Paleolimnological analysis of Bednesti Lake, B.C -- Final Report (March 2000)

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List of Figures and Appendices:

BACKGROUND

Bednesti Lake was cored on October 5, 1999 by Rick Nordin and Bruce Carmichael. The core was retrieved using a modified K-B corer (internal diameter ~ 6.35 cm) from the deep basin. On shore the core was sectioned into 0.5-cm intervals into 120-ml plastic containers. Every other sample was shipped on ice to Queen's University where they were stored in our coldroom at 4°C. The containers were weighed to determine the total wet weight of sediment prior to subsampling for ^{210}Pb analyses. Twenty intervals (every 2 cm) were subsampled for diatom and sixteen intervals for ^{210}Pb analysis. Prepared samples for ^{210}Pb analysis (see below) were sent to MYCORE Ltd.

METHODS

210-Pb Dating and Percent Organic Matter

The wet weight of the sediment was determined for all the subsections of the core that were shipped to Queen's. Sixteen subsamples of wet sediment from each core were weighed and oven-dried (24 hr at 105°C) and reweighed to determine percent water and dry weight of the sediment. Samples that were submitted for ^{210}Pb analysis were ground to a fine dust by use of a pestle and redried overnight at 105°C. The weight of this dried sediment was recorded to four decimal places after it was put in a tared plastic digestion tube for determination of ^{210}Pb activity that was shipped to MYCORE Ltd.

Percent organic matter for each of the 16 ^{210}Pb samples was determined using standard loss-on-ignition methods (Dean, 1974). A known quantity of dried sediment (recorded to four decimal places) was heated to 550°C for 2 hours. The difference between the dry weight of the sediment and the weight of sediment remaining after ignition was used to estimate the percent of organic matter in each sediment sample.

^{210}Pb activities were estimated from determination of 209-Po and a tracer of known activity by alpha spectroscopy. Unsupported ^{210}Pb is calculated by subtracting supported ^{210}Pb (the baseline activity determined from bottom samples of the core) from the total activity at each level. The sediment chronology and sedimentation rates were calculated using the constant rate of supply (CRS) model (Appleby and Oldfield, 1978) from the estimates of ^{210}Pb activities and estimates of cumulative dry mass (Binford, 1990). See Appendix B for summaries of ^{210}Pb analyses by MYCORE (B-1), summary of ^{210}Pb calculations (B-1,2), and output from the CRS model (B-3).

Diatom Preparation and Enumeration

Slides for diatom analysis were prepared using standard techniques (Cumming, Wilson, Smol and Hall, 1995). Briefly, a small amount of wet sediment was suspended in a 50:50 (molar) mixture of sulfuric and nitric acid in a 20-ml glass vial for 24 hr. prior to being submersed at 70°C in a hot water bath for 5 hr. The remaining sediment material was settled for a period of 24 hr, at which time the acid above the sample was removed. The sample was rinsed with distilled water and allowed to settle once again for 24 hrs. The procedure was repeated approx. 10 times until the sample was acid free (litmus test). The samples were settled onto coverslips in a series of four 100% dilutions, which when dry, were mounted onto glass slides using a high-resolution mounting media called Naphrax®. For each sample, at least 400 diatom taxa were enumerated with a Leica DMRB microscope equipped with DIC optics at 1000X magnification (Numerical Aperature of objective = 1.3). These analyses were based on the references of Krammer and Lange-Bertalot (1986, 1988, 1991a,b), Patrick and Reimer (1966, 1975) and Cumming et al. (1995).

Cluster Analysis

A depth-constrained cluster analysis was run on the diatom assemblages in the core to provide an unbiased assessment of changes in diatom assemblages through time. A squared chord distance as the similarity measure between samples in the cluster analysis. Zones based on this clustering algorithm were placed on the diatom stratigraphy to represent zones of similar diatom assemblages (dashed lines on Fig. 2).

Diatom-based Reconstructions of Total Phosphorus

Inferences of total phosphorus from the diatom assemblages in the core are based on a phosphorus model developed from 111 freshwater lakes from the 219 lakes sampled by Wilson, Cumming & Smol (1996). This model is based on estimates of the optima of taxa from weighted-averaging regression on non-transformed relative percentage data. The coefficient of determination (r^2) of this model is 0.66, and the jackknifed r^2 is 0.47. This model is superior to the earlier models developed by Reavie, Hall & Smol (1995) for several reasons including its better predictive ability and the larger number of samples which provide more analogs for downcore reconstructions.

The total phosphorus inferences (Fig. 1E) were critically assessed to determine: 1) if they tracked the main direction of variation in the diatom species assemblages (Fig. 1D); and 2) to assess if the assemblages encountered in the core are well represented in the modern-day samples (Fig. 1F). If the diatom-based phosphorus reconstruction matches the main direction of variation in the diatom assemblages downcore, then we can be fairly confident that the diatoms are tracking changes that are mainly related to phosphorus. If the correlation between the main direction of variation and the diatom-inferred phosphorus values is weak or nonexistent, then other environmental variables (e.g. pH, conductivity, turbulence, etc), or interactions between environmental variables, are likely responsible for the observed changes in diatom assemblages.

Determination of the Main Direction of Variation

The main direction of variation in the diatom assemblages downcore was determined from the first axis scores from a principal components analysis (PCA) ordination using non-transformed species abundance data. A PCA was chosen to represent the main direction of variation of the diatom assemblages in this core based on the small gradient length (< 1.5 sd units) obtained in an initial detrended correspondence analysis (DCA) ordination.

