EVALUATION OF THE BAD RIVER STREAMS—2006

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Introduction

This report summarizes the diatom community of selected streams on the Bad River Indian Reservation that were sampled in 2006. The evaluation was performed using the alga in the algal group, diatoms. Diatoms are a type of algae that possess siliceous cell walls and are usually abundant, diverse, and well preserved in sediments. They are especially useful because they are ecologically diverse and their ecological optima and tolerances can be quantified. Diatoms are strongly affected by the chemical composition of their surroundings. Certain taxa are usually found under nutrient poor conditions while others are more common under elevated nutrient levels.

Methods

Samples were received from the Bad River Natural Resources Department. The samples consisted of material collected from 18 streams on the Bad River Indian Reservation. The material received was from a variety of substrates. They included natural rock scrapings, sediment, periphyton, and logs. At some sites, artificial substrates were placed in the streams and later sampled. These substrates were bricks and clay pots.

For all of the samples, a small amount of material (0.1-0.2 g) was placed in a labeled tall beaker and 30% H_2O_2 is added. After approximately 2 minutes, a small amount of potassium permanganate was added. After the sample has digested, the digested sample is transferred to a labeled 50 ml centrifuge tube. The sample is washed 4 times with deionized water. Because of a high amount of sediment material in the samples from Madigan Road and Elm Creek, a further step was necessary. This involved using sodium polytungstate to separate the diatoms from much of the sediment material. This procedure extracts the diatoms since they have a different specific gravity than much of the sediment material.

After the final washing, the sample is transferred to a 50 ml beaker and deionized water is added. Number 1 coverslips, which have been stored in 70% EtOH are placed on a drying table and the diatom/sediment mixture is added to the coverslips. The table is marked into a numbered grid and the identity of each coverslip is recorded in a logbook. After the sample has dried, the coverslip is fixed to a microscope slide with Naphrax®. The identity of each sample is etched onto the slide with a diamond tipped scribe. Paper labels are also affixed to the slides. For each sample at least 250 valves are enumerated. Sample counts were recorded in a computer counting program and this information was transferred to an Excel spreadsheet. Internationally recognized taxonomic keys were utilized for identification. These keys include Patrick & Reimer (1966, 1975), Camburn et al. (1984-86), Dodd (1987), Krammer & Lange-

Bertalot (1986, 1988, 1991a,b), Krammer (1997a, b), and Krammer (2000). All samples are archived at the Research Center.

The water quality of the streams was assessed with 3 diatom metrics. The Diatom Nutrient Index (DNI) assigns tolerance values to individual taxa. The values ranged from 1 to 6 with 1 being the lowest nutrients (oligotrophic) to 6 being hypereutrophic. Nutrient values for Wisconsin diatoms were generated largely from Van Dam et al. (1994) but values were also assigned based upon experience with the diatom community in Wisconsin. If no autecological data was known, the taxa were not assigned a value and were not included in the DNI calculation. Because the index is based upon relative abundance, rare species will have little effect on the final index value. The index value for each of the diatom taxa is presented in Robertson et al. (2006). The formula used to calculate DNI is:

$$DNI = \frac{\sum n_i x t_i}{N}$$

where n_i = number of individuals in species i

t_i = nutrient value of species I

N = total number of individuals

The scale for this index ranges from 1 to 6 with lower values indicating lower nutrient concentrations.

The second metric is the Diatom Siltation Index (DSI). This index is the sum of all *Navicula* (including *Cavinula Chamaepinnularia, Craticula, Diadesmis, Fallacia, Fistulifera, Geissleria, Hippodonta, Kobarasiea, Luticola, Mayamaia, Placoneis*, and *Sellaphora*), *Nitzschia* (including *Psammodictyon* and *Tryblionella*), and *Surirella* taxa. This metric reflects the degree of siltation at a reach (Bahls 1993) because all of these taxa have good motility. The scale for the index is 0-100 with lower values indicating less silt and thus better water quality.

To assess stream biological integrity a multi-metric index called the Diatom Biotic Index (DBI) was created. The DBI was created using both diatom indices, DNI and DSI. For scoring the DBI, each metric is standardized to the 95th percentile of 38 reference streams in the Northern Lakes and Forest Ecoregion as part of a study reported in Robertson et al. (2006). The scale of the DBI is 0 to 100 with lower values indicating better biotic integrity. The DBI is intrinsically designed to be sensitive to nutrient enrichment and the impacts of sedimentation.

Results

The diatom community was very diverse with 286 taxa encountered. The taxa found represented communities typically found in the microhabitats that were sampled. These are epiphyton (associated with plants), epipelon (associated with sediment), epilithon (associated with rocks), and epipsammon (associated with sand). Because in many samples these

microhabitats were combined, it was not possible to separate the different communities during the analysis. Instead taxa from all of the microhabitats were combined. The literature reports that there are conflicting results when sampling multiple environments. Winter and Duthie (2000) found that there was no difference in substrate type while Besse-Lototskaya et al. (2006) found that macrophytes were the best substrate. In their study they found that metrics used in the Bad River study showed no significant difference between substrate types.

The Diatom Nutrient Index for the stream sites is shown in Figure 1. All of the sites are classified as either mesotrophic or meso-eutrophic (Figure 1). The sites with the lowest nutrients were Potato River at Potato River Road (3.11), Beartrap Creek at Goslin Road (3.22), and Bad River at Highway 169 (3.26). The worse sites were Graveyard Creek (4.38), White River at Thornapple Creek (4.38), White River at Hansen's Swamp (4.37), and White River at Highway 13 (4.35).

The Diatom Siltation Index (DSI) for the stream sites was generally high. This index is an indication of the amount of sediment in streams. Since the Bad River Reservation is in a high clay region of the state, it is not surprising that many of these streams have elevated DSI values. The streams with the lowest sediment are Potato River at Potato River Road (20.0) and Graveyard Creek (28.5).

The Diatom Biotic Index (DBI) is a multimetric index which assesses the streams biotic integrity. This index integrates the stressors nutrients and sediment and thus provides an overall index of the streams' integrity. The DBI for all of the stream sites ranges was in the poor range with the exception of Potato River at Potato River Road (46.0). The reason for the low DBI values is the relatively high sediment load in the streams.

A study of 240 wadable streams throughout Wisconsin was recently completed (Robertson et al. 2006). Among the streams sampled were 56 streams in the Northern Lakes and Forests (NLF) ecoregion. This is the same ecoregion that the Bad River streams are located. Figure 2 compares the diatom metrics calculated for this study with the 56 streams in the NLF ecoregion. The Diatom Nutrient Index in the Bad River sites was similar to the values found in the NLF streams (median value for Bad River sites 3.9 and for NLF 3.7) (Figure 2). However, the Diatom Sediment Index in the Bad River sites was much worse (higher) than found in the NLF sites. The median value for the NLF sites was 12.5 while it was 61 for the Bad River sites. Again this reflects the high sediment load found in the part of the state where the Bad River streams are located. The Diatom Biotic Index in the NLF had a median of 48.5 while it was 32.6 for the Bad River sites (Figure 2).

One of the purposes of the statewide wadeable stream study (Robertson et al. 2006) was to determine the phosphorus and nitrogen values at which the biotic integrity of streams is adversely affected. The value for phosphorus was 0.04-0.06 mg L^{-1} and 0.6 mg L^{-1} for nitrogen. This study also determined at what metric values the streams begin to become impaired. The values are DNI 4.1, DSI 22.5, and DBI 38.0. The Bad River sites are below the standard for the Diatom Nutrient Index but above it (impaired) for the Diatom Siltation Index and the Diatom Biotic Index.

