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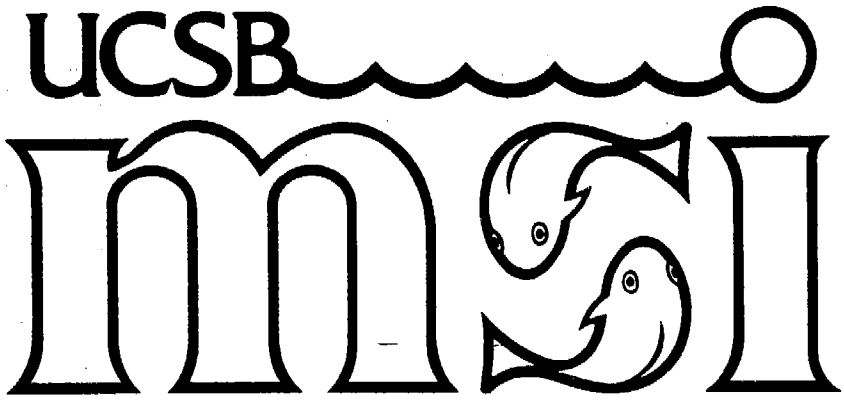

Final Report

Calibration of diatom-pH-alkalinity methodology for the interpretation of the sedimentary record in Emerald Lake Integrated Watershed Study

by

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Abstract

The present study was designed to establish quantitative relationships between lake air- equilibrated pH, alkalinity, and diatoms occurring in the surface sediments in high elevation Sierra Nevada lakes. These relationships provided the necessary information to develop predictive equations relating lake pH to the composition of surface sediment diatom assemblages in 27 study lakes. Using the Hustedt diatom pH classification system, Index B of Renberg and Hellberg, and multiple linear regression analysis, two equations were developed which predict lake pH from the relative abundance of sediment diatoms occurring in each of four diatom pH groupings. Both equations predicting pH were statistically significant and yielded values of the square of the correlation coefficient of 0.82 and 0.87, respectively. Similar analyses using alkalinity rather than pH as the dependent variable likewise proved statistically significant but with lower values of the square of the correlation coefficient (0.60 and 0.76, respectively).

Acknowledgments

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The statements and conclusions in this report are those of the contractor and not necessarily those of the California Air Resources Board. The mention of commercial products, their source or their use in connection with material reported herein is not to be construed as either actual or implied endorsement of such products.

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Summary and Conclusions

Thirty high elevation Sierra Nevada lakes (Fig. 1) of varying air equilibrated pH (5.82-9.53) were sampled in midsummer of 1985. In each lake a surface sediment core was taken in the deepest part of the lake with a modified Hongve (1972) corer (Fig. 2). The upper centimeter of each core was extruded in the field, placed in a plastic bag and sealed. This sample was used for the diatom analysis. A subsurface water sample was also collected and a pH measurement made immediately. Measurements of pH (air-equilibrated), alkalinity, conductivity, and major anions and cations were carried out later at UCSB or the Sierra Nevada Research Laboratory (Appendix B).

An aliquot of each sediment sample was prepared for diatom analysis by first chemically oxidizing the organic matter in the sample and then mounting a measured volume of the "cleaned" material with a high refractive index mounting medium (Hyrax) on a microscope slide. Approximately 500 diatom valves were counted and identified on each slide. One lake sediment sample contained too few diatoms and could not be used in the analysis.

The frequency of occurrence of each taxon as a function of air-equilibrated pH was examined in all lakes and subjectively placed in one of Hustedt's pH categories providing the taxon occurred in three or more lakes or obtained a relative frequency of about 1% in fewer than three lakes. A total of 408 diatom taxa were identified in the study. 173 (43%) of these are apparently undescribed entities and were given reference numbers. Fifty-five of these unknowns could be assigned to pH categories--altogether 183 taxa were placed in Hustedt (1939) pH categories and used obtaining the diatom-pH-alkalinity predictive equations.

For published taxa, agreement between the pH assignments used in this study and those which have been assigned to pH categories in the published literature was quite good (e.g. Anderson et al. 1986, Brugam and Lwok 1986, Charles 1985, Merilainen 1967, and Stokes and Yung 1986). Since no lake in the Sierra data set had a pH below 5.5 no taxa were placed in the Acidobiontic category even though 3 taxa encountered (Anomoeoneis serians v. brachysira, Cymbella gaeumannii, and Navicula subtilissima) are generally placed in this category. A small number of taxa generally considered Indifferent were placed in the Alkaliphilic category as their Sierra pH range seemed to justify this transfer. Very few Sierra taxa fell into the Indifferent (sensu Hustedt 1939) category.

The relative abundances and pH categories were then employed lake by lake to calculate log Index B (Renberg and Hellberg 1982):

$$\text{Index B} = \log \frac{\% \text{ Indifferent} + (5\times\% \text{ Acidophils}) + (40\times\% \text{ Acidobionts})}{\% \text{ Indifferent} + (3.5\times\% \text{ Alkaliphils}) + (108\times\% \text{ Alkalibionts})}$$

A regression equation was then obtained using lake air-equilibrated pH as the dependent variable and log Index B as the independent variable. The following equation was obtained (also see Fig. 3B):

diatom inferred pH = 7.11 - 0.40 log Index B
F = 117 Prob. >F = 0.0001 r^2 = 0.82 n = 27

Using multiple linear regression techniques with the same data the following equation was obtained:

diatom inferred pH = 7.08 - 0.0086% ACP + 0.0012% IND + 0.0081% ALP + 0.021% ACB
F = 37 Prob. >F = 0.0001 r^2 = 0.87 n = 27

where ACP is the abbreviation for Acidophilous, IND is Indifferent, ALP is Alkaliphilous, and ALB is Alkalibiontic.

Since the IND regression coefficient was not significant in the above regression equation, a new equation was obtained omitting it. The new equation is (also see Fig. 3A):

diatom inferred pH = 7.18 - 0.0097% ACP + 0.0070% ALP + 0.020% ALB
F = 52 Prob. >F = 0.0001 r^2 = 0.87 n = 27

All three equations are significant although the r^2 values are somewhat lower than those reported in the literature (e.g. Arzet 1986, Battarbee 1984, Charles 1984, 1985). The fact that the Indifferents can be dropped from regression equation without altering the r^2 value is most likely due to the wide distribution above and below neutrality used in my definition of Indifferent taxa. Taxa which only occur within a limited range ($\pm$0.5 pH unit) around neutrality are uncommon in the data set.

This project was undertaken to provide a tool that will enable scientists to estimate pH and its change through time in Sierra lakes from diatoms preserved in lake sediments. Many of these lakes are poorly buffered and it is important to determine their pH history, particularly over the past 100 years or so. If a significant reduction in pH has taken place then it will be important to determine the cause or causes.

The statistical significance of these equations and the very acceptable r^2 values strongly suggest that reasonable pH estimate can be made down core in Sierra lake sediments. In a few months a diatom pH reconstruction of a 20-cm long core from Emerald Lake, Sequoia National Park, using these equations will have been completed.

Introduction

Ever since Oden's 1968 report (Battarbee et al. 1986) drew attention to the probable relationship between atmosphere acid deposition and the acidification of some Swedish lakes, the need to examine long-term pH records from lakes of different chemical composition and buffering capacity has been recognized. Unfortunately such information does not exist for many lakes. Thus scientists interested in possible relationships between acid deposition and changes in lake acidity have found it necessary to seek alternative means of obtaining pH histories of lake waters. It was quite natural for limnologists to turn to the study of lake sediments since lake sediments contain decipherable chemical and biological information about lake and watershed conditions and their changes through recent and geological time (e.g. Deevey 1942, Bradley 1966, Haworth 1969, Pennington 1943).

One of the methods which has been employed frequently in the past decade to study past pH changes in lakes employs the composition of diatom assemblages preserved in lake sediments. The method relies on the observation that the occurrence of diatom species in aquatic environments reflects, among other things, the pH of their environment. Hustedt (1939) was perhaps the first investigator to recognize such relationships. He presented a pH classification scheme which recognized 5 diatom-pH categories:

Acidobiontic (ACB)	:	occurring below pH 7.0 with optimum distribution below pH 5.5
Acidophilous (ACP)	:	species occurring at about 7.0 with widest distribution at pH less than 7.0
Indifferent (IND)	:	equal occurrences on both sides of pH 7.0
Alkaliphilous (ALP)	:	occurring at pH about 7 with widest distribution at pH greater than 7
Alkalibiontic (ALB)	:	occurring at pH values greater than 7.0

It remained for Nygaard (1956) and Merilainen (1967) to develop semi-quantitative indices relating the composition of diatom assemblages observed growing attached to aquatic plants, rocks, or on the sediment, to lake pH. The indices developed by these investigators employed the diatom pH categories developed by Hustedt (1939) and the relative abundance of taxa in two or more of these pH categories. In 1982 Renberg and Hellberg developed an additional index and in 1984 Charles (1984, 1985) used multiple linear regression (MLR) methods to relate the occurrence of diatoms placed in Hustedt's pH categories to air-equilibrated lake pH. These indices and MLR have been employed in Scandinavia (Berge 1982, Renberg and Hellberg 1982, Tolonen and Jaakkola 1983), in Germany (Arzet 1986), in the United Kingdom (Flower and Battarbee 1983), in Canada (Dickman et al. 1983), and the United States (Brugam and Lusk 1986, Charles 1984, Davis et al., 1983,

Del Prete and Schofield, 1981, Ford 1986, and Tolonen et al. 1986) to reconstruct the past pH histories of lakes.

The present study was designed to establish quantitative relationships between lake pH, and lake alkalinity and diatom occurrence in the surface sediments in high elevation lakes in the Sierra Nevada. Once such relationships have been established they can be employed to infer the pH history from sediment cores from Sierra lakes. Such diatom inferred pH reconstructions are important in the Sierra Nevada for many of these lakes are poorly buffered (Melack et al. 1985) and thus sensitive to acidic inputs, such as acid deposition.

Methods

Thirty lakes were sampled in this study (Fig. 1). They represent, with two exceptions, a subset of the 73 Sierra Nevada lakes studied by Melack et al. (1985) and were selected to cover a wide range of pH (5.84 to 9.53) and alkalinity (5.9-1051 μ equiv. per l.) values (Table 1). They range in elevation from 2162 to 3609 meters (see Appendix B for additional information).

Water samples for chemical analyses were collected at about 1/2 meter depth following the collection of the sediment core (see below). The pH of the water was measured immediately and is designated pH Field in Appendix B. After the sample was returned to the laboratory usually within 8 hours air equilibrated pH (pH Lab) and alkalinity were measured. Samples for the analyses of nitrate, chloride, sulfate, and cations were prepared, stored, and analyzed using the methods described in Melack et al. 1985.

Surface sediment cores were taken in the deepest part of each lake with a modified Hongve (1972) corer (Fig. 2). The upper 1 cm of sediment sample was extruded in the field and placed in a plastic bag and sealed. Upon return to SNARL (The Sierra Nevada Aquatic Research Laboratory) each sample was mixed thoroughly by massaging the plastic bag containing the sediment. The bag was then opened. A plastic spoon was dipped into the homogenized sediment, withdrawn, and excess sediment removed by sliding a metal spatula along the lip of the spoon. Any sediment clinging to the sides or bottom of the spoon was carefully removed with paper tissue. The remaining sediment (1.2 cc) was quantitatively transferred with a jet of water to a 1-liter Pyrex beaker. Approximately 30 ml of 30% hydrogen peroxide was then added, and the beaker covered with parafilm. The beaker was then placed in an oven at 50°C and left for 24-48 hrs. The oxidation of the sample was completed by adding approximately 1 cc of potassium dichromate after placing the beaker in a fume hood. Following the completion of the reaction, the beaker was filled with deionized water, covered with parafilm, and set aside for 48 hrs (or more) to allow the sediment to settle. The clear supernatant was carefully decanted and the remaining liquid and sediment quantitatively transferred to a clean 250-ml beaker which was then filled with deionized water. After 48 hrs the supernatant was clear and was siphoned off. The sediment was next transferred to a 6-dram vial and filled with deionized water. Once in the vial and with a reduced dichromate concentration, the settling time of the sediment increased greatly and centrifugation and resuspension of the sediment with deionized water was employed until the supernatant was colorless.

The preparation of permanent diatom mounts was made following the methods of Battarbee (1973). The cleaned material in the vial was mixed by vigorously shaking the vial for 1 minute. The vial was then placed in a vertical position for 30

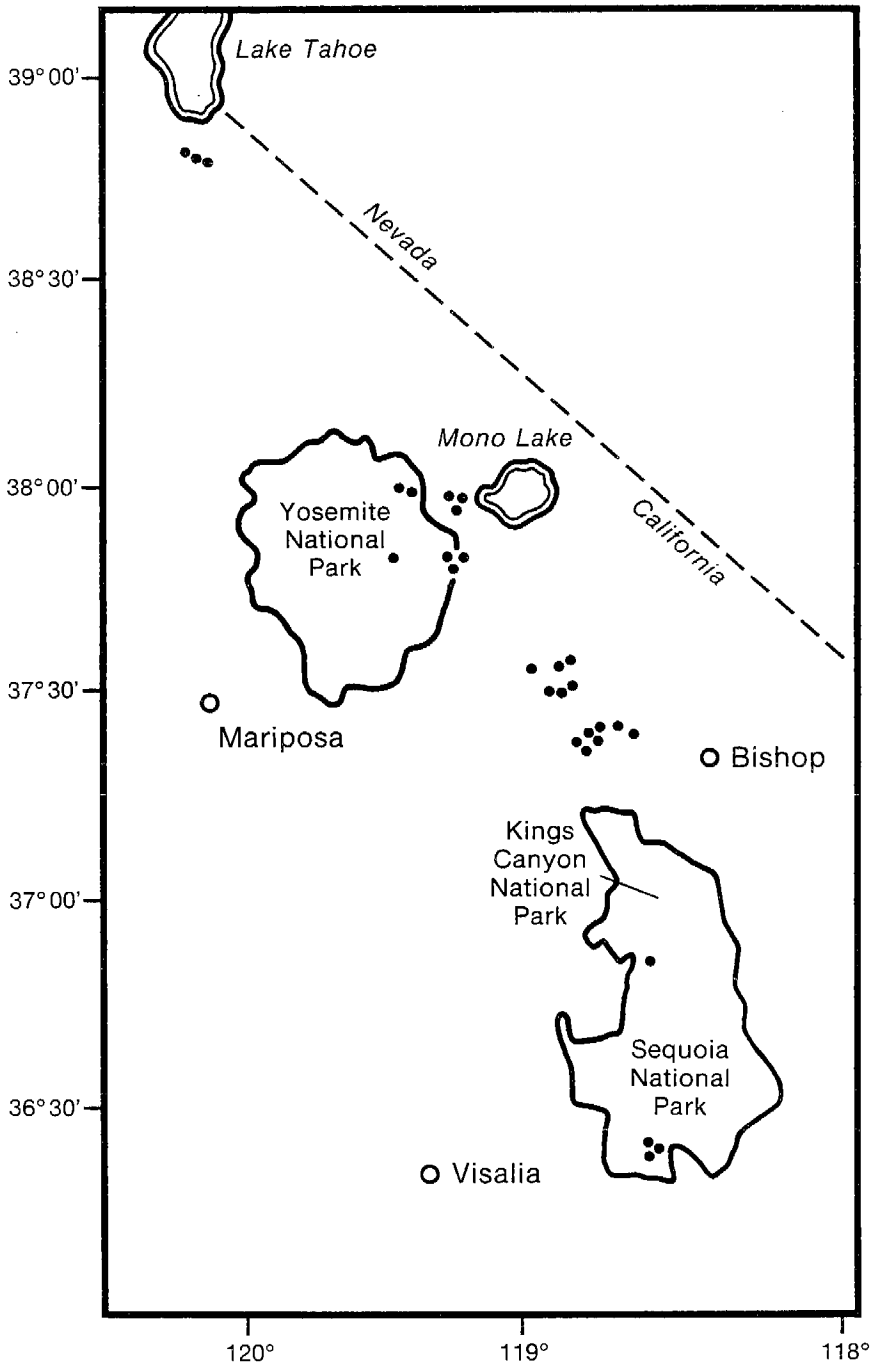


Figure 1. Approximate locations of lakes from which surface sediment samples we collected for the diaton/pH calibration.

Table 1. 1985 Sierra Nevada lake survey. Lake location, *in situ* pH, air equilibrated pH, and alkalinity (u equiv./l.). For additional information see Appendix B.

No.	Lake Name	Latitude	Longitude	i.s. pH	a.e. pH	Alkalinity
1	Parker Pass	37 50 08	119 12 35	5.64	5.84	5.9
2	Table Meadow	36 36 33	118 39 05	6.6	6.01	40.8
3	Fairy Shrimp	37 26 40	118 45 40	6.92	6.3	14.6
4	Kuna	37 49 50	119 14 15	7.02	6.25	19.1
5	Dana	37 54 35	119 13 07	6.65	6.32	19.3
6	Mosquito 3	36 25 09	118 37 16	6.52	6.41	51.2
7	Mosquito 5	36 24 53	118 37 35	6.87	6.42	52.8
8	Lower Cathedral	37 50 21	119 24 50	6.45	6.44	24.6
9	Upper Treasure	37 23 13	118 46 00	6.89	6.45	27.2
10	Dade	37 22 47	118 45 42	6.8	6.48	24
11	Le Conte	38 52 14	120 08 11	6.25	6.55	31.1
12	Summit	37 26 00	118 46 11	7.1	6.6	21.4
13	Mosquito 1	36 25 28	118 37 08	7.13	6.79	77.4
14	Gem	37 23 50	118 45 20	7.33	6.82	47.6
15	Granite	36 51 47	118 37 12	6.91	6.91	66.9
16	Heather	38 52 36	120 08 16	6.95	6.93	67.1
17	Ruby	37 24 50	118 46 15	7.05	6.95	47.3
18	Upper Angora	38 51 46	120 03 59	7	6.98	88.5
19	Dorothy	37 32 10	118 52 55	7.46	7.2	138.5
20	Eastern Brook	37 25 51	118 44 28	7.35	7.22	132.2
21	Upper Gaylor	37 55 20	119 16 01	7.37	7.27	102.4
22	Lundy	38 01 55	119 13 10	7.6	7.41	260.5
23	Constance	37 30 55	118 52 02	7.95	7.42	271.5
24	Upper Frog	38 02 38	119 17 20	7.85	7.43	257.6
25	Wit-so-nah-pah	37 31 32	118 52 32	8.15	7.57	228.7
26	East Twin	38 09 40	119 20 00	8.14	7.66	383.6
27	West Twin	38 08 51	119 21 40	7.96	7.8	324.4
28	Convict	37 35 30	118 51 25	8.4	8.35	1051
29	Bright Dot	37 32 40	118 51 40	9.07	9.03	627
30	Barney	37 33 47	118 58 02	8.77	9.53	392

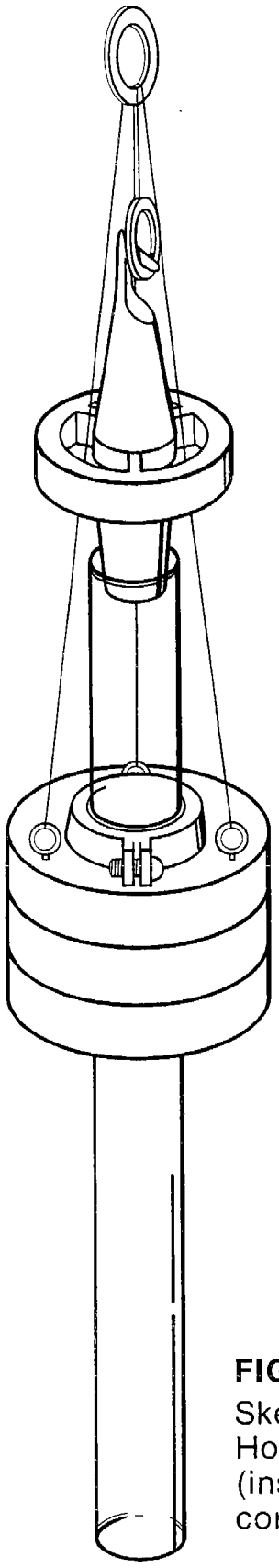


FIGURE 2:
Sketch of the modified Hongve gravity corer (inside diameter of core tube = 2.5 cm.).

seconds to allow heavy material and sand to settle. An aliquot usually 250 µℓ) was then removed and placed in a flask. Following vigorous agitation of the flask, its contents were poured into a Battarbee chamber containing cover glasses. The slide warmer on which the chambers had been placed originally was then turned on and maintained at 36°-37°C until the water in the Battarbee chamber evaporated. The coverslips containing the sedimented material were removed and placed on a hot plate set at about 80°C to drive off any residual water. Hyrax, a high refractive index mountant, was placed on each of the coverslips on the hot plate. After the mountant solvent evaporated, the cover glasses were transferred to microscope slides. The slides were gently heated with a micro Bunsen burner until the mountant melted and flowed out to the edges of the cover glasses. Frequently one, occasionally two, of the cover glasses exhibited a clumped distribution of particulates following the evaporation of the aqueous suspension in a Battarbee chamber. These were not used in the subsequent quantitative diatom enumeration.

For dry weight and ignition loss determinations another 1.2 cc of sediment was removed from each plastic sample bag as described above. Each sample was placed in a tared-aluminum pan, dried at 80°C to a constant weight, and then combusted at 485°C to obtain an estimate of organic matter content.

Approximately 500 diatom valves were identified and counted in each lake sediment sample using an oil immersion 100x objective on a Leitz Ortholux compound microscope equipped with differential interference contrast optics. Diatoms were counted in one or more transects across the coverglass until the required number of valves had been counted.

Diatom identifications were made using standard accepted reference works (Cleve-Euler, 1951-1955, Germain, Hustedt 1927-66, 1930, Patrick and Reimer 1966, 1975) supplemented by numerous more specialized publications. The unpublished but widely distributed PIRLA (Paleoecological Investigations of Recent Lake Acidification) Diatom Iconograph compiled and prepared by Keith Camburn with contributions from other PIRLA diatomists proved very useful. This series of photographic plates of diatom valves was prepared under an Electric Power Research Institute contract to P. Whitehead and D. Charles, Biology Department, Indiana University.

Verification of our diatom identifications (i.e. quality assurance) was achieved in several ways. First two PIRLA diatom identification workshops were attended by the PI. Photographs and prepared material of Sierra diatoms were examined by several PIRLA diatomists who commented upon our identifications. The PI of this study also spent a week with PIRLA diatomist K. Camburn who examined additional material and photographs offering additional comments on our naming of Sierra taxa. Thus our

assignment of names to diatoms is consistent with PIRLA identifications. Lastly, a two-week visit to the Diatom Herbarium of the Academy of Natural Sciences, Philadelphia permitted an examination of their extensive collections and helped resolve identification problems with some remaining taxa. In spite of these intensive efforts 173 taxa (species and varieties) out of 408 "taxa" identified in the Sierra samples could not be given scientific names. They were of necessity given SN (Sierra Nevada) numbers (Appendix A). Fifty-seven of these SN taxa could be assigned to pH preference categories (see below). An additional 16 were assigned PIRLA numbers.

The pH "preference categories" assignment was based on a modification of the Hustedt (1939) categories. Hustedt (1939) pH categories were defined as follows:

Acidobiontic (ACB)	- optimum distribution at pH below 5.5 (occur only in acidic habitats)
Acidophilic (ACP)	- widest distribution at pH less than 7
Indifferent (IND)	- distributed around pH 7
Alkaliphilic (ALP)	- widest distribution at pH greater than 7
Alkalibiontic (ALB)	- occur only at pH greater than 7

Assignment of the Sierra taxa to these pH categories was based on the abundance weighted means (ABM) and frequency of occurrence of each taxon in every lake in which the taxon occurred. A taxon was only placed in a pH category if it occurred in 3 or more lakes or if its relative abundance exceeded about 1% in 3 or fewer lakes. A total of 183 taxa were placed in pH categories and used in this analysis. A taxon was considered acidophilic if its AWM $\leq$7.0 even if it occurred in low abundance at pH's between about pH 7.5 and 7.0. Alkaliphilous species had an AWM between pH 7.0-8.0 and even if they occurred occasionally in low abundance between pH 8.5 and 6.5. Alkalibiontic taxa were those with AWM $\geq$8.0. In the Sierra material the greatest difficulty was experienced in assignment of taxa to the Indifferent group. Very few taxa had AWM close to pH 7.0 (designated as CN in Appendix A) with distributions limited between pH 6.5 and 7.5. In the present study broader limits were used (pH 6.2-7.8) with allowance for low relative abundance beyond these limits. Such taxa are truly Indifferent to pH. Had more restricted criteria been employed calculation of Index B (see below) would have been impossible since the denominator in this equation would have equalled 0 in about 1/3 of the study lakes. The absence of alkaliphilous species in about 1/2 of the study lakes precluded the calculation of Index Alpha (Nygaard 1956) without artificially setting the denominator equal to 1.0 (see Charles 1985).

