

United States
Environmental Protection
Agency

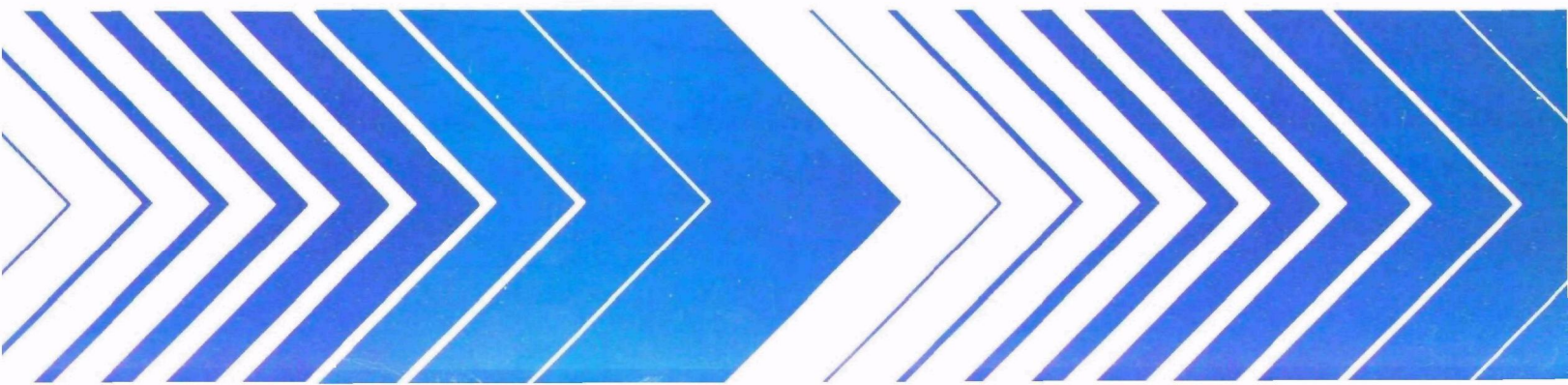
Environmental Monitoring
Systems Laboratory
P.O. Box 15027
Las Vegas NV 89114

Research and Development



Distribution of Algae in Pennsylvania

Working Paper 689



DISTRIBUTION OF ALGAE IN PENNSYLVANIA

Working Paper No. 689

National Eutrophication Survey
Office of Research and Development
U.S. Environmental Protection Agency

December 1977

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs. The Survey was designed to develop, in conjunction with State environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and State management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

The Survey collected physical, chemical, and biological data from 815 lakes and reservoirs throughout the contiguous United States. To date, the Survey has yielded more than two million data points. In-depth analyses are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. The working paper series reports the results of eutrophication and related investigations.

CONTENTS

Foreward.....	iii
Part I: DISTRIBUTION OF PHYTOPLANKTON IN LAKES.....	1
Part II: DISTRIBUTION OF ALGAE IN YORK COUNTY.....	50

PART I: DISTRIBUTION OF PHYTOPLANKTON IN LAKES

by

Fabienne A. Hiatt*, S. C. Hern, J. W. Hilgert*, V. W. Lambou,
F. A. Morris*, M. K. Morris*, L. R. Williams, and W. D. Taylor

Water and Land Quality Branch
Monitoring Operations Division
Environmental Monitoring and Support Laboratory
Las Vegas, Nevada 89114

*Department of Biological Sciences
The University of Nevada, Las Vegas
Las Vegas, Nevada 89154

CONTENTS

Introduction	2
Materials and Methods	4
Lake and Site Selection	4
Sample Preparation	4
Examination	5
Quality Control	6
Results	7
Nygaard's Trophic State Indices	7
Palmer's Organic Pollution Indices	7
Species Diversity and Abundance Indices	9
Species Occurrence and Abundance	10
Literature Cited	11
Appendix: Summary of Phytoplankton Data	12

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 1973, the Survey sampled 250 lakes in 17 States. Over 700 algal species and varieties were identified and enumerated from the 694 water samples examined.

This report presents the species and abundance of phytoplankton in the 17 lakes sampled in the State of Pennsylvania (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 PENNSYLVANIA

<u>STORET #</u>	<u>LAKE NAME</u>	<u>COUNTY</u>
4201	Blanchard Reservoir	Centre
4204	Conneaut Lake	Crawford
4207	Greenlane Dam	Montgomery
4213	Pymatuning Reservoir	Crawford, Mercer (Ashtabula in OH)
4216	Shenango River Reservoir	Mercer (Trumbull in OH)
4219	Beaver Run Reservoir	Westmoreland
4220	Beltzville Dam	Carbon
4221	Lake Canadohta	Crawford
4222	Harveys Lake	Luzerne
4223	Indian Lake	Somerset
4224	Lake Naomi	Monroe
4225	Lake Ontelaunee	Berks
(Continued)		

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

STORET #	LAKE NAME	COUNTY
4226	Pinchot Lake (Conewago Lake)	York
4227	Pocono Lake	Monroe
4228	Stillwater Lake	Monroe
4229	Lake Wallenpaupack	Pike
3641	Allegheny Reservoir (Kinzua Dam)	Warren (Cattaraugus in NY)

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 drop of superconcentrate from the bottom of the test tube was placed in a ring of clear Karo® Corn Syrup with phenol (a few crystals of phenol were added to each 100 ml of syrup) on a glass slide, 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.

® Registered trademark

QUALITY CONTROL

Internal quality control intercomparisons on species identifications and counts were performed on a regular basis among project phycologists at the rate of 7 percent. 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

The Appendix summarizes all of the phytoplankton data collected from the State by the Survey. It is organized by lake, including 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 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.

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

Index	Calculation	Oligotrophic	Eutrophic
Myxophycean	<u>Myxophyceae</u> Desmideae	0.0-0.4	0.1-3.0
Chlorophycean	<u>Chlorococcales</u> Desmideae	0.0-0.7	0.2-9.0
Diatom	<u>Centric Diatoms</u> Pennate Diatoms	0.0-0.3	0.0-1.75
Euglenophyte	<u>Euglenophyta</u> Myxophyceae + Chlorococcales	0.0-0.2	0.0-1.0
Compound	<u>Myxophyceae + Chlorococcales +</u> <u>Centric Diatoms + Euglenophyta</u> Desmideae	0.0-1.0	1.2-25

TABLE 3. ALGAL GENUS POLLUTION INDEX
(Palmer 1969)

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

TABLE 4. ALGAL SPECIES POLLUTION INDEX
(Palmer 1969)

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

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):

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

where P is the proportion of the i th taxon in the sample, which is calculated from n_i/N ; n_i is the number of individuals per milliliter of the i th 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 a 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 $\log_2 S$, the total diversity (D) was calculated from HN, and the evenness component of diversity (J) was estimated from H/MaxH (Pielou 1966). Also given in the Appendix 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).

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 species. 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 the Appendix, 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 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 (%) 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 N. Artin (ed.), Theory of Probability and Its Applications (translation of "Teoriya Veroyatnosei i ee Premeneniya") 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.
- Zand, S. M. 1976. Indexes associated with information theory in water quality. Journal WPCF. 48(8):2026-2031.

APPENDIX. 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.

LAKE NAME: BLANCHARD RES.
STORET NUMBER: 4201

NYGAARD TROPHIC STATE INDICES

DATE	04 13 73	07 24 73	10 02 73
MYXOPHYCEAN	0/0 C	2.00 E	1.50 E
CHLOROPHYCEAN	0/0 C	24.0 E	4.00 E
EUGLENOPHYTE	01/0 E	0/26 ?	0.18 ?
DIATOM	0.13 ?	0.12 ?	1.67 E
COMPCUND	03/0 E	27.0 E	9.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 13 73	07 24 73	10 02 73
GENUS	02	06	01
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 13 73	07 24 73	10 02 73
AVERAGE DIVERSITY H	2.40	2.94	2.24
NUMBER OF TAXA S	20.00	41.00	27.00
NUMBER OF SAMPLES COMPOSITED M	3.00	3.00	2.00
MAXIMUM DIVERSITY MAXH	4.32	5.36	4.75
TOTAL DIVERSITY D	1312.90	26659.92	2009.29
TOTAL NUMBER OF INDIVIDUALS/ML N	547.00	9068.00	897.00
EVENESS COMPONENT J	0.56	0.55	0.47
MEAN NUMBER OF INDIVIDUALS/TAXA L	27.35	221.17	33.22
NUMBER/ML OF MOST ABUNDANT TAXON K	212.00	3680.00	359.00

04 13 73

07 24 73

10 02 73

TAXA	FORM	ALGAL UNITS PER ML			ALGAL UNITS PER ML			ALGAL UNITS PER ML		
		S	TC		S	TC		S	TC	
ACHNANTHES LANCEOLATA	CEL									
V. CURIA	CEL			X						
AMPHOPA	CEL									X
ANABAENA	FIL									X
ANKISTRODES MUS	CEL				0.8	69				
APHANIZCHENON FLOS-AQUAE	FIL									X
APHANOTHECE ?	COL									X
ASTERIONELLA	CEL					X				
ASTERIONELLA FORMOSA	CEL					X				
ASTEROCOCCLUS ?	COL						0.7			6
ECTRYOCOCCLUS BRAUNII	COL									X
CENTRIC DIATOM	CEL						1.4			13
CHLAMYDOMONAS	CEL					X				
CHLORELLA	CEL					X				
CHLOROPHYTAN CELL	CEL									X
CLESTERIUM	CEL				0.3	23		0.7		6
COCCONEIS PLACENTULA	CEL			X						
V. EUGLYPTA	CEL									
COCCONEIS PLACENTULA	CEL			X						
V. LINEATA	CEL									
CCELASTRUM MICROPSIDRUM	COL				4	2.8	255			
CCELASTRUM PETICULATUM	COL				2	12.5	1134			X
CRUCIGENTIA RECTANGULARIS	COL						X			
CRYPTOMONAS OVATA	CEL	1	38.8	212		1.8	162	5	2.9	26
CYANOPHYTAN FILAMENT	FIL					0.3	23			
CYMBELLA #1	CEL						X			
CYMBELLA #2	CEL			X						
DIATOMA VULGARE	CEL			X						
DICTYOSPHAERIUM MULCHELLUM	COL					X				
ELAKATCTHRIX ?	COL				1.0	92				
EUGLENA GRACILIS	CEL			X						
FLAGELLATES	CEL	2	20.3	112		2.8	254		2.9	26
FRAGILARIA	CEL				5	3.8	347			X
FRAGILARIA CROTONENSIS	CEL	4	11.3	62				2	38.6	346
GOMPHONEMA HERCULFANA	CEL			X			X			
MELCIRA	CEL			X						
MELOSIRA GRANULATA	CEL							3	4.3	39
MELOSIRA GRANULATA	CEL									
V. ANGUSTISSIMA	CEL				0.5	46		4	2.9	26
MELOSIRA ITALICA	CEL							1	40.0	359
PEPICION	CEL			X						
MICROCYSTIS INCERTA	COL						X			
NAVICULA #1	CEL		2.2	12			X			
NAVICULA #2	CEL			X						
NAVICULA LANCEOLATA	CEL	5	6.3	37						
NITZSCHIA	CEL			X						
CCCYSTIS	CEL				3	19.4	1759		2.1	19
ODOCYSTIS PARVA	CEL				1	40.6	3680			
PECIASTRUM BORYANUM	COL						X			
PECIASTRUM CUPLEX	CEL									
V. GRACILIMUM	CEL								0.7	6
PECIASTRUM CUPLEX	CEL									
V. RETICULATUM	COL				0.5	46				
PECIASTRUM CUPLEX	CEL									
V. ROTUNDATUM	COL						X			
PECIASTRUM SIMPLEX	CEL									
V. DUODENARIUM	COL						X			X
PENNATE DIATOMS	CEL				2.0	185				
PHACUS LONGICAUDA	CEL									X
PHACOSPHERIA CURVATA	CEL			X						
SCENEDESMUS	COL									X
SCENEDESMUS #2	COL									X
SCENEDESMUS ARCUATUS	CEL									
V. CAPITATUS	COL				1.8	162				
SCENEDESMUS ARMATUS	COL				1.0	92				
SCENEDESMUS BICAUDATUS	COL						X			
SCENEDESMUS BIJUGA	COL				2.0	185				
SCENEDESMUS DENTICULATUS	COL				0.5	46				
SCENEDESMUS DIMORPHUS	COL						X			
SCENEDESMUS INTERMEDIUS	CEL									
V. BICAUDATUS	COL				2.0	185				
SCENEDESMUS QUADRICAUDA	COL				0.3	23				
SCENEDESMUS SPP.	COL				0.5	46				
SCHIZOCHLAMYX ?	COL				2.8	254				
SCHROEDERIA SETIGERA	CEL							0.7		6
SELENASTRUM ?	CEL						X			
SPHAEROCYSTIS SCHROETERI	CEL						X			
STAUROCYSTIS	CEL							0.7		6
STEPHANODISCUS	CEL		6.8	37						X
SURIELLA	CEL			X			X			
SYNECRA ULNA	CEL	3	13.7	75						
TETRASTRUM HETERACANTHUM	COL						X			
TRACHELONAS VOLVOGINA	CEL							1.4		13
TOTAL						547			9068	
										897

LAKE NAME: CONNEAUT LAKE
 STCET NUMBER: 4204

NYGAARD TROPHIC STATE INDICES

DATE	04 21 73	07 27 73	10 05 73
MYXOPHYCEAN	01/0 E	04/0 E	9.00 E
CHLOROPHYCEAN	01/0 E	02/0 E	2.00 E
EUGLENOPHYTE	0/02 ?	0/06 ?	0.10 ?
DIATOM	0.33 E	0.50 E	0.90 E
COMPCUND	05/0 E	09/0 E	15.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 21 73	07 27 73	10 05 73
GENUS	01	02	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 21 73	07 27 73	10 05 73
AVERAGE DIVERSITY H	2.36	3.02	2.89
NUMBER OF TAXA S	21.00	18.00	25.00
NUMBER OF SAMPLES COMPOSITED M	2.00	2.00	2.00
MAXIMUM DIVERSITY MAXH	4.39	4.17	4.70
TOTAL DIVERSITY D	2329.32	2985.79	1479.58
TOTAL NUMBER OF INDIVIDUALS/ML N	987.00	989.00	512.00
EVENESS COMPONENT J	0.54	0.72	0.61
MEAN NUMBER OF INDIVIDUALS/TAXA L	47.00	54.94	19.59
NUMBER/ML OF MOST ABUNDANT TAXON K	335.00	203.00	132.00

LAKE NAME: CONNEAUT LAKE
STORET NUMBER: 4204

CONTINUED

04 21 73

07 27 73

10 05 73

TAXA	FORM	ALGAL			ALGAL			ALGAL		
		S	SC	PER ML	S	SC	PER ML	S	SC	PER ML
ACHNANTHES MICROCEPHALA ?	CEL				7.7		76			
ANABAENA	FIL				2.5		25			
ANABAENA #2	FIL							2.5		13
ANABAENA PLANTONICA	FIL				20.5		203	2.5		132
APHANOCAPSA ? ELACHTISA	CEL						X			X
APHANOCAPSA ELACHTISA	CEL									X
ASTERIONELLA FORMOSA	CEL	4	22.3	220						X
BACTERIOCCUS BRAUNII	CEL									X
CERATIUM HIRUNDINELLA	CEL						X	4	5.1	26
CHLAMYDOMONAS	CEL			X						X
CHROCOCCUS	COL									X
CHROSPHYTAN FLAGELLATE	CEL			X						X
CLISTERIUM	CEL									X
COCCONEIS	CEL						X			
COCCONEIS PLACENTULA										
V. EUGLYPTA	CEL									X
COCCONEIS SCUTELLUM	CEL			X						
COELOSPHAERIUM NAEGELIANUM	COL						X			X
CRYPTOMONAS	CEL				3	15.4	152			
CRYPTOMONAS OVATA	CEL							3	10.4	53
CRYPTOMONAS TENUIS ?	CEL			X						X
CYANOPHYTAN FILAMENT	FIL			X						X
CYCLOTELLA BOONANICA	CEL	2	17.8	176						
CYCLOTELLA STELLIGERA	CEL							2.5		13
CYMBELLA	CEL									X
DINOBRYON BAVARIUM	CEL				4	12.8	127			
DINOBRYON DIVERGENS	CEL		0.9	9						
EPITHEMIA	CEL			X						
EPITHEMIA TURGIDA	CEL									X
EUDORINA ELEGANS	CEL		0.9	9						
FLAGELLATE #3	CEL	3	33.9	335						
FLAGELLATE #9	CEL							2.5		13
FLAGELLATES	CEL				5	10.3	102	5	20.5	105
FRAGILARIA	CEL						X			
FRAGILARIA #1	CEL	5	9.8	57						
FRAGILARIA CROTONENSIS	CEL			X						
GLENODINIUM	CEL		0.9	9		2.5	25			
LYNGBYA	FIL									X
MALLONONAS	CEL							2.5		13
MELCISTR #3	CEL						X	5.1		26
MELCISTR GRANULATA										
V. ANGUSTISSIMA	CEL									X
MELCISTR ISLANDICA ?	CEL			X						
MICROCYSTIS AERUGINOSA	COL									X
NAVICULA #1	CEL			X						
NAVICULA CRYPTOCEPHALA	CEL			X						
NAVICULA GASTRUM	CEL			X						
NITZSCHIA #1	CEL			X						
PANDORINA MORUM	COL						X			
SCENEDESMUS ABUNDANS	COL				2.5		25			
SPHAEROCYSTIS ? SCHROETERI	COL						X			
SPHAEROCYSTIS SCHROETERI	COL									X
STEPHANODISCUS ASTRAEA	CEL				2	19.0	178	2	20.5	105
STEPHANODISCUS NIAGARAE ?	CEL	1	13.4	132						
SYNECRA #1	CEL							2.5		13
SYNECRA #2	CEL				7.7		76			
TETRAEDRON ARTHRODESPIFORME										
V. CONTORTA	CEL			X						
TRACHELONONAS MISIPICA	CEL									X
TOTAL				987			989			512