Analog Analysis of Diatom Assemblages

The reliability of the downcore total phosphorus inferences assumes that the diatom assemblages encountered downcore are well represented in our modern diatom assemblages. To determine if appropriate analogs existed for the core samples, we determined which samples in our present-day dataset of 111 lakes most resembled each of the downcore samples. This determination was based on a squared chord dissimilarity coefficient between all species found in each of the core samples. The best match between downcore and modern samples was compared with the distribution of best match between modern samples. Any downcore sample that was more dissimilar than 80% of the modern distribution were deemed to be a 'poor analog'. Similarly, any downcore sample that was more dissimilar than 95% of the modern distribution were deemed to have 'no analog' in our present-day dataset. If the downcore assemblages have good representation in modern samples, more confidence can be placed in the reconstruction. If modern analogs do not exist or are poor, then caution must be placed in reconstructions from these downcore samples.

RESULTS AND DISCUSSION

^{210}Pb Profile, Sedimentation Rates and Organic Matter

The ^{210}Pb profile from Bednesti Lake shows an exponential decay with core depth, with the exception of the uppermost sample (Fig. 1A). The impact of this anomalous top sample results in a high inferred sedimentation rate in the uppermost interval. The low activity of this top sample may be the result of increased sedimentation rates or some disturbance in the uppermost sediments. Given that there are marked changes in the diatom stratigraphy in the uppermost two samples (e.g. 10 to 0% *Aulacoseira ambigua*, 10% increase in *Fragilaria crotonensis*, Fig. 2) if any mixing occurred it was not sufficiently deep to affect the sample at 2 cm depth. The time/depth chronology of this core can be found in Appendix B-3. Interestingly, there is a consistent increase from ~16% organic matter c. 1915 to ~19% c. 1950, at which time the % organic matter remains relatively constant. This subtle increase in organic matter a unique change when viewed in the context of the last ~200 years of sediment accumulation in this lake (Fig. 1C). Increases in organic matter can be attributed to several factors including increased in-lake production of organic matter, increased inwash of organic matter, or decreases in the load of inorganic matter of the lake.

Diatom Assemblage Changes and Analyses

Approximately ~150 diatom taxa were encountered in the sediment core from Bednesti Lake (Appendix C-1). Cluster analysis suggests the changes in diatom assemblages through time can be divided into three primary zones (Fig. 2).

Prior to c. 1915 (Fig. 2, Zone C), the diatom assemblage is dominated by taxa with TP optima in the range of 10-17 µg/L. Circa 1915, there is an slight increase in the mean abundance of the mesoeutrophic *Aulacoseira ambigua* (Fig. 2, Zone B), as well as small increases in *Fragilaria* brevistriata, and the planktonic taxon *Cyclotella* kuetzingiana. At ~13 cm, *Tabellaria flocculosa* str IIIP begins to increase. In the uppermost portion of the core (Zone A, Fig. 2), *F.* crotonensis increases in relative abundance and *A.* ambigua declines (Fig. 2). Changes in TP suggest that prior to c. 1915, TP concentrations exhibited low variance with a mean around 11 µg/L. However, after c. 1915, inferred TP increased slightly and became more variable (Fig. 1E).

PCA axis 1 scores (Fig. 1D) accounts for ~56% of the variation in diatom taxa in this core. The coefficient of determination between the PCA axis 1 scores (Fig. 1D) and the log TP inferences (Fig. 1E) is relatively weak but significant (r^2 = 0.37). Thus, the inferred changes in TP are only partially related to the main direction of variation in the diatom assemblages. The core diatom assemblages also appear to be adequately represented in the modern samples (Fig. 1F). The variation in the diatom assemblages that is not adequately explained by the TP inferences is the increase in *Tabellaria* in the uppermost portion of the core.

In summary, the changes in diatom assemblages in conjunction with the small increase in organic matter, suggest that this lake had pre-settlement TP values ~ 11 µg/L and it potentially became slightly more nutrient rich c. 1915.