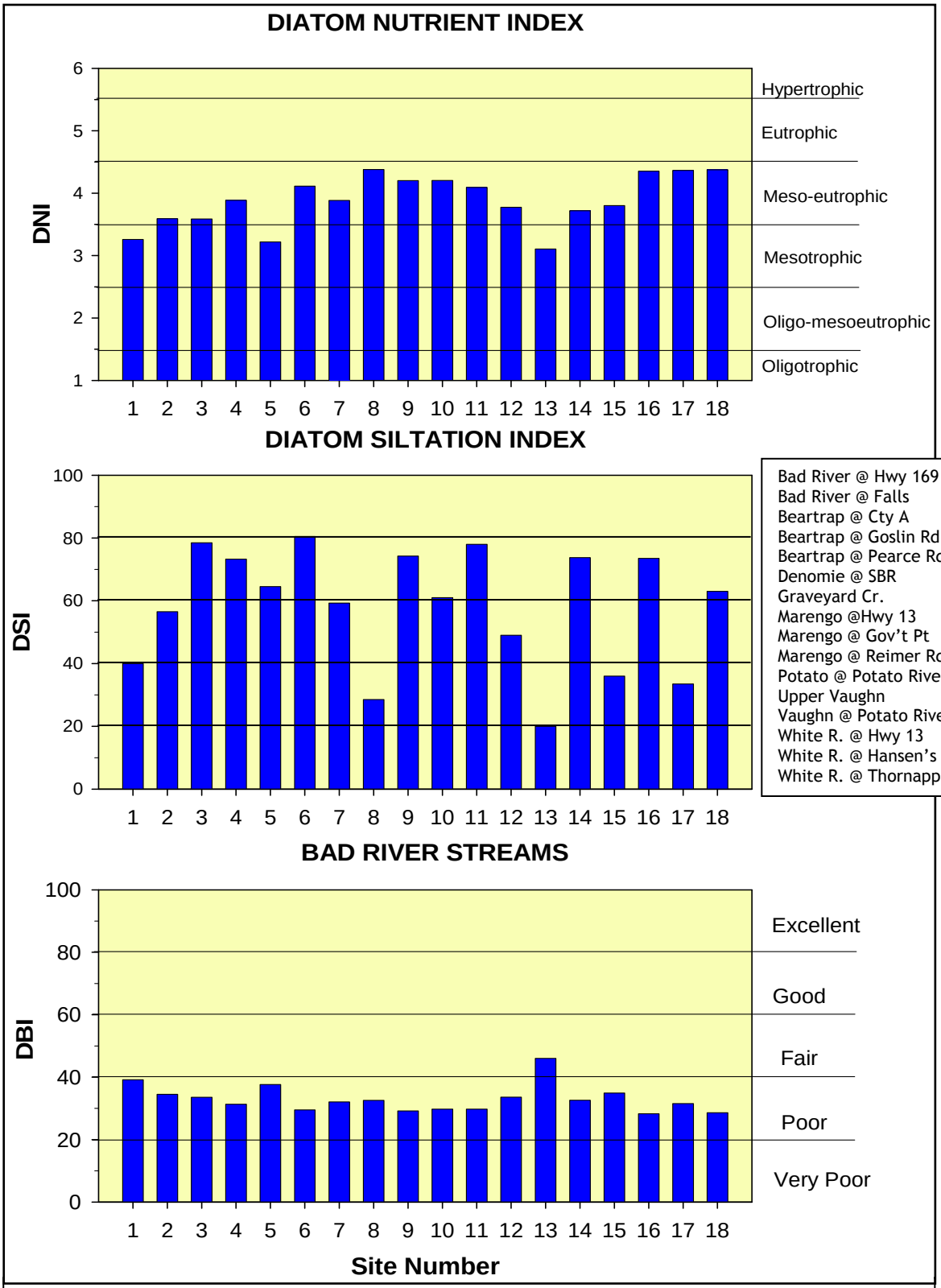

Figure 1. The nutrient levels in the streams are good but the streams contain high sediment loads which depresses the DBI index.

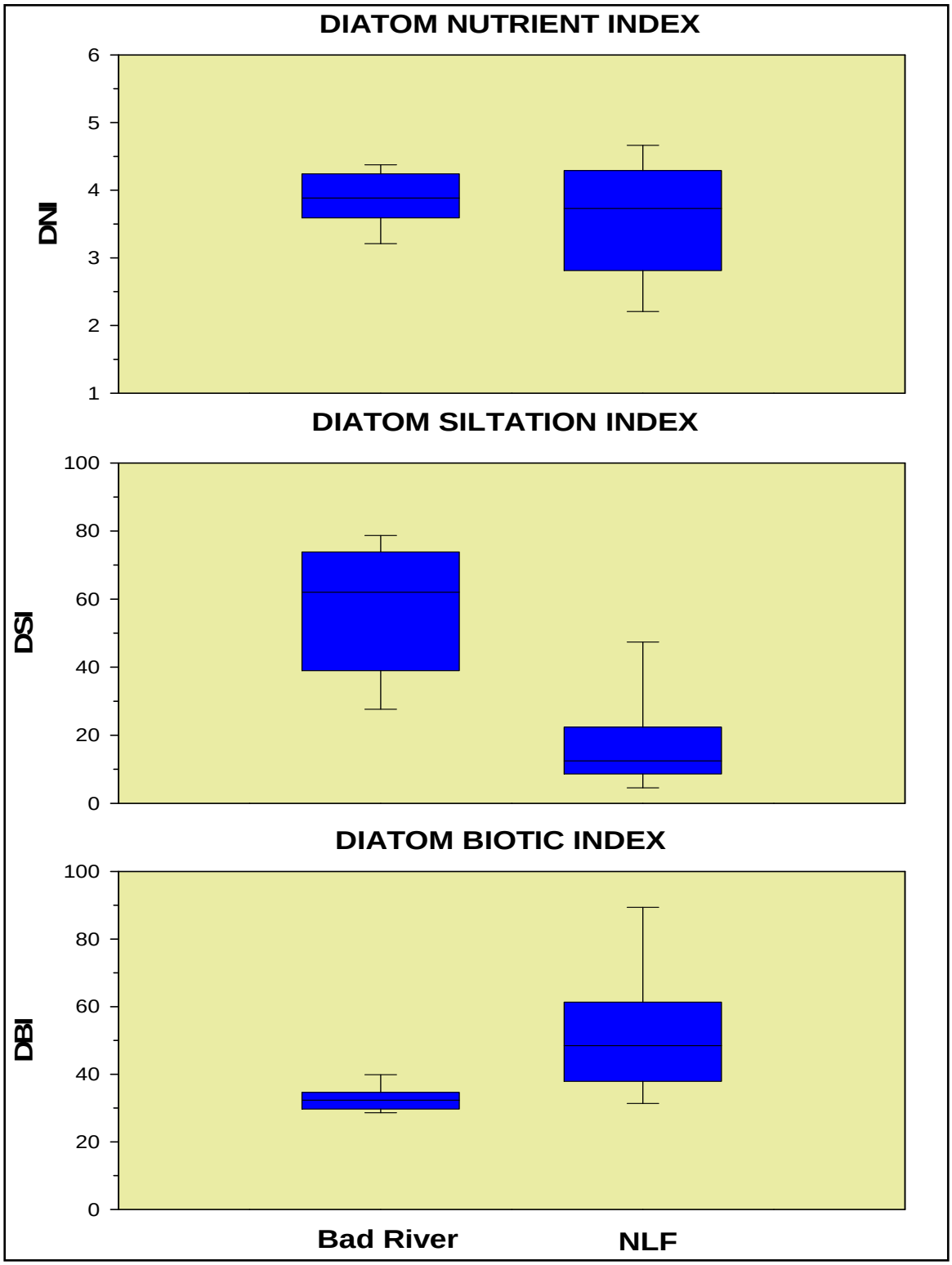

Figure 2. Comparison of diatom metrics of the Bad River streams with other sites in the Northern Lakes and Forests Ecoregion. These box plots reflect the 25th, 75th, and median values for the sites. The DSI values for the Bad River sites are much worse than other sites in the region and this results in lower DBI scores.

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BAD RIVER AT HWY 169		
Bad River Indian Reservation		
Diatoms from rocks		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes lemmermannii	1	0.003
Achnanthes subatomoides	2	0.005
Achnanthes subhudsonis var. kraeuselii	9	0.023
Achnanthidium biasolettiana var. subatomus	53	0.133
Achnanthidium exiguum	1	0.003
Achnanthidium minutissimum var. minutissimum	31	0.078
Amphipleura pellucida	2	0.005
Amphora ovalis	1	0.003
Aulacoseira ambigua	5	0.013
Aulacoseira sp.	1	0.003
Cocconeis placentula var. euglypta	5	0.013
Cocconeis placentula var. lineata	4	0.010
Ctenophora pulchella	1	0.003
Cyclotella meneghiniana	6	0.015
Cymbella affinis	2	0.005
Cymbella tumida	1	0.003
Eolimna minima	6	0.015
Eunotia praerupta var. bidens	2	0.005
Fragilaria capucina var. capucina	3	0.008
Fragilaria capucina var. rumpens	19	0.048
Fragilaria nanana	2	0.005
Frustulia amphipleuroides	5	0.013
Geissleria decussis	2	0.005
Gomphonema minutum	2	0.005
Gomphonema parvulum var. exilissimum	2	0.005
Gomphonema sp.	4	0.010
Hantzschia BRR sp. 1	2	0.005
Kolbesia amoena	3	0.008
Melosira varians	4	0.010
Navicula cryptocephala	24	0.060
Navicula cryptotenella	4	0.010
Navicula difficillima	2	0.005
Navicula reinhardtii	2	0.005
Navicula rhynchocephala	3	0.008
Navicula saprophila	5	0.013
Navicula trivialis	1	0.003
Navicula aff. semihyalina or harderii	1	0.003
Navicula aff. veneta FINER	2	0.005
Navicula small indeterminate species	26	0.065
Navicula sp.	1	0.003
Nitzschia acicularis	2	0.005
Nitzschia amphibia	1	0.003
Nitzschia archibaldii	2	0.005
Nitzschia dissipata	14	0.035
Nitzschia draveillensis	3	0.008
Nitzschia gracilis	2	0.005
Nitzschia lacuum	3	0.008
Nitzschia linearis var. tenuis	3	0.008
Nitzschia palea var. debilis	18	0.045
Nitzschia paleacea	1	0.003
Nitzschia paleaeformis	1	0.003
Nitzschia perminuta	3	0.008
Nitzschia recta	3	0.008
Nitzschia subacicularis	4	0.010
Nitzschia supralitorea	7	0.018
Nitzschia aff. agnita	1	0.003
Nitzschia aff. lacuum long	3	0.008
Nitzschia sp.	4	0.010
Pinnularia sp.	2	0.005
Planothidium lanceolatum ssp. frequentissimum	1	0.003
Planothidium lanceolatum ssp. rostratum and/or var. dubia	9	0.023
Reimeria sinuata	3	0.008
Rhoicosphenia curvata	1	0.003
Sellaphora pupula	2	0.005
Sellaphora seminulum	1	0.003
Staurosira construens var. venter	18	0.045
Staurosira elliptica	10	0.025
Staurosira construens aff. f. venter	4	0.010
Staurosirella leptostauron var. leptostauron	1	0.003
Surirella sp.	1	0.003
Synedra ulna	1	0.003
unknown	19	0.048
TOTAL	400	1.000