LAKE NAME: GREENLAND DAM
SECRET NUMBER: 4207

NYGAARD TROPHIC STATE INDICES

	DATE	04 17 73	07 24 73	10 03 73
MYXOPHYCEAN	0/0	C	2.50 E	4.00 E
CHLOROPHYCEAN	04/0	E	3.00 E	8.00 E
EUGLENOPHYTE	0/04	?	0.09 ?	0/12 ?
DIATOM	0.40	E	1.50 E	0.64 E
COMPOUND	09/0	E	7.50 E	19.0 E

PALMER'S ORGANIC POLLUTION INDICES

	DATE	04 17 73	07 24 73	10 03 73
GENUS		09	02	10
SPECIES		04	00	06

SPECIES DIVERSITY AND ABUNDANCE INDICES

	DATE	04 17 73	07 24 73	10 03 73
AVERAGE DIVERSITY	H	0.67	1.65	3.02
NUMBER OF TAXA	S	21.00	20.00	34.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	1.00	3.00
MAXIMUM DIVERSITY	MAXH	4.39	4.32	5.09
TOTAL DIVERSITY	D	10231.57	4557.30	17688.14
TOTAL NUMBER OF INDIVIDUALS/ML	N	15271.00	2762.00	5857.00
EVENNESS COMPONENT	J	0.15	0.38	0.59
MEAN NUMBER OF INDIVIDUALS/TAXA	L	727.19	138.10	172.26
NUMBER/ML OF MOST ABUNDANT TAXON	K	13676.00	1967.00	1838.00

04 17 73

07 24 73

10 03 73

TAXA	FORM	S		ALGAL UNITS PER ML	S		ALGAL UNITS PER ML	S		ALGAL UNITS PER ML
		S	SC		S	SC		S	SC	
ACHNANTHES LANCEOLATA	CEL			X						X
ANABAENA	FIL							5	5.9	344
APHANIZOEMON	FIL				11	71.2	1967			
APHANIZOEMON FLOPS-AQUAE	FIL									X
ASTERIONELLA FORMOSA	CEL			X						
ASTERIONELLA FORMOSA										
V. GRACILLIMA	CEL		0.2	28						
BOTRYOCOCCLUS BRAUNII	COL						X			
CENTRIC DIATOM	CEL						X		1.2	65
CERATIUM HIRUNDINELLA	CEL						X			
CHLAMYDOMONAS ?	CEL	31	7.1	1091						
COCCOID CELL	CEL									X
COELASTRUM MICROSPORUM	COL					0.9	22	4	7.8	459
COELOSPHAERIUM NAEGELIANUM	COL				5	2.4	66			
COCCIDIUM #1	CEL						X			
COCCIDIUM #2	CEL						X			
CRUCIGENTIA APICULATA ?	COL								0.4	23
CRYPTOMONAS BRUSA	CEL	21	0.9	140						
CRYPTOMONAS OVATA	CEL							11	20.0	1171
CYCLOSTELLA MENEGHINIANA	CEL								1.6	92
DIATOMA	CEL			X						X
EUNOTIA	CEL			X						
FLAGELLATES	CEL								4.7	276
FRAGILARIA	CEL									X
FRAGILARIA CROTONENSIS	CEL				31	5.6	155	31	31.4	1838
GOMPHONEMA ANGUSTATUM										
V. PRODUCTA	CEL			X						
KIRCHMERIELLA BRUSA ?	CEL									X
MELOSIRA DISTANS	CEL	51	0.6	84						
MELOSIRA GRANULATA	CEL				21	9.6	265	21	11.4	666
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL						X		0.4	23
MELOSIRA ITALICA	CEL		0.7	112						
MELOSIRA ITALICA										
V. TENUISSIMA	CEL									X
MELOSIRA VARIANS	CEL			X						
MICROCYSTIS AERUGINOSA	COL					2.4	66			
MICROCYSTIS INCERTA	COL					0.8	22		1.2	65
NAVICULA	CEL			X						
NAVICULA #1	CEL						X			
NAVICULA #2	CEL									X
NAVICULA LANCEOLATA ?	CEL									X
NITZSCHIA	CEL								1.2	65
NITZSCHIA #1	CEL			X						
NITZSCHIA #2	CEL									X
OOCYSTIS	CEL				41	4.8	133			
OSILLATORIA	FIL								0.4	23
PANOCPTIA MORUM	COL	41	0.2	28						
PEDIASTRUM BORYANUM	COL			X						
PEDIASTRUM DUPLEX										
V. CLATHRATUM	COL						X			
PEDIASTRUM DUPLEX										
V. RETICULATUM	COL									X
PEDIASTRUM SIMPLEX										
V. CUODENARIUM	COL									X
PENNATE DIATOM	CEL								0.5	46
PHORMIDIUM MUCICOLA	COL						X			
SCENEDESMUS	COL								0.4	23
SCENEDESMUS ACUTUS										
V. ALTERNANS	COL			X						
SCENEDESMUS DENTICULATUS	COL					0.8	22			
SCENEDESMUS INTERMEDIUS ?	COL								5.8	574
SCENEDESMUS QUADRICAUDA	COL								1.2	69
SCENEDESMUS QUADRICAUDA ?	COL		0.4	56						
SCENEDESMUS QUADRICAUDA										
V. LONGISPINA	COL		0.2	28						
SPHAEROCYSTIS ? SCHROETERI	COL					0.8	22			
STAUROSTRUM PARACXUM	CEL									X
STEPHANODISCUS ?	CEL									X
STEPHANODISCUS ASTRAEA	CEL									X
STEPHANODISCUS HANTZSCHII	CEL	11	99.6	13676						
SURTRELLA	CEL									X
SYNECRA	CEL		0.2	28						
SYNECRA DELICATISSIMA ?										
V. ANGUSTISSIMA	CEL			X						
SYNECRA DELICATISSIMA										
V. ANGUSTISSIMA	CEL								0.4	23
TRACHELONONAS	CEL					0.8	22			
TOTAL				15271			2762			5857

LAKE NAME: PYMATUNING
 STCRET NUMBER: 4213

NYGAARD TROPHIC STATE INDICES

DATE	04 21 73	07 31 73	10 06 73
MYXOPHYCEAN	2.67 E	2.40 E	3.20 E
CHLOROPHYCEAN	5.00 E	5.50 E	5.40 E
EUGLENOPHYTE	0.04 ?	0.05 ?	0.05 ?
DIATOM	1.00 E	1.00 E	1.00 E
COMPCUND	10.3 E	9.50 E	10.4 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 21 73	07 31 73	10 06 73
GENUS	19	17	16
SPECIES	04	04	03

SPECIES DIVERSITY AND ABUNCANCE INDICES

DATE	04 21 73	07 31 73	10 06 73
AVERAGE DIVERSITY	H 2.60	3.80	4.24
NUMBER OF TAXA	S 43.00	53.00	59.00
NUMBER OF SAMPLES COMPOSITED	M 4.00	4.00	4.00
MAXIMUM DIVERSITY	MAXH 5.43	5.98	6.11
TOTAL DIVERSITY	D 33152.50	50788.50	52503.50
TOTAL NUMBER OF INDIVIDUALS/ML	N 12751.00	15597.00	14765.00
EVENESS COMPONENT	J 0.48	0.64	0.69
MEAN NUMBER OF INDIVIDUALS/TAXA	L 296.53	253.92	213.99
NUMBER/ML OF MOST ABUNDANT TAXON	K 6169.00	3765.00	2789.00

TAXA	FORM	04 21 73			07 31 73			10 26 73		
		S	%C	ALGAL UNITS PER ML	S	%C	ALGAL UNITS PER ML	S	%C	ALGAL UNITS PER ML
ACHNANTHES LANCEOLATA	CEL									X
V. CURIA	CEL									39
ACTINASTRUM HANTZSCHII	CEL		0.3	39					0.3	39
ANABAENA #1	FIL					1.9	292		1.1	157
ANABAENA #2	FIL				3	4.7	745	4	7.5	1100
ANABAENA #3	FIL								0.9	119
ANABAENOPSIS	FIL								0.8	118
ANABAENOPSIS PHILIPPINENSIS	FIL								0.5	79
ANKISTRODES MUS	CEL		0.6	75						
ANKISTRODES MUS FALCATUS	CEL					0.6	97		3.5	511
APHANIZOENON ?	FIL	1	48.4	5159		1.2	195		0.3	39
ASTERIONELLA FORMOSA	CEL		2.7	339			X			X
BOTRYOCOCCLUS	COL					0.2	32			
BOTRYOCOCCLUS BRAUNII	COL						X		0.3	39
CERATIUM HIRUNDINELLA	CEL						X			X
CLUSTERIPSIS	CEL					0.2	32			
CLUSTERIPSIS ?	CEL									X
CLOSTERIUM	CEL		0.6	75						
CCELASTRUM CAMBRICUM	COL					0.6	65		0.3	39
CCELASTRUM CAMBRICUM ?										
V. INTERMEDIUM	CCL								0.3	39
CCELASTRUM CAMBRICUM										
V. INTERMEDIUM	CCL						X			
CCELASTRUM MICROPSRUM	COL						X		0.3	39
CCELASTRUM RETICULATUM	COL			X						
CCELASTRUM SPHAERICUM	CCL			X						
COELOSPHAERIUM NAEGELIANUM	COL		0.3	39		0.2	32		1.1	157
CCSMARIUM #1	CEL						X		0.3	39
CCSMARIUM #2	CEL						X			X
CRUCIGENIA APICULATA	COL						X			X
CRUCIGENIA TETRAPELIA	COL								0.3	39
CRYPTOMONAS ERISA	CEL	4	3.8	489						
CYCLOTELLA MENEGHINIANA	CEL						X		0.3	39
DICTYOSPHAERIUM FULCHELLUM	COL			X		0.2	32		0.3	39
DINOBYCN DIVERGENS	CEL									X
DINOBYCN SENTULARIA	CEL		3.5	451						
DINOFLLAGELLATE	CEL					0.2	32			
EUASTRUM	CEL			X			X			X
EUGLENA	CEL			X						X
FLAGELLATES	CEL	2	22.1	2821		2.8	454	3	8.5	1257
FRAGILARIA	CEL			X						X
FRAGILARIA CROTCNENSIS	CEL						X			X
GLENODINIUM PULVISULUS	CEL			X						
GLENKINIA	CEL					0.6	97			
LAGERHEIMIA CITRIFORMIS	CEL						X			X
LUNATE CELL	CEL					1.2	195			
LYNGBYA #1	FIL				2	23.5	3765	1	19.9	2789
LYNGBYA #2	FIL				1	22.3	3570		4.0	589
LYNGBYA LAGERHEIMII	FIL			X		2.4	389		1.1	157
MELOSIRA	CEL			X						
MELOSIRA #2	CEL					1.6	260	5	3.5	511
MELOSIRA #3	CEL								0.8	118
MELOSIRA CISTANS	CEL								1.1	157
MELOSIRA GRANULATA	CEL					2.0	326			
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL		2.4	301		1.4	227		3.2	471
MERISMOPEDIA TENUISSIMA	CCL			X		0.9	130			X
MICRACTINIUM PUSILLUM	COL		0.3	39						
MICROCYSTIS AERUGINOSA	COL			X	4		X		1.1	157
MICROCYSTIS INCERTA	COL		0.6	75		3.5	552		7.5	1100
MCUGERTIA	FIL		1.2	150					0.3	39
NAVICULA #1	CEL						X			
NAVICULA #2	CEL									X
NITZSCHIA	CEL		1.2	150		5.9	1103		5.1	746
NITZSCHIA ACTULARIS	CEL					1.4	227			
COCYSTIS	CEL			X		0.4	65			X
CSCILLATORIA	FIL			X						
CSCILLATORIA #1	FIL		1.9	226				2	13.0	1925
CSCILLATORIA #2	FIL					0.4	65		0.3	39
PECIASTRUM BORYANUM	CCL		0.9	113		0.9	130		0.3	39
PECIASTRUM CUPLEX	COL			X					0.3	39
PECIASTRUM CUPLEX										
V. RETICULATUM	COL					0.2	32			
PECIASTRUM CUPLEX										
V. RECTONATUM	COL						X			
PECIASTRUM SIMPLEX										
V. DUCDENARTUM	COL			X		0.2	32		0.3	39

LAKE NAME: PYMATUNING
SECRET NUMBER: 4213

CONTINUED

04 21 73

07 31 73

10 06 73

TAXA	FORM	ALGAL UNITS PER ML			ALGAL UNITS PER ML			ALGAL UNITS PER ML		
		S	SC		S	SC		S	SC	
FEDIASTRUM TETRAS										
V. TETRACDON	CCL			X		0.2	32			
PERIDINIUM WISCONSINENSE	CEL									X
PHACUS #1	CEL							0.3		35
PHACUS #2	CEL						X			
PHACUS ACUMINATUS ?	CEL						X			
PHORMIDIUM MUCICOLA	COL					0.6	97		0.3	35
SCENEDESMUS #1	COL								0.3	39
SCENEDESMUS ABUNDANS	COL		0.3	39		2.2	357		4.0	589
SCENEDESMUS ACUMINATUS										
V. ELONGATUS	COL					0.2	32			X
SCENEDESMUS ARMATUS	COL					3.5	552		2.4	354
SCENEDESMUS STJUGA										
V. ALTERNANS	COL			X						
SCENEDESMUS DENTICULATUS										
V. LINEARIS	COL			X						
SCENEDESMUS DIMORPHUS	COL			X		0.2	32		0.3	39
SCENEDESMUS INTERMEDIUS										
V. STCAUCATUS	COL						X			
SCENEDESMUS OPCLINENSIS	COL					0.2	32		0.5	79
SCENEDESMUS QUADRICAUCA	COL	3	4.7	602						
SCENEDESMUS QUADRICAUCA										
V. LONGISPINA	COL			X						
SELENASTRUM	CEL						X			X
STAUROSTRUM #1	CEL						X		0.3	35
STAUROSTRUM #2	CEL						X			X
STAUROSTRUM #3	CEL									X
STAUROSTRUM #4	CEL			X						
STEPHANODISCUS	CEL		0.5	75		9.3	1331		3.2	471
STEPHANODISCUS ASTRAEA	CEL		0.3	38	5	2.0	326		1.3	196
SYNEURA	CEL	5	1.5	451		0.2	32		0.3	39
TABELLARIA FENESTRATA	CEL									X
TETRAEDRON CAUDATUM	CEL						X			X
TETRAEDRON LOBULATUM	CEL									X
TETRAEDRON MINIMUM	CEL						X			
TETRAEDRON REGULARE	CEL			X						
TETRAEDRON REGULARE										
V. INCL	CEL									X
TETRASTRUM HETERACANTHUM	CEL						X			X
TETRASTRUM STAUROGENIAEFORME	CEL									X
TREUBARIA	CEL						X			
TOTAL										
				12751			15997			14755

LAKE NAME: SHENANGO RIVER RES.
 STCRET NUMBER: 4216

NYGAARD TROPHIC STATE INDICES

	DATE	04 20 73	07 30 73	10 08 73
MYXOPHYCEAN		01/0 E	2.20 E	2.00 E
CHLOROPHYCEAN		03/0 E	2.80 E	5.67 E
EUGLENOPHYTE		0.25 E	0.04 ?	3.04 ?
DIATOM		0.29 ?	1.00 E	1.33 E
COMPCUND		07/0 E	6.20 E	9.33 E

PALMER'S ORGANIC POLLUTION INDICES

	DATE	04 20 73	07 30 73	10 08 73
GENUS		10	13	21
SPECIES		03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

	DATE	04 20 73	07 30 73	10 08 73
AVERAGE DIVERSITY	H	1.75	3.50	3.84
NUMBER OF TAXA	S	17.00	46.00	39.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00
MAXIMUM DIVERSITY MAXH		4.09	5.52	5.29
TOTAL DIVERSITY	D	6284.25	14829.40	110456.00
TOTAL NUMBER OF INDIVIDUALS/ML	N	3591.00	4119.00	29775.00
EVENESS COMPONENT	J	0.43	0.65	0.73
MEAN NUMBER OF INDIVIDUALS/TAXA	L	211.24	99.54	737.92
NUMBER/ML OF MOST ABUNDANT TAXON	K	1706.00	1506.00	6050.00