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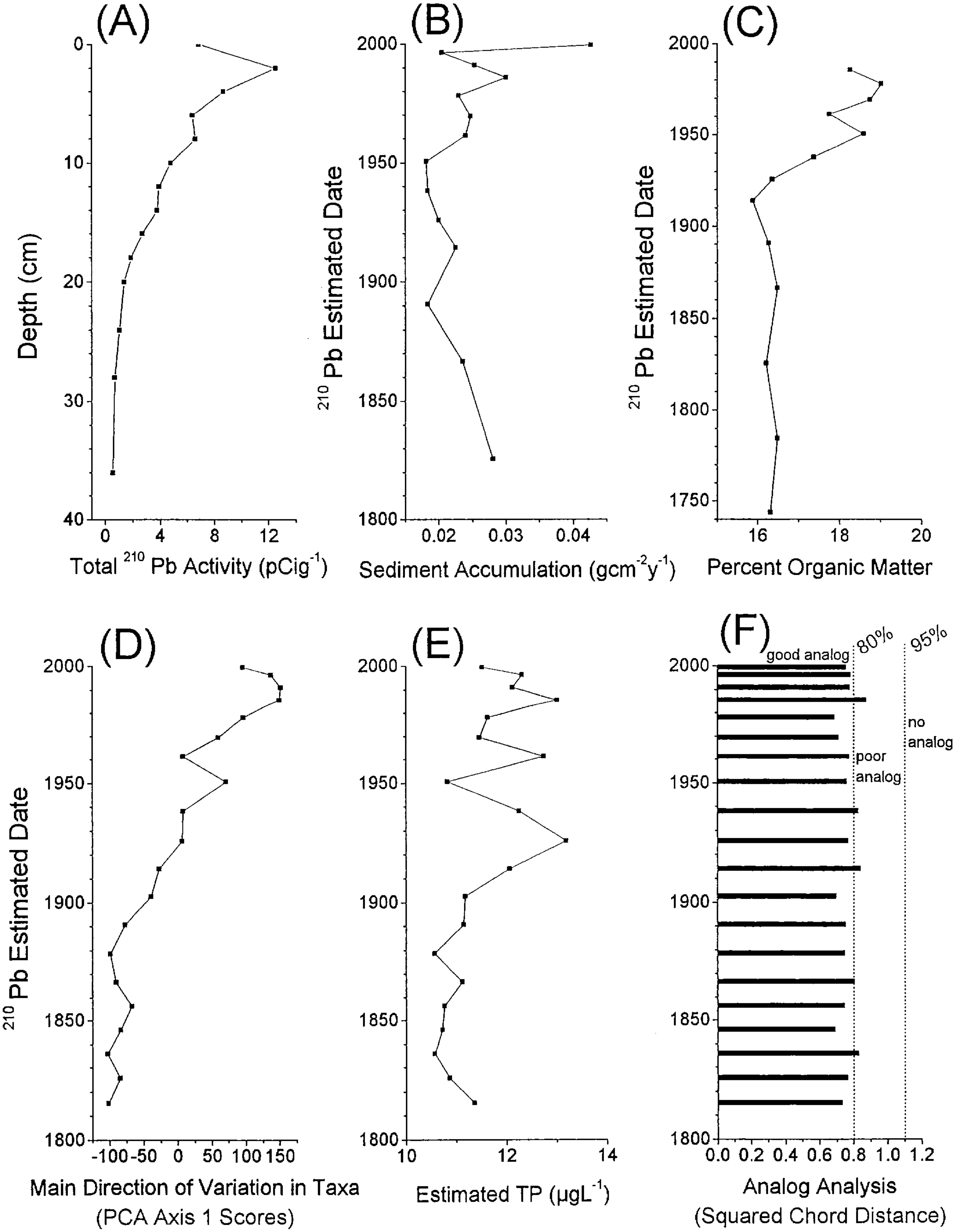
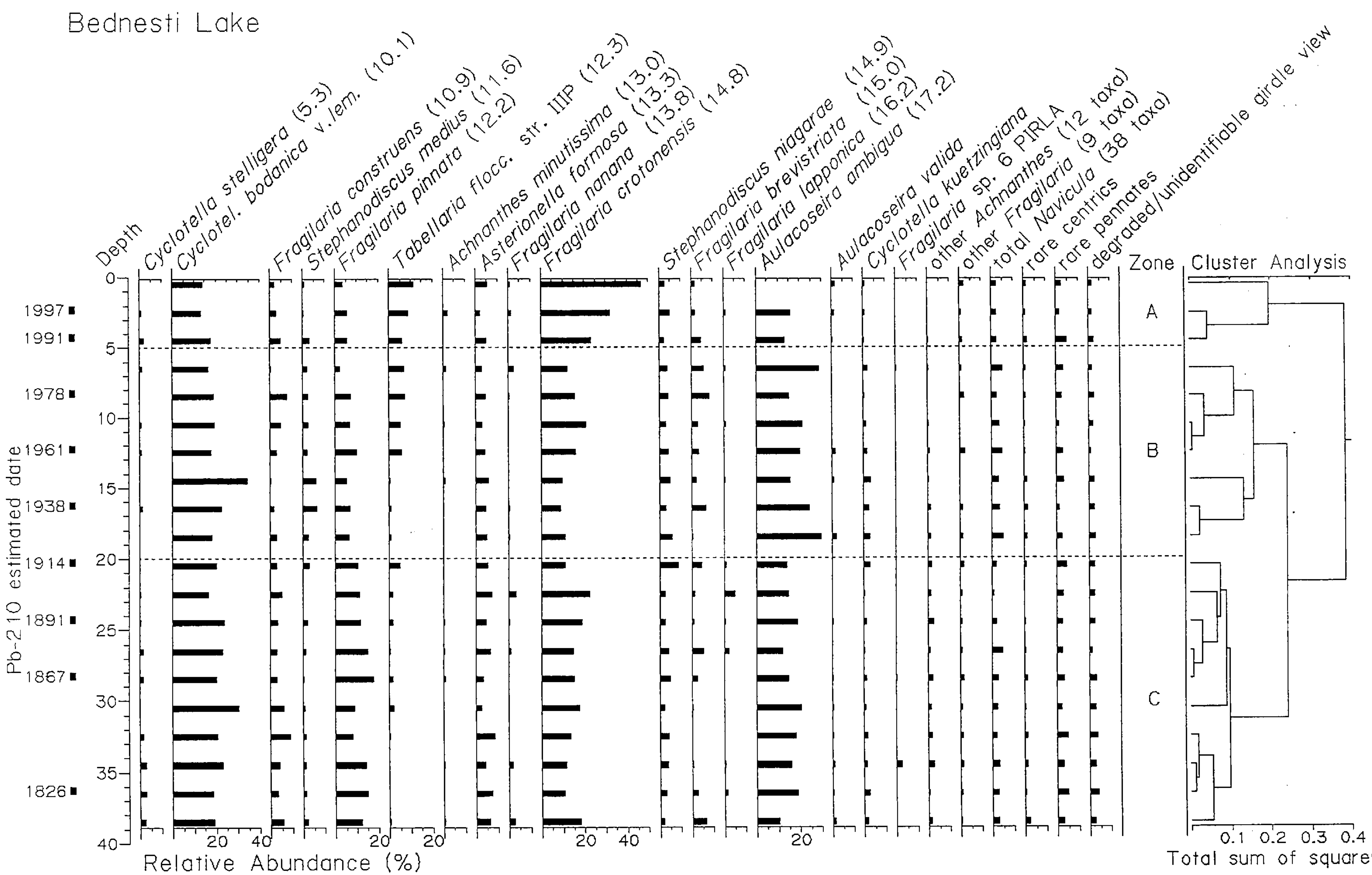
Figure Captions

Figure 1. Summary diagram for the sediment core from Bednesti Lake showing: A) total ^{210}Pb activity from which the chronology of the core is based; B) the sediment accumulation rate; C) the change in the percent of organic matter in the core; D) the main direction of variation in the diatom assemblage data; E) diatom-based estimated late-summer total phosphorus; and F) analog analysis showing the dissimilarity between present-day and downcore samples (any sample that has a squared chord distance > 0.8 was determined to be a poor analog, whereas any sample with a squared chord distance greater than 1.1 was determined to have no analog in the modern dataset).

