

IMPACTS OF HEAVY METALS ON DIATOM (BACILLARIOPHYCEAE)
COMMUNITIES IN CONSTITUTION MARSH AND FOUNDRY COVE
COLD SPRING, NEW YORK, USA

By

BETSEY H. HALLIHAN

A dissertation submitted to the Graduate Faculty in Biology in
partial fulfillment of the requirements for the degree of
Doctor of Philosophy, The City University of New York

2006

UMI Number: 3205021

Copyright 2006 by
Hallihan, Betsey H.

All rights reserved.



UMI Microform 3205021

Copyright 2006 by ProQuest Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

Copyright 2006 by

HALLIHAN, BETSEY H.

All Rights Reserved

This manuscript has been read and accepted for the Graduate Faculty in Biology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy

Date

Chair of Examining Committee
Dr. Thomas Jensen, Lehman College

Date

Executive Officer
Dr. Richard Chappell

Dr. Dwight Kincaid, Lehman College

Dr. Joseph Rachlin, Lehman College

Dr. Barbara Warkentine, SUNY Maritime College

Dr. Jack Valdovinos, Lehman College

THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

IMPACTS OF HEAVY METALS ON DIATOM (BACILLARIOPHYCEAE)
COMMUNITIES IN CONSTITUTION MARSH AND FOUNDRY COVE
COLD SPRING, NEW YORK, USA

By

BETSEY H. HALLIHAN

Adviser: Dr. Thomas Jensen

Foundry Cove and Constitution Marsh are located on the east side of the Hudson River, 85 km upriver from lower Manhattan. The marsh is a contiguous area of emergent marsh plants and mud flats. Between 1965 and 1971 cadmium and nickel were discharged into Foundry Cove by Marathon Battery Company. Cobalt was briefly discharged during this time. An estimated 53 metric tons of cadmium and nickel were deposited in the cove, which became a Superfund site in 1994. The dredging and restoration was completed in 1996.

Have heavy metals affected diatom communities in Constitution Marsh and Foundry Cove? Surface sediments were collected in triplicate from 12 sampling sites on eight occasions from September 18, 1997 to May 16, 1998. Three sampling sites were added to the 12 original sites during the May 30, 1998 collection and were sampled throughout the rest of the study for a total of 738 samples. Cadmium, nickel and cobalt levels were determined for each of the 738 samples. Diatoms were identified and enumerated for each collected sample. These data were analyzed using Bray-Curtis

Similarity, MDS ordination, analysis of similarity, similarity of percentages and diversity indices.

Results show that the diversity of benthic diatoms is not affected by cadmium, nickel and cobalt at the concentrations found. In fact, the areas of the marsh with higher cadmium-nickel concentrations had similar diatoms to other parts of the study area. The dominant taxa, *Navicula gregaria*, *Cyclotella meneghiniana* and *Cocconeis placentula* var. *lineata* were present in similar proportions at all sampling sites. *Navicula gregaria*, however, occurred in the higher cadmium and nickel sites, stations four and five, in greater relative abundance than in other stations. This raises the question of whether this species is more tolerant of metals. Rarer species, then, were very important in differentiating the higher cadmium sites from the control sites.

Keywords: Diatoms, heavy metals, estuarine marsh, *Navicula gregaria*, diversity, MDS, SIMPER

ACKNOWLEDGEMENTS

Many people provided assistance toward the completion of this dissertation. Without their help and encouragement it would not have been possible.

I am grateful to my advisor, Dr. Thomas Jensen, for his support throughout my tenure at Lehman College. I'd also like to thank him for the thesis topic and sending me out to one of the most beautiful spots on the Hudson River. I acknowledge and gratefully thank the members of my committee, Dr. Kincaid, Dr. Rachlin, Dr. Warkentine and Dr. Valdovinos for their time, assistance, comments and suggestions in preparing my thesis.

I am indebted to Joan Reid and Delores Vitanza who provided assistance through my long and arduous graduate years at CUNY and Lehman College.

I thank the many friend and students that helped with my sediment sampling especially Gilbert Fitch who with short notice and the bribe of a sandwich and a beer would spend the day with me canoeing on Constitution Marsh.

I extend a special thanks to Michael Baxter at Lehman College for his assistance throughout my study especially with our work with the Perkin Elmer ICP. He was extremely patient with the vast amount of mud stored in freezers and the extensive number of tubes piled around our lab. We also have the distinction of having an Y2K problem.

I am grateful to Tom Ruehli for his countless hours of computer assistance and his exuberance toward my project. I also thank Emily Volstad for her lab assistance and data entry and Alex Kent for his computer mapping skills.

I extend my thanks to the staff at Constitution Marsh, Jim Rod, Eric Lind and Connie Mayer for their assistance with canoes, library and their interest in my project.

I thank my friends, colleagues, students and faculty at Lehman College for making my tenure at Lehman and very pleasant experience.

I am thankful to my co-workers at Waterbury Hospital for juggling their schedules to make my graduate studies possible.

I express my gratitude to my mother, Carrie Husted, and my son, Bryan Lundeen, for all that they have done to accommodate my graduate studies.

Finally, I am most thankful to Dr. Donald Roeder for introducing me to diatoms and his enduring support, encouragement, confidence and friendship during the past 17 years. Without his assistance in diatom identification and support, this thesis would not have been possible.

TABLE OF CONTENTS

Chapter 1: General introduction	page 1
Chapter 2: Diatoms as pollution indicators	5
Chapter 3: Study sites: Foundry Cove, Constitution Marsh and South Cove	11
Chapter 4: History of heavy metal pollution in Foundry Cove	14
Chapter 5: Benthic sampling and laboratory analyses	16
Chapter 6: Metrics of biotic integrity: Diversity and statistical analysis	20
Chapter 7: Results	
Diatom richness, diversity, evenness indices	26
Diatom species composition	32
Bray-Curtis Similarity Index	35
Heavy Metal analyses	38
Multidimensional scaling (MDS)	46
Analysis of similarity (ANOSIM)	48
Similarity of percentages (SIMPER)	50
Chapter 8: Discussion	52
Distribution of metals: cadmium and nickel	
Foundry Cove	52
Constitution Marsh and South Cove	54
Temporal differences in cadmium and nickel	56
Diversity Indices: Hill's and Shannon	58
Bray-Curtis similarity indices, MDS, ANOSIM, SIMPER	60
Chapter 9: Concluding remarks	65
Appendices	67
Literature cited	322

LIST OF TABLES

	page
Table 1. Diversity indices calculated in this study	22
Table 2. Mean diversity results calculated by Hill's N1, N2 and Shannon. Includes cadmium and nickel results and the number of species equal to or greater than five percent	27
Table 3. ANOVA of Hill's N1 diversity	30
Table 4. ANOVA of Hill's N2 diversity	30
Table 5. ANOVA of Shannon's diversity	31
Table 6. Mean cadmium for selected stations for collections 1-18	39
Table 7. ANOVA of cadmium results	43
Table 8. Mean nickel for selected stations for collections 1-18	44
Table 9. SIMPER results for clusters A, B and C calculated by Bray Curtis similarity index	51

LIST OF FIGURES

	page
Figure 1. Study site. Foundry Cove, Constitution Marsh, South Cove	13
Figure 2. Hill's N1 and N2 diversity of diatoms	28
Figure 3. Shannon's diversity of diatoms	28
Figure 4. Influence of <i>Navicula gregaria</i> on Hill's N1 diversity	35
Figure 5. Dendrogram of diatom community similarity	37
Figure 6. MDS plot of diatom similarities	38
Figure 7. Temporal changes in cadmium and nickel	40
Figure 8. Mean cadmium for 15 stations	41
Figure 9. Mean cadmium for 18 collections	41
Figure 10. Summarization plot for cadmium, stations and collections	42
Figure 11. Mean nickel for 15 stations	45
Figure 12. Mean nickel for 18 collections	45
Figure 13. Summary of cadmium and nickel for 15 stations	46
Figure 14. MDS plot of diatom similarities overlain with Cd bubbles	47
Figure 15. MDS plot of diatom similarities overlain with Ni bubbles	48
Figure 16. Analysis of similarities (ANOSIM)	49
Figure 17. Dendrogram of clusters formed from Bray Curtis	50

LIST OF APPENDICES

	page
Appendix 1. Diatom taxa, authority table and references	67
Appendix 2. Diatom counts for each station for 18 collections	75
Appendix 3. Equations for evenness, diversity, richness	237
Appendix 4. Diversity indices for each station for 18 collections	238
Appendix 5. Diversity summaries	256
Appendix 6. Diatom taxa equal to or greater than 5%	259
Appendix 7. Cadmium and nickel means for stations and collections	274
Appendix 8. Cadmium, nickel and cobalt data	276
Appendix 9. MDS of diatom similarities for 18 collections	309
Appendix 10. MDS of diatom similarities for 18 collections overlain with cadmium bubbles	312
Appendix 11. Similarity of percentages (SIMPER) of clusters A, B, C	315
Appendix 12. Dissimilarity of percentages (SIMPER) of clusters A, B, C	317
Appendix 13. SIMPER of selected stations, comparison of similarities and dissimilarities	320

Chapter 1

INTRODUCTION

Aquatic ecosystems throughout the world have endured chronic inputs of heavy metals from industrial processing, mining, combustion of fossil fuels, effluents from sewage treatment plants and atmospheric deposition. Some aquatic organisms are stressed by this contamination, which, in turn, impacts the ecosystem as a whole. Foundry Cove of the Hudson River ecosystem was contaminated with heavy metals (cadmium, nickel and cobalt) from battery manufacturing in Cold Spring, NY from 1952 to 1979 (Knutson *et al.* 1987).

Heavy metals and other toxic substances eventually find their way to aquatic sediments, which serve both as a source and sink for pollutants. These substances tend to sorb to sediments and organic materials by adsorption (scavenging), co-precipitation, and cellular internalization by organisms and eventually become highly concentrated in the sediments. Most pollutants become bioavailable to sediment-dwelling organisms, which can disperse toxins via predation and/or bioavailability to organisms at higher trophic levels, eventually impacting human consumers.

Extensive research has focused on the ramification of these contaminants in the environment and their effects on organisms in the aquatic food web. And while many studies have narrowed their attention to impacts of heavy metals on organisms at the top of the food web, this study addresses the influence of cadmium, nickel and cobalt on the bottom, or base of the food web, the primary producers.

Phytoplankton and periphyton are primary producers in an aquatic ecosystem and comprise the first trophic level. They adsorb pollutants and transfer metals to the next

trophic level, the micro zooplankton, which in turn regenerates metal contaminants either by fecal pellets or through predation by higher trophic level organisms (Twiss *et al.* 1996). This process can maintain metal availability to other organisms.

Constitution Marsh is also a spawning and feeding ground for anadromous and resident fishes including alewife, blueback herring, white perch, striped bass, and largemouth bass (Anon. 1990). It is also a nesting site for least bitterns and feeding grounds for herons, osprey, and other waterfowl (Anon. 1990). These organisms all depend on the trophic transfer of nutrients from phytoplankton, but unfortunately, some heavy metals may transfer along with these essential nutrients to the next trophic level (Twiss *et al.* 1996).

Resource species or key organisms are vital to the health of the Hudson River. It is extremely important when studying the toxicological and physiological responses of an aquatic ecosystem to study the impact of pollutants, especially heavy metals, on the phytoplankton or primary producers. Since these are at the base of the food chain, resource species are highly dependent on the abundance and diversity of these organisms.

In the Hudson River, as in all aquatic ecosystems, the plankton incorporate and cycle a large amount of energy that is passed on to higher trophic levels. Phytoplankton are the primary producers and consist mainly of protists, primarily diatoms. Diatoms have long been used as a tool to assess variable environmental conditions due to their large number of species, their fundamental role in the food web and their sensitivity to pollutants. Pollutants can affect the diatoms' ability to photosynthesize, grow and reproduce. Ultimately these changes will reduce the growth rate, abundance and

diversity of the populations and will, in turn, fail to support the next trophic level, the micro zooplankton, thus impacting the whole ecosystem (Twiss *et al.* 1996).

Algae, especially diatoms, have been used as indicators of environmental conditions. Patrick (1963) considered shifts in species richness and evenness of species abundances as indicators of ecological conditions. With this approach, a pollutant's effects on species composition of the community can be detected. However, this approach requires counting large numbers of species over a long period of time. Patrick (1973) raises the question "are algae reliable indicators of water quality?" According to Patrick, a pollutant can result in shifts in species composition and structure of the community when compared to natural communities. One can predict the effects of pollution by observing the types of shifts in populations. The effect of pollution, therefore, reduces the number of species, which causes greater unevenness.

Unfortunately, information on the effects of pollutants on natural populations is limited when compared with the data available from studies of single species in laboratory conditions. The laboratory assays are generally of measured toxicity to known concentrations of metals (Rosko & Rachlin 1977, Baxter & Jensen 1980a, 1980b; Jensen *et al.* 1982a, 1982b; Rachlin *et al.* 1982a, 1982b; Rachlin *et al.* 1984; Rachlin *et al.* 1985; Rai *et al.* 1990; Jensen & Corpe 1993). These studies identified the intracellular sequestering of metals. They have shown that polyphosphate bodies and the cytoplasm bind cadmium, cobalt, nickel and other metals.

Objectives

The main objective of this thesis is to investigate whether there have been any affects on benthic diatom (Bacillariophyceae) populations in Constitution Marsh and East Foundry Cove due to heavy metal (cadmium, nickel and cobalt) contamination. Has the metal contamination in Constitution Marsh caused a change in populations, relative abundances and species diversity? In addition, can changes in species composition and diversity be used as an indicator of changes in water and sediment quality due to metal pollution?

Chapter 2

DIATOMS AS POLLUTION INDICATORS

Diatoms have been used for decades as indicators of a variety of environmental conditions. Kolkwitz and Marsson (1908) did one of the earliest studies of the use of diatoms as indicators of organic pollution in European rivers and streams. Since then, numerous studies have used several diatom taxa and assemblages of taxa to monitor environmental conditions. Because diatoms are important components of the biological community and food web and are sensitive to changes in water quality, they provide information on both the biological integrity of the ecosystem and those factors likely to be causing any changes. Diatoms, as biological indicators, can indicate acid deposition and eutrophication of lakes, changes in climate over the past thousands of years, fecal pollution to rivers and possibly indicators of heavy metal pollution. Due to their siliceous cell walls, they are preserved, providing a permanent record of environmental conditions when they were alive.

Researchers have used diatoms to infer past and present pH in lakes in acid-sensitive regions of the U.S. and world (Charles 1985, Charles *et al.* 1989). Diatom assemblages in the stratigraphic record of dated lake sediment cores show that about 25%-35% of the lakes in the Adirondack Mountains with the lowest ability to neutralize acids have become more acidic since pre-industrial times (Cumming *et al.* 1992). Diatoms are also used as indicators of surface water acidity (Charles 1985, Battarbee *et al.* 1999). Lakes in other regions of the country have also acidified but not to the same extent (Charles *et al.* 1989). Analysis of diatoms and sedimentary remains of other

biological groups (e.g., chrysophytes, chironomids, Cladocera) reveals that acidic deposition has had significant effects on aquatic communities in many lakes. Numbers of taxa are reduced, while acid-tolerant taxa have significantly increased in abundance.

Paleolimnological studies of sediment cores provide valuable data on climate change over the past hundreds to thousands of years. Diatom populations are sensitive to changes in water level, salinity, ice cover, wind-mixing patterns and other characteristics directly and indirectly affected by climate which are essential for understanding the nature and magnitude of ecosystem change that can be expected in future years (Mason *et al.* 1994).

The approach of examining lake eutrophication, past and present, by using diatom assemblages has been widely applied in North America and throughout the world. Eutrophication is the most widespread form of lake pollution in the world. There are considerable changes to overall primary production with changes to biochemical cycles and biological communities. This may cause a reduction in the biodiversity of organisms in many lakes (Margalef 1968). Lakes are more eutrophic now than in pre-settlement times. This information is being obtained from analyses of diatom assemblages from recent and pre-industrial levels of sediment cores taken as part of the U.S. Environmental Protection Agency's Surface Water component of the Environmental Monitoring and Assessment Program, EMAP, (Dixit and Smol 1994). Since diatoms preserve well in lake sediments they can be used as long-term indicators of lake responses to eutrophication.

Monitoring eutrophication in rivers has also included diatom assemblages but select only a few taxa to monitor the trophic status. Kelly and Whitton's (1995) Trophic Diatom Index, TDI, is based on 86 taxa, which are easily identified and are good

indicators of organic pollution. The value of TDI can range from one (very low nutrient concentrations) to five (very high nutrient concentrations). The pollution tolerance index (PTI) resembles the TDI. Lange-Bertalot (1979) distinguishes three categories of diatoms according to their tolerance to increased pollution, from one to three with a value of three representing the most sensitive species.

Many diatom data sets exist that can inform us about long term trends in water quality in rivers and streams. Autecological indices were developed to infer levels of pollution based on the species composition and the ecological preferences and tolerances of taxa (Fjerdingstad 1950, Lowe 1974, Lange-Bertalot 1979, Descy and Coste 1990, Pan *et al.* 1996). Patrick's early monitoring work (Patrick *et al.* 1954) and later work (Patrick & Strawbridge 1963, Patrick 1973), used diatom diversity as an indicator of pollution. The monitoring program conducted by the Federal Water Pollution Control Agency in the 1960s tracked the status of major rivers throughout the country (Williams and Scott 1962). Beaver (1981) tabulated ecological characteristics of approximately 1000 diatoms. The Academy of Natural Sciences of Philadelphia has long-term records for several rivers in the eastern United States. Many of these records show that the water quality downstream from industrial effluent outfalls and sewage treatment plants has improved, but others show that the opposite conditions exist. Much more could be learned about trends by simply analyzing the immense data that already exist, especially by using new quantitative techniques developed in the past 5-10 years.

Organic pollution from industrial wastes and sewage treatment also includes heavy metals. A study of the impacts of metals on diatom communities in streams by Reese (1937) focused on downstream effects from lead mines. Many studies have focused on the influence of zinc on species composition of the periphyton (Williams & Mount 1965). More recent studies compare algal communities upstream and downstream from a point source of metal pollution (Roch *et al.* 1985). The results of these types of studies are difficult to interpret since there are other factors such as nutrient concentration, pH and light for example. Experimental conditions have been set up to exclude these types of factors (Gray & Hill 1995).

Artificial streams and microcosms have also been used to study changes in community structure due to zinc stress (Genter *et al.* 1987). Blanck *et al.* (1988) studied marine periphyton and found arsenate stress induced community tolerance, or PICT (pollution induced community tolerance).

Several studies, by Whitton (1971), Prosi (1981), Moore and Ramamoorthy (1984), Stronkhorst *et al.* (1994) and Absil and van Scheppingen (1996) have reported that the overall community size decreases in the presence of elevated metal concentrations. They also agree that algal communities become tolerant after prolonged exposure to metal and a more tolerant community is then established. Constitution Marsh may have established a dominant community of tolerant diatoms.

Ivorra (2000) investigated heavy metal impacts on benthic communities, using biofilms and translocation in the polluted Dommel River, Belgium. Several experiments included the addition of phosphorus with the resulting diatom communities responding in

various ways. *Gomphonema parvulum* became more tolerant to zinc in these experiments. Translocation changed shifts in species composition, which could be related to metal pollution. *Achnanthes minutissima*, normally an indicator of good water quality (Lange-Bertalot 1979), became a dominant (>50%) species under zinc plus phosphorus conditions and *Navicula gregaria* was more tolerant under the cadmium plus phosphorus conditions thus indicating their potential as water quality indicators.

Gomphonema parvulum persisted under metal polluted conditions in another study (Ivorra *et al.* 2002). *Gomphonema* was isolated from a zinc and cadmium contaminated stream and a reference (uncontaminated) stream. The strains were cultured in synthetic medium on biofilms. *Gomphonema parvulum* from the polluted sites had more tolerance for zinc than from the reference site.

Achnanthes minutissima was also the dominate diatom in a study of the Godani River, Japan, a river contaminated by a copper mine (Nakanishi *et al.* 2004). They found that this diatom had a tolerance to the following metals: cooper, zinc, lead and cadmium

Gold *et al.* (2002) used periphytic diatom communities grown on artificial substrates from a reference site and transferred these to a site polluted by cadmium (15 micrograms per liter) and zinc (800 micrograms per liter). At one month, changes in diatom density and taxonomic composition were assessed for metal sensitivity. The community structure of the transferred communities shifted towards the structure of the resident community of the polluted site. Diatom density decreased, as did the relative abundance of transferred species from the reference site. Common species at the polluted site were *Gomphonema parvulum*, *Pinnularia sp.* and *Fragilaria crotonensis*. According

to Gold and others, this short-term change in community structure could, therefore, be useful as indicators of metal pollution.

Gold *et al.* (2003) continued their investigations but used artificial streams located along the pollution gradient of the River Lot in France. The three sites were the reference (upstream of pollution), slightly polluted (1.5 micrograms per liter cadmium) and polluted (6 micrograms per liter cadmium). Diatom communities in these artificial streams were studied at one, two, three and four weeks. Community changes were observed as early as one week. After four weeks, cell density was lower in the polluted site than the reference site and taxonomic composition was also different between the sites.

These studies raise the question of whether metal contamination in rivers is steering algal succession towards more metal tolerant taxa.

Chapter 3

STUDY SITE

The Hudson River flows 507 kilometers from Lake Tear of the Clouds in northern New York to the Battery, New York City where it discharges into the Upper New York Bay. The Hudson is an estuary, which is a river that has a free connection with the sea and is, therefore, influenced by tides and salinity. Salt water enters the river from the Upper New York Bay during the flood phase of the tidal cycle and this salinity reaches as far north as Newburgh, 100 km north of the Battery and north of Constitution Marsh. Freshwater mixed with salt discharges into New York Bay during the ebb phase of the tidal cycle. The fluctuating salinity in the river enhances productivity, which results in a greater biodiversity (Limburg *et al.* 1986).