LAKE NAME: SHENANGO RIVER RES.
 STORER NUMBER: 4216

CONTINUED

04 20 73

07 30 73

10 08 73

TAXA	FORM	ALGAL UNITS PER ML			ALGAL UNITS PER ML			ALGAL UNITS PER ML		
		S	SC	PER ML	S	SC	PER ML	S	SC	PER ML
ANABAENA	FIL									X
ANABAENA #1	FIL				21	7.81	323			
ANABAENA #2	FIL				11	36.61	1506			
ANABAENA PLANCTONICA	FIL				31	5.91	242			
ANKISTRODESMUS	CEL					0.71	27			
ANKISTRODESMUS #1	CEL							3.11		990
ANKISTRODESMUS #2	CEL							1.71		455
ANKISTRODESMUS FALCATUS	CEL	51	2.91	99			X			X
APHANIZOCHENON ?	FIL				1	7.91	323			
ASTERIONELLA FORMOSA	CEL	11	35.71	1399						
BACTERIOCOCCUS SP. AUNT?	CEL						X			
CARTERIA	CEL					1.31	54		0.51	165
CENTRIC DIATOM	CEL									X
CERATIUM HIRUNDINELLA	CEL					0.71	27			
CHLAMYDOMONAS	CEL					2.01	81			X
CHLOROPHYTAN FLAGELLATES	CEL							11	21.01	6050
CHRYSOCCOCUS	COL							21	12.51	3630
CHRYSOCHYTAN FLAGELLATE	CEL	141	5.51	198						
CLOSTERIUM	CEL					2.01	81			
COCCONEIS PLACENTULA	CEL			X						
COELASTRUM CAMBICUM	COL						X			
COELASTRUM MICROPORUM	COL						X			
COELOSPHAERIUM	COL								0.81	220
COELOSPHAERIUM NAEGLIANUM	COL					1.31	54			
COSCIINODISCUS LACUSTRIS	CEL	31	1.11	40			X			
CRUCIGENIA APICULATA	COL								0.21	55
CRUCIGENIA IRREGULARIS	COL								1.01	275
CRUCIGENIA QUADRATA	COL								1.31	385
CRUCIGENIA TETRAPELIA	COL									
CRYPTOMONAS OVATA	CEL			X		2.01	81			
CYMBELLA TURGIDA	CEL			X						
DACTYLOCOCCUS FASCICULARIS	CEL						X		6.71	1925
DICTYOSPHAERIUM FULCHELLUM	COL									
DIMORPHOCOCCUS	COL								3.11	880
DINOCYCN	CEL			X						
DINOFALGELLATE	CEL								0.21	55
EUASTRUM	CEL					0.71	27			X
EUGLENA	CEL								1.01	275
FLAGELLATES	CEL					5.21	215			
FRAGILARIA	CEL			X						
FRAGILARIA CROTONENSIS	CEL			X			X			
GOLENKINIA RADIIATA	CEL								0.41	110
GYROSIGMA ?	CEL						X			
KIRCHNERIELLA #1	CEL								1.91	550
KIRCHNERIELLA GONTOPTA ?	CEL								6.11	1760
KIRCHNERIELLA OBESA	CEL						X			
LEFOCCINCLIS ?	CEL			X						
LYNGBYA	FIL						X			
MELOSIRA DISTANS	CEL					3.91	161			
MELOSIRA GRANULATA	CEL									X
MELOSIRA GRANULATA ?	CEL								1.01	275
MELOSIRA GRANULATA	CEL									
V. DELICATISSIMA	CEL					0.71	27			
MELOSIRA ITALICA	CEL	121	47.51	1706		2.61	108			
MERISMOPEDIA	COL								2.91	00825
MERISMOPEDIA PUNCTATA	COL						X			
MERISMOPEDIA TENUISSIMA	COL					1.31	54			
MICROCYSTIS	COL							31	10.91	3135
MICROCYSTIS AERUGINOSA	COL					1.31	54			
MICROCYSTIS INCERTA	COL					1.31	54			
NAVICULA	CEL						X		0.21	55
NITZSCHIA	CEL			X						
COCCYSTIS	CEL						X			
OSCILLATORIA	FIL								0.21	55
OSCILLATORIA GEMINATA	FIL		1.71	60		0.71	27			
PEDIASTRUM DUPLEX	CEL									
V. RETICULATUM	COL						X			
PEDIASTRUM SIMPLEX	CEL									
V. CUODENARIUM	COL					1.31	54		0.21	55
PENNATE DIATOM	CEL								2.61	1045
SCENEDESMUS	COL								6.21	01770
SCENEDESMUS #1	COL					0.71	27			
SCENEDESMUS BIJUGA ?	COL								0.91	220
SCENEDESMUS INTERMEDIUS	COL									
V. BICAUCATUS	COL					0.71	27			
SCENEDESMUS QUADRICAUDA	COL									
V. LONGISPINA	COL			X						
SELENASTRUM	CEL								0.21	55
SPHAEROCOCCUS ? SCHROETERI	COL						X			
SPHAEROCOCCUS SCHROETERI	COL		0.61	20						

LAKE NAME: SHENANGO RIVER RES.
STORE NUMBER: 4216

CONTINUED

TAXA	FORM	04 20 73			07 30 73			10 08 73		
		S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML
STAUSTRUM #1	CEL				0.7	27				
STAUSTRUM #2	CEL					X		0.8		220
STAUSTRUM #3	CEL					X				
STAUSTRUM TETRACERUM	CEL							1.0		275
STEPHANODISCUS	CEL				15	7.8	323	10.3		02970
STEPHANODISCUS ASTRAEA	CEL					X				
SYNEDRA	CEL									X
SYNEDRA #1	CEL		2.2	79		1.3	54			
SYNEDRA DELICATISSIMA										
V. ANGLUSTISSIMA	CEL					1.3	54			
TETRAECEN HASTATUM										
V. PALATIUM	CEL									X
TETRASTRUM HETEPACANTHUM	COL							0.4		110
TRACHELCHONAS VOLVOCCINA	CEL				0.7	27				
TOTAL				3591		4119				28775

LAKE NAME: BEAVER RUN RES.
 STRET NUMBER: 4219

NYGAARD TROPHIC STATE INDICES

DATE	04 23 73	07 28 73	10 05 73
MYXOPHYCEAN	0/0 0	2.00 E	01/0 E
CHLOROPHYCEAN	0/0 0	4.00 E	01/0 E
EUGLENOPHYTE	0/0 ?	0.17 ?	0.50 E
DIATOM	0.80 E	3.00 E	1.25 E
COMPOUND	04/0 E	10.0 E	09/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 23 73	07 28 73	10 05 73
GENUS	00	01	01
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 23 73	07 28 73	10 05 73
AVERAGE DIVERSITY H	2.56	1.45	1.86
NUMBER OF TAXA S	15.00	19.00	19.00
NUMBER OF SAMPLES COMPOSITED M	2.00	2.00	2.00
MAXIMUM DIVERSITY MAXH	4.00	4.25	4.25
TOTAL DIVERSITY D	773.12	1193.35	2103.65
TOTAL NUMBER OF INDIVIDUALS/ML N	302.00	823.00	1131.00
EVENNESS COMPONENT J	0.64	0.34	0.44
MEAN NUMBER OF INDIVIDUALS/TAXA L	19.88	43.32	59.53
NUMBER/ML OF MOST ABUNDANT TAXON K	101.00	487.00	686.00

LAKE NAME: BEAVER RUN RES.
 STORE NUMBER: 4219

CONTINUED

TAXA	FORM	04 23 73			07 28 73			10 05 73		
		ALGAL			ALGAL			ALGAL		
		S	%C	UNITS PER ML	S	%C	UNITS PER ML	S	%C	UNITS PER ML
ASTERICNELLA FORMOSA	CEL		3.0	9						
CEPATIUM HIRUNDINELLA	CEL				3	6.1	50			X
CHLOROPHYTAN FILAMENT #1	FIL				4	2.1	17			
CLOSTERIUM #1	CEL						X			
COELASTRUM RETICULATUM ?	CEL									X
COSCINODISCUS	CEL			X						
COSCINODISCUS LACUSTRIS	CEL	2	15.2	46						
CRYPTOMONAS EROSA	CEL	5	5.0	18						
CRYPTOMONAS OVA	CEL							3	5.5	62
CYCLOTELLA BODANICA	CEL				2	30.6	252		0.9	10
CYCLOTELLA STELLIGERA	CEL								1.9	21
CYMBELLA TURGIDA	CEL									X
DINOBRYON BAVARICUM	CEL									X
DINOBRYON DIVERGENS	CEL				1	59.2	487	1	60.7	656
DINOBRYON SERTULARIA	CEL	1	24.5	74						
DINOBRYON SERTULARIA	CEL									
V. PROTUBERANS	CEL			X			X			
EUGLENA	CEL								0.9	10
FLAGELLATE #1	CEL			X				2	20.2	229
FLAGELLATE #2	CEL	4	33.4	101	5	2.1	17			
FLAGELLATE #9	CEL							5	4.6	52
FRAGILARIA	CEL									X
GLOECCYSTIS PLANCTONICA	CEL			X						
MALLONONAS ALPINA	CEL			X						
MELCSTRA	CEL			X						
MELCSTRA DISTANS	CEL			X						
MELCSTRA DISTANS ?	CEL									X
MELCSTRA GRANULATA	CEL						X			
MELCSTRA GRANULATA	CEL									
V. ANGUSTISSIMA	CEL								0.9	10
MELCSTRA ITALICA	CEL							4	3.6	41
PERISOMOEDIA MINIMA ?	CEL									X
PERISOMOEDIA TENUISSIMA	CEL						X			
MICROCCYSTIS INCERTA	CEL						X			
NAVICULA	CEL									X
NITZSCHIA	CEL		6.0	18						
NITZSCHIA PALEA	CEL			X						
GEDOGONIUM	FIL						X			
COCCYSTIS BORGET	CEL						X			
PERIDINIUM GATUNENSE	CEL						X			
PERIDINIUM WISCONSINENSE	CEL								0.9	10
PHACUS ACUMINATUS	CEL						X			
SCENEDESMUS NANUS ?	CEL									
V. BICALDATUS	CEL						X			
SCENEDESMUS QUACRICAUDA	CEL									
V. LONGISPINA	CEL						X			
SPHAEROCYSTIS SCHRADERI	CEL						X			
STAURONETIS CRUCICULA	CEL						X			
STEPHANODISCUS	CEL						X			
SYNECRA	CEL		6.0	18						
TABELLARIA FLOCCULOSA	CEL	3	5.0	18						X
TOTAL				302			929			1131

LAKE NAME: BELTZVILLE DAM
 STORET NUMBER: 4220

NYGAARD TROPHIC STATE INDICES

DATE	07 24 73	10 04 73
MYXOPHYCEAN	0/0 C	01/0 E
CHLOROPHYCEAN	02/0 E	01/0 E
EUGLENOPHYTE	0/02 ?	0/02 ?
DIATOM	1.00 E	0.57 E
COMPOUND	05/0 E	04/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	07 24 73	10 04 73
GENUS	02	01
SPECIES	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	07 24 73	10 04 73
AVERAGE DIVERSITY H	2.21	1.55
NUMBER OF TAXA S	15.00	11.00
NUMBER OF SAMPLES COMPOSITED M	3.00	3.00
MAXIMUM DIVERSITY MAXH	3.91	3.46
TOTAL DIVERSITY D	5558.15	2162.25
TOTAL NUMBER OF INDIVIDUALS/ML N	2515.00	1395.00
EVENESS COMPONENT J	0.57	0.45
MEAN NUMBER OF INDIVIDUALS/TAXA L	167.67	126.82
NUMBER/ML OF MOST ABUNDANT TAXON K	1115.00	619.00

LAKE NAME: BELTZVILLE DAM
 STORE NUMBER: 4220

CONTINUED

07 24 73

10 04 73

TAXA	FORM	ALGAL			ALGAL		
		S	SC	UNITS PER ML	S	SC	UNITS PER ML
ASTERIONELLA FORMOSA	CEL	21	27.01	678			X
CHLOROPHYTAN CYST	CEL			X			
CCELCSPIAERIUM NAEGELIANUM	CEL						X
CPLCIGENTIA TETRAPODIA	CEL			X	51	1.41	20
CRYPTOMONAS EPOSA	CEL		6.11	153			
CYCLOTILLA STELLIGERA	CEL	41	5.21	131	11	44.31	618
DINOBYCN PAVAPICUM	CEL						X
DINOBYCN DIVERGENS	CEL				21	42.91	558
DINOBYCN TABELLARIAE	CEL			X			
FLAGELLATE #1	CEL		1.71	44			
FLAGELLATE #2	CEL			X			
FLAGELLATE #9	CEL				41	1.41	20
FLAGELLATES	CEL				31	10.01	139
GLCFCYSTIS GIGAS ?	CEL	31	9.51	241			
GYMNOINIUM NEGLECTUM ?	CEL			X			
MELOSIPA	CEL						X
MELOSIPA #1	CEL	51	5.21	131			
MELOSIPA DISTANS	CEL			X			
NAVICULA	CEL						X
SCENEDESMUS BIJUGA	CEL		0.91	22			
SYNFOPA	CEL			X			
TABELLARIA FENESTRATA	CEL	11	44.31	1115			X
TOTAL				2515			1395

LAKE NAME: LAKE CANADOTA
SECRET NUMBER: 4221

NYGAARD TROPHIC STATE INDICES

DATE	07 27 73	10 05 73
MYXOPHYCEAN	4.50 E	7.00 E
CHLOROPHYCEAN	2.50 E	3.00 E
EUGLENOPHYTE	0.07 ?	0/10 ?
DIATOM	1.00 E	1.50 E
COMPOUND	9.00 E	13.0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	07 27 73	10 05 73
GENUS	06	01
SPECIES	04	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	07 27 73	10 05 73
AVERAGE DIVERSITY H	2.47	1.57
NUMBER OF TAXA S	27.00	20.00
NUMBER OF SAMPLES COMPOSITED M	1.00	1.00
MAXIMUM DIVERSITY MAXH	4.75	4.32
TOTAL DIVERSITY D	2924.48	4591.03
TOTAL NUMBER OF INDIVIDUALS/ML N	1194.00	3179.00
EVENNESS COMPONENT J	0.52	0.36
MEAN NUMBER OF INDIVIDUALS/TAXA L	43.85	159.95
NUMBER/ML OF MOST ABUNDANT TAXON K	469.00	2342.00

LAKE NAME: LAKE CANADONA
SECRET NUMBER: 4221

CONTINUED

07 27 73

10 05 73

TAXA	FORM	ALGAL UNITS PER ML		ALGAL UNITS PER ML	
		S	SC	S	SC
ANABAENA PLANCTONICA	FIL		1.9	22	215
ANKYSTRODESMUS	CEL			X	
APHANOCAPSA ELACHISTA					
V. PLANCTONICA	CEL			4	204
ARTHROSPIRA GOMONTIANA	FIL			X	
CENTRIC DIATOM	CEL		0.9	11	
CEPATIUM HIRUNDINELLA	CEL				0.3
CHLAMYDOMONAS	CEL				1.4
CHLAMYDOMONAS GLABROSA	CEL				X
CHROCOCCUS	COL		0.9	11	X
COCCONEIS	CEL			X	
COELASTRUM RETICULATUM	CEL				X
COELOSPHAERIUM	COL		0.9	11	
COELOSPHAERIUM NAGELIANUM	COL			X	0.7
COELOSPHAERIUM PALLICUM ?	COL			X	
COSMARIUM	CEL			X	
CRYPTOMONAS EROSA	CEL	12	39.6	469	
CYANOPHYTAN FILAMENT	FIL			13	3.6
CYCLotella BODANICA	CEL			X	
CYMBELLA	CEL			X	
FLAGELLATE	CEL				3.9
FLAGELLATE #9	CEL	13	7.5	89	
FLAGELLATES	CEL	15	4.0	47	
FRAGILARIA CROTCHENSIS	CEL			X	73.7
GEMMOSPHAERIA ? LACUSTRIS	COL				1.8
GYMNOIDIUM ORDINATUM	CEL		1.9	22	
HELOSIRA	CEL				X
HELOSIRA #2	CEL			X	
MICROCYSTIS INCERTA	COL	4	3.9	45	0.7
MOOCYSTIS	CEL		0.9	11	
MOOCYSTIS PARVA	CEL				X
OSCILLATORIA LINNETICA	FIL		0.9	11	
OSCILLATORIA TENUISS	FIL	11	32.0	379	
PHACUS ACUMINATUS	CEL			X	
SCENEDESMUS	COL		0.9	11	
SCENEDESMUS BIJUGA	COL				0.3
SPHAEROCYSTIS ?	COL		3.8	45	
STAUROSTRUM ANATINUM ?	CEL			X	
STAUROSTRUM DEJECTUM	CEL				X
STEPHANODISCUS	CEL				0.3
SYNECPA	CEL				X
TETRAECON MINIMUM	CEL			X	
TOTAL				1194	3179

LAKE NAME: HARVEY'S LAKE
STORET NUMBER: 4222

NYGAARD TROPHIC STATE INDICES

DATE	04 12 73	07 23 73	10 02 73
MYXOPHYCEAN	03/0 E	6.00 E	5.00 E
CHLOROPHYCEAN	01/0 E	3.00 E	2.00 E
EUGLENOPHYTE	0/04 ?	0/09 ?	0/07 ?
DIATOM	0.75 E	0.33 E	0/01 ?
COMPOUND	07/0 E	10.0 E	7.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 73	07 23 73	10 02 73
GENUS	00	01	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 12 73	07 23 73	10 02 73
AVERAGE DIVERSITY H	0.82	2.86	2.59
NUMBER OF TAXA S	15.00	18.00	13.00
NUMBER OF SAMPLES COMPOSITED M	2.00	2.00	2.00
MAXIMUM DIVERSITY MAXH	2.91	4.17	3.70
TOTAL DIVERSITY D	1992.60	2765.62	613.83
TOTAL NUMBER OF INDIVIDUALS/ML N	2430.00	967.00	237.00
EVENESS COMPONENT J	0.21	0.59	0.70
MEAN NUMBER OF INDIVIDUALS/TAXA L	162.00	53.72	18.23
NUMBER/ML OF MOST ABUNDANT TAXON K	2097.00	299.00	75.00