Figure 2. Stratigraphy of the most abundant diatom taxa found in the sediment core from Bednesti Lake, B.C. (see Appendix C for a complete list of taxa and the relative percentage data). The diatom taxa are arranged in order of increasing late-summer total phosphorus (TP) optima which is indicated in parentheses for those taxa with known optima. The dotted lines separate the stratigraphy into the zones that were identified by a cluster analysis on the diatom assemblage composition that was constrained to the depth of the core samples (see text for details).

Bednesti Lake





Bednesti Lake
Depth
Cyclotella stelligera (5.3)
Cyclotel. bodanica v. lem. (10.1)
Fragilaria construens (10.9)
Stephanodiscus medius (11.6)
Fragilaria pinnata (12.2)
Tabellaria flocc. str. IIIP (12.3)
Achnanthes minutissima (13.0)
Asterionella formosa (13.3)
Fragilaria nanana (13.8)
Fragilaria crotonensis (14.8)
Stephanodiscus niagarae (14.9)
Fragilaria brevistriata (15.0)
Fragilaria lapponica (16.2)
Aulacoseira ambigua (17.2)
Aulacoseira valida
Cyclotella kuetzingiana
Fragilaria sp. 6 PIRLA
other Achnanthes (12 taxa)
other Fragilaria (9 taxa)
total Navicula (38 taxa)
rare centrics
rare pennates
degraded/unidentifiable girdle view
Zone
A
B
C
Cluster Analysis
Pb-210 estimated date
1997
1991
1978
1961
1938
1914
1891
1867
1826
0
5
10
15
20
25
30
35
40
Relative Abundance (%)
Total sum of squares
0.1
0.2
0.3
0.4

Bednesti Lake Summary File

Pb210 and LOI summary
(x-missing LOI values)

INTTOP (cm)	INTBOT (cm)	Pb210Act (pCi/g)	LOI(550C %organic	estimated AD date	SEDRATE (g/cm2/yr)
0	0.5	6.8234	x	1999.7	0.0426
2	2.5	12.4890	x	1996.5	0.0204
4	4.5	8.6468	x	1991.1	0.0253
6	6.5	6.3603	18.24	1985.8	0.0299
8	8.5	6.5633	19.01	1978.3	0.0229
10	10.5	4.7722	18.74	1969.5	0.0247
12	12.5	3.9143	17.74	1961.3	0.0239
14	14.5	3.7608	18.57	1950.8	0.0181
16	16.5	2.6814	17.36	1938.3	0.0183
18	18.5	1.8661	16.35	1925.9	0.0199
20	20.5	1.3399	15.87	1914.3	0.0225
24	24.5	1.0010	16.26	1890.9	0.0183
28	28.5	0.6843	16.47	1866.7	0.0235
36	36.5	0.5450	16.20	1825.8	0.028
44	44.5		16.48	1784.9	
52	52.5		16.31	1744.0	

Diatom analyses

Depth (c TOP	Depth (c BOTTOM	estimated AD date	log TP	TP	PCA Axis 1	minumum sq. chord
0	0.5	1999.7	1.06	11.5	95	0.75
2	2.5	1996.5	1.09	12.3	137	0.78
4	4.5	1991.1	1.08	12.1	151	0.78
6	6.5	1985.8	1.11	13.0	149	0.87
8	8.5	1978.3	1.07	11.6	96	0.69
10	10.5	1969.5	1.06	11.5	59	0.71
12	12.5	1961.3	1.11	12.7	7	0.77
14	14.5	1950.8	1.03	10.8	71	0.76
16	16.5	1938.3	1.09	12.2	7	0.83
18	18.5	1925.9	1.12	13.2	6	0.77
20	20.5	1914.3	1.08	12.1	-28	0.84
22	22.5	1902.6	1.05	11.2	-40	0.70
24	24.5	1890.9	1.05	11.1	-78	0.75
26	26.5	1878.8	1.02	10.6	-99	0.75
28	28.5	1866.7	1.05	11.1	-91	0.80
30	30.5	1856.4	1.03	10.8	-68	0.74
32	32.5	1846.2	1.03	10.7	-84	0.69
34	34.5	1836.0	1.02	10.6	-103	0.83
36	36.5	1825.8	1.04	10.9	-85	0.76
38	38.5	1815.5	1.06	11.4	-102	0.73

Sample Number	Disk #	Section Top (cm)	of Core Bottom (cm)	Sample Weight used (mg)	209 Po Counts	210 Po Counts	210 Po Meas (Bq/g)	210 Po (Bq/g)	Precisn 1 STD (%)
Bednesti									
1	511	0	1	210	3249	264	0.240	0.251	6.4
2	512	2	2.5	454	3063	999	0.439	0.459	3.6
3	513	4	4.5	525	3418	899	0.304	0.318	3.7
4	514	6	6.5	604	3060	668	0.223	0.234	4.3
5	515	8	8.5	696	3122	799	0.230	0.241	4.0
6	516	10	10.5	694	4231	802	0.167	0.176	3.9
7	517	12	12.5	711	4990	743	0.129	0.144	3.9
8	518	14	14.5	613	3720	487	0.130	0.138	4.8
9	519	16	16.5	787	5825	653	0.088	0.099	4.1
10	520	18	18.5	900	5452	483	0.061	0.069	4.7
11	521	20	20.5	961	19583	1462	0.048	0.049	2.7
12	522	24	24.5	668	4161	158	0.035	0.037	8.1
13	523	28	2.5	830	3187	106	0.025	0.025	9.9
14	524	36	36.58	554	12266	199	0.018	0.020	7.1
15	525	44	44.5	839	11279	254	0.017	0.019	6.3
16	526	52	52.5	700	11469	210	0.016	0.018	7.0