BAD RIVER AT FALLS		
Bad River Indian Reservation		
Rocks & periphyton community		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium biasolettiana var. subatomus	10	0.025
Achnanthidium biasolettianum var. biasolettianum	1	0.003
Achnanthidium minutissimum var. minutissimum	64	0.160
Adlafia sp. 1	1	0.003
Amphora pediculus	2	0.005
Aulacoseira sp.	2	0.005
Cocconeis pediculus	16	0.040
Cocconeis placentula var. euglypta	4	0.010
Cyclotella meneghiniana	2	0.005
Diadesmis contenta	4	0.010
Diatoma vulgare	8	0.020
Eolimna minima	12	0.030
Epithemia sorex	1	0.003
Fallacia monoculata	2	0.005
Fragilaria capucina var. vaucheriae	4	0.010
Fragilaria nanana	6	0.015
Geissleria decussis	2	0.005
Gomphonema minutum	2	0.005
Gomphonema parvulum var. exilissimum	1	0.003
Gomphonema sp.	7	0.018
Hippodonta capitata	4	0.010
Melosira varians	12	0.030
Navicula antonii	1	0.003
Navicula capitatoradiata	3	0.008
Navicula cryptocephala	12	0.030
Navicula difficillima	3	0.008
Navicula erifuga	1	0.003
Navicula germainii	1	0.003
Navicula gregaria	5	0.013
Navicula indifferens	14	0.035
Navicula reichardtiana	2	0.005
Navicula rhynchocephala	1	0.003
Navicula salinicola	8	0.020
Navicula symmetrica	4	0.010
Navicula tenera	2	0.005
Navicula trivialis	1	0.003
Navicula viridula var. rostellata	8	0.020
Navicula aff. tenelloides FINER	2	0.005
Navicula aff. veneta FINER	6	0.015
Navicula aff. vilaplanii	2	0.005
Navicula small indeterminate species	14	0.035
Navicula sp.	3	0.008
Neidium sp.	2	0.005
Nitzschia acicularis	8	0.020
Nitzschia amphibia	4	0.010
Nitzschia incognita	6	0.015
Nitzschia lacuum	27	0.068
Nitzschia linearis	2	0.005
Nitzschia linearis var. tenuis	2	0.005
Nitzschia palea	3	0.008
Nitzschia palea BIG form	2	0.005
Nitzschia palea var. debilis	13	0.033
Nitzschia paleacea	4	0.010
Nitzschia paleaeformis	5	0.013
Nitzschia perminuta	2	0.005
Nitzschia recta	1	0.003
Nitzschia sinuata var. tabellaria	6	0.015
Nitzschia supralitorea	2	0.005
Nitzschia aff. lacuum long	5	0.013
Placoneis elginensis	6	0.015
Planothidium lanceolatum ssp. rostratum and/or var. dubia	10	0.025
Reimeria sinuata	4	0.010
Sellaphora pupula	4	0.010
Simonsenia delognei	4	0.010
Surirella aff. minuta	1	0.003
Surirella sp.	1	0.003
unknown	16	0.040
TOTAL	400	1.000

BEARTRAP CREEK AT HWY 13		
Bad River Indian Reservation		
Diatoms from brick & sediment surface		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium minutissimum var. minutissimum	7	0.018
Adlafia sp. 1	4	0.010
Amphora ovalis	1	0.003
Centric sp.	1	0.003
Craticula cuspidata	1	0.003
Cyclotella meneghiniana	5	0.013
Cymbella naviculiformis	1	0.003
Encyonema silesiacum	5	0.013
Entomoeneis ornata	1	0.003
Eolimna minima	18	0.045
Eunotia bilunaris var. bilunaris	3	0.008
Eunotia minor	2	0.005
Eunotia praerupta var. bidens	1	0.003
Fragilaria capucina var. capucina	2	0.005
Fragilaria capucina var. rumpens	2	0.005
Fragilaria capucina var. vaucheriae	1	0.003
Gomphonema angustatum	1	0.003
Gomphonema gracile	2	0.005
Gomphonema minutum	1	0.003
Gomphonema parvulum var. exilissimum	8	0.020
Gomphonema sp.	4	0.010
Gyrosigma nodifera	1	0.003
Hippodonta capitata	10	0.025
Hippodonta hungarica	2	0.005
Mayamaea atomus	10	0.025
Mayamaea aff. fossalis	1	0.003
Meridion circulare	4	0.010
Navicula cryptocephala	26	0.065
Navicula difficillima	13	0.033
Navicula gregaria	22	0.055
Navicula rhynchocephala	3	0.008
Navicula rotunda	10	0.025
Navicula saprophila	18	0.045
Navicula trivialis	1	0.003
Navicula upsaliensis	1	0.003
Navicula aff. kuelbsii	3	0.008
Navicula aff. semihyalina or harderii	5	0.013
Navicula aff. tenelloides FINER	1	0.003
Navicula small indeterminate species	10	0.025
Navicula sp.	3	0.008
Nitzschia acicularis	7	0.018
Nitzschia archibaldii	12	0.030
Nitzschia dissipata	3	0.008
Nitzschia gracilis	8	0.020
Nitzschia lacuum	31	0.078
Nitzschia linearis	4	0.010
Nitzschia palea	1	0.003
Nitzschia palea BIG form	1	0.003
Nitzschia palea var. debilis	35	0.088
Nitzschia paleacea	11	0.028
Nitzschia perminuta	3	0.008
Nitzschia pumila	1	0.003
Nitzschia recta	7	0.018
Nitzschia terrestris	2	0.005
Nitzschia aff. capitellata subarcuata-frequens group	2	0.005
Nitzschia aff. lacuum long	1	0.003
Nitzschia sp.	2	0.005
Placoneis elginensis	2	0.005
Planothidium lanceolatum ssp. frequentissimum	7	0.018
Planothidium lanceolatum ssp. rostratum and/or var. dubia	6	0.015
Sellaphora pupula	11	0.028
Sellaphora seminulum	5	0.013
Sellaphora sp.	1	0.003
Simonsenia delognei	1	0.003
Stauroneis anceps	2	0.005
Staurosira construens var. venter	1	0.003
Surirella sp.	1	0.003
Synedra biceps	3	0.008
unknown	14	0.035
TOTAL	400	1.000

BEARTRAP CREEK AT CTY HWY A		
Bad River Indian Reservation		
Diatoms from rock & sediment surface		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium exiguum	1	0.003
Achnanthidium granum	1	0.003
Achnanthidium minutissimum var. minutissimum	1	0.003
Adlafia sp. 1	4	0.010
Amphora pediculus	6	0.015
Caloneis sp.	2	0.005
Cavinula jarnefeltii	3	0.008
Chamaepinnularia sp. 1 short stumpy	2	0.005
Craticula sp.	2	0.005
Cyclotella meneghiniana	3	0.008
Cymatopleura solea var. apiculata	1	0.003
Cymbella naviculiformis	4	0.010
Diadesmis contenta	2	0.005
Diploneis parma	1	0.003
Encyonema silesiacum	3	0.008
Eolimna minima	24	0.060
Eolimna subminuscula	1	0.003
Eunotia bilunaris var. bilunaris	1	0.003
Eunotia sp.	1	0.003
Fallacia monoculata	3	0.008
Frustulia crassinervia	1	0.003
Frustulia aff. weinholdii	3	0.008
Geissleria decussis	7	0.018
Gomphonema acuminatum var. coronatum	2	0.005
Gomphonema sp.	3	0.008
Hantzschia amphioxys	1	0.003
Hippodonta capitata	5	0.013
Luticola mutica	2	0.005
Melosira varians	1	0.003
Navicula antonii	5	0.013
Navicula cryptocephala	33	0.083
Navicula difficillima	17	0.043
Navicula gerloffii	1	0.003
Navicula germainii	9	0.023
Navicula gregaria	5	0.013
Navicula hustedtii	2	0.005
Navicula indifferens	1	0.003
Navicula ingenua	7	0.018
Navicula notha	1	0.003
Navicula rhynchocephala	14	0.035
Navicula rotunda	1	0.003
Navicula saprophila	7	0.018
Navicula symmetrica	1	0.003
Navicula trivialis	9	0.023
Navicula viridulacalcis ssp. viridulacalcis	4	0.010
Navicula aff. semihyalina or harderii	1	0.003
Navicula aff. tenelloides FINER	5	0.013
Navicula aff. veneta FINER	9	0.023
Navicula sp.	5	0.013
Neidium affine	1	0.003
Nitzschia acicularis	1	0.003
Nitzschia archibaldii	1	0.003
Nitzschia dissipata	3	0.008
Nitzschia gracilis	1	0.003
Nitzschia lacuum	7	0.018
Nitzschia lanceolata	6	0.015
Nitzschia linearis	1	0.003
Nitzschia palea BIG form	1	0.003
Nitzschia palea var. debilis	21	0.053
Nitzschia palea var. tenuirostris	2	0.005
Nitzschia paleacea	1	0.003
Nitzschia perminuta	2	0.005
Nitzschia recta	6	0.015
Nitzschia supralitorea	3	0.008
Nitzschia sp.	7	0.018
Nupela aff. wellneri	7	0.018
Pinnularia sp.	3	0.008
Planothidium apiculatum	1	0.003
Planothidium lanceolatum ssp. frequentissimum	14	0.035
Planothidium lanceolatum ssp. rostratum and/or var. dubia	21	0.053
Sellaphora pupula	19	0.048
Sellaphora seminulum	7	0.018
Sellaphora sp.	1	0.003
Stauroneis anceps	5	0.013
Stauroneis phoenicenteron	1	0.003
Stauroneis smithii	1	0.003
Stauroneis thermicola fo. lanceolata	1	0.003
Staurosira elliptica	3	0.008
Surirella angusta	1	0.003
Surirella aff. suecica	9	0.023
Synedra ulna	1	0.003
Tabellaria fenestrata	1	0.003
unknown	12	0.030
TOTAL	400	1.000