The assignment of Sierra taxa to the somewhat modified ACP, ALP, ALB, and IND categories of Hustedt (1939) agrees quite well to similar assignments of the same taxa in other geographic areas (Anderson *et al*. 1986, Brugham and Lusk, 1986, Charles 1985,

Lowe 1974, Merilainen 1967, Stokes and Yung 1986). Differences mainly involve a few species (e.g. Anomoeoneis serians v. brachysira, Cymbella gaeumanii, and Navicula subtilissima) which are considered Acidobiontic by most authors and which were placed in the Acidophilous category in the present study since no lakes in the Sierra data set had a pH as low as 5.5. A few "Indifferent" species of several authors were considered alkaliphilous in Sierra samples because some of them had occurrences near pH 8. The effect of these classification differences had little effect upon Index B or the linear regression analyses.

Regression analyses and associated statistics were obtained using PC SAS Version 6 (SAS Institute, Cary, N.C.).

Results and Discussion

Two diatom pH predictive equations were derived from the relative abundance of each diatom taxon assigned to the modified Hustedt (1939) pH categories in 29 of the 30 lakes sampled. The sediment of Dana Lake contained so few diatoms that quantitative counts could not be obtained. In each of the remaining lakes the relative abundance of taxa in each of the pH categories were summed and Index B (Renberg and Hellberg 1982) calculated using their equation:

$$\text{Index B} = \frac{\text{IND} + (5.0 \times \% \text{ ACP}) + (40 \times \% \text{ ACB})}{\text{IND} + (3.5 \% \text{ ALP}) + (108 \text{ X } \% \text{ ALB})}$$

When the observed pH and Log Index B were compared a good relationship was observed except for two extreme outliers which were the two highest pH lakes (Barney pH Lab 9.53, Bright Dot pH 9.03) sampled.

Multiple linear regression analyses using observed air-equilibrated pH values as the dependent variables and diatom pH categories as independent variables also revealed Bright Dot and Barney Lakes as extreme outliers. In both of these lake sediment samples 3-4 diatom taxa were highly dominant and possessed unusual and uncharacterizable pH categories which clearly degraded their pH signal. Thus data from these lakes was excluded when calculating Index B and regression equations, leaving 27 out of the 30 lakes sampled available for pH and alkalinity predictions.

The following relationship between air equilibrated pH (Lab pH) and log Index B was obtained (also see Fig. 3B):

$$\text{Lab pH} = 7.11 - 0.40 \log \text{Index B}$$
$$F = 117 \quad \text{Prob.} > F = 0.0001 \quad r^2 = 0.82 \quad n = 27 \quad (1)$$

Clearly the relationship is statistically significant and the equation can be usd to estimate pH from diatoms preserved in diatom sediments (Fig. 3B).

A somewhat better relationship between the relative abundance of diatoms in pH categories in each lake was obtained using multiple linear regression. The same data yielded the following equation:

$$\text{Lab pH} = 7.08 - 0.0086\% \text{ ACP} + 0.0012\% \text{ IND} + 0.0081\% \text{ ALP} + 0.021\% \text{ ALB}$$
$$F = 37 \quad P > F = 0.0001 \quad r^2 = 0.87 \quad n = 27 \quad (2)$$

These equations are comparable to those reported in the scientific literature (e.g. Arzet et al. 1986, Charles 1985, Dickman et al. 1984, Renberg and Hellberg 1982). In equation 2 the coefficient for the IND category was not significant. This

is clearly an indication of the difficulty experienced in establishing satisfactory criteria for the Indifferent group (see Methods). A new equation (3) obtained without using the Indifferent category (3) was calculated and yielded the following (also see Fig. 3A):

$$\text{Lab pH} = 7.18 - 0.0097\%\ \text{ACP} + 0.0070\ \text{ALP} + 0.20\ \text{ALB}$$
$$F = 52 \quad P>F = 0.0001 \quad r^2 = 0.87 \quad n = 27 \qquad (3)$$

The F value increased somewhat while the r^2 remained the same, clearly showing that the Indifferent group as defined herein is of no value in predicting pH. It remains possible that a redefinition of the Indifferents might improve the overall F and r^2 values.

In the Sierra Nevada lake data set significant positive correlations exist between Lab pH and alkalinity ($F = 46.1$, Prob. $F> = 0.0001$, $= r^2 = 0.62$, $n = 30$) and between Lab pH and Log alkalinity ($F = 93.5$, Prob. $>F = 0.0001$, $r^2 = 0.77$, $n = 30$ - see Figs. 4A and 4B). Thus surface sediment diatoms can also be employed to estimate lake alkalinity.

The following alkalinity predictive equations were obtained using the same 27 lakes employed in the pH predictive equations.

$$\text{Alkalinity} = 204 - 121\ \text{Log Index B} \qquad (4)$$
$$F = 38.1,\ \text{Prob.} >F = 0.0001,\ r^2 = 0.60$$

$$\text{Alkalinity} = -4.25 + 0.393\%\ \text{ACP} + 5.03\%\ \text{ALP} + 18.2\%\ \text{ALB} \qquad (5)$$
$$F = 26.0,\ \text{Prob.} >F = 0.0001,\ r^2 = 0.77$$

$$\text{Log alkalinity} = 2.089 - 0.00830\%\ \text{ACP} + 0.00752\%\ \text{ALP} + 0.00860\%\ \text{ALB} \qquad (6)$$
$$F = 35.2,\ \text{Prob} >F = 0.0001,\ r^2 = 0.82$$

The equation predicting Log alkalinity (6) has an r^2 value somewhat lower than that obtained with the pH predictive equation 3 ($r^2 = 0.87$) which employed the same diatom pH categories. Thus diatoms can be used with some confidence to predict both pH and alkalinity in Sierra Nevada lake sediment cores.

The analysis has also revealed that the best predictions will be obtained by developing diatom-pH-alkalinity relationships and equations for each area under study. It is doubtful that pH predictive equations developed for Florida, or Maine, or in the Rocky Mountains can provide very satisfactory down core pH (or alkalinity) estimates. Part of difficulty is that widely separated aquatic habitats often have rather different diatom floras. In poorly studied areas like the Sierra Nevada many diatom taxa are new; thus the published literature provides no

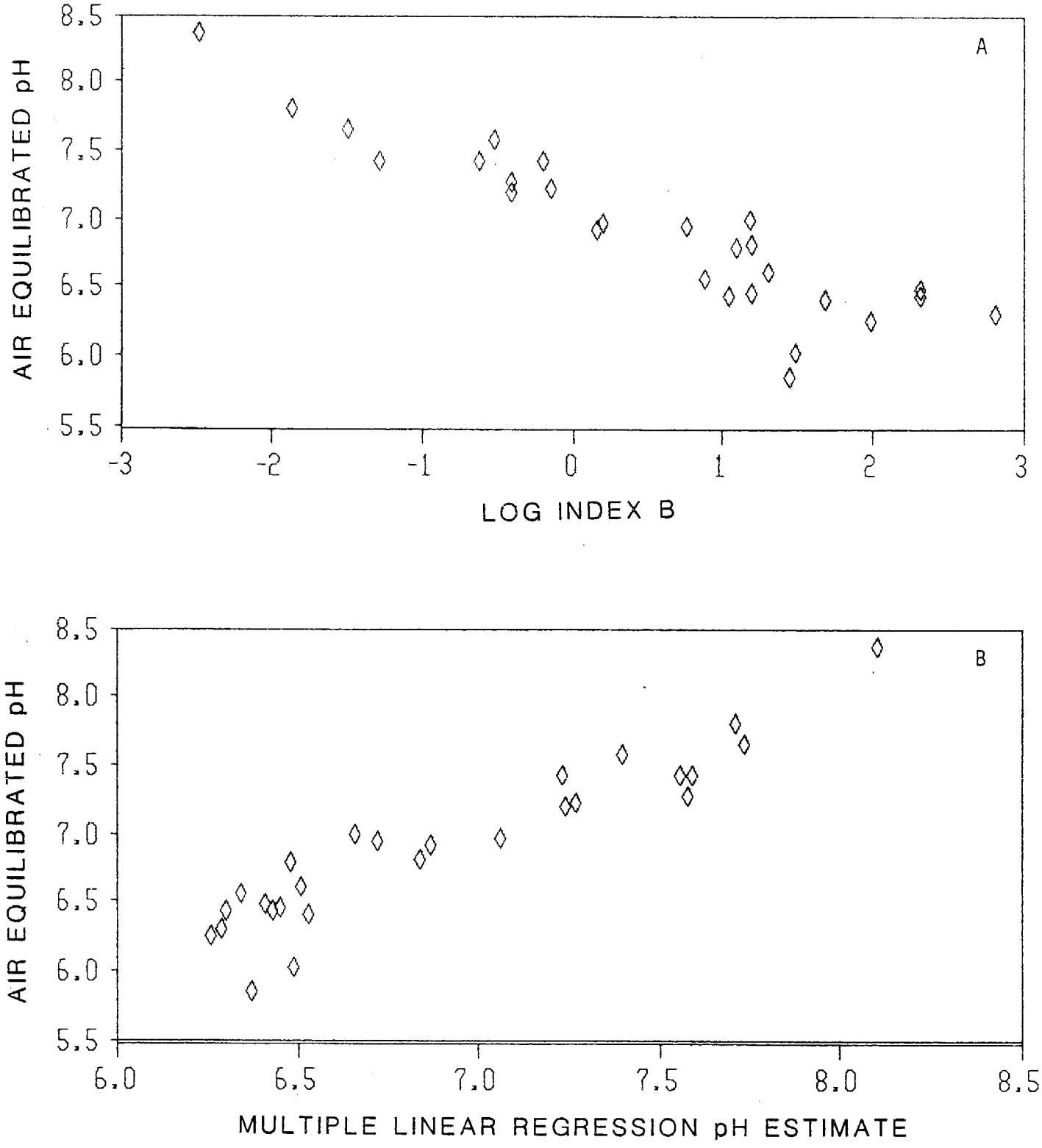
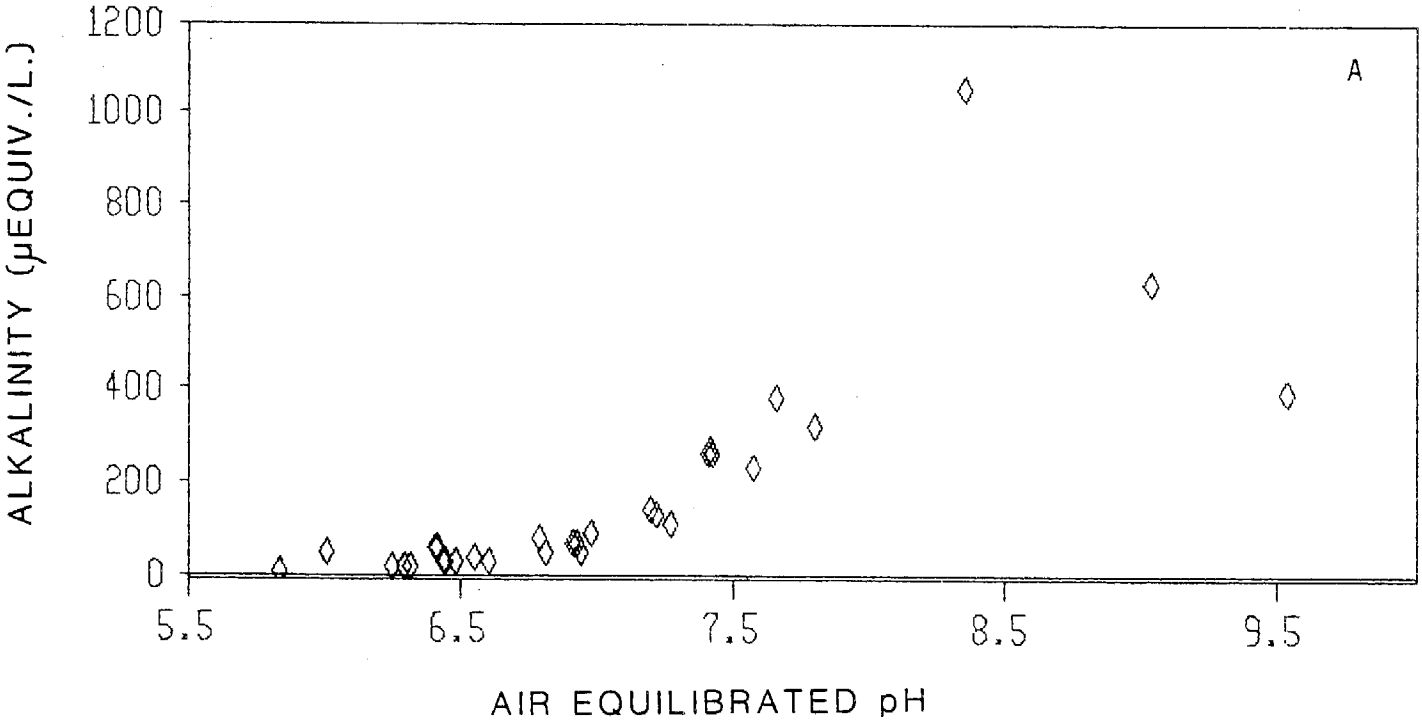


Figure 3. Predicted air equilibrated pH values and observed air equilibrated pH values for twenty seven high elevation Sierra Nevada lakes.A) Log Index B predictive equation(Equation 1). B) Multiple linear regression model(Equation 3).



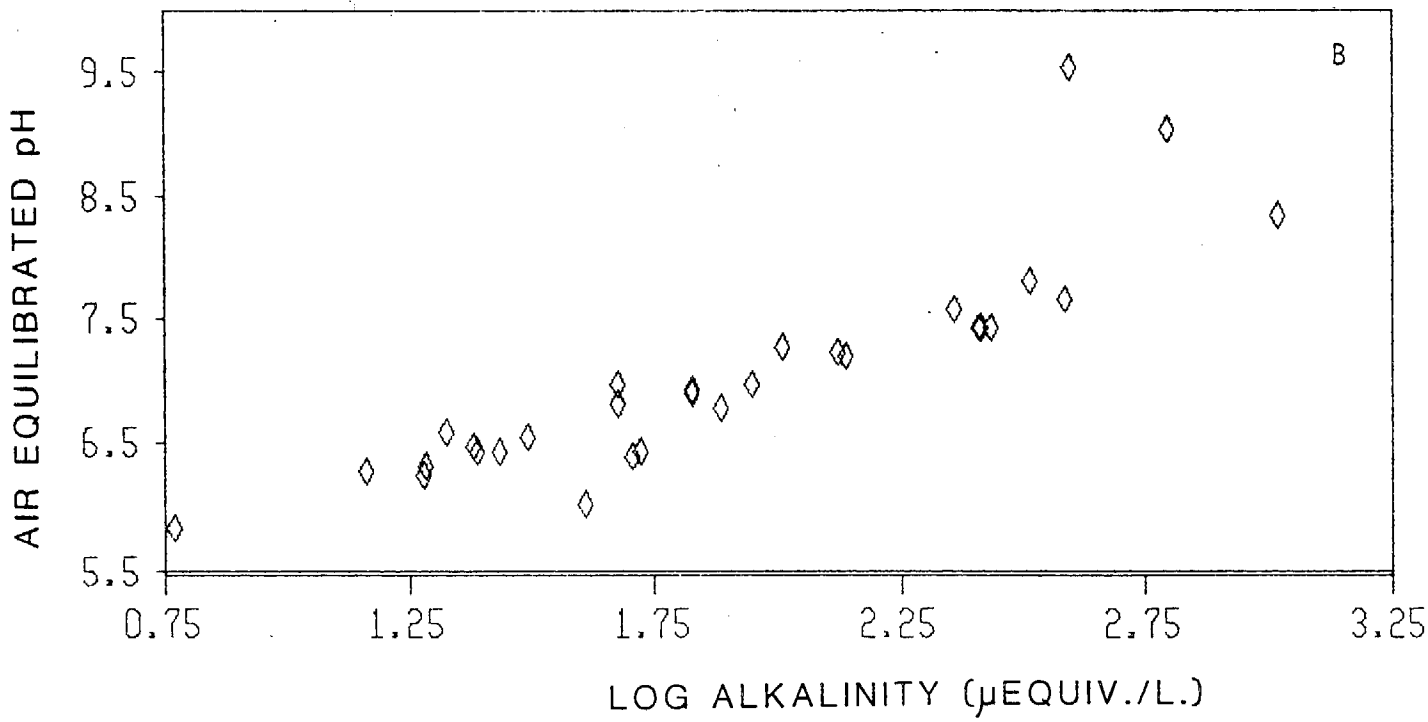


Figure 4. The relationship between air equilibrated pH and alkalinity in the thirty lakes used to develop the diatom/pH predictive equations. Fig.4a uses untransformed alkalinity while in Fig.4b the alkalinity data has been log transformed. See text for additional information.

information on possible taxon-pH relationships, potentially weakening down core predictive abilities.

The only investigation comparable to the present study of high elevation mountain lakes has been carried out in Rocky Mountain National Park (Baron et al. 1985 - unpublished manuscript). Twenty-three lakes were included in the calibration set in which field-measured pH varied between 5.89 and 9.01 (only 2 lakes had pH values in excess of 7.0). These authors report observing over 110 taxa in 4 lakes cored to a depth of about 50 cm. Of the 14 common dominant diatom taxa in these lakes, none were dominant in Sierra lakes of comparable pH and several were not encountered at all.

Using methods comparable to those of the present study Baron et al. (1985) obtained pH predictive equations employing Log Index Alpha and Log Index B (Renberg and Hellberg 1982). According to the authors these equations were not statistically significant. They then employed the Wilcoxon Sign Test and t-test for paired observations (observed pH and predicted pH) which yielded no significant differences at the 0.05 level, and proceeded to use the non-significant predictive equations for down core diatom inferred pH prediction. This is certainly a questionable procedure. It should also be noted that the surface sediment diatoms in the four lakes for which down core pH reconstructions were obtained were also employed in calculating the pH predictive equations. The validity of including these 4 lakes in the lake calibration data set used in the down core pH reconstruction of these 4 lakes is likewise open to serious criticism. Because of these difficulties and the incompleteness of the unpublished manuscript a meaningful comparison of the Rocky Mountain National Park data and those obtained in the present Sierra study is not yet possible.

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R. W. Holmes

Appendix A Diatom Taxon List and pH Categories - CARB/Sierra Nevada Lake Survey

(ACP = acidophil, CN = circumneutral, ALPF = alkaliphil, ALB = alkalibiontic, IND = indifferent, - = unclassified)

---	2001	Achnanthes affinis Grun. v. affinis
ACP	2002	Achnanthes austriaca Hust. v. austriaca
ACP	2003	Achnanthes austriaca Hust. v. helvetica
---	99001	Achnanthes bicapitata Hust.
ACP	2049	Achnanthes bioreti Germain v. bioreti
---	99002	Achnanthes calcar Cl.
---	2004	Achnanthes clevei Grun. v. clevei
CN?	99003	Achnanthes daui v. alaskaensis Foged
ACP	2042	Achnanthes detha Hohn & Hellerm. v. detha
ALP	2006	Achnanthes didyma Hust. v. didyma
---	2012	Achnanthes haukiana Grun. v. haukiana
ALP	2015	Achnanthes lanceolata (Breb.) Grun. v. lanceolata
---	99004	Achnanthes lanceolata f. capitata O. Mull.
---	2016	Achnanthes lanceolata v. dubia Grun.
ACP	99333	Achnanthes lapponica Hust.
ALP	2048	Achnanthes laterostrata Hust. v. laterostrata
---	2022	Achnanthes levanderi Hust. v. levanderi
---	2023	Achnanthes levanderi v. helvetica Hust.
ALP	2024	Achnanthes linearis (W. Sm.) Grun. v. linearis
CN?	2026	Achnanthes linearis v. pusilla Grun.
ACP	2028	Achnanthes marginulata Grun. v. marginulata
ACP	2029	Achnanthes microcephala (Kutz.) Grun. v. microcephala
IND	2030	Achnanthes minutissima Kutz. v. minutissima
---	2047	Achnanthes peragalli v. fossilis Temp. & Perag.
---	99334	Achnanthes recurvata Hust.
ALP	99006	Achnanthes suchlandi Hust.
---	2889	Achnanthes spp.
---	2051	Achnanthes 3-PIRLA
ACP	99007	Achnanthes 1-SN
---	99008	Achnanthes 2-SN
IND	99009	Achnanthes 3-SN
---	99010	Achnanthes 4-SN
---	99011	Achnanthes 6-SN
IND	99012	Achnanthes 7-SN
---	99013	Achnanthes 8-SN
---	99014	Achnanthes 9-SN
ACP	99015	Achnanthes 10-SN
---	99016	Achnanthes 11-SN
---	99017	Achnanthes 13-SN
---	99018	Achnanthes 16-SN
---	99019	Achnanthes 18-SN
ALB	99021	Achnanthes 21-SN
---	99025	Achnanthes 31-SN
CN	99026	Achnanthes 32-SN
---	99027	Achnanthes 34-SN

---	99029	Achnanthes 37-SN
---	99031	Achnanthes 39-SN
---	7001	Amphora ovalis (Kutz.) Kutz. v. ovalis
---	7002	Amphora ovalis v. affinis (Kutz.) V. H. ex Det.
IND	7003	Amphora ovalis v. pediculus (Kutz.) V. H. ex Det.
IND	7004	Amphora perpusilla (Grun.) Grun. v. perpusilla
ACP	8003	Anomoeoneis serians (Breb. ex Kutz.) Cl. v. serians
ACP	8005	Anomoeoneis serians v. brachysira (Breb.) ex Kutz.) Hustedt
ACP	99035	Anomoeoneis serians v. 1-SN
ACP	8001	Anomoeoneis exilis v. lanceolata A. Mayer
ALP	9001	Asterionella formosa Hust. v. formosa
---	9002	Asterionella ralfsii v. americana Korn.
IND	12001	Caloneis bacillum (Grun.) Cl. v. bacillum
ALP	16001	Cocconeis diminuta Pant. v. diminuta
---	99038	Cocconeis placentula Ehr. v. placentula
---	99039	Cocconeis placentula v. euglypta (Ehr.) Cl.
---	99040	Cocconeis 2-SN
ALB	20002	Cyclotella bodanica Eulenst. v. bodanica
ALP	20005	Cyclotella kuetzingiana Thwaites v. kuetzingiana
ALP	20009	Cyclotella ocellata Pant. v. ocellata
ALP	20012	Cyclotella pseudostelligera Hust. v. pseudostelligera
IND	20010	Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera
---	99042	Cyclotella 1-SN
ACP	23004	Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii
ALP	23005	Cymbella cistula (Ehr.) Kirchner v. cistula
---	99342	Cymbella cymbiformis Agardh
ACP	23007	Cymbella gaeumannii Meist. v. gaeumannii
ACP	23008	Cymbella hebridica Grun. ex Cl. v. hebridica
ACP	23009	Cymbella lunata W. Sm. v. lunata
ALP	23010	Cymbella microcephala Grun. v. microcephala
IND	23012	Cymbella minuta Hilse ex Rabh. v. minuta
---	23013	Cymbella minuta f. latens (Krasske) Reim.
---	23014	Cymbella minuta v. pseudogracilis (Choln.) Reim.
IND	23015	Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.
---	23031	Cymbella muelleri Hust. v. muelleri
CN?	23016	Cymbella naviculiformis Auersw. ex Heib. v. naviculiformis
---	99050	Cymbella rainierensis Sov.
---	99051	Cymbella sinuata Greg.
---	23889	Cymbella spp.
ACP	23021	Cymbella 1-PIRLA
---	99052	Cymbella 1-SN
---	99053	Cymbella 2-SN
---	99054	Cymbella 3-SN
---	99059	Cymbella 8-SN
ACP	99060	Cymbella 9-SN
---	99061	Cymbella 10-SN
---	99062	Cymbella 11-SN
CN	99350	Cymbella 13-SN
---	27001	Diatoma anceps (Ehr.) Kirchn. v. anceps
IND	27002	Diatoma hiemale v. mesodon (Ehr.) Grun.
CN?	30001	Diploneis elliptica (Kutz.) Cl. v. elliptica
---	30003	Diploneis marginestriata Hust. v. marginestriata

ALP	99067	Epithemia adnata (Kutz.) Breb.
ALP	99069	Epithemia turgida (Ehr.) Kutz.
ACP	33036	Eunotia naegelii Migula v. naegelii
CN?	33001	Eunotia arcus Ehr. v. arcus
ACP	33008	Eunotia curvata (Kutz.) Langerst. v. curvata
---	33009	Eunotia curvata v. capitata (Grun.) Woodhead & Tweed
ACP	33010	Eunotia curvata v. subarcuata (Naeg.) Woodhead & Tweed
---	99071	Eunotia curvata v. 1-SN
ACP	33011	Eunotia denticulata (Breb.) Rabh. v. denticulata
ACP	33015	Eunotia exigua (Breb. ex Kutz.) Rabh. v. exigua
ACP	33018	Eunotia fallax Cl.-Eul. v. fallax
ACP	99072	Eunotia fallax v. gracillima Krasske
ACP	33019	Eunotia flexuosa Breb. ex Kutz. v. flexuosa
---	33021	Eunotia formica Ehr. v. formica
ACP	33026	Eunotia incisa W. Sm.ex Greg. v. incisa
---	33030	Eunotia maior (W. Sm.) v. maior
---	33039	Eunotia pectinalis (O. F. Mull.?) Rabh. v. pectinalis
ACP	33040	Eunotia pectinalis v. minor (Kutz.) Rabh.
---	33046	Eunotia praerupta v. bidens (Ehr.) Grun.
---	33051	Eunotia rhomboidea Hust. v. rhomboidea
---	33054	Eunotia serra Ehr. Hust. v. serra
---	99355	Eunotia sp. (girdle view)
---	33059	Eunotia sudetica O. Mull. v. sudetica
ACP	33060	Eunotia tenella (Grun.) Cl. v. tenella
---	33061	Eunotia trinacria Krasske v. trinacria
ACP	33065	Eunotia vanheurckii Pat. v. vanheurckii
---	33066	Eunotia vanheurckii v. intermedia (Krasske) ex Hust. Patr.
---	99074	Eunotia 1-SN
---	99075	Eunotia 2-SN
---	99081	Eunotia 11-SN
---	99082	Eunotia 12-SN
---	99083	Eunotia 13-SN
---	99084	Eunotia 14-SN
IND	34003	Fragilaria brevistriata Grun. v. brevistriata
---	34006	Fragilaria capucina Desm. v. capucina
---	99086	Fragilaria capucina v. mesolepta Rabh.
IND	34030	Fragilaria vaucheriae (Kutz.) Lange-Bertelot v. vaucheriae
ALB	34012	Fragilaria construens (Ehr. Grun. v. construens
ALP	34013	Fragilaria construens v. binodis (Ehr.) Grun.
---	34014	Fragilaria construens v. pumila Grun.
IND	34016	Fragilaria construens v. venter (Ehr.) Grun.
ALP	34017	Fragilaria crotonensis Kitton v. crotonensis
ALP	34022	Fragilaria leptostauron (Ehr.) Hust.
ALP	34023	Fragilaria leptostauron v. dubia (Grun.) Hust.
---	34025	Fragilaria pinnata Ehr. v. pinnata
CN	34038	Fragilaria pinnata v. acuminata A. Mayer
---	34026	Fragilaria pinnata v. intercedens (Grun.) Hust.
ALB	34027	Fragilaria pinnata v. lancettula (Schum.) Hust.
IND	34030	Fragilaria vaucheriae (Kutz.) Peters var. vaucheriae
ALP	34032	Fragilaria virescens Rolfs v. virescens
IND	34037	Fragilaria virescens v. exigua Grun.
---	34034	Fragilaria virescens v. oblongella Grun.
---	34889	Fragilaria spp.

