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Distribution of Phytoplankton in Kansas Lakes

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June 1979

DISTRIBUTION OF PHYTOPLANKTON IN KANSAS LAKES

by

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FOREWORD

Protection of the environment requires effective regulatory actions which are based on sound technical and scientific information. This information must include the quantitative description and linking of pollutant sources, transport mechanisms, interactions, and resulting effects on man and his environment. Because of the complexities involved, assessment of specific pollutants in the environment requires a total systems approach which transcends the media of air, water, and land. The Environmental Monitoring and Support Laboratory-Las Vegas contributes to the formation and enhancement of a sound monitoring data base for exposure assessment through programs designed to:

- develop and optimize systems and strategies for monitoring pollutants and their impact on the environment
- demonstrate new monitoring systems and technologies by applying them to fulfill special monitoring needs of the Agency's operating programs

This report presents the species and abundance of phytoplankton in the 15 lakes sampled by the National Eutrophication Survey in the State of Kansas, along with results from the calculation of several commonly used biological indices of water quality and community structure. These data can be used to biologically characterize the study lakes, and as baseline data for future investigations. This report was written for use by Federal, State, and local governmental agencies concerned with water quality analysis, monitoring, and or regulation. Private industry and individuals similarly involved with the biological aspects of water quality will find the document useful. For further information contact the Water and Land Quality Branch, Monitoring Operations Division.

George B. Morgan
Director
Environmental Monitoring and Support Laboratory
Las Vegas

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INTRODUCTION

The collection and analysis of phytoplankton data were included in the National Eutrophication Survey in an effort to determine relationships between algal characteristics and trophic status of individual lakes.

During spring, summer, and fall of 1974, the Survey sampled 179 lakes in 10 States. Over 700 algal species and varieties were identified and enumerated from the 573 water samples examined.

This report presents the species and abundance of phytoplankton in the 15 lakes sampled in the State of Kansas (Table 1). The Nygaard's Trophic State (Nygaard 1949), Palmer's Organic Pollution (Palmer 1969), and species diversity and abundance indices are also included.

TABLE 1. LAKES SAMPLED IN THE STATE OF KANSAS

STORET No.	Lake Name	County
2001	Cedar Bluff Reservoir	Trego
2002	Council Grove	Morris
2003	Elk City	Montgomery
2004	Fall River Reservoir	Greenwood
2005	John Redmond Reservoir	Coffey
2006	Kanopolis Reservoir	Ellsworth
2007	Marion Reservoir	Marion
2008	Melvern Reservoir	Osage
2009	Milford Reservoir	Clay, Geary, Riley
2010	Norton Reservoir	Norton
2011	Perry Reservoir	Jefferson

(Continued)

TABLE 1. LAKES SAMPLED IN THE STATE OF KANSAS (Continued)

STORET No.	Lake Name	County
2012	Pomona Reservoir	Osage
2013	Toronto Reservoir	Greenwood, Woodson
2014	Tuttle Creek Reservoir	Marshall, Riley, Pottawatomie
2015	Wilson Reservoir	Russell, Lincoln

MATERIALS AND METHODS

LAKE AND SITE SELECTION

Lakes and reservoirs included in the Survey were selected through discussions with State water pollution agency personnel and U.S. Environmental Protection Agency Regional Offices (U.S. Environmental Protection Agency 1975). Screening and selection strongly emphasized lakes with actual or potential accelerated eutrophication problems. As a result, the selection was limited to lakes:

(1) impacted by one or more municipal sewage treatment plant outfalls either directly into the lake or by discharge to an inlet tributary within approximately 40 kilometers of the lake;

(2) 40 hectares or larger in size; and

(3) with a mean hydraulic retention time of at least 30 days.

Specific selection criteria were waived for some lakes of particular State interest.

Sampling sites for a lake were selected based on available information on lake morphometry, potential major sources of nutrient input, and on-site judgment of the field limnologist (U.S. Environmental Protection Agency 1975). Primary sampling sites were chosen to reflect the deepest portion of each major basin in a test lake. Where many basins were present, selection was guided by nutrient source information on hand. At each sampling site, a depth-integrated phytoplankton sample was taken. Depth-integrated samples were uniform mixtures of water from the surface to a depth of 15 feet (4.6 meters) or from the surface to the lower limit of the photic zone representing 1 percent of the incident light, whichever was greater. If the depth at the sampling site was less than 15 feet (4.6 meters), the sample was taken from just off the bottom to the surface. Normally, a lake was sampled three times in 1 year, providing information on spring, summer, and fall conditions.

SAMPLE PREPARATION

To preserve the sample 4 milliliters (ml) of Acid-Lugol's solution (Prescott 1970) were added to each 130-ml sample from each site at the time of collection. The samples were shipped to the Environmental Monitoring and Support Laboratory, Las Vegas, Nevada, where equal volumes from each site

were mixed to form two 130-ml composite samples for a given lake. One composite sample was put into storage and the other was used for the examination.

Prior to examination, the composite samples were concentrated by the settling method. Solids were allowed to settle for at least 24 hours prior to siphoning off the supernate. The volume of the removed supernate and the volume of the remaining concentrate were measured and concentrations determined. A small (8-ml) library subsample of the concentrate was then taken. The remaining concentrate was gently agitated to resuspend the plankton and poured into a capped, graduated test tube. If a preliminary examination of a sample indicated the need for a more concentrated sample, the contents of the test tube were further concentrated by repeating the settling method. Final concentrations varied from 15 to 40 times the original.

Permanent slides were prepared from concentrated samples after analysis was complete. A ring of clear Karo® corn syrup with phenol (a few crystals of phenol were added to each 100 ml of syrup) was placed on a glass slide. A drop of superconcentrate from the bottom of the test tube was placed in the ring. This solution was thoroughly mixed and topped with a coverglass. After the syrup at the edges of the coverglass had hardened, the excess was scraped away and the mount was sealed with clear fingernail polish. Permanent diatom slides were prepared by drying sample material on a coverglass, heating in a muffle furnace at 400° C for 45 minutes, and mounting in Hyrax®. Finally, the mounts were sealed with clear fingernail polish.

Backup samples, library samples, permanent sample slides, and Hyrax®mounted diatom slides are being stored and maintained at the Environmental Monitoring and Support Laboratory-Las Vegas.

EXAMINATION

The phytoplankton samples were examined with the aid of binocular compound microscopes. A preliminary examination was performed to precisely identify and list all forms encountered. The length of this examination varied depending on the complexity of the sample. An attempt was made to find and identify all of the forms present in each sample. Often forms were observed which could not be identified to species or to genus. Abbreviated descriptions were used to keep a record of these forms (e.g., lunate cell, blue-green filament, Navicula #1). Diatom slides were examined using a standard light microscope. If greater resolution was essential to accurately identify the diatoms, a phase-contrast microscope was used.

After the species list was compiled, phytoplankton were enumerated using a Neubauer Counting Chamber with a 40X objective lens and a 10X ocular lens. All forms within each field were counted. The count was continued until a minimum of 100 fields had been viewed, or until the dominant form had been observed a minimum of 100 times.

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QUALITY CONTROL

Project phycologists performed internal quality control intercomparisons regularly on 7 percent of the species identification and counts. Although an individual had primary responsibility for analyzing a sample, taxonomic problems were discussed among the phycologists.

Additional quality control checks were performed on the Survey samples by Dr. G. W. Prescott of the University of Montana at the rate of 5 percent. Quality control checks were made on 75 percent of these samples to verify species identifications while checks were made on the remaining 25 percent of the samples to verify genus counts. Presently, the agreement between quality control checks for species identification and genus enumerations is satisfactory.

RESULTS

A phytoplankton species list for the State is presented in Appendix A. Appendix B summarizes all of the phytoplankton data collected from the State by the Survey. The latter is organized by lake, and includes an alphabetical phytoplankton species list with concentrations for individual species given by sampling date. Results from the application of several indices are presented (Nygaard's Trophic State, Palmer's Organic Pollution, and species diversity and abundance). Each lake has been assigned a four-digit STORET number. (STORET (STOrage and RETrieval) is the U.S. Environmental Protection Agency's computer system which processes and maintains water quality data.) The first two digits of the STORET number identify the State; the last two digits identify the lake.

NYGAARD'S TROPHIC STATE INDICES

Five indices devised by Nygaard (1949) were proposed under the assumption that certain algal groups are indicative of levels of nutrient enrichment. These indices were calculated in order to aid in determining the surveyed lakes' trophic status. As a general rule, Cyanophyta, Euglenophyta, centric diatoms, and members of the Chlorococcales are found in waters that are eutrophic (rich in nutrients), while desmids and many pennate diatoms generally cannot tolerate high nutrient levels and so are found in oligotrophic waters (poor in nutrients).

In applying the indices to the Survey data, the number of taxa in each major group was determined from the species list for each sample. The ratios of these groups give numerical values which can be used as a biological index of water richness. The five indices and the ranges of values established for Danish lakes by Nygaard for each trophic state are presented in Table 2. The appropriate symbol, (E) eutrophic and (O) oligotrophic, follows each calculated value in the tables in Appendix B. A question mark (?) following a calculated value in these tables was entered when that value was within the range of both classifications.

PALMER'S ORGANIC POLLUTION INDICES

Palmer (1969) analyzed reports from 165 authors and developed algal pollution indices for use in rating water samples with high organic pollution. Two lists of organic-pollution-tolerant forms were prepared, one containing 20 genera, the other, 20 species (Tables 3 and 4). Each form was assigned a pollution index number ranging from 1 for moderately tolerant forms to 6 for

TABLE 2. NYGAARD'S TROPHIC STATE INDICES ADAPTED FROM HUTCHINSON (1967)

Index	Calculation	Oligotrophic	Eutrophic
Myxophycean	$\frac{\text{Myxophyceae}}{\text{Desmideae}}$	0.0-0.4	0.1-3.0
Chlorophycean	$\frac{\text{Chlorococcales}}{\text{Desmideae}}$	0.0-0.7	0.2-9.0
Diatom	$\frac{\text{Centric Diatoms}}{\text{Pennate Diatoms}}$	0.0-0.3	0.0-1.75
Euglenophyte	$\frac{\text{Euglenophyta}}{\text{Myxophyceae + Chlorococcales}}$	0.0-0.2	0.0-1.0
Compound	$\frac{\text{Myxophyceae + Chlorococcales + Centric Diatoms + Euglenophyta}}{\text{Desmideae}}$	0.0-1.0	1.2-25

TABLE 3. ALGAL GENUS POLLUTION INDEX (Palmer 1969)

Genus	Pollution Index
Anacystis	1
Ankistrodesmus	2
Chlamydomonas	4
Chlorella	3
Closterium	1
Cyclotella	1
Euglena	5
Gomphonema	1
Lepocinclis	1
Melosira	1
Micractinium	1
Navicula	3
Nitzschia	3
Oscillatoria	5
Pandorina	1
Phacus	2
Phormidium	1
Scenedesmus	4
Stigeoclonium	2
Synedra	2

TABLE 4. ALGAL SPECIES POLLUTION INDEX (Palmer 1969)

Species	Pollution Index
Ankistrodesmus falcatus	3
Arthrospira jenneri	2
Chlorella vulgaris	2
Cyclotella meneghiniana	2
Euglena gracilis	1
Euglena viridis	6
Gomphonema parvulum	1
Melosira varians	2
Navicula cryptocephala	1
Nitzschia acicularis	1
Nitzschia palea	5
Oscillatoria chlorina	2
Oscillatoria limosa	4
Oscillatoria princeps	1
Oscillatoria putrida	1
Oscillatoria tenuis	4
Pandorina morum	3
Scenedesmus quadricauda	4
Stigeoclonium tenue	3
Synedra ulna	3

extremely tolerant forms. Palmer based the index numbers on occurrence records and/or where emphasized by the authors as being especially tolerant of organic pollution.

In analyzing a water sample, any of the 20 genera or species of algae present in concentrations of 50 per milliliter or more are recorded. The pollution index numbers of the algae present are totaled, providing a genus score and a species score. Palmer determined that a score of 20 or more for either index can be taken as evidence of high organic pollution, while a score of 15 to 19 is taken as probable evidence of high organic pollution. Lower figures suggest that the organic pollution of the sample is not high, that the sample is not representative, or that some substance or factor interfering with algal persistence is present and active.

SPECIES DIVERSITY AND ABUNDANCE INDICES

"Information content" of biological samples is being used commonly by biologists as a measure of diversity. Diversity in this connection means the degree of uncertainty attached to the specific identity of any randomly selected individual. The greater the number of taxa and the more equal their proportions, the greater the uncertainty, and hence, the diversity (Pielou 1966). There are several methods of measuring diversity, e.g., the formulas given by Brillouin (1962) and Shannon and Weaver (1963). The method which is appropriate depends on the type of biological sample on hand.