	Section Top (cm)	of Core Bottom (cm)	Back calculate to coring (KRL) Date Po Sample Extra (year)	(month)	(day)	Date of coring (year)	(month)	(day)	Time since coring (days)	Decay Corr. to Extractn (Bq/g)	Decay Corr. to Coring (Bg/g)	Std dev (Bg/g)
Bednesti L.												
	0	1	99	12	10	99	10	5	66	0.251	0.2525	0.0071
	2	2.5	99	12	10	99	10	5	66	0.459	0.4621	0.0099
	4	4.5	99	12	10	99	10	5	66	0.318	0.3199	0.0077
	6	6.5	99	12	10	99	10	5	66	0.234	0.2353	0.0071
	8	8.5	99	12	10	99	10	5	66	0.241	0.2428	0.0072
	10	10.5	99	12	10	99	10	5	66	0.176	0.1766	0.0052
	12	12.5	99	12	10	99	10	5	66	0.144	0.1448	0.0045
	14	14.5	99	12	10	99	10	5	66	0.138	0.1391	0.0049
	16	16.5	99	12	10	99	10	5	66	0.099	0.0992	0.0034
	18	18.5	99	12	10	99	10	5	66	0.069	0.0690	0.0030
	20	20.5	99	12	10	99	10	5	66	0.049	0.0496	0.0013
	24	24.5	99	12	10	99	10	5	66	0.037	0.0370	0.0024
	28	2.5	99	12	10	99	10	5	66	0.025	0.0253	0.0022
	36	36.58	99	12	10	99	10	5	66	0.020	0.0202	0.0011
	44	44.5	99	12	10	99	10	5	66	0.019	0.0187	0.0011
	52	52.5	99	12	10	99	10	5	66	0.018	0.0184	0.0011

CALCULATIONS FOR INPUT INTO BINFORD PROGRAM

Bednesti - Pb210

INTTOP (cm)	INTBOT (cm)	Back calculated to coring Pb-210 (Bq/g) activity	Std dev (Bg/g)	Pb210 activity (pCig-1)	Std dev (pCig-1)	Rho (g cm-3)
0	0.5	0.2525	0.0071	6.8234	0.1924	0.0270
2	2.5	0.4621	0.0099	12.4890	0.2662	0.0624
4	4.5	0.3199	0.0077	8.6468	0.2090	0.0592
6	6.5	0.2353	0.0071	6.3603	0.1913	0.0879
8	8.5	0.2428	0.0072	6.5633	0.1937	0.1103
10	10.5	0.1766	0.0052	4.7722	0.1404	0.0961
12	12.5	0.1448	0.0045	3.9143	0.1211	0.1042
14	14.5	0.1391	0.0049	3.7608	0.1334	0.1147
16	16.5	0.0992	0.0034	2.6814	0.0931	0.1129
18	18.5	0.0690	0.0030	1.8661	0.0806	0.1226
20	20.5	0.0496	0.0013	1.3399	0.0344	0.1206
24	24.5	0.0370	0.0024	1.0010	0.0651	0.1184
28	28.5	0.0253	0.0022	0.6843	0.0605	0.1278
36	36.5	0.0202	0.0011	0.5450	0.0288	0.1267
44	44.5	0.0187	0.0011	0.5068	0.0291	0.1254
52	52.5	0.0184	0.0011	0.4974	0.0287	0.0776
			avg	0.5021	= supported	
			stds	0.0066	0.5153	

BINFORD FILE INPUTS FOR CALCULATIONS OF DATES AND SEDIMENTATION RATES

Bednesti
C1
16.00
0.0066

INTTOP (cm)	INTBOT (cm)	Pb210 Total (pCig-1)	Pb210 Unsup. (pCig-1)	Rho (g cm-3)	OM proportion	CUMTOP (g cm-2)	CUMBOT (g cm-2)	std Pb210 (pCig-1)
0.0000	0.5000	6.8234	6.3214	0.0270	0.187	0.0000	0.0135	0.1924
2.0000	2.5000	12.4890	11.9869	0.0624	0.187	0.0740	0.1052	0.2662
4.0000	4.5000	8.6468	8.1448	0.0592	0.187	0.1924	0.2220	0.2090
6.0000	6.5000	6.3603	5.8582	0.0879	0.182	0.3341	0.3781	0.1913
8.0000	8.5000	6.5633	6.0613	0.1103	0.190	0.5188	0.5740	0.1937
10.0000	10.5000	4.7722	4.2701	0.0961	0.187	0.7252	0.7732	0.1404
12.0000	12.5000	3.9143	3.4122	0.1042	0.177	0.9244	0.9765	0.1211
14.0000	14.5000	3.7608	3.2587	0.1147	0.186	1.1387	1.1961	0.1334
16.0000	16.5000	2.6814	2.1794	0.1129	0.174	1.3656	1.4221	0.0931
18.0000	18.5000	1.8661	1.3641	0.1226	0.164	1.5943	1.6556	0.0806
20.0000	20.5000	1.3399	0.8379	0.1206	0.159	1.8277	1.8880	0.0344
24.0000	24.5000	1.0010	0.4989	0.1184	0.163	2.3004	2.3596	0.0651
28.0000	28.5000	0.6843	0.1822	0.1278	0.165	2.7909	2.8548	0.0605
36.0000	36.5000	0.5450	0.0429	0.1267	0.162	3.7723	3.8357	0.0288
44.0000	44.5000	0.5068	0.0000	0.1254	0.165	4.7800	4.8427	0.0291
52.0000	52.5000	0.4974	0.0000	0.0776	0.163	5.9302	5.9690	0.0287