Foundry Cove and Constitution Marsh are located on the east side of the Hudson River, 85 km upriver from lower Manhattan, in Cold Spring, NY. The cove and marsh are across the river from the northern section of West Point Military Academy and Storm King Mountain (fig. 1). Salinity at West Point averages 5 parts per thousand but fluctuates seasonally, tidally and with varying freshwater runoff. There are two high tides and two low tides occurring every 24 hours and 50 minutes with an average range at West Point of 0.8 meters (Limburg *et al.* 1986).

The cove and marsh are strongly influenced by the varying salinity and tides. West Foundry Cove is open to the Hudson River so water flows are unrestricted. East Foundry Cove has been separated from the west by a railroad trestle. The east cove flood and ebb water flows are restricted to a 65-foot wide passage under the trestle.

Northern Constitution Marsh is influenced by the same restricted water flows as east Foundry Cove. Southern Constitution Marsh has flood and ebb water flows restricted by another train trestle to the south where water flows from the Hudson through the trestle passage and into South Cove.

Constitution Marsh, adjacent to East Foundry Cove, is separated from the Hudson by Constitution Island. The marsh is a 161-hectare contiguous area of emergent marsh plants, predominately narrow-leaved cattail (*Typha angustifolia*), marsh mallow (*Hibiscus moscheutos*), pickerel weed (*Pontederia cordata*) and mud flats but the water flows are quite different between the northern and southern areas of the marsh.

Foundry Cove and Constitution Marsh have several freshwater streams flowing into the area thereby reducing the salinity below 5 parts per thousand. Only during periods of drought does the salinity increase above that level. Foundry Brook provides freshwater to Foundry Cove and Indian Brook flows into South Cove adjacent to the Audubon Center (Fig.1).

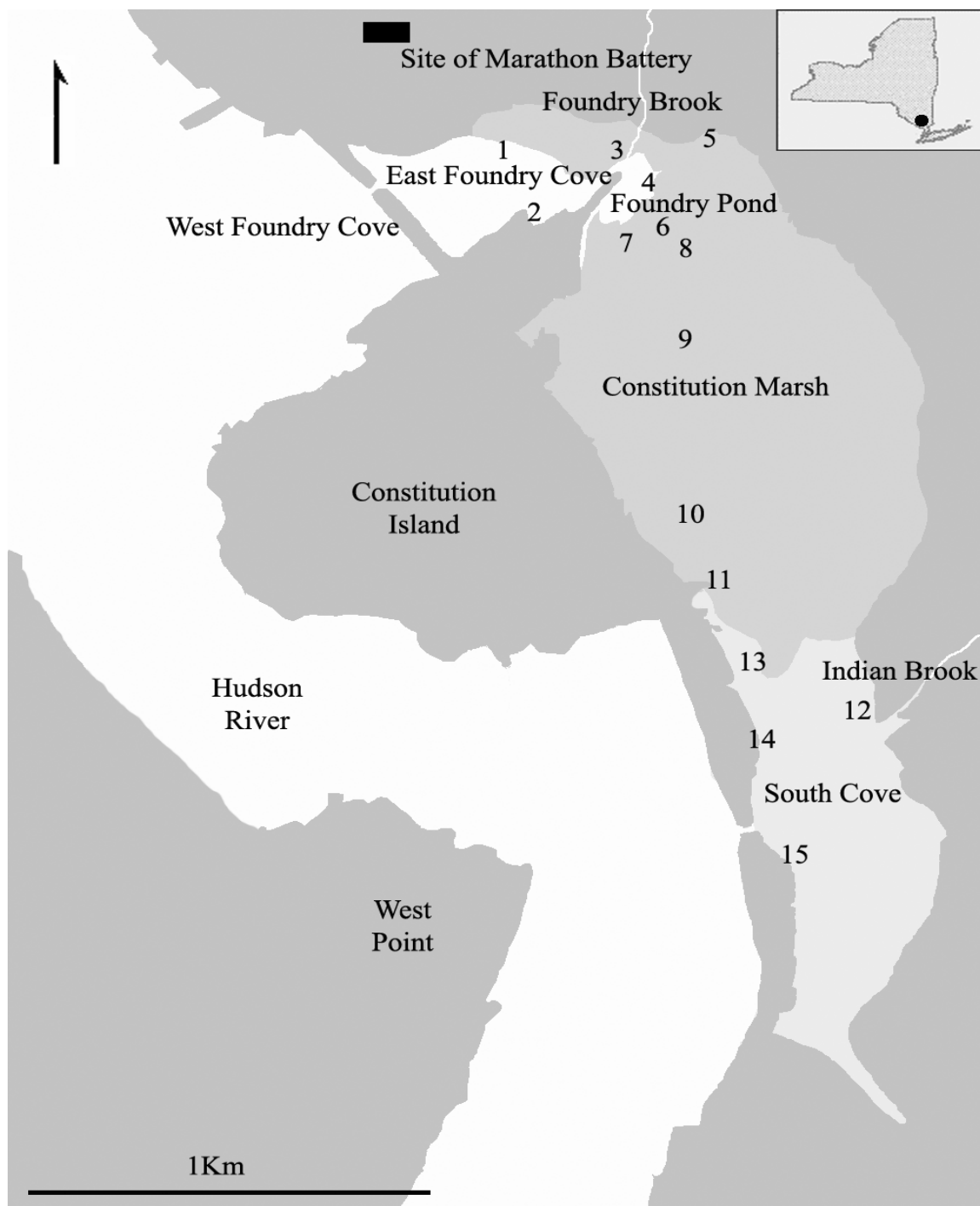


Figure 1. Study area and collecting stations shown as numbers 1-15.

Chapter 4

HISTORY OF HEAVY METAL POLLUTION IN FOUNDRY COVE

The Marathon Battery Company was built in 1952 by the U.S. Army Corps of Engineers to manufacture nickel-cadmium batteries under military contracts (Hazen 1981). The production of batteries requires concentrated metal nitrate solutions and resulted in large volumes of waste solutions containing cadmium and nickel hydroxides. Cobalt was used briefly as an additive in the process and was also discharged as waste. All three were discharged into the Hudson River at Cold Spring Pier through the town's waste treatment system. In 1965, the company was ordered to discontinue using the town's waste facility and, thereafter released heavy metal waste until 1971 directly into Foundry Brook, which feeds into East Foundry Cove (Hazen 1981). By this time a new treatment facility was built in Cold Spring and all wastewater from the battery factory was again discharged into the Hudson River at Cold Spring Pier until 1979 when the factory was closed.

By then, Resource Engineering (1983) estimated that 179 metric tons of cadmium were discharged from the factory into the Hudson River. Of this, 53 metric tons of cadmium were estimated to have been deposited in sediments of the cove resulting in cadmium "hot spots" (concentrations >900 ppm). For this Foundry Cove earned the distinction of being the "world's largest cadmium dump site."

The most heavily contaminated Foundry Cove sediments were dredged in the spring of 1973. However, this operation not only upset the ecosystem but also failed to decrease the level of cadmium in the cove (Kneip and Hazen 1979). The site was again

dredged in 1994 under the Comprehensive Environmental Response Compensation Liability Act (CERCLA, 1980), also known as The Superfund. Under the EPA Superfund citing, the sediments were removed from East Foundry Cove and East Foundry Pond of Constitution Marsh. The area was restored with new sediments and aquatic and terrestrial plants. The dredging and restoration of Foundry Cove was completed in 1996. The total cost of the project was estimated to be 91 million U.S. dollars according to the EPA Record of Decision R02-89/97.

Constitution Marsh and Foundry Cove exhibit interesting water flows and hydrodynamics. Prior to the 1996 cleanup and restoration, Foundry Cove experienced tidal losses of cadmium to the Hudson River (Hazen 1981). Less is known about the movement of cadmium into Constitution Marsh, but recent cadmium levels indicate that sediment movement has occurred (Resource Engineering 1983).

Constitution Marsh, which is adjacent to Foundry Cove and Foundry Pond, was not included in the Superfund cleanup. Follow-up studies from 1995 to 2000 by Advanced Geoservices Corp., Chadds Ford, PA were hired to perform follow up studies on cadmium in cover soil, sediment samples and surface water from November 1995 to October 2002.

Chapter 5

BENTHIC SAMPLING AND LABORATORY ANALYSES

Diatoms grow abundantly in rivers and inhabit a multitude of habitats. Within aquatic habitats there are many sites for diatoms to grow; some on rock surfaces (epilithon), logs, or twigs (epidendron), others inhabit plant surfaces (epiphyton), while others free-float in the water column (pelagic) or planktonic, some inhabit the sand surfaces (episammon) and live in the silty sediments (epipelon) of the benthos (Round 1991). In this study, only the epipelon was sampled but this may include other types of diatoms that may have become part of the benthos.

All sampling was done after the Superfund cleanup and restoration of Foundry Cove. Sampling began in September of 1997 and continued until October 1998 on a monthly or twice monthly regiment. In order to evaluate the diversity of diatom populations it was necessary to follow its pattern for a minimum of one year (Ravera 1979). Sampling, however, could not be done during the months of November and December since Constitution Marsh is an Audubon bird sanctuary and is off limits to humans during bird hunting season (Rod 1997).

Surface sediments

Surface sediments were collected in triplicate from 15 sampling sites (fig. 1): three in Foundry Cove, six in northern Constitution Marsh, two in southern Constitution Marsh, and four in South Cove with the LaMotte surface sediment grab sampler. Originally, there were 12 sampling sites; three additional sites were added during the May 30, 1998 collection to be used as reference sites. There are no similar marshes in

that area of the Hudson River so South Cove is used as a reference site. Sediments were collected between low and mid tide and vice versa sometimes on the ebb tide and others on the flood tide. Collecting usually took several hours by canoe since motors are prohibited in Constitution Marsh. Temporal variations in benthos may exist due to the time required to collect. At each sampling location, three replicates were randomly collected within approximately 5 meters of each other. All collected sediments were placed in zip-lock bags, transported to Lehman College and frozen for analysis. A total of 18 collections were done from September 1997 to October 1998.

Sediment digestion

The sediments were digested of organic matter using the EPA method 3051 and CEM (Matthews, NC) MDS 2000 microwave digester. Two grams of wet weight sediment were dried in a 100-degree Celsius oven. Once dried, 0.5 grams were weighed and placed in digestion tubes along with 10 milliliters of high quality, metal free, nitric acid. Once digested, the nitric acid was poured into centrifuge tubes for heavy metal analysis. The sediment portion (diatoms) was rinsed with distilled water, centrifuged, decanted and washed three times with distilled water. After the final rinse, the digested sediment samples were added to 20 milliliters of distilled water, pipetted onto cover slips in plastic evaporation trays and left undisturbed until evaporation was complete. The cover slips were then mounted onto glass slides with Naphrax, refractive index 1.69, (Northern Biological Supplies Limited, Ipswich, England) mounting medium. A minimum of 300 diatom valves was counted for each sample using a Bausch and Lomb series "R" light microscope equipped with a 1.30 N.A. semiapochromatic oil objective.

Heavy metal analysis

The post digestion nitric acid samples were diluted 1:10 with distilled/deionized water. Cadmium, nickel and cobalt levels were determined for each sample using a Perkin Elmer (Norwalk, CT) ICP 3000 XL (inductively coupled plasma-optical emission spectrometry). A standard curve and controls were run with each batch of samples. Every other run contained a digested sediment sample with a known amount of cadmium (a spike), which had been added prior to drying and analysis. Spectrophotometric wavelengths (measured in nanometers) were chosen for each element by two criteria: the detection limit (or concentrations) of each element and wavelengths, which are less vulnerable to interferences. Cadmium was measured at wavelengths 214.4nm and 228.8nm, nickel at 228.6nm and 230.7nm, and cobalt at 232.0nm and 341.4nm. Results were recorded for each collection site and date and entered into Statview 5 (SAS Institute 1999).

Diatom analysis

A minimum of 300 diatom valves were counted and identified for each station replicate and collection date. Enumerating and identifying this number of diatom valves is a standard approach used in some U.S. National programs (Stevenson 1984). Also, according to Archibald (1972), counting and identifying 300 valves provides enough data for the computation of species diversity and evenness. Several authors use different counts in their methods. For example, Kelly and Whitton (1995) and Kelly *et al.* (1995) used a minimum of 200 frustules on each sample in their study in the use of diatoms for

biological monitoring. Michelutti *et al.* (2001) counted a minimum of 350 frustules in their paleohydrological study of lake sediments.

A total of 188 taxa were determined (Appendix 1). The counts for collections and stations are also included (Appendix 2). Taxa were identified according to Patrick and Reimer (1967, 1975) and Krammer & Lange-Bertalot (1986, 1988, 1991a, b). Several other works were used to help in the identification process; Hustedt (1930, 1939, 1953, 1959), Round *et al.* (1990), Vinyard (1979), Stoermer *et al.* (1999), Barber and Haworth (1981) and Dodd (1987). The following internet sites confirmed several identifications: Fort Howard State University, ADIAC Diatom Image Database, Bowling Green State University Algae Image Archive, California Academy of Sciences, Diatom Collection, Great Lakes Diatom Home Page, University of Michigan, South Florida Periphyton Research group. The addresses for these are listed in references.

Diatom taxonomy is constantly changing and more changes are likely in the near future. Round *et al.* (1990) have made many changes to the historic taxonomy. These changes make the status of many taxa reported from the United States uncertain. The classification of Patrick and Reimer (1967, 1975) was followed and supplemented with other authors. Synonyms have been found for many species in the taxa list and the reader should consult synonyms listed in the previous internet sites.

Chapter 6

METRICS OF BIOTIC INTEGRITY

Statistical analysis and diversity measures

Univariate and multivariate techniques were used to analyze the data. Univariate techniques measure the diatom richness, evenness and diversity and attempt to assess community structure. Diversity indices are used to calculate diversity within a community (alpha), diversity across communities (beta) and diversity due to differences among samples when combined into a single sample (gamma) (Whittaker 1960). Diversity indices incorporate two other variables, richness (the total number of species) and the evenness (how the abundance data are distributed among the species). They attempt to reduce the complexity of communities into a single index (or small number of indices), which can be compared within or between sites and other communities.

Ecologists and conservationists use diversity indices as another way to attempt to measure the effects of pollution. Different types of pollution can alter the number and the evenness of species. Patrick (1973) observed that as pollution increased, the community diversity decreased. Her earlier work (1963) suggests that to observe changes in the environment, shifts in numbers of species or species richness and evenness can be used. She also states that along with the community structure, the types of species and the total biomass should also be assessed.

Wilhm and Dorris (1968) used macroinvertebrate community diversity as a measure for water quality. The diversity of these communities was used to indicate water pollution. Diversity less than one, using the Shannon Index, indicates heavily polluted areas, greater than one but less than three indicates moderately polluted areas and greater

than three indicates non-polluted areas. This follows Ravera (1979) that natural communities evolve over time and a change in environmental conditions can change the diversity, which can indicate the level of pollution the community is subject to. This is especially true if the diversity is measured before and after pollution. However, it is difficult to estimate the effects on the entire community because of the difficulty measuring all the environmental factors involved.

Diversity indices have been used to explain and simplify the community concept. Theory based indices were first used by Margalef (1957) in community studies. The application of diversity to applied studies followed with the work of Wilhm and Dorris (1968) where diversity was successful as an indicator of organic pollution. One difficulty of using diversity measures is the interpretation of the results. The same diversity index value can be obtained for a community with low richness and high evenness as for a community with high richness and low evenness.

Several scientists, Archibald (1972), Green and Vascotto (1978), and Stevenson (1984) dispute the assumption that an increase in pollution will result in a decrease in diversity and have observed in studies that diversity can be dependent upon other variables and not pollution in aquatic ecosystems. Archibald found that diversity of diatoms in some South African rivers could not be directly linked to water quality. Stevenson observed that species diversity could be greater in polluted areas than in less polluted areas.

Richness is the number of species in a sample. High species richness can indicate high biotic integrity because many species have adapted to the conditions of the habitat. The richness of the community may decrease with increasing pollution. However,

richness can be reduced by other environmental factors such as nutrient and light availability. Along with these factors, richness depends on the sample size and in this study the sample size is variable and not of equal size. With increasing diatom counts, the number of species also increases. Even large counts of diatoms may continue to yield rare species. Richness in this study is, therefore, only useful to calculate other indices.

The indices of Margalef (1957) and Menhinick (1964) are used for the calculation of richness. Five evenness indices were used. They included Pielou (1977), Sheldon (1969), Heip (1974), Hill's ratio, and Modified Hill's ratio (1973b). Diversity indices I used include Hill's diversity (N_1 , N_2), Simpson (1949) and Shannon (1948) indices (Table 1). See Appendix 3 for the equations used to calculate richness, diversity and evenness in this study.

Table 1. Diatom richness, diversity and evenness indices used in this study.

Richness	Margalef	Menhinick
Diversity	Hill's N_1 ratio Hill's N_2 ratio	Simpson Shannon
Evenness	Pielou Sheldon Heip	Hill's ratio Modified Hill's ratio

The most commonly used diversity measure used in community ecology is the Shannon diversity index (Stevenson 1984). It is a measure of the average degree of uncertainty in predicting what species an individual chosen at random from a collection of S species and N individuals will belong. H' equals zero if and only if there is only one species in the sample and H' is the maximum only when the same number of individuals

represents all S species. Shannon index is often called the Shannon-Weaver or Shannon-Wiener but will be referred to here as Shannon index (1948).

Simpson's (1949) index measures the probability that two individuals randomly selected from a population will belong to the same species. The index varies from zero to one. If the probability is high that the two individuals are of the same species then the diversity of the community is considered to be low and is closer to zero.

Hill's (1973) diversity combines Simpson and Shannon's indices and has three components (N_0 , N_1 , and N_2). N_0 is the number of all species in the sample, N_1 measures the number of abundant species (a transformation of Shannon's) and N_2 is the number of very abundant species in the sample (the reciprocal of Simpson's). N_1 will always be between N_0 and N_2 . The units in Hill's numbers are species and as the number increases less weight is put on rare species and lower values are obtained for N_1 and N_2 since they measure the abundant and very abundant species in a sample.

Evenness refers to how the species abundance is distributed among the species. Maximum evenness in a community is when all species in a sample are equally abundant. The community changes as the abundances diverge away from evenness. The most common evenness index is Pielou (1977, 1984), which expresses H' relative to the maximum value that H' can obtain when all the species are perfectly evenly distributed. The Pielou index is defined between zero and one, where one represents evenness in the community and decreases to zero when species diverge from an even distribution of species. This index, however, is strongly affected by species richness. If one more species is added to a sample with only a few species it greatly changes the evenness value.

Hill (1973) used the ratio of N_2 to N_1 , or the numbers of very abundant to abundant species as an index of evenness. If one species is more dominant then the ratio comes closer to one and the community is less diverse. Modified Hill's ratio is the ratio of N_2 minus one to N_1 minus one and as one species becomes more dominant then the ratio comes closer to becoming zero. Modified Hill's ratio does not require an estimate of the number of species in the community, which is affected by sample size. Results for these measures are in Appendix 4.

The Bray-Curtis community similarity index (Bray & Curtis 1957) is a common technique to measure similarity between samples. Similarity is based on values from zero to 100, 100 being the most similar. Raw data can be used but sometimes it's more useful to transform the data before a similarity index is performed. The two useful transformations are root and double root (Clark and Warwick 2001). The root transformation down weights the importance of highly abundant species so the less common species have an influence in the similarity index. The double root is a more severe down weighting of the abundant species and includes not only the "midrange" species but also the very rare species in the calculation.

Multivariate techniques include multidimensional scaling (MDS), cluster analysis or dendrogram, similarity of percentage (SIMPER) and analysis of similarity (ANOSIM). The Bray-Curtis community similarity index (Bray and Curtis 1957, according to Clark and Warwick 2001) was calculated between stations and collection dates for both diatom taxa and cadmium/nickel data. Root and double root transformations were performed along with no transformations for Bray-Curtis similarity index. Results of these were then used to calculate multivariate techniques.

Cluster analysis finds natural groupings of samples or stations that are more similar to each other. A clearer picture of cluster analysis is the dendrogram, which delineates groups of sites within the community structure. Ordination by MDS constructs a map or configuration of the samples based on similarity calculated from Bray-Curtis similarity index. The stress, or goodness of fit of compressing the sample relationships into two dimensions is expressed as a number, which when less than 0.1 can be interpreted as containing no misleading interpretation of the two dimensional plot. Any MDS >0.1 and <0.2 gives a useful picture, and stress greater than 0.3 indicates that the points are arbitrarily placed in the two dimensional ordination (Clarke & Warwick, 2001). The MDS plots of diatom similarity, for each station during every collection, were overlaid with cadmium and nickel using “bubble plots” (Clarke & Warwick, 2001).

Similarity of percentages (SIMPER) can be used to identify the contribution each species contributes to the dissimilarity (or similarity) of groups. It starts with all the data and does not have to be calculated from the Bray Curtis similarity matrix. It is useful to determine the species that are primarily responsible for the separation into different groups.

To test if there are differences or no differences between the groups, an analysis of similarities (ANOSIM) can be performed from the Bray Curtis similarity matrix. A rank (R) of one indicates that the groups are statistically different. If there is no effect of groups, then R equals zero (Clarke & Warwick 2001).

Chapter 7

RESULTS

Diatom Richness, Diversity, Evenness indices

The Hill's N1 and N2 and Shannon diversity results varied between stations and collections (Appendix 4). The lowest diversity Hill's N1 of 6.9 and the lowest N2 of 3.4 occurred during the 9-18-1997 collection at station three. *Achnanthes haukiana* var. *rostrata* dominated the other taxa with 51.8% relative frequency. There were only three other dominant taxa during that collection, *Achnanthes lanceolata* (8.6%), *Navicula viridula* (5.9%) and *Nitzschia frustulum* (12%). Only 26 different taxa were present in this collection.