Pielou (1966) classifies the types of biological samples and gives the measure of diversity appropriate for each type. The Survey phytoplankton samples are what she classifies as larger samples (collections in Pielou's terminology) from which random subsamples can be drawn. According to Pielou, the average diversity per individual (H) for these types of samples can be estimated from the Shannon-Wiener formula (Shannon and Weaver 1963):

$$H = -\sum_{i=1}^{S} P_i \log_x P_i$$

where P is the proportion of the ith taxon in the sample, which is calculated from n_i/N; n_i is the number of individuals per milliliter of the ith taxon; N is the total number of individuals per ml; and S is the total number of taxa. However, Basharin (1959) and Pielou (1966) have pointed out that H calculated from the subsample is a biased estimator of the sample H, and if this bias is to be accounted for, we must know the total number of taxa present in the sample since the magnitude of this bias depends on it.

Pielou (1966) suggests that if the number of taxa in the subsample falls only slightly short of the number in the larger sample, no appreciable error will result in considering S, estimated from the subsample, as being equal to the sample value. Even though considerable effort was made to find and identify all taxa, the Survey samples undoubtedly contain a fair number of rare phytoplankton taxa which were not encountered.

In the Shannon-Wiener formula, an increase in the number of taxa and/or an increase in the evenness of the distribution of individuals among taxa will increase the average diversity per individual from its minimal value of zero. Sager and Hasler (1969) found that the richness of taxa was of minor importance in determination of average diversity per individual for phytoplankton and they concluded that phytoplankton taxa in excess of the 10 to 15 most abundant ones have little effect on H. This was verified by our own calculations. Our counts are in number per milliliter and since logarithms to the base 2 were used in our calculations, H is expressed in units of bits per individual. When individuals of a taxon were so rare that they were not counted, a value of 1/130 per milliliter or 0.008 per milliliter was used in the calculations since at least one individual of the taxon must have been present in the collection.

A Survey sample for a given lake represents a composite of all phytoplankton collected at different sampling sites on the lake during a given sampling period. Since the number of samples (M) making up a composite is a function of both the complexity of the lake sampled and its size, it should affect the richness-of-taxa component of the diversity of our phytoplankton collections. The maximum diversity (MaxH) (i.e., when the individuals are distributed among the taxa as evenly as possible) was estimated from $\log_2 S$ (Pielou 1966), while the minimum diversity (MinH), was estimated from the formula:

$$\text{MinH} = -\frac{S-1}{N}\log_2\frac{1}{N} - \frac{N-(S-1)}{N}\log_2\frac{N-(S-1)}{N}$$

given by Zand (1976). The total diversity (D) was calculated from HN (Pielou 1966). Also given in Appendix B are L (the mean number of individuals per taxa per milliliter) and K (the number of individuals per milliliter of the most abundant taxon in the sample).

The evenness component of diversity (J) was estimated from H/MaxH (Pielou 1966). Relative evenness (RJ) was calculated from the formula:

$$\text{RJ} = \frac{\text{H-MinH}}{\text{MaxH-MinH}}$$

given by Zand (1976). Zand suggests that RJ be used as a substitute for both J and the redundancy expression given by Wilhm and Dorris (1968). As pointed out by Zand, the redundancy expression given by Wilhm and Dorris does not properly express what it is intended to show, i.e., the position of H in the range between MaxH and MinH. RJ may range from 0 to 1; being 1 for the most even samples and 0 for the least even samples.

Zand (1976) suggests that diversity indices be expressed in units of "sits", i.e., in logarithms to base S (where S is the total number of taxa in the sample) instead of in "bits", i.e., in logarithms to base 2. Zand points out that the diversity index in sits per individual is a normalized number ranging from 1 for the most evenly distributed samples to 0 for the least evenly distributed samples. Also, it can be used to compare different samples, independent of the number of taxa in each. The diversity in bits per

individual should not be used in direct comparisons involving various samples which have different numbers of taxa. Since MaxH equals log S, the expression in sits is equal to $\log_S S$, or 1. Therefore diversity in sits per individual is numerically equivalent to J, the evenness component for the Shannon-Wiener formula.

SPECIES OCCURRENCE AND ABUNDANCE

The alphabetic phytoplankton species list for each lake, presented in Appendix B, gives the concentrations of individual species by sampling date. Concentrations are in cells, colonies, or filaments (CEL, COL, FIL) per milliliter. An "X" after a species name indicates that the species identified in the preliminary examination was in such a low concentration that it did not appear in the count. A blank space indicates that the organism was not found in the sample collected on that date. Column S is used to designate the examiner's subjective opinion of the five dominant taxa in a sample, based upon relative size and concentration of the organism. The percent column (%C) presents, by abundance, the percentage composition of each taxon.

LITERATURE CITED

Basharin, G. P. 1959. On a statistical estimate for the entropy of a sequence of independent random variables, pp. 333-336. In: Theory of Probability and Its Applications (translation of "Teoriya Veroyatnosei i ee Premeneniya"). N. Artin (ed). 4. Society for Industrial and Applied Mathematics, Philadelphia.

Brillouin, L. 1962. Science and Information Theory (2nd ed.). Academic Press, New York. 351 pp.

Hutchinson, G. E. 1967. A Treatise on Limnology. II. Introduction to Lake Biology and the Limnoplankton. John Wiley and Sons, Inc., New York. 1,115 pp.

Nygaard, G. 1949. Hydrobiological studies of some Danish ponds and lakes. II. (K danske Vidensk. Selsk.) Biol. Sci. 7:293.

Palmer, C. M. 1969. A composite rating of algae tolerating organic pollution. J. Phycol. 5:78-82.

Pielou, E. C. 1966. The measurement of diversity in different types of biological collections. J. Theor. Biol. 13:131-144.

Prescott, G. W. 1970. How to Know the Freshwater Algae. William C. Brown Company, Dubuque. 348 pp.

Sager, P. E., and A. D. Hasler. 1969. Species diversity in lacustrine phytoplankton. I. The components of the index of diversity from Shannon's formula. Amer. Natur. 103(929):51-59.

Shannon, C. E., and W. Weaver. 1963. The Mathematical Theory of Communication. University of Illinois Press, Urbana. 117 pp.

U.S. Environmental Protection Agency. 1975. National Eutrophication Survey Methods 1973-1976. Working Paper No. 175. Environmental Monitoring and Support Laboratory, Las Vegas, Nevada, and Corvallis Environmental Research Laboratory, Corvallis, Oregon. 91 pp.

Wilhm, V. L., and T. C. Dorris. 1968. Biological parameters for water quality criteria. Bio-Science. 18:477.

Zand, S. M. 1976. Indexes associated with information theory in water quality. J. Water Pollut. Contr. Fed. 48(8):2026-2031.

APPENDIX A

PHYTOPLANKTON SPECIES LIST FOR THE STATE OF KANSAS

Actinastrum gracilimum
Anabaena sp.
Anabaenopsis sp.
Ankistrodesmus falcatus
Ankistrodesmus falcatus
v. *acicularis*
Ankistrodesmus falcatus
v. *mirabilis*
Aphanizomenon flos-aquae
Asterionella formosa
Asterionella formosa
v. *gracillima*
Botryococcus sudeticus
Carteria klebsii
Ceratium hirundinella
f. *brachyceras*
Ceratium hirundinella
f. *furcoides*
Ceratium hirundinella
f. *scotticum*
Characium limneticum
Characium naegelii ?
Chlamydomonas globosa
Chlorogonium sp.
Chroomonas acuta
Closteriopsis sp.
Closterium sp.
Cocconeis pediculus ?
Coelastrum cambricum
v. *intermedium*
Coelastrum microporum
Coelastrum reticulatum
Coelastrum reticulatum
v. *polychordon*
Coelosphaerium naegelianum
Cosmarium granatum
Crucigenia apiculata
Crucigenia fenestrata
Crucigenia quadrata
Crucigenia tetrapedia
Cryptomonas erosa
Cryptomonas erosa
v. *reflexa*
Cryptomonas marssonii
Cryptomonas reflexa
Cyclotella meneghiniana
Cyclotella michiganiana ?
Cyclotella stelligera
Cymatopleura solea
Cymbella affinis
Dactylococcopsis acicularis
Dactylococcopsis irregularis
Diatoma vulgare
Dictyosphaerium pulchellum
Dinobryon divergens
Dinobryon sertularia
Dinobryon sociale
Diploneis smithii
v. *pumila*
Diplopsalis acuta
Elakatothrix gelatinosa
Entomoneis alata
Euastrum sp.
Eudorina sp.
Euglena acus
Euglena ehrenbergii
Euglena gracilis
Euglena oxyuris
Euglena oxyuris
v. *minor*
Euglena tripteris
Fragilaria crotonensis
Fragilaria intermedia
Glenodinium edax
Glenodinium oculatum
Gloeocystis sp.
Golenkinia sp.
Gomphonema gracile
Gomphonema olivaceum
Gymnodinium albulum
Gymnodinium ordinatum
Gyrosigma sp.
Hantzschia amphioxys
Kirchneriella contorta
Lagerheimia sp.
Lepocinclis sp.
Lyngbya sp.
Mallomonas sp.
Melosira distans
Melosira granulata
Melosira granulata
v. *angustissima*
Melosira granulata
v. *angustissima* f. *spiralis*
Melosira italica
Melosira italica
v. *tenuissima*
Melosira varians
Merismopedia minima
Merismopedia punctata
Merismopedia tenuissima
Mesostigma viridis

Micractinium pusillum
Microcystis aeruginosa
Microcystis incerta
Navicula cryptocephala ?
Navicula cuspidata
Navicula heufleri
Navicula salinarium
v. *intermedia*
Nephrocytium sp.
Nitzschia acicularis
Nitzschia apiculata ?
Nitzschia dissipata
Nitzschia holsatica
Nitzschia hungarica
Nitzschia longissima
v. *reversa*
Nitzschia sigmoidea
Nitzschia tryblionella
Nitzschia tryblionella
v. *debilis ?*
Nitzschia vermicularis
Oocystis sp.
Oscillatoria agardhii
Oscillatoria limnetica
Pandorina morum
Pediastrum boryanum
Pediastrum duplex
v. *clathratum*
Pediastrum duplex
v. *reticulatum*
Pediastrum simplex
v. *duodenarium*
Pediastrum tetras
Pediastrum tetras
v. *tetraodon*
Peridinium quadridens
Phacus acuminatus
Phacus caudatus
Phacus helikoides
Phacus longicauda
Phacus megalopsis
Phacus orbicularis
Phacus pseudonordstedtii
Phormidium sp.
Pinnularia sp.
Pteromonas angulosa
Scenedesmus abundans
Scenedesmus acuminatus
Scenedesmus arcuatus
Scenedesmus balatonicus
Scenedesmus bijuga
Scenedesmus denticulatus
Scenedesmus dimorphus
Scenedesmus intermedius
Scenedesmus intermedius
v. *bicaudatus*
Scenedesmus opoliensis
Scenedesmus quadricauda
Scenedesmus quadricauda
v. *longispina*
Schroederia setigera
Skeletonema potamos
Sphaerocystis schroeteri
Staurastrum tetracerum
Stephanodiscus astraea
v. *minutula*
Stephanodiscus hantzschia
Stephanodiscus invistatus
Stephanodiscus tenuis
Surirella angusta
Surirella linearis
v. *helvetica ?*
Surirella ovata
Synedra acus
Synedra minuscula
Synedra rumpens
Synedra ulna
Tetraedron minium
Tetraedron minium
v. *scrobiculatum*
Tetraedron muticum
Tetrastrum elegans
Tetrastrum glabrum
Tetrastrum staurogeniaeforme
Trachelomonas australica
Trachelomonas bulla
Trachelomonas fluviatilis
Trachelomonas gibberosa
Trachelomonas girardiana
Trachelomonas hispida
Trachelomonas intermedia
Trachelomonas oblonga
Trachelomonas scabra
Trachelomonas schauinslandii
Trachelomonas verrucosa
Trachelomonas volvocina

APPENDIX B. SUMMARY OF PHYTOPLANKTON DATA

This appendix was generated by computer. Because it was only possible to use upper case letters in the printout, all scientific names are printed in upper case and are not italicized.

The alphabetic phytoplankton lists include taxa without species names (e.g., EUNOTIA, EUNOTIA #1, FLAGELLATE, FLAGELLATES, MICROCYSTIS INCERTA ?, CHLOROPHYTAN COCCOID CELLED COLONY). When species determinations were not possible, symbols or descriptive phrases were used to separate taxa for enumeration purposes. Each name on a list, however, represents a unique species different from any other name on the same list, unless otherwise noted, for counting purposes.

Numbers were used to separate unidentified species of the same genus. A generic name listed alone is also a unique species. A question mark (?) is placed immediately after the portion of a name which was assigned with uncertainty. Numbered, questioned, or otherwise designated taxa were established on a lake-by-lake basis; therefore NAVICULA #2 from lake A cannot be compared to NAVICULA #2 from lake B. Pluralized categories (e.g., FLAGELLATES, CENTRIC DIATOMS, SPP.) were used for counting purposes when taxa could not be properly differentiated on the counting chamber.