YOU ARE ANALYZING CORE C1 FROM LAKE Bednesti

THE DATA ARE:

INTTOP	INTBOT	PB210ACT	UNSUPACT	RHO	PERCORG	CUMMASST	CUMMASSB	SDACT
0.0	0.5	6.82340	6.32140	0.02700	0.180	0.0000	0.0135	0.1924
2.0	2.5	12.48900	11.98690	0.06240	0.180	0.0740	0.1052	0.2662
4.0	4.5	8.64680	8.14480	0.05920	0.180	0.1924	0.2220	0.2090
6.0	6.5	6.36030	5.85820	0.08790	0.180	0.3341	0.3781	0.1913
8.0	8.5	6.56330	6.06130	0.11030	0.190	0.5188	0.5740	0.1937
10.0	10.5	4.77220	4.27010	0.09610	0.180	0.7252	0.7732	0.1404
12.0	12.5	3.91430	3.41220	0.10420	0.170	0.9244	0.9765	0.1211
14.0	14.5	3.76080	3.25870	0.11470	0.180	1.1387	1.1961	0.1334
16.0	16.5	2.68140	2.17940	0.11290	0.170	1.3656	1.4221	0.0931
18.0	18.5	1.86610	1.36410	0.12260	0.160	1.5943	1.6556	0.0806
20.0	20.5	1.33990	0.83790	0.12060	0.150	1.8277	1.8880	0.0344
24.0	24.5	1.00100	0.49890	0.11840	0.160	2.3004	2.3596	0.0651
28.0	28.5	0.68430	0.18220	0.12780	0.160	2.7909	2.8548	0.0605
36.0	36.5	0.54500	0.04290	0.12670	0.160	3.7723	3.8357	0.0288
44.0	44.5	0.50680	0.00000	0.12540	0.160	4.7800	4.8427	0.0291
52.0	52.5	0.49740	0.00000	0.07760	0.160	5.9302	5.9690	0.0287

STANDARD DEVIATION OF SUPPORTED PB-210 = 0.0066

Pb-210 dates for Lake Bednesti core C1

INTTOP	INTBOT	MIDINT	TTOP	SDTTOP	TBOT	SDTBOT	SEDRATE	SDSEDRT	SUMTOP
0.0	0.5	0.2	0.00	0.21	0.32	0.21	0.0426	0.0064	8.7001
2.0	2.5	2.2	2.58	0.22	4.11	0.22	0.0204	0.0038	8.0287
4.0	4.5	4.2	8.17	0.23	9.33	0.24	0.0253	0.0046	6.7466
6.0	6.5	6.2	13.25	0.25	14.72	0.25	0.0299	0.0056	5.7580
8.0	8.5	8.2	20.34	0.28	22.75	0.28	0.0229	0.0049	4.6179
10.0	10.5	10.2	29.33	0.32	31.28	0.33	0.0247	0.0052	3.4901
12.0	12.5	12.2	37.44	0.38	39.62	0.39	0.0239	0.0053	2.7115
14.0	14.5	14.2	47.42	0.47	50.60	0.50	0.0181	0.0051	1.9868
16.0	16.5	16.2	60.03	0.63	63.12	0.68	0.0183	0.0053	1.3417
18.0	18.5	18.2	72.41	0.87	75.50	0.94	0.0199	0.0065	0.9125
20.0	20.5	20.2	84.22	1.21	86.89	1.30	0.0225	0.0064	0.6318
24.0	24.5	24.2	107.33	2.32	110.57	2.52	0.0183	0.0095	0.3076
28.0	28.5	28.2	131.80	4.39	134.52	4.68	0.0235	0.0166	0.1436
36.0	36.5	36.2	172.93	8.32	175.19	8.78	0.0280	0.0258	0.0399

Execution terminated : 0

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C:\PB210>pd pb210.bat

C:\PB210>
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C-1

Bednesti Lake - Dec 99   Analyst: Joe Bennett

Diatom Relative Abundances (%)