BEARTRAP CREEK AT GOSLIN ROAD		
Bad River Indian Reservation		
Diatoms from brick and periphyton		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium biasolettiana var. subatomus	1	0.003
Achnanthidium minutissimum var. minutissimum	17	0.043
Amphipleura pellucida	24	0.060
Aulacoseira ambigua	1	0.003
Caloneis sp.	1	0.003
Chamaepinnularia sp. 1 short stumpy	2	0.005
Cocconeis pediculus	1	0.003
Cocconeis placentula var. lineata	2	0.005
Craticula cuspidata	1	0.003
Ctenophora pulchella	2	0.005
Cymbella gracilis	2	0.005
Diploneis oculata	1	0.003
Eolimna minima	17	0.043
Eolimna subminuscula	1	0.003
Epithemia adnata	1	0.003
Epithemia sorex	2	0.005
Epithemia sp.	1	0.003
Eunotia bilunaris var. bilunaris	3	0.008
Eunotia incisa	2	0.005
Eunotia sp.	1	0.003
Fragilaria capucina var. capucina	1	0.003
Fragilaria capucina var. mesolepta	1	0.003
Fragilaria capucina var. rumpens	26	0.065
Fragilaria exigua	5	0.013
Fragilaria nanana	7	0.018
Geissleria clementis	1	0.003
Gomphonema sp.	3	0.008
Hippodonta capitata	3	0.008
Mayamaea atomus	1	0.003
Navicula cryptocephala	21	0.053
Navicula difficillima	7	0.018
Navicula gregaria	1	0.003
Navicula ingenua	2	0.005
Navicula tenera	1	0.003
Navicula viridula	1	0.003
Navicula viridula var. rostellata	2	0.005
Navicula small indeterminate species	37	0.093
Navicula sp.	2	0.005
Nitzschia acicularis	13	0.033
Nitzschia archibaldii	2	0.005
Nitzschia gracilis	7	0.018
Nitzschia lacuum	35	0.088
Nitzschia linearis var. tenuis	3	0.008
Nitzschia palea	1	0.003
Nitzschia palea BIG form	3	0.008
Nitzschia palea var. debilis	25	0.063
Nitzschia palea var. tenuirostris	5	0.013
Nitzschia paleacea	19	0.048
Nitzschia paleaeformis	5	0.013
Nitzschia perminuta	23	0.058
Nitzschia recta	2	0.005
Nitzschia subacicularis	1	0.003
Nitzschia terrestris	1	0.003
Nitzschia vermicularis	1	0.003
Nitzschia aff. sigma	3	0.008
Planothidium lanceolatum ssp. rostratum and/or var. dubia	7	0.018
Rhopalodia gibba	11	0.028
Sellaphora pupula	1	0.003
Simonsenia delognei	8	0.020
Synedra biceps	6	0.015
Synedra ulna var. acus	6	0.015
Unknown	7	0.018
TOTAL	400	1.000

BEARTRAP CREEK AT PEARCE ROAD		
Bad River Indian Reservation		
Diatoms from rock		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium biasolettiana var. subatomus	1	0.003
Achnanthidium minutissimum var. minutissimum	1	0.003
Amphora montana	2	0.005
Craticula dissociata	1	0.003
Craticula sp.	1	0.003
Cyclotella meneghiniana	3	0.008
Encyonema silesiacum	3	0.008
Eolimna minima	24	0.060
Eolimna subminuscula	20	0.050
Fragilaria capucina var. capucina	4	0.010
Gomphonema gracile	19	0.048
Gomphonema parvulum	4	0.010
Gomphonema parvulum var. exilissimum	3	0.008
Gomphonema aff. gracile	2	0.005
Gomphonema sp.	3	0.008
Hippodonta capitata	4	0.010
Mayamaea atomus	2	0.005
Melosira varians	4	0.010
Meridion circulare	3	0.008
Navicula antonii	2	0.005
Navicula cryptocephala	41	0.103
Navicula cryptotenella	2	0.005
Navicula difficillima	2	0.005
Navicula ingenua	2	0.005
Navicula reichardtiana	3	0.008
Navicula rotunda	5	0.013
Navicula saprophila	1	0.003
Navicula trivialis	23	0.058
Navicula aff. veneta FINER	3	0.008
Navicula small indeterminate species	2	0.005
Nitzschia acidoclinata	4	0.010
Nitzschia amphibia	8	0.020
Nitzschia archibaldii	7	0.018
Nitzschia bremensis	1	0.003
Nitzschia dissipata	1	0.003
Nitzschia fonticola	39	0.098
Nitzschia gracilis	4	0.010
Nitzschia incognita	14	0.035
Nitzschia lacuum	18	0.045
Nitzschia palea	1	0.003
Nitzschia palea BIG form	1	0.003
Nitzschia palea var. debilis	4	0.010
Nitzschia paleacea	1	0.003
Nitzschia paleaeformis	4	0.010
Nitzschia perminuta	6	0.015
Nitzschia pusilla	1	0.003
Nitzschia supralitorea	36	0.090
Nitzschia aff. lacuum long	19	0.048
Nitzschia aff. lacuum short	4	0.010
Nitzschia sp.	4	0.010
Pinnularia sp.	6	0.015
Planothidium lanceolatum ssp. frequentissimum	1	0.003
Planothidium lanceolatum ssp. rostratum and/or var. dubia	1	0.003
Sellaphora pupula	4	0.010
Sellaphora seminulum	3	0.008
Stauroneis anceps	1	0.003
Staurosirella pinnata var. pinata	2	0.005
Synedra biceps	5	0.013
Synedra ulna	4	0.010
Synedra ulna var. acus	2	0.005
unknown	4	0.010
TOTAL	400	1.000

BEARTRAP CREEK AT PEARCE ROAD		
Bad River Indian Reservation		
Diatoms from rock		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium biasolettiana var. subatomus	1	0.003
Achnanthidium minutissimum var. minutissimum	1	0.003
Amphora montana	2	0.005
Craticula dissociata	1	0.003
Craticula sp.	1	0.003
Cyclotella meneghiniana	3	0.008
Encyonema silesiacum	3	0.008
Eolimna minima	24	0.060
Eolimna subminuscula	20	0.050
Fragilaria capucina var. capucina	4	0.010
Gomphonema gracile	19	0.048
Gomphonema parvulum	4	0.010
Gomphonema parvulum var. exilissimum	3	0.008
Gomphonema aff. gracile	2	0.005
Gomphonema sp.	3	0.008
Hippodonta capitata	4	0.010
Mayamaea atomus	2	0.005
Melosira varians	4	0.010
Meridion circulare	3	0.008
Navicula antonii	2	0.005
Navicula cryptocephala	41	0.103
Navicula cryptotenella	2	0.005
Navicula difficillima	2	0.005
Navicula ingenua	2	0.005
Navicula reichardtiana	3	0.008
Navicula rotunda	5	0.013
Navicula saprophila	1	0.003
Navicula trivialis	23	0.058
Navicula aff. veneta FINER	3	0.008
Navicula small indeterminate species	2	0.005
Nitzschia acidoclinata	4	0.010
Nitzschia amphibia	8	0.020
Nitzschia archibaldii	7	0.018
Nitzschia bremensis	1	0.003
Nitzschia dissipata	1	0.003
Nitzschia fonticola	39	0.098
Nitzschia gracilis	4	0.010
Nitzschia incognita	14	0.035
Nitzschia lacuum	18	0.045
Nitzschia palea	1	0.003
Nitzschia palea BIG form	1	0.003
Nitzschia palea var. debilis	4	0.010
Nitzschia paleacea	1	0.003
Nitzschia paleaeformis	4	0.010
Nitzschia perminuta	6	0.015
Nitzschia pusilla	1	0.003
Nitzschia supralitorea	36	0.090
Nitzschia aff. lacuum long	19	0.048
Nitzschia aff. lacuum short	4	0.010
Nitzschia sp.	4	0.010
Pinnularia sp.	6	0.015
Planothidium lanceolatum ssp. frequentissimum	1	0.003
Planothidium lanceolatum ssp. rostratum and/or var. dubia	1	0.003
Sellaphora pupula	4	0.010
Sellaphora seminulum	3	0.008
Stauroneis anceps	1	0.003
Staurosirella pinnata var. pinata	2	0.005
Synedra biceps	5	0.013
Synedra ulna	4	0.010
Synedra ulna var. acus	2	0.005
unknown	4	0.010
TOTAL	400	1.000