ERRATA

Minimum and evenness are misspelled in the computer printout of the species diversity and abundance indices data.

LAKE NAME: CEDAR BLUFF RES.
STORET NUMBER: 2001

NYGAARD TROPHIC STATE INDICES

DATE	04 14 74	06 26 74	10 01 74
MYXOPHYCEAN	0/03 D	1.00 E	2.50 E
CHLOROPHYCEAN	2.00 E	5.00 E	3.00 E
EUGLENOPHYTE	0/06 ?	0.33 E	0.27 E
DIATOM	0.43 E	0.75 E	0.67 E
COMPOUND	3.00 E	11.0 E	8.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 14 74	06 26 74	10 01 74
GENUS	03	00	05
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 14 74	06 26 74	10 01 74
AVERAGE DIVERSITY	H	1.63	1.02	2.53
NUMBER OF TAXA	S	22.00	24.00	26.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.46	4.58	4.70
MINUMUM DIVERSITY	MINH	0.45	0.45	0.15
TOTAL DIVERSITY	D	792.18	542.64	5353.48
TOTAL NUMBER OF INDIVIDUALS/ML	N	486.00	532.00	2116.00
EVENESS COMPONENT	J	0.37	0.22	0.54
RELATIVE EVENESS	RJ	0.30	0.14	0.53
MEAN NUMBER OF INDIVIDUALS/TAXA	L	22.09	22.17	81.38
NUMBER/ML OF MOST ABUNDANT TAXON	K	312.00	437.00	1041.00

LAKE NAME: CEDAR BLUFF RES. CONTINUED
STORET NUMBER: 2001

TAXA	FORM	04 14 74 IS	04 14 74 %C	04 14 74 ALGAL UNITS PER ML	06 26 74 IS	06 26 74 %C	06 26 74 ALGAL UNITS PER ML	10 01 74 IS	10 01 74 %C	10 01 74 ALGAL UNITS PER ML
CARTERIA	CEL									X
CARTERIA KLEBSII	CEL				4	3.6	19			
CERATIUM HIRUNDINELLA	CEL						X			
CHROOMONAS ACUTA	CEL				11	82.1	437	11	49.2	1041
CLOSTERIUM	CEL			X					2.9	61
COELASTRUM MICROPORUM	COL			X						
COELASTRUM RETICULATUM	COL			X						
COSMARIUM	CEL			X			X			
CRUCIGENIA QUADRATA	COL									X
CRYPTOMONAS	CEL	5	7.2	35			X			
CRYPTOMONAS EROSA	CEL							2	5.8	123
CRYPTOMONAS MARSSONII	CEL				2	7.1	38			
CRYPTOMONAS REFLEXA	CEL			X						
CYCLOTELLA MENEGHINIANA	CEL									X
CYCLOTELLA MICHIGANIANA ?	CEL	2	14.2	69						
CYMBELLA	CEL			X			X			
CYST	CEL						X			
DACTYLOCOCCOPSIS	CEL							4	15.9	337
DINOBRYON DIVERGENS	CEL			X	5	3.6	19			X
ELAKATOTHRIX GELATINOSA	CEL			X						
EUGLENA	CEL									X
EUGLENA EHRENBERGII ?	CEL						X			
FLAGELLATE	CEL						X			
FRAGILARIA CROTONENSIS	CEL			X			X			
GYROSIGMA	CEL			X						X
MELOSIRA DISTANS	CEL						X			
MELOSIRA ITALICA	CEL			X			X			
MERISMOPEDIA MINIMA	COL								1.5	31
MERISMOPEDIA PUNCTATA	COL									X
MICROCYSTIS AERUGINOSA	COL						X			
NAVICULA	CEL			X						
NITZSCHIA #1	CEL			X						
NITZSCHIA #2	CEL			X						
OOCYSTIS	CEL	4	7.2	35			X	3	5.8	123
OSCILLATORIA	FIL									X
OSCILLATORIA LIMNETICA	FIL								1.5	31
PEDIASTRUM BORYANUM	COL						X			
PEDIASTRUM DUPLEX V. CLATHRATUM	COL						X			
PENNATE DIATOM	CEL						X			
PERIDINIUM QUADRIDENS	CEL									X
PHACUS MEGALOPSIS	CEL								1.5	31
SCENEDESMUS ABUNDANS	COL								5.8	123
SCENEDESMUS BALATONICUS	COL									X
SCENEDESMUS BIJUGA	COL			X			X			
SCENEDESMUS QUADRICAUDA	COL	3	7.2	35						
SCENEDESMUS QUADRICAUDA V. LONGISPINA	COL									X
SPHAEROCYSTIS SCHROETERI	COL						X			
STAURASTRUM TETRACERUM	CEL			X						X
STEPHANODISCUS	CEL			X	3	3.6	19			
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL								2.9	61
SYNEDRA	CEL						X		1.5	31
SYNEDRA ACUS	CEL	11	64.2	312						
SYNEDRA MINUSCULA	CEL									X
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL									
TRACHELOMONAS INTERMEDIA	CEL							5	5.8	123
TRACHELOMONAS OBLONGA	CEL						X			X
TOTAL				486			532			2116

LAKE NAME: COUNCIL GROVE
STORET NUMBER: 2002

NYGAARD TROPHIC STATE INDICES

DATE	04 11 74	06 25 74	10 02 74
MYXOPHYCEAN	0/01 D	0/02 D	0.25 ?
CHLOROPHYCEAN	5.00 E	1.00 E	0.75 E
EUGLENOPHYTE	0.60 E	2.50 E	1.50 E
DIATOM	0.50 E	04/0 E	0.83 E
COMPOUND	13.0 E	5.50 E	3.75 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 11 74	06 25 74	10 02 74
GENUS	09	01	08
SPECIES	05	00	03

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 11 74	06 25 74	10 02 74
AVERAGE DIVERSITY	H	2.72	1.76	1.67
NUMBER OF TAXA	S	28.00	17.00	30.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	4.81	4.09	4.91
MINUMUM DIVERSITY	MINH	0.09	0.20	0.13
TOTAL DIVERSITY	D	10852.80	1545.26	4701.05
TOTAL NUMBER OF INDIVIDUALS/ML	N	3990.00	878.00	2815.00
EVENESS COMPONENT	J	0.57	0.43	0.34
RELATIVE EVENESS	RJ	0.56	0.41	0.33
MEAN NUMBER OF INDIVIDUALS/TAXA	L	142.50	51.65	93.83
NUMBER/ML OF MOST ABUNDANT TAXON	K	1020.00	527.00	1583.00

LAKE NAME: COUNCIL GROVE
STORET NUMBER: 2002

CONTINUED

TAXA	FORM	04 11 74 IS	04 11 74 %C	04 11 74 ALGAL UNITS PER ML	06 25 74 IS	06 25 74 %C	06 25 74 ALGAL UNITS PER ML	10 02 74 IS	10 02 74 %C	10 02 74 ALGAL UNITS PER ML
ANKISTRODESMUS FALCATUS	FIL		0.8	30						
ANKISTRODESMUS FALCATUS V. ACICULARIS	FIL		3.8	150						
ANKISTRODESMUS FALCATUS V. MIRABILIS	CEL	1	24.8	990				1	2.1	59
APHANIZOMENON FLOS-AQUAE	FIL									X
ASTERIONELLA FORMOSA	CEL		0.8	30						
CERATIUM HIRUNDINELLA	CEL						X			
CERATIUM HIRUNDINELLA F. BRACHYCERAS	CEL									X
CHROOMONAS ACUTA	CEL	3	25.6	1020	2	60.0	527	3	27.1	762
CHRYSOPHYTAN CELL #1	CEL				1	4.0	35			
CLOSTERIUM #1	CEL			X						X
CLOSTERIUM #2	CEL									X
CLOSTERIUM #3	CEL						X			X
CLOSTERIUM #4	CEL				1	4.0	35			
COELASTRUM MICROPORUM	COL			X			X			
COSMARIUM GRANATUM	CEL									X
CRYPTOMONAS	CEL	1	6.8	270			X			
CRYPTOMONAS EROSA	CEL							1	2.1	59
CRYPTOMONAS REFLEXA	CEL			X						
CYCLOTELLA	CEL							2	56.2	1583
CYCLOTELLA MENEGHINIANA	CEL		2.3	90						
CYMBELLA	CEL			X						X
DIATOMA VULGARE	CEL									X
DIPLOPSALIS ACUTA	CEL									X
ELAKATOTHRIX GELATINOSA	CEL									X
EUGLENA	CEL		1.9	60			X			
EUGLENA #1	CEL							1	2.1	59
EUGLENA #2	CEL									X
EUGLENA #3	CEL			X						
EUGLENA EHRENBERGII	CEL									X
EUGLENA OXYURIS V. MINOR	CEL									X
EUGLENA TRIPTERIS	CEL									X
FRAGILARIA	CEL			X						
GLENODINIUM IDAE	CEL		0.8	30						
GLENODINIUM OCULATUM	CEL									X
GOMPHONEMA	CEL			X						
GYROSIGMA	CEL									X
HANTZSCHIA AMPHIOXYS	CEL			X						
MELOSIRA	CEL									X
MELOSIRA DISTANS	CEL			X						X
MELOSIRA GRANULATA	CEL	1	8.3	330	1	20.0	176			
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL						X			X
MELOSIRA VARIANS	CEL			X						
NAVICULA	CEL			X						X
NITZSCHIA	CEL									X
NITZSCHIA VERMICULARIS	CEL			X						
PEDIASTRUM TETRAS V. TETRADON	COL									X
PHACUS HELIKOIDES	CEL						X			
PHACUS MEGALOPSIS	CEL			X			X			X
PINNULARIA	CEL									X
SCENEDESMUS QUADRICAUDA	COL						X			
SKELETONEMA POTAMOS	COL				1	4.0	35			
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL	2	22.6	900	1	8.0	70	1	10.4	293
SURIRELLA	CEL			X						
SYNEDRA ACUS	CEL			X						
SYNEDRA ULNA	CEL			X						
TETRASTRUM STAUROGENIAEFORME	COL		2.3	90						
TRACHELOMONAS	CEL						X			
TRACHELOMONAS SCHAUINSLANDII	CEL						X			
TOTAL				3990			878			2815

LAKE NAME: ELK CITY
STORET NUMBER: 2003

NYGAARD TROPHIC STATE INDICES

DATE	04 10 74	06 24 74	10 03 74
MYXOPHYCEAN	03/0 E	03/0 E	2.00 E
CHLOROPHYCEAN	02/0 E	07/0 E	2.00 E
EUGLENOPHYTE	0.40 E	0.90 E	0.25 E
DIATOM	0.60 E	0.83 E	4.00 E
COMPOUND	13/0 E	24/0 E	9.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 10 74	06 24 74	10 03 74
GENUS	13	07	01
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 10 74	06 24 74	10 03 74
AVERAGE DIVERSITY	H	3.10	3.59	2.55
NUMBER OF TAXA	S	31.00	36.00	16.00
NUMBER OF SAMPLES COMPOSITED	M	1.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.95	5.17	4.00
MINUMUM DIVERSITY	MINH	0.14	0.19	0.39
TOTAL DIVERSITY	D	8866.00	8156.48	991.95
TOTAL NUMBER OF INDIVIDUALS/ML	N	2860.00	2272.00	389.00
EVENESS COMPONENT	J	0.63	0.69	0.64
RELATIVE EVENESS	RJ	0.62	0.69	0.60
MEAN NUMBER OF INDIVIDUALS/TAXA	L	92.26	63.11	24.31
NUMBER/ML OF MOST ABUNDANT TAXON	K	664.00	436.00	129.00