ALP	99087	Fragilaria 6-PIRLA
ALP	99088	Fragilaria 2-SN
---	99089	Fragilaria 4-SN
ALB	99090	Fragilaria 7-SN
---	99091	Fragilaria 8-SN
---	99092	Fragilaria 9-SN
---	99093	Fragilaria 10-SN
---	99094	Fragilaria 11-SN
---	99095	Fragilaria 13-SN
ALP	99096	Fragilaria 14-SN
CN	99098	Fragilaria 16-SN
ACP	35001	Frustulia rhomboides (Ehr.) DeT. v. rhomboides
---	35002	Frustulia rhomboides v. amphipleuroides (Grun.) Pet.
---	35003	Frustulia rhomboides v. capitata (A. Mayer) Patr.
ACP	35005	Frustulia rhomboides v. saxonica (Rabh.) DeT.
ACP	99102	Frustulia rhomboides v. 1-SN
---	99103	Gomphonema affine v. insigne (Greg.) Andrews
ACP	37003	Gomphonema angustatum (Kutz.) Rabh.
ALP	37004	Gomphonema angustatum v. citera (Hohn & Hum) Kutz.
---	37005	Gomphonema consector Hohn & Hell. Patr. v. consector
---	37010	Gomphonema parvulum (Kutz.) Kutz. v. parvulum
ACP	99105	Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn
ACP	99345	Gomphonema quadripunctatum (Ost.) Wils. v. quadripunctatum
---	99106	Gomphonema subclavatum (Grun.) Grun.
---	37012	Gomphonema subtile Ehr. v. subtile
ACP	99107	Gomphonema tackei v. abbreviatum Camburn
---	37014	Gomphonema truncatum v. capitatum (Ehr.) Patr.
---	99348	Gomphonema truncatum Ehr. v. truncatum
ACP	99335	Gomphonema ventricosum
---	37889	Gomphonema spp.
---	99109	Gomphonema 3-SN
---	99111	Gomphonema 5-SN
---	99115	Gomphonema 9-SN
---	99117	Gomphonema 11-SN
ACP	99119	Gomphonema 13-SN
---	99120	Gomphonema 14-SN
---	99336	Gyrosigma obtusatum (Sullivan & Wormley) Boyer
---	99121	Gyrosigma spencerii (Quekett) Griffith & Henfries
---	99123	Hannea arcus (Ehr.) Pat.
---	40002	Hantzschia amphioxus (Ehr.) Grun. v. amphioxus
CN?	99124	Krasskella kriegeriana (Krasske) Ross & Sims
ALP	44001	Melosira ambigua (Grun.) O. Mull. v. ambigua
---	44002	Melosira distans (Ehr.) Kutz. v. distans
ACP	44030	Melosira distans v. nivalis (W. Sm.) Kirchn.
CN?	44008	Melosira islandica O. Mull. v. islandica
ALP	44010	Melosira italica (Ehr.) Kutz. v. italica
---	44011	Melosira italica ssp. subarctica O. Mull.
ALP	44040	Melosira italica ssp. subarctica f. tenuissima (Grun.) Camburn
ACP	44013	Melosira italica v. valida (Grun.) Hust.
CN	44014	Melosira lirata (Ehr.) Kutz. v. lirata
ACP	44022	Melosira perglabra Ostr. v. perglabra
---	44027	Melosira 1-PIRLA
ACP	99126	Melosira 1-SN

---	99127	Melosira 2-SN
CN	99128	Melosira 3-SN
ACP	99129	Melosira 4-SN
---	99130	Melosira 5-SN
ACP	45001	Meridion circulare (Grev.) Agardh v. circulare
---	46002	Navicula angusta Grun. v. angusta
---	99131	Navicula aurora Sov.
---	46008	Navicula bremensis Hust.
---	99132	Navicula capitata v. hungarica (Grun.) Ross
ACP	99133	Navicula cari Ehr.
---	46115	Navicula confervacea (Kutz.) Grun. v. fervaceae
ALB	46014	Navicula cryptocephala Kutz. v. cryptocephala
---	99135	Navicula cryptocephala v. venata (Kutz.) Rabh.
---	46021	Navicula globulifera Hust. v. globulifera
ACP	46095	Navicula heimansii van Dam & Kooyman v. heimansii
---	46030	Navicula krasskei Hust. v. krasskei
IND	46032	Navicula laevissima Kutz. v. laevissima
ACP	46038	Navicula mediocris Krasske v. mediocris
ACP	99137	Navicula mediopunctata Hust.
---	46042	Navicula mutica Kutz. v. mutica
---	46102	Navicula mutica v. cohnii (Hilse) Grun.
---	99138	Navicula pseudolanceolata Lange-Bertalot
CN	46050	Navicula pseudoscutiformis Hust. v. pseudoscutiformis
ALP	46051	Navicula pupula Kutz. v. pupula
---	46101	Navicula pupula v. elliptica Hust.
---	46054	Navicula pupula v. rectangularis (Greg.) Grun.
CN	46056	Navicula radiosa Kutz. v. radiosa
---	46057	Navicula radiosa v. parva Wallace
ACP	46113	Navicula cf. subtilissima v. 2-PIRLA
ACP	46121	Navicula cf. subtilissima v. 4-PIRLA
---	99355	Navicula subtilissima 5 SN
---	46889	Navicula spp.
ACP	46133	Navicula 14-PIRLA
ACP	46123	Navicula 23-PIRLA
IND	99142	Navicula 1-SN
ACP	99143	Navicula 6-SN
ACP	99144	Navicula 7-SN
ACP	99145	Navicula 9-SN
IND	99146	Navicula 10-SN
---	99147	Navicula 11-SN
ACP	99148	Navicula 13-SN
ACP	99149	Navicula 14-SN
ACP	99150	Navicula 16-SN
---	99151	Navicula 18-SN
---	99152	Navicula 21-SN
---	99153	Navicula 22-SN
---	99345	Navicula 23-SN
---	99154	Navicula 24-SN
---	99155	Navicula 25-SN
ACP	99156	Navicula 26-SN
ALP	99157	Navicula 27-SN
---	99158	Navicula 28-SN
---	99161	Navicula 30-SN
---	99162	Navicula 31-SN
ACP	99163	Navicula 32-SN

---	99164	Navicula 35-SN
---	99165	Navicula 36-SN
---	99166	Navicula 37-SN
---	99167	Navicula 38-SN
---	99168	Navicula 39-SN
ACP	99172	Navicula 43-SN
ALP	99175	Navicula 46-SN
ACP	99176	Navicula 47-SN
ACP	99179	Navicula 50-SN
---	99180	Navicula 51-SN
---	99181	Navicula 52-SN
---	99182	Navicula 53-SN
---	99183	Navicula 54-SN
---	99184	Navicula 55-SN
ACP	99185	Navicula 56-SN
---	99186	Navicula 57-SN
ALP	99187	Navicula 58-SN
---	99188	Navicula 59-SN
---	99189	Navicula 60-SN
ALP	99190	Navicula 61-SN
---	99194	Navicula 65-SN
---	99198	Navicula 69-SN
---	99200	Navicula 71-SN
ACP	99201	Navicula 72-SN
---	99202	Navicula 73-SN
---	99206	Navicula 77-SN
---	99209	Navicula 80-SN
---	99210	Navicula 81-SN
---	99211	Navicula 82-SN
---	99212	Navicula 83-SN
---	99213	Navicula 84-SN
---	99214	Navicula 85-SN
ACP	47001	Neidium affine (Ehr.) Pfitz. v. affine
CN	47002	Neidium affine v. amphirhynchus (Ehr.) Cl.ACP
ACP	47007	Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum
---	47008	Neidium bisulcatum v. baicalense (Skv. & Meyer) Reim.
---	47014	Neidium iridis (Ehr.) Cl. v. iridis
---	47016	Neidium iridis v. amphigomphus (Ehr.) Temp. & Perag.
ACP	47025	Neidium 2-PIRLA
---	99218	Neidium 1-SN
---	99219	Neidium 2-SN
---	99220	Neidium 3-SN
---	99221	Neidium 4-SN
---	99223	Neidium 6-SN
---	99226	Nitzschia acuta Hantzsch
---	99227	Nitzschia admissoides Hust.
ALB	99341	Nitzschia amphibiodes Hust.
---	48008	Nitzschia dissipata (Kutz.) Grun. v. dissipata
ACP	99228	Nitzschia dissipata v. undulata Sovereign
---	48030	Nitzschia romana Grun. v. romana
---	48889	Nitzschia spp.
ALP	48035	Nitzschia 1-PIRLA
IND	99229	Nitzschia frustulum 1-SN
IND	99230	Nitzschia frustulum 2-SN
IND	99231	Nitzschia frustulum 3-SN

---	99233	Nitzschia frustulum 5-SN
---	99234	Nitzschia frustulum 6-SN
IND	99235	Nitzschia frustulum 7-SN
---	99236	Nitzschia frustulum 8-SN
---	99237	Nitzschia 1-SN
ACP	99239	Nitzschia 3-SN
IND	99240	Nitzschia 5-SN
IND	99241	Nitzschia 6-SN
ACP	99242	Nitzschia 7-SN
---	99243	Nitzschia 8-SN
ACP	99244	Nitzschia 9-SN
---	99246	Nitzschia 11-SN
---	99247	Nitzschia 12-SN
---	99249	Nitzschia 14-SN
---	99250	Nitzschia 15-SN
---	99252	Nitzschia 17-SN
---	99257	Nitzschia 25-SN
---	99259	Nitzschia 27-SN
---	99260	Nitzschia 28-SN
---	99261	Nitzschia 30-SN
ALP	99266	Nitzschia 35-SN
ALP	99267	Nitzschia 36-SN
---	99268	Nitzschia 37-SN
---	99269	Nitzschia 38-SN
---	99270	Nitzschia 39-SN
ALP	99351	Nitzschia 41-SN
---	99356	Nitzschia 42-SN
ALP	99271	Opephora martyi Heribaud
---	52001	Pinnularia abaujensis (Pant.) Ross v. abaujensis
ACP	52002	Pinnularia abaujensis v. linearis (Hust.) Patr.
ACP	52078	Pinnularia abaujensis v. 2-PIRLA
---	52011	Pinnularia biceps Greg. v. biceps
---	52074	Pinnularia biceps v. 1-PIRLA
---	52013	Pinnularia borealis Ehr. v. borealis
ACP	52086	Pinnularia cf.braunii v.amphicephala f.subconica Vankantaraman-PIRLA
---	52025	Pinnularia divergens W. Sm. v. divergens
ACP	52027	Pinnularia divergentissima (Grun.) Cl. v. divergentissima
ACP	52038	Pinnularia maior (Kutz.) Rabh. v. maior
ACP	52080	Pinnularia cf. pseudomicrostauron Gandhi v. pseudomicrostauron
IND	99274	Pinnularia subcapitata v. 1-SN
---	99275	Pinnularia substomatophora v. 2-PIRLA
---	52069	Pinnularia termitina (Ehr.) Patr. v. termitina
---	52889	Pinnularia spp.
---	52079	Pinnularia 9-PIRLA
ACP	99276	Pinnularia 1-SN
ACP	99277	Pinnularia 2-SN
---	99278	Pinnularia 5-SN
---	99280	Pinnularia 8-SN
ACP	99281	Pinnularia 9-SN
---	99282	Pinnularia 10-SN
ACP	99283	Pinnularia 11-SN
---	99284	Pinnularia 12-SN

---	99294	Pinnularia 23-SN
---	99297	Pinnularia 26-SN
---	99298	Pinnularia 27-SN
---	99299	Pinnularia 28-SN
---	99303	Pinnularia 32-SN
---	99305	Pinnularia 34-SN
---	99309	Pinnularia 39-SN
---	99310	Pinnularia 40-SN
---	99311	Pinnularia 41-SN
---	99353	Pinnularia 43-SN
---	58001	Rhopalodia gibba (Ehr.) O. Mull. v. gibba
---	62002	Stauroneis anceps Ehr. v. anceps
ALP	62003	Stauroneis anceps f. gracilis Rabh.
ACP	62024	Stauroneis anceps v. 1-PIRLA
ACP	62022	Stauroneis anceps v. 2-PIRLA
---	62015	Stauroneis phoenicenteron (Nitz.) Ehr. v. phoenicenteron
---	63003	Stenopterobia anceps (Lewis) Breb. ex V. H. v. anceps
ACP	63002	Stenopterobia intermedia (Lewis) V. H. v. intermedia
ALB	99316	Stephanodiscus parvus Stoermer & Hakansson
ALB	99317	Stephanodiscus 1-SN
---	99318	Stephanodiscus 2-SN
---	99319	Stephanodiscus 3-SN
---	99320	Stephanodiscus 4-SN
---	99321	Stephanodiscus 5-SN
ACP	65011	Surirella delicatissima Lewis v. delicatissima
ACP	65033	Surirella delicatissima f. tenuissima Mang.
ACP	65014	Surirella linearis W. Sm. v. linearis
---	65015	Surirella linearis v. constricta Grun.
---	99327	Synedra capitata Ehr.
ALB	66014	Synedra parasitica (W. Sm.) Hust. v. parasitica
---	99347	Synedra pulchella Kutz.
ALP	66015	Synedra radians (Kutz.) v radians
---	66016	Synedra rumpens Kutz. v. rumpens
---	66023	Synedra tenera W. Sm. v. tenera
---	66024	Synedra ulna (Nitz.) Ehr. v. ulna
---	66026	Synedra ulna v. danica (Kutz.) V. H.
ALP	66029	Synedra 1-PIRLA
ALP	99330	Synedra 2-SN
ALP	99331	Synedra 4-SN
---	67002	Tabellaria fenestrata (Lyngb.) Kutz. v. fenestrata
IND	67005	Tabellaria flocculosa Roth (Kutz.) strain III sensu Koppen
ACP	67006	Tabellaria flocculosa Roth (Kutz.) strain IV sensu Koppen
		Unidentified SN pennate diatoms

APPENDIX B

LAKE: PARKER PASS LAT DEG: 37 MIN: 50 SEC: 8 LONG DEG: 119 MIN: 12 SEC: 35
QUADRANGLE: MONO CRATERS AREA: 2.85 SHED AREA: 101 ELEV: 3316
VEG CLASS: 2 ROCK TYPE: % COVER: A: 1 B: 4 C: 1 D: 1
pH FIELD: 5.64 pH LAB: 5.84 CONDUCTIVITY: 16 uS@25:
HCO3: 5.9 Cl: 4.15 NO3: 8.32 SO4: 106.2 MICR EQUIV/L:
Ca: 86.6 Mg: 17.6 Na : 12.7 K : 5.72
DATE SAMPLED: 8-10-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.9954 GMS PER CC:
SED DRY WT: 0.1419 GMS PER CC: INGN LOSS: 14.2

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	517.00	3.00	0.580
2003 Achnanthes austriaca Hust. v. helvetica	517.00	40.00	7.737
2022 Achnanthes levanderi Hust. v. levanderi	517.00	1.00	0.193
2028 Achnanthes marginulata Grun. v. marginulata	517.00	141.00	27.273
2049 Achnanthes bioreti Germain v. bioreti	517.00	11.00	2.128
7003 Amphora ovalis v. pediculus (Kutz.) V. H. ex Det.	517.00	3.00	0.580
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	517.00	2.00	0.387
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	517.00	9.00	1.741
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	517.00	3.00	0.580
23007 Cymbella gaeumannii Meist. v. gaeumannii	517.00	7.00	1.354
23009 Cymbella lunata W. Sm. v. lunata	517.00	10.00	1.934
23012 Cymbella minuta Hilse ex Rabh. v. minuta	517.00	9.00	1.741
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	517.00	1.00	0.193
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	517.00	4.00	0.774
44011 Melosira italica ssp. subarctica O. Mull.	517.00	1.00	0.193
44027 Melosira 1-PIRLA	517.00	32.00	6.190
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	517.00	7.00	1.354
62003 Stauroneis anceps f. gracilis Rabh.	517.00	1.00	0.193
62022 Stauroneis anceps v. 2-PIRLA	517.00	5.00	0.967
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	517.00	1.00	0.193
65011 Surirella delicatissima Lewis v. delicatissima	517.00	7.00	1.354
65014 Surirella linearis W. Sm. v. linearis	517.00	4.00	0.774
99007 Achnanthes 1-SN	517.00	151.00	29.207
99015 Achnanthes 10-SN	517.00	4.00	0.774
99018 Achnanthes 16-SN	517.00	2.00	0.387
99126 Melosira 1-SN	517.00	28.00	5.416
99143 Navicula 6-SN	517.00	3.00	0.580
99148 Navicula 13-SN	517.00	8.00	1.547
99221 Neidium 4-SN	517.00	1.00	0.193
99239 Nitzschia 3-SN	517.00	5.00	0.967
99241 Nitzschia 6-SN	517.00	1.00	0.193
99244 Nitzschia 9-SN	517.00	3.00	0.580
99277 Pinnularia 2-SN	517.00	6.00	1.161
99281 Pinnularia 9-SN	517.00	3.00	0.580

LAKE: TABLE MEADOW LAT DEG: 36 MIN: 36 SEC: 33 LONG DEG: 118 MIN: 39 SEC: 5
QUADRANGLE: TRIPLE DIVIDE AREA: 1.55 SHED AREA: 25.1 ELEV: 3139
VEG CLASS: 2 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 6.6 pH LAB: 6.01 CONDUCTIVITY: 5.6 uS@25:
HCO3: 40.8 Cl: 4.01 NO3: 0.78 SO4: 3.91 MICR EQUIV/L:
Ca: 29.8 Mg: 3.45 Na : 13 K : 3.22
DATE SAMPLED: 7-20-1985 INVESTIGATOR: J.S.AND R.W.H.
SED WET WT: 0.9328 GMS PER CC:
SED DRY WT: 0.1212 GMS PER CC: INGN LOSS: 19.4

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	508.00	24.00	4.724
2016 Achnanthes lanceolata v. dubia Grun.	508.00	1.00	0.197
2028 Achnanthes marginulata Grun. v. marginulata	508.00	20.00	3.937
2042 Achnanthes detha Hohn & Hellerm. v. detha	508.00	6.00	1.181
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	508.00	3.00	0.591
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	508.00	3.00	0.591
23007 Cymbella gaeumannii Meist. v. gaeumannii	508.00	1.00	0.197
23009 Cymbella lunata W. Sm. v. lunata	508.00	3.00	0.591
23012 Cymbella minuta Hilse ex Rabh. v. minuta	508.00	1.00	0.197
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	508.00	1.00	0.197
27001 Diatoma anceps (Ehr.) Kirchn. v. anceps	508.00	1.00	0.197
33008 Eunotia curvata (Kutz.) Langerst. v. curvata	508.00	8.00	1.575
33015 Eunotia exigua (Breb. ex Kutz.) Rabh. v. exigua	508.00	2.00	0.394
33026 Eunotia incisa W. Sm.ex Greg. v. incisa	508.00	2.00	0.394
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	508.00	2.00	0.394
33060 Eunotia tenella (Grun.) Cl. v. tenella	508.00	3.00	0.591
34003 Fragilaria brevistriata Grun. v. brevistriata	508.00	2.00	0.394
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	508.00	2.00	0.394
34025 Fragilaria pinnata Ehr. v. pinnata	508.00	5.00	0.984
34026 Fragilaria pinnata v. intercedens (Grun.) Hust.	508.00	2.00	0.394
34037 Fragilaria virescens v. exigua Grun.	508.00	14.00	2.756
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	508.00	6.00	1.181
37003 Gomphonema angustatum (Kutz.) Rabh.	508.00	3.00	0.591
37010 Gomphonema parvulum (Kutz.) Kutz. v. parvulum	508.00	1.00	0.197
40002 Hantzschia amphioxus (Ehr.) Grun. v. amphioxus	508.00	1.00	0.197
44013 Melosira italica v. valida (Grun.) Hust.	508.00	2.00	0.394
44022 Melosira perglabra Ostr. v. perglabra	508.00	1.00	0.197
44027 Melosira 1-PIRLA	508.00	81.00	15.945
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	508.00	6.00	1.181
45001 Meridion circulare (Grev.) Agardh v. circulare	508.00	6.00	1.181
46038 Navicula mediocris Krasske v. mediocris	508.00	7.00	1.378
46054 Navicula pupula v. rectangularis (Greg.) Grun.	508.00	2.00	0.394
46113 Navicula cf. subtilissima v. 2-PIRLA	508.00	2.00	0.394
46121 Navicula cf. subtilissima v. 4-PIRLA	508.00	2.00	0.394
47001 Neidium affine (Ehr.) Pfitz. v. affine	508.00	1.00	0.197
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	508.00	2.00	0.394
47016 Neidium iridis v. amphigomphus (Ehr.) Temp. & Perag.	508.00	3.00	0.591
47025 Neidium 2-PIRLA	508.00	1.00	0.197
52889 Pinnularia spp.	508.00	1.00	0.197
62022 Stauroneis anceps v. 2-PIRLA	508.00	8.00	1.575
62024 Stauroneis anceps v. 1-PIRLA	508.00	2.00	0.394
65011 Surirella delicatissima Lewis v. delicatissima	508.00	14.00	2.756

TAXON NAME	Total No	This Tax	%REL ABUND
65014 Surirella linearis W. Sm. v. linearis	508.00	3.00	0.591
90990 Nitzschia 42-SN	508.00	2.00	0.394
99007 Achnanthes 1-SN	508.00	84.00	16.535
99012 Achnanthes 7-SN	508.00	1.00	0.197
99050 Cymbella rainierensis Sov.	508.00	4.00	0.787
99054 Cymbella 3-SN	508.00	2.00	0.394
99071 Eunotia curvata v. 1-SN	508.00	1.00	0.197
99109 Gomphonema 3-SN	508.00	2.00	0.394
99126 Melosira 1-SN	508.00	49.00	9.646
99133 Navicula cari Ehr.	508.00	9.00	1.772
99137 Navicula mediopunctata Hust.	508.00	1.00	0.197
99142 Navicula 1-SN	508.00	3.00	0.591
99144 Navicula 7-SN	508.00	23.00	4.528
99148 Navicula 13-SN	508.00	10.00	1.969
99149 Navicula 14-SN	508.00	2.00	0.394
99229 Nitzschia frustulum 1-SN	508.00	2.00	0.394
99231 Nitzschia frustulum 3-SN	508.00	1.00	0.197
99239 Nitzschia 3-SN	508.00	14.00	2.756
99240 Nitzschia 5-SN	508.00	3.00	0.591
99247 Nitzschia 12-SN	508.00	2.00	0.394
99281 Pinnularia 9-SN	508.00	29.00	5.709
99283 Pinnularia 11-SN	508.00	2.00	0.394
99333 Achnanthes lapponica Hust.	508.00	1.00	0.197