The greatest Hill's N1 diversity was 38.9 and occurred during the 7-14-98 collection at station six. There were 79 different taxa present in this collection. Of these, 22 species had a relative frequency greater than 1%. The three dominant diatoms are *Cocconeis placentula* var. *lineata* (8.8%), *Cyclotella meneghiniana* (8.9%) and *Navicula gregaria* (13.0%).

Hill's N2 diversity, however, was the highest, 26.2, during the 9-12-98 collection at station four. There were 61 taxa present with only one dominant diatom, *Navicula gregaria* (9.7%) and 27 diatoms comprising one percent or more of the total.

Shannon's index followed Hill's N1 diversity in that the most diverse station was station six (3.7) during the 7-14-98 collection and the lowest at station three (1.9) during the 9-18-97 collection.

The means of diversity and evenness for each station, during the 18 collections, are summarized in Table 2, Figures 2 and 3. The mean number of taxa at each station during every collection is also included in Table 2. Richness, diversity and evenness indices for every station and collection are in Appendix 4 and summarized for all collections and stations in Appendix 5.

Table 2. A comparison of mean diversity and evenness results for all collections using Hill's N1, N2, Shannon, Pielou, Hill's E4 and E5. The mean number of taxa is also included.

Station	Hill's N1	Hill's N2	Shannon	Pielou E1	Hill's E4	Hill's E5	Mean # of taxa
1	23.3	15.1	3.1	0.75	0.65	0.66	50.9
2	29.9	19.3	3.4	0.86	0.68	0.67	63.2
3	26.3	16.4	3.2	0.84	0.65	0.63	57.4
4	26.7	15.4	3.3	0.79	0.59	0.56	60.9
5	28.2	16.8	3.3	0.80	0.62	0.60	60.8
6	30.3	17.4	3.4	0.81	0.60	0.58	67.8
7	23.8	12.5	3.2	0.77	0.51	0.53	59.7
8	30.0	17.7	3.4	0.81	0.58	0.60	65.1
9	27.5	15.8	3.3	0.80	0.61	0.60	60.5
10	28.1	16.4	3.3	0.80	0.61	0.59	63.8
11	27.6	16.1	3.3	0.80	0.61	0.60	61.2
12	27.1	16.0	3.4	0.81	0.62	0.61	59.3
13	31.8	19.0	3.5	0.82	0.60	0.64	68.3
14	28.5	17.5	3.3	0.80	0.66	0.64	61.9
15	26.9	17.1	3.3	0.81	0.70	0.64	58.6

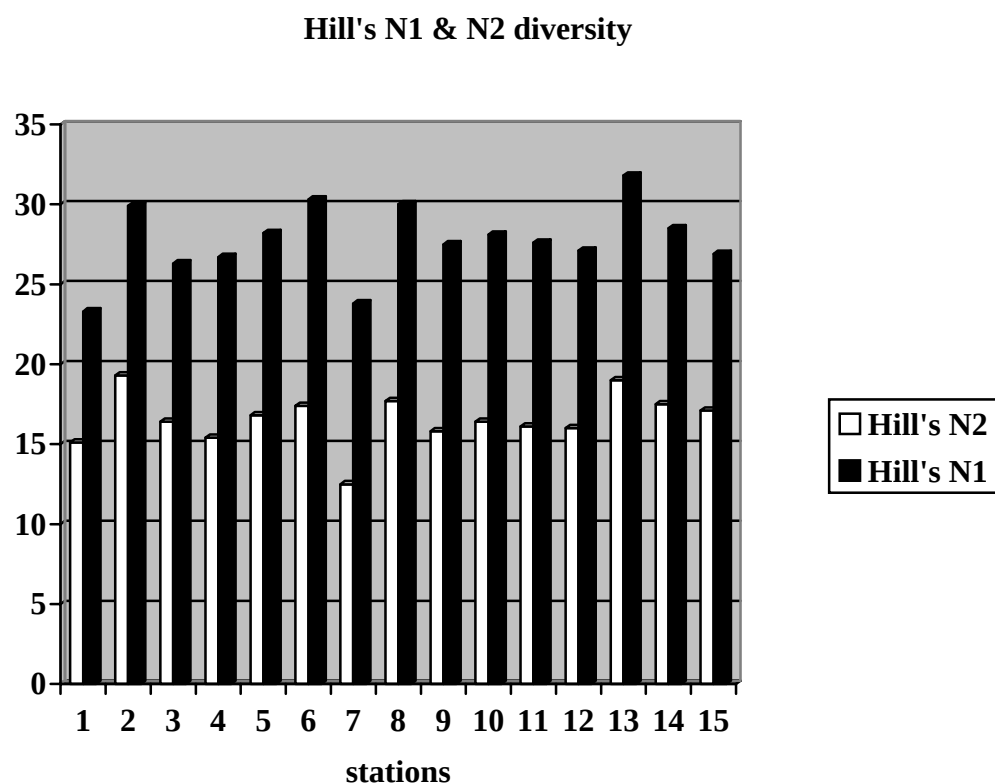


Figure 2. Hill's diversity for each station with collection dates combined.

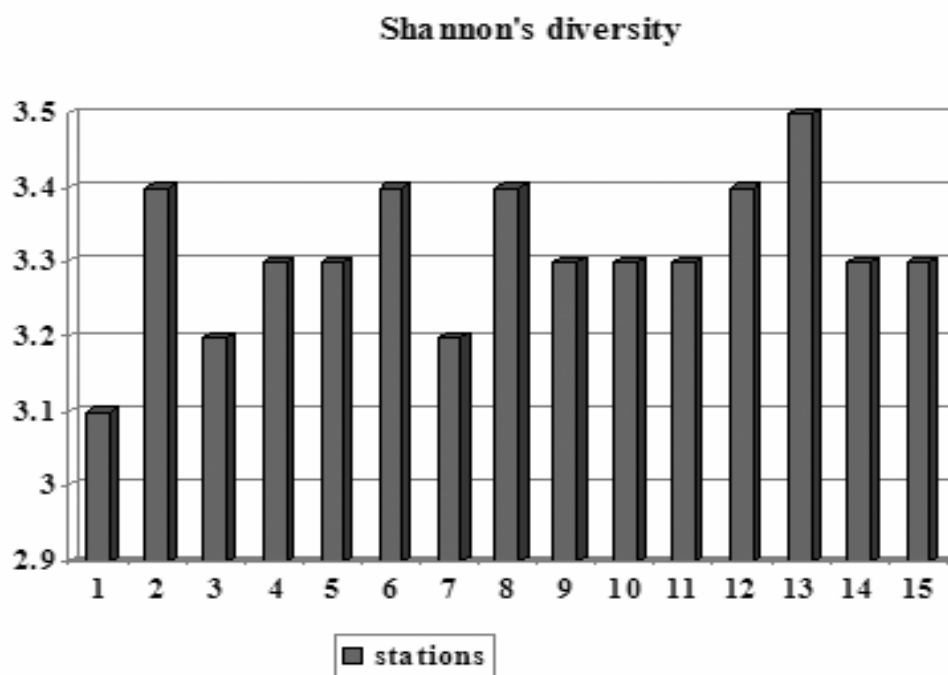


Figure 3. Shannon's diversity for each station with collection dates combined.

Using Hill's N1 diversity, stations one and seven had the lowest mean diversity, 23.1 and 23.8, respectively. While stations six, eight and 13 had the greatest mean diversity during the study period. Relative abundances of dominant diatoms had an effect on the diversity indices. For example, station one had 15 species with relative abundances of 5% or more out of a total of 51 species and station seven had 11 species with relative abundances of 5% or more out of a total of 60 (Appendix 6). On the other hand, station eight had 14 species 5% or more out of the total 65 species while station 13 had eight species 5% or more out of 68. Station six was very similar to station eight with a diversity of 30.3 and a total of 68 species.

Stations 13, 14, 15 were added during the May 30, 1998 as additional reference sites. They were then sampled until the end of the study period. The mean diversity in the reference sites, stations 12, 13, 14, 15 was 29.0 (Hill's N1 ratio). Station 12 had a low diversity of 20.9 during the 4-30-98 collections and had the highest diversity of 36.2 during the 6-10-98 collection. Station 13 had higher diversity, which ranged from 26.2 on 8-30-98 to 37.5 on 7-14-98. Station 14 had a wider range of diversity from 16.3 on 6-10-98 to 35.8 on 8-13-98. Station 15, the southern most station, ranged from 21.4 on 5-30-98 to 33.3 on 7-14-98.

Diversity was slightly greater in the reference sites of 12 through 15 than stations one through 11 which had a mean diversity of 27.5. The lowest mean diversity, 26.5, was at the Foundry Cove sites one through three. The marsh sites of four through nine are located in the middle section of Constitution Marsh. They had a mean diversity of

27.9. Stations 10 and 11 are located at the southern part of Constitution Marsh. Mean diversity for these stations was 27.9.

Hill's diversity, N2, differed slightly from N1. The greatest mean diversity was station two (19.3) and station 13 (19.0). The lowest mean diversity occurred at station seven (12.5) and station one (15.1). Shannon diversity results were again similar to Hill's N1 with station 13 the most diverse (3.5) and stations one (3.1) and seven (3.2) being the least diverse.

Differences in diversity of Hill's N1, N2 and Shannon were analyzed using one-way ANOVA. Results of ANOVA showed highly significant p values (Tables 3, 4, 5).

Table 3. ANOVA results for Hill's N1 diversity

Source of variation	SS	Df	MS	F	p-value	R-square
Between groups	3261.486	17	191.8521	7.295466	3.55E-14	0.35231
Within groups	5995.817	228	26.29744			0.64769
Total	9257.303	245				

Table 4. ANOVA results for Hill's N2 diversity

Source of variation	SS	Df	MS	F	p-value	R-square
Between groups	2301.157	17	135.3622	8.407642	1.75E-16	0.38532
Within groups	3670.776	228	16.0999			0.61467
Total	5971.933	245				

Table 5. ANOVA results for Shannon diversity

Source of variation	SS	Df	MS	F	p-value	R-square
Between groups	6.02454	17	0.354385	4.009149	5.85E-07	0.23013
Within groups	20.15383	228	0.088394			0.76987
Total	26.17837	245				

The species richness indices, Margalef (1968) and Menhinick (1964), were calculated for all stations during the study period. These are of limited usefulness in this study since these are based on the number of species counted, specifically, on the relationship between S (species) and the total number of individuals observed, n , which increases with sample size. Exact manual counts of diatoms are difficult, therefore, richness can vary. Also, a single diatom species can influence species richness; the results are reported but only briefly discussed.

Several evenness indices, Pielou, Sheldon, Heip, Hill's ratio, and modified Hill's ratio, were calculated and summarized (Appendix 5). Modified Hill's ratio, E_5 is the most useful and interpretable since it doesn't require an estimate of the number of species in the community, which is affected by sample size. Evenness followed diversity and when a station had low diversity it also had decreased evenness. For example, station three during the 9-18-97 collection was dominated by *Achnanthes haukiana* var. *rostrata* (51.8% abundance), thus the diversity and evenness were decreased. The evenness results did not add any additional information to the existing diversity indices.

Diatom species composition

One hundred eighty eight taxa were identified (Appendix 1). Composition and relative abundances of species, expressed as percentages differed between stations and collections. Diatoms with relative abundances equal to or greater than five percent are listed by station for each collection in (Appendix 6). The taxa, comprising ten percent of all taxa sometime during the study period are *Achnanthes chilidanos*, *A. haukiana*, *A. haukiana* var. *rostrata*, *A. lanceolata*, *C. neodimuata*, *Actinocyclus normanii*, *Cocconeis placentula* var. *lineata*, *Cyclotella meneghiniana*, *Navicula gregaria*, *N. odiosa*, *N. salinarum* var. *intermedia*, *N. viridula*, *Nitzschia frustulum*, *N. frustulum* var. *perpusilla*, *N. microcephala*.

The three dominant taxa throughout the study were *Navicula gregaria*, *Cocconeis placentula* var. *lineata* and *Cyclotella meneghiniana*. *Navicula gregaria* was a prominent diatom during the 4-30-98 collection at all stations and was the most abundant at stations one, four and five during that collection. *Cocconeis placentula* var. *lineata* occurred more frequently throughout the study at stations two, four, six, and eight through 15. *Cyclotella meneghiniana* was abundant at stations two, 10, 11 and was found in significant numbers at stations one, four, five, six, eight, nine, and 12 through 15.

Thirteen *Achnanthes* species were identified. Three of these, *A. chilidanos*, *A. haukiana* var. *rostrata* and *A. lanceolata*, were prominent taxa. *Achnanthes chilidanos* occurred in higher numbers (greater than five percent) at station one (collection 8-13-98), station two (collections 10-30-07, 9-12-98, 9-30-98), station 12 (collections 5-16-98, 7-14-98 and at station 15 (collections 8-13-98, 8-31-98). The dominant diatom at station three was *A. haukiana* var. *rostrata*. It occurred in relative abundances greater than five

percent during the collections 9-17-97 through 8-13-98. It was also prominent at station one and occurred less frequently at other stations.

Twenty-two *Nitzschia* species were identified but did not occur in large numbers throughout the collection period. *Nitzschia microcephala* was most common at station one where it occurred in large numbers, greater than five percent during the fall (9-17-97, 10-7-97, 10-30-97) collections. It again occurred in large numbers, greater than five percent, during the February and March 1998 collections and during the spring (5-16-98, 5-30-98 and 6-10-98) collections. During the 10-7-07 collection, *N. microcephala* was 11.7% at station two, 9.6% at station three, and 9.6% at station four. It was not a prominent diatom at other stations during the collection period. *Nitzschia fonticula* appeared at station one during the collections of 9-18-97, 10-30-97, 1-6-98. *Nitzschia frustrulum* var. *perpusilla* occurred more frequently in stations one, two and three at different collection dates than at other stations throughout the study.

Actinocyclus normanii was not a dominant diatom but did occur in numbers greater than five percent at station two during the 6-10-98, 7-27-98 and 8-13-98 collections and at station five during the 7-27-98 collection and at station 10 during the 9-18-97 collection. It was more prominent at station 11 during the collection dates of 5-30-98, 6-10-98, 6-25-98, 7-27-98 and 9-30-98. It also occurred periodically in the reference stations, 12 through 15, throughout the study period.

Navicula was the dominant genus in Foundry Cove, Constitution Marsh and South Cove. Forty-three taxa were identified with the most common being *Navicula gregaria*. *Navicula odiosa* occurred in large numbers at stations one, 10 and 11 during the 10-7-97 collection with relative frequencies of 26.6%, 31% and 36.6%, respectively.

N. odiosa was also found in reduced numbers at other stations. Other *Navicula* species occurred sporadically in frequencies greater than five percent. These include *N. minima*, *N. peregrina*, *N. salinarum* var. *intermedia*, *N. viridula*, *N. viridula* var. *rostellata*. *Navicula salinarum* var. *intermedia* occurred most frequently at station 10.

Navicula gregaria was the dominant diatom throughout the study period. It was most abundant during the 4-30-98 collection at every station. Unfortunately, the South Cove stations, 13-15 were not sampled on this collection date. This increase in this dominant diatom influenced the diversity for that collection. The relative abundance of *N. gregaria* was greater than other collection dates and with this increased abundance reduced Hill's N1, N2 and Shannon diversity for that date. Mean Hill's diversity for April 30, 1998 was 19.9 compared to the overall mean for all collections of 27.3. The collection with the greatest diversity of 32.4 (Hill's N1) was July 14, 1998. A comparison between the collection dates of 4-30-98 and 7-14-98 (Figure 4) illustrates how diversity can be influenced by a single taxon and, therefore, diversity indices should be carefully interpreted.

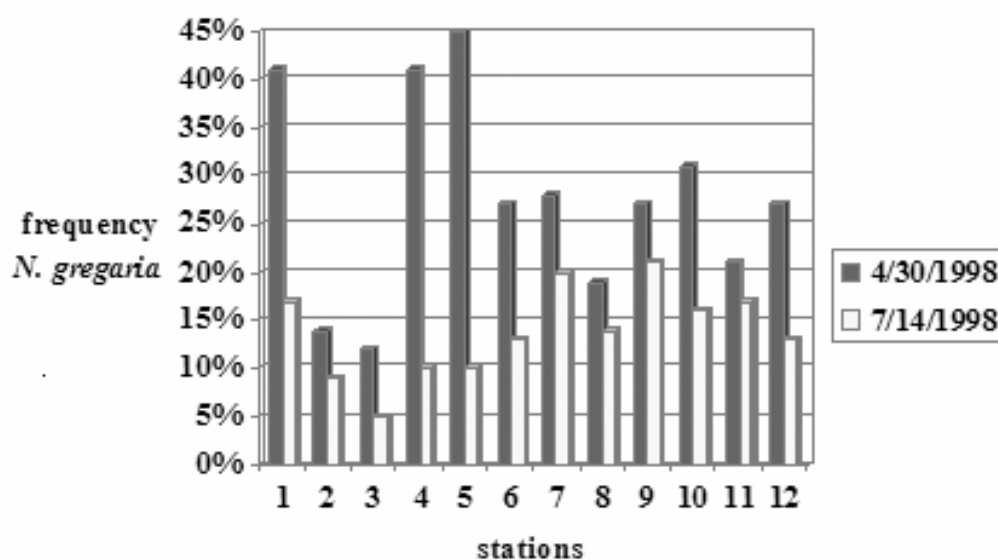


Figure 4. The frequency distribution of the dominant taxon, *Navicula gregaria*. A comparison is made between 4-30-98 and 7-14-98 collections.

Bray –Curtis Community Similarity Index

Bray-Curtis similarity index was calculated on the combined collection data and summarized into a similarity index showing the similarities between all 15 stations for the entire study period. The similarity between stations is further demonstrated by a dendrogram derived from the similarity index (Fig. 5). In addition, on the MDS ordination (Fig. 6) shows another two-dimensional representation showing the close similarity between stations four, five, six, eight and nine. The dendrogram demonstrates three major clusters based on the similarity of diatom taxa. The first cluster includes stations four through 10. Stations two, 11 through 15 form a second cluster and stations one and three form a third cluster. Results indicate that stations four and five are 92% similar, stations six and eight are 91% similar and the complex of stations four, five, six,

eight and nine are 87% similar. Station ten is 83% similar and station seven is 80% similar to the complex.

Stations one and three were not similar to other stations throughout the study but when the data were combined there was a 74% similarity between these stations. There is a clear difference in the diatom community at these stations and the rest of the collection sites. Station one and three are located in Foundry Cove, the dredged and restored area.

The third complex are stations located at the southern sections of Constitution Marsh and in South Cove with the exception of station two, which is located in Foundry Cove. Stations 11 and 13 are 86% similar and station 15 is included in this grouping being 83% similar. Stations 12 and 14 are 84% similar. These stations form a grouping that is 82.5%. Station two belongs to this group but is only 79% similar to the rest of the stations.

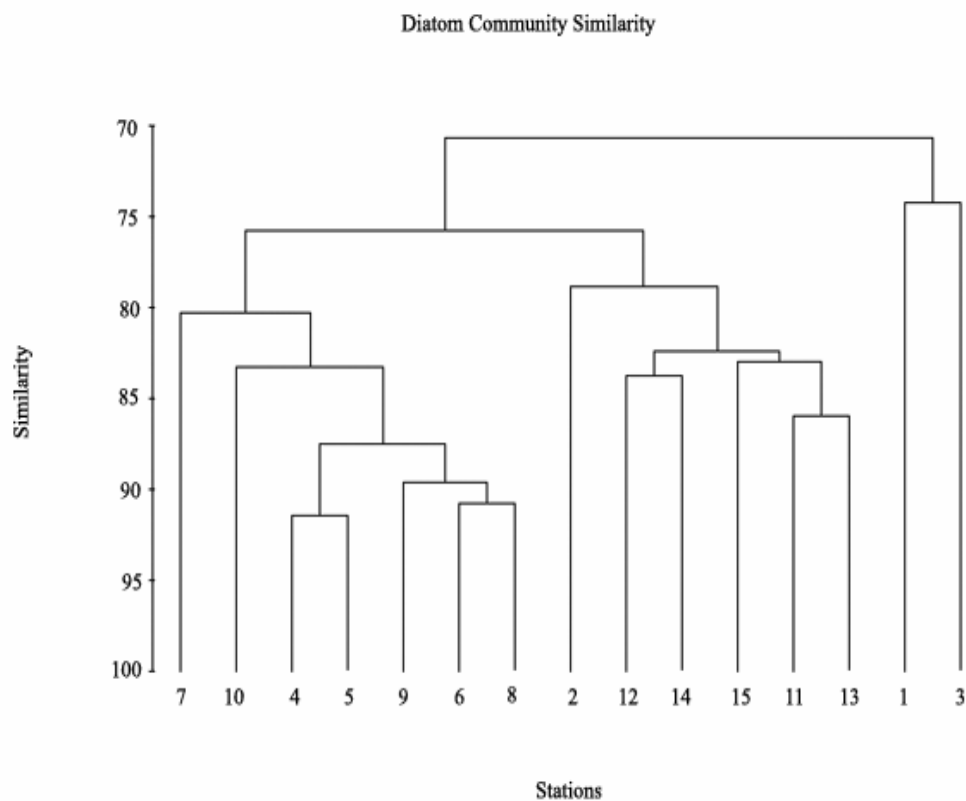


Figure 5. A dendrogram corresponding to the Bray-Curtis similarity of diatom communities at stations 1-15 for combined collections. The dendrogram shows three dominant clusters.