LAKE NAME: ELK CITY
STORET NUMBER: 2003

CONTINUED

TAXA	FORM	04 10 74 IS	04 10 74 %C	04 10 74 ALGAL UNITS PER ML	06 24 74 IS	06 24 74 %C	06 24 74 ALGAL UNITS PER ML	10 03 74 IS	10 03 74 %C	10 03 74 ALGAL UNITS PER ML
ANABAENA	FIL									X
APHANIZOMENON FLOS-AQUAE	FIL							1	20.1	78
CENTRIC DIATOMS	CEL	11	23.2	664	2	12.1	275			
CERATIUM HIRUNDINELLA F. FURCOIDES	CEL									X
CHLAMYDOMONAS GLOBOSA	CEL		4.3	124						
CHLOROPHYTAN CELL	CEL									X
CHROOMONAS	CEL			X						
CHROOMONAS ACUTA	CEL	2	17.4	498		10.1	229	5	33.2	129
CLOSTERIUM	CEL							4	13.4	52
COELASTRUM CAMBRICUM V. INTERMEDIUM	COL						X			
COELASTRUM MICROPORUM	COL									X
CRUCIGENIA TETRAPEDIA	COL					1.0	23			
CRYPTOMONAS	CEL			X						
CRYPTOMONAS EROSA	CEL			X		6.1	138	3	13.4	52
CRYPTOMONAS REFLEXA	CEL							2	6.7	26
CRYPTOMONAS SPP.	CEL	14	13.0	373						
CYCLOTELLA	CEL						X			
CYCLOTELLA MENEGHINIANA	CEL			X					6.7	26
CYCLOTELLA STELLIGERA	CEL			X						
CYMBELLA	CEL			X						
DACTYLOCOCCOPSIS	CEL			X			X			
DINOBRYON DIVERGENS	CEL						X			
EUGLENA	CEL		2.9	83						
EUGLENA #1	CEL						X			
EUGLENA #2	CEL						X			
EUGLENA OXYURIS	CEL									X
EUGLENA SPP.	CEL				5	5.1	115			
EUGLENA TRIPTERIS	CEL						X			
FRAGILARIA INTERMEDIA	CEL			X						
GOLENKINIA	CEL						X			
GOMPHONEMA GRACILE	CEL			X						
GYMNODINIUM ORDINATUM	CEL	5	8.7	249						
GYROSIGMA	CEL					1.0	23			
HANTZSCHIA AMPHIOXYS	CEL			X			X			
KEPOCINCLIS	CEL					2.0	46			
MELOSIRA DISTANS	CEL		4.3	124						X
MELOSIRA GRANULATA	CEL			X			X			X
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL					7.1	161			
MESOSTIGMA VIRIDIS ?	CEL	3	17.4	498						
MICROCYSTIS	COL					2.0	46			
NAVICULA	CEL						X			
NAVICULA #1	CEL			X						
NAVICULA #2	CEL		1.4	41						
NAVICULA #3	CEL		1.4	41						
NITZSCHIA	CEL					1.0	23			
NITZSCHIA #1	CEL			X			X			
NITZSCHIA ACICULARIS	CEL						X			
NITZSCHIA HUNGARICA	CEL									X
NITZSCHIA TRYBLIONELLA V. DEBILIS ?	CEL			X						
OSCILLATORIA	FIL		1.4	41						
PHACUS ACUMINATUS	CEL						X			
PHACUS MEGALOPSIS	CEL						X			
PHORMIDIUM	FIL			X	4	19.2	436			
PTEROMONAS ANGULOSA	CEL				1	12.1	275			
SCENEDESMUS BICAUDATUS	COL								6.7	26
SCENEDESMUS DENTICULATUS	CEL					2.0	46			
SCENEDESMUS DIMORPHUS	COL		1.4	41						
SCENEDESMUS QUADRICAUDA	COL						X			
SCHROEDERIA SETIGERA	CEL					2.0	46			
SKELETONEMA POTAMOS	CEL					6.1	138			
STEPHANODISCUS	CEL			X						X
SURIRELLA OVATA	CEL			X						
TETRASTRUM GLABRUM	COL		2.9	83						
TETRASTRUM STAUROGENIAEFORME	COL					2.0	46			
TRACHELOMONAS AUSTRALICA	CEL						X			
TRACHELOMONAS INTERMEDIA	CEL			X			X			
TRACHELOMONAS SCABRA	CEL						X			
TRACHELOMONAS SPP.	CEL				13	9.1	206			
TOTAL				2860			2272			389

LAKE NAME: FALL RIVER RES.
STORET NUMBER: 2004

NYGAARD TROPHIC STATE INDICES

DATE	04 10 74	06 24 74	10 02 74
MYXOPHYCEAN	0.50 E	1.00 E	2.00 E
CHLOROPHYCEAN	0.02 O	1.00 E	1.00 E
EUGLENOPHYTE	2.00 E	2.00 E	1.00 E
DIATOM	0.83 E	0.75 E	2.50 E
COMPOUND	4.00 E	7.50 E	11.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 10 74	06 24 74	10 02 74
GENUS	01	02	01
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 10 74	06 24 74	10 02 74
AVERAGE DIVERSITY	H	2.87	1.61	1.78
NUMBER OF TAXA	S	21.00	27.00	17.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.39	4.75	4.09
MINIMUM DIVERSITY	MINH	0.25	0.12	0.20
TOTAL DIVERSITY	D	2566.65	5268.91	1566.40
TOTAL NUMBER OF INDIVIDUALS/ML	N	895.00	2911.00	880.00
EVENESS COMPONENT	J	0.65	0.38	0.44
RELATIVE EVENESS	RJ	0.64	0.37	0.41
MEAN NUMBER OF INDIVIDUALS/TAXA	L	42.62	107.81	51.76
NUMBER/ML OF MOST ABUNDANT TAXON	K	211.00	1202.00	550.00

LAKE NAME: FALL RIVER RES. CONTINUED
STORET NUMBER: 2004

TAXA	FORM	04 10 74 IS	04 10 74 %C	04 10 74 ALGAL UNITS PER ML	06 24 74 IS	06 24 74 %C	06 24 74 ALGAL UNITS PER ML	10 02 74 IS	10 02 74 %C	10 02 74 ALGAL UNITS PER ML
ANABAENA	FIL					1.1	32			X
APHANIZOMENON FLOS-AQUAE	FIL						X			
ASTERIONELLA FORMOSA	CEL	1	23.6	211						
CENTRIC DIATOM	CEL									X
CERATIUM HIRUNDINELLA										
F. BRACHYCERAS	CEL						X			X
CERATIUM HIRUNDINELLA										
F. FURCOIDES	CEL						X			
CHRUOMONAS ACUTA	CEL	15	17.7	158	3	27.2	791	1	62.5	550
CLOSTERIUM #1	CEL			X			X	1	5.0	44
CLOSTERIUM #2	CEL			X			X			
COCCONEIS	CEL						X			
CRYPTOMONAS EROSA	CEL	3	11.7	105	1	41.3	1202			X
CRYPTOMONAS MARSSONII	CEL	4	11.7	105						
CRYPTOMONAS REFLEXA	CEL			X						
DACTYLOCOCCOPSIS	CEL	1	5.9	53						X
DINOBRYON SERTULARIA	CEL	1	5.9	53						
DIPLOPSALIS ACUTA	CEL						X			
EUGLENA	CEL			X			X			X
EUGLENA ACUS	CEL						X			
EUGLENA EHRENBERGII ?	CEL						X			
EUGLENA GRACILIS	CEL						X			
EUGLENA TRIPTERIS	CEL						X			
GLENODINIUM OCULATUM	CEL						X			
GYROSIGMA	CEL				1	1.1	32			
MELOSIRA	CEL							2	15.0	132
MELOSIRA DISTANS	CEL	1	11.7	105				3	10.0	88
MELOSIRA GRANULATA	CEL			X			X			
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL			X			X			
NITZSCHIA	CEL			X						X
NITZSCHIA #1	CEL								2.5	22
NITZSCHIA VERMICULARIS	CEL			X			X			
PEDIASTRUM DUPLEX										
V. CLATHRATUM	COL						X			
PEDIASTRUM TETRAS	COL						X			
PHACUS	CEL			X					2.5	22
PHACUS ACUMINATUS	CEL						X			
PHACUS LONGICAUDA ?	CEL						X			
SCHROEDERIA SETIGERA	CEL									X
SKELETONIMA POTAMOS	CEL									X
STEPHANODISCUS	CEL	2	11.7	105						
STEPHANODISCUS ASTRAEA										
V. MINUTULA	CEL			X	2	27.2	791	1	2.5	22
SURIRELLA	CEL			X						
SYNEDRA	CEL				1	2.2	63			
SYNEDRA ACUS	CEL			X						
SYNEDRA ULNA	CEL			X						
TRACHELOMONAS	CEL						X			
TRACHELOMONAS INTERMEDIA	CEL									X
TOTAL				895			2911			880

LAKE NAME: JOHN REDMOND RES.
STORET NUMBER: 2005

NYGAARD TROPHIC STATE INDICES

DATE	04 11 74	06 25 74	10 01 74
MYXOPHYCEAN	02/0 E	01/0 E	1.00 E
CHLOROPHYCEAN	03/0 E	05/0 E	6.00 E
EUGLENOPHYTE	0.40 E	1.33 E	0.86 E
DIATOM	1.25 E	2.00 E	2.00 E
COMPOUND	12/0 E	20/0 E	17.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 11 74	06 25 74	10 01 74
GENUS	11	12	00
SPECIES	04	01	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 11 74	06 25 74	10 01 74
AVERAGE DIVERSITY	H	2.73	3.21	2.23
NUMBER OF TAXA	S	20.00	25.00	24.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.32	4.64	4.58
MINUMUM DIVERSITY	MINH	0.07	0.24	0.42
TOTAL DIVERSITY	D	9191.91	3761.38	1302.32
TOTAL NUMBER OF INDIVIDUALS/ML	N	3367.00	1178.00	584.00
EVENESS COMPONENT	J	0.63	0.69	0.49
RELATIVE EVENESS	RJ	0.63	0.68	0.44
MEAN NUMBER OF INDIVIDUALS/TAXA	L	168.35	47.12	24.33
NUMBER/ML OF MOST ABUNDANT TAXON	K	1143.00	337.00	167.00

LAKE NAME: JOHN REDMOND RES. CONTINUED
STORET NUMBER: 2065

TAXA	FORM	04 11 74 IS	04 11 74 %C	04 11 74 ALGAL UNITS PER ML	06 25 74 IS	06 25 74 %C	06 25 74 ALGAL UNITS PER ML	10 01 74 IS	10 01 74 %C	10 01 74 ALGAL UNITS PER ML
ACTINASTRUM	CEL		7.2	241						
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL	14	3.6	120						X
APHANIZOMENON FLOS-AQUAE	FIL									X
CENTRIC DIATOM	CEL	12	25.0	842						
CHARACIUM #2	CEL						X			
CHARACIUM LIMNETICUM ?	CEL						X			
CHROOMONAS ACUTA	CEL	13	12.5	421				15	23.8	139
CLOSTERIOPSIS	CEL									X
CLOSTERIUM	CEL									X
COELASTRUM MICROPORUM	COL									X
CRUCIGENIA TETRAPEDIA	COL						X			
CRYPTOMONAS EROSA	CEL		3.6	120	14	3.6	42	13	14.2	83
CYCLOTELLA	CEL					7.1	84			
CYMBELLA	CEL		3.6	120			X			
DACTYLOCOCCOPSIS	CEL			X						
EUGLENA #2	CEL									X
EUGLENA ACUS	CEL						X			
EUGLENA GRACILIS	CEL		1.8	60	21	7.1	84			X
EUGLENA OXYURIS V. MINOR ?	CEL									X
EUGLENA TRIPTERIS	CEL									X
FLAGELLATE #2	CEL			X						
FLAGELLATE #3	CEL					14.3	169			
GLOEOCYSTIS	CEL							12	23.8	139
GOMPHONEMA	CEL						X			
KIRCHNERIELLA	CEL			X						
LYNGBYA	FIL		1.8	60						
MELOSIRA DISTANS	CEL			X			X			X
MELOSIRA GRANULATA	CEL					3.6	42			X
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL				13	28.6	337			X
MELOSIRA ITALICA	CEL	15	9.3	180						
NAVICULA	CEL			X						
NITZSCHIA #1	CEL						X			
NITZSCHIA #2	CEL			X						
NITZSCHIA #3	CEL			X						
NITZSCHIA #4	CEL									X
NITZSCHIA SPP.	CEL		1.8	60						
OOCYSTIS	CEL						X			
OSCILLATORIA	FIL					7.1	84			
PEDIASTRUM DUPLEX V. CLATHRATUM	COL									X
PENNATE DIATOMS	CEL							14	9.6	56
PHACUS ACUMINATUS	CEL						X			
PHACUS CAUDATUS	CEL									X
PHACUS MEGALOPSIS	CEL					3.6	42			
PHACUS PSEUDONORDSTEDTII	CEL			X						
PTEROMONAS	CEL									X
SCENEDESMUS BIJUGA	COL									X
SCENEDESMUS DIMORPHUS	COL					3.6	42			
SCHROEDERIA SETIGERA	CEL									X
SKELETONEMA POTAMUS	CEL					7.1	84			
STEPHANODISCUS	CEL	11	33.9	1143	11	10.7	126			
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL			X				11	28.6	167
TRACHELOMONAS AUSTRALICA ?	CEL						X			
TRACHELOMONAS BULLA	CEL									X
TRACHELOMONAS GIBBERUSA	CEL				15	3.6	42			
TRACHELOMONAS GIRARDIANA	CEL						X			
TRACHELOMONAS INTERMEDIA	CEL						X			
TOTAL				3367			1178			584