LAKE: FAIRY SHRIMP LAT DEG: 37 MIN: 26 SEC: 40 LONG DEG: 118 MIN: 45 SEC: 40
QUADRANGLE: MT ABBOT AREA: 1.3 SHED AREA: 15.5 ELEV: 3517
VEG CLASS: 2 ROCK TYPE: % COVER: A: 1 B: 1 C: 1 D: 4
pH FIELD: 6.92 pH LAB: 6.3 CONDUCTIVITY: 3 uS@25:
HCO3: 14.6 Cl: 1.8 NO3: 3.75 SO4: 4.15 MICR EQUIV/L:
Ca: 16 Mg: 1.96 Na : 4.25 K : 2.29
DATE SAMPLED: 8-11-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.8633 GMS PER CC:
SED DRY WT: 1.3601 GMS PER CC: INGN LOSS: 2.31

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	529.00	10.00	1.890
2003 Achnanthes austriaca Hust. v. helvetica	529.00	199.00	37.618
2028 Achnanthes marginulata Grun. v. marginulata	529.00	197.00	37.240
2042 Achnanthes detha Hohn & Hellerm. v. detha	529.00	12.00	2.268
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	529.00	1.00	0.189
33046 Eunotia praerupta v. bidens (Ehr.) Grun.	529.00	2.00	0.378
33060 Eunotia tenella (Grun.) Cl. v. tenella	529.00	3.00	0.567
44027 Melosira 1-PIRLA	529.00	18.00	3.403
46030 Navicula krasskei Hust. v. krasskei	529.00	1.00	0.189
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	529.00	1.00	0.189
47025 Neidium 2-PIRLA	529.00	2.00	0.378
52013 Pinnularia borealis Ehr. v. borealis	529.00	3.00	0.567
62002 Stauroneis anceps Ehr. v. anceps	529.00	4.00	0.756
90990 Nitzschia 42-SN	529.00	1.00	0.189
99015 Achnanthes 10-SN	529.00	6.00	1.134
99035 Anomoeoneis serians v. 1-SN	529.00	1.00	0.189
99072 Eunotia fallax v. gracillima Krasske	529.00	11.00	2.079
99075 Eunotia 2-SN	529.00	1.00	0.189
99102 Frustulia rhomboides v. l-SN	529.00	8.00	1.512
99144 Navicula 7-SN	529.00	1.00	0.189
99148 Navicula 13-SN	529.00	10.00	1.890
99176 Navicula 47-SN	529.00	10.00	1.890
99221 Neidium 4-SN	529.00	2.00	0.378
99239 Nitzschia 3-SN	529.00	2.00	0.378
99244 Nitzschia 9-SN	529.00	1.00	0.189
99274 Pinnularia subcapitata v. 1-SN	529.00	1.00	0.189
99276 Pinnularia 1-SN	529.00	8.00	1.512
99277 Pinnularia 2-SN	529.00	1.00	0.189
99297 Pinnularia 26-SN	529.00	1.00	0.189
99298 Pinnularia 27-SN	529.00	1.00	0.189

LAKE: KUNA 11 LAT DEG: 37 MIN: 49 SEC: 50 LONG DEG: 119 MIN: 14 SEC: 15
QUADRANGLE: MONO CRATERS AREA: 4.92 SHED AREA: 23.3 ELEV: 3536
VEG CLASS: 1 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 7.02 pH LAB: 6.25 CONDUCTIVITY: 3.6 uS@25:
HCO3: 19.1 Cl: 1.79 NO3: 4.19 SO4: 4.17 MICR EQUIV/L:
Ca: 16.2 Mg: 3.28 Na : 6.16 K : 3.16
DATE SAMPLED: 8-14-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.5586 GMS PER CC:
SED DRY WT: 0.6634 GMS PER CC: INGN LOSS: 3.14

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	512.00	5.00	0.977
2003 Achnanthes austriaca Hust. v. helvetica	512.00	44.00	8.594
2028 Achnanthes marginulata Grun. v. marginulata	512.00	207.00	40.430
2042 Achnanthes detha Hohn & Hellerm. v. detha	512.00	33.00	6.445
23009 Cymbella lunata W. Sm. v. lunata	512.00	1.00	0.195
23012 Cymbella minuta Hilse ex Rabh. v. minuta	512.00	5.00	0.977
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	512.00	1.00	0.195
33011 Eunotia denticulata (Breb.) Rabh. v. denticulata	512.00	3.00	0.586
33059 Eunotia sudetica O. Mull. v. sudetica	512.00	1.00	0.195
34016 Fragilaria construens v. venter (Ehr.) Grun.	512.00	1.00	0.195
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	512.00	1.00	0.195
44027 Melosira 1-PIRLA	512.00	8.00	1.563
46030 Navicula krasskei Hust. v. krasskei	512.00	3.00	0.586
46133 Navicula 14-PIRLA	512.00	1.00	0.195
47001 Neidium affine (Ehr.) Pfitz. v. affine	512.00	1.00	0.195
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	512.00	3.00	0.586
52086 Pinnularia cf.braunii v.amphicephala f.subconica	512.00	1.00	0.195
62022 Stauroneis anceps v. 2-PIRLA	512.00	2.00	0.391
65011 Surirella delicatissima Lewis v. delicatissima	512.00	1.00	0.195
65014 Surirella linearis W. Sm. v. linearis	512.00	2.00	0.391
99007 Achnanthes 1-SN	512.00	111.00	21.680
99015 Achnanthes 10-SN	512.00	26.00	5.078
99035 Anomoeoneis serians v. 1-SN	512.00	1.00	0.195
99107 Gomphonema tackei v. abbreviatum Camburn	512.00	14.00	2.734
99126 Melosira 1-SN	512.00	6.00	1.172
99137 Navicula mediopunctata Hust.	512.00	2.00	0.391
99144 Navicula 7-SN	512.00	1.00	0.195
99145 Navicula 9-SN	512.00	1.00	0.195
99148 Navicula 13-SN	512.00	7.00	1.367
99150 Navicula 16-SN	512.00	2.00	0.391
99156 Navicula 26-SN	512.00	5.00	0.977
99223 Neidium 6-SN	512.00	1.00	0.195
99244 Nitzschia 9-SN	512.00	10.00	1.953
99280 Pinnularia 8-SN	512.00	1.00	0.195

LAKE: MOSQUITO 3 LAT DEG: 36 MIN: 25 SEC: 9 LONG DEG: 118 MIN: 37 SEC: 16
QUADRANGLE: TRIPLE DIVIDE AREA: 0.78 SHED AREA: 132 ELEV: 2999
VEG CLASS: 4 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 6.52 pH LAB: 6.41 CONDUCTIVITY: 5.8 uS@25:
HCO3: 51.2 Cl: 2.19 NO3: 1.01 SO4: 9.91 MICR EQUIV/L:
Ca: 45.2 Mg: 5.26 Na : 10.5 K : 3.39
DATE SAMPLED: 7-21=1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.9118 GMS PER CC:
SED DRY WT: 0.0745 GMS PER CC: INGN LOSS: 52.5

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	521.00	1.00	0.192
2028 Achnanthes marginulata Grun. v. marginulata	521.00	16.00	3.071
2042 Achnanthes detha Hohn & Hellerm. v. detha	521.00	1.00	0.192
8001 Anomoeoneis exilis v. lanceolata A. Mayer	521.00	3.00	0.576
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	521.00	36.00	6.910
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	521.00	4.00	0.768
23007 Cymbella gaeumannii Meist. v. gaeumannii	521.00	45.00	8.637
23008 Cymbella hebridica Grun. ex Cl. v. hebridica	521.00	6.00	1.152
23009 Cymbella lunata W. Sm. v. lunata	521.00	38.00	7.294
23012 Cymbella minuta Hilse ex Rabh. v. minuta	521.00	3.00	0.576
23021 Cymbella 1-PIRLA	521.00	7.00	1.344
33009 Eunotia curvata v. capitata (Grun.) Woodhead & Tweed	521.00	1.00	0.192
33026 Eunotia incisa W. Sm.ex Greg. v. incisa	521.00	13.00	2.495
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	521.00	4.00	0.768
33051 Eunotia rhomboidea Hust. v. rhomboidea	521.00	2.00	0.384
33054 Eunotia serra Ehr. Hust. v. serra	521.00	1.00	0.192
33059 Eunotia sudetica O. Mull. v. sudetica	521.00	1.00	0.192
33060 Eunotia tenella (Grun.) Cl. v. tenella	521.00	1.00	0.192
34017 Fragilaria crotonensis Kitton v. crotonensis	521.00	3.00	0.576
34025 Fragilaria pinnata Ehr. v. pinnata	521.00	1.00	0.192
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	521.00	1.00	0.192
34034 Fragilaria virescens v. oblongella Grun.	521.00	1.00	0.192
34037 Fragilaria virescens v. exigua Grun.	521.00	72.00	13.820
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	521.00	22.00	4.223
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	521.00	15.00	2.879
37003 Gomphonema angustatum (Kutz.) Rabh.	521.00	4.00	0.768
37005 Gomphonema consector Hohn & Hell. Patr. v. consector	521.00	2.00	0.384
44001 Melosira ambigua (Grun.) O. Mull. v. ambigua	521.00	2.00	0.384
44022 Melosira perglabra Ostr. v. perglabra	521.00	2.00	0.384
44027 Melosira 1-PIRLA	521.00	8.00	1.536
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	521.00	4.00	0.768
46002 Navicula angusta Grun. v. angusta	521.00	3.00	0.576
46038 Navicula mediocris Krasske v. mediocris	521.00	10.00	1.919
46121 Navicula cf. subtilissima v. 4-PIRLA	521.00	7.00	1.344
46123 Navicula 23-PIRLA	521.00	15.00	2.879
47001 Neidium affine (Ehr.) Pfitz. v. affine	521.00	5.00	0.960
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	521.00	1.00	0.192
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	521.00	1.00	0.192
52027 Pinnularia divergentissima (Grun.) Cl. v.	521.00	8.00	1.536
52080 Pinnularia cf. pseudomicrostauron Gandhi v.	521.00	7.00	1.344
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	521.00	4.00	0.768
67006 Tabellaria flocculosa Roth (Kutz.) strain IV sensu	521.00	7.00	1.344

TAXON NAME	Total No	This Tax	%REL ABUND
90990 Nitzschia 42-SN	521.00	2.00	0.384
99007 Achnanthes 1-SN	521.00	13.00	2.495
99053 Cymbella 2-SN	521.00	5.00	0.960
99074 Eunotia 1-SN	521.00	2.00	0.384
99106 Gomphonema subclavatum (Grun.) Grun.	521.00	2.00	0.384
99126 Melosira 1-SN	521.00	30.00	5.758
99128 Melosira 3-SN	521.00	1.00	0.192
99133 Navicula cari Ehr.	521.00	6.00	1.152
99142 Navicula 1-SN	521.00	3.00	0.576
99231 Nitzschia frustulum 3-SN	521.00	48.00	9.213
99239 Nitzschia 3-SN	521.00	1.00	0.192
99274 Pinnularia subcapitata v. 1-SN	521.00	3.00	0.576
99275 Pinnularia substomatophora v. 2-PIRLA	521.00	1.00	0.192
99281 Pinnularia 9-SN	521.00	7.00	1.344
99284 Pinnularia 12-SN	521.00	1.00	0.192
99334 Achnanthes recurvata Hust.	521.00	1.00	0.192

LAKE: MOSQUITO 5 LAT DEG: 36 MIN: 24 SEC: 53 LONG DEG: 118 MIN: 37 SEC: 35
QUADRANGLE: TRIPLE DIVIDE AREA: 3.11 SHED AREA: 76.7 ELEV: 3048
VEG CLASS: 3 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 6.87 pH LAB: 6.42 CONDUCTIVITY: 6.7 uS@25:
HCO3: 52.8 Cl: 1.51 NO3: 2.18 SO4: 13.25 MICR EQUIV/L:
Ca: 51 Mg: 4.49 Na : 11 K : 3.16
DATE SAMPLED: 7-21-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.047 GMS PER CC:
SED DRY WT: 0.1102 GMS PER CC: INGN LOSS: 15.9

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	499.00	1.00	0.200
2003 Achnanthes austriaca Hust. v. helvetica	499.00	18.00	3.607
2028 Achnanthes marginulata Grun. v. marginulata	499.00	41.00	8.216
2042 Achnanthes detha Hohn & Hellerm. v. detha	499.00	12.00	2.405
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	499.00	1.00	0.200
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	499.00	8.00	1.603
23007 Cymbella gaeumannii Meist. v. gaeumannii	499.00	7.00	1.403
23008 Cymbella hebridica Grun. ex Cl. v. hebridica	499.00	1.00	0.200
23009 Cymbella lunata W. Sm. v. lunata	499.00	22.00	4.409
23012 Cymbella minuta Hilse ex Rabh. v. minuta	499.00	20.00	4.008
27002 Diatoma hiemale v. mesodon (Ehr.) Grun.	499.00	1.00	0.200
30001 Diploneis elliptica (Kutz.) Cl. v. elliptica	499.00	2.00	0.401
33008 Eunotia curvata (Kutz.) Langerst. v. curvata	499.00	1.00	0.200
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	499.00	1.00	0.200
34016 Fragilaria construens v. venter (Ehr.) Grun.	499.00	8.00	1.603
34037 Fragilaria virescens v. exigua Grun.	499.00	10.00	2.004
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	499.00	7.00	1.403
37010 Gomphonema parvulum (Kutz.) Kutz. v. parvulum	499.00	2.00	0.401
44010 Melosira italica (Ehr.) Kutz. v. italica	499.00	2.00	0.401
44011 Melosira italica ssp. subarctica O. Mull.	499.00	5.00	1.002
44013 Melosira italica v. valida (Grun.) Hust.	499.00	1.00	0.200
44027 Melosira 1-PIRLA	499.00	9.00	1.804
44040 Melosira italica ssp. subarctica f. tenuissima (Grun.)	499.00	1.00	0.200
46032 Navicula laevissima Kutz. v. laevissima	499.00	1.00	0.200
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	499.00	2.00	0.401
46101 Navicula pupula v. elliptica Hust.	499.00	3.00	0.601
46133 Navicula 14-PIRLA	499.00	10.00	2.004
47001 Neidium affine (Ehr.) Pfitz. v. affine	499.00	1.00	0.200
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	499.00	4.00	0.802
48030 Nitzschia romana Grun. v. romana	499.00	1.00	0.200
52027 Pinnularia divergentissima (Grun.) Cl. v.	499.00	1.00	0.200
62003 Stauroneis anceps f. gracilis Rabh.	499.00	2.00	0.401
62022 Stauroneis anceps v. 2-PIRLA	499.00	5.00	1.002
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	499.00	1.00	0.200
65011 Surirella delicatissima Lewis v. delicatissima	499.00	4.00	0.802
65015 Surirella linearis v. constricta Grun.	499.00	1.00	0.200
99007 Achnanthes 1-SN	499.00	144.00	28.858
99015 Achnanthes 10-SN	499.00	7.00	1.403
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	499.00	10.00	2.004
99126 Melosira 1-SN	499.00	24.00	4.810
99133 Navicula cari Ehr.	499.00	5.00	1.002
99137 Navicula mediopunctata Hust.	499.00	3.00	0.601

TAXON NAME	Total No	This Tax	%REL ABUND
99142 Navicula 1-SN	499.00	26.00	5.210
99145 Navicula 9-SN	499.00	10.00	2.004
99146 Navicula 10-SN	499.00	6.00	1.202
99148 Navicula 13-SN	499.00	5.00	1.002
99153 Navicula 22-SN	499.00	1.00	0.200
99172 Navicula 43-SN	499.00	2.00	0.401
99228 Nitzschia dissipata v. undulata Sovereign	499.00	1.00	0.200
99230 Nitzschia frustulum 2-SN	499.00	2.00	0.401
99239 Nitzschia 3-SN	499.00	2.00	0.401
99242 Nitzschia 7-SN	499.00	4.00	0.802
99243 Nitzschia 8-SN	499.00	1.00	0.200
99281 Pinnularia 9-SN	499.00	27.00	5.411
99345 Gomphonema quadripunctatum (Ost.) Wils. v.	499.00	2.00	0.401

LAKE: L. CATHERDRAL LAT DEG: 37 MIN: 50 SEC: 21 LONG DEG: 119 MIN: 24 SEC: 50
QUADRANGLE: TUOL.MEADOWS AREA: 4.66 SHED AREA: 148 ELEV: 2902
VEG CLASS: ROCK TYPE: % COVER: A: 1 B: 1 C: 1 D: 4
pH FIELD: 6.45 pH LAB: 6.44 CONDUCTIVITY: 3.2 uS@25:
HCO3: 24.6 Cl: 1.47 NO3: 0 SO4: 2.6 MICR EQUIV/L:
Ca: 16.4 Mg: 3.23 Na : 8.67 K : 1.94
DATE SAMPLED: 8-16-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.1618 GMS PER CC:
SED DRY WT: 0.0614 GMS PER CC: INGN LOSS: 41.9

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	507.00	3.00	0.592
2028 Achnanthes marginulata Grun. v. marginulata	507.00	14.00	2.761
2042 Achnanthes detha Hohn & Hellerm. v. detha	507.00	1.00	0.197
8003 Anomoeoneis serians (Breb. ex Kutz.) Cl. v. serians	507.00	6.00	1.183
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	507.00	36.00	7.101
23007 Cymbella gaeumannii Meist. v. gaeumannii	507.00	19.00	3.748
23008 Cymbella hebridica Grun. ex Cl. v. hebridica	507.00	2.00	0.394
23009 Cymbella lunata W. Sm. v. lunata	507.00	3.00	0.592
23021 Cymbella 1-PIRLA	507.00	61.00	12.032
33010 Eunotia curvata v. subarcuata (Naeg.) Woodhead & Tweed	507.00	2.00	0.394
33015 Eunotia exigua (Breb. ex Kutz.) Rabh. v. exigua	507.00	4.00	0.789
33026 Eunotia incisa W. Sm.ex Greg. v. incisa	507.00	3.00	0.592
33036 Eunotia naegelii Migula v. naegelii	507.00	3.00	0.592
33039 Eunotia pectinalis (O. F. Mull.?) Rabh. v. pectinalis	507.00	1.00	0.197
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	507.00	3.00	0.592
33060 Eunotia tenella (Grun.) Cl. v. tenella	507.00	1.00	0.197
33065 Eunotia vanheurckii Pat. v. vanheurckii	507.00	2.00	0.394
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	507.00	8.00	1.578
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	507.00	8.00	1.578
37003 Gomphonema angustatum (Kutz.) Rabh.	507.00	4.00	0.789
44022 Melosira perglabra Ostr. v. perglabra	507.00	1.00	0.197
44027 Melosira 1-PIRLA	507.00	16.00	3.156
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	507.00	15.00	2.959
45001 Meridion circulare (Grev.) Agardh v. circulare	507.00	2.00	0.394
46021 Navicula globulifera Hust. v. globulifera	507.00	1.00	0.197
46038 Navicula mediocris Krasske v. mediocris	507.00	20.00	3.945
46056 Navicula radiosa Kutz. v. radiosa	507.00	1.00	0.197
46095 Navicula heimansii van Dam & Kooyman v. heimansii	507.00	1.00	0.197
46121 Navicula cf. subtilissima v. 4-PIRLA	507.00	6.00	1.183
47001 Neidium affine (Ehr.) Pfitz. v. affine	507.00	1.00	0.197
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	507.00	4.00	0.789
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	507.00	1.00	0.197
52011 Pinnularia biceps Greg. v. biceps	507.00	1.00	0.197
52038 Pinnularia maior (Kutz.) Rabh. v. maior	507.00	1.00	0.197
52069 Pinnularia termitina (Ehr.) Patr. v. termitina	507.00	1.00	0.197
52079 Pinnularia 9-PIRLA	507.00	1.00	0.197
52080 Pinnularia cf. pseudomicrostauron Gandhi v.	507.00	9.00	1.775
52086 Pinnularia cf.braunii v.amphicephala f.subconica	507.00	5.00	0.986
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	507.00	2.00	0.394
65033 Surirella delicatissima f. tenuissima Mang.	507.00	9.00	1.775
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	507.00	3.00	0.592
99035 Anomoeoneis serians v. 1-SN	507.00	18.00	3.550

TAXON NAME	Total No	This Tax	%REL ABUND
99060 Cymbella 9-SN	507.00	11.00	2.170
99082 Eunotia 12-SN	507.00	1.00	0.197
99083 Eunotia 13-SN	507.00	2.00	0.394
99102 Frustulia rhomboides v. l-SN	507.00	7.00	1.381
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	507.00	8.00	1.578
99126 Melosira 1-SN	507.00	58.00	11.440
99133 Navicula cari Ehr.	507.00	12.00	2.367
99144 Navicula 7-SN	507.00	72.00	14.201
99231 Nitzschia frustulum 3-SN	507.00	6.00	1.183
99241 Nitzschia 6-SN	507.00	4.00	0.789
99274 Pinnularia subcapitata v. 1-SN	507.00	3.00	0.592
99277 Pinnularia 2-SN	507.00	10.00	1.972
99278 Pinnularia 5-SN	507.00	1.00	0.197
99281 Pinnularia 9-SN	507.00	7.00	1.381
99305 Pinnularia 34-SN	507.00	1.00	0.197
99309 Pinnularia 39-SN	507.00	1.00	0.197

LAKE: UP. TREASURE LAT DEG: 37 MIN: 23 SEC: 13 LONG DEG: 118 MIN: 46 SEC: 0
QUADRANGLE: MT. ABBOT AREA: 2.85 SHED AREA: 184 ELEV: 3389
VEG CLASS: 3 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 6.89 pH LAB: 6.45 CONDUCTIVITY: 5.7 uSa25:
HCO3: 27.2 Cl: 1.05 NO3: 0 SO4: 4.72 MICR EQUIV/L:
Ca: 25.7 Mg: 2.07 Na : 5.97 K : 6.52
DATE SAMPLED: 8-7-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.5195 GMS PER CC:
SED DRY WT: 0.7577 GMS PER CC: INGN LOSS: 3.12

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	508.00	9.00	1.772
2003 Achnanthes austriaca Hust. v. helvetica	508.00	46.00	9.055
2028 Achnanthes marginulata Grun. v. marginulata	508.00	91.00	17.913
2030 Achnanthes minutissima Kutz. v. minutissima	508.00	2.00	0.394
2042 Achnanthes detha Hohn & Hellerm. v. detha	508.00	21.00	4.134
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	508.00	5.00	0.984
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	508.00	4.00	0.787
23012 Cymbella minuta Hilse ex Rabh. v. minuta	508.00	16.00	3.150
23014 Cymbella minuta v. pseudogracilis (Choln.) Reim.	508.00	2.00	0.394
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	508.00	42.00	8.268
33018 Eunotia fallax Cl.-Eul. v. fallax	508.00	1.00	0.197
33060 Eunotia tenella (Grun.) Cl. v. tenella	508.00	1.00	0.197
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	508.00	1.00	0.197
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	508.00	7.00	1.378
40002 Hantzschia amphioxus (Ehr.) Grun. v. amphioxus	508.00	2.00	0.394
44027 Melosira 1-PIRLA	508.00	3.00	0.591
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	508.00	1.00	0.197
45001 Meridion circulare (Grev.) Agardh v. circulare	508.00	2.00	0.394
46133 Navicula 14-PIRLA	508.00	15.00	2.953
47025 Neidium 2-PIRLA	508.00	3.00	0.591
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	508.00	1.00	0.197
52078 Pinnularia abaujensis v. 2-PIRLA	508.00	1.00	0.197
62003 Stauroneis anceps f. gracilis Rabh.	508.00	3.00	0.591
62022 Stauroneis anceps v. 2-PIRLA	508.00	4.00	0.787
65014 Surirella linearis W. Sm. v. linearis	508.00	6.00	1.181
65033 Surirella delicatissima f. tenuissima Mang.	508.00	1.00	0.197
67006 Tabellaria flocculosa Roth (Kutz.) strain IV sensu	508.00	1.00	0.197
90990 Nitzschia 42-SN	508.00	4.00	0.787
99001 Achnanthes bicapitata Hust.	508.00	4.00	0.787
99003 Achnanthes daui v. alaskaensis Foged	508.00	8.00	1.575
99007 Achnanthes 1-SN	508.00	88.00	17.323
99009 Achnanthes 3-SN	508.00	3.00	0.591
99015 Achnanthes 10-SN	508.00	28.00	5.512
99059 Cymbella 8-SN	508.00	2.00	0.394
99060 Cymbella 9-SN	508.00	1.00	0.197
99102 Frustulia rhomboides v. 1-SN	508.00	4.00	0.787
99107 Gomphonema tackei v. abbreviatum Camburn	508.00	16.00	3.150
99119 Gomphonema 13-SN	508.00	2.00	0.394
99126 Melosira 1-SN	508.00	10.00	1.969
99145 Navicula 9-SN	508.00	2.00	0.394
99148 Navicula 13-SN	508.00	6.00	1.181
99150 Navicula 16-SN	508.00	14.00	2.756