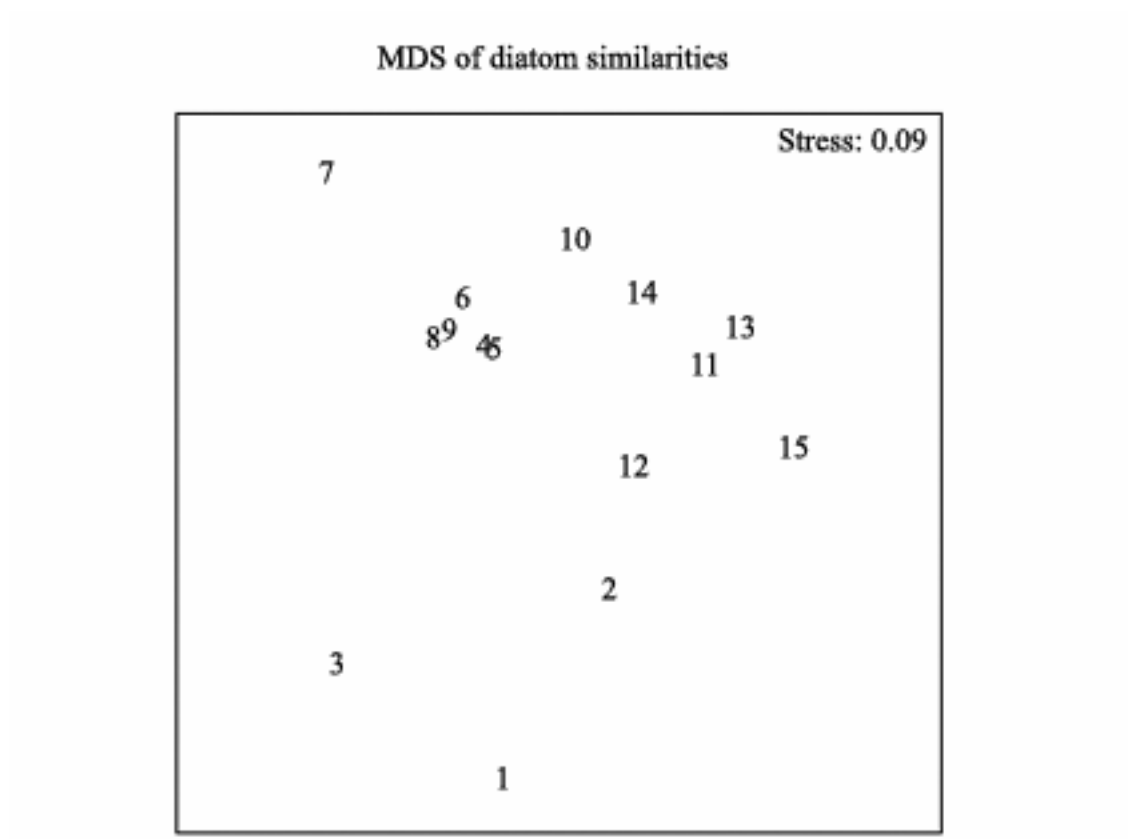


Figure 6. A MDS plot of combined data from all collections for stations 1 through 15. The MDS plot corresponds to the dendrogram in figure 5.

Heavy metal analyses, cadmium

The mean concentrations of cadmium in sediments at collection sites one through 12 are seen in Table 6. Mean cadmium concentrations ranged from $<0.1 \mu\text{g/L}$ to $13.7 \mu\text{g/L}$. Sediments from stations four and five contained the highest concentrations of cadmium. The reference stations (12 through 15) had negligible concentrations (<0.1 to $0.2 \mu\text{g/L}$) of cadmium. Of the three stations in Foundry Cove, only station two had mean concentrations of cadmium greater than $0.2 \mu\text{g/L}$ (Appendix 7).

Table 6. Mean concentrations of cadmium $\mu\text{g/L}$ at stations during each of the 18 collections. Stations 13-15 were added during the 5-30-98 collections and continued to be sample until the end of the study. Cadmium concentrations at these stations are less than $0.2\mu\text{g/L}$

Dates	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
9/18/97	0.1	1.6	<0.1	11.6	0.5	3.1	3.4	3.7	4.3	1.9	0.1	<0.1
10/7/97	0.2	3.0	0.1	11.6	5.5	2.5	4.3	4.9	2.9	0.3	0.1	<0.1
10/30/97	0.1	2.1	0.1	8.2	13.7	4.3	5.3	4.1	3.2	0.4	0.1	0.1
1/6/98	0.3	0.8	0.1	2.1	1.8	1.0	1.4	2.0	2.9	0.4	0.2	<0.1
2/3/98	0.2	1.7	0.2	5.8	6.8	2.7	2.5	3.2	3.8	0.2	0.1	1.6
3/27/98	0.2	1.2	0.1	11.0	4.7	3.4	2.4	4.6	3.9	0.4	0.1	<0.1
4/30/98	<0.1	2.4	0.1	8.7	10.8	6.7	3.4	6.7	5.1	1.7	0.2	<0.1
5/16/98	1.0	2.9	0.3	10.6	8.5	2.3	3.9	5.0	5.9	1.8	0.2	<0.1
5/30/98	0.2	2.4	0.2	7.6	6.8	6.5	2.8	3.4	4.4	1.5	0.2	<0.1
6/10/98	0.2	2.5	0.2	5.7	7.7	4.7	3.4	4.2	4.1	1.2	0.2	<0.1
6/25/98	0.3	2.4	0.1	10.2	8.2	2.6	3.8	3.6	6.8	1.7	0.2	0.2
7/14/98	0.2	2.2	0.2	8.4	7.0	3.7	2.2	4.2	5.0	0.7	0.2	<0.1
7/27/98	0.2	2.8	0.1	13.5	9.1	4.7	3.1	7.0	3.5	0.7	0.2	0.1
8/13/98	0.1	1.8	0.3	5.6	7.0	2.8	4.0	2.6	3.2	0.9	0.1	<0.1
8/31/98	0.2	2.2	0.1	7.6	6.8	3.9	3.4	4.2	3.7	1.3	0.1	<0.1
9/12/98	0.1	2.0	0.3	9.2	7.9	3.8	3.6	5.7	4.8	1.4	0.2	<0.1
9/30/98	0.2	1.6	0.4	8.5	4.6	4.1	3.1	3.6	4.4	1.3	0.1	<0.1
10/24/98	0.2	1.6	0.4	8.5	8.6	4.3	3.6	4.8	4.0	2.6	0.1	0.1

There were also seasonal differences in cadmium concentrations. Cadmium decreased (mean $1.1 \mu\text{g/L}$) for all stations during the January 6, 1998 collection.

Cadmium levels (mean 3.8 and $3.5\mu\text{g/L}$) were the highest during the April 30 and May 16, 1998 collections, respectively. The first fall collections of October 7 and 30, 1997 had higher concentrations of cadmium of 3.0 and $3.5\mu\text{g/L}$, respectively, than the fall collections in 1998 (Appendix 7).

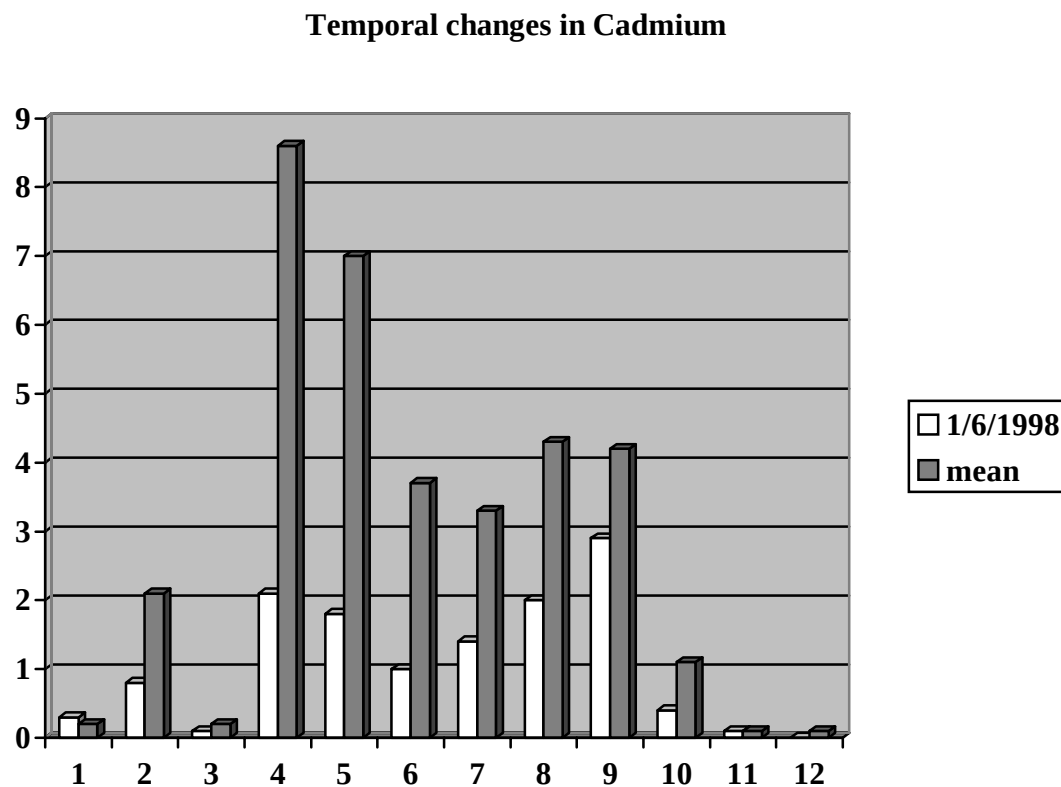


Figure 7. Cadmium concentrations ($\mu\text{g/L}$) for the January 6, 1998 collection compared to the cadmium mean throughout the study period. Stations 13-15 were added as additional reference sites beginning with the May 30, 1998 collection.

Cadmium data by station and/or collection date are summarized in Figures 8, 9 and 10. Figure 9 combines cadmium data for stations with collection dates. The results again demonstrate the higher cadmium concentrations at stations two, four through ten and a decrease during the January 6, 1998 collection.

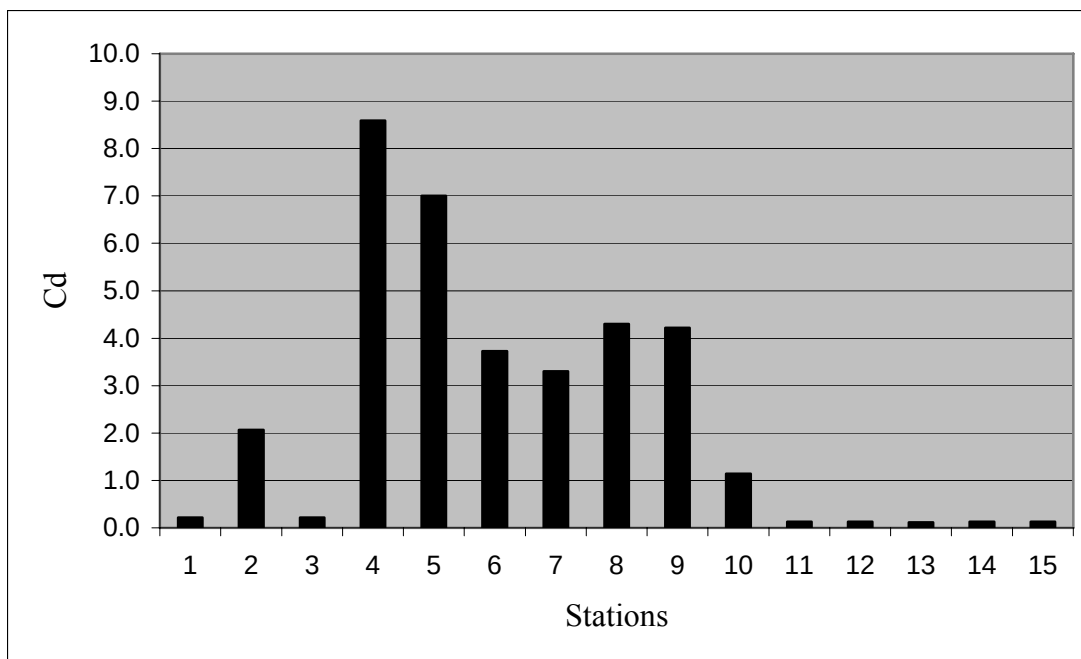


Figure 8. Mean cadmium in µg/L for each station

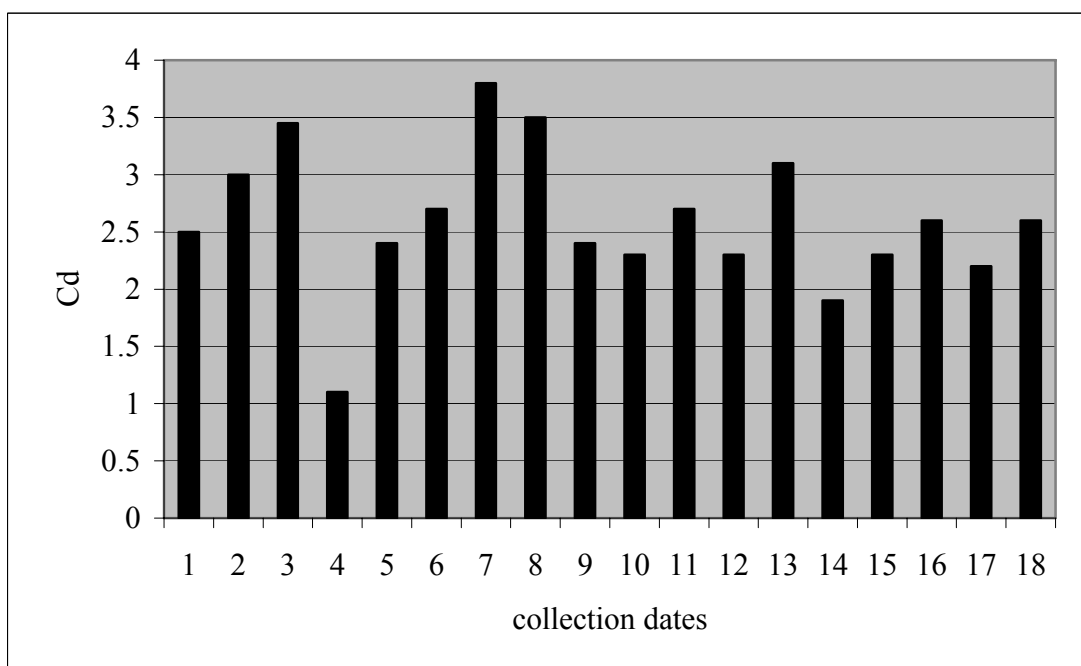


Figure 9. Mean cadmium in µg/L for collection dates 1-18 (total cadmium from all stations combined on each date divided by the number of sample on that dates)

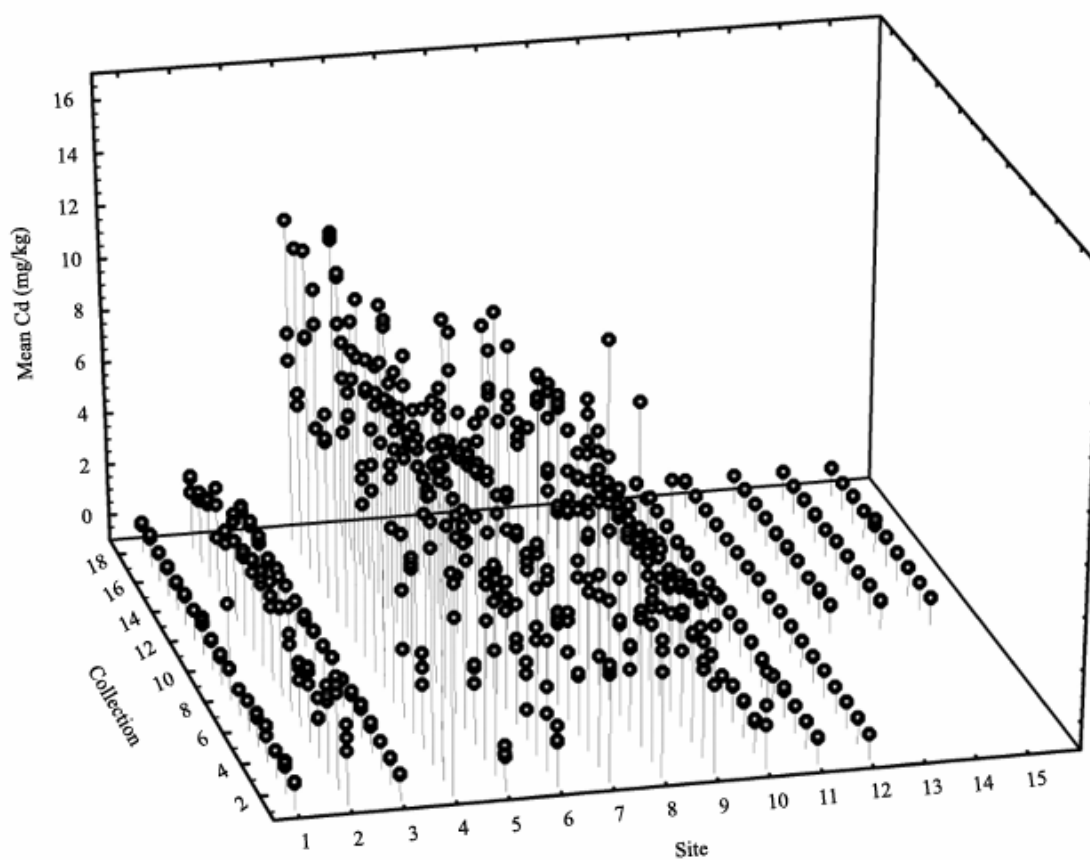


Figure 10. A three-dimensional plot of cadmium ($\mu\text{g/L}$) for each station combining all collection dates. Note that stations 13,14,15 were added during the May 30, 1998 collection.

Two way ANOVA was performed using Statview software to determine if significant differences in cadmium using mean cadmium from the two measured wavelengths, dates and station sites (Appendix 8) existed. Stations one through twelve were used in calculating ANOVA.

Table 7. ANOVA table for mean cadmium

	DF	Sum of Squares	Mean Square	F-value	P-value	R-square
Day	17	241.82	14.225	7.194	<.001	0.03489
Sites	11	4840.935	440.085	222.555	<.001	0.69852
Day*Sites	187	989.244	5.29	2.675	<.001	0.14274
Unexplained	434	858.202	1.977			0.12383
Total	649	6930.201				

Heavy metal analyses, Nickel

Nickel was also discharged from Marathon Battery along with cadmium. Results indicate that concentrations of nickel were also increased at stations four and five and followed the same seasonal differences as seen with cadmium. Nickel results are summarized in Table 8 and Appendix 7. Cadmium is more toxic than nickel and is, therefore, the focus of this study.

Table 8. Mean concentrations of nickel $\mu\text{g/L}$ at stations during each of the 18 collections. Stations 13-15 were added during the 5-30-98 collections and continued to be sample until the end of the study. Nickel concentrations at these stations are less than 1.3 $\mu\text{g/L}$

	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
9/18/97	0.2	1.6	0.2	8.7	1.0	2.0	3.2	2.8	4.1	2.0	1.3	0.7
10/7/97	0.8	3.0	0.2	4.2	3.2	1.7	3.3	3.3	2.5	1.0	1.6	0.8
10/30/97	0.3	1.9	0.6	3.6	5.3	2.9	3.1	2.7	2.4	1.3	1.1	0.7
1/6/98	1.0	2.6	0.4	1.5	1.2	1.6	1.2	1.3	1.7	0.1	0.1	0.8
2/3/98	0.5	1.5	0.6	2.6	2.8	2.6	1.5	1.6	2.1	0.5	0.7	1.1
3/27/98	1.0	1.6	0.5	8.5	2.8	3.5	2.4	3.2	2.1	1.3	1.0	0.8
4/30/98	0.1	1.8	0.6	5.4	6.3	6.9	2.9	4.0	4.3	1.6	1.2	0.8
5/16/98	1.3	2.0	0.7	5.7	4.8	3.1	3.2	3.2	3.4	1.6	1.2	0.6
5/30/98	0.6	2.5	0.7	4.1	3.4	6.4	2.5	2.2	2.5	1.5	1.0	0.5
6/10/98	0.7	1.9	0.7	2.8	3.3	2.4	2.8	2.3	2.5	1.3	1.0	0.5
6/25/98	0.8	1.8	1.0	4.1	3.1	2.6	3.0	2.6	3.1	1.6	1.1	1.1
7/14/98	0.8	2.1	0.7	3.7	4.0	3.3	2.8	2.7	3.1	1.1	1.2	0.6
7/27/98	0.5	2.2	1.1	4.2	4.2	2.5	2.3	2.9	2.6	1.3	1.0	0.5
8/13/98	0.5	1.9	1.0	2.5	3.7	2.3	3.5	2.8	2.1	1.1	0.7	0.6
8/31/98	0.4	1.7	0.7	3.1	3.0	2.6	2.4	2.5	2.6	1.2	0.8	0.4
9/12/98	0.8	1.7	0.9	3.4	3.8	2.4	2.5	2.9	3.3	1.6	1.1	0.6
9/30/98	0.5	1.5	0.8	2.7	3.0	2.8	2.2	2.2	2.5	1.2	0.8	0.4
10/24/98	0.8	1.8	1.0	3.5	4.8	4.7	3.5	3.0	3.3	2.0	1.3	0.8

Nickel data by station and/or collection date are summarized in Figures 11 and 12.

Figure 13 combines cadmium and nickel data for stations with collection dates. The results again demonstrate the higher cadmium concentrations at stations two, four through ten.