LAKE NAME: KANOPOLIS RES.
STORET NUMBER: 2006

NYGAARD TROPHIC STATE INDICES

DATE	04 12 74	06 27 74	10 01 74
MYXOPHYCEAN	0170 E	0270 E	1.00 E
CHLOROPHYCEAN	0270 E	1170 E	5.00 E
EUGLENOPHYTE	0.33 E	0.62 E	0.33 E
DIATOM	1.25 E	0.80 E	1.00 E
COMPOUND	0970 E	2570 E	10.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 74	06 27 74	10 01 74
GENUS	11	22	06
SPECIES	01	02	03

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 12 74	06 27 74	10 01 74
AVERAGE DIVERSITY	H	2.89	2.77	2.61
NUMBER OF TAXA	S	18.00	38.00	17.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.17	5.25	4.09
MINUMUM DIVERSITY	MINH	0.03	0.08	0.05
TOTAL DIVERSITY	D	25353.97	18203.08	11384.82
TOTAL NUMBER OF INDIVIDUALS/ML	N	6773.00	6604.00	4362.00
EVENESS COMPONENT	J	0.69	0.53	0.64
RELATIVE EVENESS	RJ	0.70	0.53	0.64
MEAN NUMBER OF INDIVIDUALS/TAXA	L	487.39	173.79	256.59
NUMBER/ML OF MOST ABUNDANT TAXON	K	2563.00	3393.00	1410.00

LAKE NAME: KANOPOLIS RES. CONTINUED
STORET NUMBER: 2006

TAXA	FORM	04 12 74 IS	04 12 74 %C	04 12 74 ALGAL UNITS PER ML	06 27 74 IS	06 27 74 %C	06 27 74 ALGAL UNITS PER ML	10 01 74 IS	10 01 74 %C	10 01 74 ALGAL UNITS PER ML
ACTINASTRUM	COL					1.7	111			
ANKISTRODESMUS FALCATUS	CEL						X			
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL								3.0	132
CELL	CEL						X			
CENTRIC DIATOMS	CEL	1	22.3	1955						
CHLAMYDOMONAS	CEL				1	51.4	3393			
CHROOMONAS ACUTA	CEL		8.4	738		10.1	664	4	12.1	529
CHRYSOPHYTAN CELL	CEL		7.4	652						
CLOSTERIUM	CEL									X
COELASTRUM CAMBRICUM V. INTERMEDIUM	COL					0.6	37			
CRYPTOMONAS EROSA	CEL		4.5	391	4	2.2	148	2	11.1	485
CRYPTOMONAS MARSSONII	CEL					0.6	37			
CRYPTOMONAS REFLEXA	CEL	5	1.5	130						
CYCLOTELLA	CEL				3	5.0	332			
CYCLOTELLA MENEGHINIANA	CEL			X						
DACTYLOCOCCOPSIS	CEL	2	29.2	2563		2.2	148			
DICTYOSPHAERIUM PULCHELLUM	COL								2.0	88
DIPLOPSALIS ACUTA	CEL						X			
ENTOMONEIS	CEL		0.5	43						
EUGLENA	CEL									X
EUGLENA ACUS	CEL						X			
EUGLENA GRACILIS	CEL	3	5.9	521		3.9	258			X
FLAGELLATE	CEL							3	32.3	1410
GLENODINIUM EDAX	CEL						X			
GLENODINIUM OCULATUM	CEL									X
GOLENKINIA	CEL			X						
MELOSIRA DISTANS	CEL			X		0.6	37			
MERISMOPEDIA TENUISSIMA	COL									X
NAVICULA	CEL		3.5	304			X			
NITZSCHIA #2	CEL					3.3	221			
NITZSCHIA #5	CEL		1.5	130		0.6	37			
NITZSCHIA ACICULARIS	CEL					1.1	74			
NITZSCHIA LONGISSIMA V. REVERSA	CEL						X		1.0	44
OSCILLATORIA	FIL					1.1	74			
PEDIASTRUM DUPLEX V. CLATHRATUM	COL				5	0.6	37			
PENNATE DIATOM	CEL		0.5	43						
PHACUS ACUMINATUS	CEL						X			
PHACUS HELIKOIDES	CEL						X			
PHACUS MEGALOPSIS	CEL						X			
SCENEDESMUS BIJUGA	COL					2.8	184			
SCENEDESMUS DENTICULATUS	COL						X			
SCENEDESMUS DIMORPHUS	COL						X		1.0	44
SCENEDESMUS OPOLIENSIS	COL						X			
SCENEDESMUS QUADRICAUDA	COL						X		1.0	44
SCHROEDERIA SETIGERA	CEL								1.0	44
SKELETONEMA POTAMOS	CEL	4	14.4	1260		1.7	111	5	6.1	264
STEPHANODISCUS	CEL			X		1.7	111			
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL							1	28.3	1234
SURIRELLA	CEL			X						
SYNEDRA ACUS	CEL								1.0	44
TETRAEDRON MUTICUM	CEL						X			
TETRASTRUM GLABRUM	COL						X			
TETRASTRUM STAUROGENIAEFORME	COL		0.5	43						
TRACHELOMONAS FLUVIATILIS	CEL						X			
TRACHELOMONAS HISPIDA	CEL						X			
TRACHELOMONAS INTERMEDIA	CEL					0.6	37			
ZOOSPORE	CEL				2	8.4	553			
TOTAL				8773			6604			4362

LAKE NAME: MARION RES.
STORET NUMBER: 2007

NYGAARD TROPHIC STATE INDICES

DATE	04 12 74	06 27 74	10 02 74
MYXOPHYCEAN	1.00 E	2.00 E	4.00 E
CHLOROPHYCEAN	6.00 E	6.00 E	14.0 E
EUGLENOPHYTE	0/07 ?	0.37 E	0.17 ?
DIATOM	0.37 E	2.50 E	1.00 E
COMPOUND	10.0 E	16.0 E	25.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 74	06 27 74	10 02 74
GENUS	09	01	07
SPECIES	05	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 12 74	06 27 74	10 02 74
AVERAGE DIVERSITY	H	1.00	2.95	3.57
NUMBER OF TAXA	S	22.00	23.00	36.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.46	4.52	5.17
MINIMUM DIVERSITY	MINH	0.01	0.22	0.11
TOTAL DIVERSITY	D	38915.00	3360.05	15079.68
TOTAL NUMBER OF INDIVIDUALS/ML	N	38915.00	1139.00	4224.00
EVENESS COMPONENT	J	0.22	0.65	0.69
RELATIVE EVENESS	RJ	0.23	0.64	0.69
MEAN NUMBER OF INDIVIDUALS/TAXA	L	1768.86	49.52	117.33
NUMBER/ML OF MOST ABUNDANT TAXON	K	36716.00	308.00	660.00

LAKE NAME: MARION RES. CONTINUED
STORET NUMBER: 2007

TAXA	FORM	04 12 74 IS	04 12 74 %C	04 12 74 ALGAL UNITS PER ML	06 27 74 IS	06 27 74 %C	06 27 74 ALGAL UNITS PER ML	10 02 74 IS	10 02 74 %C	10 02 74 ALGAL UNITS PER ML
ACTINASTRUM GRACILIMUM	CEL									X
ANABAENA	FIL						X			
ANKISTRODESMUS FALCATUS										
V. ACICULARIS	CEL		0.2	85						X
APHANIZOMENON FLOS-AQUAE	FIL			X					2.1	88
CARTERIA	CEL							1	15.6	660
CERATIUM HIRUNDINELLA										
F. BRACHYCERAS	CEL						X			
CHLAMYDOMONAS	CEL							5	9.4	396
CHLOROPHYTAN COCCOID CELLED COLONY	COL			X						
CHROOMONAS ACUTA	CEL				5	14.6	166	4	14.6	616
CLOSTERIUM	CEL			X		2.1	24			X
COELASTRUM MICROPORUM	COL		0.1	42			X			X
CRUCIGENIA QUADRATA	COL	5	0.4	169						X
CRUCIGENIA TETRAPEDIA	COL			X						
CRYPTOMONAS EROSA	CEL		0.1	42	2	12.5	142		7.3	308
CRYPTOMONAS EROSA										
V. REFLEXA	CEL								3.1	132
CRYPTOMONAS REFLEXA	CEL						X			
CYCLOTELLA MENEGHINIANA	CEL	1	78.9	30718			X			
DACTYLOCOCCOPSIS	CEL								9.4	396
DICTYOSPHAERIUM PULCHELLUM	COL					2.1	24		1.0	44
DIPLONEIS	CEL									X
ELAKATOTHRIX GELATINOSA	CEL									X
EUGLENA	CEL									X
EUGLENA #1	CEL						X			
EUGLENA OXYURIS										
V. MINOR	CEL						X			
GYMNODINIUM ALBULUM	CEL			X					1.0	44
GYROSIGMA	CEL			X						X
LAGERHEINIA	CEL								1.0	44
LEPOCINCLIS	CEL									X
MELOSIRA DISTANS	CEL	2	16.0	6211	3	16.7	190		1.0	44
MELOSIRA GRANULATA	CEL						X			
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL				4	10.4	118			X
MERISMOPEDIA MINIMA	COL								1.0	44
MICROCYSTIS	COL									X
NAVICULA	CEL		0.2	85						
NITZSCHIA	CEL			X						X
NITZSCHIA #1	CEL					2.1	24			
NITZSCHIA #2	CEL			X						
NITZSCHIA HOLSATICA	CEL							2	13.5	572
NITZSCHIA VERMICULARIS	CEL			X						
OOCYSTIS	CEL			X		8.3	95		4.2	176
OSCILLATORIA	FIL						X			
PEDIASTRUM DUPLEX										
V. RETICULATUM	COL						X			X
PENNATE DIATOM	CEL						X			
PHACUS	CEL						X			
SCENEDESMUS INTERMEDIUS										
V. BICAUDATUS	COL									X
SCENEDESMUS QUADRICAUDA	COL		0.1	42					1.0	44
SCHROEDERIA SETIGERA	CEL					2.1	24		1.0	44
SKELETONEMA POTAMOS	CEL								1.0	44
STEPHANODISCUS ASTRAEA										
V. MINUTULA	CEL	3	3.4	1310	1	27.0	308	3	11.5	484
SURIRELLA #9	CEL			X						
SYNEDRA ACUS	CEL	4	0.5	211						
SYNEDRA ULNA	CEL			X						
TETRAEDRON MUTICUM	CEL									X
TETRASTRUM ELEGANS	COL					2.1	24			
TETRASTRUM STAUROGENEAEFORME	COL								1.0	44
TRACHELOMONAS INTERMEDIA	CEL									X
TOTAL				38915			1139			4224

LAKE NAME: MELVERN RES.
STORET NUMBER: 2008

NYGAARD TROPHIC STATE INDICES

DATE	04 12 74	06 25 74	10 01 74
MYXOPHYCEAN	1.00 E	1.00 E	2.50 E
CHLOROPHYCEAN	1.00 E	5.00 E	1.50 E
EUGLENOPHYTE	1.50 E	0.25 E	0.25 E
DIATOM	0.62 E	0370 E	3.50 E
COMPOUND	10.0 E	9.00 E	8.50 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 74	06 25 74	10 01 74
GENUS	06	01	02
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 12 74	06 25 74	10 01 74
AVERAGE DIVERSITY	H	1.28	2.44	2.29
NUMBER OF TAXA	S	46.00	24.00	24.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	5.52	4.58	4.58
MINUMUM DIVERSITY	MINH	0.03	0.29	0.11
TOTAL DIVERSITY	D	29136.64	2137.44	6153.23
TOTAL NUMBER OF INDIVIDUALS/ML	N	22763.00	876.00	2687.00
EVENESS COMPONENT	J	0.23	0.53	0.50
RELATIVE EVENESS	RJ	0.23	0.51	0.49
MEAN NUMBER OF INDIVIDUALS/TAXA	L	494.85	36.50	111.96
NUMBER/ML OF MOST ABUNDANT TAXON	K	16106.00	243.00	1399.00