GRAVEYARD CREEK		
Bad River Indian Reservation		
Diatoms from sediments & log		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium exiguum	8	0.020
Achnanthidium minutissimum var. minutissimum	9	0.023
Amphipleura pellucida	2	0.005
Amphora ovalis	1	0.003
Amphora pediculus	6	0.015
Cavinula jarnefeltii	1	0.003
Diploneis sp.	2	0.005
Eolimna minima	3	0.008
Eunotia sp.	1	0.003
Fragilaria capucina var. capucina	2	0.005
Frustulia vulgaris	2	0.005
Gomphonema sp.	1	0.003
Hippodonta capitata	9	0.023
Hippodonta hungarica	2	0.005
Karayevia clevei	6	0.015
Martyana olsenii	33	0.083
Mayamaea atomus	1	0.003
Meridion circulare	12	0.030
Navicula cryptocephala	3	0.008
Navicula gregaria	12	0.030
Navicula lanceolata	16	0.040
Navicula margalithii	1	0.003
Navicula saprophila	1	0.003
Navicula viridulacalcis ssp. viridulacalcis	1	0.003
Navicula aff. veneta FINER	1	0.003
Navicula sp.	1	0.003
Nitzschia dissipata	22	0.055
Nitzschia heufleriana	2	0.005
Nitzschia lanceolata	1	0.003
Nitzschia linearis	13	0.033
Nitzschia palea var. debilis	1	0.003
Nitzschia pusilla	4	0.010
Nitzschia recta	10	0.025
Nitzschia aff. lacuum long	3	0.008
Placoneis elginensis	1	0.003
Planothidium lanceolatum ssp. frequentissimum	8	0.020
Planothidium lanceolatum ssp. rostratum and/or var. dubia	21	0.053
Psammothidium bioretii	2	0.005
Sellaphora pupula	5	0.013
Staurosira elliptica	28	0.070
Staurosirella leptostauron var. leptostauron	30	0.075
Staurosirella pinnata var. pinata	102	0.255
Synedra biceps	4	0.010
unknown	6	0.015
TOTAL	400	1.000

MARENGO RIVER AT HWY 13		
Bad River Indian Reservation		
Diatoms from sediment & rock		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes sp.	2	0.005
Achnanthidium biasolettiana var. subatomus	6	0.015
Achnanthidium minutissimum var. minutissimum	19	0.048
Amphipleura pellucida	1	0.003
Amphora libyca	5	0.013
Amphora pediculus	1	0.003
Cavinula jarnefeltii	1	0.003
Cocconeis pediculus	3	0.008
Cocconeis placentula var. lineata	3	0.008
Cymbella sp.	1	0.003
Diploneis aff. boldtiana or modica	3	0.008
Encyonema silesiacum	2	0.005
Eolimna minima	13	0.033
Fragilaria capucina var. capucina	1	0.003
Frustulia vulgaris	1	0.003
Gomphonema parvulum var. exilissimum	1	0.003
Gomphonema sp.	3	0.008
Gyrosigma acuminatum	1	0.003
Melosira varians	6	0.015
Navicula capitatoradiata	14	0.035
Navicula cryptocephala	13	0.033
Navicula erifuga	15	0.038
Navicula germainii	7	0.018
Navicula gregaria	24	0.060
Navicula lundii	4	0.010
Navicula perminuta	1	0.003
Navicula radiosa	3	0.008
Navicula reichardtiana	2	0.005
Navicula saprophila	9	0.023
Navicula symmetrica	1	0.003
Navicula tripunctata	1	0.003
Navicula trivialis	4	0.010
Navicula viridula var. rostellata	11	0.028
Navicula viridulacalcis ssp. viridulacalcis	2	0.005
Navicula aff. phylleptosoma	1	0.003
Navicula aff. semihyalina or harderii	1	0.003
Navicula aff. tenelloides FINER	12	0.030
Navicula aff. veneta FINER	2	0.005
Navicula small indeterminate species	2	0.005
Navicula sp.	7	0.018
Nitzschia acicularis	1	0.003
Nitzschia amphibia	4	0.010
Nitzschia archibaldii	4	0.010
Nitzschia capitellata	2	0.005
Nitzschia clausii	1	0.003
Nitzschia constricta	1	0.003
Nitzschia dissipata	2	0.005
Nitzschia gracilis	2	0.005
Nitzschia heufleriana	12	0.030
Nitzschia incognita	3	0.008
Nitzschia inconspicua	15	0.038
Nitzschia lacuum	44	0.110
Nitzschia linearis	7	0.018
Nitzschia palea	1	0.003
Nitzschia palea BIG form	1	0.003
Nitzschia palea var. debilis	2	0.005
Nitzschia palea var. tenuirostris	1	0.003
Nitzschia pusilla	2	0.005
Nitzschia recta	5	0.013
Nitzschia supralitorea	1	0.003
Nitzschia aff. agnita	10	0.025
Nitzschia aff. lacuum long	13	0.033
Nitzschia sp.	4	0.010
Placoneis elginensis	2	0.005
Planothidium lanceolatum ssp. frequentissimum	8	0.020
Planothidium lanceolatum ssp. rostratum and/or var. dubia	18	0.045
Sellaphora bacillum	1	0.003
Simonsenia delognei	4	0.010
Staurosira elliptica	8	0.020
Surirella amphioxys	1	0.003
Surirella tenera	1	0.003
Synedra biceps	2	0.005
Synedra parasitica	3	0.008
Synedra ulna	2	0.005
unknown	3	0.008
TOTAL	400	1.000

MARENGO RIVER AT GOVERNMENT POINT		
Bad River Indian Reservation		
Sediment periphyton community		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes lemmermannii	7	0.018
Achnanthes subatomoides	2	0.005
Achnanthes subhudsonis var. kraeuselii	1	0.003
Achnanthidium biasolettiana var. subatomus	9	0.023
Achnanthidium biasolettianum var. biasolettianum	5	0.013
Achnanthidium granum	1	0.003
Achnanthidium minutissimum var. minutissimum	15	0.038
Amphipleura pellucida	1	0.003
Amphora libyca	4	0.010
Amphora pediculus	2	0.005
Cocconeis placentula var. euglypta	1	0.003
Cocconeis placentula var. lineata	10	0.025
Cyclotella meneghiniana	3	0.008
Cymbella affinis	37	0.093
Cymbella tumida	1	0.003
Cymbella turgidula	1	0.003
Diploneis aff. boldtiana or modica	3	0.008
Encyonema silesiacum	2	0.005
Eolimna minima	13	0.033
Fallacia helensis	1	0.003
Fragilaria capucina var. capucina	2	0.005
Fragilaria capucina var. gracilis	1	0.003
Gomphonema aff. kobayasii	2	0.005
Gomphonema sp.	2	0.005
Gyrosigma sp.	1	0.003
Hippodonta capitata	1	0.003
Hippodonta hungarica	5	0.013
Karayevia clevei	1	0.003
Melosira varians	3	0.008
Navicula antonii	2	0.005
Navicula capitatoradiata	13	0.033
Navicula cryptocephala	11	0.028
Navicula difficillima	2	0.005
Navicula erifuga	4	0.010
Navicula germainii	6	0.015
Navicula gregaria	11	0.028
Navicula lundii	1	0.003
Navicula notha	4	0.010
Navicula saprophila	3	0.008
Navicula symmetrica	1	0.003
Navicula trivialis	1	0.003
Navicula viridula var. rostellata	50	0.125
Navicula viridulacalcis ssp. viridulacalcis	1	0.003
Navicula aff. tenelloides FINER	6	0.015
Navicula small indeterminate species	7	0.018
Navicula sp.	3	0.008
Nitzschia acicularis	1	0.003
Nitzschia fonticola	2	0.005
Nitzschia heufleriana	6	0.015
Nitzschia incognita	1	0.003
Nitzschia lacuum	24	0.060
Nitzschia linearis	8	0.020
Nitzschia palea	1	0.003
Nitzschia palea BIG form	5	0.013
Nitzschia palea var. debilis	10	0.025
Nitzschia palea var. tenuirostris	2	0.005
Nitzschia paleacea	2	0.005
Nitzschia perminuta	2	0.005
Nitzschia recta	4	0.010
Nitzschia sinuata var. tabellaria	3	0.008
Nitzschia sublinearis	1	0.003
Nitzschia supralitorea	4	0.010
Nitzschia aff. lacuum long	13	0.033
Nitzschia aff. lacuum short	1	0.003
Pinnularia sp.	1	0.003
Placoneis elginensis	5	0.013
Planothidium lanceolatum ssp. frequentissimum	5	0.013
Planothidium lanceolatum ssp. rostratum and/or var. dubia	15	0.038
Rhoicosphenia curvata	2	0.005
Sellaphora pupula	2	0.005
Staurosira elliptica	9	0.023
Staurosirella pinnata var. pinata	1	0.003
Surirella linearis var. helvetica	1	0.003
Synedra biceps	3	0.008
Synedra parasitica	1	0.003
Synedra ulna	1	0.003
unknown	1	0.003
TOTAL	400	1.000