Depth (cm) - samples in 0.5 cm intervals

taxa	code	0.5	2.5	4.5	6.5	8.5	10.5	12.5	14.5	16.5	18.5	20.5	22.5	24.5	26.5	28.5	30.5	32.5	34.5	36.5	38.5
Achnanthes acares	ac acar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43	0.87	0.96	0.60	1.40	0.00	0.00	0.21	0.00	0.21
Achnanthes clevi	ac clev	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00
Achnanthes conspicua	AC CONS	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00
Achnanthes exigua	AC EXIG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63
Achnanthes aff. grana	ac gran	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00
Achnanthes jouracense	ac jour	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00
Achnanthes lanceolata var. dubia	ac la.d	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.20	0.00	0.00	1.35	1.07	0.23	0.00
Achnanthes lanceolata spp. frequentissima	AC LA.F	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	1.05	0.00	0.00	0.00	0.77	0.00	0.00	0.23	0.00	0.00	0.00	0.00
Achnanthes levanderi	ac leve	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00
Achnanthes minutissima	AC MINU	0.23	2.10	0.00	1.27	0.00	0.62	0.00	0.83	0.00	0.00	0.00	0.00	0.38	0.40	0.80	0.00	0.00	0.43	0.23	0.42
Achnanthes peragalli	ac pera	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achnanthes ricula	ac ricu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Achnanthes ziegleri	AC ZIEG	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
Amphora libyca	AM LIBY	0.00	0.00	0.72	0.00	0.00	0.41	0.39	0.83	0.42	0.24	0.20	0.00	0.77	0.00	0.00	0.23	0.00	0.64	1.13	0.00
Amphora pediculus	AM PEDI	0.00	0.00	0.97	0.21	0.70	0.00	0.00	0.00	0.00	0.00	0.41	0.66	0.38	0.40	0.00	0.00	1.93	0.86	1.35	0.21
Amphora veneta	AM VENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asterionella formosa	AS FORM	5.24	2.10	5.07	2.76	4.64	2.88	4.13	5.58	4.64	4.96	5.32	7.42	4.42	6.41	3.21	2.31	8.70	4.28	7.45	6.26
Aulacoseira ambigua	AU AMBI	0.23	15.85	13.04	28.66	15.08	21.19	20.04	15.50	24.26	29.55	13.91	14.85	18.65	11.62	14.63	20.37	17.99	15.85	18.51	10.23
Aulacoseira granulata	AU GRAN	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aulacoseira valida	au valid	1.37	1.17	0.48	0.00	0.00	0.00	1.57	0.83	0.00	2.13	0.00	0.00	0.19	0.00	0.20	0.23	0.19	0.86	0.45	1.04
Cocconeis neodiminuta	co neod	0.46	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.22	0.19	0.60	0.80	0.00	0.58	0.00	0.00	0.42
Cocconeis neothumensis	co neot	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cocconeis placentula var. euglypta	CO PL.E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.21	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.21	0.00	0.00
Cyclotella bodanica var. affinis	cy bo.a	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.20	0.20	0.00	0.00	0.00	0.00	0.00
Cyclotella bodanica var. lemanica	CY BO.L	13.90	13.05	17.63	16.56	18.79	19.14	17.68	34.30	22.36	17.97	20.04	16.59	23.85	22.85	20.24	30.32	20.70	22.91	18.51	18.79
Cyclotella glomerata	CY GLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00
Cyclotella kuetzingiana	cy kuet	0.68	0.70	0.48	1.91	0.46	1.03	1.38	3.31	2.53	2.84	2.86	0.22	0.96	0.40	1.00	0.69	1.55	1.28	2.48	1.67
Cyclotella rossi	cy rosi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.80	0.23	0.58	0.43	0.45	0.42
Cyclotella schumanni	cy schu	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella sp. pl. 2	cy sp.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyclotella stelligera	CY STEL	0.00	0.70	1.93	1.27	0.00	0.82	0.79	0.00	1.05	0.00	0.00	0.22	0.19	1.40	1.60	0.00	1.55	2.57	2.71	2.51
Cymbella cesatii	CM CESA	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.62	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cymbella cistula	CM CIST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00
Cymbella gracilis	cm grac	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cymbella microcephala	CM MICR	0.00	0.00	0.48	0.00	0.00	0.00	0.39	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cymbella minuta	CM MINU	0.00	0.00	1.21	0.64	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.44	0.00	0.40	0.00	0.46	0.00	0.00	0.23	0.00
Cymbella muelleri	CM MUE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cymbella sp. 2 PISCES	CM SP.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00
Denticula keutzingii	DE KUET	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00
Diploneis parma	di parm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Entomoneis paludosa	EN PALU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.22	0.00	0.20	0.00	0.46	0.00	0.00	0.00	0.21
Epithemia adnata	EP ADNA	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.86	0.00	0.00
Epithemia sorex	ep sore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00
Eunotia spp.	eu spp	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria 6 PIRLA	fr 6pir	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	2.36	0.00	0.00
Fragilaria brevistriata	FR BREV	1.82	1.63	4.35	5.94	6.12	2.88	3.14	2.27	6.75	0.47	4.50	1.31	0.96	5.41	2.40	0.46	0.19	0.43	2.71	6.26
Fragilaria capucina	FR CAPU	0.00	0.00	0.00	0.21	0.00	0.00	0.39	0.00	0.21	0.24	0.20	0.44	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.21
Fragilaria capucina var. rumpens	fr ca.r	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria construens	FR CONS	2.05	2.80	4.59	0.21	7.42	4.53	2.55	0.41	1.48	2.60	2.66	5.02	3.27	2.61	2.81	6.02	8.70	4.07	3.16	5.64
Fragilaria crotonensis	FR CROT	46.47	32.17	23.19	12.10	15.65	20.78	15.91	9.92	9.07	10.87	11.04	22.49	18.65	14.43	14.83	17.59	13.35	11.35	10.61	17.75
Fragilaria cyclopum	FR CYCL	0.68	0.23	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria lapponica	FR LAPP	0.00	0.70	0.00	1.06	0.00	1.03	0.00	0.62	0.00	0.00	1.02	4.80	0.38	2.00	0.20	0.00	0.00	0.43	1.13	0.00
Fragilaria leptostauron	fr lepi	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fragilaria nanana	FR NANA	0.68	1.17	0.00	2.34	0.23	0.00	0.00	0.00	0.63	0.47	0.00	3.28	0.58	0.80	0.20	0.00	0.00	1.71	0.00	2.30
Fragilaria parasitica	FR PARA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.38	0.20	0.20	0.46	0.00	0.00	0.00	0.00
Fragilaria pinnata	FR PINN	3.64	5.36	5.31	2.12	6.96	6.79	9.82	5.17	6.54	6.15	10.22	11.35	11.73	14.83	17.64	8.80	7.93	13.92	14.90	12.11
Fragilaria pinnata var. intercedens	FR PI.I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	0.68	0.00
Fragilaria tenera	FR TENE	1.14	0.47	0.72	0.21	1.16	0.00	0.98	0.00	0.84	0.71	0.41	0.44	0.19	0.00	0.80	0.23	0.97	0.00	0.00	0.00
Fragilaria ulna	FR ULNA	0.23	0.00	0.00	0.21	0.70	0.00	0.39	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.21
Fragilaria ulna var. acus	FR UL.A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Gomphonema acuminatum	GO ACU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema angustum	GO ANG	0.00	0.00	0.00	0.64	0.00	0.62	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.45	1.04