LAKE NAME: MELVERN RES. CONTINUED
STORET NUMBER: 2008

TAXA	FORM	04 12 74 IS	04 12 74 %C	04 12 74 ALGAL UNITS PER ML	06 25 74 IS	06 25 74 %C	06 25 74 ALGAL UNITS PER ML	10 01 74 IS	10 01 74 %C	10 01 74 ALGAL UNITS PER ML
ANABAENA #1	FIL						X		2.1	56
ANABAENA #2	FIL				5	5.6	49	4	6.3	168
ANKISTRODESMUS FALCATUS										
V. ACICULARIS	CEL		1.0	221			X			
APHANIZOMENON	FIL							5	4.2	112
APHANIZOMENON FLOS-AQUAE	FIL			X						
ASTERIONELLA FORMOSA	CEL			X						
BOTRYOCOCCUS SUDETICUS	COL						X			
CENTRIC DIATOMS	CEL	1	79.5	18106				1	12.5	336
CERATIUM HIRUNDINELLA	CEL							3	2.1	56
CERATIUM HIRUNDINELLA										
F. 7	CEL						X			
CHLOROPHYTAN COCCOID CELLED COLONY	COL						X			
CHLOROPHYTAN COLONY	COL		0.1	22						
CHROOMONAS ACUTA	CEL	3	4.1	927	4	16.7	146			X
CLOSTERIUM #1	CEL			X						
CLOSTERIUM #2	CEL			X						
CLOSTERIUM #3	CEL						X			
CLOSTERIUM #4	CEL									X
COELASTRUM MICROPORUM	COL						X			
COELASTRUM RETICULATUM										
V. POLYCHORDON	COL								2.1	56
COELOSPHAERIUM MALGELIANUM	COL									X
COSMARIUM	CEL									X
CRUCIGENIA APICULATA	COL						X			
CRYPTOMONAS	CEL								2.1	56
CRYPTOMONAS EROSA	CEL	4	1.9	442	1	27.7	243			
CRYPTOMONAS REFLEXA	CEL		0.4	88						
CYCLOTELLA MENEGHINIANA	CEL			X						X
CYCLOTELLA STELLIGERA	CEL			X						X
CYMBELLA AFFINIS	CEL		0.1	22						
CYST	CEL			X						
DICTYOSPHAERIUM PULCHELLUM	CEL		0.1	22						
DINOBRYON SOCIALE	CEL		0.3	66						
EUGLENA #1	CEL			X						
EUGLENA #2	CEL			X						
EUGLENA ACUS	CEL			X			X			
EUGLENA TRIPTERIS	CEL			X			X			
FLAGELLATE #2	CEL		0.3	66						
FRAGILARIA	CEL			X						
GOMPHONEMA OLIVACEUM	CEL		0.1	22						
GYROSIGMA	CEL			X						
LEPOCINCLIS	CEL					11.1	97			
LUNATE CELLED COLONY	COL			X						
LYNGBYA	FIL			X						
MELOSIRA DISTANS	CEL	2	8.7	1907			X			X
MELOSIRA GRANULATA	CEL			X				2	52.1	1399
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL						X			X
MELOSIRA ITALICA	CEL	5	2.2	508						
MELOSIRA VARIANS	CEL			X						
MICROCYSTIS	COL								2.1	56
NAVICULA #2	CEL		0.1	22						
NAVICULA CUSPIDATA	CEL			X						
NITZSCHIA #2	CEL			X						
NITZSCHIA #5	CEL			X						
NITZSCHIA ACICULARIS	CEL			X						
NITZSCHIA DISSIPATA	CEL			X						
NITZSCHIA HUNGARICA	CEL		0.2	44						
NITZSCHIA VERMICULARIS	CEL		0.1	22						
OOCYSTIS	CEL						X			X
PEDIASTRUM DUPLEX										
V. RETICULATUM	COL						X			
PEDIASTRUM SIMPLEX										
V. DUODENARIUM	COL						X	1	14.6	392
PHACUS PSEUDONORDSTEDTII	CEL		0.1	22						
SCENEDESMUS ARCUATUS	COL						X			
SCENEDESMUS DIMORPHUS	COL						X			
SCHROEDERIA SETIGERA	CEL				2	22.3	195			
SKELETONEMA POTAMOS	CEL		0.4	88						
STAURASTRUM	CEL						X			
STEPHANODISCUS	CEL			X						X
STEPHANODISCUS ASTRAEA										
V. MINUTULA	CEL			X	3	16.7	146			
SURIRELLA ANGUSTA	CEL			X						
SYNEDRA ACUS	CEL									X
SYNEDRA RUMPENS										
V. 7	CEL			X						
SYNEDRA ULNA	CEL		0.2	44						X
TRACHELOMONAS	CEL									X
TRACHELOMONAS INTERMEDIA	CEL		0.1	22						
TRACHELOMONAS VOLVOCINA	CEL									X
TOTAL				22763			876			2687

LAKE NAME: MILFORD RES.
STORET NUMBER: 2009

NYGAARD TROPHIC STATE INDICES

DATE	04 11 74	06 26 74	10 03 74
MYXOPHYCEAN	0170 E	0670 E	0270 E
CHLOROPHYCEAN	0370 E	0470 E	0570 E
EUGLENOPHYTE	0.25 E	0.50 E	0.71 E
DIATOM	0.44 E	0.80 E	1.67 E
COMPOUND	0970 E	1970 E	1770 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 11 74	06 26 74	10 03 74
GENUS	07	13	07
SPECIES	03	01	04

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 11 74	06 26 74	10 03 74
AVERAGE DIVERSITY	H	1.60	3.13	1.70
NUMBER OF TAXA	S	22.00	27.00	24.00
NUMBER OF SAMPLES COMPOSITED	M	4.00	4.00	4.00
MAXIMUM DIVERSITY	MAXH	4.46	4.75	4.58
MINIMUM DIVERSITY	MINH	0.01	0.22	0.04
TOTAL DIVERSITY	D	37680.00	4294.36	12920.00
TOTAL NUMBER OF INDIVIDUALS/ML	N	23550.00	1372.00	7600.00
EVENESS COMPONENT	J	0.36	0.66	0.37
RELATIVE EVENESS	RJ	0.36	0.65	0.37
MEAN NUMBER OF INDIVIDUALS/TAXA	L	1070.45	50.81	316.67
NUMBER/ML OF MOST ABUNDANT TAXON	K	11528.00	264.00	5182.00

LAKE NAME: MILFORD RES. CONTINUED
STORET NUMBER: 2009

TAXA	FORM	04 11 74 IS	04 11 74 %C	04 11 74 ALGAL UNITS PER ML	06 26 74 IS	06 26 74 %C	06 26 74 ALGAL UNITS PER ML	10 03 74 IS	10 03 74 %C	10 03 74 ALGAL UNITS PER ML
ACTINASTRUM GRACILIMUM	CEL			X						
ANABAENA #1	FIL						X			
ANABAENOPSIS	FIL						X			
ANKISTRODESMUS FALCATUS										
V. ACICULARIS	CEL	15	1.9	450						
APHANIZOMENON	FIL						X			
ASTERIONELLA FORMOSA	CEL			X						
CENTRIC DIATOMS	CEL				11	20.7	284			
CHLOROPHYTAN COLONY	COL									X
CHROOMONAS ACUTA	CEL	31	7.6	1801	14	6.9	95	12	10.4	790
COCCOID CELL	CEL			X						
COELASTRUM MICROPORUM	COL									X
CRUCIGENIA TETRAPEDIA	COL									X
CRYPTOMONAS	CEL				12	10.3	142			
CRYPTOMONAS EROSA	CEL	14	1.0	225				15	1.3	99
CYCLOTELLA	CEL						X			
CYMATOPLEURA SOLEA	CEL			X						
DACTYLOCOCCOPSIS IRREGULARIS	CEL								3.9	296
EUGLENA	CEL			X						
EUGLENA ACUS	CEL									X
EUGLENA GRACILIS	CEL				31	6.9	95		0.6	49
EUGLENA TRIPTERIS	CEL						X			
FLAGELLATE	CEL				15	10.3	142			
GYMNODINIUM ALBULUM	CEL									X
GYROSIGMA	CEL						X			X
LEPOCINCLIS	CEL						X			X
LYNGBYA	FIL		0.2	45						
MELOSIRA DISTANS	CEL			X					1.3	99
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL						X			X
MELOSIRA GRANULATA										
V. ANGUSTISSIMA F. SPIRALIS	CEL									X
MELOSIRA ITALICA	CEL			X						
MICROCYSTIS AERUGINOSA	COL						X			
MICROCYSTIS INCERTA	COL					17.2	236			
NAVICULA #1	CEL			X			X			
NAVICULA #2	CEL			X						
NITZSCHIA #1	CEL									X
NITZSCHIA #2	CEL		0.6	135						
NITZSCHIA #3	CEL					10.3	142			
NITZSCHIA SIGMOIDEA	CEL			X						
NITZSCHIA TRYBLIONELLA	CEL						X			
OOCYSTIS	CEL						X			
OSCILLATORIA #1	FIL									X
OSCILLATORIA #2	FIL					3.4	47			
PEDIASTRUM DUPLEX										
V. CLATHRATUM	COL									X
PEDIASTRUM TETRAS										
V. TETRAODON	COL						X			
PERIDINIUM QUADRIDENS	CEL			X						
PHACUS ACUMINATUS	CEL									X
PHACUS LONGICAUDA	CEL						X			
PHACUS ORBICULARIS	CEL						X			
PHACUS PSEUDONORDSTEDTII	CEL									X
SCENEDESMUS BICAUDATUS	COL					10.3	142			
SCENEDESMUS DIMORPHUS	COL			X					0.6	49
SCENEDESMUS QUADRICAUDA	COL					3.4	47	4	1.9	148
SKELETONEMA POTAMOS	CEL							3	9.7	740
STEPHANODISCUS	CEL	12	49.0	11528			X			
STEPHANODISCUS ASTRAEA										
V. MINUTULA	CEL	11	39.2	9231				11	68.2	5182
SURIRELLA #9	CEL		0.2	45						
SURIRELLA ANGUSTA	CEL			X						
SURIRELLA LINEARIS										
V. HELVETICA ?	CEL						X			
SYNEDRA ACUS	CEL		0.4	90					1.9	148
TOTAL				23550			1372			7600

LAKE NAME: NORTON RES.
STORET NUMBER: 2010

NYGAARD TROPHIC STATE INDICES

DATE	04 15 74	06 28 74	09 30 74
MYXOPHYCEAN	0370 E	0470 E	0470 E
CHLOROPHYCEAN	0870 E	1170 E	1170 E
EUGLENOPHYTE	0.18 ?	0.07 ?	0.33 E
DIATOM	0.20 ?	1.00 E	1.33 E
COMPOUND	1470 E	2070 E	2470 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 15 74	06 28 74	09 30 74
GENUS	14	17	20
SPECIES	03	03	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 15 74	06 28 74	09 30 74
AVERAGE DIVERSITY	H	3.04	2.51	3.76
NUMBER OF TAXA	S	26.00	31.00	33.00
NUMBER OF SAMPLES COMPOSITED	M	1.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.70	4.95	5.04
MINUMUM DIVERSITY	MINH	0.03	0.02	0.06
TOTAL DIVERSITY	D	45506.80	71610.30	29665.20
TOTAL NUMBER OF INDIVIDUALS/ML	N	14970.00	28530.00	7895.00
EVENESS COMPONENT	J	0.65	0.51	0.75
RELATIVE EVENESS	RJ	0.65	0.51	0.75
MEAN NUMBER OF INDIVIDUALS/TAXA	L	575.77	920.32	239.24
NUMBER/ML OF MOST ABUNDANT TAXON	K	4786.00	11142.00	1837.00

LAKE NAME: MURTON RES.
STORET NUMBER: 2010

CONTINUED

TAXA	FORM	04 15 74 IS	04 15 74 %C	04 15 74 ALGAL UNITS PER ML	06 28 74 IS	06 28 74 %C	06 28 74 ALGAL UNITS PER ML	09 30 74 IS	09 30 74 %C	09 30 74 ALGAL UNITS PER ML
ANABAENA	FIL						X			X
ANKISTRODESMUS	CEL						X		8.2	645
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL	8	32.0	4786						
ASTERIONELLA FORMOSA	CEL					0.4	104			
CHARACIUM #2	CEL						X			
CHARACIUM NAEGELII ?	CEL						X			
CHLAMYDOMONAS	CEL				2	19.9	5675		1.9	149
CHROOMONAS ACUTA	CEL	4	24.8	3717	5	5.5	1562		6.9	546
COELASTRUM CAMBRICUM V. INTERMEDIUM	COL								0.6	50
CRUCIGENIA	COL					0.2	52			
CRUCIGENIA FENESTRATA	COL		4.8	713						
CRUCIGENIA TETRAPEDIA	COL		3.1	458				4	8.2	645
CRYPTOMONAS	CEL					0.5	156			X
CRYPTOMONAS EROSA	CEL								0.6	50
CRYPTOMONAS MARSSONII	CEL			X						
CRYPTOMONAS SPP.	CEL	3	8.2	1222						
CYCLOTELLA	CEL						X		5.7	447
DACTYLOCOCCOPSIS	CEL		2.4	356					6.3	496
DICTYOSPHAERIUM PULCHELLUM	COL			X						
DINOFLAGELLATE	CEL								0.6	50
ELAKATOTHRIX	CEL						X			
EPIPHYTE	CEL				4	21.9	6248			
EUGLENA #1	CEL							1	3.8	298
EUGLENA #2	CEL		1.0	153						
EUGLENA #3	CEL						X			
EUGLENA ACUS	CEL									X
FLAGELLATE #2	CEL		4.4	662					2.5	199
GLENODINIUM EDAX	CEL		0.7	102						
GLOEOCYSTIS ?	COL					0.4	104			
GOMPHONEMA	CEL			X						
KIRCHNERIELLA	CEL								2.5	199
LUNATE CELLS	CEL		1.0	153						
MALLOMONAS	CEL						X			
MELOSIRA DISTANS	CEL								0.6	50
MELOSIRA GRANULATA	CEL					2.7	781			X
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL				11	39.1	11142			
MERISMOPEDIA MINIMA	COL		0.3	51			X	3	23.3	1837
MERISMOPEDIA TENUISSIMA	COL					0.2	52			
MESOSTIGMA VIRIDIS	CEL		0.3	51						
MICROCYSTIS	COL		0.7	102				5	8.2	645
MICROCYSTIS INCERTA	COL					0.5	156			
NAVICULA #1	CEL			X						
NAVICULA #2	CEL					0.2	52			
NAVICULA HEUFLERI	CEL									X
NEPHROCYTIUM	COL			X						
NITZSCHIA	CEL					0.2	52			
NITZSCHIA #1	CEL									X
NITZSCHIA #2	CEL									X
NITZSCHIA TRYBLIONELLA	CEL					0.4	104			
OOCYSTIS	CEL					3.6	1041			
PANDORINA MORUM	COL				3	0.5	156			
PEDIASTRUM DUPLEX V. CLATHRATUM	COL						X			X
PHACUS	CEL									X
PHACUS ALGALUPSIS	CEL								0.6	50
SCENEDESMUS	COL							2	8.2	645
SCENEDESMUS ACUMINATUS	COL		0.3	51						
SCENEDESMUS BIJUGA	COL					0.2	52			
SCENEDESMUS DENTICULATUS	COL									X
SCENEDESMUS DIMORPHUS	COL		3.1	458			X		0.6	50
SCHROEDERIA SETIGERA	CEL					2.9	833		6.3	496
STEPHANODISCUS	CEL	2	8.5	1273		0.7	208			X
SYNEDRA	CEL		1.4	204						
SYNEDRA #1	CEL			X						
SYNEDRA #2	CEL			X						
TETRAEDRON	CEL								1.3	99
TETRASTRUM STAUROGENIAEFORME	COL		0.3	51			X		2.5	199
TRACHELOMONAS	CEL	5	2.7	407					0.6	50
TOTAL				14970			28530			7895