MARENGO RIVER AT GOVERNMENT ROAD		
Bad River Indian Reservation		
Diatoms from rocks		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes subatomoides	1	0.003
Achnanthidium biasolettiana var. subatomus	1	0.003
Achnanthidium minutissimum var. minutissimum	2	0.005
Amphipleura pellucida	2	0.005
Caloneis bacillum	12	0.030
Caloneis hyalina	1	0.003
Caloneis silicula	2	0.005
Centric sp.	7	0.018
Chamaepinnularia sp. 1 short stumpy	2	0.005
Craticula sp.	1	0.003
Cyclotella meneghiniana	4	0.010
Encyonema silesiacum	1	0.003
Eolimna minima	62	0.155
Eolimna subminuscula	30	0.075
Eunotia bilunaris var. bilunaris	4	0.010
Eunotia sp.	2	0.005
Fragilaria capucina var. capucina	1	0.003
Fragilaria nanana	2	0.005
Gomphonema affine	2	0.005
Gomphonema gracile	3	0.008
Gomphonema parvulum var. exilissimum	5	0.013
Navicula capitatoradiata	2	0.005
Navicula cryptocephala	4	0.010
Navicula difficillima	15	0.038
Navicula ingenua	4	0.010
Navicula rotunda	23	0.058
Navicula saprophila	50	0.125
Navicula trivialis	2	0.005
Navicula aff. veneta FINER	6	0.015
Navicula small indeterminate species	20	0.050
Navicula sp.	1	0.003
Nitzschia acidoclinata	4	0.010
Nitzschia amphibia	6	0.015
Nitzschia archibaldii	2	0.005
Nitzschia constricta	1	0.003
Nitzschia gracilis	1	0.003
Nitzschia incognita	4	0.010
Nitzschia lacuum	8	0.020
Nitzschia linearis	1	0.003
Nitzschia palea	4	0.010
Nitzschia palea BIG form	9	0.023
Nitzschia palea var. debilis	3	0.008
Nitzschia paleacea	1	0.003
Nitzschia perminuta	3	0.008
Nitzschia pusilla	1	0.003
Nitzschia supralitorea	4	0.010
Nitzschia aff. lacuum long	3	0.008
Nupela aff. wellneri	3	0.008
Pinnularia subgibba var. undulata	1	0.003
Pinnularia sp.	1	0.003
Planothidium lanceolatum ssp. frequentissimum	20	0.050
Planothidium lanceolatum ssp. rostratum and/or var. dubia	3	0.008
Sellaphora seminulum	32	0.080
Stauroneis kriegeri	4	0.010
Surirella angusta	2	0.005
Surirella aff. suecica	1	0.003
Tabellaria flocculosa str. IV	1	0.003
unknown	3	0.008
TOTAL	400	1.000

MARENGO RIVER AT REIMER ROAD		
Bad River Indian Reservation		
Stream diatom sample -- community unknown		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium biasolettianum var. biasolettianum	7	0.018
Achnanthidium minutissimum var. minutissimum	84	0.210
Amphora libyca	1	0.003
Amphora pediculus	2	0.005
Caloneis sp.	3	0.008
Cocconeis pediculus	3	0.008
Cocconeis placentula var. euglypta	7	0.018
Cocconeis placentula var. lineata	4	0.010
Cyclotella meneghiniana	12	0.030
Cymatopleura solea var. apiculata	1	0.003
Cymbella affinis	5	0.013
Cymbella sp.	2	0.005
Diatoma vulgare	2	0.005
Encyonema silesiacum	1	0.003
Eolimna minima	17	0.043
Eolimna subminuscula	1	0.003
Eunotia sp.	1	0.003
Fragilaria capucina var. capucina	1	0.003
Fragilaria nanana	1	0.003
Gomphonema minutum	10	0.025
Gomphonema parvulum var. exilissimum	3	0.008
Gomphonema aff. kobayasii	2	0.005
Gomphonema sp.	1	0.003
Gyrosigma sp.	1	0.003
Hippodonta hungarica	10	0.025
Hippodonta luneburgensis	2	0.005
Karayevia clevei	1	0.003
Mayamaea aff. agrestis	2	0.005
Melosira varians	9	0.023
Navicula capitatoradiata	27	0.068
Navicula cryptocephala	2	0.005
Navicula difficillima	1	0.003
Navicula erifuga	1	0.003
Navicula germainii	2	0.005
Navicula gregaria	4	0.010
Navicula margalithii	3	0.008
Navicula perminuta	1	0.003
Navicula radiosa	2	0.005
Navicula rotunda	1	0.003
Navicula saprophila	4	0.010
Navicula tripunctata	4	0.010
Navicula viridula var. rostellata	2	0.005
Navicula viridulacalcis ssp. viridulacalcis	2	0.005
Navicula aff. tenelloides FINER	3	0.008
Navicula aff. veneta FINER	2	0.005
Navicula small indeterminate species	2	0.005
Navicula sp.	3	0.008
Nitzschia acicularis	1	0.003
Nitzschia acidoclinata	1	0.003
Nitzschia amphibia	2	0.005
Nitzschia gracilis	3	0.008
Nitzschia heufleriana	19	0.048
Nitzschia incognita	3	0.008
Nitzschia inconspicua	1	0.003
Nitzschia lacuum	7	0.018
Nitzschia linearis	22	0.055
Nitzschia palea	2	0.005
Nitzschia palea var. debilis	11	0.028
Nitzschia paleacea	2	0.005
Nitzschia perminuta	1	0.003
Nitzschia recta	15	0.038
Nitzschia supralitorea	3	0.008
Planothidium lanceolatum ssp. frequentissimum	3	0.008
Planothidium lanceolatum ssp. rostratum and/or var. dubia	15	0.038
Rhoicosphenia curvata	4	0.010
Sellaphora pupula	1	0.003
Staurosirella pinnata var. pinata	3	0.008
Surirella amphioxys	3	0.008
Surirella angusta	1	0.003
Synedra biceps	5	0.013
Synedra parasitica	2	0.005
Tabellaria flocculosa str. IV	1	0.003
unknown	7	0.018
TOTAL	400	1.000

POTATO RIVER AT POTATO RIVER ROAD		
Bad River Indian Reservation		
Diatoms from rock		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes conspicua	1	0.003
Achnanthidium biasolettiana var. subatomus	14	0.035
Achnanthidium biasolettianum var. biasolettianum	22	0.055
Achnanthidium duthii	6	0.015
Achnanthidium minutissimum var. jackii	29	0.073
Achnanthidium minutissimum var. minutissimum	120	0.300
Amphora fogediana	1	0.003
Aulacoseira ambigua	1	0.003
Brachysira vitrea	5	0.013
Cocconeis placentula var. euglypta	1	0.003
Cocconeis placentula var. lineata	5	0.013
Cyclotella meneghiniana	1	0.003
Cymbella affinis	10	0.025
Cymbella microcephala	8	0.020
Diatoma mesodon	4	0.010
Diatoma vulgare	4	0.010
Encyonema caespitosum	3	0.008
Encyonema silesiacum	2	0.005
Eolimna minima	4	0.010
Fragilaria capucina var. capucina	29	0.073
Fragilaria capucina var. mesolepta	1	0.003
Fragilaria nanana	10	0.025
Gomphonema parvulum var. exilissimum	2	0.005
Gomphonema aff. apuncto	3	0.008
Gomphonema sp.	7	0.018
Navicula cryptocephala	9	0.023
Neidium sp.	1	0.003
Nitzschia amphibia	4	0.010
Nitzschia amphibioides	7	0.018
Nitzschia archibaldii	2	0.005
Nitzschia dissipata	7	0.018
Nitzschia fonticola	1	0.003
Nitzschia gracilis	3	0.008
Nitzschia incognita	1	0.003
Nitzschia lacuum	3	0.008
Nitzschia linearis var. tenuis	4	0.010
Nitzschia palea	1	0.003
Nitzschia palea BIG form	1	0.003
Nitzschia palea var. debilis	8	0.020
Nitzschia paleacea	2	0.005
Nitzschia perminuta	1	0.003
Nitzschia recta	1	0.003
Nitzschia sinuata var. tabellaria	10	0.025
Nitzschia supralitorea	6	0.015
Nitzschia aff. lacuum long	1	0.003
Nitzschia sp.	1	0.003
Pinnularia sp.	2	0.005
Placoneis elginensis	1	0.003
Planothidium lanceolatum ssp. rostratum and/or var. dubia	2	0.005
Reimeria sinuata	2	0.005
Staurosira elliptica	13	0.033
Surirella amphioxys	2	0.005
Synedra biceps	6	0.015
Synedra ulna	2	0.005
unknown	3	0.008
TOTAL	400	1.000