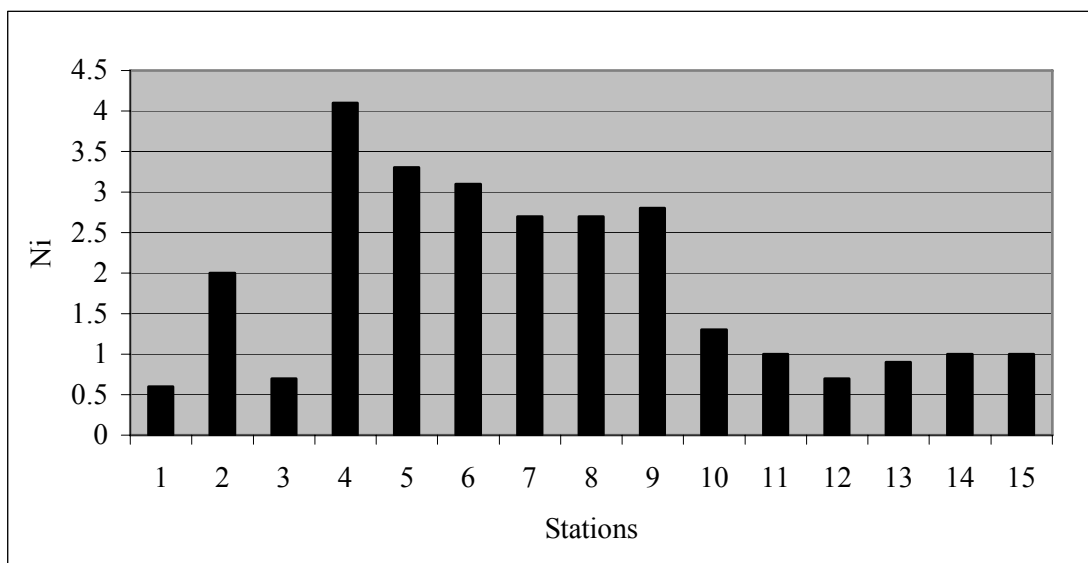


Figure 11. Mean nickel in µg/L for each station

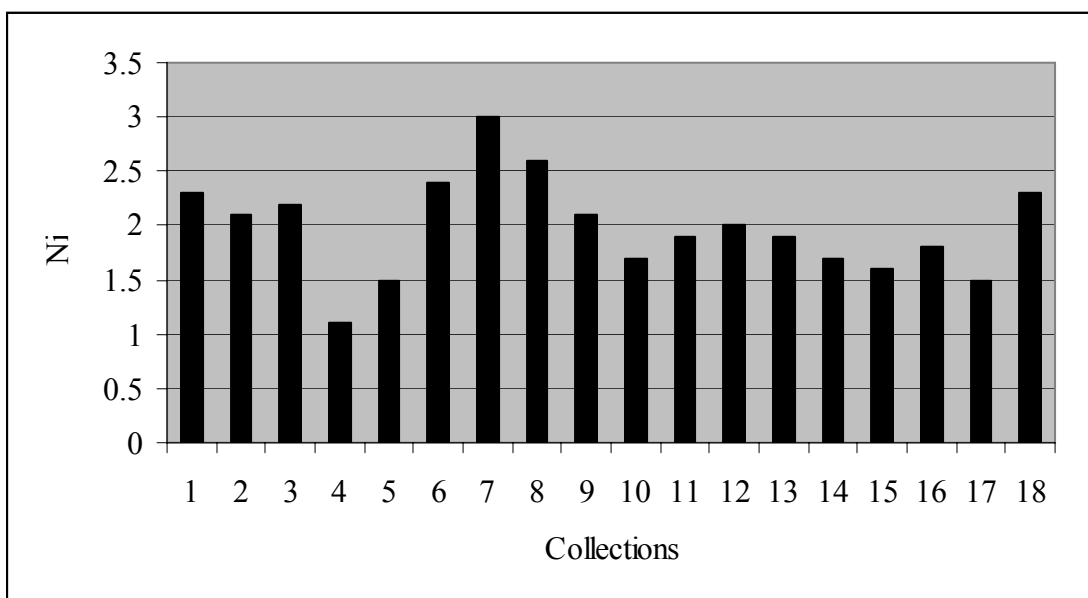


Figure 12. Mean nickel in µg/L for collection dates 1-18 with combined data from every station

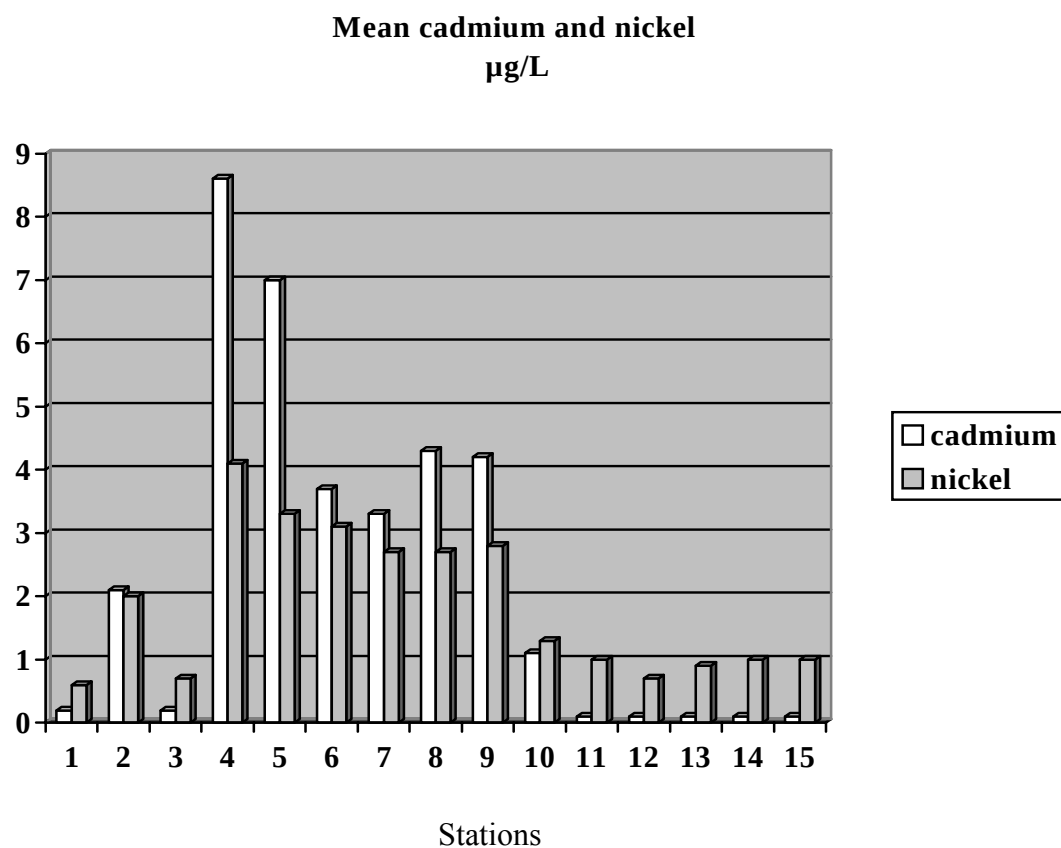


Figure 13. A summary of mean cadmium and nickel (µg/L) for stations 1-15

Heavy metal analyses, cobalt

Cobalt was briefly used in the manufacture of batteries and was discharged into Foundry Cove. Cobalt levels are less than 0.3 µg/L throughout Foundry Cove, Constitution Marsh and South Cove and are not significant to this study (Appendix 8).

Multidimensional scaling, analysis of similarities, similarity of percentages

Multidimensional Scaling (MDS) ordination technique (Clarke & Warwick 2001) was calculated to determine the similarities between the diatom communities at each

station for each collection (Appendix 9). Data transformations, square root and double root, were done when calculating the Bray Curtis similarity index. Stress levels, however, were lower with no data transformations indicating a good two-dimensional ordination. Cadmium and nickel concentrations were added to the MDS plot and appear as bubbles overlaying station numbers (figures 14 & 15, respectively). Both MDS plots have a stress less than 0.1 indicating a good two-dimensional ordination. Individual collection MDS plots with cadmium bubbles were also calculated (appendix 10).

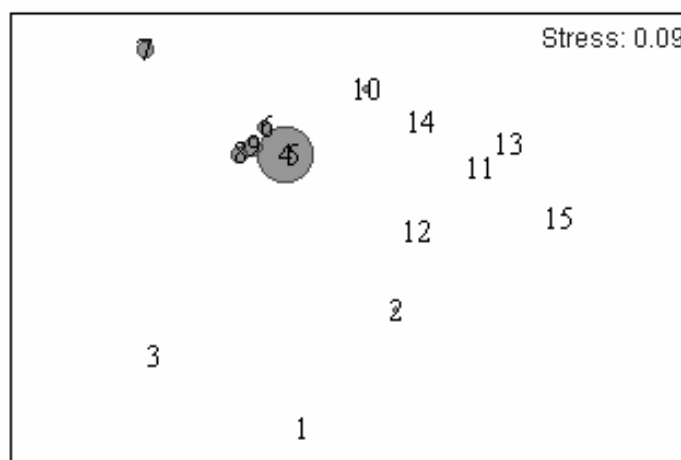


Figure 14. MDS plot of diatom similarity of combined data from all collections overlain with cadmium bubbles indicating relative cadmium concentration.

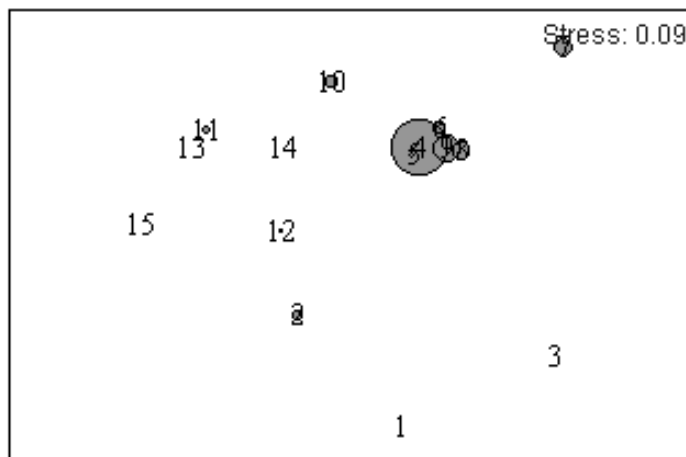


Figure 15. MDS plot of diatom similarity of combined data from all collections overlain with nickel bubbles indicating relative cadmium concentration.

Analysis of similarity (ANOSIM) was also calculated from the Bray Curtis similarity index. Results indicate that the three clusters (A, B and C) are statistically different (Fig. 16). The global R-value of zero indicates no difference while a R-value of one indicates 100% dissimilarity. The global R of ANOSIM is 0.83 indicating a difference between the groups. More importantly are the R-values between clusters A, B, and C. The R-value between Cluster A and B is 0.80 and is less than the global R. However, the comparison of clusters A and C has a R-value of 0.97 while the comparison between cluster B and C has a R-value of 0.99. These differences were further investigated by using, similarity of percentages, SIMPER (Clarke & Warwick 2001).

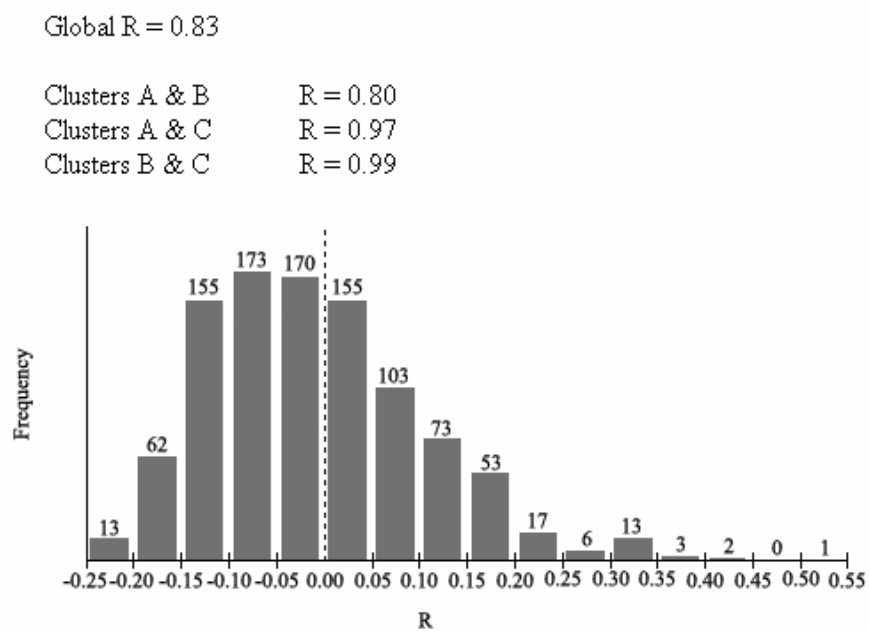


Figure 16. Analysis of similarity (ANOSIM) of combined diatom data (global R). R -values are also calculated between clusters A, B, C.

The following dendrogram shows three separate clusters of diatom similarity (Fig. 17). Cluster A contains stations four through 10, which are located in Constitution Marsh. Cluster B contains station 2, located in Foundry Cove, and stations 11 through 15 located in South Cove. Cluster C contains stations one and three located in Foundry Cove.

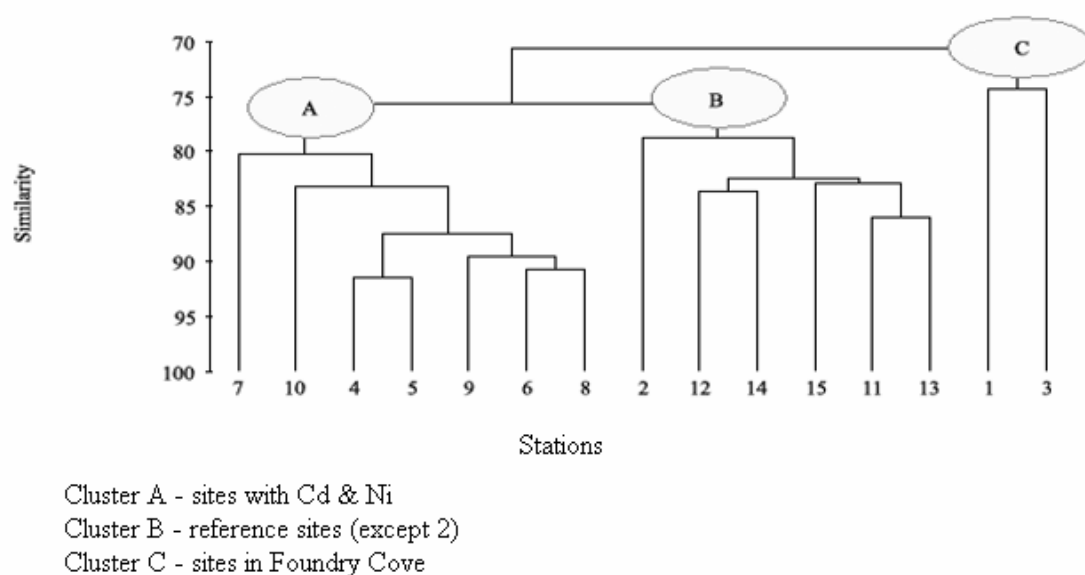


Figure 17. Dendrogram of diatom community similarity with three clusters (A, B, C)

Similarity of percentages (SIMPER) was calculated from the combined diatom data (Appendix 11). The average similarity of taxa in cluster A is 84.9 percent. The average similarity of cluster B cluster and C is 81.6 percent and 74.3 percent, respectively. *Navicula gregaria* contributed 19 percent to cluster A, 12.4 percent to cluster B and 14.6 percent to cluster C. Other taxa contributed to similarity of these clusters and the most dominant 10 diatoms are summarized in table 9.

Table 9. SIMPER of clusters A (stations 4-10), B (2, 11-15), C (1, 3) and the dominant 10 diatoms contributing to the similarity of each cluster.

Cluster A similarity 84.9% Taxa	%	Cluster B similarity 81.6% Taxa	%	Cluster C similarity 74.3% Taxa	%
<i>Navicula gregaria</i>	19	<i>Navicula gregaria</i>	12.4	<i>Navicula gregaria</i>	14.6
<i>Cocconeis placentula</i> var. <i>lineata</i>	7.7	<i>Cyclotella meneghiniana</i>	11.3	<i>Achnanthes haukiana</i> var. <i>rostrata</i>	8.6
<i>Cyclotella meneghiniana</i>	7.2	<i>Cocconeis placentula</i> var. <i>lineata</i>	9.9	<i>Cocconeis placentula</i> var. <i>lineata</i>	6.4
<i>Navicula odiosa</i>	4.9	<i>Navicula salinarum</i> var. <i>intermedia</i>	4.8	<i>Cyclotella meneghiniana</i>	5.3
<i>Navicula lanceolata</i>	4.4	<i>Actinocyclus normanii</i>	4.4	<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	5.2
<i>Nitzschia brevissima</i>	3.4	<i>Navicula lanceolata</i>	4.3	<i>Navicula viridula</i>	5.1
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	3.1	<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	4	<i>Navicula lanceolata</i>	4.4
<i>Navicula viridula</i>	3.1	<i>Navicula viridula</i>	3.9	<i>Navicula odiosa</i>	4.2
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	2.9	<i>Navicula peregrina</i>	2.9	<i>Achnanthes haukiana</i>	3.1
<i>Bacillaria paradoxa</i>	2.7	<i>Cocconeis neodiminuta</i>	2.7	<i>Navicula salinarum</i> var. <i>intermedia</i>	3.0

Chapter 8

DISCUSSION

Distribution of metals Foundry Cove, Constitution Marsh and South Cove

Cadmium and nickel in Foundry Cove

The cleanup and restoration of Foundry Cove greatly reduced cadmium and nickel to levels found at the reference sites in South Cove. The exception to this is station two, which is located on the southern shore of Foundry Cove. The mean concentrations of cadmium and nickel were 2.1 and 2.0 $\mu\text{g/L}$, respectively. Though, this is not a significant amount, it is greater than stations one and three and also greater than the reference stations in South Cove. Station two is located in the area where tidal currents are greater during the ebb and flood tides. This area may be receiving metals from the Hudson River and/or from Constitution Marsh.

This difference may also be due to sediment composition. Throughout the study, station two sediments were consistently composed of fine silty-clay particles, as were stations four through 15. Sediments at stations one and three, however, varied throughout the study collections from soft to more compact and, sometimes, almost gravelly in texture. Initial collections from stations one and three contained soft, silty mud. The sediment types at these stations varied throughout the study period and were not noted. Kelaher et al. (2003) reported more sediment compaction in Foundry Cove than in North Cove (North of Cold Spring) and South Cove. The depth of penetration was reduced in Foundry Cove compared to their reference sites in North Cove and South Cove. Other parameters such as fine particles, organic nitrogen and C:N ratio had no significant differences. They reported, "Compression of sediments can negatively affect benthic

organisms and, in this study, was negatively correlated with oligochaetes and chironomids”. Their conclusion was that the changes in macrobenthic communities after the restoration were attributed to the sediment compaction. Prior to cleanup, they report that the macrobenthic assemblages had no significant differences between the polluted and non-polluted sites.

Several studies have shown that fine-grained sediment particles composed of clay-silt (grain size less than 63 μm) have the highest concentrations of metals (Lakhan *et al.* 2003) These sediments also have higher concentrations of metals than those found in water according to de Groot *et al.* (1982), Kevin and Worsfold (1990, Thorne and Nickless (1981), Arujo *et al.* (1988) and De Gregori *et al.*(1996). However, other studies have found that metal concentrations did not increase with decreased particle size (Moore *et al.* 1989, Ramesh *et al.* 1990).

The noticeable difference between Foundry Cove sediments and those throughout Constitution Marsh may partially contribute in continuing the reduction of cadmium and nickel levels. Since station two showed some cadmium and nickel, there might be inputs of metals from the Hudson River and/or outputs from metals still in Constitution Marsh due to the flood and ebb tides. The restoration of the cove did not include restoration of soft sediments and marsh specific plants such as narrow leaf cattail, *Typha angustifolia*, marsh mallow, *Hibiscus moscheutos*, and pickerel weed, *Pontederia cordata*, which are found throughout Constitution Marsh and South Cove. The restored area is, therefore, different from its pre-restoration condition.

In the restored Foundry Cove, stations one and three, (cluster C) showed some similarity (74.25%) in diatom population but not as much as stations in Constitution

Marsh (cluster A) and South Cove (cluster B). There was also less similarity between that area and stations located outside the cove. A number of factors may be influencing this, but one factor that has been studied in Foundry Cove is the sediment structure. The post restoration soil compaction in the cove may alter the community structure as seen with the macro fauna studied by Kelaher *et al.* (2003).

Cadmium and nickel in Constitution Marsh and South Cove

The reference stations, 12 through 15, had very low levels of both cadmium and nickel as was expected. The mean cadmium of these stations was $\leq 0.2\mu\text{g/L}$ with the exception of the 2-3-98 collection where the mean cadmium was $1.6\mu\text{g/L}$. The mean nickel was $\leq 1.2\mu\text{g/L}$ for all collections at the reference stations.

Cadmium and nickel were the greatest at station four which is located on the southeastern edge of Foundry Pond. The pond is separated from Foundry Cove by an old causeway. This is the closest site to Foundry Cove in this study and is influenced by water fluctuations during the ebb and flood tides. The mean cadmium was $8.6\mu\text{g/L}$ but varied throughout the collection period. The lowest cadmium level, $2.1\mu\text{g/L}$, was on January 6, 1998 and the highest ($13.5\mu\text{g/L}$) during the July 27, 1998 collection. Nickel concentrations also declined during the January collection but peaked during the September 18, 1997 and March 27, 1998 collections. Mean concentrations of nickel at station four were $4.1\mu\text{g/L}$ and again was the highest of any station.

Station five is farther away from station four than stations six and eight. It is at the end of a long channel and is the closest to shore (Fig. 1). In this area, there isn't a constant tidal flux as there are with stations four, six, eight and nine. Cadmium levels at

station five peaked ($13.7 \mu\text{g/L}$) during the October 30, 1997 collection, while nickel concentrations there peaked ($6.3 \mu\text{g/L}$) during the April 30, 1998 collection. Station seven had similar fluctuations of cadmium as station five, but the levels were considerably lower ($5.3 \mu\text{g/L}$) during October 30, 1997. Station seven is located in a mud flat area and does not receive tidal fluxes through the channel.