TAXON NAME	Total No	This Tax	%REL ABUND
99172 Navicula 43-SN	508.00	1.00	0.197
99176 Navicula 47-SN	508.00	1.00	0.197
99194 Navicula 65-SN	508.00	3.00	0.591
99206 Navicula 77-SN	508.00	1.00	0.197
99211 Navicula 82-SN	508.00	2.00	0.394
99212 Navicula 83-SN	508.00	1.00	0.197
99213 Navicula 84-SN	508.00	2.00	0.394
99228 Nitzschia dissipata v. undulata Sovereign	508.00	2.00	0.394
99242 Nitzschia 7-SN	508.00	2.00	0.394
99244 Nitzschia 9-SN	508.00	5.00	0.984
99247 Nitzschia 12-SN	508.00	1.00	0.197
99274 Pinnularia subcapitata v. 1-SN	508.00	1.00	0.197
99281 Pinnularia 9-SN	508.00	2.00	0.394
99311 Pinnularia 41-SN	508.00	1.00	0.197

LAKE: DADE LAT DEG: 37 MIN: 22 SEC: 47 LONG DEG: 118 MIN: 45 SEC: 42
QUADRANGLE: MT.ABBOT AREA: 3.11 SHED AREA: 130 ELEV: 3511
VEG CLASS: 1 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 6.8 pH LAB: 6.48 CONDUCTIVITY: 4.9 uS@25:
HCO3: 24 Cl: 1.18 NO3: SO4: 5.84 MICR EQUIV/L:
Ca: 31.7 Mg: 2.45 Na : 5.28 K : 2.18
DATE SAMPLED: 8-7-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.8756 GMS PER CC:
SED DRY WT: 1.2642 GMS PER CC: INGN LOSS: 1.08

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	514.00	1.00	0.195
2003 Achnanthes austriaca Hust. v. helvetica	514.00	35.00	6.809
2015 Achnanthes lanceolata (Breb.) Grun. v. lanceolata	514.00	1.00	0.195
2028 Achnanthes marginulata Grun. v. marginulata	514.00	114.00	22.179
2030 Achnanthes minutissima Kutz. v. minutissima	514.00	16.00	3.113
2042 Achnanthes detha Hohn & Hellerm. v. detha	514.00	53.00	10.311
7003 Amphora ovalis v. pediculus (Kutz.) V. H. ex Det.	514.00	2.00	0.389
23007 Cymbella gaeumannii Meist. v. gaeumannii	514.00	1.00	0.195
23012 Cymbella minuta Hilse ex Rabh. v. minuta	514.00	41.00	7.977
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	514.00	9.00	1.751
34037 Fragilaria virescens v. exigua Grun.	514.00	1.00	0.195
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	514.00	1.00	0.195
45001 Meridion circulare (Grev.) Agardh v. circulare	514.00	1.00	0.195
46042 Navicula mutica Kutz. v. mutica	514.00	1.00	0.195
46133 Navicula 14-PIRLA	514.00	2.00	0.389
47025 Neidium 2-PIRLA	514.00	2.00	0.389
65011 Surirella delicatissima Lewis v. delicatissima	514.00	1.00	0.195
65014 Surirella linearis W. Sm. v. linearis	514.00	1.00	0.195
67006 Tabellaria flocculosa Roth (Kutz.) strain IV sensu	514.00	1.00	0.195
90990 Nitzschia 42-SN	514.00	2.00	0.389
99003 Achnanthes daui v. alaskaensis Foged	514.00	7.00	1.362
99007 Achnanthes 1-SN	514.00	139.00	27.043
99008 Achnanthes 2-SN	514.00	1.00	0.195
99010 Achnanthes 4-SN	514.00	13.00	2.529
99015 Achnanthes 10-SN	514.00	11.00	2.140
99016 Achnanthes 11-SN	514.00	2.00	0.389
99017 Achnanthes 13-SN	514.00	1.00	0.195
99107 Gomphonema tackei v. abbreviatum Camburn	514.00	17.00	3.307
99137 Navicula mediopunctata Hust.	514.00	2.00	0.389
99145 Navicula 9-SN	514.00	2.00	0.389
99148 Navicula 13-SN	514.00	3.00	0.584
99150 Navicula 16-SN	514.00	11.00	2.140
99151 Navicula 18-SN	514.00	4.00	0.778
99219 Neidium 2-SN	514.00	1.00	0.195
99220 Neidium 3-SN	514.00	1.00	0.195
99239 Nitzschia 3-SN	514.00	5.00	0.973
99247 Nitzschia 12-SN	514.00	1.00	0.195
99282 Pinnularia 10-SN	514.00	1.00	0.195
99335 Gomphonema ventricosum	514.00	6.00	1.167

LAKE: LE CONTE LAT DEG: 38 MIN: 52 SEC: 20 LONG DEG: 120 MIN: 8 SEC: 10
QUADRANGLE: FALLEN LEAF LK. AREA: SHED AREA: ELEV: 2500
VEG CLASS: ROCK TYPE: % COVER: A: B: C: D:
pH FIELD: 6.25 pH LAB: 6.55 CONDUCTIVITY: 3.1 uS@25:
HCO3: 31.1 Cl: 2.82 NO3: 0 SO4: 3.97 MICR EQUIV/L:
Ca: 11.2 Mg: 2.84 Na : 5.13 K : 2.18
DATE SAMPLED: 8-22-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.9048 GMS PER CC:
SED DRY WT: 0.0773 GMS PER CC: INGN LOSS: 27.7

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	496.00	6.00	1.210
2003 Achnanthes austriaca Hust. v. helvetica	496.00	8.00	1.613
2028 Achnanthes marginulata Grun. v. marginulata	496.00	31.00	6.250
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	496.00	10.00	2.016
23007 Cymbella gaeumannii Meist. v. gaeumannii	496.00	14.00	2.823
23009 Cymbella lunata W. Sm. v. lunata	496.00	13.00	2.621
23012 Cymbella minuta Hilse ex Rabh. v. minuta	496.00	1.00	0.202
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	496.00	2.00	0.403
23021 Cymbella 1-PIRLA	496.00	6.00	1.210
33018 Eunotia fallax Cl.-Eul. v. fallax	496.00	5.00	1.008
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	496.00	17.00	3.427
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	496.00	1.00	0.202
37003 Gomphonema angustatum (Kutz.) Rabh.	496.00	1.00	0.202
44027 Melosira 1-PIRLA	496.00	59.00	11.895
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	496.00	4.00	0.806
46008 Navicula bremensis Hust.	496.00	2.00	0.403
46038 Navicula mediocris Krasske v. mediocris	496.00	65.00	13.105
46095 Navicula heimansii van Dam & Kooyman v. heimansii	496.00	7.00	1.411
46115 Navicula confervacea (Kutz.) Grun. v. fervaceae	496.00	2.00	0.403
46121 Navicula cf. subtilissima v. 4-PIRLA	496.00	6.00	1.210
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	496.00	1.00	0.202
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	496.00	1.00	0.202
52027 Pinnularia divergentissima (Grun.) Cl. v.	496.00	2.00	0.403
52086 Pinnularia cf.braunii v.amphicephala f.subconica	496.00	21.00	4.234
62002 Stauroneis anceps Ehr. v. anceps	496.00	1.00	0.202
62022 Stauroneis anceps v. 2-PIRLA	496.00	2.00	0.403
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	496.00	1.00	0.202
65014 Surirella linearis W. Sm. v. linearis	496.00	4.00	0.806
65033 Surirella delicatissima f. tenuissima Mang.	496.00	2.00	0.403
90990 Nitzschia 42-SN	496.00	2.00	0.403
99035 Anomoeoneis serians v. 1-SN	496.00	1.00	0.202
99060 Cymbella 9-SN	496.00	20.00	4.032
99081 Eunotia 11-SN	496.00	1.00	0.202
99102 Frustulia rhomboides v. l-SN	496.00	22.00	4.435
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	496.00	1.00	0.202
99126 Melosira 1-SN	496.00	26.00	5.242
99129 Melosira 4-SN	496.00	13.00	2.621
99144 Navicula 7-SN	496.00	102.00	20.565
99148 Navicula 13-SN	496.00	1.00	0.202
99218 Neidium 1-SN	496.00	2.00	0.403
99231 Nitzschia frustulum 3-SN	496.00	1.00	0.202
99241 Nitzschia 6-SN	496.00	5.00	1.008

TAXON NAME	Total No	This Tax	%REL ABUND
99266 Nitzschia 35-SN	496.00	1.00	0.202
99277 Pinnularia 2-SN	496.00	2.00	0.403
99281 Pinnularia 9-SN	496.00	1.00	0.202

LAKE: SUMMIT LAT DEG: 37 MIN: 26 SEC: 0 LONG DEG: 118 MIN: 46 SEC: 11
QUADRANGLE: MT.ABBOT AREA: 1.81 SHED AREA: 82.9 ELEV: 3609
VEG CLASS: 1 ROCK TYPE: % COVER: A: 1 B: 1 C: 1 D: 4
pH FIELD: 7.1 pH LAB: 6.6 CONDUCTIVITY: 2.8 uS@25:
HCO3: 21.4 Cl: 1.14 NO3: 0 SO4: 3.88 MICR EQUIV/L:
Ca: 13.8 Mg: 2.18 Na : 5.43 K : 4.21
DATE SAMPLED: 8-11-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.46 GMS PER CC:
SED DRY WT: 0.8082 GMS PER CC: INGN LOSS: 1.84

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	507.00	18.00	3.550
2028 Achnanthes marginulata Grun. v. marginulata	507.00	172.00	33.925
2042 Achnanthes detha Hohn & Hellerm. v. detha	507.00	17.00	3.353
2051 Achnanthes 3-PIRLA	507.00	1.00	0.197
23007 Cymbella gaeumannii Meist. v. gaeumannii	507.00	2.00	0.394
23012 Cymbella minuta Hilse ex Rabh. v. minuta	507.00	5.00	0.986
23021 Cymbella 1-PIRLA	507.00	5.00	0.986
33011 Eunotia denticulata (Breb.) Rabh. v. denticulata	507.00	2.00	0.394
33051 Eunotia rhomboidea Hust. v. rhomboidea	507.00	1.00	0.197
33061 Eunotia trinacria Krasske v. trinacria	507.00	1.00	0.197
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	507.00	3.00	0.592
34037 Fragilaria virescens v. exigua Grun.	507.00	7.00	1.381
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	507.00	2.00	0.394
44002 Melosira distans (Ehr.) Kutz. v. distans	507.00	1.00	0.197
44027 Melosira 1-PIRLA	507.00	137.00	27.022
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	507.00	8.00	1.578
45001 Meridion circulare (Grev.) Agardh v. circulare	507.00	4.00	0.789
46121 Navicula cf. subtilissima v. 4-PIRLA	507.00	1.00	0.197
46133 Navicula 14-PIRLA	507.00	6.00	1.183
52074 Pinnularia biceps v. 1-PIRLA	507.00	1.00	0.197
52086 Pinnularia cf.braunii v.amphicephala f.subconica	507.00	2.00	0.394
62022 Stauroneis anceps v. 2-PIRLA	507.00	4.00	0.789
99007 Achnanthes 1-SN	507.00	50.00	9.862
99015 Achnanthes 10-SN	507.00	6.00	1.183
99107 Gomphonema tackei v. abbreviatum Camburn	507.00	2.00	0.394
99137 Navicula mediopunctata Hust.	507.00	38.00	7.495
99144 Navicula 7-SN	507.00	6.00	1.183
99239 Nitzschia 3-SN	507.00	1.00	0.197
99240 Nitzschia 5-SN	507.00	1.00	0.197
99277 Pinnularia 2-SN	507.00	1.00	0.197
99283 Pinnularia 11-SN	507.00	1.00	0.197
99333 Achnanthes lapponica Hust.	507.00	1.00	0.197

LAKE: MOSQUITO 1 LAT DEG: 36 MIN: 25 SEC: 28 LONG DEG: 118 MIN: 37 SEC: 8
QUADRANGLE: TRIPLE DIVIDE AREA: 2.07 SHED AREA: 127 ELEV: 2926
VEG CLASS: 4 ROCK TYPE: % COVER: A: 2 B: 1 C: 4 D: 1
pH FIELD: 7.13 pH LAB: 6.79 CONDUCTIVITY: 7.4 uS@25:
HCO3: 77.4 Cl: 1.89 NO3: 0.4 SO4: 7.33 MICR EQUIV/L:
Ca: 58.2 Mg: 8.63 Na : 16.8 K : 5.15
DATE SAMPLED: 7-21-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.6718 GMS PER CC:
SED DRY WT: 0.0368 GMS PER CC: INGN LOSS: 41.6

TAXON NAME	Total No	This Tax	%REL ABUND
2028 Achnanthes marginulata Grun. v. marginulata	520.00	10.00	1.923
2030 Achnanthes minutissima Kutz. v. minutissima	520.00	3.00	0.577
8001 Anomoeoneis exilis v. lanceolata A. Mayer	520.00	22.00	4.231
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	520.00	28.00	5.385
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	520.00	1.00	0.192
23007 Cymbella gaeumannii Meist. v. gaeumannii	520.00	6.00	1.154
23008 Cymbella hebridica Grun. ex Cl. v. hebridica	520.00	5.00	0.962
23009 Cymbella lunata W. Sm. v. lunata	520.00	76.00	14.615
23012 Cymbella minuta Hilse ex Rabh. v. minuta	520.00	9.00	1.731
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	520.00	1.00	0.192
23016 Cymbella naviculiformis Auersw. ex Heib. v.	520.00	1.00	0.192
23021 Cymbella 1-PIRLA	520.00	24.00	4.615
23889 Cymbella spp.	520.00	1.00	0.192
27001 Diatoma anceps (Ehr.) Kirchn. v. anceps	520.00	3.00	0.577
27002 Diatoma hiemale v. mesodon (Ehr.) Grun.	520.00	1.00	0.192
33008 Eunotia curvata (Kutz.) Langerst. v. curvata	520.00	1.00	0.192
33015 Eunotia exigua (Breb. ex Kutz.) Rabh. v. exigua	520.00	2.00	0.385
33026 Eunotia incisa W. Sm.ex Greg. v. incisa	520.00	3.00	0.577
33033 Nitzschia 42-SN	520.00	3.00	0.577
33036 Eunotia naegelii Migula v. naegelii	520.00	1.00	0.192
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	520.00	7.00	1.346
33066 Eunotia vanheurckii v. intermedia (Krasske) ex Hust.	520.00	1.00	0.192
34017 Fragilaria crotonensis Kitton v. crotonensis	520.00	3.00	0.577
34025 Fragilaria pinnata Ehr. v. pinnata	520.00	2.00	0.385
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	520.00	2.00	0.385
34037 Fragilaria virescens v. exigua Grun.	520.00	34.00	6.538
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	520.00	17.00	3.269
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	520.00	6.00	1.154
37003 Gomphonema angustatum (Kutz.) Rabh.	520.00	9.00	1.731
44027 Melosira 1-PIRLA	520.00	9.00	1.731
46038 Navicula mediocris Krasske v. mediocris	520.00	5.00	0.962
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	520.00	1.00	0.192
46095 Navicula heimansii van Dam & Kooyman v. heimansii	520.00	1.00	0.192
46113 Navicula cf. subtilissima v. 2-PIRLA	520.00	19.00	3.654
47001 Neidium affine (Ehr.) Pfitz. v. affine	520.00	1.00	0.192
47014 Neidium iridis (Ehr.) Cl. v. iridis	520.00	1.00	0.192
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	520.00	5.00	0.962
52011 Pinnularia biceps Greg. v. biceps	520.00	1.00	0.192
52025 Pinnularia divergens W. Sm. v. divergens	520.00	2.00	0.385
62015 Stauroneis phoenicenteron (Nitz.) Ehr. v.	520.00	2.00	0.385
62022 Stauroneis anceps v. 2-PIRLA	520.00	1.00	0.192
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	520.00	4.00	0.769

TAXON NAME	Total No	This Tax	%REL ABUND
65011 Surirella delicatissima Lewis v. delicatissima	520.00	3.00	0.577
67002 Tabellaria fenestrata (Lyngb.) Kutz. v. fenestrata	520.00	1.00	0.192
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	520.00	12.00	2.308
67006 Tabellaria flocculosa Roth (Kutz.) strain IV sensu	520.00	3.00	0.577
99007 Achnanthes 1-SN	520.00	4.00	0.769
99008 Achnanthes 2-SN	520.00	1.00	0.192
99009 Achnanthes 3-SN	520.00	5.00	0.962
99011 Achnanthes 6-SN	520.00	1.00	0.192
99050 Cymbella rainierensis Sov.	520.00	1.00	0.192
99052 Cymbella 1-SN	520.00	4.00	0.769
99074 Eunotia 1-SN	520.00	2.00	0.385
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	520.00	3.00	0.577
99124 Krasskella kriegeriana (Krasske) Ross & Sims	520.00	5.00	0.962
99126 Melosira 1-SN	520.00	65.00	12.500
99133 Navicula cari Ehr.	520.00	11.00	2.115
99144 Navicula 7-SN	520.00	2.00	0.385
99154 Navicula 24-SN	520.00	2.00	0.385
99231 Nitzschia frustulum 3-SN	520.00	24.00	4.615
99240 Nitzschia 5-SN	520.00	5.00	0.962
99281 Pinnularia 9-SN	520.00	30.00	5.769
99283 Pinnularia 11-SN	520.00	1.00	0.192
99333 Achnanthes lapponica Hust.	520.00	1.00	0.192

LAKE: GEM LAT DEG: 37 MIN: 26 SEC: 30 LONG DEG: 118 MIN: 34 SEC: 11
QUADRANGLE: MT ABBOT AREA: 2.77 SHED AREA: 1230 ELEV: 3595
VEG CLASS: ROCK TYPE: 3 % COVER: A: B: C: D:
pH FIELD: 7.33 pH LAB: 6.82 CONDUCTIVITY: 7.4 uS@25:
HCO3: 77.4 Cl: 1.89 NO3: 0.4 SO4: 7.33 MICR EQUIV/L:
Ca: 58.2 Mg: 8.63 Na : 16.8 K : 4.14
DATE SAMPLED: 7-21-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.6628 GMS PER CC:
SED DRY WT: 1.0757 GMS PER CC: INGN LOSS: 3

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	512.00	4.00	0.781
2004 Achnanthes clevei Grun. v. clevei	512.00	2.00	0.391
2028 Achnanthes marginulata Grun. v. marginulata	512.00	2.00	0.391
2030 Achnanthes minutissima Kutz. v. minutissima	512.00	18.00	3.516
2042 Achnanthes detha Hohn & Hellerm. v. detha	512.00	8.00	1.563
7002 Amphora ovalis v. affinis (Kutz.) V. H. ex Det.	512.00	1.00	0.195
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	512.00	26.00	5.078
23012 Cymbella minuta Hilse ex Rabh. v. minuta	512.00	1.00	0.195
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	512.00	17.00	3.320
30001 Diploneis elliptica (Kutz.) Cl. v. elliptica	512.00	2.00	0.391
30003 Diploneis marginestriata Hust. v. marginestriata	512.00	9.00	1.758
34016 Fragilaria construens v. venter (Ehr.) Grun.	512.00	5.00	0.977
34025 Fragilaria pinnata Ehr. v. pinnata	512.00	16.00	3.125
34889 Fragilaria spp.	512.00	2.00	0.391
37003 Gomphonema angustatum (Kutz.) Rabh.	512.00	1.00	0.195
46095 Navicula heimansii van Dam & Kooyman v. heimansii	512.00	1.00	0.195
65014 Surirella linearis W. Sm. v. linearis	512.00	1.00	0.195
99003 Achnanthes daui v. alaskaensis Foged	512.00	42.00	8.203
99004 Achnanthes lanceolata f. capitata O. Mull.	512.00	4.00	0.781
99006 Achnanthes suchlandi Hust.	512.00	16.00	3.125
99007 Achnanthes 1-SN	512.00	23.00	4.492
99015 Achnanthes 10-SN	512.00	6.00	1.172
99026 Achnanthes 32-SN	512.00	1.00	0.195
99062 Cymbella 11-SN	512.00	1.00	0.195
99090 Fragilaria 7-SN	512.00	3.00	0.586
99094 Fragilaria 11-SN	512.00	58.00	11.328
99107 Gomphonema tackei v. abbreviatum Camburn	512.00	33.00	6.445
99119 Gomphonema 13-SN	512.00	15.00	2.930
99123 Hannea arcus (Ehr.) Pat.	512.00	1.00	0.195
99137 Navicula mediopunctata Hust.	512.00	8.00	1.563
99138 Navicula pseudolanceolata Lange-Bertalot	512.00	3.00	0.586
99146 Navicula 10-SN	512.00	1.00	0.195
99153 Navicula 22-SN	512.00	1.00	0.195
99154 Navicula 24-SN	512.00	2.00	0.391
99161 Navicula 30-SN	512.00	34.00	6.641
99162 Navicula 31-SN	512.00	14.00	2.734
99166 Navicula 37-SN	512.00	2.00	0.391
99179 Navicula 50-SN	512.00	57.00	11.133
99181 Navicula 52-SN	512.00	3.00	0.586
99185 Navicula 56-SN	512.00	7.00	1.367
99200 Navicula 71-SN	512.00	2.00	0.391
99201 Navicula 72-SN	512.00	44.00	8.594

TAXON NAME	Total No	This Tax	%REL ABUND
99231 Nitzschia frustulum 3-SN	512.00	1.00	0.195
99233 Nitzschia frustulum 5-SN	512.00	2.00	0.391
99252 Nitzschia 17-SN	512.00	3.00	0.586
99261 Nitzschia 30-SN	512.00	4.00	0.781
99268 Nitzschia 37-SN	512.00	3.00	0.586
99310 Pinnularia 40-SN	512.00	2.00	0.391

LAKE: GRANITE LAT DEG: 36 MIN: 51 SEC: 47 LONG DEG: 118 MIN: 37 SEC: 12
QUADRANGLE: TUOL.MEADOWS AREA: 20.7 SHED AREA: 262 ELEV: 3097
VEG CLASS: 3 ROCK TYPE: % COVER: A: 1 B: 1 C: 1 D: 4
pH FIELD: 6.91 pH LAB: 6.91 CONDUCTIVITY: 6.9 uS@25:
HCO3: 66.9 Cl: 1.29 NO3: 0 SO4: 4.65 MICR EQUIV/L:
Ca: 49.6 Mg: 6.68 Na : 15.6 K : 4.09
DATE SAMPLED: 7-5-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.3143 GMS PER CC:
SED DRY WT: 0.0321 GMS PER CC: INGN LOSS: 22.9

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	511.00	2.00	0.391
2023 Achnanthes levanderi v. helvetica Hust.	511.00	1.00	0.196
2028 Achnanthes marginulata Grun. v. marginulata	511.00	2.00	0.391
2042 Achnanthes detha Hohn & Hellerm. v. detha	511.00	22.00	4.305
9001 Asterionella formosa Hust. v. formosa	511.00	1.00	0.196
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	511.00	85.00	16.634
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	511.00	1.00	0.196
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	511.00	3.00	0.587
23009 Cymbella lunata W. Sm. v. lunata	511.00	2.00	0.391
23012 Cymbella minuta Hilse ex Rabh. v. minuta	511.00	10.00	1.957
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	511.00	24.00	4.697
23031 Cymbella muelleri Hust. v. muelleri	511.00	1.00	0.196
34003 Fragilaria brevistriata Grun. v. brevistriata	511.00	20.00	3.914
34016 Fragilaria construens v. venter (Ehr.) Grun.	511.00	14.00	2.740
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	511.00	2.00	0.391
34025 Fragilaria pinnata Ehr. v. pinnata	511.00	24.00	4.697
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	511.00	1.00	0.196
34037 Fragilaria virescens v. exigua Grun.	511.00	1.00	0.196
34038 Fragilaria pinnata v. acuminata A. Mayer	511.00	71.00	13.894
44001 Melosira ambigua (Grun.) O. Mull. v. ambigua	511.00	5.00	0.978
44010 Melosira italica (Ehr.) Kutz. v. italica	511.00	6.00	1.174
44011 Melosira italica ssp. subarctica O. Mull.	511.00	4.00	0.783
44027 Melosira 1-PIRLA	511.00	4.00	0.783
46032 Navicula laevissima Kutz. v. laevissima	511.00	5.00	0.978
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	511.00	1.00	0.196
46133 Navicula 14-PIRLA	511.00	36.00	7.045
47001 Neidium affine (Ehr.) Pfitz. v. affine	511.00	1.00	0.196
47008 Neidium bisulcatum v. baicalense (Skv. & Meyer)	511.00	3.00	0.587
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	511.00	1.00	0.196
52025 Pinnularia divergens W. Sm. v. divergens	511.00	1.00	0.196
52078 Pinnularia abaujensis v. 2-PIRLA	511.00	1.00	0.196
62003 Stauroneis anceps f. gracilis Rabh.	511.00	1.00	0.196
65011 Surirella delicatissima Lewis v. delicatissima	511.00	1.00	0.196
99003 Achnanthes daui v. alaskaensis Foged	511.00	1.00	0.196
99007 Achnanthes 1-SN	511.00	65.00	12.720
99009 Achnanthes 3-SN	511.00	11.00	2.153
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	511.00	8.00	1.566
99126 Melosira 1-SN	511.00	6.00	1.174
99133 Navicula cari Ehr.	511.00	1.00	0.196
99137 Navicula mediopunctata Hust.	511.00	9.00	1.761
99138 Navicula pseudolanceolata Lange-Bertalot	511.00	5.00	0.978
99142 Navicula 1-SN	511.00	11.00	2.153