LAKE NAME: PERRY RES.
STORET NUMBER: 2011

NYGAARD TROPHIC STATE INDICES

DATE	04 12 74	06 25 74	10 02 74
MYXOPHYCEAN	01/0 E	0/0 D	2.00 E
CHLOROPHYCEAN	10/0 E	56/0 E	8.00 E
EUGLENOPHYTE	0.27 E	0.50 E	0.20 ?
DIATOM	1.00 E	5.00 E	2.00 E
COMPOUND	21/0 E	14/0 E	10.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 74	06 25 74	10 02 74
GENUS	03	00	11
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 12 74	06 25 74	10 02 74
AVERAGE DIVERSITY	H	3.05	2.63	2.73
NUMBER OF TAXA	S	33.00	22.00	26.00
NUMBER OF SAMPLES COMPOSITED	M	4.00	5.00	5.00
MAXIMUM DIVERSITY	MAXH	5.04	4.46	4.70
MINUMUM DIVERSITY	MINH	0.13	0.22	0.13
TOTAL DIVERSITY	D	9439.75	2906.15	6535.62
TOTAL NUMBER OF INDIVIDUALS/ML	N	3095.00	1105.00	2394.00
EVENESS COMPONENT	J	0.61	0.59	0.58
RELATIVE EVENESS	RJ	0.60	0.57	0.57
MEAN NUMBER OF INDIVIDUALS/TAXA	L	93.79	50.23	92.08
NUMBER/ML OF MOST ABUNDANT TAXON	K	806.00	368.00	741.00

LAKE NAME: PERRY RES. CONTINUED
STORET NUMBER: 2011

TAXA	FORM	04 12 74 IS	04 12 74 %	04 12 74 ALGAL UNITS PER ML	06 25 74 IS	06 25 74 %	06 25 74 ALGAL UNITS PER ML	10 02 74 IS	10 02 74 %	10 02 74 ALGAL UNITS PER ML
ACTINASTRUM GRACILIMUM	CEL			X						
ANKISTRODESMUS FALCATUS	CEL									X
ANKISTRODESMUS FALCATUS										
V. ACICULARIS	CEL		2.7	85			X			
ANKISTRODESMUS FALCATUS										
V. MIRABILIS	CEL			X						X
ASTERIONELLA FORMOSA	CEL			X						
CERATIUM HIRUNDINELLA										
F. BRACHYCERAS	CEL									X
CHLAMYDOMONAS	CEL		1.4	42			X		2.4	57
CHLOROCOCCALEAN CELL	CEL		4.1	127						
CHLORICONIUM	CEL									X
CHROOMONAS ACUTA	CEL		26.0	806		13.3	147	13	31.0	741
COCCONEIS PEDICULUS ?	CEL			X						
COELASTRUM	COL									X
COELASTRUM MICROPORUM	COL					3.3	37			
CRYPTOMONAS	CEL					33.3	368	11	11.9	285
CRYPTOMONAS EROSA	CEL		4.1	127						
CYCLOTELLA MENEGHINIANA	CEL						X			
CYCLOTELLA STELLIGERA	CEL			X						
DIATOMA VULGARE	CEL			X						
DICTYOSPHAERIUM PULCHELLUM	COL			X						
DINOFLAGELLATE	CEL									X
DIPLOPSALIS ACUTA	CEL						X			
EUASTRUM	CEL								2.4	57
EUGLENA	CEL						X			
EUGLENA #1	CEL		1.4	42						
FLAGELLATE	CEL					20.0	221			
GLENODINIUM OCULATUM ?	CEL						X			
GYMNODINIUM ALBULUM	CEL			X						
KIRCHNERIELLA	COL					3.3	37			
LUNATE CELLED COLONY	COL		1.4	42						
MELOSIRA	CEL		13.7	424						
MELOSIRA DISTANS	CEL		12.3	382			X			X
MELOSIRA GRANULATA	CEL							12	19.0	456
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL						X			
MELOSIRA ITALICA	CEL			X						
MELOSIRA VARIANS	CEL			X						
MERISMOPEDIA MINIMA	COL									X
MESOSTIGMA VIRIDIS	CEL									X
MICRACTINIUM PUSILLUM	COL			X						
MICROCYSTIS INCERTA	COL									X
NAVICULA	CEL								2.4	57
NITZSCHIA	CEL							15	19.0	456
OOCYSTIS	CEL			X						X
OSCILLATORIA	FIL		1.4	42						
PANDORINA MORUM	COL						X			
PEDIASTRUM DUPLEX										
V. CLATHRATUM	COL									X
PHACUS	CEL									X
PHACUS #1	CEL					3.3	37			
PHACUS MEGALOPSIS	CEL			X						
SCENEDESMUS ACUMINATUS	COL			X						
SCENEDESMUS BICAUDATUS	COL									X
SCENEDESMUS DENTICULATUS	COL									X
SCENEDESMUS INTERMEDIUS										
V. BICAUDATUS	COL					3.3	37			
SCENEDESMUS QUADRICAUDA	COL						X			
SCHROEDERIA SETIGERA	CEL						X		2.4	57
SKELETONEMA POTAMOS	CEL						X		4.8	114
STEPHANODISCUS	CEL							14	4.8	114
STEPHANODISCUS ASTRAEA										
V. MINUTULA	CEL		9.6	297		3.3	37			
STEPHANODISCUS TENUIS	CEL		19.2	594						
SURIRELLA ANGUSTA	CEL			X						
SYNEDRA	CEL						X			
SYNEDRA ACUS	CEL			X						
SYNEDRA RUMPENS	CEL			X						
SYNEDRA ULNA	CEL			X						
TETRASTRUM ELEGANS	COL			X						
TETRASTRUM STAURODENIAEFORME	COL		2.7	85						
TRACHELOMONAS	CEL			X						X
TRACHELOMONAS INTERMEDIA	CEL					16.7	184			
TOTAL				3495			1105			2394

LAKE NAME: POMONA RES.
STORET NUMBER: 2012

NYGAARD TROPHIC STATE INDICES

DATE	04 11 74	06 25 74	10 01 74
MYXOPHYCEAN	0/0 D	01/0 E	2.00 E
CHLOROPHYCEAN	01/0 E	01/0 E	1.00 E
EUGLENOPHYTE	1.00 E	3.00 E	0.67 E
DIATOM	1.00 E	3.00 E	2.00 E
COMPOUND	06/0 E	11/0 E	9.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 11 74	06 25 74	10 01 74
GENUS	03	06	01
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 11 74	06 25 74	10 01 74
AVERAGE DIVERSITY	H	1.95	1.72	1.84
NUMBER OF TAXA	S	12.00	15.00	17.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	3.58	3.91	4.09
MINUMUM DIVERSITY	MINH	0.05	0.05	0.39
TOTAL DIVERSITY	D	5912.40	6640.92	761.76
TOTAL NUMBER OF INDIVIDUALS/ML	N	3032.00	3861.00	414.00
EVENESS COMPONENT	J	0.54	0.44	0.45
RELATIVE EVENESS	RJ	0.54	0.44	0.40
MEAN NUMBER OF INDIVIDUALS/TAXA	L	252.67	257.40	24.35
NUMBER/ML OF MOST ABUNDANT TAXON	K	1663.00	2119.00	184.00

LAKE NAME: POMONA RES.
STORET NUMBER: 2012

CONTINUED

TAXA	FORM	04 11 74 IS	04 11 74 %C	04 11 74 ALGAL UNITS PER ML	06 25 74 IS	06 25 74 %C	06 25 74 ALGAL UNITS PER ML	10 01 74 IS	10 01 74 %C	10 01 74 ALGAL UNITS PER ML
ANKISTRODESMUS FALCATUS V. MIRABILIS	CEL	13	54.8	1663						X
APHANIZOMENON FLOS-AQUAE	FIL						X			X
CERATIUM HIRUNDINELLA F. BRACHYCERAS	CEL									X
CHLOROPHYTAN COCCOID CELLED COLONY	COL						X			
CHROOMONAS ACUTA	CEL	15	11.3	342				13	22.2	92
CLOSTERIUM	CEL									X
CRYPTOMONAS	CEL	14	4.8	147						
CRYPTOMONAS EROSA	CEL					1.2	47			X
DIPLOPSALIS ACUTA	CEL						X			X
EUGLENA #1	CEL									X
EUGLENA #2	CEL									X
EUGLENA ACUS	CEL				14	1.2	47			
EUGLENA EHRENBERGII	CEL						X			
EUGLENA GRACILIS	CEL				15	1.2	47			
EUGLENA TRIPTERIS	CEL						X			
GLENODINIUM OCULATUM	CEL							12	11.1	46
GYROSIGMA	CEL									X
MELOSIRA DISTANS	CEL		3.2	98						X
MELOSIRA GRANULATA	CEL				11	54.9	2119			X
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL	13	9.7	293	13	19.5	753			
MELOSIRA ITALICA	CEL							13	44.4	184
MERISMOPEDIA TENUISSIMA	COL							14	22.2	92
NITZSCHIA	CEL			X						
NITZSCHIA #1	CEL						X			
NITZSCHIA VERMICULARIS	CEL			X						
PHACUS ACUMINATUS	CEL						X			
PHACUS MEGALOPSIS	CEL			X						
PHACUS PSEUDONORDSTEDTII	CEL						X			
SCENEDESMUS BICAUDATUS	COL					1.2	47			
STEPHANODISCUS	CEL			X						
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL	12	16.1	489	12	20.7	801			X
SURIRELLA	CEL									X
SYNEDRA	CEL			X						
SYNEDRA ACUS	CEL			X						
TOTAL				3032			3861			414

LAKE NAME: TORONTO RES.
STORET NUMBER: 2013

NYGAARD TROPHIC STATE INDICES

DATE	04 10 74	06 24 74	10 02 74
MYXOPHYCEAN	0/0 U	1.00 E	3.00 E
CHLOROPHYCEAN	02/0 E	1.00 E	3.00 E
EUGLENOPHYTE	1.00 E	2.00 E	0.50 E
DIATOM	0.50 E	1.00 E	1.25 E
COMPOUND	07/0 E	9.00 E	14.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 10 74	06 24 74	10 02 74
GENUS	03	01	01
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 10 74	06 24 74	10 02 74
AVERAGE DIVERSITY	H	1.73	1.76	3.01
NUMBER OF TAXA	S	17.00	17.00	23.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.09	4.09	4.52
MINUMUM DIVERSITY	MINH	0.06	0.26	0.45
TOTAL DIVERSITY	D	6402.73	1195.04	1547.14
TOTAL NUMBER OF INDIVIDUALS/ML	N	3701.00	679.00	514.00
EVENESS COMPONENT	J	0.42	0.43	0.67
RELATIVE EVENESS	RJ	0.42	0.40	0.63
MEAN NUMBER OF INDIVIDUALS/TAXA	L	217.71	39.94	22.35
NUMBER/ML OF MOST ABUNDANT TAXON	K	2355.00	255.00	103.00

