40.0	30.0	
10/72-9/73	11	790-3100	1600	1.67	0.72-1.71	1.22	0.33	0	63.6	36.4	
2-year	21		750	10.02		1.11	0.66	14.3	52.4	33.3	

* ND = Alga not detected

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-12	160	0
12-2	ND	
1972		
1-13	ND	
3-3	1100	1.38
4-14	2000	1.78
5-24	4400	1.85
6-5	2800	1.67
7-5	1600	1.85
8-9	1400	1.75
9-15	1700	0.44
10-3	790	1.37
11-1	1600	1.30
12-6	1600	1.30
1973		
1-9	790	0.72
2-12	790	0.72
3-12	2500	1.50
4-20	2400	1.71
6-5	1900	0.82
7-24	3100	1.18
8-7	1300	1.30
9-12	2500	1.50

40. BIG MUDDY RIVER AT MURPHYSBORO

The site is quite productive and, from the standpoint of diatom genera, more diversified than other collection sites. In addition to the prevalent algae *Cyclotella* and *Navicula,* occasional blooms of *Nitzschia, Melosira,* and *Fragilaria* were detected. The predominant green algae were *Scenedesmus, Ulothrix,* and *Ankistrodesmus.*

The annual maximum for 1972 occurred on August 7 and was composed mostly of *Navicula.* About 30 days earlier the predominant genus was *Cyclotella.* In 1973 the spring maximum was detected on March 16 (3600 cts/ml) and *Ulothrix* was the prevailing alga followed by *Scenedesmus* and *Euglena.* There were no diatoms in the sample. Another pulse occurred in May and the diatoms *Nitzschia* and *Cyclotella* were the major contributors.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density Range	M_g	σ_g	Diversity index Range	Avg	a	Algal density occurrence *(% of time)* <500	500 to 2000	2001 to 5000	>5000
11/71-9/72	10	940-4600	2300	1.70	1.14-2.22	1.64	0.37		30.0	70.0	
10/72-9/73	12	790-3600	1700	1.67	0.72-2.05	1.35	0.42		66.7	33.3	
2-year	22		1900	1.71		1.48	0.42		50.0	50.0	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
11-11	3000	1.71
12-9	2200	1.92
1972		
1-10	1100	1.38
3-7	940	1.25
4-20	3000	1.75
5-24	2000	2.13
6-5	2800	2.22
7-5	4200	1.51
8-7	4600	1.14
9-8	1600	1.36
10-2	2700	1.22
11-13	1900	1.04
12-20	1300	1.30
1973		
1-20	790	0.72
2.14	1300	1.81
3-16	3600	1.35
4-3	2400	1.24
5-21	3500	1.69
6-15	1600	2.05
7-9	790	0.97
8-15	1100	1.84
9-10	1700	0.87

41. MAX CREEK NEAR SIMPSON

Only 10 samples were collected at this site during the study period. A maximum pulse occurred on July 6, 1972, consisting mainly of *Melosira, Ulothrix,* and *Euglena.* In 1973 the maximum count occurred in the May 16 sample when *Asterionella* and *Ulothrix* were dominant. *Ulothrix* was the only green alga identified in 1973, and, as usual, *Cyclotella* and *Navicula* were the major diatoms observed during the study period.

Statistical Summary of Algal Data

Study period	Number of samples	Algal density			Diversity index			Algal density occurrence *(% of time)*			
		Range	M_g	σ_g	*Range*	*Avg*	σ	*<500*	*500 to 2000*	*2001 to 5000*	*>5000*
12/71-9/72	5	1100-4700	1900	1.87	0.97-1.74	1.36	0.31		60.0	40.0	
10/72-9/73	5	630-4700	2000	2.15	0.37-2.06	1.27	0.70		40.0	60.0	
2-year	10		2000	1.94		1.32	0.51		50.0	50.0	

Data Summary

Date	Algal density *(cts/ml)*	Diversity index
1971		
12-6	1600	0.97
1972		
1-14	1100	1.38
3-3	1100	1.15
6-5	2700	1.57
7-6	4700	1.74
11-8	630	0.81
1973		
2-6	1600	1.30
5-16	4700	2.06
6-6	2700	1.81
7-15	2800	0.37

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