TAXON NAME	Total No	This Tax	%REL ABUND
99146 Navicula 10-SN	511.00	1.00	0.196
99147 Navicula 11-SN	511.00	1.00	0.196
99155 Navicula 25-SN	511.00	2.00	0.391
99163 Navicula 32-SN	511.00	7.00	1.370
99228 Nitzschia dissipata v. undulata Sovereign	511.00	1.00	0.196
99230 Nitzschia frustulum 2-SN	511.00	2.00	0.391
99231 Nitzschia frustulum 3-SN	511.00	1.00	0.196
99239 Nitzschia 3-SN	511.00	1.00	0.196
99240 Nitzschia 5-SN	511.00	1.00	0.196
99242 Nitzschia 7-SN	511.00	3.00	0.587
99249 Nitzschia 14-SN	511.00	1.00	0.196
99250 Nitzschia 15-SN	511.00	1.00	0.196
99277 Pinnularia 2-SN	511.00	2.00	0.391
99281 Pinnularia 9-SN	511.00	8.00	1.566
99283 Pinnularia 11-SN	511.00	1.00	0.196
99330 Synedra 2-SN	511.00	3.00	0.587
99335 Gomphonema ventricosum	511.00	1.00	0.196

LAKE: HEATHER/TAH. LAT DEG: 38 MIN: 52 SEC: 40 LONG DEG: 120 MIN: 8 SEC: 10
QUADRANGLE: FALLEN LEAF AREA: SHED AREA: ELEV:
VEG CLASS: ROCK TYPE: % COVER: A: B: C: D:
pH FIELD: 6.95 pH LAB: 6.93 CONDUCTIVITY: 8.1 uS@25:
HCO3: 67.1 Cl: 2.08 NO3: 0 SO4: 12.1 MICR EQUIV/L:
Ca: 50.2 Mg: 5.82 Na : 12.1 K : 5.9
DATE SAMPLED: 8-22-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.9953 GMS PER CC:
SED DRY WT: 0.0576 GMS PER CC: INGN LOSS: 31.8

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	513.00	2.00	0.390
2003 Achnanthes austriaca Hust. v. helvetica	513.00	2.00	0.390
2026 Achnanthes linearis v. pusilla Grun.	513.00	41.00	7.992
2028 Achnanthes marginulata Grun. v. marginulata	513.00	10.00	1.949
2029 Achnanthes microcephala (Kutz.) Grun. v. microcephala	513.00	47.00	9.162
2030 Achnanthes minutissima Kutz. v. minutissima	513.00	13.00	2.534
2042 Achnanthes detha Hohn & Hellerm. v. detha	513.00	5.00	0.975
8001 Anomoeoneis exilis v. lanceolata A. Mayer	513.00	50.00	9.747
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	513.00	9.00	1.754
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	513.00	76.00	14.815
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	513.00	1.00	0.195
23007 Cymbella gaeumannii Meist. v. gaeumannii	513.00	4.00	0.780
23009 Cymbella lunata W. Sm. v. lunata	513.00	14.00	2.729
23010 Cymbella microcephala Grun. v. microcephala	513.00	7.00	1.365
23012 Cymbella minuta Hilse ex Rabh. v. minuta	513.00	2.00	0.390
23021 Cymbella 1-PIRLA	513.00	1.00	0.195
33008 Eunotia curvata (Kutz.) Langerst. v. curvata	513.00	3.00	0.585
33010 Eunotia curvata v. subarcuata (Naeg.) Woodhead & Tweed	513.00	2.00	0.390
33015 Eunotia exigua (Breb. ex Kutz.) Rabh. v. exigua	513.00	2.00	0.390
33019 Eunotia flexuosa Breb. ex Kutz. v. flexuosa	513.00	18.00	3.509
33036 Eunotia naegelii Migula v. naegelii	513.00	9.00	1.754
33065 Eunotia vanheurckii Pat. v. vanheurckii	513.00	15.00	2.924
34017 Fragilaria crotonensis Kitton v. crotonensis	513.00	6.00	1.170
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	513.00	1.00	0.195
34037 Fragilaria virescens v. exigua Grun.	513.00	2.00	0.390
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	513.00	6.00	1.170
35003 Frustulia rhomboides v. capitata (A. Mayer) Patr.	513.00	3.00	0.585
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	513.00	6.00	1.170
37003 Gomphonema angustatum (Kutz.) Rabh.	513.00	5.00	0.975
37014 Gomphonema truncatum v. capitatum (Ehr.) Patr.	513.00	1.00	0.195
37889 Gomphonema spp.	513.00	2.00	0.390
44011 Melosira italica ssp. subarctica O. Mull.	513.00	2.00	0.390
44013 Melosira italica v. valida (Grun.) Hust.	513.00	1.00	0.195
44027 Melosira 1-PIRLA	513.00	7.00	1.365
46095 Navicula heimansii van Dam & Kooyman v. heimansii	513.00	2.00	0.390
46113 Navicula cf. subtilissima v. 2-PIRLA	513.00	2.00	0.390
46123 Navicula 23-PIRLA	513.00	4.00	0.780
46133 Navicula 14-PIRLA	513.00	2.00	0.390
46889 Navicula spp.	513.00	4.00	0.780
47001 Neidium affine (Ehr.) Pfitz. v. affine	513.00	1.00	0.195
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	513.00	2.00	0.390
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	513.00	1.00	0.195

TAXON NAME	Total No	This Tax	%REL ABUND
52001 Pinnularia abaujensis (Pant.) Ross v. abaujensis	513.00	1.00	0.195
52025 Pinnularia divergens W. Sm. v. divergens	513.00	2.00	0.390
52038 Pinnularia maior (Kutz.) Rabh. v. maior	513.00	1.00	0.195
52074 Pinnularia biceps v. 1-PIRLA	513.00	3.00	0.585
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	513.00	5.00	0.975
65011 Surirella delicatissima Lewis v. delicatissima	513.00	3.00	0.585
66016 Synedra rumpens Kutz. v. rumpens	513.00	5.00	0.975
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	513.00	4.00	0.780
67006 Tabellaria flocculosa Roth (Kutz.) strain IV sensu	513.00	2.00	0.390
99007 Achnanthes 1-SN	513.00	1.00	0.195
99009 Achnanthes 3-SN	513.00	19.00	3.704
99013 Achnanthes 8-SN	513.00	2.00	0.390
99025 Achnanthes 31-SN	513.00	1.00	0.195
99035 Anomoeoneis serians v. 1-SN	513.00	1.00	0.195
99094 Fragilaria 11-SN	513.00	3.00	0.585
99102 Frustulia rhomboides v. l-SN	513.00	2.00	0.390
99119 Gomphonema 13-SN	513.00	3.00	0.585
99120 Gomphonema 14-SN	513.00	2.00	0.390
99123 Hannea arcus (Ehr.) Pat.	513.00	1.00	0.195
99124 Krasskella kriegeriana (Krasske) Ross & Sims	513.00	4.00	0.780
99133 Navicula cari Ehr.	513.00	2.00	0.390
99142 Navicula 1-SN	513.00	1.00	0.195
99143 Navicula 6-SN	513.00	2.00	0.390
99175 Navicula 46-SN	513.00	1.00	0.195
99194 Navicula 65-SN	513.00	1.00	0.195
99211 Navicula 82-SN	513.00	2.00	0.390
99214 Navicula 85-SN	513.00	2.00	0.390
99228 Nitzschia dissipata v. undulata Sovereign	513.00	1.00	0.195
99229 Nitzschia frustulum 1-SN	513.00	4.00	0.780
99237 Nitzschia 1-SN	513.00	2.00	0.390
99240 Nitzschia 5-SN	513.00	2.00	0.390
99241 Nitzschia 6-SN	513.00	1.00	0.195
99242 Nitzschia 7-SN	513.00	3.00	0.585
99269 Nitzschia 38-SN	513.00	3.00	0.585
99270 Nitzschia 39-SN	513.00	1.00	0.195
99277 Pinnularia 2-SN	513.00	1.00	0.195
99281 Pinnularia 9-SN	513.00	11.00	2.144
99303 Pinnularia 32-SN	513.00	1.00	0.195
99330 Synedra 2-SN	513.00	7.00	1.365
99350 Cymbella 13-SN	513.00	7.00	1.365

LAKE: RUBY LAT DEG: 37 MIN: 24 SEC: 50 LONG DEG: 118 MIN: 46 SEC: 15
QUADRANGLE: MT.ABBOT AREA: 14.5 SHED AREA: 202 ELEV: 3365
VEG CLASS: 3 ROCK TYPE: % COVER: A: 1 B: 1 C: 1 D: 4
pH FIELD: 7.05 pH LAB: 6.95 CONDUCTIVITY: 5.5 uS@25:
HCO3: 47.3 Cl: 1.65 NO3: 2.88 SO4: 7.04 MICR EQUIV/L:
Ca: 43.2 Mg: 3.72 Na : 9.01 K : 3.45
DATE SAMPLED: 8-11-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.2904 GMS PER CC:
SED DRY WT: 0.0835 GMS PER CC: INGN LOSS: 14.3

TAXON NAME	Total No	This Tax	%REL ABUND
2006 Achnanthes didyma Hust. v. didyma	511.00	2.00	0.391
2026 Achnanthes linearis v. pusilla Grun.	511.00	2.00	0.391
2028 Achnanthes marginulata Grun. v. marginulata	511.00	29.00	5.675
2029 Achnanthes microcephala (Kutz.) Grun. v. microcephala	511.00	1.00	0.196
2030 Achnanthes minutissima Kutz. v. minutissima	511.00	8.00	1.566
2042 Achnanthes detha Hohn & Hellerm. v. detha	511.00	40.00	7.828
2048 Achnanthes laterostrata Hust. v. laterostrata	511.00	1.00	0.196
9001 Asterionella formosa Hust. v. formosa	511.00	34.00	6.654
9002 Asterionella ralfsii v. americana Korn.	511.00	1.00	0.196
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	511.00	140.00	27.397
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	511.00	46.00	9.002
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	511.00	2.00	0.391
23009 Cymbella lunata W. Sm. v. lunata	511.00	1.00	0.196
23012 Cymbella minuta Hilse ex Rabh. v. minuta	511.00	11.00	2.153
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	511.00	2.00	0.391
34037 Fragilaria virescens v. exigua Grun.	511.00	3.00	0.587
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	511.00	1.00	0.196
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	511.00	2.00	0.391
44011 Melosira italica ssp. subarctica O. Mull.	511.00	2.00	0.391
44013 Melosira italica v. valida (Grun.) Hust.	511.00	6.00	1.174
44014 Melosira lirata (Ehr.) Kutz. v. lirata	511.00	8.00	1.566
44027 Melosira 1-PIRLA	511.00	14.00	2.740
44030 Melosira distans v. nivalis (W. Sm.) Kirchn.	511.00	4.00	0.783
45001 Meridion circulare (Grev.) Agardh v. circulare	511.00	1.00	0.196
46002 Navicula angusta Grun. v. angusta	511.00	1.00	0.196
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	511.00	2.00	0.391
46102 Navicula mutica v. cohnii (Hilse) Grun.	511.00	1.00	0.196
46133 Navicula 14-PIRLA	511.00	4.00	0.783
52027 Pinnularia divergentissima (Grun.) Cl. v.	511.00	1.00	0.196
52078 Pinnularia abaujensis v. 2-PIRLA	511.00	1.00	0.196
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	511.00	1.00	0.196
99001 Achnanthes bicapitata Hust.	511.00	1.00	0.196
99003 Achnanthes daui v. alaskaensis Foged	511.00	19.00	3.718
99007 Achnanthes 1-SN	511.00	43.00	8.415
99009 Achnanthes 3-SN	511.00	1.00	0.196
99012 Achnanthes 7-SN	511.00	1.00	0.196
99015 Achnanthes 10-SN	511.00	1.00	0.196
99016 Achnanthes 11-SN	511.00	1.00	0.196
99090 Fragilaria 7-SN	511.00	9.00	1.761
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	511.00	5.00	0.978
99107 Gomphonema tackei v. abbreviatum Camburn	511.00	7.00	1.370
99137 Navicula mediopunctata Hust.	511.00	23.00	4.501

TAXON NAME	Total No	This Tax	%REL ABUND
99142 Navicula 1-SN	511.00	4.00	0.783
99146 Navicula 10-SN	511.00	1.00	0.196
99148 Navicula 13-SN	511.00	3.00	0.587
99150 Navicula 16-SN	511.00	2.00	0.391
99151 Navicula 18-SN	511.00	1.00	0.196
99152 Navicula 21-SN	511.00	1.00	0.196
99172 Navicula 43-SN	511.00	1.00	0.196
99228 Nitzschia dissipata v. undulata Sovereign	511.00	1.00	0.196
99239 Nitzschia 3-SN	511.00	2.00	0.391
99283 Pinnularia 11-SN	511.00	3.00	0.587
99284 Pinnularia 12-SN	511.00	1.00	0.196
99330 Synedra 2-SN	511.00	8.00	1.566

LAKE: UPPER ANGORA LAT DEG: 38 MIN: 51 SEC: 46 LONG DEG: 120 MIN: 3 SEC: 59
QUADRANGLE: FALLEN LEAF AREA: 5.44 SHED AREA: 65.3 ELEV: 2292
VEG CLASS: 4 ROCK TYPE: % COVER: A: 1 B: 1 C: 4 D: 1
pH FIELD: 7 pH LAB: 6.98 CONDUCTIVITY: 9.9 uS@25:
HCO3: 88.5 Cl: 4.95 NO3: 0 SO4: 1.7 MICR EQUIV/L:
Ca: 42.2 Mg: 12.3 Na : 34.3 K : 7.53
DATE SAMPLED: 8-22-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.1692 GMS PER CC:
SED DRY WT: 0.0603 GMS PER CC: INGN LOSS: 16.1

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	507.00	4.00	0.789
2026 Achnanthes linearis v. pusilla Grun.	507.00	1.00	0.197
2028 Achnanthes marginulata Grun. v. marginulata	507.00	2.00	0.394
2030 Achnanthes minutissima Kutz. v. minutissima	507.00	16.00	3.156
2042 Achnanthes detha Hohn & Hellerm. v. detha	507.00	1.00	0.197
8001 Anomoeoneis exilis v. lanceolata A. Mayer	507.00	29.00	5.720
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	507.00	29.00	5.720
16001 Cocconeis diminuta Pant. v. diminuta	507.00	1.00	0.197
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	507.00	42.00	8.284
23007 Cymbella gaeumannii Meist. v. gaeumannii	507.00	8.00	1.578
23008 Cymbella hebridica Grun. ex Cl. v. hebridica	507.00	1.00	0.197
23009 Cymbella lunata W. Sm. v. lunata	507.00	40.00	7.890
23016 Cymbella naviculiformis Auersw. ex Heib. v.	507.00	2.00	0.394
33008 Eunotia curvata (Kutz.) Langerst. v. curvata	507.00	8.00	1.578
33010 Eunotia curvata v. subarcuata (Naeg.) Woodhead & Tweed	507.00	7.00	1.381
33011 Eunotia denticulata (Breb.) Rabh. v. denticulata	507.00	1.00	0.197
33015 Eunotia exigua (Breb. ex Kutz.) Rabh. v. exigua	507.00	2.00	0.394
33018 Eunotia fallax Cl.-Eul. v. fallax	507.00	1.00	0.197
33019 Eunotia flexuosa Breb. ex Kutz. v. flexuosa	507.00	1.00	0.197
33021 Eunotia formica Ehr. v. formica	507.00	1.00	0.197
33026 Eunotia incisa W. Sm.ex Greg. v. incisa	507.00	1.00	0.197
33036 Eunotia naegelii Migula v. naegelii	507.00	3.00	0.592
33039 Eunotia pectinalis (O. F. Mull.?) Rabh. v. pectinalis	507.00	2.00	0.394
33065 Eunotia vanheurckii Pat. v. vanheurckii	507.00	4.00	0.789
33066 Eunotia vanheurckii v. intermedia (Krasske) ex Hust.	507.00	2.00	0.394
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	507.00	5.00	0.986
34037 Fragilaria virescens v. exigua Grun.	507.00	3.00	0.592
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	507.00	11.00	2.170
35002 Frustulia rhomboides v. amphipleuroides (Grun.) Pet.	507.00	1.00	0.197
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	507.00	3.00	0.592
37003 Gomphonema angustatum (Kutz.) Rabh.	507.00	12.00	2.367
37889 Gomphonema spp.	507.00	2.00	0.394
44008 Melosira islandica O. Mull. v. islandica	507.00	6.00	1.183
44011 Melosira italica ssp. subarctica O. Mull.	507.00	3.00	0.592
44027 Melosira 1-PIRLA	507.00	18.00	3.550
46008 Navicula bremensis Hust.	507.00	1.00	0.197
46032 Navicula laevissima Kutz. v. laevissima	507.00	3.00	0.592
46038 Navicula mediocris Krasske v. mediocris	507.00	10.00	1.972
46051 Navicula pupula Kutz. v. pupula	507.00	2.00	0.394
46056 Navicula radiosa Kutz. v. radiosa	507.00	3.00	0.592
46057 Navicula radiosa v. parva Wallace	507.00	10.00	1.972
46121 Navicula cf. subtilissima v. 4-PIRLA	507.00	1.00	0.197

TAXON NAME	Total No	This Tax	%REL ABUND
47001 Neidium affine (Ehr.) Pfitz. v. affine	507.00	12.00	2.367
47002 Neidium affine v. amphirhynchus (Ehr.) Cl.ACP	507.00	1.00	0.197
47007 Neidium bisulcatum (Lagerst.) Cl. v. bisulcatum	507.00	1.00	0.197
47014 Neidium iridis (Ehr.) Cl. v. iridis	507.00	4.00	0.789
47025 Neidium 2-PIRLA	507.00	3.00	0.592
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	507.00	2.00	0.394
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	507.00	6.00	1.183
52038 Pinnularia maior (Kutz.) Rabh. v. maior	507.00	3.00	0.592
52080 Pinnularia cf. pseudomicrostauron Gandhi v.	507.00	5.00	0.986
62015 Stauroneis phoenicenteron (Nitz.) Ehr. v.	507.00	4.00	0.789
62022 Stauroneis anceps v. 2-PIRLA	507.00	7.00	1.381
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	507.00	5.00	0.986
63003 Stenopterobia anceps (Lewis) Breb. ex V. H. v. anceps	507.00	1.00	0.197
65011 Surirella delicatissima Lewis v. delicatissima	507.00	3.00	0.592
65014 Surirella linearis W. Sm. v. linearis	507.00	1.00	0.197
66016 Synedra rumpens Kutz. v. rumpens	507.00	3.00	0.592
66029 Synedra 1-PIRLA	507.00	3.00	0.592
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	507.00	4.00	0.789
90990 Nitzschia 42-SN	507.00	4.00	0.789
99007 Achnanthes 1-SN	507.00	1.00	0.197
99009 Achnanthes 3-SN	507.00	1.00	0.197
99013 Achnanthes 8-SN	507.00	2.00	0.394
99084 Eunotia 14-SN	507.00	1.00	0.197
99098 Fragilaria 16-SN	507.00	11.00	2.170
99102 Frustulia rhomboides v. l-SN	507.00	3.00	0.592
99103 Gomphonema affine v. insigne (Greg.) Andrews	507.00	2.00	0.394
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	507.00	19.00	3.748
99107 Gomphonema tackei v. abbreviatum Camburn	507.00	1.00	0.197
99124 Krasskella kriegeriana (Krasske) Ross & Sims	507.00	4.00	0.789
99126 Melosira 1-SN	507.00	12.00	2.367
99128 Melosira 3-SN	507.00	2.00	0.394
99130 Melosira 5-SN	507.00	1.00	0.197
99143 Navicula 6-SN	507.00	1.00	0.197
99144 Navicula 7-SN	507.00	2.00	0.394
99226 Nitzschia acuta Hantzsch	507.00	1.00	0.197
99228 Nitzschia dissipata v. undulata Sovereign	507.00	2.00	0.394
99231 Nitzschia frustulum 3-SN	507.00	1.00	0.197
99236 Nitzschia frustulum 8-SN	507.00	8.00	1.578
99240 Nitzschia 5-SN	507.00	9.00	1.775
99268 Nitzschia 37-SN	507.00	3.00	0.592
99281 Pinnularia 9-SN	507.00	38.00	7.495
99299 Pinnularia 28-SN	507.00	3.00	0.592
99330 Synedra 2-SN	507.00	1.00	0.197
99334 Achnanthes recurvata Hust.	507.00	1.00	0.197
99348 Gomphonema truncatum Ehr. v. truncatum	507.00	2.00	0.394

LAKE: DOROTHY LAT DEG: 37 MIN: 32 SEC: 10 LONG DEG: 118 MIN: 52 SEC: 55
QUADRANGLE: MT MORRISON AREA: 61.6 SHED AREA: 396 ELEV: 3121
VEG CLASS: 3 ROCK TYPE: % COVER: A: 1 B: 3 C: 3 D: 1
pH FIELD: 7.46 pH LAB: 7.2 CONDUCTIVITY: 22.9 uS@25:
HCO3: 138.5 Cl: 2.66 NO3: 0.72 SO4: 83.2 MICR EQUIV/L:
Ca: 189.6 Mg: 21.3 Na : 18 K : 7.64
DATE SAMPLED: 8-20-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.3673 GMS PER CC:
SED DRY WT: 0.2802 GMS PER CC: INGN LOSS: 6.24

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	519.00	1.00	0.193
2006 Achnanthes didyma Hust. v. didyma	519.00	4.00	0.771
2023 Achnanthes levanderi v. helvetica Hust.	519.00	5.00	0.963
2024 Achnanthes linearis (W. Sm.) Grun. v. linearis	519.00	22.00	4.239
2028 Achnanthes marginulata Grun. v. marginulata	519.00	17.00	3.276
2029 Achnanthes microcephala (Kutz.) Grun. v. microcephala	519.00	1.00	0.193
2048 Achnanthes laterostrata Hust. v. laterostrata	519.00	6.00	1.156
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	519.00	1.00	0.193
8001 Anomoeoneis exilis v. lanceolata A. Mayer	519.00	1.00	0.193
20009 Cyclotella ocellata Pant. v. ocellata	519.00	14.00	2.697
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	519.00	296.00	57.033
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	519.00	1.00	0.193
23010 Cymbella microcephala Grun. v. microcephala	519.00	1.00	0.193
23012 Cymbella minuta Hilse ex Rabh. v. minuta	519.00	1.00	0.193
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	519.00	2.00	0.385
34016 Fragilaria construens v. venter (Ehr.) Grun.	519.00	4.00	0.771
34025 Fragilaria pinnata Ehr. v. pinnata	519.00	21.00	4.046
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	519.00	4.00	0.771
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	519.00	1.00	0.193
44013 Melosira italica v. valida (Grun.) Hust.	519.00	2.00	0.385
44027 Melosira 1-PIRLA	519.00	2.00	0.385
47002 Neidium affine v. amphirhynchus (Ehr.) Cl.ACP	519.00	2.00	0.385
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	519.00	2.00	0.385
65014 Surirella linearis W. Sm. v. linearis	519.00	2.00	0.385
66014 Synedra parasitica (W. Sm.) Hust. v. parasitica	519.00	1.00	0.193
99003 Achnanthes daui v. alaskaensis Foged	519.00	7.00	1.349
99006 Achnanthes suchlandi Hust.	519.00	23.00	4.432
99007 Achnanthes 1-SN	519.00	11.00	2.119
99013 Achnanthes 8-SN	519.00	1.00	0.193
99015 Achnanthes 10-SN	519.00	2.00	0.385
99021 Achnanthes 21-SN	519.00	3.00	0.578
99026 Achnanthes 32-SN	519.00	10.00	1.927
99027 Achnanthes 34-SN	519.00	2.00	0.770
99035 Anomoeoneis serians v. 1-SN	519.00	3.00	0.578
99042 Cyclotella 1-SN	519.00	1.00	0.193
99051 Cymbella sinuata Greg.	519.00	2.00	0.385
99061 Cymbella 10-SN	519.00	3.00	0.578
99088 Fragilaria 2-SN	519.00	16.00	3.083
99094 Fragilaria 11-SN	519.00	7.00	1.349
99095 Fragilaria 13-SN	519.00	1.00	0.193
99127 Melosira 2-SN	519.00	1.00	0.193
99137 Navicula mediopunctata Hust.	519.00	1.00	0.193

TAXON NAME	Total No	This Tax	%REL ABUND
99138 Navicula pseudolanceolata Lange-Bertalot	519.00	3.00	0.578
99172 Navicula 43-SN	519.00	1.00	0.193
99186 Navicula 57-SN	519.00	2.00	0.385
99229 Nitzschia frustulum 1-SN	519.00	1.00	0.193
99231 Nitzschia frustulum 3-SN	519.00	2.00	0.385

LAKE: EASTERN BROOK LAT DEG: MIN: SEC: LONG DEG: MIN: SEC:
QUADRANGLE: MT TOM AREA: SHED AREA: ELEV:
VEG CLASS: ROCK TYPE: % COVER: A: B: C: D:
pH FIELD: 7.35 pH LAB: 7.22 CONDUCTIVITY: 12 uS@25:
HCO3: 132.2 Cl: 4.7 NO3: 0 SO4: 6.21 MICR EQUIV/L:
Ca: 98.9 Mg: 14.7 Na : 28.5 K : 9.97
DATE SAMPLED: 7-3-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.2456 GMS PER CC:
SED DRY WT: 0.0715 GMS PER CC: INGN LOSS: 23.1