LAKE NAME: HARVEY'S LAKE
STREET NUMBER: 4222

CONTINUED

	04 12 73				07 23 73				10 02 73			
TAXA	FORM	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC
ANABAENA #1	FIL					1.9	18		10.5	25		
ANABAENA #2	FIL									X		
ANKISTRODES MUS	CEL					3.6	35					
ANKISTRODES MUS FALCATUS	CEL			X								
APHANIZOENON ?	FIL					130.9	299					
APHANIZOENON FLCS-AQUAE	FIL								5.1	12		
ASTERIONELLA FORMOSA	CEL	1186.3		2097			X					
CENTRIC DIATOM	CEL						X					
CEPHEIDUM MUNDINELLA	CEL					9.1	99		10.5	25		
CHLORELLA VULGARIS ?	CEL									X		
CHROCOCCUS	COL						X					
COELOSPHAERIUM CONFERTUM ?	COL					1.9	18					
COELOSPHAERIUM PALLIDUM	COL					1.9	18		2121.1	50		
COSCIINOTISCU	CEL			X								
CRYPTOMONAS EROSA	CEL	3	2.6	63		14.5	140		3131.6	75		
CYANOPHYTAN COLONY	COL								10.5	25		
CYANOPHYTAN FILAMENT	FIL			X								
CYCLOSTELLA BODANICA	CEL	4	0.9	21								
CYCLOSTELLA MICHIGANIANA	CEL			X								
DICTYOSPHAERIUM EHRENBERGIANUM	COL									X		
DICTYOSPHAERIUM PULCHELLUM	COL					3.5	35					
FLAGELLATE #1	CEL	2	9.1	199								
FLAGELLATE #9	CEL						X					
FLAGELLATES	CEL					20.0	193					
FRAGILARIA CAPTANENSIS	CEL	5	1.3	31			X					
GLENODINIUM	CEL		0.4	10								
GLAUCOCYSTIS PLANKTONICA	COL								110.5	25		
GONYAULAX ?	CEL			X								
GONYAULAX ACARCIOS	CEL									X		
MICROCYSTIS INCERTA	COL		0.4	10		9.1	89					
NAVICULA FOIOSA ?	CEL			X								
NITZSCHIA	CEL					3.5	35			X		
OSCILLATOPIA	FIL			X								
SPHAEROCYSTIS SCHAEFERI	COL						X					
STAUROSPORIUM	CEL						X					
STAUROSPORIUM #1	CEL									X		
TABELLARIA FENESTRATA	CEL			X								
TOTAL				2430			967			237		

LAKE NAME: INDIAN LAKE
 STCDET NUMBER: 4223

NYGAARD TROPHIC STATE INDICES

DATE	04 23 73	07 25 73	10 04 73
MYXOPHYCEAN	0.50 E	0/0 0	0.67 E
CHLOROPHYCEAN	0/02 0	02/0 E	1.67 E
EUGLENOPHYTE	0/01 ?	0/02 ?	0/07 ?
DIATOM	1.00 E	0.50 E	0.33 E
COMPOUND	1.50 E	03/0 E	2.67 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 23 73	07 25 73	10 04 73
GENUS	00	01	03
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 23 73	07 25 73	10 04 73
AVERAGE DIVERSITY H	2.37	1.32	1.65
NUMBER OF TAXA S	12.00	10.00	18.00
NUMBER OF SAMPLES COMPOSITED M	3.00	3.00	3.00
MAXIMUM DIVERSITY MAXH	3.58	3.32	4.17
TOTAL DIVERSITY D	552.21	1676.40	3633.30
TOTAL NUMBER OF INDIVIDUALS/ML N	233.00	1270.00	2202.00
EVENNESS COMPONENT J	0.66	0.40	0.40
MEAN NUMBER OF INDIVIDUALS/TAXA L	19.42	127.00	122.33
NUMBER/ML OF MOST ABUNDANT TAXON K	100.00	949.00	1559.00

LAKE NAME: INDIAN LAKE
STORE NUMBER: 4223

CONTINUED

	04 23 73			07 25 73			10 04 73			
TAXA	FORM	IS	SC	ALGAL UNITS PER ML	IS	SC	ALGAL UNITS PER ML	IS	SC	ALGAL UNITS PER ML
ANKISTRUCOSMUS	CEL							3	6.6	146
APHANIZOENON FLCS-AQUAE	FIL		1.0	7					2.5	59
ARTHRODESMUS	CEL									
CHLOROPHYTAN CELL	CEL				2	12.7	161			
CHRYSOPHYTAN COLONY	CEL		42.9	100						
CLCSTERIUM	CEL									
CRUCIGENTIA TETRAEDRIA	COL								0.7	15
CYANOPHYTAN COCCOID CELLED COLONY	CEL									
CYCLOTELLA BOONANICA	CEL	5	5.5	13						
CYCLOTELLA STELLIGERA	CEL				1	74.7	949	1	70.9	1555
CESMICIUM BAILEYII	CEL			x						
DINOBRYON BAVARTICUM	CEL									
DINOBRYON SERTULARIA	CEL						x		0.7	15
DINOBRYON SERTULARIA										
V. PROCTUBERANS	CEL	2	14.2	33						
DINOBRYON STATOSPORA	CEL		11.6	27						
FLAGELLATES	CEL				4	5.3	80	2	9.9	219
GYMNODINIUM ALBULUM	CEL	4	14.2	33						
MELOSIRA	CEL			x						
NITZSCHIA	CEL			x						
OCCYSTIS	CEL							4	4.0	87
OPHIOCYTIUM CAPITATUM										
V. LONGISPINUM	CEL			x						
OSCILLATORIA	FIL									
PENNATE DIATOM	CEL								0.7	15
PERIDINIUM INCONSPICUUM	CEL					1.3	16			
PERIDINIUM WISCONSINENSE	CEL				3	2.5	32			
PIANULARIA	CEL								0.7	15
SCENEDESMUS #1	COL								0.7	15
SCENEDESMUS BIJUGA	COL						x			
SPINOCOSMARIUM ?	CEL			x						
SYNECDA	CEL	3	9.6	20	5	1.3	16			
TABELLARIA	CEL						x			
TETRAEDRON MINIMUM	CEL					1.3	16			
XANTHICIUM COCCOCCINIS	CEL							5	2.6	58
TOTAL				233			1270			2202

LAKE NAME: LAKE NACMI
STORET NUMBER: 4224

NYGAARD TROPHIC STATE INDICES

DATE	07 23 73	10 03 73
MYXOPHYCEAN	0.50 E	0/05 0
CHLOROPHYCEAN	2.00 E	1.00 E
EUGLENOPHYTE	0.20 ?	0/05 ?
DIATOM	3.40 E	0.21 ?
COMPOUND	4.00 E	1.60 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	07 23 73	10 03 73
GENUS	03	00
SPECIES	02	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	07 23 73	10 03 73
AVERAGE DIVERSITY H	2.71	2.43
NUMBER OF TAXA S	22.00	36.00
NUMBER OF SAMPLES COMPOSITED M	1.00	1.00
MAXIMUM DIVERSITY MAXH	5.46	5.17
TOTAL DIVERSITY D	11062.22	3810.24
TOTAL NUMBER OF INDIVIDUALS/ML N	4092.00	1569.00
EVENNESS COMPONENT J	0.61	0.47
MEAN NUMBER OF INDIVIDUALS/TAXA L	185.55	43.56
NUMBER/ML OF MOST ABUNDANT TAXON K	1784.00	851.00

LAKE NAME: LAKE NAOMI
 STCRET NUMBER: 4224

CONTINUED

07 23 73

10 03 73

TAXA	FCRM	ALGAL UNITS PER ML		ALGAL UNITS PER ML	
		S	SC	S	SC
ANKISTRODESMUS FALCATUS	CEL			1.0	16
ARTHRODESMUS	CEL		5.5	1.0	16
ASTERIONELLA FORMOSA	CEL	5	7.5		
ASTERIONELLA FORMOSA ?	CEL			2.1	33
CHLAMYDOMONAS	CEL				
CHLOROPHYTAN CELL	CEL			4.1	65
CHRYSOPHYTAN COCCOID CELL	CEL		2.7		
CHRYSOPHYTAN FLAGELLATE #1	CEL		0.5		
CCSMATIUM	CEL				
CRUCIGENIA QUADRATA	CEL			1.0	16
CRUCIGENIA TETRAPELIA	CEL		1.1		
CRYPTOCYNAS EOSA	CEL		1.6		
CRYPTOMONAS OVATA	CEL			1	8.4
CYANOPHYTAN FILAMENT	FIL		1.1		
CYMBELLA GRACILIS	CEL				
DICTYOSPHAERIUM PULCHELLUM ?	CEL				
EUNOTIA PECTINALIS	CEL				
V. MINOR ?	CEL				
EUNOTIA TENELLA	CEL				
FLAGELLATE #1	CEL			6.2	98
FLAGELLATE #2	CEL		0.5		
FLAGELLATE #3	CEL			2154.3	951
FLAGELLATES	CEL			5	8.4
FRANCEIA CROESCHERI	CEL				
FRUSTULIA RHOMBICIDES	CEL				
GLENNODINIUM ARMATUM	CEL	3	13.7		
MALLONEMAS	CEL				
MELOSIRA DISTANS	CEL			1.0	16
MELOSIRA GRANULATA	CEL				
MELOSIRA ITALICA	CEL	2	14.2		
MELOSIRA ITALICA ?	CEL			1.0	16
MELOSIRA VARIANS	CEL	4	4.4		
NAVICULA ?	CEL				
OOCYSTIS	CEL				
PERIDINIUM INCONSPICUUM	CEL			3	9.4
PERIDINIUM UMBONATUM	CEL			4	1.0
PERIDINIUM WISCONSINENSE	CEL		1.1		
PINNULARIA ACUMINATA	CEL				
V. STELANSKII	CEL				
PINNULARIA BICEPS	CEL				
PINNULARIA FERMICA	CEL				
SCENEDESMUS	CEL				
SCENEDESMUS ABUNDANS	CEL				
SCENEDESMUS BYJUGA	CEL		1.1		
STAUROSTRUM	CEL		0.5		
STAUROSTRUM O'MEARII	CEL				
STAURONEIS	CEL				
SUTIRELLA LINEARIS ?	CEL				
SUTIRELLA OVALIS	CEL				
SYNECPA	CEL	1	43.7		
SYNECPA RACIANS ?	CEL			1.0	16
TABELLARIA FENESTRATA	CEL				
TABELLARIA FLOCCULOSA	CEL				
TRACHELONEMAS HISPIDA	CEL				
V. CORONATA	CEL		0.5		
XANTHODIUM	CEL				
TOTAL			4082		1568

LAKE NAME: LAKE ONTELAUNEE
STORET NUMBER: 4225

NYGAARD TROPHIC STATE INDICES

DATE	04 13 73	07 24 73	10 03 73
MYXOPHYCEAN	0/0 0	1.00 E	2.50 E
CHLOROPHYCEAN	01/0 E	5.33 E	2.50 E
EUGLENCOPHYTE	0/01 ?	0/19 ?	0.10 ?
DIATOM	0.27 ?	0.33 E	1.00 E
COMPOUND	05/0 E	5.67 E	7.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 13 73	07 24 73	10 03 73
GENUS	01	04	01
SPECIES	00	04	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 13 73	07 24 73	10 03 73
AVERAGE DIVERSITY H	1.77	3.28	1.40
NUMBER OF TAXA S	23.00	29.00	22.00
NUMBER OF SAMPLES COMPOSITED M	2.00	2.00	2.00
MAXIMUM DIVERSITY MAXH	4.52	4.86	4.46
TOTAL DIVERSITY D	1794.78	2207.44	11413.40
TOTAL NUMBER OF INDIVIDUALS/ML N	1014.00	673.00	8156.00
EVENNESS COMPONENT J	0.39	0.67	0.31
MEAN NUMBER OF INDIVIDUALS/TAXA L	44.09	23.21	370.73
NUMBER/ML OF MOST ABUNDANT TAXON K	590.00	131.00	4597.00

LAKE NAME: LAKE CNTELAUNEE
STCRET NUMBER: 4225

CONTINUED

TAXA	FORM	04 13 73		07 24 73		10 03 73	
		S	SC	S	SC	S	SC
		ALGAL UNITS PER ML		ALGAL UNITS PER ML		ALGAL UNITS PER ML	
ACHNANTHES LANCECLATA	CEL		X				
V. DUBIA	FIL				X		
ANABAENA	FIL					51	0.4
APHANIZOENON ?	CEL	14	10.5	107			30
ASTERIONELLA FORMOSA	CEL						20
CHLAMYDOMONAS PALMELLA	CEL				X		
CHLOROPHYTAN FILAMENT	FIL					1.1	91
COCCONEIS	CEL		X				
COELASTRUM RETICULATUM	COL			41	5.8	55	X
COELASTRUM SPHAERICUM	COL			21	11.0	74	
COELOSPHAERIUM NAEGELIANUM	CCL					0.1	10
CCSMARIUM	CEL						X
CCSMARIUM #1	CEL				2.4	16	
CCSMARIUM #2	CEL					X	
CRUCIGENIA TETRAEDRIA	CCL				3.7	25	
CRYPTOMONAS	CEL	21	6.6	67			
CRYPTOMONAS OVATA	CEL					X	
CYCLotella STELLIGERA	CEL			X			10
CYMATOPLEURA SOLEA	CEL				X		
CYMBELLA	CEL		X				
FUGLENA	CEL						X
FLAGELLATE	CEL		X				
FLAGELLATE #9	CEL						X
FLAGELLATES	CEL					0.1	10
FRAGILARIA CROTONENSIS	CEL				X	21	37.8
FRANCEIA LAGERHEIMIA	CEL				X		
GLOEOCAPSA PUNCTATA	CEL				X		
GLCEOCYSTIS PLANCYTONICA	COL			11	19.5	131	
GCMPHONEMA	CEL		X				
GCMPHOSPHAERIA ? LACLISTRIE	COL						X
V. CONTRACTA	CEL		X				
GYPESIGMA	CEL				X		
KIRCHWERTIELLA SUBSCLITARIA	CEL						
LUNATE CELL	CEL		X				
MELOSTIRA GRANULATA	CEL		X		2.4	15	41
MELOSTIRA GRANULATA	CEL					1.2	101
V. ANGUSTISSIMA	CEL	31	6.6	67		11	56.4
MEFISMOPEDIA MINIMA	COL				7.3	49	
MICROCYSTIS AERUGINOSA	COL						X
MICROCYSTIS INCERTA	CCL					0.1	10
NAVICULA #1	CEL		2.7	27		X	X
NAVICULA #2	CEL			X			
NAVICULA #3	CEL			X			
NITZSCHIA #1	CEL	51	2.7	27			
NITZSCHIA #2	CEL			X			
COCYSTIS PARVA	CEL			31	11.0	74	
PECIASTRUM DUPLEX	COL						
V. RETICLLATUM	COL					X	
PECIASTRUM SIMPLEX	COL					X	
PECIASTRUM SIMPLEX	COL						
V. CUODENARIUM	CCL					31	1.2
PENNATE DIATOM #1	CEL		1.3	13			
PENNATE DIATOM #2	CEL		1.3	13			
SCENEDESMUS	COL		1.3	13			
SCENEDESMUS BIJUGA	COL			13.5	00091		
SCENEDESMUS DENTICULATUS	CCL				X		
SCENEDESMUS ECOPNIS	COL				X		
V. DISCIFORMIS	CCL			12.2	82		
SCENEDESMUS QUADRICAUDA	COL			1.2	9		
V. LONGISPINA P. ASYMPETRICUS	COL						
SPHAEROPOCISTIS SCHROETERI	CCL						X
STAUROSTOMUM #1	CEL				X		X
STEPHANODISCUS	CEL	11	67.1	680			
SURIPELLA ANGUSTATA	CEL			X			
TABELLARIA FLUCCULOSA	CEL			X			
TETRAEDRON MINIMUM	CEL			5.1	41		
TETRAEDRON REGULARE	CEL				X		
TREUBAPTIA TRIAPPENDICULATA ?	CEL				X		
TOTAL				1014		673	8156

LAKE NAME: PINCHOT LAKE
STORET NUMBER: 4226

NYGAARD TROPHIC STATE INDICES

DATE	04 13 73	07 24 73	10 02 73
MYXOPHYCEAN	0/0 C	1.40 E	0.29 ?
CHLOROPHYCEAN	02/0 E	0.60 ?	2.00 E
EUGLENOPHYTE	0/02 ?	0.40 E	0.12 ?
DIATOM	0.33 E	1.00 E	0.62 E
COMPOUND	05/0 E	3.40 E	3.29 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 13 73	07 24 73	10 02 73
GENUS	05	13	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	04 13 73	07 24 73	10 02 73
AVERAGE DIVERSITY H	2.66	1.99	2.60
NUMBER OF TAXA S	20.00	28.00	43.00
NUMBER OF SAMPLES COMPOSITED M	2.00	2.00	2.00
MAXIMUM DIVERSITY MAXH	4.32	4.81	5.43
TOTAL DIVERSITY D	21635.44	10375.86	4401.80
TOTAL NUMBER OF INDIVIDUALS/ML N	9134.00	5214.00	1693.00
EVENNESS COMPONENT J	0.62	0.41	0.48
MEAN NUMBER OF INDIVIDUALS/TAXA L	406.70	186.21	39.37
NUMBER/ML OF MOST ABUNDANT TAXON K	2952.00	3551.00	565.00