Station ten is of interest since it is the second farthest station south of Foundry Cove and is still located in Constitution Marsh. It is at the end of a long channel south of station nine. Between stations nine and ten the tidal influence changes. The northern section is influenced by flood tides from West Foundry Cove into East Foundry cove and then into Constitution Marsh. Station ten receives flood tides from South Cove and vice versa on the ebb tide. Station ten did have higher levels of cadmium and nickel than the reference stations of 12 through 15. Mean cadmium was $1.1 \mu\text{g/L}$ and mean nickel was $1.3 \mu\text{g/L}$, indicating that tidal influences at this station which flow from the south may be of interest and should be considered when designing future remediation projects of this sort.

Other stations had similar fluctuations of cadmium and nickel during the study period. All stations, however, had a noticeable decline in cadmium and nickel during the January 6, 1998 collection. The concentrations one month later in February did not show the same overall reduction in cadmium and nickel. The winter of 1998 was warmer than most and the study site did not freeze over. The collections for January, February and March were on seasonably warm days and the sediments, during the winter, were collected using the same methods as during the warmer months. Further research should

address the question; is there a seasonal decline of these metals during that period of the year, and if so, what is the cause of this reduction?

Temporal variation in cadmium and nickel

Several authors have investigated spatial and temporal variation in heavy metals in sediments. Metal distribution in sediments is still site specific even though attempts have been made to predict metal binding to oxides, organic matter (humic substances) and clay using SCAMP (Surface chemistry assemblage model for particles). Lofts and Tipping (1998, 2000) describe sub-models of SCAMP to relate metal-binding properties of solid phases to their compositions. They simulated temporal variation in partitioning of five metals (Co, Ni, Cu, Zn, Pb) at fixed sites on four rivers in the U.K. Weng *et al.* (2002) applied this to the complexation of heavy metals with dissolved organic matter (DOM). The environmental influences, which affect the solubility and mobility of metals, depend upon metal loading over soil sorbants, pH, concentration of inorganic ligands and the DOM in soils.

Facetti *et al.* (1998) studied a temporal variation of metals in the Paraguay River. Seasonal fluctuations occurred with a decline in metal concentrations during the winter. They attribute this decline to high organic matter content in the sediments during August (winter). They hypothesize that the heavy metals were retained in a dissolved state as organic complexes and, therefore, were decreased in the sediments. The highest concentrations were measured in April (fall).

Organic matter was also reported to control the sorption of metals. Allen (1993) proposed that in contaminated sediments when cadmium and nickel exceed the molar

concentration of acid volatile sulfide (AVS), then the organic matter is the controlling factor. The AVS and the reduced pH contribute to the mobility of the metals and in turn, the availability to plants. Acid volatile sulfide consists of iron sulfide (FeS) a more soluble sulfide when present as a solid phase in the sediment. AVS can immobilize heavy metals including cadmium and nickel as highly insoluble sulfides in anaerobic (anoxic) sediments. The release of metals to sediment pore water is dependent on the AVS concentration.

Otero and Macias (2002) studied interstitial water of salt marsh soils in northwestern Spain for variations in heavy metals, pH, and electrical conductivity. Their study showed two clear patterns of seasonal variation, which differed, between the vegetated and open channels of the salt marsh. Heavy metals and pH were dependant upon whether the soils were vegetated with *Spartina* or, in areas with no vegetation. During summer, the pH increased and metal concentrations decreased in non-vegetated soils. This is attributed to an increase in sulfate reducing bacteria activity, which increases the alkalinity and precipitated metal sulfides due to oxidation. In vegetated soils the pH decreased and the metal concentration in the interstitial water increased due to oxidation of metal sulfides, AVS because of an increase in aeration of the soils. Oxidation releases metals from soils and in turn increases the concentration in the interstitial water. This dissolution of metals may be favored by a decrease in pH.

Other seasonal variations in heavy metals have been observed. Wright and Mason (1999) studied heavy metals and biota in the Orwell and Stour estuaries in England. They found metal concentrations were the greatest in winter and lowest in summer. A similar temporal variation was also observed in the algae and invertebrates

they studied. They attributed this variation to environmental factors such as discharges into the estuary, changes in pH, salinity and suspended matter.

Changes in pH, oxygen and acid-volatile sulfide are among the important chemical factors that affect the mobility of sediment bound metals. Iron and manganese oxides and humic acids are also important as metal binding components. It appears from research on this topic that each site has specific biological and chemical factors that influence the mobilization of heavy metals. Many of these factors may be influencing this temporal variation of cadmium and nickel in Constitution Marsh and would require further research.

Diversity indices

All diversity indices have their limitations. Species richness is calculated by the number of species and has several pitfalls. The most obvious is that it depends on the sample size and, as in diatom counts; exact sample sizes are difficult to obtain. Another problem with species richness is the state of diatom taxonomy. Many authors split species into subgroups, thereby, increasing the number of taxa. Another problem with using species richness is the amount of time spent counting individuals. The more diatom valves counted, results in the addition of a few more rare species. Therefore, species richness results should be carefully interpreted.

Diversity indices incorporate both species richness and evenness into a single number. Problems exist with the interpretation of diversity indices such as situations of high evenness and low richness or low evenness and high richness. Hill's diversity

includes Simpson's index and Shannon's index, thereby; more information goes into the final diversity number.

Hill's N1 diversity numbers widely varied from station to station and collection to collection (Appendix 4). Stations one and seven are the least diverse while station 13 had the greatest overall diversity along with stations eight and six. Collections varied also, the least diverse collection was April 30, 1998 and the most were July 14 and September 12 and 30, 1998. In the April collection, six stations had Hill's N1 diversity less than 20 and 11 out of 12 stations had a Hill's diversity less than 25.1. This contrasts with high diversity collection dates when the collections of July 14 and September 12 and 30 had no stations with diversity less than 24.9. However, one year earlier, the collection of September 18, 1997 only had a mean diversity of 25.1.

There is no obvious pattern to these differences in diversity. More important, is no noticeable correlation between cadmium and nickel concentrations and diatom diversity. Station four and five (stations with the highest cadmium and nickel) had little difference in diversity than the reference stations. A seasonal difference is not an explanation since the diversity during the colder months did not differ from summer months. Although the numbers of species varied, this still is not an explanation for any differences.

Why is the diversity lower during the April 30, 1998 collection? An obvious difference is high abundance and low evenness. *Navicula gregaria*, one of the most common species in this study varies considerably between a collection date with high diversity and one with low diversity. The April 30, 1998 collection had large numbers of one species, which can mathematically reduce the diversity. There may have been a

bloom of this common species at that time, which artificially reduced the numbers of other species. This is also shown in the evenness indices (Appendix 4).

Evenness indices of Pielou, Sheldon, Heip, Hill's ratio and Modified Hill's ratio show a decreased evenness during the April 30, 1998 collection. The evenness calculated by Modified Hill's ratio (E5) approaches zero as a single species becomes more dominant. Modified Hill's ratio remains more constant with sampling and tends to be more independent of sample size. For these reasons, diversity measures should be interpreted carefully.

Bray-Curtis similarity indices

The purpose of calculating Bray-Curtis similarity indices is to find natural groups of species based on their similarities, or to compare their differences as indicated previously. Communities can be similar in diversity, but be different in species composition. One way of measuring this difference is to calculate the distance between locations in a multi-dimensional space. Ecological distance measures are constructed to compare differences in species composition. The Bray-Curtis measures Euclidean distance. This distance measures consider the abundances of all species in a multi-dimensional space. Once this is calculated clustering and/or ordination can be plotted graphically.

Multidimensional scaling (MDS)

The dendrogram for overall diatom community structure demonstrates similarities between stations computed for all collections. The x-axis represents the full set of

samples and the y-axis is the Bray-Curtis similarity. The Bray-Curtis similarity was then viewed as a MDS (multidimensional scaling) two-dimensional map of the samples with no transformation of the data.

The results of the dendrogram and MDS, derived from the Bray Curtis similarity index, demonstrate that the diatom communities in stations four through ten have similar species. The reference stations of 12 through 15 formed another group. The stations in Foundry Cove, one and three, formed a third group. Station two had more diatoms similar with the reference group.

The MDS plots are more interesting in this study when cadmium and nickel concentrations are superimposed in the form of bubbles, which represents the concentration of cadmium and nickel (fig. 14, 15). This overlay confirms that stations four through ten had similar communities and were subject to cadmium and nickel contamination with stations four and five having larger bubbles.

It is not obvious that the cadmium/nickel concentrations would control the characteristics of the diatom community. Several authors have reported heavy metal tolerant species of diatoms (Ivorra 2000). Most of these studies use mesocosms and microcosms, diatom communities upstream and downstream from a point source of pollution, and translocation experiments. So, the outcome of this study is more difficult to interpret.

The results of ANOSIM indicate differences between the clusters A, B and C. Cluster A and B were less dissimilar ($R = 0.8$) than clusters A and C ($R = 0.970$) and clusters B and C ($R = 0.99$). This can also be seen on the dendrogram calculated from

Bray Curtis similarity. The results of SIMPER look closer into these differences (Appendix 11).

SIMPER calculates similarity and also dissimilarity. Dissimilarity is also a means of investigating the differences between the dendrogram clusters designated as A,B,C. The dissimilarity between cluster A and B is 24.3% with *Navicula gregaria* contributing 11.6% towards this dissimilarity. The dissimilarity between clusters A and C is greater with the average dissimilarity of 28.6% (Appendix 12). Two diatoms, *Achnanthes haukiana* var. *rostrata* and *Navicula gregaria*, contribute 11.8% and 11.3%, respectively, to the dissimilarity. The greatest dissimilarity is between clusters B and C with 30.4% dissimilarity. *Achnanthes haukiana* var. *rostrata* contributes 13% towards this dissimilarity. Other taxa contribute less than seven percent to the dissimilarity between the clusters.

SIMPER was used again to investigate the similarity and dissimilarity between the selected stations (Appendix 13). Stations four and five had a similarity of 91.4% while stations 13, 14 and 15 were 83.5% similar. The difference in the similarity of these is the relative abundance of *Navicula gregaria*, which accounts for 17% of this 91.4%. *N. gregaria* contributes less, only 13%, to the similarity between stations 13, 14 and 15. Interestingly, the dissimilarity between stations four and five and 13, 14 and 15 is only 23.5% and the contribution of *N. gregaria* is 10.2%. The other diatom contributing to the dissimilarity of these groups is *Navicula salinarum* var. *intermedia*. Its abundance is slightly greater in the South Cove stations of 13, 14 and 15.

Two other clusters were then compared. Stations four through nine were compared to stations one, two and three. The similarity of stations four through nine is

86.2% with *Navicula gregaria* being the most abundant taxon contributing 18% to the similarity. Other taxa contributed less than eight percent to the similarity between these stations. Stations one, two and three were only 73.6% similar with *N. gregaria* contributing 10% and *Achnanthes haukiana* var. *rostrata* contributing 7% towards the similarity. When comparing these two clusters, *N. gregaria* contributed 14.6% towards the dissimilarity and *A. haukiana* var. *rostrata* 9.1%. Other taxa contributed less than five percent towards the dissimilarity.

Three species identified in the SIMPER analysis (Table 9) do contribute to this dissimilarity. *Actinocyclus normanii*, *Navicula peregrina*, and *Cocconeis neodiminuta* were found only in cluster B at greater than 2.5 percent relative abundance. *Nitzschia brevissima* was the only species to occur at greater than two percent relative abundance in cluster A, while *Navicula minima* was found only in cluster C at a relative abundance greater than two percent. This indicates that the relatively rare species are contributing significantly to the similarity and dissimilarity between the three groups.

In this study, ANOSIM demonstrates that there are differences between the stations in Foundry Cove, Constitution Marsh and South Cove. However, SIMPER discloses that they're no striking differences in community structure. The results indicate that stations four and five had larger relative abundances of *Navicula gregaria*, which contributed greatly to the 91.4% similarity between these stations. These are not in close proximity spatially to each other as was earlier noted. They do both contain the highest concentrations of cadmium and nickel. This demonstrates the following questions for further research. Does this mean that this diatom is more tolerant or that the other species

are more sensitive to higher levels of cadmium and nickel? Is this an example of pollution induced community tolerance as indicated by Blanck *et al.* (1988)?

Chapter 9

CONCLUDING REMARKS

The Superfund cleanup of cadmium and nickel in Foundry Cove was successful. The concentrations of these heavy metals were reduced to the levels in the reference site, South Cove. Foundry Pond was also included in this cleanup but not to the extent of Foundry Cove. Station four is at the southern edge of Foundry Pond and contained the largest cadmium and nickel concentrations, greater than the reference site. Stations five, six, seven and eight are also close to Foundry Pond and had varying concentrations of cadmium and nickel, again greater than the reference sites in South Cove.

Diversity and evenness of diatom communities were not affected by the remediation, and heavy metals in the concentrations found, had no effect on these parameters. This supports the contention of Stevenson (1984), that the diversity in diatom communities is not affected by pollution concentrations.

The multivariate techniques of MDS, SIMPER, ANOSIM, were more useful in demonstrating differences in the diatom communities. Cluster analysis and MDS showed differences (or similarity) in diatom communities, and identified three distinct clusters. Diatom communities in stations four through 10 were more similar to each other than to other stations. When overlain with “bubble plots” of cadmium and nickel, these communities were located in areas of higher concentrations of metals. The reference sites of 12 through 15 were similar and, interestingly, this group included station two which is located in Foundry Cove. Stations one and three (Foundry Cove sites) had similar diatom communities most likely due to the substrate deposited during the restoration of the cove. The differences in these communities seem to be attributable in

differences in rarer species, supporting the ideas of Patrick (1973) that rare species must be considered in analyzing diatom community structure.

In looking at stations one and three in the restoration area, the underlying sediments and marsh plants were not completely restored to what is present in Constitution Marsh or South Cove. Therefore, the question arises; is restoration in the way it was done in Foundry Cove a form of disturbance and do the differences in community reflect this disturbance?

This study did not disclose any measurable impacts of the remaining cadmium and nickel to the diatom communities. It is unfortunate that the community structure was not observed during the initial contamination and the subsequent cleanup and restoration. There were, however, differences between stations with cadmium and nickel (four and five) and the reference stations (12-15). *Navicula gregaria* was more abundant (17 percent) at stations four and five, contributing to the 91.4 percent similarity between these stations. *N. gregaria* was less abundant (13 percent) at the reference stations (12-15). This difference contributed to 10.2 percent dissimilarity between stations four and five and the reference sites (stations 12-15). This highlights additional research topics. There are questions for the future. Is there pollution induced community tolerance (PICT); is the presence and/or absence of rarer species more important than the dominant species in community analysis; and are there seasonal differences in cadmium and nickel, and what is causing a possible seasonal difference?

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa	Year	Authority	reference
<i>Achnanthes</i>	1963	Hohn & Hellerman	KLB
	1880	Grun. in Cleve & Grun.	P&R
	1891	Cleve	P&R
	1880	(Breb. in W. Sm.) Grun. in Cleve & Grun.	P&R
	1880	Grun. in Cleve & Grun.	P&R
	1880	Grun. in Cleve & Grun.	P&R
	1926	Schulz	KLB
	1880	(Grun.) Grun. in Cleve & Grun.	P&R
	1880	(Breb. ex Kutz.) Grun. in Cleve & Grun.	P&R
	1933	Hust.	P&R
<i>Actinocyclus</i>	1880	(W. Sm.) Grun. in Cleve & Grun.	KLB
	1937	Hust.	KLB
	1895	Rabenhorst	KLB
	1967	(Greg. ex Grev.) Hust. ex VanLand.	KLB
	1843	(Ehrenb.) Ehrenb.	V
	1844	(Kutz.) Kutz.	P&R
	1844	(Kutz.) Kutz.	P&R
	na	(Grun. in Van Heurck) Grun. in Van Heurck	P&R
	1977	(Kutz) Schmid	P&R
	1930	(Grun. in Van Heurck) Hust.	KLB
<i>Actinopterychus</i>	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
<i>Amphipleura</i>	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
<i>Amphora</i>	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
<i>Anomoeoneis</i>	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
<i>Bacillaria</i>	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
<i>Caloneis</i>	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R
	na	na	P&R
	1894	(Grun.) Cleve	P&R
	1977	(Kutz) Schmid	KLB
	1930	(Grun. in Van Heurck) Hust.	KLB
	1788	Gmelin in Linnaeus or O.F. Mull. Hendey	KLB
	1894	(Grun.) Cleve	P&R

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa	Year	Authority	reference
<i>Capartogramma</i>	na	na	P&R
<i>Cocconeis</i>	na	na	P&R
	1991	Krammer	KLB
	1885	(Ehrenb.) Van Heurck	P&R
	1884	(Ehrenb.) Grun.	P&R
	1958	(Ehrenb.) Van Heurck	P&R
	na	(Eulenstein) Cleve-Euler	KLB
<i>Cyclotella</i>	1848	Thwaites	KLB
	1884	Kutz.	KLB
	1901	Brunnthalier	KLB
	1851	(Breb. & Godey) W. Sm.	J
<i>Cymatopleura</i>	1844	Kutz.	P&R
<i>Cymbella</i>	1917	Font.	P&R
	1862	Hilse ex Rabenh.	P&R
	1862	na	P&R
	1938 or 1863	Hust.	P&R
	1894	Auersw. ex Heib.	P&R
	1864	Bleisch ex Rabenh.	KLB
	1880	(Breb. ex Kutz.) Grun. in Van Heurck	P&R
	unk.	Bory	P&R
<i>Diatoma</i>	1862	Grun.	P&R
	1881	Grun. in Van Heurck	P&R
	1937	(Cleve) Hust.	P&R
<i>Diploneis</i>	1891	(Kutz.) Cleve	P&R

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa		Year	Authority	reference
<i>Diploneis</i>	<i>smithii</i>	1894	(Breb. ex W. Sm.) Cleve	P&R
	<i>species</i>			P&R
	<i>sorex</i>	1844	Kutz.	P&R
<i>Epithemia</i>	<i>turgida</i>	1844	(Ehrenb.) Kutz.	P&R
<i>Eunotia</i>	<i>hexaglyphis</i> var. <i>hexaglyphis</i>	1854	Ehrenb.	P&R
	<i>indica</i>	na	na	P&R
	<i>pectinalis</i> var. <i>minor</i>	1864	(Kutz.) Rabenh.	P&R
<i>Fragilaria</i>	<i>tenella</i>	1895	(Grun. in Van Heurck) A. Cleve	P&R
	<i>constricta</i>	1843 or 1862	Ehrenb.	P&R
	<i>construens</i> var. <i>binodis</i>	1957	(Ehrenb.) Grun.	P&R
	<i>leptostauran</i>	1931	(Ehrenb.) Hust.	P&R
	<i>pinnata</i> var. <i>pinnata</i>	1843	Ehrenb.	P&R
	<i>species</i>	na		P&R
<i>Gomphonema</i>	<i>virescens</i> var. <i>capitata</i>	1910	Ostr.	P&R
	<i>acuminatum</i>	1832	Ehrenb.	P&R
	<i>angustatum</i>	1864	(Kutz.) Rabenh.	P&R
	<i>angustatum</i> var. <i>obtusatum</i>	1880	(Kutz.) Grun. in Van Heurck	P&R
	<i>angustatum</i> var. <i>sarcophagus</i>	1880	(Greg.) Grun. in Van Heurck	P&R
	<i>grovei</i>	1899	M. Schmidt	P&R
	<i>olivaceum</i>	1838	(Hornemann) Breb.	P&R
	<i>parvulum</i>	1849	(Kutz.) Kutz.	P&R
<i>Gyrosigma</i>	<i>sphaerophorum</i>	1845	Ehrenb.	P&R
	<i>truncatum</i>	1832	Ehrenb.	P&R
	<i>truncatum</i> var. <i>capitatum</i>	1975	(Ehrenb.) Patr. in Patr. & Reimer	P&R
	<i>acuminatum</i>	1853	(Kutz.) Rabenh.	P&R

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa	Year	Authority	reference
<i>Gyrosigma</i>	1853	(Kutz.) Rabenh.	KLB
	na	(W.Smith)Griffuths & Henfrey	P&R
	1894	(Rabenh.) Cleve	P&R
<i>Hantzschia</i>	1909	O. Mull.	J
<i>Mastogloia</i>	1856	Thwaites ex W. Sm.	P&R
<i>Melosira</i>	1882 or 1844	na	KLB
	1884	(Ehrenb.) Kutz.	KLB
<i>Meridion</i>	1831	(Grev.) Ag.	P&R
	1880	(Ralfs) Van Heurck	P&R
<i>Navicula</i>	unk.	Sovereign	P&R
	1838	Ehrenb.	P&R
	1966	(Grun.) Patr. in Patr. & Reimer	P&R
	na	Patrick	P&R
	1934 or 1863	Meister ex Hust.	P&R
	1884	(Kutz.) Rabenh.	P&R
<i>cryptocephala</i> var. <i>veneta</i>	unk.	unk.	P&R
<i>cuspidata</i> var. <i>major</i>	1893	Grun. ex Cleve	P&R
<i>delawarensis</i>	1853	W. Sm.	P&R
<i>elegans</i>	1861	(Greg.) Ralfs in Pritch.	P&R
<i>elginensis</i>	na	na	P&R
<i>elginensis</i> var. <i>lata</i>	na	na	P&R
<i>elmorei</i>	1927	Hustedt	KLB
<i>globulifera</i>	1861	Donk.	P&R
<i>gregaria</i>	1894	(Grun. ex Van Heurck) Cleve	P&R
<i>halophila</i>	1956	na	P&R
<i>ilopangoensis</i>			

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa	Year	Authority	reference
<i>Navicula</i>			
<i>integra</i>	1861	(W. Sm.) Ralfs in Pritch.	P&R
<i>keeleyi</i>	1945	na	P&R
<i>lacustris</i>	1856	Greg.	P&R
<i>lanceolata</i>	na	na	P&R
<i>menisculus</i>	1867	Schum.	P&R
<i>minima</i>	1880	Grun. in Van Heurck	P&R
<i>mutica</i>	1844	Kutz.	P&R
<i>odiosa</i>	1960	Wallace	P&R
<i>peregrina</i>	1844	(Ehrenb.) Kutz.	P&R
<i>placenta</i>	1854	Ehrenb.	P&R
<i>pseudokotschyi</i>	1985	na	KLB
<i>punctata</i> var. <i>coactata</i>	na	na	P&R
<i>pupula</i> var. <i>capitata</i>	1928	Skvortz. & Meyer	P&R
<i>pupula</i> var. <i>mutata</i>	1930	(Krasske) Hust.	P&R
<i>pupula</i> var. <i>rectangularis</i>	1880 or 1853	(Greg.) Grun. in Cleve & Grun.	P&R
<i>pusilla</i>	1860	W. Sm.	P&R
<i>pygmaea</i>	1849	Kutz.	KLB
<i>rhynchocephala</i>	1844	Kutz.	P&R
<i>salinarum</i> var. <i>intermedia</i>	1896	(Grun. in Van Heurck) Cleve	P&R
<i>salinarum</i>	1880	Grun. in Cleve & Grun.	P&R
<i>secura</i>	na	na	P&R
<i>tenera</i>	1937	Hust.	P&R
<i>tripunctata</i>	1822	(O.F. Mull.) Bory	P&R
<i>tuscula</i>	1841	Ehrenb.	P&R
<i>vanheurckii</i>	1966	Patr. in Patr. & Reimer	P&R

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa	Year	Authority	reference
<i>Nitzschia</i>	1880	(Grun.) Grun. in Cleve & Grun.	J
<i>Plagiotropis</i>	1898	(Greg.) O. Kuntze	KLB
<i>Pinnularia</i>	na	na	P&R
	1853	W. Sm.	P&R
	1856	Greg.	P&R
	1913	Carlson	P&R
	1864	(Kutz.) Rabenh.	P&R
	1896	(Grun. in Van Heurck) Cleve	P&R
	1856	(Ehrenb.) W. Sm.	P&R
	1932	Krasske	P&R
		species 1	P&R
		species 2	P&R
	1896	(Grun. ex A. Schmidt) Cleve	P&R
<i>Pleurosira</i>	1843	(Nitzsch) Ehrenb.	P&R
<i>Rhaphoneis</i>	1882	(Ehrenb.) Compere	KLB
	1844	(Ehrenb.) Ehrenb.	KLB
		species	KLB
<i>Rhoicosphenia</i>	1860	(Kutz.) Grun.	P&R
		species	P&R
<i>Rhopalodia</i>	1895	(Ehrenb.) O. Mull.	KLB
	1895	(Ehrenb.) O. Mull.	KLB
<i>Stauroneis</i>	1843	Ehrenb.	P&R
	1904	(Ehrenb.) Dippel	P&R
<i>Stephanodiscus</i>			KLB
<i>Surirella</i>	1917	Hust. ex A. Mayer	J

Appendix 1. Authorities and the identification references for the diatoms identified in this study.