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	522.00	2.00	0.383
2006 Achnanthes didyma Hust. v. didyma	522.00	1.00	0.192
2024 Achnanthes linearis (W. Sm.) Grun. v. linearis	522.00	5.00	0.958
2026 Achnanthes linearis v. pusilla Grun.	522.00	5.00	0.958
2028 Achnanthes marginulata Grun. v. marginulata	522.00	13.00	2.490
2030 Achnanthes minutissima Kutz. v. minutissima	522.00	25.00	4.789
2042 Achnanthes detha Hohn & Hellerm. v. detha	522.00	1.00	0.192
8001 Anomoeoneis exilis v. lanceolata A. Mayer	522.00	12.00	2.299
8005 Anomoeoneis serians v. brachysira (Breb.) ex Kutz.)	522.00	3.00	0.575
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	522.00	1.00	0.192
16001 Cocconeis diminuta Pant. v. diminuta	522.00	1.00	0.192
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	522.00	34.00	6.513
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	522.00	27.00	5.172
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	522.00	1.00	0.192
23007 Cymbella gaeumannii Meist. v. gaeumannii	522.00	2.00	0.383
23009 Cymbella lunata W. Sm. v. lunata	522.00	14.00	2.682
23010 Cymbella microcephala Grun. v. microcephala	522.00	14.00	2.682
33026 Eunotia incisa W. Sm.ex Greg. v. incisa	522.00	1.00	0.192
34016 Fragilaria construens v. venter (Ehr.) Grun.	522.00	12.00	2.299
34017 Fragilaria crotonensis Kitton v. crotonensis	522.00	1.00	0.192
34025 Fragilaria pinnata Ehr. v. pinnata	522.00	3.00	0.575
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	522.00	7.00	1.341
34037 Fragilaria virescens v. exigua Grun.	522.00	57.00	10.920
35001 Frustulia rhomboides (Ehr.) DeT. v. rhomboides	522.00	1.00	0.192
35005 Frustulia rhomboides v. saxonica (Rabh.) DeT.	522.00	3.00	0.575
44027 Melosira 1-PIRLA	522.00	46.00	8.812
46032 Navicula laevissima Kutz. v. laevissima	522.00	2.00	0.383
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	522.00	2.00	0.383
46051 Navicula pupula Kutz. v. pupula	522.00	4.00	0.766
46056 Navicula radiosa Kutz. v. radiosa	522.00	2.00	0.383
46095 Navicula heimansii van Dam & Kooyman v. heimansii	522.00	1.00	0.192
46889 Navicula spp.	522.00	1.00	0.192
48035 Nitzschia 1-PIRLA	522.00	20.00	3.831
52889 Pinnularia spp.	522.00	2.00	0.383
62002 Stauroneis anceps Ehr. v. anceps	522.00	1.00	0.192
63002 Stenopterobia intermedia (Lewis) V. H. v. intermedia	522.00	4.00	0.766
66016 Synedra rumpens Kutz. v. rumpens	522.00	1.00	0.192
90990 Nitzschia 42-SN	522.00	9.00	1.724
99088 Fragilaria 2-SN	522.00	63.00	12.069
99096 Fragilaria 14-SN	522.00	12.00	2.299
99124 Krasskella kriegeriana (Krasske) Ross & Sims	522.00	3.00	0.575
99126 Melosira 1-SN	522.00	17.00	3.257

TAXON NAME	Total No	This Tax	%REL ABUND
99133 Navicula cari Ehr.	522.00	3.00	0.575
99231 Nitzschia frustulum 3-SN	522.00	3.00	0.575
99241 Nitzschia 6-SN	522.00	2.00	0.383
99250 Nitzschia 15-SN	522.00	13.00	2.490
99260 Nitzschia 28-SN	522.00	1.00	0.192
99267 Nitzschia 36-SN	522.00	3.00	0.575
99270 Nitzschia 39-SN	522.00	1.00	0.192
99281 Pinnularia 9-SN	522.00	5.00	0.958
99283 Pinnularia 11-SN	522.00	3.00	0.575
99294 Pinnularia 23-SN	522.00	1.00	0.192
99330 Synedra 2-SN	522.00	2.00	0.383
99347 Synedra pulchella Kutz.	522.00	1.00	0.192
99350 Cymbella 13-SN	522.00	12.00	2.299
99351 Nitzschia 41-SN	522.00	32.00	6.130
99353 Pinnularia 43-SN	522.00	1.00	0.192
99355 Eunotia sp. (girdle view)	522.00	1.00	0.192
99356 Nitzschia 42-SN	522.00	2.00	0.383

LAKE: UPPER GAYLOR LAT DEG: 37 MIN: 55 SEC: 20 LONG DEG: 119 MIN: 16 SEC: 1
QUADRANGLE: TUOL. MEADOOW. AREA: 4.66 SHED AREA: 41.2 ELEV: 3121
VEG CLASS: 2 ROCK TYPE: % COVER: A: 1 B: 4 C: 1 D: 1
pH FIELD: 7.37 pH LAB: 7.27 CONDUCTIVITY: 11.9 uS@25:
HCO3: 102.4 Cl: 1.17 NO3: 0 SO4: 20.2 MICR EQUIV/L:
Ca: 111 Mg: 5.59 Na : 8.77 K : 1.59
DATE SAMPLED: 8-16-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.14 GMS PER CC:
SED DRY WT: 0.0886 GMS PER CC: INGN LOSS: 19.4

TAXON NAME	Total No	This Tax	%REL ABUND
2006 Achnanthes didyma Hust. v. didyma	511.00	1.00	0.196
2028 Achnanthes marginulata Grun. v. marginulata	511.00	3.00	0.587
2030 Achnanthes minutissima Kutz. v. minutissima	511.00	3.00	0.587
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	511.00	38.00	7.436
23009 Cymbella lunata W. Sm. v. lunata	511.00	3.00	0.587
23012 Cymbella minuta Hilse ex Rabh. v. minuta	511.00	6.00	1.174
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	511.00	3.00	0.587
23016 Cymbella naviculiformis Auersw. ex Heib. v.	511.00	2.00	0.391
33066 Eunotia vanheurckii v. intermedia (Krasske) ex Hust.	511.00	1.00	0.196
34016 Fragilaria construens v. venter (Ehr.) Grun.	511.00	57.00	11.155
34025 Fragilaria pinnata Ehr. v. pinnata	511.00	23.00	4.501
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	511.00	1.00	0.196
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	511.00	1.00	0.196
44010 Melosira italica (Ehr.) Kutz. v. italica	511.00	4.00	0.783
44027 Melosira 1-PIRLA	511.00	1.00	0.196
46014 Navicula cryptocephala Kutz. v. cryptocephala	511.00	5.00	0.978
46032 Navicula laevissima Kutz. v. laevissima	511.00	3.00	0.587
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	511.00	2.00	0.391
46057 Navicula radiosa v. parva Wallace	511.00	1.00	0.196
46133 Navicula 14-PIRLA	511.00	1.00	0.196
46889 Navicula spp.	511.00	1.00	0.196
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	511.00	1.00	0.196
48889 Nitzschia spp.	511.00	1.00	0.196
62003 Stauroneis anceps f. gracilis Rabh.	511.00	2.00	0.391
62024 Stauroneis anceps v. 1-PIRLA	511.00	1.00	0.196
90990 Nitzschia 42-SN	511.00	1.00	0.196
99003 Achnanthes daui v. alaskaensis Foged	511.00	1.00	0.196
99006 Achnanthes suchlandi Hust.	511.00	1.00	0.196
99009 Achnanthes 3-SN	511.00	18.00	3.523
99015 Achnanthes 10-SN	511.00	1.00	0.196
99088 Fragilaria 2-SN	511.00	5.00	0.978
99090 Fragilaria 7-SN	511.00	76.00	14.873
99094 Fragilaria 11-SN	511.00	31.00	6.067
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	511.00	2.00	0.391
99109 Gomphonema 3-SN	511.00	1.00	0.196
99137 Navicula mediopunctata Hust.	511.00	2.00	0.391
99142 Navicula 1-SN	511.00	117.00	22.896
99146 Navicula 10-SN	511.00	1.00	0.196
99187 Navicula 58-SN	511.00	73.00	14.286
99189 Navicula 60-SN	511.00	1.00	0.196
99227 Nitzschia admissoides Hust.	511.00	1.00	0.196
99229 Nitzschia frustulum 1-SN	511.00	1.00	0.196

TAXON NAME	Total No	This Tax	%REL ABUND
99230 Nitzschia frustulum 2-SN	511.00	1.00	0.196
99241 Nitzschia 6-SN	511.00	1.00	0.196
99281 Pinnularia 9-SN	511.00	6.00	1.174
99330 Synedra 2-SN	511.00	5.00	0.978

LAKE: LUNDY LAT DEG: 38 MIN: 1 SEC: 44 LONG DEG: 119 MIN: 16 SEC: 13
QUADRANGLE: BODIE AREA: 42.7 SHED AREA: 4507 ELEV: 2390
VEG CLASS: 5 ROCK TYPE: % COVER: A: 2 B: 3 C: 3 D: 1
pH FIELD: 7.6 pH LAB: 7.41 CONDUCTIVITY: 49.9 uS@25:
HCO3: 260.5 Cl: 3.67 NO3: 0 SO4: 175 MICR EQUIV/L:
Ca: 381.2 Mg: 27.5 Na : 44.2 K : 14.6
DATE SAMPLED: 8-5-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.2958 GMS PER CC:
SED DRY WT: 0.0688 GMS PER CC: IGN LOSS: 17.3

TAXON NAME	Total No	This Tax	%REL ABUND
2015 Achnanthes lanceolata (Breb.) Grun. v. lanceolata	506.00	2.00	0.395
2024 Achnanthes linearis (W. Sm.) Grun. v. linearis	506.00	2.00	0.395
2028 Achnanthes marginulata Grun. v. marginulata	506.00	4.00	0.791
2030 Achnanthes minutissima Kutz. v. minutissima	506.00	49.00	9.684
2048 Achnanthes laterostrata Hust. v. laterostrata	506.00	2.00	0.395
2889 Achnanthes spp.	506.00	1.00	0.198
7001 Amphora ovalis (Kutz.) Kutz. v. ovalis	506.00	1.00	0.198
8001 Anomoeoneis exilis v. lanceolata A. Mayer	506.00	1.00	0.198
9001 Asterionella formosa Hust. v. formosa	506.00	87.00	17.194
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	506.00	2.00	0.395
16001 Cocconeis diminuta Pant. v. diminuta	506.00	1.00	0.198
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	506.00	4.00	0.791
23005 Cymbella cistula (Ehr.) Kirchner v. cistula	506.00	5.00	0.988
23009 Cymbella lunata W. Sm. v. lunata	506.00	4.00	0.791
23010 Cymbella microcephala Grun. v. microcephala	506.00	7.00	1.383
23012 Cymbella minuta Hilse ex Rabh. v. minuta	506.00	3.00	0.593
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	506.00	3.00	0.593
23031 Cymbella muelleri Hust. v. muelleri	506.00	1.00	0.198
30001 Diploneis elliptica (Kutz.) Cl. v. elliptica	506.00	3.00	0.593
34006 Fragilaria capucina Desm. v. capucina	506.00	2.00	0.395
34016 Fragilaria construens v. venter (Ehr.) Grun.	506.00	18.00	3.557
34017 Fragilaria crotonensis Kitton v. crotonensis	506.00	33.00	6.522
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	506.00	2.00	0.395
34025 Fragilaria pinnata Ehr. v. pinnata	506.00	87.00	17.194
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	506.00	6.00	1.186
34032 Fragilaria virescens Rolfs v. virescens	506.00	1.00	0.198
34037 Fragilaria virescens v. exigua Grun.	506.00	1.00	0.198
44010 Melosira italica (Ehr.) Kutz. v. italica	506.00	1.00	0.198
44027 Melosira 1-PIRLA	506.00	3.00	0.593
46014 Navicula cryptocephala Kutz. v. cryptocephala	506.00	1.00	0.198
46021 Navicula globulifera Hust. v. globulifera	506.00	1.00	0.198
46032 Navicula laevissima Kutz. v. laevissima	506.00	1.00	0.198
46057 Navicula radiosa v. parva Wallace	506.00	2.00	0.395
46889 Navicula spp.	506.00	1.00	0.198
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	506.00	2.00	0.395
52889 Pinnularia spp.	506.00	2.00	0.395
66016 Synedra rumpens Kutz. v. rumpens	506.00	1.00	0.198
66029 Synedra 1-PIRLA	506.00	12.00	2.372
99003 Achnanthes daui v. alaskaensis Foged	506.00	1.00	0.198
99006 Achnanthes suchlandi Hust.	506.00	1.00	0.198
99009 Achnanthes 3-SN	506.00	1.00	0.198
99029 Achnanthes 37-SN	506.00	1.00	0.198

TAXON NAME	Total No	This Tax	%REL ABUND
99031 Achnanthes 39-SN	506.00	1.00	0.198
99038 Cocconeis placentula Ehr. v. placentula	506.00	1.00	0.198
99067 Epithemia adnata (Kutz.) Breb.	506.00	1.00	0.198
99088 Fragilaria 2-SN	506.00	12.00	2.372
99090 Fragilaria 7-SN	506.00	35.00	6.917
99094 Fragilaria 11-SN	506.00	20.00	3.953
99095 Fragilaria 13-SN	506.00	1.00	0.198
99096 Fragilaria 14-SN	506.00	4.00	0.791
99115 Gomphonema 9-SN	506.00	1.00	0.198
99121 Gyrosigma spencerii (Quekett) Griffith & Henfries	506.00	1.00	0.198
99128 Melosira 3-SN	506.00	1.00	0.198
99133 Navicula cari Ehr.	506.00	5.00	0.988
99142 Navicula 1-SN	506.00	3.00	0.593
99147 Navicula 11-SN	506.00	1.00	0.198
99188 Navicula 59-SN	506.00	2.00	0.395
99190 Navicula 61-SN	506.00	9.00	1.779
99214 Navicula 85-SN	506.00	5.00	0.988
99229 Nitzschia frustulum 1-SN	506.00	3.00	0.593
99231 Nitzschia frustulum 3-SN	506.00	8.00	1.581
99235 Nitzschia frustulum 7-SN	506.00	6.00	1.186
99239 Nitzschia 3-SN	506.00	3.00	0.593
99241 Nitzschia 6-SN	506.00	5.00	0.988
99327 Synedra capitata Ehr.	506.00	1.00	0.198
99330 Synedra 2-SN	506.00	14.00	2.767

LAKE: CONSTANCE LAT DEG: 37 MIN: 30 SEC: 55 LONG DEG: 118 MIN: 52 SEC: 2
QUADRANGLE: MT. MORRISON AREA: 14 SHED AREA: 207 ELEV: 3292
VEG CLASS: 1 ROCK TYPE: % COVER: A: 1 B: 4 C: 1 D: 1
pH FIELD: 7.95 pH LAB: 7.42 CONDUCTIVITY: uS@25:
HCO3: 271.5 Cl: 1.94 NO3: 2.1 SO4: 97.8 MICR EQUIV/L:
Ca: 345 Mg: 12.4 Na : 8.27 K : 7.58
DATE SAMPLED: 8-20-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.1284 GMS PER CC:
SED DRY WT: 0.1789 GMS PER CC: INGN LOSS: 8.24

TAXON NAME	Total No	This Tax	%REL ABUND
2002 Achnanthes austriaca Hust. v. austriaca	521.00	2.00	0.384
2006 Achnanthes didyma Hust. v. didyma	521.00	1.00	0.192
2026 Achnanthes linearis v. pusilla Grun.	521.00	5.00	0.960
2030 Achnanthes minutissima Kutz. v. minutissima	521.00	5.00	0.960
2042 Achnanthes detha Hohn & Hellerm. v. detha	521.00	2.00	0.384
2048 Achnanthes laterostrata Hust. v. laterostrata	521.00	2.00	0.384
2889 Achnanthes spp.	521.00	5.00	0.960
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	521.00	4.00	0.768
9001 Asterionella formosa Hust. v. formosa	521.00	45.00	8.637
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	521.00	1.00	0.192
20009 Cyclotella ocellata Pant. v. ocellata	521.00	4.00	0.768
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	521.00	51.00	9.789
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	521.00	16.00	3.071
23009 Cymbella lunata W. Sm. v. lunata	521.00	1.00	0.192
23010 Cymbella microcephala Grun. v. microcephala	521.00	3.00	0.576
23012 Cymbella minuta Hilse ex Rabh. v. minuta	521.00	4.00	0.768
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	521.00	3.00	0.576
30003 Diploneis marginestriata Hust. v. marginestriata	521.00	1.00	0.192
34016 Fragilaria construens v. venter (Ehr.) Grun.	521.00	9.00	1.727
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	521.00	15.00	2.879
34025 Fragilaria pinnata Ehr. v. pinnata	521.00	24.00	4.607
46032 Navicula laevissima Kutz. v. laevissima	521.00	6.00	1.152
46889 Navicula spp.	521.00	1.00	0.192
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	521.00	1.00	0.192
66014 Synedra parasitica (W. Sm.) Hust. v. parasitica	521.00	1.00	0.192
66015 Synedra radians (Kutz.) v radians	521.00	22.00	4.223
66016 Synedra rumpens Kutz. v. rumpens	521.00	1.00	0.192
90990 Nitzschia 42-SN	521.00	4.00	0.768
99001 Achnanthes bicapitata Hust.	521.00	1.00	0.192
99002 Achnanthes calcar Cl.	521.00	1.00	0.192
99006 Achnanthes suchlandi Hust.	521.00	13.00	2.495
99009 Achnanthes 3-SN	521.00	7.00	1.344
99013 Achnanthes 8-SN	521.00	1.00	0.192
99039 Cocconeis placentula v. euglypta (Ehr.) Cl.	521.00	2.00	0.384
99040 Cocconeis 2-SN	521.00	1.00	0.192
99088 Fragilaria 2-SN	521.00	51.00	9.789
99090 Fragilaria 7-SN	521.00	13.00	2.495
99094 Fragilaria 11-SN	521.00	46.00	8.829
99096 Fragilaria 14-SN	521.00	1.00	0.192
99119 Gomphonema 13-SN	521.00	1.00	0.192
99132 Navicula capitata v. hungarica (Grun.) Ross	521.00	4.00	0.768
99137 Navicula mediopunctata Hust.	521.00	3.00	0.576

TAXON NAME	Total No	This Tax	%REL ABUND
99138 Navicula pseudolanceolata Lange-Bertalot	521.00	1.00	0.192
99146 Navicula 10-SN	521.00	1.00	0.192
99157 Navicula 27-SN	521.00	2.00	0.384
99166 Navicula 37-SN	521.00	3.00	0.576
99168 Navicula 39-SN	521.00	4.00	0.768
99175 Navicula 46-SN	521.00	5.00	0.960
99183 Navicula 54-SN	521.00	2.00	0.384
99194 Navicula 65-SN	521.00	5.00	0.960
99198 Navicula 69-SN	521.00	1.00	0.192
99201 Navicula 72-SN	521.00	2.00	0.384
99209 Navicula 80-SN	521.00	1.00	0.192
99210 Navicula 81-SN	521.00	2.00	0.384
99231 Nitzschia frustulum 3-SN	521.00	3.00	0.576
99233 Nitzschia frustulum 5-SN	521.00	1.00	0.192
99240 Nitzschia 5-SN	521.00	1.00	0.192
99271 Opephora martyi Heribaud	521.00	2.00	0.384
99330 Synedra 2-SN	521.00	94.00	18.042
99331 Synedra 4-SN	521.00	5.00	0.960
99343 Nitzschia 42-SN	521.00	1.00	0.192
99350 Cymbella 13-SN	521.00	1.00	0.192

LAKE: UPPER FROG LAT DEG: 38 MIN: 2 SEC: 38 LONG DEG: 119 MIN: 17 SEC: 20
QUADRANGLE: MATTERHRN. PK. AREA: 0.78 SHED AREA: 57.2 ELEV: 3231
VEG CLASS: 2 ROCK TYPE: % COVER: A: 1 B: 4 C: 1 D: 1
pH FIELD: 7.85 pH LAB: 7.43 CONDUCTIVITY: 55.5 uS@25:
HCO3: 257.6 Cl: 2.86 NO3: 3.29 SO4: 247.4 MICR EQUIV/L:
Ca: 432 Mg: 21.2 Na : 35.8 K : 7.18
DATE SAMPLED: 3-8-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.4103 GMS PER CC:
SED DRY WT: 0.1238 GMS PER CC: INGN LOSS: 13.6

TAXON NAME	Total No	This Tax	%REL ABUND
2015 Achnanthes lanceolata (Breb.) Grun. v. lanceolata	532.00	2.00	0.376
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	532.00	3.00	0.564
23012 Cymbella minuta Hilse ex Rabh. v. minuta	532.00	5.00	0.940
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	532.00	7.00	1.316
30003 Diploneis marginestriata Hust. v. marginestriata	532.00	1.00	0.188
34013 Fragilaria construens v. binodis (Ehr.) Grun.	532.00	3.00	0.564
34014 Fragilaria construens v. pumila Grun.	532.00	3.00	0.564
34016 Fragilaria construens v. venter (Ehr.) Grun.	532.00	406.00	76.316
34025 Fragilaria pinnata Ehr. v. pinnata	532.00	31.00	5.827
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	532.00	1.00	0.188
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	532.00	1.00	0.188
34037 Fragilaria virescens v. exigua Grun.	532.00	1.00	0.188
34038 Fragilaria pinnata v. acuminata A. Mayer	532.00	17.00	3.195
99012 Achnanthes 7-SN	532.00	1.00	0.188
99087 Fragilaria 6-PIRLA	532.00	30.00	5.639
99088 Fragilaria 2-SN	532.00	2.00	0.376
99089 Fragilaria 4-SN	532.00	4.00	0.752
99092 Fragilaria 9-SN	532.00	3.00	0.564
99094 Fragilaria 11-SN	532.00	3.00	0.564
99233 Nitzschia frustulum 5-SN	532.00	7.00	1.316

LAKE: WIT-SO-NAH-PAH LAT DEG: MIN: SEC: LONG DEG: MIN: SEC:
QUADRANGLE: MT.MORRISON AREA: SHED AREA: ELEV:
VEG CLASS: ROCK TYPE: % COVER: A: B: C: D:
pH FIELD: 8.15 pH LAB: 7.57 CONDUCTIVITY: 37.4 uS@25:
HCO3: 228.7 Cl: 2.15 NO3: 3.11 SO4: 132.9 MICR EQUIV/L:
Ca: 385 Mg: 11.4 Na : 10.1 K : 6.94
DATE SAMPLED: 8-20-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.5037 GMS PER CC:
SED DRY WT: 0.7457 GMS PER CC: INGN LOSS: 5.11

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	516.00	2.00	0.388
2016 Achnanthes lanceolata v. dubia Grun.	516.00	5.00	0.969
2028 Achnanthes marginulata Grun. v. marginulata	516.00	3.00	0.581
2030 Achnanthes minutissima Kutz. v. minutissima	516.00	54.00	10.465
2042 Achnanthes detha Hohn & Hellerm. v. detha	516.00	1.00	0.194
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	516.00	1.00	0.194
9001 Asterionella formosa Hust. v. formosa	516.00	1.00	0.194
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	516.00	2.00	0.388
20005 Cyclotella kuetzingiana Thwaites v. kuetzingiana	516.00	8.00	1.550
20009 Cyclotella ocellata Pant. v. ocellata	516.00	1.00	0.194
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	516.00	67.00	12.984
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	516.00	2.00	0.388
23004 Cymbella cesatii (Rabh.) Grun. ex A. S. v. cesatii	516.00	1.00	0.194
23012 Cymbella minuta Hilse ex Rabh. v. minuta	516.00	53.00	10.271
23013 Cymbella minuta f. latens (Krasske) Reim.	516.00	2.00	0.388
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	516.00	97.00	18.798
27002 Diatoma hiemale v. mesodon (Ehr.) Grun.	516.00	1.00	0.194
33040 Eunotia pectinalis v. minor (Kutz.) Rabh.	516.00	1.00	0.194
34016 Fragilaria construens v. venter (Ehr.) Grun.	516.00	1.00	0.194
34022 Fragilaria leptostauron (Ehr.) Hust.	516.00	20.00	3.876
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	516.00	54.00	10.465
34025 Fragilaria pinnata Ehr. v. pinnata	516.00	11.00	2.132
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	516.00	4.00	0.775
37004 Gomphonema angustatum v. citera (Hohn & Hum) Kutz.	516.00	6.00	1.163
46014 Navicula cryptocephala Kutz. v. cryptocephala	516.00	2.00	0.580
46050 Navicula pseudoscutiformis Hust. v. pseudoscutiformis	516.00	1.00	0.194
62002 Stauroneis anceps Ehr. v. anceps	516.00	1.00	0.194
66016 Synedra rumpens Kutz. v. rumpens	516.00	2.00	0.388
66024 Synedra ulna (Nitz.) Ehr. v. ulna	516.00	1.00	0.194
90990 Nitzschia 42-SN	516.00	2.00	0.388
99025 Achnanthes 31-SN	516.00	1.00	0.194
99094 Fragilaria 11-SN	516.00	3.00	0.581
99096 Fragilaria 14-SN	516.00	1.00	0.194
99117 Gomphonema 11-SN	516.00	1.00	0.194
99123 Hannea arcus (Ehr.) Pat.	516.00	5.00	0.969
99151 Navicula 18-SN	516.00	1.00	0.194
99153 Navicula 22-SN	516.00	3.00	0.581
99184 Navicula 55-SN	516.00	2.00	0.388
99202 Navicula 73-SN	516.00	2.00	0.388
99231 Nitzschia frustulum 3-SN	516.00	6.00	1.163
99236 Nitzschia frustulum 8-SN	516.00	1.00	0.194
99241 Nitzschia 6-SN	516.00	2.00	0.388