LAKE NAME: PINCHCT LAKE
STCRET NUMBER: 4226

CONTINUED

04 13 73

07 24 73

10 02 73

TAXA	FORM	ALGAL UNITS PER ML			ALGAL UNITS PER ML			ALGAL UNITS PER ML		
		S	SC		S	SC		S	SC	
ANABAENA PLANKTONICA	FIL				1.0		51	1133.4		565
ANKISTRODESMUS	CEL		1.0	79						X
ARTHROSPIRA	FIL				169.1		3551			
ASTERIONELLA FORMOSA	CEL			X						
CHLOROPHYTAN CELL	CEL							2.2		37
CLCSTERIUM	CEL				3	4.4	230	2.9		49
COCCOID CELL	CEL							1.4		24
CCELASTRUM RETICULATUM	CEL							2.9		49
CCELASTRUM SPMAERTICUM	CEL				0.5		26			X
COELOSPHAERIUM NAEGELIANUM	CEL						X			
CCSMARIUM #1	CEL				0.5		26			X
CCSMARIUM #2	CEL				0.5		26			
CCSMARIUM #3	CEL									X
CCSMARIUM BIPUNCTATUM	CEL									X
CRUCIGENTA APICULATA ?	CEL									X
CRYPTOMONAS	CEL							4.4		74
CRYPTOMONAS OVATA	CEL	2	6.8	555			X			
CYANOPHYTAN FILAMENT	FIL				0.5		26			
CYCLOTELLA STELLIGERA	CEL		0.3	26	2.0		102	2.2		37
CYMBELLA	CEL			X						
CYMBELLA CISTULA	CEL									X
DIAPOBYCN BAVARICUM	CEL	1135.1		2852						
DINOBRYON DIVERGENS	CEL	411.0		998						
EUASTRUM	CEL									X
EUGLENA #1	CEL				1.0		51			
EUGLENA #2	CEL						X			
EUGLENA SANGUINEA ?	CEL									X
EUNCTIA	CEL									X
FLAGELLATE #1	CEL	3126.0		2113						
FLAGELLATE #2	CEL	5	7.5	507						
FLAGELLATE #9	CEL				4	4.9	255	4	2.9	49
FLAGELLATES	CEL				2.5		128	2132.6		552
FRAGILARIA	CEL			X						X
FRAGILARIA #1	CEL		4.5	370						
FRAGILARIA CROTCENENSIS	CEL			X			X			X
GLENODINIUM OCULATUM	CEL		0.7	53						
GOMPHONEMA ?	CEL			X						
GOMPHONEMA ACUMINATUM	CEL									
V. CORONATA	CEL									X
GOMPHOSPHERIA LACUSTRIS	CEL									
V. COMPACTA ?	CEL							0.7		12
MELOSTIRA GRANULATA	CEL									
V. ANGUSTISSIMA	CEL						X			X
MELOSTIRA ITALICA	CEL				2	7.3	383			X
MELOSTIRA ITALICA ?	CEL		0.3	26						
MELCISIRA VARIANS	CEL									X
MICROCYSTIS AERUGINOSA	CEL						X			
NAVICULA	CEL		0.7	53						X
NEPHROCYTIUM	CEL									X
NITZSCHIA	CEL									X
OCCYSTIS	CEL							3	12.3	209
OCCYSTIS PARVA	CEL									X
OSCILLATORIA #1	FIL				2.5		128			
OSCILLATORIA TENUIS	FIL						X			
PEDIASTRUM DUPLEX	CEL						X			
V. ?	CEL									
PEDIASTRUM SIMPLEX	CEL									
V. DUODENARIUM	CEL		0.3	26		0.5	26			X
PENNATE CIATON	CEL									X
PHACIS HELIKOIDES	CEL									X
RHIZOSOLENTA LONGISETA	CEL									X
SCENEDESMUS BIJUGA	CEL							0.7		12
SCENEDESMUS BIJUGA	CEL									
V. ALTERNANS	CEL									X
SCHROEDERIA SETIGERA	CEL		4.5	370				0.7		12
SCRASTRUM AMERICANUM	CEL									X
SPHAEROCYSTIS ?	CEL									X
STAUROSTRUM #1	CEL						X			X
STAUROSTRUM #2	CEL						X	0.7		12
STEPHANODISCUS	CEL		1.3	106						
SYNECRA #1	CEL			X			X			
TETRAEDRON GRACILE	CEL				0.5		26			
TETRASTRUM GLABRUM	CEL									X
TRACHELCMONAS HISPIDA	CEL				0.5		26			
TRACHELCMONAS VOLVOCCINA	CEL				5	2.9	173			
TOTAL					8134		5214			1693

LAKE NAME: POCONG LAKE
STORET NUMBER: 4227

NYGAARD TROPHIC STATE INDICES

	DATE	04 17 73	07 23 73	10 03 73
MYXOPHYCEAN		0/0 0	0.33 ?	1.00 E
CHLOROPHYCEAN		02/0 E	4.33 E	4.00 E
EUGLENOPHYTE		0.50 E	0.29 E	0.40 E
DIATOM		0.17 ?	0.37 E	0.30 ?
COMPCUND		05/0 E	3.00 E	10.0 E

PALMER'S ORGANIC POLLUTION INDICES

	DATE	04 17 73	07 23 73	10 03 73
GENUS		00	07	06
SPECIES		00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

	DATE	04 17 73	07 23 73	10 03 73
AVERAGE DIVERSITY	H	2.15	3.59	2.92
NUMBER OF TAXA	S	21.00	53.00	44.00
NUMBER OF SAMPLES COMPOSITE	M	2.00	2.00	1.00
MAXIMUM DIVERSITY	MAXH	4.39	5.73	5.46
TOTAL DIVERSITY	C	1325.24	7450.11	3559.84
TOTAL NUMBER OF INDIVIDUALS/ML	N	615.00	2019.00	1252.00
EVENESS COMPONENT	J	0.49	0.64	0.52
MEAN NUMBER OF INDIVIDUALS/TAXA	L	29.24	39.09	28.68
NUMBER/ML OF MOST ABUNDANT TAXON	K	247.00	301.00	459.00

LAKE NAME: PCCONC LAKE
STORET NUMBER: 4227

CONTINUED

TAXA	FORM	04 17 73			07 23 73			10 03 73		
		S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML
ACHNANTHES LANCEOLATA										
V. DUBIA	CEL									X
ANKISTRORDES MUS FALCATUS	CEL							2.9		36
ARTHROCEPHALUS	CEL				0.3	7				
ASTERICHELLA FORMOSA	CEL		3.4	21	0.7	15				X
ASTERICHELLA FORMOSA										
V. GRACILLIMA	CEL				3	13.4	271			
CHLOROPHYTAN CELL	CEL				0.7	15				
CHLOROPHYTAN FILAMENT	FIL				1.1	22		1.4		18
CHRYSOCEPHALUS CELL	CEL					X				
CHLOROPHYTAN CELL	CEL									X
COCCONEIS PLACENTULA										
V. EUGLYPTA	CEL			X				1.4		19
CESMARIUM ?	CEL					X				
CRUCIGENIA TETRAPECTIA	COL			X	0.3	7				
CRYPTOCOCCHUS EROSA	CEL				2	14.8	294			
CYCLOTELLA	CEL				0.7	15		2.9		36
CYCLOTELLA PSEUDOSTELLIGERA	CEL				0.3	7				
CYCLOTELLA STELLIGERA	CEL							5	2.9	36
CYMBELLA #1	CEL			X						X
CYMBELLA #2	CEL					X				X
DACTYLOCOCCOPUS ACICULARIS	CEL					X				
DIATOMA	CEL					X				X
DICTYOSPHAERIUM	COL				0.3	7				
DICTYOSPHAERIUM EHRENBURGIANUM	COL					X				
DINOBRYON SERTULARIA	CEL	1	40.2	247						
EUCOPTINA	COL					X				
EUGLENA	CEL									X
EUGLENA GRACILIS	CEL									X
EUNOTIA	CEL		1.8	11		X				
EUNOTIA PECTINALIS	CEL									X
FLAGELLATE #1	CEL				0.3	7				
FLAGELLATES	CEL	2	36.9	225	5	10.8	219	3	25.8	325
FRAGILARIA	CEL									X
FRAGILARIA CROTONENSIS	CEL					X				X
FRANCEA	CEL				1.9	39				
FRUSTULIA #1	CEL			X						
FRUSTULIA #2	CEL							1.4		18
GLENCOLINTUM	CEL	3	1.8	11						
GOMPHONEMA	CEL									X
GOMPHONEMA GLOBIATUM	CEL					X				
LYNGBYA	FIL									X
MELOSIRA #3	CEL							4	4.3	54
MELOSIRA DISTANS	CEL				1.4	150				
MELOSIRA GRANULATA										
V. ANGUSTISSIMA	CEL				3.4	58	2	10.0		125
MELOSIRA ITALICA	CEL				1	14.9	301	1	37.2	469
MELOSIRA VARIANS	CEL	4	1.8	11						
MCUGERTIA	FIL			X						
NAVICULA	CEL			X						
NAVICULA #1	CEL							1.4		18
NAVICULA #2	CEL									X
NAVICULA #3	CEL					X				
NAVICULA #4	CEL					X				
NAVICULA LACUSTRIS	CEL					X				
NITZSCHIA	CEL		1.8	11						
NITZSCHIA #1	CEL							2.9		36
COCCYSTIS	CEL				0.3	7				
OSCELLATORIA GEMINATA	FIL									X
PERIDINIUM DUPLEX										
V. ?	CEL									X
PERIDINIUM TETRAS	COL									X
V. TETRACON	COL									X
PENNATE DIATOM	CEL									
PENNATE DIATOM #1	CEL					X				
PENNATE DIATOM #2	CEL					X				
PENNATE DIATOM #3	CEL					X				
PENNATE DIATOM #4	CEL				0.7	15				
PERIDINIUM INCONSPICUUM ?	CEL				3.4	68				
PERONELLA ?	CEL				1.1	22				
PHACUS	CEL									X
PHACUS #1	CEL					X				
PHACUS #2	CEL					X				
PHACUS MELIKOIDES	CEL					X				X
PINNULARIA	CEL			X						
RHIZOSOLENIA	CEL							1.4		18
RHIZOSOLENIA ?	CEL				0.3	7				
SCENEDSMUS	COL					X				
SCENEDSMUS #1	COL							1.4		18
SCENEDSMUS ABUNDANS	COL				2.2	45		2.9		36

LAKE NAME: FORDNC LAKE
 STOR# NUMBER: 4227

CONTINUED

TAXA	04 17 73				07 22 73				10 03 73			
	FORM	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC
SCENEDESMUS ARMATUS	COL									X		
SCENEDESMUS DENTICULATUS	COL					0.7	15					
SCENEDESMUS DENTICULATUS V. LINEARIS	COL						X					
SCENEDESMUS INTERMEDIUS	COL									X		
SCENEDESMUS QUADRICAUDA	COL					0.3	7			X		
STAUROSTRUM	CEL						X			X		
STAURONEIS	CEL			X						X		
SUPIRELLA	CEL									X		
SYNEODRA #1	CEL		1.9	11		13.0	263					
SYNEODRA MAZAMAENSIS	CEL									X		
TABELLARIA FENESTRATA	CEL			X						X		
TABELLARIA FLOCCULOSA	CEL	5	9.9	54		0.7	15			X		
TETRAEDRON	CEL		1.8	11								
TETRAEDRON TRIGONUM	CEL						X					
TETRAEDRON TUNICULUM	CEL						X					
TETRASTRUM GLABRUM	COL						X					
TRACHELCOMNAS	CEL			X								
TRACHELCOMNAS VOLVCCINA	CEL					5.6	113					
TOTAL				614			2019			1262		

LAKE NAME: STILLWATER LAKE
STORET NUMBER: 4228

NYGAARD TROPHIC STATE INDICES

	DATE	07 23 73	10 03 73
MYXOPHYCEAN		03/0 E	0/03 0
CHLOROPHYCEAN		07/0 E	2.67 E
EUGLENOPHYTE		0.20 ?	0.12 ?
DIATOM		0.33 E	0.25 ?
COMPCUND		13/0 E	3.67 E

PALMER'S ORGANIC POLLUTION INDICES

	DATE	07 23 73	10 03 73
GENUS		02	04
SPECIES		00	02

SPECIES DIVERSITY AND ABUNDANCE INDICES

	DATE	07 23 73	10 03 73
AVERAGE DIVERSITY	H	2.15	0.59
NUMBER OF TAXA	S	23.00	25.00
NUMBER OF SAMPLES COMPOSITED	M	1.00	1.00
MAXIMUM DIVERSITY	MAXH	4.85	4.64
TOTAL DIVERSITY	D	1563.05	3986.13
TOTAL NUMBER OF INDIVIDUALS/ML	N	727.00	5777.00
EVENESS COMPONENT	J	0.44	0.15
MEAN NUMBER OF INDIVIDUALS/TAXA	L	25.07	231.08
NUMBER/ML OF MOST ABUNDANT TAXON	K	391.00	5235.00

LAKE NAME: STILLWATER LAKE
 STORER NUMBER: 4228

CONTINUED

07 23 73

10 03 73

TAXA	FORM	ALGAL			ALGAL		
		IS	SC	UNITS PER ML	IS	SC	UNITS PER ML
ANKISTRODES MUS	CEL						X
ASTERIONELLA FORMOSA	CEL			X			X
BOTRYOCOCCUS BRAUNII	COL						X
CHLAMYDOMONAS PSEUDOPERTYI ?	CEL			X			
CHLORELLA VULGARIS	CEL				11	90.5	9235
CHLOROPHYTAN COCCOID CELL	CEL	21	15.4	112			
COSMARUM EXCAVATUM	CEL						X
CRUCIGENIA TETRAPECTIA	COL		2.6	19		0.2	11
CRYPTOMONAS OVATA	CEL	31	10.2	74			
CYANOPHYTAN COCCOID CELLED COLONY	CEL			X			
CYANOPHYTAN COCCOID CELLED COLONY #	CEL			X			
DINOBRYON	CEL					0.6	34
DINOBRYON CAMPANULOSTIPITUM	CEL		2.5	19			
DINOFAGELLATE #1	CEL			X			
EUGLENA	CEL						X
EUGLENA ELONGATA	CEL		2.5	19			
EUNOTIA PECTINALIS	CEL				14	1.2	69
FLAGELLATE #1	CEL			X			
FLAGELLATE #2	CEL	41	5.1	37			
FLAGELLATE #3	CEL			X			
FLAGELLATE #4	CEL			X			
FLAGELLATES	CEL				21	4.1	237
GLENODINIUM #1	CEL			X	15	0.8	45
GLAUCOCYSTIS	CEL			X			
GALLIONELLA ?	CEL			X			
HELOSIRA GRANULATA	CEL			X			
HELOSIRA ITALICA	CEL				13	1.4	79
COCCYSTIS	CEL			X			X
PECIASTRUM TETRAS	CEL						
V. TETRACCON	COL						X
PERIDINIUM INCONSPICUUM	CEL	11	53.9	391			
PINULARIA TORTA ?	CEL						X
ROMERIA GRACILIS ?	CEL			X			
SCENEDESMUS #1	COL			X			
SCENEDESMUS BIJUGA	COL			X		0.2	11
SCENEDESMUS QUADRICAUDA	CEL			X			X
SCHROEDERIA SETIGERA	CEL			X			
STAUROSTRUM #1	CEL						X
STAUROSTRUM #2	CEL						X
STAUROCKEIS PHOENICENTERON	CEL						X
STEPHANODISCUS	CEL					0.2	11
SURIPELLA #1	CEL						X
SURIPELLA #2	CEL						X
SYNEOPA	CEL	51	7.7	56			
TABELLARIA FENESTRATA	CEL					0.2	11
TABELLARIA FLOCCULOSA	CEL			X		0.6	34
TRACHYGLONAS	CEL			X			
TREBARTIA SETIGERUM	CEL			X			
TOTAL				727			5777

LAKE NAME: LAKE WALLENPAUPACK
 STCPET NUMBER: 4229

NYGAARD TROPHIC STATE INDICES

DATE	04 12 73	07 23 73	10 03 73
MYXOPHYCEAN	02/0 E	6.00 E	1.33 E
CHLOROPHYCEAN	01/0 E	1.00 E	0.33 ?
EUGLENOPHYTE	0.33 E	0/07 ?	0.20 ?
DIATOM	0.14 ?	0.50 E	0.33 E
COMPCUND	05/0 E	9.00 E	2.67 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 12 73	07 23 73	10 03 73
GENUS	00	00	01
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INCICES

DATE	04 12 73	07 23 73	10 03 73
AVERAGE DIVERSITY H	1.27	1.90	2.98
NUMBER OF TAXA S	23.00	14.00	20.00
NUMBER OF SAMPLES COMPOSITED M	4.00	4.00	4.00
MAXIMUM DIVERSITY MAXH	4.52	3.81	4.32
TOTAL DIVERSITY D	3923.03	3767.70	2199.24
TOTAL NUMBER OF INDIVIDUALS/ML N	3089.00	1983.00	738.00
EVENESS COMPONENT J	0.29	0.50	0.59
MEAN NUMBER OF INDIVIDUALS/TAXA L	134.30	141.64	36.90
NUMBER/ML OF MOST ABUNDANT TAXON K	2447.00	1250.00	174.00