Gomphonema gracile	GO GRA	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gomphonema parvulum	GO PARV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gyrosigma acuminatum	gy acum	0.00	0.00	0.00	0.00	0.23	0.00	0.39	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mastogloia elliptica	MA ELLI	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Melosira undulata	me undu	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Meridion circulare	mr circ	1.14	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula aff. avanita	na afev	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula aff. modica	na afmo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00
Navicula aff.veneta	NA AFVE	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula aff. rotunda	na afro	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula aurora	na auro	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula bacillum	na baci	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula bahusiensis	na bahu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula capitata var. capitata	NA CA.C	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00
Navicula capitata var. hungarica	NA CA.H	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Navicula citrus	na citr	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula cocconeiformis	na cocc	0.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.23	0.00
Navicula cryptonella	NA CRYP	0.00	0.00	0.00	0.42	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.43	0.45	0.00
Navicula digitoriata var. minima	NA DI.M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Navicula diluviana	NA DILU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
Navicula explanta	na expl	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.43	0.00	0.00
Navicula forcipata	na forc	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula laevissima	NA LAEV	0.00	0.47	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00
Navicula meniscculus	na menu	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula minima	NA MINI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00
Navicula cf. minuscula	NA MINU	0.00	0.00	0.00	1.49	0.70	0.00	1.18	0.83	1.05	0.95	0.82	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.68	0.21
Navicula oblonga	NA OBLO	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21
Navicula porifera v. opportuna	na povo	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula pseudoscutiformis	na pscu	0.00	0.00	0.00	0.00	0.00	0.82	0.39	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.21	0.23	0.00
Navicula pseudoventralis	NA PSVE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.43	0.00	0.00
Navicula pupula	NA PUPU	0.00	0.00	0.48	0.64	0.46	0.00	0.00	0.41	0.84	1.18	0.82	0.22	0.00	0.40	0.20	0.00	0.39	0.21	0.00	0.00
Navicula pygmea	na pygm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00
Navicula radiosa	NA RADI	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.43	0.00	0.21
Navicula saprophila	na sapr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
Navicula schaderi	na scha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.23	0.63
Navicula cf. schoenfeldi	na scho	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula seminulum	na semi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.69	0.58	0.00	0.00	0.00
Navicula similis	na simi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Navicula sp. pl. 20	na pl20	0.00	0.00	0.00	0.85	0.00	0.00	0.59	1.03	0.63	0.95	0.00	0.22	0.00	1.60	0.00	0.69	0.00	0.64	0.45	0.00
Navicula sp. pl. 23	na pl23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00
Navicula submuralis	na sbmu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
Navicula subminuscula	NA SUBM	1.14	0.93	1.69	0.42	0.00	0.41	1.77	0.00	0.00	0.47	0.00	0.00	0.19	0.20	0.40	0.00	0.00	0.21	0.00	0.84
Navicula utermoehli	NA UTER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00
Navicula vitabunda	NA VITA	0.00	0.00	0.00	0.42	0.00	1.65	0.39	0.00	0.00	0.24	0.41	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.45	0.00
Neidium affine	ne affi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.20	0.00	0.00	0.00	0.00	0.00
Nedium ampliatum	NE AMPL	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Neidium hitchcockii	ne hitc	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia amphibia	NI AMPH	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.24	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia bacillum	NI BACI	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.45	0.21
Nitzschia cocconeiformis	ni cocc	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia dissipata var. media	ni dsvm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia gracilis	NI GRAC	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00
Nitzschia liebetruthii fo. 1 PISCES	NI LI.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00
Nitzschia liebetruthii fo. 2 PISCES	NI LI.2	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia palea	NI PALE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.23	0.00
Nitzschia palea var. tenuirostris	NI PA.T	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00
Nitzschia paleacea	NI PALC	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nitzschia perminuta	NI PERM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00
Pinnularia divergens	pl dive	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00
Pinnularia microstauron	PI MICR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhopalodia gibba	RH GIBB	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stauroneis smithii	sr smit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
Stephanodiscus hantzschii	ST HANT	0.00	0.47	1.21	0.21	0.23	0.21	0.20	0.41	1.05	0.71	0.41	0.00	0.19	0.00	0.00	0.00	0.19	0.43	0.00	0.84
Stephanodiscus hantzschii fo. 1PISCES	ST HA.1	0.00	0.00	0.24	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63
Stephanodiscus medius	ST MEDI	0.68	0.23	3.14	1.91	2.32	2.47	1.96	5.99	6.12	2.13	2.86	0.00	1.73	1.00	0.40	0.69	0.97	1.07	0.90	1.88
Stephanodiscus minutulus	ST MINU	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.00	0.42	0.47	0.00	0.22	0.00	1.40	0.20	0.00	0.00	0.21	0.68	0.63
Stephanodiscus niagarae	ST NIAG	2.51	4.90	2.17	3.61	4.16	3.09	4.13	5.17	2.95	5.91	8.59	2.62	2.69	4.21	4.81	2.31	4.06	3.64	2.93	1.67
Surirella linearis var. constricta	sur l.c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Synedra cf. incisa	sy inci	0.00	0.47	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.22	0.38	0.20	0.20	0.23	0.58	0.00	0.23	0.00
Tabellaria flocculosa lrs. llip	TA FL3P	11.39	8.86	6.04	6.79	7.42	5.35	5.50	0.21	0.84	0.71	4.91	1.53	1.73	0.20	1.40	1.85	0.39	0.00	0.00	0.21
degraded/unidentifiable girdle view	deg/grd	1.59	1.63	2.42	1.49	2.09	1.85	0.59	2.07	2.11	2.60	2.04	2.40	2.31	1.20	3.01	2.55	3.46	2.76	3.84	2.09