LAKE NAME: TORONTO RES.
STORET NUMBER: 2013

CONTINUED

TAXA	FORM	04 10 74 IS	04 10 74 %C	04 10 74 ALGAL UNITS PER ML	06 24 74 IS	06 24 74 %C	06 24 74 ALGAL UNITS PER ML	10 02 74 IS	10 02 74 %C	10 02 74 ALGAL UNITS PER ML
ANABAENA #1	FIL						X			X
ANABAENA #2	FIL								20.0	103
ANKISTRODESMUS FALCATUS V. MIRABILIS	CEL		4.5	168						
CERATIUM HIRUNDINELLA F. FURCOIDES	CEL									X
CHLAMYDOMONAS	CEL			X					6.6	34
CHROOMONAS ACUTA	CEL		10.6	393	12	37.6	255		13.4	69
CLOSTERIUM	CEL						X			X
COELASTRUM MICROPORUM	COL						X			X
CRUCIGENIA TETRAPEDIA	COL								6.6	34
CRYPTOMONAS EROSA	CEL		12.1	449	11	37.6	255		20.0	103
CYCLOTELLA MENEGHINIANA	CEL									X
CYMATOPLEURA SOLEA	CEL			X						
CYMBELLA	CEL			X						X
DINOBRYON SERTULARIA	CEL			X						
DIPLONEIS SMITHII V. PUMILA	CEL						X			
EUDORINA	CEL						X			
EUGLENA	CEL									X
EUGLENA ACUS	CEL						X			
EUGLENA EHRENBERGII	CEL						X			
EUGLENA GRACILIS	CEL			X						
GYMNODINIUM ALBULUM	CEL						X			
GYROSIGMA	CEL						X			
KIRCHNERIELLA CONTORTA	CEL			X						
MELOSIRA DISTANS	CEL		3.0	112					13.4	69
MELOSIRA GRANULATA	CEL		6.1	224	3	18.7	127			X
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL						X			
NAVICULA SALINARIUM V. INTERMEDIA	CEL									X
NITZSCHIA	CEL			X						
NITZSCHIA #1	CEL						X			X
NITZSCHIA APICULATA ?	CEL			X						
NITZSCHIA SIGMOIDEA	CEL			X						
OSCILLATORIA	FIL									X
PENNATE DIATOM	CEL								6.6	34
PHACUS #1	CEL									X
PHACUS #2	CEL						X			
PHACUS ACUMINATUS	CEL			X						
SCHROEDERIA SETIGERA	CEL								6.6	34
STEPHANODISCUS	CEL		63.6	2355						
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL				14	6.2	42			X
STEPHANODISCUS HANTZSCHII	CEL									X
SYNEDRA ULNA	CEL			X						
TRACHELOMONAS INTERMEDIA	CEL						X		6.6	34
TOTAL				3701			679			514

LAKE NAME: TUTTLE CREEK RES.
STORET NUMBER: 2014

NYGAARD TROPHIC STATE INDICES

DATE	04 11 74	06 25 74	10 02 74
MYXOPHYCEAN	01/0 E	0/0 0	02/0 E
CHLOROPHYCEAN	04/0 E	02/0 E	09/0 E
EUGLENOPHYTE	0.40 E	1.00 E	0.09 ?
DIATOM	0.29 ?	02/0 E	1.17 E
COMPOUND	09/0 E	06/0 E	19/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 11 74	06 25 74	10 02 74
GENUS	09	01	03
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 11 74	06 25 74	10 02 74
AVERAGE DIVERSITY	H	0.95	0.95	2.15
NUMBER OF TAXA	S	22.00	9.00	30.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	4.46	3.17	4.91
MINUMUM DIVERSITY	MINH	0.02	0.05	0.10
TOTAL DIVERSITY	D	13040.65	1935.15	8213.00
TOTAL NUMBER OF INDIVIDUALS/ML	N	13727.00	2037.00	3820.00
EVENESS COMPONENT	J	0.21	0.30	0.44
RELATIVE EVENESS	RJ	0.21	0.29	0.43
MEAN NUMBER OF INDIVIDUALS/TAXA	L	623.95	226.33	127.33
NUMBER/ML OF MOST ABUNDANT TAXON	K	10947.00	1703.00	1641.00

LAKE NAME: TUTTLE CREEK RES.
STORET NUMBER: 2014

CONTINUED

TAXA	FORM	04 11 74 IS	04 11 74 %C	04 11 74 ALGAL UNITS PER ML	06 25 74 IS	06 25 74 %C	06 25 74 ALGAL UNITS PER ML	10 02 74 IS	10 02 74 %C	10 02 74 ALGAL UNITS PER ML
ACTINASTRUM GRACILIMUM	CEL			X						
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL		1.3	181						X
ANKISTRODESMUS FALCATUS V. MIRABILIS	CEL									X
CHROOMONAS ACUTA	CEL		16.3	2238		9.1	183		4.1	158
COCCOID CELL	CEL			X						
CRUCIGENIA TETRAPEDIA	COL								0.8	32
CRYPTOMONAS	CEL					1.5	30			
CRYPTOMONAS EROSA	CEL		1.3	181					0.8	32
CRYPTOMONAS REFLEXA	CEL		0.4	60						
CYCLOTELLA MENEGHINIANA	CEL			X						X
CYST	CEL			X						
DACTYLOCOCCOPSIS ACICULARIS	CEL									X
DICTYOSPHAERIUM PULCHELLUM	COL			X						X
DIPLOPSALIS ACUTA	CEL						X			
EUGLENA	CEL					1.5	30			
EUGLENA GRACILIS	CEL									X
FLAGELLATE	CEL								7.4	284
GLENODINIUM OCULATUM	CEL			X						
GLENODINIUM OCULATUM ?	CEL									X
GOMPHONEMA OLIVACEUM	CEL									X
GYROSIGMA	CEL									X
MELOSIRA DISTANS	CEL									X
MELOSIRA GRANULATA	CEL									X
MELOSIRA ITALICA	CEL									X
MELOSIRA ITALICA V. TENUISSIMA	CEL					3.0	61			
NAVICULA	CEL			X						
NAVICULA CRYPTOCEPHALA ?	CEL									X
NITZSCHIA	CEL								43.0	1641
NITZSCHIA #1	CEL									X
NITZSCHIA #2	CEL		0.4	60						
NITZSCHIA LONGISSIMA V. REVERSA	CEL									X
NITZSCHIA SIGMOIDEA	CEL			X						
OSCILLATORIA	FIL								0.8	32
OSCILLATORIA AGARDHII	FIL			X						
PHACUS MEGALOPSIS	CEL			X						
PTEROMONAS ANGULOSA	CEL									X
SCENEDESMUS ABUNDANS	COL									X
SCENEDESMUS ARCUATUS	COL					1.5	30			X
SCENEDESMUS DIMORPHUS	COL		0.4	60			X			X
SCENEDESMUS INTERMEDIUS	COL									X
SCHROEDERIA SETIGERA	CEL									X
SKELETONEMA POTAMOS	CEL								4.9	189
STEPHANODISCUS	CEL		79.7	10947					32.2	1231
STEPHANODISCUS ASTRAEA V. MINUTULA	CEL					83.6	1703		5.8	221
SURIRELLA	CEL			X						
SURIRELLA #9	CEL			X						
SURIRELLA ANGUSTA	CEL			X						
SYNEDRA ACUS	CEL			X						
TRACHELOMONAS INTERMEDIA	CEL						X			
TRACHELOMONAS VERRUCOSA	CEL			X						
TOTAL				13727			2037			3820

LAKE NAME: WILSON RES.
STORET NUMBER: 2015

NYGAARD TROPHIC STATE INDICES

DATE	04 12 74	06 26 74	10 01 74
MYXOPHYCEAN	3.00 E	0/0 O	1.00 E
CHLOROPHYCEAN	9.00 E	07/0 E	2.00 E
EUGLENOPHYTE	0.17 ?	0/07 ?	0.13 ?
DIATOM	0.29 ?	0/01 ?	0.50 E
COMPOUND	16.0 E	07/0 E	3.60 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 74	06 26 74	10 01 74
GENUS	09	00	07
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 12 74	06 26 74	10 01 74
AVERAGE DIVERSITY	H	2.75	1.32	2.52
NUMBER OF TAXA	S	28.00	12.00	28.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	4.81	3.58	4.81
MINUMUM DIVERSITY	MINH	0.04	0.15	0.08
TOTAL DIVERSITY	D	25250.50	1103.52	11476.08
TOTAL NUMBER OF INDIVIDUALS/ML	N	9182.00	836.00	4554.00
EVENESS COMPONENT	J	0.57	0.37	0.52
RELATIVE EVENESS	RJ	0.57	0.35	0.52
MEAN NUMBER OF INDIVIDUALS/TAXA	L	327.93	69.67	162.64
NUMBER/ML OF MOST ABUNDANT TAXON	K	3438.00	575.00	1847.00

LAKE NAME: WILSON RES.
STORET NUMBER: 2015

CONTINUED

TAXA	FORM	04 12 74 #S	04 12 74 %C	04 12 74 ALGAL UNITS PER ML	06 26 74 #S	06 26 74 %C	06 26 74 ALGAL UNITS PER ML	10 01 74 #S	10 01 74 %C	10 01 74 ALGAL UNITS PER ML
ALTINASTRUM GRACILIMUM	CEL									X
ANKISTRODESMUS FALCATUS V. MIRABILIS	CEL		7.2	659					0.9	43
ASTERIONELLA FORMOSA V. GRACILLIMA	CEL			X						
BOTRYOCOCCUS SUDETICUS	COL						X			
CERATIUM HIRUNDINELLA F. SCOTTICUM	CEL						X			
CHLAMYDOMONAS	CEL						X			
CHROOMONAS ACUTA	CEL	14	15.4	1413	11	68.8	575		1.9	86
CLOSTERIUM	CEL			X						X
COCCONEIS ?	CEL			X						
COELASTRUM MICROPORUM	COL			X			X	15	1.9	86
COSMARIUM	CEL								0.9	43
COSMARIUM #1	CEL									X
COSMARIUM #2	CEL									X
CRUCIGENIA QUADRATA	COL		1.0	94						X
CRUCIGENIA TETRAPEDIA	COL		1.0	94			X		2.8	329
CRYPTOMONAS	CEL				12	18.8	157			
CRYPTOMONAS EROSA	CEL	15	4.1	377					1.9	86
DACTYLOCOCCOPSIS IRREGULARIS	CEL		6.7	612					2.8	329
DIPLONEIS SMITHII V. PUMILA	CEL						X			
DIPLOPSALIS ACUTA	CEL									X
ELAKATOTHRIX GELATINOSA	CEL			X						
ENTOMONEIS ALATA	CEL			X						
EUGLENA	CEL			X						
EUGLENA GRACILIS	CEL									X
GYMNODINIUM ALBULUM ?	CEL			X						
GYROSIGMA ?	CEL			X						X
MICROCYSTIS AERUGINOSA	COL									X
MICROCYSTIS INCERTA	COL									X
NITZSCHIA #1	CEL		0.5	47						
OOCYSTIS	COL	12	11.8	1083	13	6.2	52	14	5.7	258
OSCILLATORIA	FIL			X					0.9	43
OSCILLATORIA LIMNETICA	FIL		1.0	94				13	25.5	1160
PEDIASTRUM DUPLEX V. CLATHRATUM	COL			X						X
PHACUS ACUMINATUS	CEL			X						
PHACUS MEGALOPSIS	CEL									X
SCENEDESMUS BALATONICUS	COL			X			X			X
SCENEDESMUS DIMORPHUS	COL								0.9	43
SCENEDESMUS QUADRICAUDA	COL			X						X
SKELETONEMA POTAMOS	CEL		1.0	94						
SPHAEROCYSTIS SCHROETERI	COL				14	6.2	52			
STAURASTRUM	CEL									X
STEPHANODISCUS INVISITATUS	CEL	13	12.3	1130				11	40.6	1847
SURIRELLA #9	CEL		0.5	47						
SYNEDRA ACUS	CEL	11	37.4	3438				12	13.2	601
SYNEDRA ULNA	CEL			X						
TETRAEDRON MINIMUM	CEL						X			
TOTAL				9182			836			4554

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

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4. TITLE AND SUBTITLE DISTRIBUTION OF PHYTOPLANKTON IN KANSAS LAKES		5. REPORT DATE June 1979
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15. SUPPLEMENTARY NOTES

16. ABSTRACT

This is a data report presenting the species and abundance of phytoplankton in the 15 lakes sampled by the National Eutrophication Survey in the State of Kansas. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
*aquatic microbiology lakes *phytoplankton water quality	Kansas lake eutrophication Nygaard's trophic indices Palmer's organic pollution indices Species diversity and abundance indices	06 C, M 08 H 13 B

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