LAKE NAME: LAKE WALLENPAUPACK
 STCET NUMBER: 4229

CONTINUED

TAXA	FORM	04 12 73			07 23 73			10 03 73		
		S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML	S	SC	ALGAL UNITS PER ML
ACHNANTHES	CEL			X						
ANABAENA #1	FIL				4	4.1	82			
ANABAENA #2	FIL		0.8	25						X
ANABAENA PLANCTONICA	FIL							1	23.6	174
ANABAENOPSIS	FIL					1.4	27			
ANKISTRODES MUS FALCATUS	CEL						X			
APHANIZZEMENON ?	FIL							3	9.8	72
APHANIZZEMENON FLCS-ACUAE	FIL				2	12.4	245			
APHANOTHECE	CEL					1.4	27			
APHANOTHECE NIOLANS	CEL						X			
ASTERICHELLA FORMOSA	CEL	1	79.2	2447		1.4	27	5	9.8	72
CHLOROCOCALAN	CEL									X
CHLOROPHYTAN CELL	CEL			X						X
CHLOROCOCCLUS	CEL									X
CHLOROPHYTAN FLAGELLATE	CEL				1	63.0	1250			
COELOSPHERIUM NAEGELIANUM	CEL			X						
COELOSPHERIUM PALLIDUM ?	CEL						X			
COSCIINODISCUS	CEL					1.4	27			
COSMARIUM	CEL								1.4	10
CRYPTOMONAS	CEL	4	3.7	115						
CRYPTOMONAS EROSA	CEL				5	2.7	54			
DINOBRYON	CEL			X						
DINOBRYON BAVARIUM	CEL			X						
DINOBRYON SERTULARIA	CEL	3	5.9	181						
EUCORTINA ELEGANS	CEL			X						
EUGLENA GRACILIS ?	CEL			X						
FLAGELLATE #9	CEL	12	5.3	155						
FLAGELLATES	CEL	5	2.9	91					19.5	144
FRAGILARIA CROTONENSIS	CEL		0.3	8				4	16.7	123
GOMPHONEMA	CEL								1.4	10
GYMNODINIUM ALBULUM ?	CEL					1.4	27			
GYMNODINIUM NEGLECTUM	CEL									X
LEFOCINCLIS FUSIFORMIS	CEL									X
PALLIDUM ?	CEL		0.5	16						
MELOSIRA ITALICA	CEL							2	6.9	51
MELOSIRA ITALICA ?	CEL			X						
PERIDICA	CEL		1.1	33						
NAVICULA	CEL									X
PENNATE DIATOM	CEL								1.4	10
PERIDINIUM	CEL			X						
SCENEDESMUS ABUNDANS	CEL			X						
STAUROSTRUM	CEL						X			
STAUROSTRUM LEPTOCLODUM	CEL									X
STEPHANODISCUS OUBIUS	CEL								4.2	31
SURIPELLA	CEL			X						
SYNEDRA	CEL			X						
SYNURA	CEL			X						
TABELLARIA FENESTRATA	CEL		0.3	8	3	10.9	217		5.6	41
XANTHIDIUM SUBMISTIFERUM	CEL									X
TOTAL				3089			1983			738

LAKE NAME: KINZUA DAM
STORET NUMBER: 3641

NYGAARD TROPHIC STATE INDICES

DATE	07 27 73	10 05 73
MYXOPHYCEAN	05/0 E	02/0 E
CHLOROPHYCEAN	02/0 E	01/0 E
EUGLENOPHYTE	0.14 ?	0.67 E
DIATOM	0.17 ?	0.25 ?
COMPOUND	10/0 E	07/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	07 27 73	10 05 73
GENUS	09	00
SPECIES	03	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE	07 27 73	10 05 73
AVERAGE DIVERSITY H	3.72	2.21
NUMBER OF TAXA S	29.00	25.00
NUMBER OF SAMPLES COMPOSITED M	0.00	0.00
MAXIMUM DIVERSITY MAXH	4.86	4.54
TOTAL DIVERSITY D	7700.40	2291.77
TOTAL NUMBER OF INDIVIDUALS/ML N	2070.00	1037.00
EVENNESS COMPONENT J	0.77	0.48
MEAN NUMBER OF INDIVIDUALS/TAXA L	71.38	41.48
NUMBER/ML OF MOST ABUNDANT TAXON K	572.00	429.00

LAKE NAME: KINZUA
STCPT NUMBER: 3541

CONTINUED

07 27 73

10 05 73

TAXA	FORM	ALGAL UNITS PER ML			ALGAL UNITS PER ML		
		S	SC		S	SC	
ANABAENA	FIL			X			X
AFHANIZCHENON FLOS-AQUAE	FIL		5.7	118	11	41.4	429
ASTERICNELLA FORMOSA	CEL		3.8	79			X
CEPATIUM MIRUNDINELLA							
F. GRACILIS	CEL					1.7	18
CHLOROGONIUM	CEL		1.0	20			
CHLOROPHYTAN COCCOID CELL	CEL						X
CHCANCFLAGELLATE	CEL			X			
COCCOID CELL	CEL				5	3.5	36
COCCONEIS	CEL		1.9	39			
CRYPTOCYNAS	CEL	3	7.5	159			
CYMBELLA	CEL			X			X
DINOBRYON	CEL	4	7.6	158		1.7	18
DINOBRYON SAVARICUM	CEL			X			
DINOBRYON DIVERGENS	CEL						X
EUGLENA #1	CEL						X
EUGLENA GRACILIS	CEL		1.9	39			
EUGLENCID CELL	CEL						X
EUNOTIA	CEL		2.9	59			
FLAGELLATE #1	CEL	1	27.6	572	2	29.8	268
FLAGELLATE #2	CEL						X
FLAGELLATE #3	CEL				3	17.3	179
FRAGILARIA	CEL		5.7	118			
FRAGILARIA CROTONENSIS	CEL				4	6.8	71
FRAGILARIA CROTONENSIS							
V. PPLICNGATA	CEL			X			
LYNGBYA	FIL		1.0	20			
PALLCMCNAS ACARCIDES	CEL						X
MELOSIRA #4	CEL		1.0	20			
MELOSIRA GRANULATA	CEL						X
MERISMOCEDIA TENUISSIMA	COL		1.9	39			
MICROCYSTIS INCEPTA	COL		2.9	59			
NAVICULA CRYPTOCEPHALA	CEL			X			
NAVICULA SPP.	CEL		4.9	99			
NITZSCHIA	CEL		1.0	20			
NITZSCHIA #1	CEL						X
NITZSCHIA FILIFORMIS	CEL			X			
NITZSCHIA SPP.	CEL		2.9	59			
PHCICCSPPERIA CURVATA	CEL		1.9	39			
SCENEDESMUS	COL			X			
SPHAEROCYSTIS SCHROETERI	COL						X
STAURONEIS ANCEPS	CEL						X
STAURONEIS PHOENICENTERON	CEL						X
STEPHANODISCS OUBIUS	CEL	2	8.5	177			X
SYNECRA	CEL						X
SYNECRA ULNA	CEL	15	7.6	159			X
SYNLRA	COL					1.7	18
TETRAEDRON MINIMUM	CEL		1.0	20			
TOTAL				2070			1037

PART II: DISTRIBUTION OF ALGAE IN YORK COUNTY

by

Robert L. Frock

113 Fulton Street
Hanover, Pennsylvania

17331

CONTENTS

Introduction	51
Description of Study Area	51
Materials and Methods	53
Results	55
Literature Cited	56
Bibliography	57
Appendix: Species List of the Freshwater Algae in York County, Pennsylvania	58

INTRODUCTION

Previous surveys dealing with Pennsylvania algae have been sketchy and often included taxa that have since undergone revision in nomenclature. Seldom were taxa identified to species. Most algal surveys were in connection with specific reservoir, water supply facility, or pollution studies. Francis Wolle (1887, 1892) made the most extensive survey of Pennsylvania algae, especially for the desmids. This survey reports on 152 genera and 502 species of fresh-water algae found within a 16-kilometer (km) radius of Hanover, York County Pennsylvania. Included are 16 genera and 159 species of desmids. I am greatly indebted to Drs. Gerald W. Prescott, Hannah T. Croasdale, L. A. Whitford, and Mr. William D. Taylor, for their most generous assistance with identifications and manuscript suggestions.

DESCRIPTION OF STUDY AREA

Emphasis in this study was placed on Lake Marburg and Glatco Lodge (Haldeman's Pond) from which the majority of species was found. All of the habitats studied are presented in Table 1.

Lake Marburg is located in Heidelberg, Manheim, and West Manheim Townships of York County, Pennsylvania, about 6.4 km east of Hanover (Selcher, 1972). This reservoir, impounded in 1967, is owned by the Pennsylvania Department of Environmental Resources, and is crossed by Route 216.

Lake Marburg has a surface area of 516 hectares and a drainage area of 5808 hectares (Selcher, 1972). The lake has a maximum depth of 32 meters (m) and an average depth of 12.2 m. There are about 45 km of shoreline. Nature of the bottom is organic silt and mud. The surrounding terrain is hilly with pastures and hardwood trees. The shoreline profile is usually steep.

Because of mixing prompted by rapid draw-off at a depth of 21 m by the P. H. Glatfelter Paper Company of Spring Grove, Pennsylvania, the dissolved oxygen content of the lake is sufficiently high to accommodate the needs of salmonid fish down to 21 m at the dam (Selcher, 1972). The region of the lake unaffected by the maximum mixing efforts of the drawoff shows a more typical summer dissolved oxygen pattern, with concentrations too low to support trout below depths of 4.6 to 6 m. The normal range of pH is from 6.0 to 9.0 (Selcher, 1972). At depths from 0.3 to 21 m the temperature decreased from 23.5° C to 7.0° C. The alkalinity (as CaCO₃), ranges from 36 to 39 milligrams/liter (mg/liter). The dissolved oxygen ranges from 8.7 to 3.6 ppm.

Extensive limnological data for Glatco Lodge (Haldeman's Pond), the major source of algal samples, are not available. About 100 years ago it was an iron ore quarry and was subsequently abandoned due to low grade ore and the exposure of springs. The average range of pH is from 6.0 to 8.0, using the paper strip testing method. Large quantities of Ferric oxides appear to be present. The pond is surrounded by pine, oak, and maple trees. The aquatic shoreline vegetation consists mostly of Elodea, Lemna, and Sphagnum. The pond is owned by the P. H. Glatfelter Paper Company of Spring Grove, Pennsylvania. It is well stocked with trout by the Pennsylvania Fish Commission and by local Rod and Gun Clubs. Table 2 summarizes the limnological data available for the Lake Marburg and Glatco Lodge impoundment.

TABLE 1. HABITATS SAMPLED FOR FRESHWATER ALGAE IN
YORK COUNTY, PENNSYLVANIA

Glatco Lodge (Haldeman's Pond) (GL)	Detailed description in text
Lake Marburg (Codus Creek State Park) (LM)	Detailed description in text
Reck's farm pond (RF)	A small, privately owned pond, fed by springs and run-off
Budd's farm pond (BF)	A small, privately owned pond, fed by springs and run-off
Storm drain ditch (SD)	A small stream east of Hanover, about 10 centimeters (cm) deep, 1 m wide, and slow flowing all year.
Sheppard Myers Reservoir (SM)	A large impoundment about eight kilometers southeast of Hanover, which is the city's main water supply.
Hanover High School Nature Study Pond (HH)	A small pond
South Western Intermediate School Nature Study pond (SW)	A small pond

MATERIALS AND METHODS

Collections were made at least once per month during the years 1971 through 1975. Six 500 ml wide mouth jars with screw lids were used for each sample. Shallow water vegetation such as Elodea and Sphagnum, and allocthonous material, e.g. pine needles, maple and oak leaves, were placed in a jar with water about one inch from the top. The lid was screwed on and the jar vigorously shaken. The contents were then squeezed out into the jar. This was repeated several times for each jar. Finally, a small amount of vegetation was placed in the jar to complete the collection. This method proved satisfactory in obtaining a good variety of desmids and epiphytic forms.

Samples were taken to the lab as soon as possible where they were examined with a binocular brightfield microscope (Olympus model KHC). Most specimens were examined live using a flat-bottomed well slide (20 x 28mm) with a coverglass. Other examinations were made of materials preserved in Transeau's 6-3-1. A portion of each sample was preserved as part of the author's permanent collection. Permanent slide mounts were made only for the examination of diatoms. An extensive illustrated diatom species list will be published at a later date.

TABLE 2. PHYSICAL CHARACTERISTICS OF LAKE MARBURG AND GLATCO LODGE IMFOUNDMENT

	Lake Marburg	Glatco Lodge
Surface area (hectares)	516.0	9.0
Drainage area (hectares)	5808.0	-----
Maximum depth (m)	32.0	-----
Average depth (m)	12.2	-----
Length of shore line (k)	45.0	1.1
pH (standard Units)	6.0-9.0	6.0-8.0
Dissolved oxygen (ppm)	3.6-8.7	-----
Temperature (°C)	7.0-23.5	-----
Alkalinity (as CaCO ₃)	46.0-39	-----

A freehand drawing was made of each species on a 5 x 8 index card. Additional information on the card included the name of the organism, dimensions, habitat, and date. This material was used by Drs. G. W. Prescott, H. Croasdale, and L. A. Whitford for species verification.

The primary references used to make identifications included: Gojdics (1953), Irénée-Marie (1939), Prescott (1962, 1970), Prescott et al. (1972, 1975), West and West (1904-1923), and Whitford and Schumacher (1969).

The following notations as to the relative abundance of species refer only to my collections and are not intended to be generalized for other Pennsylvania areas.

Common:	Abundant in all habitats.
Fairly common:	Not abundant; restricted to certain habitats.
Uncommon:	Found only a few times in a specific habitat.
Rare:	Found only once from one site.

RESULTS

A species list with habitat and abundance records is presented in the appendix. Reported are 502 species of 152 genera. Table 3 summarizes the number of genera and species by phylum. There are 293 new species for Pennsylvania including, to the best of my knowledge, 3 species new for North America. The species new for North America are Euglena proxima var. amphoraeformis Szabados, Trachelomonas conica Playf., and Menoidium bibacillatum (author?). These species were rare or uncommon in the study samples. Another species, Tetrastrum tetracanthum G.S.W. Brunnthaler, is rare in the United States, having been found only at one station in Alabama. In this survey it was found several times in Reck's farm pond.

TABLE 3. NUMBER OF GENERA AND SPECIES BY PHYLUM

	Genera	Species
Chlorophyta	91	335
Cyanophyta	24	67
Chrysophyta	17	31
Euglenophyta	10	55
Cryptophyta	5	5
Pyrrhophyta	5	8
Chloromonadophyta	<u>1</u>	<u>1</u>
	152	502

LITERATURE CITED

- Gojdics, M. 1953. The genus *Euglena*. Univ. Wisconsin Press. 268 pp.
- Irène-Marie, F. 1939. Flore Desmidiaceae de la région de Montréal. Laprairie. 547 pp. Pls. 69.
- Prescott, G. W. 1962. Algae of the western Great Lakes area. Wm. C. Brown Co. 977 pp. Pls. 1-136.
- Prescott, G. W. 1970. How to know the freshwater algae. Wm. C. Brown Co. 348 pp. Figs. 533.
- Prescott, G. W., H. T. Croasdale, and W. C. Vinyard. 1972. Desmidiaceae. Part 1. Saccodermatae, Mesotaeniaceae. North American Flora. N. Y. Bot. Garden. II, 6:1-84. Pls. 1-8.
- Prescott, G. W., H. T. Croasdale, and W. C. Vinyard. 1975. A synopsis of North American desmids. Part II. Desmidiaceae: Placodermatae, Section I, Univ. of Nebraska Press. 275 pp. Pls. 9-57.
- Selcher, J. 1972. Lake Marburg. Pennsylvania Angler. Nov. 1972. pp. 13-15.
- Smith, G. M. 1950. The fresh-water algae of the United States. 2nd. ed. McGraw-Hill. 719 pp.
- Taft, C. E. and C. W. Taft. 1971. The algae of western Lake Erie. Ohio Biol. Surv., 4(1):1-189. Figs. 1-654.
- Tiffany, L. H. and M. E. Britton. 1971. The algae of Illinois. Hafner Publishing Company. (fasc. of the 1952 ed.) 407 pp. Pls. 1-108.
- West, W. and G. S. West. 1904-1923. A monograph of the British Desmidiaceae. Vols. I - IV; V(1924, with Nellie Carter), Ray Soc. London.
- Whitford, L. A. and G. J. Schumacher. 1969. A manual of the freshwater algae in North Carolina. North Carolina Agriculture Experimental Station. Tech. Bull. 118:1-313. Pls. 1-71.
- Wolle, F. 1887. Freshwater algae of the United States. Bethlehem, Pennsylvania. 364 pp.
- Wolle, F. 1892. Desmids of the United States and a list of American *Pediastrum*. Bethlehem, Pennsylvania. 182 pp.

BIBLIOGRAPHY

- Buck, W. S. 1935. The common algae of Berks County, Pennsylvania. Proc. Penna. Acad. Sci. 9:100-107.
- Buck, W. S. 1938. A key to the algae of Berks County. Proc. Penna. Acad. Sci. 12:84-87.
- Coutant, C. C. 1963. Stream plankton above and below Green Lane Reservoir. Proc. Penna. Acad. Sci. 37:122-126.
- Croasdale, H. T. 1973. Freshwater algae of Ellesmere Island, N. W. T. Nat. Mus. Canada, Publ. in Bot. 3:1-131. Pls. 1-18, 2 maps, 3 graphs.
- Gottschall, R. Y. 1930. Preliminary report on the phytoplankton and pollution in Presque Isle Bay, Lake Erie. Proc. Penna. Acad. Sci. 4:69-79.
- MacEntee, F. J. 1970. A preliminary investigation of the soil algae of northeastern Pennsylvania. Soil Sci. 110(5):313-317.
- Morrissey, R. V. 1928. Summer survey of algae in ponds on Presque Isle, Erie, Pennsylvania. Penna. Acad. Sci. pp. 47-51.
- Rosowske, J. R. and B. L. Parker. 1971. Selected papers in phycology. Univ. of Nebraska Press. 876 pp.
- Scott, A. M. and R. Grönblad. 1957. New and interesting desmids from the Southeastern United States. Acta Soc. Sci. Fenn. n.s. B. 2(8):1-62. Pls. 1-37.
- Van Dersal, W. R. and J. L. Cartledge. ? . The blue-green algae of Pennsylvania. Penna. Acad. Sci. pp. 82-88.