UPPER VAUGHN CREEK		
Bad River Indian Reservation		
Diatoms -- periphyton		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium minutissimum var. minutissimum	24	0.060
Achnanthidium subexiguum	1	0.003
Amphipleura pellucida	17	0.043
Centric sp.	7	0.018
Chamaepinnualaria bremensis	2	0.005
Craticula buderi	1	0.003
Craticula cuspidata	1	0.003
Diploneis oculata	3	0.008
Diploneis sp.	1	0.003
Encyonema silesiacum	3	0.008
Eolimna minima	14	0.035
Eunotia flexuosa	1	0.003
Fallacia monoculata	1	0.003
Fragilaria capucina var. capucina	4	0.010
Fragilaria nanana	7	0.018
Geissleria decussis	4	0.010
Gomphonema sp.	1	0.003
Gyrosigma scalproides	3	0.008
Hippodonta capitata	3	0.008
Mayamaea atomus	3	0.008
Melosira varians	2	0.005
Navicula antonii	1	0.003
Navicula capitatoradiata	2	0.005
Navicula cryptocephala	4	0.010
Navicula difficillima	2	0.005
Navicula germainii	3	0.008
Navicula glomus	1	0.003
Navicula gregaria	2	0.005
Navicula recens	3	0.008
Navicula reichardtiana	1	0.003
Navicula rhynchocephala	1	0.003
Navicula trivialis	2	0.005
Navicula viridula var. rostellata	1	0.003
Navicula viridulacalcis ssp. viridulacalcis	1	0.003
Navicula aff. tenelloides FINER	7	0.018
Navicula aff. veneta FINER	16	0.040
Navicula small indeterminate species	22	0.055
Navicula sp.	4	0.010
Neidium affine	1	0.003
Neidium binodeformis	3	0.008
Neidium sp.	1	0.003
Nitzschia acicularis	3	0.008
Nitzschia acidoclinata	4	0.010
Nitzschia angustatula	3	0.008
Nitzschia archibaldii	9	0.023
Nitzschia dissipata	16	0.040
Nitzschia draveillensis	3	0.008
Nitzschia flexa	2	0.005
Nitzschia fonticola	2	0.005
Nitzschia gracilis	5	0.013
Nitzschia incognita	2	0.005
Nitzschia lacuum	47	0.118
Nitzschia linearis	6	0.015
Nitzschia linearis var. tenuis	8	0.020
Nitzschia palea	1	0.003
Nitzschia palea BIG form	6	0.015
Nitzschia palea var. debilis	13	0.033
Nitzschia paleacea	1	0.003
Nitzschia perminuta	1	0.003
Nitzschia pusilla	4	0.010
Nitzschia recta	4	0.010
Nitzschia supralitorea	14	0.035
Nitzschia aff. lacuum long	14	0.035
Nitzschia aff. lacuum short	1	0.003
Nupela aff. wellneri	2	0.005
Pinnularia sp.	1	0.003
Placoneis elginensis	1	0.003
Planothidium lanceolatum aff. var. biporoma	1	0.003
Planothidium lanceolatum ssp. frequentissimum	5	0.013
Planothidium lanceolatum ssp. rostratum and/or var. dubia	9	0.023
Psammothidium bioretii	1	0.003
Rhopalodia gibba	1	0.003
Sellaphora pupula	8	0.020
Sellaphora seminulum	1	0.003
Simonsenia delognei	11	0.028
Stauroneis smithii	1	0.003
Stauroneis sp.	1	0.003
Surirella angusta	1	0.003
Surirella aff. suecica	1	0.003
Surirella sp.	1	0.003
Synedra ulna	1	0.003
Synedra ulna var. acus	1	0.003
unknown	2	0.005
TOTAL	400	1.000

VAUGHN CREEK AT POTATO RIVER ROAD		
Bad River Indian Reservation		
Diatoms from sediment and rock composite		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthidium minutissimum var. minutissimum	108	0.270
Amphora ovalis	3	0.008
Amphora pediculus	4	0.010
Caloneis bacillum	2	0.005
Cocconeis pediculus	49	0.123
Cocconeis placentula var. euglypta	1	0.003
Cocconeis placentula var. lineata	3	0.008
Cymbella affinis	35	0.088
Cymbella cistula	4	0.010
Cymbella reichardtii	1	0.003
Diploneis aff. boldtiana or modica	3	0.008
Eolimna minima	2	0.005
Geissleria decussis	1	0.003
Gomphonema minutum	25	0.063
Hippodonta hungarica	1	0.003
Melosira varians	6	0.015
Navicula capitatoradiata	8	0.020
Navicula cryptocephala	2	0.005
Navicula cryptotenella	2	0.005
Navicula gregaria	5	0.013
Navicula notha	1	0.003
Navicula viridula var. rostellata	1	0.003
Navicula aff. tenelloides FINER	2	0.005
Navicula aff. veneta FINER	2	0.005
Navicula small indeterminate species	1	0.003
Nitzschia archibaldii	1	0.003
Nitzschia dissipata	1	0.003
Nitzschia heufleriana	25	0.063
Nitzschia lacuum	2	0.005
Nitzschia linearis	36	0.090
Nitzschia palea var. debilis	1	0.003
Nitzschia pusilla	1	0.003
Nitzschia recta	7	0.018
Nitzschia sinuata var. tabellaria	3	0.008
Nitzschia sociabilis	5	0.013
Nitzschia sublinearis	20	0.050
Nitzschia supralitorea	1	0.003
Nitzschia aff. lacuum long	3	0.008
Nitzschia aff. littorea	2	0.005
Placoneis elginensis	4	0.010
Placoneis placentula	2	0.005
Planothidium lanceolatum ssp. frequentissimum	2	0.005
Planothidium lanceolatum ssp. rostratum and/or var. dubia	1	0.003
Rhoicosphenia curvata	1	0.003
Stauroneis smithii	1	0.003
Surirella angusta	1	0.003
Surirella linearis var. helvetica	1	0.003
Synedra parasitica	6	0.015
unknown	1	0.003
TOTAL	400	1.000

WHITE RIVER AT HWY 13		
Bad River Indian Reservation		
Diatoms from sediments and rocks		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes lemmermannii	1	0.003
Achnanthes sp.	1	0.003
Achnanthidium exiguum	2	0.005
Achnanthidium minutissimum var. minutissimum	6	0.015
Amphora pediculus	6	0.015
Caloneis bacillum	2	0.005
Caloneis schumanniana	2	0.005
Centric sp.	1	0.003
Cocconeis pediculus	7	0.018
Cocconeis placentula var. euglypta	8	0.020
Cocconeis placentula var. lineata	8	0.020
Cyclotella meneghiniana	1	0.003
Diatoma mesodon	6	0.015
Diatoma vulgare	4	0.010
Diploneis oculata	2	0.005
Encyonema silesiacum	1	0.003
Eolimna minima	2	0.005
Epithemia sp.	2	0.005
Fragilaria capucina var. capucina	1	0.003
Fragilaria capucina var. rumpens	5	0.013
Fragilaria capucina var. vaucheriae	3	0.008
Gomphonema minutum	1	0.003
Gyrosigma scalproides	1	0.003
Hippodonta capitata	2	0.005
Karayevia clevei	1	0.003
Melosira varians	3	0.008
Navicula capitatoradiata	20	0.050
Navicula cryptocephala	4	0.010
Navicula cryptotenella	4	0.010
Navicula difficillima	4	0.010
Navicula erifuga	1	0.003
Navicula gerloffii	1	0.003
Navicula germainii	4	0.010
Navicula gregaria	33	0.083
Navicula lanceolata	2	0.005
Navicula lenzii	1	0.003
Navicula notha	5	0.013
Navicula perminuta	7	0.018
Navicula reichardtiana	6	0.015
Navicula symmetrica	4	0.010
Navicula tripunctata	2	0.005
Navicula trivialis	7	0.018
Navicula viridula	1	0.003
Navicula viridula var. rostellata	2	0.005
Navicula viridulacalcis ssp. viridulacalcis	1	0.003
Navicula aff. parablis	1	0.003
Navicula aff. tenelloides FINER	2	0.005
Navicula aff. veneta FINER	3	0.008
Navicula small indeterminate species	1	0.003
Navicula sp.	4	0.010
Neidium dubium	1	0.003
Nitzschia acicularis	6	0.015
Nitzschia archibaldii	1	0.003
Nitzschia capitellata	3	0.008
Nitzschia clausii	1	0.003
Nitzschia constricta	3	0.008
Nitzschia dissipata	14	0.035
Nitzschia heufleriana	11	0.028
Nitzschia lacuum	12	0.030
Nitzschia linearis	15	0.038
Nitzschia linearis var. subtilis	2	0.005
Nitzschia linearis var. tenuis	26	0.065
Nitzschia palea	3	0.008
Nitzschia palea BIG form	12	0.030
Nitzschia palea var. debilis	7	0.018
Nitzschia paleacea	4	0.010
Nitzschia recta	14	0.035
Nitzschia sublinearis	4	0.010
Nitzschia supralitorea	8	0.020
Nitzschia aff. agnita	2	0.005
Nitzschia aff. lacuum long	4	0.010
Nitzschia aff. littorea	2	0.005
Nitzschia aff. sigma	1	0.003
Nitzschia sp.	1	0.003
Planothidium lanceolatum aff. var. biporoma	1	0.003
Planothidium lanceolatum ssp. frequentissimum	2	0.005
Planothidium lanceolatum ssp. rostratum and/or var. dubia	3	0.008
Psammothidium bioretii	1	0.003
Rhoicosphenia curvata	1	0.003
Simonsenia delognei	5	0.013
Staurosira construens var. construens	2	0.005
Staurosira elliptica	3	0.008
Staurosirella leptostauron var. martyi	3	0.008
Staurosirella pinnata var. pinata	3	0.008
Surirella aff. minuta	5	0.013
Surirella sp.	4	0.010
Synedra ulna	3	0.008
unknown	8	0.020
TOTAL	400	1.000