TAXON NAME	Total No	This Tax	%REL ABUND
99266 Nitzschia 35-SN	516.00	40.00	7.752
99267 Nitzschia 36-SN	516.00	33.00	6.395
99276 Pinnularia 1-SN	516.00	1.00	0.194
99330 Synedra 2-SN	516.00	3.00	0.581
99342 Cymbella cymbiformis Agardh	516.00	1.00	0.194
99347 Synedra pulchella Kutz.	516.00	2.00	0.388

LAKE: EASTERN TWIN LAT DEG: 38 MIN: 9 SEC: 40 LONG DEG: 119 MIN: 20 SEC: 0
QUADRANGLE: MATTERHORN PK AREA: 161 SHED AREA: 6786 ELEV: 2158
VEG CLASS: 5 ROCK TYPE: % COVER: A: 2 B: 2 C: 1 D: 4
pH FIELD: 8.14 pH LAB: 7.66 CONDUCTIVITY: 49.5 uS@25:
HCO3: 383.6 Cl: 5.72 NO3: 0 SO4: 78.1 MICR EQUIV/L:
Ca: 356 Mg: 60 Na : 71.3 K : 13.9
DATE SAMPLED: 8-3-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.96 GMS PER CC:
SED DRY WT: 0.1192 GMS PER CC: INGN LOSS: 12.4

TAXON NAME	Total No	This Tax	%REL ABUND
2003 Achnanthes austriaca Hust. v. helvetica	501.00	2.00	0.399
2015 Achnanthes lanceolata (Breb.) Grun. v. lanceolata	501.00	6.00	1.198
2026 Achnanthes linearis v. pusilla Grun.	501.00	1.00	0.200
2028 Achnanthes marginulata Grun. v. marginulata	501.00	1.00	0.200
2047 Achnanthes peragalli v. fossilis Temp. & Perag.	501.00	1.00	0.200
2048 Achnanthes laterostrata Hust. v. laterostrata	501.00	1.00	0.200
9001 Asterionella formosa Hust. v. formosa	501.00	23.00	4.591
23005 Cymbella cistula (Ehr.) Kirchner v. cistula	501.00	1.00	0.200
23010 Cymbella microcephala Grun. v. microcephala	501.00	4.00	0.798
23012 Cymbella minuta Hilse ex Rabh. v. minuta	501.00	2.00	0.399
34003 Fragilaria brevistriata Grun. v. brevistriata	501.00	32.00	6.387
34012 Fragilaria construens (Ehr. Grun. v. construens	501.00	1.00	0.200
34013 Fragilaria construens v. binodis (Ehr.) Grun.	501.00	32.00	6.387
34016 Fragilaria construens v. venter (Ehr.) Grun.	501.00	7.00	1.397
34017 Fragilaria crotonensis Kitton v. crotonensis	501.00	168.00	33.533
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	501.00	8.00	1.597
34025 Fragilaria pinnata Ehr. v. pinnata	501.00	16.00	3.194
37012 Gomphonema subtile Ehr. v. subtile	501.00	2.00	0.399
44001 Melosira ambigua (Grun.) O. Mull. v. ambigua	501.00	9.00	1.796
44010 Melosira italica (Ehr.) Kutz. v. italica	501.00	26.00	5.190
44011 Melosira italica ssp. subarctica O. Mull.	501.00	80.00	15.968
44040 Melosira italica ssp. subarctica f. tenuissima (Grun.)	501.00	19.00	3.792
46133 Navicula 14-PIRLA	501.00	1.00	0.200
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	501.00	15.00	2.994
99019 Achnanthes 18-SN	501.00	1.00	0.200
99086 Fragilaria capucina v. mesolepta Rabh.	501.00	2.00	0.399
99087 Fragilaria 6-PIRLA	501.00	5.00	0.998
99105 Gomphonema puiggarianum v. aequatorialis (Cl.) Camburn	501.00	2.00	0.399
99157 Navicula 27-SN	501.00	1.00	0.200
99158 Navicula 28-SN	501.00	1.00	0.200
99229 Nitzschia frustulum 1-SN	501.00	1.00	0.200
99230 Nitzschia frustulum 2-SN	501.00	1.00	0.200
99246 Nitzschia 11-SN	501.00	2.00	0.399
99271 Opephora martyi Heribaud	501.00	6.00	1.198
99281 Pinnularia 9-SN	501.00	1.00	0.200
99316 Stephanodiscus parvus Stoermer & Hakansson	501.00	17.00	3.393
99317 Stephanodiscus 1-SN	501.00	21.00	4.192
99318 Stephanodiscus 2-SN	501.00	1.00	0.200

LAKE: WESTERN TWIN LAT DEG: 38 MIN: 8 SEC: 51 LONG DEG: 119 MIN: 21 SEC: 40
QUADRANGLE: MATTERHRN PK AREA: 120 SHED AREA: 5284 ELEV: 2162
VEG CLASS: 5 ROCK TYPE: % COVER: A: 2 B: 2 C: 1 D: 4
pH FIELD: 7.96 pH LAB: 7.8 CONDUCTIVITY: 40.2 uS@25:
HCO3: 324.4 Cl: 3.73 NO3: 0 SO4: 52.1 MICR EQUIV/L:
Ca: 322 Mg: 42.1 Na : 52.1 K : 9.45
DATE SAMPLED: 38-3-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.0922 GMS PER CC:
SED DRY WT: 0.1195 GMS PER CC: INGN LOSS: 13.5

TAXON NAME	Total No	This Tax	%REL ABUND
2012 Achnanthes haukiana Grun. v. haukiana	513.00	1.00	0.195
2015 Achnanthes lanceolata (Breb.) Grun. v. lanceolata	513.00	5.00	0.975
2030 Achnanthes minutissima Kutz. v. minutissima	513.00	7.00	1.365
9001 Asterionella formosa Hust. v. formosa	513.00	28.00	5.458
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	513.00	1.00	0.195
23005 Cymbella cistula (Ehr.) Kirchner v. cistula	513.00	1.00	0.195
23012 Cymbella minuta Hilse ex Rabh. v. minuta	513.00	6.00	1.170
23013 Cymbella minuta f. latens (Krasske) Reim.	513.00	3.00	0.585
27002 Diatoma hiemale v. mesodon (Ehr.) Grun.	513.00	2.00	0.390
30003 Diploneis marginestriata Hust. v. marginestriata	513.00	1.00	0.195
34003 Fragilaria brevistriata Grun. v. brevistriata	513.00	1.00	0.195
34006 Fragilaria capucina Desm. v. capucina	513.00	1.00	0.195
34012 Fragilaria construens (Ehr. Grun. v. construens	513.00	1.00	0.195
34016 Fragilaria construens v. venter (Ehr.) Grun.	513.00	1.00	0.195
34017 Fragilaria crotonensis Kitton v. crotonensis	513.00	50.00	9.747
34022 Fragilaria leptostauron (Ehr.) Hust.	513.00	1.00	0.195
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	513.00	10.00	1.949
34025 Fragilaria pinnata Ehr. v. pinnata	513.00	21.00	4.094
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	513.00	1.00	0.195
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	513.00	5.00	0.975
34032 Fragilaria virescens Rolfs v. virescens	513.00	10.00	1.949
34038 Fragilaria pinnata v. acuminata A. Mayer	513.00	24.00	4.678
37889 Gomphonema spp.	513.00	3.00	0.585
44001 Melosira ambigua (Grun.) O. Mull. v. ambigua	513.00	39.00	7.602
44010 Melosira italica (Ehr.) Kutz. v. italica	513.00	46.00	8.967
44011 Melosira italica ssp. subarctica O. Mull.	513.00	91.00	17.739
44040 Melosira italica ssp. subarctica f. tenuissima (Grun.)	513.00	9.00	1.754
45001 Meridion circulare (Grev.) Agardh v. circulare	513.00	1.00	0.195
46056 Navicula radiosa Kutz. v. radiosa	513.00	2.00	0.390
52013 Pinnularia borealis Ehr. v. borealis	513.00	1.00	0.195
58001 Rhopalodia gibba (Ehr.) O. Mull. v. gibba	513.00	1.00	0.195
66014 Synedra parasitica (W. Sm.) Hust. v. parasitica	513.00	2.00	0.390
66023 Synedra tenera W. Sm. v. tenera	513.00	2.00	0.390
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	513.00	22.00	4.288
99003 Achnanthes daui v. alaskaensis Foged	513.00	1.00	0.195
99006 Achnanthes suchlandi Hust.	513.00	3.00	0.585
99007 Achnanthes 1-SN	513.00	2.00	0.390
99010 Achnanthes 4-SN	513.00	1.00	0.195
99013 Achnanthes 8-SN	513.00	4.00	0.780
99051 Cymbella sinuata Greg.	513.00	2.00	0.390
99067 Epithemia adnata (Kutz.) Breb.	513.00	3.00	0.585
99069 Epithemia turgida (Ehr.) Kutz.	513.00	5.00	0.975

TAXON NAME	Total No	This Tax	%REL ABUND
99087 Fragilaria 6-PIRLA	513.00	4.00	0.780
99090 Fragilaria 7-SN	513.00	9.00	1.754
99091 Fragilaria 8-SN	513.00	2.00	0.390
99092 Fragilaria 9-SN	513.00	1.00	0.195
99094 Fragilaria 11-SN	513.00	1.00	0.195
99115 Gomphonema 9-SN	513.00	1.00	0.195
99123 Hannea arcus (Ehr.) Pat.	513.00	1.00	0.195
99126 Melosira 1-SN	513.00	5.00	0.975
99157 Navicula 27-SN	513.00	6.00	1.170
99162 Navicula 31-SN	513.00	2.00	0.390
99175 Navicula 46-SN	513.00	1.00	0.195
99198 Navicula 69-SN	513.00	1.00	0.195
99229 Nitzschia frustulum 1-SN	513.00	1.00	0.195
99234 Nitzschia frustulum 6-SN	513.00	2.00	0.390
99316 Stephanodiscus parvus Stoermer & Hakansson	513.00	8.00	1.559
99317 Stephanodiscus 1-SN	513.00	44.00	8.577
99321 Stephanodiscus 5-SN	513.00	1.00	0.195
99341 Nitzschia amphibiodes Hust.	513.00	2.00	0.390

LAKE: CONVICT LAT DEG: 37 MIN: 35 SEC: 30 LONG DEG: 118 MIN: 51 SEC: 25
QUADRANGLE: MT.MORRISON AREA: 74.6 SHED AREA: 4999 ELEV: 2310
VEG CLASS: 5 ROCK TYPE: % COVER: A: 3 B: 3 C: 3 D: 1
pH FIELD: 8.4 pH LAB: 8.35 CONDUCTIVITY: 119 uS@25:
HCO3: 1051 Cl: 1.86 NO3: 0 SO4: 231.8 MICR EQUIV/L:
Ca: 1234 Mg: 35.1 Na : 51.3 K : 15.6
DATE SAMPLED: 7-3-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 0.9156 GMS PER CC:
SED DRY WT: 0.222 GMS PER CC: INGN LOSS: 6.56

TAXON NAME	Total No	This Tax	%REL ABUND
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	514.00	4.00	0.778
9001 Asterionella formosa Hust. v. formosa	514.00	84.00	16.342
12001 Caloneis bacillum (Grun.) Cl. v. bacillum	514.00	3.00	0.584
20002 Cyclotella bodanica Eulenst. v. bodanica	514.00	37.00	7.198
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	514.00	1.00	0.195
23010 Cymbella microcephala Grun. v. microcephala	514.00	5.00	0.973
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	514.00	2.00	0.389
27002 Diatoma hiemale v. mesodon (Ehr.) Grun.	514.00	1.00	0.195
34016 Fragilaria construens v. venter (Ehr.) Grun.	514.00	2.00	0.389
34017 Fragilaria crotonensis Kitton v. crotonensis	514.00	230.00	44.747
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	514.00	1.00	0.195
34025 Fragilaria pinnata Ehr. v. pinnata	514.00	3.00	0.584
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	514.00	1.00	0.195
34038 Fragilaria pinnata v. acuminata A. Mayer	514.00	10.00	1.946
37010 Gomphonema parvulum (Kutz.) Kutz. v. parvulum	514.00	1.00	0.195
37889 Gomphonema spp.	514.00	2.00	0.389
44010 Melosira italica (Ehr.) Kutz. v. italica	514.00	3.00	0.584
44011 Melosira italica ssp. subarctica O. Mull.	514.00	1.00	0.195
52002 Pinnularia abaujensis v. linearis (Hust.) Patr.	514.00	1.00	0.195
66014 Synedra parasitica (W. Sm.) Hust. v. parasitica	514.00	2.00	0.389
66023 Synedra tenera W. Sm. v. tenera	514.00	2.00	0.389
67005 Tabellaria flocculosa Roth (Kutz.) strain III sensu	514.00	6.00	1.167
67009 Nitzschia 42-SN	514.00	1.00	0.195
99009 Achnanthes 3-SN	514.00	1.00	0.195
99021 Achnanthes 21-SN	514.00	9.00	1.751
99038 Cocconeis placentula Ehr. v. placentula	514.00	1.00	0.195
99067 Epithemia adnata (Kutz.) Breb.	514.00	1.00	0.195
99087 Fragilaria 6-PIRLA	514.00	3.00	0.584
99094 Fragilaria 11-SN	514.00	2.00	0.389
99111 Gomphonema 5-SN	514.00	2.00	0.389
99133 Navicula cari Ehr.	514.00	1.00	0.195
99161 Navicula 30-SN	514.00	2.00	0.389
99164 Navicula 35-SN	514.00	1.00	0.195
99165 Navicula 36-SN	514.00	1.00	0.195
99229 Nitzschia frustulum 1-SN	514.00	2.00	0.389
99230 Nitzschia frustulum 2-SN	514.00	2.00	0.389
99231 Nitzschia frustulum 3-SN	514.00	1.00	0.195
99239 Nitzschia 3-SN	514.00	1.00	0.195
99316 Stephanodiscus parvus Stoermer & Hakansson	514.00	34.00	6.615
99317 Stephanodiscus 1-SN	514.00	43.00	8.366
99318 Stephanodiscus 2-SN	514.00	2.00	0.389
99320 Stephanodiscus 4-SN	514.00	1.00	0.195
99336 Gyrosigma obtusatum (Sullivan & Wormley) Boyer	514.00	1.00	0.195

LAKE: BRIGHT DOT LAT DEG: 37 MIN: 32 SEC: 40 LONG DEG: 118 MIN: 51 SEC: 40
QUADRANGLE: MT.MORRISON AREA: 11.4 SHED AREA: 140 ELEV: 3194
VEG CLASS: 3 ROCK TYPE: % COVER: A: 3 B: 3 C: 1 D: 1
pH FIELD: 9.07 pH LAB: 9.03 CONDUCTIVITY: 67 uS@25:
HCO3: 627 Cl: 2.44 NO3: 0 SO4: 67.2 MICR EQUIV/L:
Ca: 699 Mg: 21.8 Na : 10.8 K : 5.95
DATE SAMPLED: 8-18-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.1164 GMS PER CC:
SED DRY WT: 0.051 GMS PER CC: INGN LOSS: 28.1

TAXON NAME	Total No	This Tax	%REL ABUND
2004 Achnanthes clevei Grun. v. clevei	514.00	1.00	0.195
2030 Achnanthes minutissima Kutz. v. minutissima	514.00	2.00	0.389
7001 Amphora ovalis (Kutz.) Kutz. v. ovalis	514.00	1.00	0.195
7004 Amphora perpusilla (Grun.) Grun. v. perpusilla	514.00	4.00	0.778
9001 Asterionella formosa Hust. v. formosa	514.00	6.00	1.167
16001 Cocconeis diminuta Pant. v. diminuta	514.00	1.00	0.195
20010 Cyclotella stelligera (Cl. & Grun. V. H. v. stelligera	514.00	47.00	9.144
20012 Cyclotella pseudostelligera Hust. v. pseudostelligera	514.00	12.00	2.335
30003 Diploneis marginestriata Hust. v. marginestriata	514.00	1.00	0.195
34003 Fragilaria brevistriata Grun. v. brevistriata	514.00	2.00	0.389
34016 Fragilaria construens v. venter (Ehr.) Grun.	514.00	74.00	14.397
34022 Fragilaria leptostauron (Ehr.) Hust.	514.00	1.00	0.195
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	514.00	2.00	0.389
34025 Fragilaria pinnata Ehr. v. pinnata	514.00	101.00	19.650
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	514.00	3.00	0.584
34037 Fragilaria virescens v. exigua Grun.	514.00	1.00	0.195
46014 Navicula cryptocephala Kutz. v. cryptocephala	514.00	19.00	3.696
46032 Navicula laevissima Kutz. v. laevissima	514.00	2.00	0.389
46057 Navicula radiosa v. parva Wallace	514.00	2.00	0.389
48008 Nitzschia dissipata (Kutz.) Grun. v. dissipata	514.00	3.00	0.584
52025 Pinnularia divergens W. Sm. v. divergens	514.00	1.00	0.195
66015 Synedra radians (Kutz.) v radians	514.00	2.00	0.389
66016 Synedra rumpens Kutz. v. rumpens	514.00	3.00	0.584
66026 Synedra ulna v. danica (Kutz.) V. H.	514.00	2.00	0.389
90990 Nitzschia 42-SN	514.00	2.00	0.389
99007 Achnanthes 1-SN	514.00	3.00	0.584
99009 Achnanthes 3-SN	514.00	1.00	0.195
99012 Achnanthes 7-SN	514.00	1.00	0.195
99013 Achnanthes 8-SN	514.00	6.00	1.167
99025 Achnanthes 31-SN	514.00	1.00	0.195
99087 Fragilaria 6-PIRLA	514.00	4.00	0.778
99088 Fragilaria 2-SN	514.00	20.00	3.891
99090 Fragilaria 7-SN	514.00	46.00	8.949
99094 Fragilaria 11-SN	514.00	73.00	14.202
99107 Gomphonema tackei v. abbreviatum Camburn	514.00	2.00	0.389
99131 Navicula aurora Sov.	514.00	1.00	0.195
99135 Navicula cryptocephala v. venata (Kutz.) Rabh.	514.00	1.00	0.195
99138 Navicula pseudolanceolata Lange-Bertalot	514.00	1.00	0.195
99142 Navicula 1-SN	514.00	10.00	1.946
99154 Navicula 24-SN	514.00	1.00	0.195
99155 Navicula 25-SN	514.00	9.00	1.751
99175 Navicula 46-SN	514.00	1.00	0.195

TAXON NAME	Total No	This Tax	%REL ABUND
99180 Navicula 51-SN	514.00	3.00	0.584
99182 Navicula 53-SN	514.00	3.00	0.584
99183 Navicula 54-SN	514.00	3.00	0.584
99184 Navicula 55-SN	514.00	1.00	0.195
99214 Navicula 85-SN	514.00	1.00	0.195
99229 Nitzschia frustulum 1-SN	514.00	1.00	0.195
99237 Nitzschia 1-SN	514.00	1.00	0.195
99240 Nitzschia 5-SN	514.00	1.00	0.195
99241 Nitzschia 6-SN	514.00	6.00	1.167
99246 Nitzschia 11-SN	514.00	3.00	0.584
99250 Nitzschia 15-SN	514.00	6.00	1.167
99257 Nitzschia 25-SN	514.00	1.00	0.195
99259 Nitzschia 27-SN	514.00	1.00	0.195
99274 Pinnularia subcapitata v. 1-SN	514.00	1.00	0.195
99317 Stephanodiscus 1-SN	514.00	2.00	0.389
99341 Nitzschia amphibiodes Hust.	514.00	4.00	0.778

LAKE: BARNEY LAT DEG: 37 MIN: 33 SEC: 47 LONG DEG: 118 MIN: 58 SEC: 2
QUADRANGLE: MT.MORRISON AREA: 3.11 SHED AREA: 98.4 ELEV: 3097
VEG CLASS: 3 ROCK TYPE: % COVER: A: 1 B: 4 C: 1 D: 1
pH FIELD: 8.77 pH LAB: 9.53 CONDUCTIVITY: 56 uS@25:
HCO3: 392 Cl: 6.68 NO3: 0 SO4: 157 MICR EQUIV/L:
Ca: 497 Mg: 8.68 Na : 80.8 K : 4.97
DATE SAMPLED: 8-9-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 1.436 GMS PER CC:
SED DRY WT: 0.0979 GMS PER CC: INGN LOSS: 13.3

TAXON NAME	Total No	This Tax	%REL ABUND
2001 Achnanthes affinis Grun. v. affinis	515.00	1.00	0.194
2016 Achnanthes lanceolata v. dubia Grun.	515.00	1.00	0.194
2030 Achnanthes minutissima Kutz. v. minutissima	515.00	3.00	0.583
7003 Amphora ovalis v. pediculus (Kutz.) V. H. ex Det.	515.00	2.00	0.388
23012 Cymbella minuta Hilse ex Rabh. v. minuta	515.00	2.00	0.388
23015 Cymbella minuta v. silesiaca (Bleisch ex Rabh.) Reim.	515.00	2.00	0.388
34012 Fragilaria construens (Ehr. Grun. v. construens	515.00	19.00	3.689
34016 Fragilaria construens v. venter (Ehr.) Grun.	515.00	111.00	21.553
34023 Fragilaria leptostauron v. dubia (Grun.) Hust.	515.00	1.00	0.194
34025 Fragilaria pinnata Ehr. v. pinnata	515.00	183.00	35.534
34027 Fragilaria pinnata v. lancettula (Schum.) Hust.	515.00	22.00	4.272
34030 Fragilaria vaucheriae (Kutz.) Lange-Bertelot v.	515.00	1.00	0.194
34038 Fragilaria pinnata v. acuminata A. Mayer	515.00	3.00	0.583
46032 Navicula laevissima Kutz. v. laevissima	515.00	2.00	0.388
46051 Navicula pupula Kutz. v. pupula	515.00	1.00	0.194
66014 Synedra parasitica (W. Sm.) Hust. v. parasitica	515.00	1.00	0.194
90990 Nitzschia 42-SN	515.00	1.00	0.194
99007 Achnanthes 1-SN	515.00	1.00	0.194
99014 Achnanthes 9-SN	515.00	1.00	0.194
99088 Fragilaria 2-SN	515.00	17.00	3.301
99090 Fragilaria 7-SN	515.00	96.00	18.641
99093 Fragilaria 10-SN	515.00	1.00	0.194
99094 Fragilaria 11-SN	515.00	9.00	1.748
99131 Navicula aurora Sov.	515.00	2.00	0.388
99157 Navicula 27-SN	515.00	4.00	0.777
99162 Navicula 31-SN	515.00	7.00	1.359
99167 Navicula 38-SN	515.00	1.00	0.194
99229 Nitzschia frustulum 1-SN	515.00	2.00	0.388
99230 Nitzschia frustulum 2-SN	515.00	1.00	0.194
99233 Nitzschia frustulum 5-SN	515.00	5.00	0.971
99240 Nitzschia 5-SN	515.00	1.00	0.194
99257 Nitzschia 25-SN	515.00	1.00	0.194
99316 Stephanodiscus parvus Stoermer & Hakansson	515.00	3.00	0.583
99317 Stephanodiscus 1-SN	515.00	2.00	0.388
99319 Stephanodiscus 3-SN	515.00	4.00	0.777
99341 Nitzschia amphibiodes Hust.	515.00	1.00	0.194

LAKE: DANA LAT DEG: 37 MIN: 54 SEC: 35 LONG DEG: 119 MIN: 13 SEC: 7
QUADRANGLE: MONO CRATERS AREA: 5.18 SHED AREA: 189 ELEV: 3365
VEG CLASS: 1 ROCK TYPE: % COVER: A: 2 B: 3 C: 1 D: 3
pH FIELD: 6.65 pH LAB: 6.32 CONDUCTIVITY: 9.9 uS@25:
HCO3: 19.3 Cl: 1.28 NO3: 9.08 SO4: 52.2 MICR EQUIV/L:
Ca: 63.8 Mg: 8.46 Na : 7.44 K : 2
DATE SAMPLED: 8-15-1985 INVESTIGATOR: J.S. AND R.W.H.
SED WET WT: 2.7352 GMS PER CC:
SED DRY WT: 1.9404 GMS PER CC: INGN LOSS: 1.49