Taxa	Year	Authority	reference
<i>Surirella</i>			
		<i>biseriata</i>	J
		<i>minuta</i>	KLB
<i>Synedra</i>		<i>ovata</i>	J
		<i>acus</i>	P&R
		<i>fasciculata</i>	P&R
		<i>fasciculata</i> var. <i>truncata</i>	P&R
		<i>parasitica</i>	P&R
		<i>parasitica</i> var. <i>subconstricta</i>	P&R
		<i>pulchella</i>	P&R
		<i>pulchella</i> var. <i>lanceolata</i>	P&R
		<i>rumpens</i>	P&R
		<i>ulna</i> var. <i>amphirhynchus</i>	P&R
<i>Tabellaria</i>		species	KLB

Reference abbreviations are as follows: Patrick and Reimer (P&R) 1967, 1975; Jensen (J) 1985; Krammer and Lange-Bertalot (KLB) 1986, 1988, 1991a, 1991b; Hustedt (H'30) 1930; Vinyard (V) 1979.

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	4	9	0	5	12	2	0	4	2	3	4	20
<i>clevei</i>	0	0	0	0	0	4	0	0	0	2	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	0	0	0	2	0	0	0	2	0	0	2	2
<i>exigua</i>	0	0	0	0	0	0	0	4	2	0	0	0
<i>haukiana</i>	5	10	3	8	9	20	5	8	9	6	5	10
<i>haukiana</i> var. <i>rostrata</i>	6	2	175	10	26	53	12	13	12	3	7	15
<i>hungarica</i>	0	0	0	0	0	0	0	0	0	0	0	6
<i>lanceolata</i>	2	29	29	23	23	44	22	24	21	13	6	23
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	0	0	0	0	0	0	2	1	0	4	0
<i>petersenii</i>	2	6	2	0	0	0	0	0	0	0	2	2
<i>polaris</i>	0	0	0	0	0	0	2	0	0	0	0	0
<i>normanii</i>	5	11	6	12	9	14	13	3	11	28	16	9
<i>Actinocyclus</i>												
<i>senarius</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Actinopterychus</i>												
<i>pellucida</i>	0	0	0	0	0	0	0	0	0	2	1	0
<i>Amphipleura</i>												
<i>ovalis</i>	2	4	0	3	2	0	4	6	1	6	2	5
<i>Amphora</i>												
<i>perpusilla</i>	2	0	0	4	2	0	0	0	3	0	0	0
<i>species</i>	0	0	1	3	4	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	5	9	0	4	2	3	8	0	2
<i>styriaca</i>	0	0	0	0	0	0	0	0	2	0	0	0
<i>Bacillaria</i>												
<i>paradoxa</i>	4	16	1	10	17	5	32	17	3	14	3	6
<i>Caloneis</i>												
<i>bacillum</i>	0	1	0	9	0	0	3	4	3	2	0	0

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	2	0	0	1	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluviatilis</i>	0	1	0	4	1	2	1	3	1	1	0	0
<i>neodiminuta</i>	4	5	0	2	0	1	4	7	4	7	7	11
<i>placentula</i> var. <i>lineata</i>	13	37	5	64	10	17	18	53	40	83	73	81
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	0	0	0	0	1	1	0	0	0	1	0	0
<i>kuetzingiana</i>	1	5	0	1	4	3	4	1	3	4	2	3
<i>meneghiniana</i>	23	39	13	42	41	39	38	32	32	51	39	35
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>												
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>												
<i>affinis</i>	0	0	0	0	0	0	1	0	0	1	0	4
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>minuta</i>	0	1	2	0	1	5	5	3	3	7	2	2
<i>minuta</i> var. <i>latens</i>	0	1	0	1	1	1	0	0	2	1	2	0
<i>muellerii</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tumida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	4	9	1	1	3	3	1	4	4	3	7	12

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>Diploneis</i>												
<i>vulgare</i> var. <i>linearis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>elliptica</i>	0	2	0	3	0	5	1	0	0	3	0	2
<i>smithii</i>	1	0	0	1	2	0	0	3	0	0	1	0
<i>species</i>	0	0	0	3	0	0	2	4	2	1	0	0
<i>sorex</i>	0	0	0	0	0	0	0	1	0	2	0	0
<i>turgida</i>	0	0	0	1	0	0	1	1	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	0	0	0	1	1	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	1	0	0	0	0	0	1	0	0	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	9	0	1	2	2	2	2	1	1	0	1	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	1	3	0	1	0	2	1	1	0	1	2	2
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	1	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	1	0	1	0	2	0	1	0	0	0	2
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	0	0	0	1	1	0	2	1	1	3	1	1

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Gomphonema truncatum</i>	0	0	0	0	0	0	0	1	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	3	0	2	3	0	1	4	0	2	0	0
<i>Gyrosigma attenuatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalproides</i>	0	0	0	0	2	2	4	1	0	1	14	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	1	0	2	0	0	1	0	0	0
<i>Melosira alpigena</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>distans</i>	0	3	0	4	4	0	0	0	0	2	0	0
<i>circulare</i>	0	0	0	1	0	0	0	0	0	1	0	0
<i>circulare</i> var. <i>constrictum</i>	0	1	0	1	0	0	0	0	0	0	0	0
<i>aurora</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>capitata</i>	0	7	0	1	2	1	0	4	1	11	2	4
<i>capitata</i> var. <i>luneburgensis</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	2	0	1	0	0	1	0	0	1	2	8	0
<i>cryptocephala</i> var. <i>veneta</i>	0	0	0	0	0	0	0	0	0	1	0	2
<i>cuspidata</i> var. <i>major</i>	0	0	0	2	0	0	1	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	2	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>elginensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elmorei</i>	0	0	0	0	0	0	0	2	0	0	0	0
<i>globulifera</i>	2	4	0	6	6	0	5	10	3	9	7	8
<i>gregaria</i>	2	32	13	64	40	58	69	66	63	55	28	56
<i>halophila</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	0	0	0	0	0	0	0	0	0	0	0	5
<i>integra</i>	0	0	0	1	0	1	2	1	1	1	0	0
<i>keeleyi</i>	0	0	0	0	2	0	3	0	2	0	0	0
<i>lacustris</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>menisculus</i>	0	3	0	2	2	0	5	5	2	0	4	0
<i>minima</i>	2	17	0	5	10	5	6	5	16	3	1	3
<i>mutica</i>	0	4	0	3	2	1	7	6	1	1	1	0
<i>odiosa</i>	75	15	7	26	18	16	30	25	12	7	88	11
<i>peregrina</i>	2	5	2	4	19	5	6	10	10	19	9	6
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschy</i>	12	2	2	0	2	2	0	3	0	1	0	0
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>capitata</i>	0	1	0	6	0	3	6	0	2	0	0	10
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>rectangularis</i>	0	0	0	0	2	0	0	0	0	0	0	0
<i>pusilla</i>	0	0	0	0	0	1	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>pygmaea</i>	0	3	0	4	2	0	0	2	2	12	5	4
<i>rhynchocephala</i>	1	2	1	1	4	1	0	3	1	0	0	0
<i>salinarum</i> var. <i>intermedia</i>	0	10	0	16	8	0	13	6	18	45	6	13
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>secura</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	5	2	2	2	3	1	2	4	1	1	2	3
<i>tripunctata</i>	2	3	0	8	8	1	11	5	8	9	0	8
<i>tuscula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	26	38	20	15	24	16	14	29	31	11	70	25
<i>viridula</i> var. <i>rostellata</i>	1	3	2	5	10	4	1	7	3	5	0	13
<i>affine</i>	0	0	1	2	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>amphibia</i>	0	1	0	4	5	3	1	6	1	3	0	0
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>brevissima</i>	12	16	2	15	11	7	25	9	19	14	7	5
<i>dissipata</i>	4	0	0	2	0	2	1	5	3	0	0	0
<i>filiformis</i>	1	0	0	0	0	0	1	0	1	3	4	3
<i>fonticola</i>	47	10	1	1	0	9	2	1	4	0	0	10
<i>frustrulum</i>	51	20	36	23	28	0	2	4	2	1	1	0
<i>frustrulum</i> var. <i>perpusilla</i>	0	0	0	0	0	5	18	22	21	12	7	36
<i>heuseriana</i>	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Nitzschia</i>												
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	1	0	0	3	0	2	6	5	0	0	1	1
<i>linearis</i>	1	1	0	0	0	2	7	0	1	2	0	0
<i>microcephala</i>	76	9	6	2	0	0	1	0	0	0	2	1
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	1	0	1	0	0
<i>sigma</i>	1	1	1	1	0	0	0	0	4	1	0	1
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>tryblionella</i>	0	0	0	3	1	0	1	1	1	2	4	2
<i>tryblionella</i> var. <i>debilis</i>	0	3	2	3	2	2	3	1	1	1	0	1
<i>tryblionella</i> var. <i>victoriae</i>	1	0	0	1	3	0	2	4	0	3	2	1
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	1	0	0	0	0	0	0	0	0
species 2	0	0	0	0	0	0	1	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Pinnularia viridis</i>	0	0	0	0	0	1	2	2	2	5	1	0
<i>Plagiotropis lepidoptera</i>	0	0	0	0	0	1	0	0	0	0	1	1
<i>Pleurosira laevis</i>	0	0	0	0	0	0	1	0	0	1	0	0
<i>Raphoneis amphicerus</i>	0	2	0	0	4	4	0	0	0	0	0	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	0	0	0	1	0	0	0	0	0	1	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>gibberula</i>	2	4	0	0	0	4	4	3	0	4	2	5
<i>anceps</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	1	0	0	1	1	0
<i>Stephanodiscus species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Surirella birostrata</i>	1	2	0	1	5	2	1	1	3	6	2	7
<i>biseriata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acus</i>	0	0	0	0	0	1	1	1	1	1	0	0
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	3	0	2	0	2	4	1	3	1	0	0
<i>parasitica</i>	0	0	0	0	0	1	0	2	0	1	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	1	0	1	0	1	0	2	3	0	1	0
<i>pulchella</i>	0	0	0	2	0	2	1	0	0	0	0	0
<i>pulchella</i> var. <i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	1

Appendix 2. The number of diatoms counted at each station
9-18-97 Collection (number 1)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tabellaria</i>												
species	0	0	0	0	0	0	0	0	0	0	0	0
Total Diatoms	419	425	338	474	412	402	453	480	418	521	472	507

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	0	20	7	1	2	3	4	0	0	0	0	17
<i>clevei</i>	0	0	0	1	0	0	0	2	0	0	0	0
<i>clevei</i> var. <i>bottnica</i>	5	1	0	0	0	0	0	0	1	1	0	0
<i>coarctata</i>	0	0	0	0	0	0	0	0	0	0	0	3
<i>exigua</i>	0	4	22	28	30	26	12	38	17	19	6	9
<i>haukiana</i>	10	12	56	21	31	21	6	48	20	8	3	7
<i>haukiana</i> var. <i>rostrata</i>	3	12	43	0	0	7	3	0	0	0	0	1
<i>hungarica</i>	0	0	0	0	0	0	0	2	2	0	0	0
<i>lanceolata</i>	7	29	30	20	15	28	21	14	34	9	12	28
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	1	2	0	0	0	0	0	0	0	0	7
<i>petersenii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>polaris</i>	0	1	0	0	0	0	0	0	0	0	0	2
<i>normanii</i>	14	18	9	9	9	8	7	8	16	16	5	15
<i>Actinocyclus</i>												
<i>Actinopterychus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Amphipleura</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Amphora</i>	0	5	0	2	0	0	0	0	2	1	0	3
<i>perpusilla</i>	0	0	5	0	0	2	0	0	0	0	0	3
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	0	0	1	0	0	0	0	0	2
<i>styriaca</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Bacillaria</i>	3	18	4	29	8	16	36	13	25	7	4	2
<i>paradoxa</i>												
<i>Caloneis</i>	0	1	0	0	0	5	0	0	0	0	0	1
<i>bacillum</i>												

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluviatilis</i>	0	1	0	2	5	1	5	1	4	0	2	1
<i>neodiminuta</i>	7	25	4	22	7	14	2	0	9	3	77	21
<i>placentula</i> var. <i>lineata</i>	4	71	16	66	60	34	19	44	40	34	51	32
<i>placentula</i> var. <i>euglypta</i>	0	3	1	6	3	3	0	0	0	0	3	1
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	0	1	0	1	1	3	0	1	1	0	1	3
<i>kuetzingiana</i>	35	20	4	11	9	5	3	3	6	5	10	2
<i>meneghiniana</i>	42	56	29	50	38	37	23	34	34	42	8	60
<i>planktonia</i>	2	2	0	0	0	0	0	1	1	0	0	0
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>												
<i>affinis</i>	0	9	0	0	0	0	2	0	0	5	0	1
<i>Cymbella</i>												
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	1	0	0	0	1	0	0	0	0
<i>minuta</i>	0	6	0	11	3	0	0	2	2	1	1	7
<i>minuta</i> var. <i>latens</i>	2	3	2	0	0	1	0	0	0	0	0	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	1	3	7	1	0	4	1	2	0	0
<i>silesiaca</i>	0	0	0	4	0	2	1	2	2	1	0	0
<i>tumida</i>	0	0	0	0	2	0	0	0	1	0	0	0
<i>vulgare</i>	3	5	5	12	16	10	8	6	5	11	7	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	0	2	0	0	0	0	2	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>Diploneis</i>												
<i>vulgare</i> var. <i>linearis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	0	8	0	7	5	3	3	2	1	0	0	1
<i>smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	2	4	3	2	10	2	5	0	0
<i>sorex</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>turgida</i>	0	0	0	0	1	0	1	1	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	1	0	0	0	0	0	0	0	1
<i>tenella</i>	0	0	0	0	0	1	0	2	0	1	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	1	1	0	0	0	0
<i>leptostauran</i>	0	3	0	3	1	4	6	0	0	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	0	1	0	0	0	4	2	7	1	3	0	2
<i>species</i>	0	0	0	0	0	0	0	1	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	1	0	0	0	0	0	3
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	2	0	0	0	0	1	1	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	3	0	4	6	2	2	2	2	1	1	3
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	3	1	0	1	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	0	1	6	3	0	0	0	1	3	1	2	4

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>elginensis</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	1	0	0	2	1	0	0	0	0
<i>elmorei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>globulifera</i>	0	0	1	0	0	8	0	0	1	2	0	7
<i>gregaria</i>	7	23	7	84	120	94	164	90	78	73	16	79
<i>halophila</i>	10	17	7	11	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	0	0	0	0	0	0	0	0	0	0	0	4
<i>integra</i>	0	0	0	0	0	0	1	0	0	0	0	6
<i>keeleyi</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>lacustris</i>	0	0	0	0	2	1	0	1	0	0	0	0
<i>lanceolata</i>	0	0	4	0	0	0	0	0	0	0	0	0
<i>menisculus</i>	0	1	0	0	0	0	2	0	0	0	0	3
<i>minima</i>	32	19	16	30	40	20	9	20	22	6	6	8
<i>mutica</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>odiosa</i>	150	16	23	44	45	26	52	39	32	172	189	16
<i>peregrina</i>	8	14	13	18	13	11	8	18	17	8	6	2
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschyi</i>	2	1	9	1	0	1	1	3	0	0	0	0
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>capitata</i>	0	1	2	1	0	2	0	4	0	0	1	1
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>pupula</i> var. <i>rectangularis</i>	0	0	0	0	0	1	0	1	0	0	0	0
<i>pusilla</i>	0	0	0	1	1	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>pygmaea</i>	5	3	1	6	12	10	3	3	7	6	0	13
<i>rhynchocephala</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>salinarum</i> var. <i>intermedia</i>	14	22	16	22	15	9	3	8	3	31	8	10
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>secura</i>	0	0	1	1	0	0	0	0	0	0	0	0
<i>tenera</i>	0	0	3	0	1	5	0	0	0	0	0	3
<i>tripunctata</i>	0	0	0	0	0	1	0	0	0	0	0	9
<i>tuscula</i>	0	0	1	2	0	2	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	39	18	10	6	8	15	8	8	4	3	3	19
<i>viridula</i> var. <i>rostellata</i>	0	0	3	0	0	0	1	0	0	0	0	9
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>												
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>amphibia</i>	0	5	2	2	4	1	0	13	3	1	1	3
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>brevissima</i>	13	11	11	26	18	17	26	23	20	10	7	8
<i>dissipata</i>	0	1	2	0	0	0	0	0	5	5	4	8
<i>filiformis</i>	4	2	1	2	1	0	21	4	1	6	6	2
<i>fonticola</i>	0	1	10	1	2	1	1	0	5	0	1	7
<i>frustrulum</i>	20	22	14	1	4	5	1	4	2	4	0	4
<i>frustrulum</i> var. <i>perpusilla</i>	0	33	43	20	34	18	18	15	16	13	62	35
<i>heufleriana</i>	0	0	1	0	2	0	1	0	0	0	0	2

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Pinnularia</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Plagiotropis</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>Pleurosira</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia</i>	0	1	0	0	0	2	1	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia</i>	0	0	0	0	0	3	0	0	0	0	0	0
	0	0	0	0	2	0	0	0	0	0	0	0
<i>Stauroneis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Surirella</i>	0	0	1	0	0	1	0	0	0	0	0	4
	0	0	0	0	0	0	0	0	1	0	0	0
	0	0	0	0	1	0	0	2	4	2	0	3
	0	0	0	0	0	0	0	0	0	0	0	0
	0	4	2	2	1	1	0	0	1	0	0	3
<i>Synedra</i>	0	0	0	0	0	0	0	0	0	0	0	0
	0	1	2	0	0	0	0	0	0	0	0	0
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	0	0	0	1	0	0	0	4	2	1	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>pulchella</i>	0	2	8	5	3	1	4	1	1	3	0	0
<i>pulchella</i> var. <i>lanceolata</i>	0	1	2	2	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
10-7-97 Collection (number 2)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	0	0	0	1	0	1	0	0	0	0	1	2
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tabellaria</i>												
species	0	0	0	0	0	0	0	0	1	0	0	0
Total diatoms	564	631	483	646	624	530	533	529	481	549	516	554

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	2	38	11	8	5	4	0	4	0	9	7	11
<i>clevei</i>	0	0	1	0	2	4	0	2	1	0	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	0	0	0	0	0	0	2	0	0	7	6	0
<i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	6	20	17	15	4	8	10	19	27	5	12	6
<i>haukiana</i> var. <i>rostrata</i>	16	10	150	23	12	18	15	31	11	18	18	7
<i>hungarica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	0	41	14	21	5	29	17	23	17	26	14	25
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	0	1	0	0	0	0	0	0	8	4	10
<i>petersenii</i>	0	4	0	0	2	0	4	4	0	0	0	3
<i>polaris</i>	0	0	0	0	0	1	0	1	4	1	0	0
<i>normanii</i>	2	10	4	6	3	5	9	10	13	18	12	13
<i>Actinocyclus</i>												
<i>actinoptychus</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>Amphipleura</i>												
<i>pellucida</i>	0	1	0	0	0	0	1	0	0	0	0	0
<i>Amphora</i>												
<i>ovalis</i>	2	5	2	12	0	0	7	3	12	0	5	3
<i>perpusilla</i>	0	2	0	0	0	0	2	0	0	4	2	4
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	0	2	2	0	2	4	0	1	0	2	2	0
<i>styriaca</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>Bacillaria</i>												
<i>paradoxa</i>	0	10	18	11	1	4	26	16	13	7	4	6
<i>Caloneis</i>												
<i>bacillum</i>	0	0	0	8	0	2	10	5	3	4	0	2