APPENDIX

SPECIES LIST OF THE FRESHWATER ALGAE IN YORK COUNTY, PENNSYLVANIA

An asterisk (*) indicates a new species for the state, while a double asterisk (**) indicates a new species for North America. Abbreviations for habitats follow the author-citation and are enclosed in parentheses. The abbreviations are as follows: Glatco Lodge (GL), Lake Marburg (LM), Reck's farm pond (RF), Budd's farm pond (BF), storm drain ditch (SD), Sheppard Myers Reservoir (SM), Hanover High School Nature Study Pond (HH), and South Western Intermediate School Nature Study Pond (SW). Immediately following the habitat is a lower case letter indicating abundance: c (common), f (fairly common), u (uncommon), and r (rare).

CHLOROPHYTA
CHLOROPHYCEAE
VOLVOCALES

Carteria

C. klebsii (Dang.) Dillwyn - (GL)u

Chlamydomonas

*C. angulosa Dillwyn - (GL)c

*C. cienkowskii Schmidle - (GL,SM,SW)u

C. globosa Snow - (GL-SW)u

*C. pseudoperty Pascher - (LM)r

Chlorogonium

C. elongatum (Ehrenb.) Dang. - (GL)r

Haematococcus

*H. lacustris (Girad.) Rostaf. - (ceramic
bird bath)r

Eudorina

E. elegans (Ehrenb.) - (GL,HH)f

Gonium

G. pectorale Muller - (GL,LM)f

Pandorina

P. morum (Muller) Bory - (GL,HH)f

Pleodorina

*P. illinoisensis Kofoed - (GL,HH,SW)f

Volvox

*V. aureus Ehrenb. - (GL)r

*V. perglobator Smith - (GL)r

*V. tertius A. Mayer - (GL,SW)c

TETRASPORALES

Schizochlamys (Placosphaera)

*S. compacta Prescott - (GL)r

Tetraspora

T. gelatinosa (Vaucher) Desvaux -
(GL)u

*T. lamellosa Prescott - (GL,HH)f

T. lubrica (Roth) C. A. Ag. - (GL)c

Asterococcus

*A. limneticus G. M. Smith - (GL)r

Gloeocystis

G. ampla (Kütz.) Lagerh. - (GL,HH)f

*G. gigas (Kütz.) Lagerh. - (LM)u

Stylosphaeridium

*S. stipitatum (Bachm.) Geitler & Gimesi -
(GL)r

CHLOROCOCCALES (CHLOROSPHAERALES)

Characium

C. ambiguum Hermann - (GL)c

*C. falcatum Schröder - (GL)r

*C. hookeri (Reinsch) Hansg. - (SD)r

C. limneticum Lemm. - (LM)r

*C. obtusum A. Braun - (GL)r

*C. ornithocephalum A. Braun - (GL)f

C. pringsheimii A. Braun - (GL)f

*C. rostratum Reinhard - (GL)r

Chlorococcum

*C. humicola (Näg.) Rabenh. - (GL)c

Closteridium

*C. lunula Reinsch - (LM)r

Planktosphaeria

P. gelatinosa G. M. Smith - (LM,SW)r

8 Tetraëdron

*T. gracile (Reinsch) Hansg. - (RF)r

*T. hastatum
var. palatinum (Schmidle) Lemm. - (RF)f

*T. limneticum Borge - (GL,RF)u

*T. lobulatum var. crassum Prescott - (RF)r

T. minimum (A. Braun) Hansg. - (LM,RF,SW)c

T. muticum (A. Braun) Hansg. - (GL)r

*T. muticum
var. punctulatum (Reinsch) De Toni - (GL)r

*T. pentaedricum W & W - (RF)r

*T. quadricuspdatum (Reinsch) Hansg. - (RF)r

*T. regulare var. incus Teiling - (RF)u

*T. trigonum
var. gracile (Reinsch) De Toni - (RF)r

Palmella

P. mucosa Kütz. - (HH)f

Sphaerocystis (Palmellocystis)

S. schroeteri Chodat - (LM,SW)u

Ankistrodesmus

A. convolutus Corda - (LM)f

A. falcatus (Corda) Ralfs - (LM,SW)f

*A. falcatus var. acicularis (A. Braun) (LM)r
G. S. West - (LM)r

*A. falcatus var. mirabilis W & W - (LM,SW)r

*A. falcatus var. tumidus W & W - (LM)r

*A. spiralis (Turner) Lemm. - (LM)u

Chlorella

C. vulgaris Beyerinck - (GL,LM,HH,RF,SW)c

Zoochlorella

*Z. parasitica Brandt - (LM)c

Chodatella (Lagerheimia)

*C. citriformis
var. paucispina Tiff. & Ahls. - (GL)r

*C. quadriseta Lemm. - (LM)r

*C. subsalsa Lemm. - (LM)r

Closteriopsis

- *C. longissima var. tropica W & W - (GL)r

Eremosphaera

- E. viridis De Bary - (GL)r

Franceia

- *F. droescheri (Lemm.) - (GL)r

Kirchneriella

- *K. contorta (Schmidle) Bohlin - (GL)u

- *K. lunaris
var. irregularis G. M. Smith - (RF)f

Nephrocytium

- *N. agardhianum Næg. - (LM,RF)c

- *N. obesum W & W - (LM,HH,RF)c

Oocystis

- O. borgei Snow - (GL,LM,SW)c

- *O. parva W & W - (LM,RF)f

- *O. pusilla Hansg. - (GL)c

Quadrigula

- *Q. chodatii (Tan. - Full.) G. M. Smith - (LM)r

- Q. lacustris (Chodat) G. M. Smith - (GL,RF)r

Selenastrum

- *S. bibraianum Reinsch - (LM,SW)f

- S. gracile Reinsch - (LM,SW)c

- *S. minutum (Næg.) Collins - (GL)u

- *S. westii G. M. Smith - (GL)f

Trochiscia

- *T. reticularis (Reinsch) Hansg. - (GL,LM,SW)u

Golenkinia

- *G. paucispina W & W - (GL)r

- G. radiata (Chodat) Wille - (GL)r

Micractinium

- *M. pusillum Fresenius - (GL)r

Botryococcus

- B. braunii Kütz. - (GL)r

Dimorphococcus

- *D. lunatus A. Braun - (LM)r

Actinastrum

- A. gracillimum G. M. Smith - (LM)u

Coelastrum

- C. cambricum Archer - (GL,RF)f

- C. microporum Næg. - (GL,RF,SW)c

- *C. sphaericum Næg. - (LM,RF,SW)u

Crucigenia

- C. rectangularis (A. Braun) Gay - (LM,SW)r

- *C. tetrapedia (Kirchner) West - (LM)u

- *C. truncata G. M. Smith - (LM)r

Scenedesmus

- *S. abundans (Kirchner) Chodat - (LM)f
- *S. abundans
var. asymmetrica (Schröder) G. M. Smith - (LM)u
- *S. abundans var. brevicauda G. M. Smith - (GL)u
- *S. abundans
var. longicauda G. M. Smith - (LM,RF,SW)c
- *S. acuminatus (Lagerh.) Chodat - (GL)r
- *S. acutiformis Schröder - (GL)u
- *S. arcuatus
var. platydisca G. M. Smith - (RF)r
- S. bijuga (Turpin) Lagerh. - (GL,LM,HH)c
- *S. brasiliensis Bohlin - (LM,SW)r
- *S. brevispina (G. M. Smith) Chodat - (LM)r
- *S. denticulatus Lagerh. - (GL)u
- S. dimorphus (Turpin.) Kütz. - (LM)u
- *S. incrassatulus
var. mononae G. M. Smith - (GL)u
- *S. longus Meyen - (GL,HS)u
- *S. longus
var. naegelii (Bréb.) G. M. Smith - (GL,LM)u
- *S. obliquus (Turpin) Kütz. - (GL,LM,HH)u
- *S. opoliensis P. Richter - (GL,LM,RF)f
- *S. opoliensis var. contacta Prescott - (SD)u
- S. quadricauda (Turpin) Bréb. - (GL,LM,HH,RF,BF,SW)c

*S. quadricauda var. longispina (Chodat)
G. M. Smith - (GL,HH,BF)c

*S. quadricauda var. maximus W & W - (SD)r

*S. quadricauda var. parvus G. M. Smith - (SD)r

*S. tibiscensis Uherkovich - (GL,SW)r

Tetradesmus

*T. wisconsinense G. M. Smith - (GL,RF)r

Tetrastrum

T. staurogeniaeforme (Schröder) Lemm. - (GL)u

*T. tetracanthum G. S. W. Brunnthaler - (RF)r

Hydrodictyon

H. reticulatum (L) Lagerh. - (GL,LM,HH,RF,BF)c

Pediastrum

P. boryanum (Turpin) Menegh. - (GL,LM,AQ)c

*P. boryanum var. longicorne Racib. - (LM)u

P. duplex Meyen - (GL,LM,RF)c

*P. duplex Meyen
var. clathratum (A. Braun) - (LM)u

P. duplex var. gracillimum W & W - (RF)u

*P. duplex var. reticulatum Lagerh. - (RF)r

P. simplex Meyen Lemm. - (GL,RF)c

P. simplex
var. duodenarium (Bailey) Rabenh. - (RF)r

*P. tetras (Ehrenb.) Ralfs - (GL,LM,RF,BF,SM,HH,SW)c

- *P. tetras Ehrenb. Ralfs
var. tetraodon (Corda) Rabenh. - (GL,HH,RF)c

Sorastrum

- *S. americanum (Bohlin) Schmidle - (LM,SW)r
*S. spinulosum Næg. - (LM,SW)r

ULOTRICHALES

Chlorhormidium (Hormidium)

- *C. klebsii G. M. Smith - (GL,LM)c

Geminella

- G. minor (Næg.) Heering - (GL)r
*G. mutabilis (Bréb.) Wille - (GL)r

Radiofilum

- *R. flavescens G. S. W. - (GL)r

Stichococcus

- *S. scopulinus Hazen - (GL)u
S. subtilis (Kütz.) Klercker - (HH)u

Ulothrix

- U. aequalis Kütz. - (GL)c
*U. subtilissima Rabenh. - (GL)u
U. tenerima Kütz. - (GL)c
*U. variabilis Kütz. - (GL)c
U. zonata (Weber & Mohr) Kütz. - (SD)r

Uronema

- *U. elongatum Hodgetts - (LM)u

Microspora

- *M. pachyderma (Wille) Lagerh. - (GL)u
*M. willeana Lagerh. - (GL)u

Cylindrocapsa

- *C. conferta W. West - (GL)c
C. geminella var. minor Hansg. - (GL,HH)u

ULVALES

Schizomeris

- S. leibleinii Kütz. - (GL)r

Schizogonium

- *S. murale Kütz. - (LM)r

Chlorosarcina

- *C. consociata (Klebs) G. M. Smith - (GL)r

Chaetophora

- *C. attenuata Hazen - (LM)u

Protococcus (Desmococcus)

- P. viridis C. A. Ag. - (bark,north side
of tree)f

Draparnaldia

- *D. acuta (C. A. Ag.) - (SM)r

Microthamnion

- *M. strictissium Rabenh. - (GL)r

Protoderma

- P. viride Kütz. - (GL)r

Stigeoclonium

- *S. flagelliferum Kütz. - (SD)u
- S. nanum Kütz. - (juvenile stage) (SD)u
- *S. pachydermum Prescott - (SD)c
- S. subsecundum Kütz. - (LM)u
- S. tenue (C. A. Ag.) Kütz. - (LM)u

Aphanochaete

- A. repens A. Braun - (GL)r
- A. vermiculoides Wolle - (GL)r

Chaetosphaeridium

- *C. globosum (Nordst.) Klebahn - (LM)r

Coleochaete

- C. orbicularis Pringsheim - (GL,LM)f
- C. scutata Bréb. - (LM)u
- C. soluta Pringsheim - (LM)r

Dicranochaete

- *D. reniformis Hieronymus - (LM)r

OEDOGONIALES

Oedogonium

- *O. inconspicuum Hirn - (LM)r
- *O. rufescens
var. exiguum (Elfv.) Tiff. - (GL)u
- *O. suecicum Wittr. - (LM)r
- *O. vulgare (Wittr.) Tiff. - (LM)f

CLADOPHORALES

Cladophora

- C. glomerata (L) Kütz. - (GL)u
- *C. insignis (C. A. Ag.) Kütz. - (SD)u

Rhizoclonium

- R. fontanum Kütz. - (SD)u
- R. heiroglyphicum (C. A. Ag.) Kütz. - (GL,HH)c
- *R. hookeri Kütz. - (SD)r

ZYGNEMATALES (Conjugales)

Spirogyra

- S. condensata (Vaucher) Kütz. - (LM)r
- S. weberi Kütz. - (GL,HH)r

Zygnema

- *Z. pectinatum (Vaucher) C. A. Ag. - (LM)r

ZYGNEMATALES (Conjugales)

MESOTAENIACEAE

Gonatozygon

- *G. kinahani (Archer) Rabenh. - (GL)f
- *G. monotaenium De Bary - (GL)u
- G. pilosum Wolle - (GL)u

Netrium

- *N. digitus (Ehrenb.) Itzigs. & Roth - (GL)u

*N. digitus
var. lamellosum (Bréb.) Grönblad - (GL)r

*N. interruptum (Bréb.) Lütkm. - (GL)r

Spirotaenia

S. condensata Bréb. - (GL)r

*S. trabeculata A. Braun - (SM)r

DESMIDIACEAE

Actinotaenium

*A. diplosporum (Lundell) Teiling
var. americana W & W - (GL)r

*A. perminutum (Turner) Teiling - (GL)u

*A. rufescens (Cleve) Teiling - (SM)r

Arthrodesmus

*A. incus var. ralfsii W & W - (GL)r

Closterium

*Cl. abruptum W & W - (GL)f

Cl. acerosum (Schrank) Ehrenb. - (GL,HH,RF)u

*Cl. acerosum (Schrank) Ehrenb.
var. elongatum Bréb. - (GL,BF,SW)u

Cl. angustatum Kütz. - (GL)u

*Cl. cynthia De Not. - (GL,LM)u

Cl. didymotocum Corda - (GL)r

*Cl. gracile Bréb.
var. intermedium Irénée-Marie - (GL)r

*Cl. idiosporum W & W - (GL)u

*Cl. incurvum Bréb. - (GL,LM,SW)u

*Cl. intermedium Ralfs - (GL)f

*Cl. intermedium
var. hibernicum West - (GL)r

Cl. lanceolatum Kütz. - (GL)u

Cl. leibleinii Kütz. - (GL,RF)f

*Cl. libellula (Focke) Nordst. - (GL)r

Cl. lineatum Ehrenb. - (GL,HH,BF,SW)u

Cl. lunula (Müller) Nitzsch - (GL,BF,SW)r

*Cl. lunula (Müller) Nitzsch
fa. minor - (GL)r

*Cl. lunula (Müller) Nitzsch intermedium Gutw.
(GL)r

Cl. moniliferum (Bory) Ehrenb. - (GL,LM,
HH,SM,BF,SW)c

*Cl. navicula (Bréb.) Lütkm. - (GL,SM)r

*Cl. praelongum Bréb. - (GL)r

*Cl. pritchardianum Archer - (RF)r

Cl. ralfsii Bréb. - (GL)r

*Cl. ralfsii Bréb.
var. hybridum Rabenh. - (GL)r

Cl. strigosum Bréb. - (GL,BF)c

Cl. striolatum Ehrenb. - (LM,BF)r

*Cl. subulatum (Kütz.) Bréb. - (GL)u

*Cl. tumidum Johnson - (GL,SM,SW)f

Cl. turgidum Ehrenb. - (GL)r

Cl. venus Kütz. - (GL,RF,SW)u

Cosmarium

*Cos. abbreviatum Racib. - (LM,HH)u

*Cos. angulare Johnson - (GL,SM,BF)f

*Cos. angulosum Bréb. - (GL)r

*Cos. binum Nordst. - (GL,RF)u

Cos. bioculatum Bréb. var. depressum
(Schaarschm.) Schmidle fa. minus - (RF)r

Cos. circulare Reinsch - (GL,BF)r

*Cos. contractum Kirchner - (LM)r

Cos. dentatum Wole - (GL,RF)u

Cos. depressum (Näg.) Lundell - (GL)r

*Cos. furcatospermum W & W - (GL,LM,HH,
RF,BF,SM,SW)c

*Cos. globosum fa. minor Boldt - (LM)r

*Cos. globosum Bulnh.
var. subaltum Messik. - (GL)r

Cos. granatum Bréb. - (GL,LM,HH,RF,BF,SM,SW)c

*Cos. hammeri Reinsch
var. protuberans W & W - (GL)r

Cos. holmiense Lundell
var. integrum Lundell - (LM)r

*Cos. impressulum Elfv. - (GL)r

*Cos. inconspicuum W & W - (RF)r

*Cos. latifrons Lundell - (GL)r

*Cos. margaritatum (Lundell) Roy & Biss.
fa. minor (Boldt) W & W - (GL)r

*Cos. meneghini Bréb.
fa. reinschii Istvan. - (GL)r

*Cos. obliquum fa. minor Nordst. - (GL)r

Cos. obsoletum (Hantzsch) Reinsch - (GL)r

*Cos. obtusatum Schmidle - (SM,BF,SW)u

Cos. ornatum Ralfs - (GL)u

Cos. ovale Ralfs - (GL)u

Cos. pachydermum Lundell - (GL)r

*Cos. porrectum Nordst. - (LM)r

Cos. portianum Archer - (GL,LM)u

Cos. protractum (Näg) De Bary - (LM)u

Cos. pseudobroomei Wille - (GL,LM,SW)f

*Cos. pseudoconnatum Nordst. - (GL,BF)f

*Cos. pseudoprotuberans Kirchner - (HH,RF)u

Cos. punctulatum Bréb. - (SM)r

*Cos. punctulatum
var. subpunctulatum (Nordst.) Börg. -
(GL,LM,SM)u

*Cos. pusillum (Bréb.) Archer - (GL)r

Cos. quadratum Ralfs - (GL)r

*Cos. regnellii Wille - (LM)r

*Cos. regnellii Wille
var. minimum Eich. & Gutw. - (GL,LM)f

Cos. regnesi Reinsch - (GL,LM)f

*Cos. regnesi var. montanum Schmidle - (GL)r

Cos. reniforme (Ralfs) Archer - (GL,LM,HH)f

*Cos. sexangulare fa. minima Nordst. - (GL,LM)u

Cos. sportella Bréb. - (LM)u

*Cos. subcostatum Nordst. - (GL)r

Cos. subcrenatum Hantzsch - (GL,LM,HH,RF,BF)c

*Cos. subspeciosum Nordst. - (LM)r

*Cos. succisum West - (GL)r

*Cos. tenue Archer - (GL)r

Cos. turpinii Bréb. - (GL)r

Cos. turpinii Bréb.