WHITE RIVER AT HWY 13		
Bad River Indian Reservation		
Diatoms from sediments and rocks		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes lemmermannii	1	0.003
Achnanthes sp.	1	0.003
Achnanthidium exiguum	2	0.005
Achnanthidium minutissimum var. minutissimum	6	0.015
Amphora pediculus	6	0.015
Caloneis bacillum	2	0.005
Caloneis schumanniana	2	0.005
Centric sp.	1	0.003
Cocconeis pediculus	7	0.018
Cocconeis placentula var. euglypta	8	0.020
Cocconeis placentula var. lineata	8	0.020
Cyclotella meneghiniana	1	0.003
Diatoma mesodon	6	0.015
Diatoma vulgare	4	0.010
Diploneis oculata	2	0.005
Encyonema silesiacum	1	0.003
Eolimna minima	2	0.005
Epithemia sp.	2	0.005
Fragilaria capucina var. capucina	1	0.003
Fragilaria capucina var. rumpens	5	0.013
Fragilaria capucina var. vaucheriae	3	0.008
Gomphonema minutum	1	0.003
Gyrosigma scalproides	1	0.003
Hippodonta capitata	2	0.005
Karayevia clevei	1	0.003
Melosira varians	3	0.008
Navicula capitatoradiata	20	0.050
Navicula cryptocephala	4	0.010
Navicula cryptotenella	4	0.010
Navicula difficillima	4	0.010
Navicula erifuga	1	0.003
Navicula gerloffii	1	0.003
Navicula germainii	4	0.010
Navicula gregaria	33	0.083
Navicula lanceolata	2	0.005
Navicula lenzii	1	0.003
Navicula notha	5	0.013
Navicula perminuta	7	0.018
Navicula reichardtiana	6	0.015
Navicula symmetrica	4	0.010
Navicula tripunctata	2	0.005
Navicula trivialis	7	0.018
Navicula viridula	1	0.003
Navicula viridula var. rostellata	2	0.005
Navicula viridulacalcis ssp. viridulacalcis	1	0.003
Navicula aff. parablis	1	0.003
Navicula aff. tenelloides FINER	2	0.005
Navicula aff. veneta FINER	3	0.008
Navicula small indeterminate species	1	0.003
Navicula sp.	4	0.010
Neidium dubium	1	0.003
Nitzschia acicularis	6	0.015
Nitzschia archibaldii	1	0.003
Nitzschia capitellata	3	0.008
Nitzschia clausii	1	0.003
Nitzschia constricta	3	0.008
Nitzschia dissipata	14	0.035
Nitzschia heufleriana	11	0.028
Nitzschia lacuum	12	0.030
Nitzschia linearis	15	0.038
Nitzschia linearis var. subtilis	2	0.005
Nitzschia linearis var. tenuis	26	0.065
Nitzschia palea	3	0.008
Nitzschia palea BIG form	12	0.030
Nitzschia palea var. debilis	7	0.018
Nitzschia paleacea	4	0.010
Nitzschia recta	14	0.035
Nitzschia sublinearis	4	0.010
Nitzschia supralitorea	8	0.020
Nitzschia aff. agnita	2	0.005
Nitzschia aff. lacuum long	4	0.010
Nitzschia aff. littorea	2	0.005
Nitzschia aff. sigma	1	0.003
Nitzschia sp.	1	0.003
Planothidium lanceolatum aff. var. biporoma	1	0.003
Planothidium lanceolatum ssp. frequentissimum	2	0.005
Planothidium lanceolatum ssp. rostratum and/or var. dubia	3	0.008
Psammothidium bioretii	1	0.003
Rhoicosphenia curvata	1	0.003
Simonsenia delognei	5	0.013
Staurosira construens var. construens	2	0.005
Staurosira elliptica	3	0.008
Staurosirella leptostauron var. martyi	3	0.008
Staurosirella pinnata var. pinata	3	0.008
Surirella aff. minuta	5	0.013
Surirella sp.	4	0.010
Synedra ulna	3	0.008
unknown	8	0.020
TOTAL	400	1.000

WHITE RIVER AT HWY 13		
Bad River Indian Reservation		
Diatoms from sediments and rocks		
2006	**COUNT TOTAL**	
	Number	Prop.
TAXA		
Achnanthes lemmermannii	1	0.003
Achnanthes sp.	1	0.003
Achnanthidium exiguum	2	0.005
Achnanthidium minutissimum var. minutissimum	6	0.015
Amphora pediculus	6	0.015
Caloneis bacillum	2	0.005
Caloneis schumanniana	2	0.005
Centric sp.	1	0.003
Cocconeis pediculus	7	0.018
Cocconeis placentula var. euglypta	8	0.020
Cocconeis placentula var. lineata	8	0.020
Cyclotella meneghiniana	1	0.003
Diatoma mesodon	6	0.015
Diatoma vulgare	4	0.010
Diploneis oculata	2	0.005
Encyonema silesiacum	1	0.003
Eolimna minima	2	0.005
Epithemia sp.	2	0.005
Fragilaria capucina var. capucina	1	0.003
Fragilaria capucina var. rumpens	5	0.013
Fragilaria capucina var. vaucheriae	3	0.008
Gomphonema minutum	1	0.003
Gyrosigma scalproides	1	0.003
Hippodonta capitata	2	0.005
Karayevia clevei	1	0.003
Melosira varians	3	0.008
Navicula capitatoradiata	20	0.050
Navicula cryptocephala	4	0.010
Navicula cryptotenella	4	0.010
Navicula difficillima	4	0.010
Navicula erifuga	1	0.003
Navicula gerloffii	1	0.003
Navicula germainii	4	0.010
Navicula gregaria	33	0.083
Navicula lanceolata	2	0.005
Navicula lenzii	1	0.003
Navicula notha	5	0.013
Navicula perminuta	7	0.018
Navicula reichardtiana	6	0.015
Navicula symmetrica	4	0.010
Navicula tripunctata	2	0.005
Navicula trivialis	7	0.018
Navicula viridula	1	0.003
Navicula viridula var. rostellata	2	0.005
Navicula viridulacalcis ssp. viridulacalcis	1	0.003
Navicula aff. parablis	1	0.003
Navicula aff. tenelloides FINER	2	0.005
Navicula aff. veneta FINER	3	0.008
Navicula small indeterminate species	1	0.003
Navicula sp.	4	0.010
Neidium dubium	1	0.003
Nitzschia acicularis	6	0.015
Nitzschia archibaldii	1	0.003
Nitzschia capitellata	3	0.008
Nitzschia clausii	1	0.003
Nitzschia constricta	3	0.008
Nitzschia dissipata	14	0.035
Nitzschia heufleriana	11	0.028
Nitzschia lacuum	12	0.030
Nitzschia linearis	15	0.038
Nitzschia linearis var. subtilis	2	0.005
Nitzschia linearis var. tenuis	26	0.065
Nitzschia palea	3	0.008
Nitzschia palea BIG form	12	0.030
Nitzschia palea var. debilis	7	0.018
Nitzschia paleacea	4	0.010
Nitzschia recta	14	0.035
Nitzschia sublinearis	4	0.010
Nitzschia supralitorea	8	0.020
Nitzschia aff. agnita	2	0.005
Nitzschia aff. lacuum long	4	0.010
Nitzschia aff. littorea	2	0.005
Nitzschia aff. sigma	1	0.003
Nitzschia sp.	1	0.003
Planothidium lanceolatum aff. var. biporoma	1	0.003
Planothidium lanceolatum ssp. frequentissimum	2	0.005
Planothidium lanceolatum ssp. rostratum and/or var. dubia	3	0.008
Psammothidium bioretii	1	0.003
Rhoicosphenia curvata	1	0.003
Simonsenia delognei	5	0.013
Staurosira construens var. construens	2	0.005
Staurosira elliptica	3	0.008
Staurosirella leptostauron var. martyi	3	0.008
Staurosirella pinnata var. pinata	3	0.008
Surirella aff. minuta	5	0.013
Surirella sp.	4	0.010
Synedra ulna	3	0.008
unknown	8	0.020
TOTAL	400	1.000