var. podolicum Gutw. - (GL)r

Cos. venustum (Bréb.) Archer - (LM)r

*Cos. zygomorphicum Taft - (LM,RF)r

Desmidium

*D. asymmetricum Grönblad - (LM)r

*D. grevillii (Kütz.) De Bary - (GL)r

D. swartzii C. A. Ag. - (GL)r

Euastrum

E. affine Ralfs - (LM)r

E. ansatum Ralfs - (GL)r

E. binale (Turpin) Ehrenb. - (GL,LM)r

E. didelta (Turpin) Ralfs

var. ansatifforme Schmidle - (GL)r

*E. dubium Näg. - (GL)r

E. insulare (Witttr.) Roy - (GL,LM)u

*E. obesum Josh. - (RF)r

E. oblongum (Grev.) Ralfs - (GL)r

E. ventricosum Lundell - (GL)r

E. verrucosum Ehrenb. - (GL,RF)u

E. verrucosum Ehrenb.

var. alatum Wolle - (GL)r

Hyalotheca

H. dissiliens (J. E. Smith) Bréb. - (GL,LM)u

H. mucosa (Dillwyn) Ehrenb. - (GL,LM)r

Micrasterias

*M. abrupta W & W - (LM)r

M. americana (Ehrenb.) Ralfs - (GL)r

M. apiculata (Ehrenb.) Menegh. - (GL)r

M. apiculata

var. fimbriata (Ralfs) Nordst. - (GL)r

M. crux-melitensis (Ehrenb.) Hassall - (GL)r

M. denticulata Bréb. - (GL)r

M. laticeps Nordst. - (GL,LM,BF)f

M. muricata (Bailey) Ralfs - (GL)r

*M. radiata Hassall - (GL,LM,SW)f

M. rotata (Grev.) Ralfs - (GL,LM)u

*M. truncata var. semiradiata Cleve - (LM)r

Penium

P. margaritaceum Ralfs - (GL,LM,RF,SW)c

P. spirostriolatum Barker - (LM)r

Pleurotaenium

Pl. ehrenbergii (Bréb.) De Bary - (GL,LM)u

*Pl. maximum (Reinsch) Lundell - (LM,HH)f

Pl. nodulosum Bréb. - (GL)r

Pl. trabecula (Ehrenb.) Næg. - (GL,LM,RF,BF,SM,HH,SW)c

*Pl. trabecula (Ehrenb.) Næg.
fa. clavata (Kütz.) W & W - (GL)r

Pl. truncatum (Bréb.) Næg. - (GL,SW)f

Spondylosium

*Sp. moniliforme Lundell - (GL)r

*Sp. planum (Wolle) W & W - (GL,LM)f

Staurostrum

St. alternans Bréb. - (GL,HH,RF,BF)f

*St. apiculatum Bréb. - (GL)r

St. arctiscon (Ehrenb.) Lundell - (GL,LM)f

St. arcuatum Nordst. - (GL)r

St. avicula Bréb. - (GL)r

*St. avicula var. subarcuatum West - (GL,BF)r

St. biennaenum Rabenh. - (LM)r

St. brebissonii Archer - (GL,LM,BF)f

St. brevispinum Bréb. - (GL)r

St. dickiei Ralfs - (GL,LM)f

St. dilatatum Ehrenb. - (RF)r

St. furcatum (Ehrenb.) Bréb. - (GL)r

St. gladiosum Turner - (GL)r

St. gracile Ralfs - (GL,LM,RF)f

*St. gracile var. nanum Wille - (GL,SW)f

*St. hexacerum (Ehrenb.) Wittr. - (GL,RF)r

St. hirsutum (Ehrenb.) Bréb. - (RF,SW)r

*St. orbiculare
var. depressum Roy & Biss. - (GL,LM)f

St. paradoxum Meyen - (LM,RF)f

St. polymorphum Bréb. - (GL,LM,RF,BF,SM,HH,SW)c

*St. polymorphum var. pusillum West - (GL,HH)r

*St. radians W & W - (GL)r

St. setigerum Cleve - (GL)r

St. striolatum (Næg.) Archer - (GL)r

St. tetracerum Ralfs - (LM,RF)f

*St. tetracerum
var. validum W & W - (GL,RF,SW)f

Xanthidium

X. antilopaeum (Bréb.) Kütz. - (LM)r

CHAROPHYCEAE

CHARALES

Chara

*C. braunii Gmelin - (GL,LM)f

*C. schweinitzii A. Braun - (GL)r

EUGLENOPHYTA

EUGLENALES

Euglena

*E. acus var. longa Johnson - (GL,HH)f

*E. acus var. rigida Hueber - (GL)r

E. deses Ehrenb. - (GL)r

E. ehrenbergii Klebs - (GL,LM)f

*E. elastica Prescott - (GL)r

E. gracilis Klebs - (HH)r

E. ignobilis Johnson - (HH)r

E. minuta Prescott - (GL,HH)f

E. oxyuris Schmarda - (GL,LM)fc

E. oxyuris Schmarda
var. minor Delf. - (GL)r

E. proxima Dnag. - (HH)r

**E. proxima
var. amphoraeformis Szabados - (SD)r

E. spirogyra Ehrenb. - (HH,BF)r

*E. spirogyra var. fusiformis Defl. - (HH)r

*E. viridis Ehrenb. - (GL)r

Eutreptia

*E. viridis (Klebs) - (SD)r

Lepocinclis

L. ovum (Ehrenb.) Lemm. - (GL)r

*L. texta (Duj.) Lemm. - (HH)f

Phacus

P. acuminatus Stokes - (GL)r

P. acuminatus
var. dresepolskii Skvort. - (GL,LM)f

P. anacoelus Stokes - (GL)r

P. caudatus Huebner - (GL,RF,SW)f

*P. chloroplastes Prescott - (GL)r

*P. curvicauda Swiren. - (GL,HH,BF)f

P. longicauda (Ehrenb.) Duj. - (GL,HH,RF)f

*P. orbicularis Huebner - (LM)r

P. pyrum (Ehrenb.) Stein - (GL)r

*P. segretti var. ovum Prescott - (GL,HH)f

P. spirogyra var. maxima Prescott - (GL,HS)fc

*P. suecicus Lemm. - (GL)r

*P. tortus (Lemm.) Skvort. - (LM)r

P. triqueter (Ehrenb.) Duj. - (GL)r

*P. warszewiczii (Allegre & Jahn) - (LM)r

Trachelomonas

*T. abrupta (Swiren.) Defl. - (GL)r

*T. acanthostoma (Stokes) Defl. - (BF)r

*T. armata (Ehrenb.) Stein - (GL)r

*T. armata
var. longispina (Playf.) Defl. - (GL)r

**T. conica Playf. - (GL)r

*T. dubia (Swiren.) Defl. - (LM)r

- T. granulosa Playf. - (GL)r
T. hispida
 var. coronata Lemm. - (LM,HH,BF,SW)f
 *T. intermedia Dang. - (BF)r
 *T. lacustris Dreze. - (GL,RF,BF)f
 *T. robusta Swiren. - (LM,HH)f
 *T. rugulosa (Stein) Defl. - (RF)r
 *T. superba (Swiren.) Defl. - (GL,SW)f
 *T. superba var. swireniana Defl. - (GL)r
T. volvocina Ehrenb. - (GL,LM,RF,
 BF,SM,HH,SW)c

Astasia

- A. klebsi Lemm. - (GL,LM,HH)f

Menoidium

- **M. bibacillatum - (HH)r
M. incurvum - (RF,HH)r

Anisonema

- A. ovale Klebs - (GL,LM,HH)f

Peranema

- P. trichophorum (Ehrenb.) - (GL,HH,BF)f

Petalomonas

- *P. abscissa (Duj.) Stein - (GL)r
 *P. mediocanellata (Klebs) - (GL)r

PYRRHOPHYTA

DINOKONTAE

Gymnodinium

- *G. pulvisculus (Ehrenb.) Stein - (GL)r

Glenodinium

- G. armatum Levander - (GL)r

- *G. kulczynskii (Wolosz.) Schiller - (GL)r

Peridinium

- *P. bipes Stein - (GL)r

- P. inconspicuum Lemm. - (GL,HH)f

- *P. willei Huit. - Kaas - (HH)r

Ceratium

- C. hirundinella (Müller) Duj. - (GL,HH,
 RF,SW)c

DINOCOCCALES

Cystodinium

- *C. iners Geitler - (GL)r

CRYPTOPHYTA (CRYPTOPHYCEAE)

Chroomonas

- *C. nordstedtii Hansg. - (LM)r

Cryptochrysis

- *C. commutata Pascher - (GL)c

Chilomonas

- C. paramaecium Ehrenb. - (GL,LM,HH,RF)c

Cryptomonas

C. ovata (Pascher) - (GL,LM,HH,RF)c

Cyanomastix

*C. morgani Lackey - (GL)r

CHLOROMONADOPHYTA

Gonyostomum

*G. semen (Ehrenb.) Diesing - (GL)r

CHRYSOPHYTA

XANTHOPHYCEAE (HETEROKONTAE)

RHIZOCHLORIDALES

Stipitococcus

*S. crassistipatus Prescott - (GL)r

*S. urceolatus W & W - (GL)r

MISCHOCOCCALES

Botrydiopsis

*B. arhiza Borzi - (LM)r

Gloeobotrys

*G. limneticus (G. M. Smith) Pascher - (GL)r

Characiopsis

*C. cylindrica (Lambert) Lemm. - (LM)r

*C. pyriformis (A. Braun) Borzi - (LM)r

Ophiocytium

O. capitatum Wolle - (GL)r

*O. gracilipes (A. Braun) Rabenh. - (GL,HH)f

*O. mucronatum (A. Braun) Rabenh. - (GL)r

O. parvulum (Perty) A. Braun - (GL)r

TRIBONEMATALES

Tribonema

T. bombycinum (C. A. Ag.) - (GL,BF)r

*T. bombycinum var. tenue Hazen - (GL)r

T. utriculosum (Kütz.) Hazen - (GL)r

VAUCHERIALES

Vaucheria

V. aversa Hassall - (GL)r

*V. polysperma
var. fontinalis (L) Christensen - (GL)r

*V. sessilis
fa. clavata (Klebs) Heering - (GL)r

RHIZOCHRYSIDALES

Rhizochrysis

*R. limnetica G. M. Smith - (GL)r

*R. scherfelli (Pascher) - (GL)r

Lagynion

- *L. scherfelli Pascher - (GL)r
- *L. triangularis
var. pyramidatum Prescott - (GL)r

CHROMULINALES

Chrysococcus

- *C. rufescens Klebs - (HH)r

Chrysopsis

- *C. bipes Stein - (GL)r

Chrysocapsa

- *C. planctonica (W & W) Pascher - (GL)r

OCHROMONADALES

Cyclonexis

- *C. annularis Stokes - (LM)r

Uroglenopsis

- *U. americana (Calkins) Lemm. - (GL)r

Dinobryon

- D. bavaricum Imhof - (GL)r
- D. sertularia Ehrenb. - (GL,LM,RF,HH)c
- D. tabellariae (Lemm.) Pascher - (GL)r

Mallomonas

- M. acaroides Perty - (GL)r
- *M. caudata Iwanoff - (GL)r

Synura

- *S. uvella Ehrenb. - (GL)r

CYANOPHYTA

CHROOCOCCALES

Aphanocapsa (Anacystis)

- *A. rivularis (Carm.) Rabenh. - (GL,HH)f

Aphanothece

- A. nidulans P. Richter - (GL)r
- *A. saxicola Näg. - (GL)r
- *A. stagnina (Spreng.) A. Braun - (GL)r

Chroococcus

- *C. dispersus var. minor G. M. Smith - (GL)r
- *C. minor (Kütz.) Näg. - (GL)r
- *C. minutus (Kütz.) Näg. - (GL)r
- C. turgidus (Kütz.) Näg. - (LM,HH)f

Coelosphaerium

- *C. collinsii Drouet & Dailly - (GL,LM)f
- C. kuetszingianum Näg. - (LM)r
- C. naegelianum Unger - (GL,LM,HH)f

Gloeocapsa

- G. aeruginosa (Carm.) Kütz. - (GL)r
- G. magma (Bréb.) Kütz. - (LM)r
- *G. punctata Näg. - (GL)r
- G. rupestris Kütz. - (GL,RF,SW)f

Gloeotheca

*G. linearis Näg. - (GL)r

Merismopedia

*M. elegans A. Braun - (LM,HH)f

*M. elegans var. major G. M. Smith - (GL)r

M. glauca (Ehrenb.) Näg. - (GL,HH)c

M. punctata Meyen - (LM)r

M. tenuissima Lemm. - (GL)r

Microcystis

M. aeruginosa Kütz. emend. Elenkin - (GL,HH)f

M. incerta Lemm. - (LM)r

CHAMAESIPHONALES

Xenococcus

*X. schousboei Thuret
var. pallida Hansg. - (GL)r

OSCILLATORIALES

Borzia

*B. trilocularis Cohn - (GL)r

Lyngbya

L. aerugineo-caerulea (Kütz.) Gomont - (GL)r

*L. birgei G. M. Smith - (GL,RF)f

*L. epiphytica Hieronymus - (LM)r

*L. major Menegh. - (GL)r

Microcoleus

*M. lyngbyaceus (Kütz.) Crouan - (GL,LM,HH)f

Oscillatoria

*O. amoena (Kütz.) Gomont - (LM)r

O. amphibia C. A. Ag. - (LM)r

O. anguina Bory - (GL,LM)f

*O. angusta Koppe - (LM,HH)f

O. formosa Bory - (GL,BF,SW)f

*O. lacustris (Kleb.) Geitler - (GL)r

O. limnetica Lemm. - (GL,LM,HH,SW)f

O. limosa (Roth) C. A. Ag. - (GL,SM)f

O. princeps Vaucher - (GL,LM,HH,SW)f

O. splendida Grev. - (GL,HH,RF)f

O. tenuis C. A. Ag. - (GL)r

Phormidium

*P. ambiquum Gomont - (LM)r

P. musicola Nauman & Huber-Pestalozzi - (BF)r

*P. retzii C. A. Ag. - (LM)r

Schizothrix

S. calciola (C. A. Ag.) Gomont - (GL,
LM,HH,SW)f

Spirulina

*S. laxissima G. S. West - (LM,RF)f

*S. major Kütz. - (LM,HH)f

*S. princeps W & W - (LM)r

*S. subsalsa Oersted - (LM)r

Symploca

S. muscorum (C. A. Ag.) Gomont - (LM)r

NOSTOCALES

Anabaena

*A. affinis Lemm. - (GL)r

A. circinalis (Kütz.) Geitler - (GL)r

*A. constricta (Szafer) Geitler - (GL)r

A. flos-aquae (Lyngbye) Bréb. - (GL)r

*A. helicoidea Bernard - (GL)r

*A. subcylindrica Borge - (GL)r

A. variabilis Kütz. - (HH)r

*A. wisconsinense Prescott - (GL,HH)f

Anabaenopsis

*A. elenkinii Miller - (GL)r

Aphanizomenon

A. flos-aquae (L) Ralfs - (GL)r

Cylindrospermum

C. majus Kütz. - (GL)r

C. musciola Kütz. - (GL)r

Nodularia

*N. harveyana (Thw.) Thuret - (HH)r

*N. spumigena Mertens - (GL,HH)f

Nostoc

*N. linckia (Roth) Bornet & Thuret - (HH)r

N. sphaericum Vaucher - (LM)r

Calothrix

C. fusca (Kütz.) Bornet & Flah. -
(ceramic bird bath)r