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	1	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluvialis</i>	0	2	0	0	1	1	5	2	0	2	2	2
<i>neodiminuta</i>	3	7	2	4	1	10	2	10	4	10	19	23
<i>placentula</i> var. <i>lineata</i>	10	50	17	38	19	89	125	30	36	30	50	71
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	0	1	0	0	0	0	2	0	0	0	0	1
<i>kuetzingiana</i>	2	2	0	0	0	0	0	0	2	2	7	3
<i>meneghiniana</i>	17	51	28	63	10	42	34	48	63	58	83	67
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>												
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>												
<i>affinis</i>	0	1	0	0	0	0	1	0	0	0	0	1
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>minuta</i>	0	4	0	3	1	3	3	4	2	3	1	3
<i>minuta</i> var. <i>latens</i>	0	0	1	0	1	2	2	0	2	0	0	1
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>naviculiformis</i>	0	0	1	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	0	0	1	1	0	2	0	0	3	0	0
<i>tumida</i>	0	0	0	0	0	0	0	0	1	1	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	3	5	6	5	3	2	6	5	1	10	13	20

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>Diploneis</i>												
<i>vulgare</i> var. <i>linearis</i>	0	0	0	0	0	0	0	2	0	1	0	0
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	2	1	0	1	2	3	4	2	1	2	2	1
<i>smithii</i>	0	0	1	1	0	0	0	4	0	0	0	0
<i>species</i>	0	3	2	1	0	7	1	2	3	1	0	0
<i>Epithemia</i>												
<i>sorex</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>turgida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eunotia</i>												
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	1	0	0	0	0	0	0	1	2	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Fragilaria</i>												
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>pinnata</i> var. <i>pinnata</i>	2	0	3	0	0	1	1	6	1	2	0	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	2	1	0	2	1	0	2	3	1	0	1
<i>Gomphonema</i>												
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	2	0	2	0	0	0	2	0	3	0	1
<i>angustatum</i> var. <i>sarcophagus</i>	0	1	0	0	0	0	0	0	1	0	0	0
<i>grovei</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>olivaceum</i>	0	2	2	2	1	0	0	2	2	2	7	4

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Gomphonema parvulum</i>	2	2	0	4	1	1	1	0	0	1	1	4
<i>sphaerophorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	2	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	0	0	2	0	0	0	0	0	0	0	2
<i>Gyrosigma attenuatum</i>	0	0	0	0	0	0	0	1	0	0	0	0
<i>obscurum</i>	0	2	2	0	0	0	0	0	0	0	0	0
<i>scalproides</i>	0	0	0	0	1	2	0	2	3	4	6	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Melosira alpengia</i>	0	0	0	2	0	0	0	0	0	0	0	0
<i>distans</i>	0	0	3	0	0	0	0	0	0	0	0	0
<i>circulare</i>	0	3	2	1	1	0	2	2	0	0	0	0
<i>circulare</i> var. <i>constrictum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>aurora</i>	0	0	0	1	0	0	0	0	0	0	0	0
<i>capitata</i>	2	1	2	6	2	0	1	0	0	2	3	11
<i>capitata</i> var. <i>luneburgensis</i>	0	0	0	0	0	2	0	0	0	4	2	2
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	5	0	2	1	0	4	0	0	0	2	0	0
<i>cryptocephala</i> var. <i>veneta</i>	1	0	0	0	0	2	1	0	1	0	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	1	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>elginensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elmorei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>globulifera</i>	4	6	4	7	0	4	0	7	5	3	3	13
<i>gregaria</i>	10	59	18	62	33	94	94	100	58	51	38	53
<i>halophila</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	0	1	0	0	0	0	0	0	0	1	0	1
<i>integra</i>	0	0	2	5	0	0	2	1	1	3	3	2
<i>keeleyi</i>	0	0	0	1	0	0	0	0	0	3	0	0
<i>lacustris</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>lanceolata</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>menisculus</i>	0	1	0	4	2	3	11	4	2	0	8	4
<i>minima</i>	3	12	0	4	4	10	4	15	7	17	2	3
<i>mutica</i>	0	5	0	5	2	1	8	8	6	5	2	0
<i>odiosa</i>	14	12	16	26	5	24	34	28	18	18	13	8
<i>peregrina</i>	2	6	14	10	5	5	6	5	20	18	22	22
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschy</i>	3	0	0	0	0	0	0	0	0	1	3	2
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>capitata</i>	1	3	0	0	0	0	2	3	4	5	2	3
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	1	0	0	0	0
<i>pusilla</i>	0	1	0	0	0	0	0	2	0	3	0	0

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Nitzschia</i>												
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	0	0	0	0	0	0	1	3	1	0	1	0
<i>linearis</i>	0	0	0	4	2	0	4	0	2	3	1	1
<i>microcephala</i>	13	10	1	0	1	0	0	2	0	3	1	1
<i>punctata</i> var. <i>coarctata</i>	0	0	0	1	0	0	5	0	0	0	1	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>sigma</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>tryblionella</i>	0	2	0	0	0	0	0	1	0	2	0	1
<i>tryblionella</i> var. <i>debilis</i>	2	7	2	4	1	4	6	2	5	4	1	1
<i>tryblionella</i> var. <i>victoriae</i>	0	3	0	0	0	1	2	1	4	3	7	5
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	1	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	0	0	0	0	2	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>Pinnularia</i>												

Appendix 2. The number of diatoms counted at each station 10-30-97 Collection (number 3)

Appendix 2. The number of diatoms counted at each station
10-30-97 Collection (number 3)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	0	1	0	0	0	0	0	0	1	0	0	1
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>Tabellaria</i>												
species	0	0	0	0	0	0	0	0	0	0	0	0
Total diatoms	197	557	436	491	167	518	577	511	505	541	558	558

Note that only one sediment sample was counted at stations one and five

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	9	11	4	1	0	0	0	4	2	2	2	4
<i>clevei</i>	1	0	0	0	0	0	0	5	2	0	0	2
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	3	5	7	1	2	5	3	0	0	4	4	2
<i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	2	8	17	10	10	14	5	5	13	5	8	8
<i>haukiana</i> var. <i>rostrata</i>	19	4	70	12	33	21	12	22	20	5	3	5
<i>hungarica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	17	30	23	9	22	21	21	28	15	9	15	14
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	2	0	5	0	8	4	3	0	0	2	2	6
<i>petersenii</i>	0	4	0	0	0	2	2	0	2	0	2	2
<i>polaris</i>	0	0	0	0	0	5	0	0	0	0	0	0
<i>normanii</i>	10	15	4	12	10	9	6	11	9	7	26	20
<i>Actinocyclus</i>												
<i>senarius</i>	1	0	0	0	0	0	0	0	0	0	0	0
<i>Actinopterychus</i>												
<i>pellucida</i>	0	0	1	0	0	0	1	0	0	0	0	1
<i>Amphipleura</i>												
<i>ovalis</i>	4	7	3	0	0	7	2	3	4	2	7	11
<i>Amphora</i>												
<i>perpusilla</i>	7	4	8	0	6	2	0	2	0	4	7	3
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	1	2	2	0	2	0	1	0	4	6	6	11
<i>styriaca</i>	0	2	0	0	0	0	0	0	0	1	0	0
<i>Bacillaria</i>												
<i>paradoxa</i>	8	9	7	18	20	0	30	19	5	2	11	8
<i>Caloneis</i>												
<i>bacillum</i>	2	0	3	6	4	12	4	4	9	5	4	0

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	2	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluvialis</i>	0	2	2	1	3	4	2	5	1	1	5	3
<i>neodiminuta</i>	4	7	3	6	6	8	2	2	6	7	38	16
<i>placentula</i> var. <i>lineata</i>	73	94	20	45	29	89	76	32	13	15	99	100
<i>placentula</i> var. <i>euglypta</i>	1	0	0	0	0	1	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	0	1	0	0	1	0	0	1	0	0	2	0
<i>kuetzingiana</i>	6	4	3	2	5	1	3	2	2	0	5	2
<i>meneghiniana</i>	58	75	39	51	54	33	30	68	28	32	64	34
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>												
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>												
<i>affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>minuta</i>	1	6	4	3	1	5	1	4	2	3	2	5
<i>minuta</i> var. <i>latens</i>	0	0	1	1	2	0	0	0	0	1	0	1
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>silesiaca</i>	0	2	2	1	0	0	0	0	0	1	0	0
<i>tunida</i>	0	0	0	0	0	1	1	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	9	7	8	11	5	0	6	3	5	3	11	3

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>Diploneis</i>												
<i>vulgare</i> var. <i>linearis</i>	2	0	1	1	0	0	0	0	1	4	4	1
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	1	1	6	2	8	44	1	2	2	1	2	0
<i>smithii</i>	2	2	3	1	1	11	1	1	0	1	2	0
<i>species</i>	0	3	4	1	4	0	5	1	3	1	1	0
<i>sorex</i>	0	0	0	0	1	5	0	0	0	0	0	0
<i>turgida</i>	1	0	1	0	0	8	0	0	1	2	1	1
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	3	0	0	2	0	0	1	0	0	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	1	3	0	1	0	0	0	0	1	0	0
<i>pinnata</i> var. <i>pinnata</i>	1	1	0	5	4	12	0	1	2	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	1	0	0	3	1	1	0	0	0	4
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	1	3	1	3	0	2	0	2	1	0	0	1
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	2	6	3	2	2	4	3	5	1	1	6	6

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Gomphonema parvulum</i>	1	2	1	3	4	0	0	2	3	0	1	1
<i>sphaerophorum</i>	0	0	0	0	0	0	0	1	0	0	1	0
<i>truncatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	1	1	0	1	0	0	0	0	0	4	0
<i>Gyrosigma attenuatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscurum</i>	0	1	0	0	0	3	0	0	0	0	0	0
<i>scalpoides</i>	1	3	1	1	0	3	2	4	3	0	0	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	2	2	0	4	0	0	0	0	0	0
<i>Melosira alpigena</i>	0	0	2	0	0	4	0	2	0	0	0	0
<i>distans</i>	0	0	2	0	0	1	2	0	0	0	4	0
<i>circulare</i>	0	1	0	0	0	0	0	1	0	0	1	7
<i>circulare</i> var. <i>constrictum</i>	0	1	1	0	0	0	0	1	0	0	0	0
<i>aurorea</i>	0	0	0	0	0	0	0	0	0	0	4	4
<i>capitata</i>	3	6	4	3	3	2	3	4	11	6	0	0
<i>capitata</i> var. <i>luneburgensis</i>	13	1	0	1	0	4	0	1	0	0	0	0
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	8	2	1	0	2	0	1	0	1	1	0	0
<i>cryptocephala</i> var. <i>veneta</i>	0	2	0	0	0	5	0	1	0	1	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	0	2	0	0	1	0	0

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>elginensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elmorei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>globulifera</i>	7	12	3	5	3	5	4	4	3	3	14	13
<i>gregaria</i>	28	29	53	60	77	53	112	69	58	58	43	55
<i>halophila</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>integra</i>	0	0	1	2	2	1	2	4	4	0	0	1
<i>keeleyi</i>	1	0	0	0	0	1	1	1	0	0	0	0
<i>lacustris</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>menisculus</i>	5	3	4	8	5	4	8	2	3	0	0	3
<i>minima</i>	3	13	6	4	9	4	2	6	3	4	3	1
<i>mutica</i>	0	1	5	3	6	3	6	6	2	3	1	2
<i>odiosa</i>	57	21	24	36	16	25	25	18	10	9	12	5
<i>peregrina</i>	12	29	13	17	8	4	4	7	11	15	0	0
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschy</i>	5	1	4	1	0	1	1	2	1	0	0	0
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>capitata</i>	0	1	1	0	0	1	4	0	1	2	0	8
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	0	0	1	0	0
<i>pusilla</i>	0	0	1	0	0	5	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Pinnularia viridis</i>	0	0	0	0	2	0	0	0	0	0	0	0
<i>Plagiotropis lepidoptera</i>	1	1	2	5	0	0	0	4	0	0	3	0
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphicerus</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	0	1	0	0	1	0	0	4	0	0	0	2
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	2	0	0	0	1	0	0
<i>gibberula</i>	2	0	0	0	0	21	0	1	0	1	0	0
<i>anceps</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus species</i>	5	10	3	1	2	3	2	2	0	3	7	8
<i>Surirella birostrata</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>biseriata</i>	0	0	0	0	1	0	0	1	1	0	2	1
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	4	0	1	3	3	1	1	2	4	3	3	3
<i>acus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	0	1	0	2	1	1	2	2	2	0	1	1
<i>parasitica</i> var. <i>subconstricta</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>pulchella</i>	1	0	1	4	0	0	0	2	0	0	3	6
<i>pulchella</i> var. <i>lanceolata</i>	0	0	0	0	0	1	1	0	0	0	1	0

Appendix 2. The number of diatoms counted at each station
1-6-98 Collection (number 4)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	2	1	0	1	4	3	0	0	0	1	1	1
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>Tabellaria</i>												
species	0	0	0	0	0	0	0	0	0	0	0	1
Total diatoms	582	576	527	481	518	596	533	516	370	338	571	551

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	2	0	0	0	1	0	0	0	0	0	0	0
<i>clevei</i>	0	0	0	0	0	0	0	2	0	0	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	0	1	1	0	0	0	0	0	0	0	0	0
<i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	19	7	18	8	11	20	2	15	12	7	11	14
<i>haukiana</i> var. <i>rostrata</i>	17	11	39	19	20	9	16	29	20	8	8	15
<i>hungarica</i>	2	0	0	1	0	0	1	1	0	2	0	0
<i>lanceolata</i>	0	0	4	17	19	17	11	17	15	10	4	21
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	0	0	0	0	0	0	1	0	0	1	0
<i>petersenii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>polaris</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>normanii</i>	13	13	5	0	8	11	6	8	5	13	10	6
<i>Actinocyclus</i>												
<i>senarius</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Amphipleura</i>												
<i>pellucida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Amphora</i>												
<i>ovalis</i>	2	2	2	0	0	2	0	1	0	0	0	0
<i>perpusilla</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>styriaca</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Bacillaria</i>												
<i>paradoxa</i>	5	9	10	26	16	22	29	20	11	16	14	5
<i>Caloneis</i>												
<i>bacillum</i>	0	0	0	0	1	6	1	1	0	0	1	2

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>vulgare</i> var. <i>linearis</i>	0	0	2	0	0	2	0	0	0	1	0	0
<i>Diploneis</i>												
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	1	2	1	8	6	20	4	6	1	1	1	1
<i>smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	1	0	0	1	2	8	4	1	2	1	1	1
<i>sorex</i>	3	3	0	0	0	7	0	1	0	2	0	0
<i>turgida</i>	0	0	0	0	1	2	0	0	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	1	0	0	0	0	0	1	0	0	0	0
<i>tenella</i>	0	0	0	0	1	1	0	0	0	1	1	0
<i>Fragilaria</i>												
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	1	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	1	6	0	0	0	0	0	0	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	7	5	1	2	3	8	2	1	0	2	0	2
<i>species</i>	0	3	2	1	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gomphonema</i>												
<i>acuminatum</i>	0	0	0	0	0	0	0	0	1	0	1	1
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	3	1	1	2	0	4	1	1	0	1	6	5
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	1	0	0	1	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	0	3	3	0	2	2	2	2	0	2	3	5

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Gomphonema parvulum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>sphaerophorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	0	0	0	0	0	0	1	0	0	0	0
<i>Gyrosigma attenuatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalproides</i>	4	8	0	2	7	2	2	0	3	3	2	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Melosira alpigena</i>	0	0	0	0	1	2	5	8	0	3	9	3
<i>distans</i>	12	15	12	5	0	10	4	0	1	4	2	2
<i>circulare</i>	0	0	2	0	0	0	0	0	0	0	0	0
<i>circulare</i> var. <i>constrictum</i>	1	0	0	1	0	1	0	0	0	1	0	0
<i>aurora</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>capitata</i>	0	0	0	0	1	0	0	0	0	0	5	4
<i>capitata</i> var. <i>luneburgensis</i>	2	0	0	1	0	1	0	1	2	1	1	1
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	7	0	0	0	1	0	2	1	0	1	0	0
<i>cryptocephala</i> var. <i>veneta</i>	1	1	0	1	0	1	2	0	0	1	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Taxa	Stations											
<i>Navicula</i>	1	2	3	4	5	6	7	8	9	10	11	12
<i>elginensis</i>	0	0	0	1	0	0	0	1	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elmorei</i>	1	0	0	0	0	0	0	2	0	0	0	0
<i>globulifera</i>	1	2	0	10	10	3	3	2	5	6	9	1
<i>gregaria</i>	16	31	54	61	82	62	89	46	88	75	39	98
<i>halophila</i>	1	1	0	0	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>integra</i>	0	0	0	0	0	1	1	1	1	2	0	2
<i>keeleyi</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>lacustris</i>	1	0	0	0	0	0	1	0	0	0	0	0
<i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>menisculus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>minima</i>	24	28	19	14	16	16	20	16	26	14	6	15
<i>mutica</i>	0	0	4	0	2	2	5	5	1	0	4	4
<i>odiosa</i>	60	24	26	20	22	37	46	32	23	36	18	15
<i>peregrina</i>	8	9	17	14	4	3	2	11	8	7	5	3
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschy</i>	10	0	2	0	1	0	0	1	0	2	0	3
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>capitata</i>	0	0	0	0	3	1	0	0	1	0	0	2
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>rectangularis</i>	0	0	0	0	0	3	0	0	0	0	0	0
<i>pusilla</i>	0	0	0	0	0	1	0	0	0	0	0	1

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>pygmaea</i>	1	2	2	4	1	0	0	3	0	5	2	4
<i>rhynchocephala</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>salinarum</i> var. <i>intermedia</i>	19	10	17	9	5	5	3	9	5	27	33	33
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>secura</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	0	0	3	1	2	1	3	0	0	2	0	0
<i>tripunctata</i>	3	2	3	8	4	5	1	5	2	2	0	3
<i>tuscula</i>	0	1	0	0	3	0	0	0	0	0	0	1
<i>vanheurneckii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	15	26	23	27	22	16	21	16	22	13	45	28
<i>viridula</i> var. <i>rostellata</i>	0	2	6	4	3	1	4	1	3	2	2	5
<i>Neidium</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>amphiatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>amphibia</i>	1	2	5	3	4	14	3	4	2	3	4	1
<i>apiculata</i>	0	1	1	0	5	0	0	0	1	0	1	1
<i>brevissima</i>	5	12	9	9	14	18	20	14	9	17	11	10
<i>dissipata</i>	6	3	10	4	3	12	1	1	1	5	3	2
<i>filiformis</i>	3	4	0	0	2	4	7	1	3	6	0	0
<i>fonticola</i>	1	7	9	3	4	1	4	1	3	1	3	0
<i>frustrulum</i>	1	4	0	3	3	1	2	4	0	1	5	4
<i>frustrulum</i> var. <i>perpusilla</i>	18	27	27	16	17	11	12	16	20	12	21	18
<i>heufleriana</i>	1	0	0	0	0	0	1	0	1	2	1	0

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

[illegible]

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Appendix 2. The number of diatoms counted at each station
2-3-98 Collection (number 5)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	0	2	1	1	2	1	0	0	0	0	0	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tabellaria</i>												
species	0	0	0	0	0	1	0	0	0	1	0	0
Total diatoms	458	420	439	439	437	497	411	403	393	442	465	443

Appendix 2. The number of diatoms counted at each station 3-27-98 Collection (number 6)

Appendix 2. The number of diatoms counted at each station
3-27-98 Collection (number 6)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluviatilis</i>	0	1	0	4	2	2	1	2	0	0	0	0
<i>neodiminuta</i>	8	10	0	0	9	13	2	8	11	7	11	16
<i>placentula</i> var. <i>lineata</i>	38	83	29	31	17	29	15	52	24	24	15	10
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	2	0	0	0	0	0	1
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	2	1	2	2	1	0	2	0	0	0	0	0
<i>kuetzingiana</i>	6	8	3	6	5	5	6	2	7	11	14	22
<i>meneghiniana</i>	80	67	28	64	43	36	26	22	19	24	28	23
<i>planktonia</i>	4	0	0	0	0	0	0	0	0	0	1	0
<i>Cymatopleura</i>												
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>												
<i>affinis</i>	0	0	5	0	0	1	0	0	1	0	0	3
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	2	0	0	0	0	0	0	0
<i>minuta</i>	9	5	10	1	3	5	1	3	1	3	2	4
<i>minuta</i> var. <i>latens</i>	0	0	0	0	0	1	0	0	1	0	0	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	1	0	1	2	1	0	0	0	0	0	0
<i>silesiaca</i>	1	1	0	2	1	0	2	0	0	0	0	0
<i>tumida</i>	0	3	0	0	0	0	0	0	4	1	1	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	6	13	11	1	4	3	7	3	3	8	10	15

Appendix 2. The number of diatoms counted at each station
3-27-98 Collection (number 6)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>Diploneis</i>												
<i>vulgare</i> var. <i>linearis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	4	2	3	4	5	24	1	1	1	0	1	0
<i>smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	2	2	1	1	2	12	5	5	10	0	0	0
<i>sorex</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>turgida</i>	0	0	0	0	0	3	0	0	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenella</i>	0	0	0	0	0	0	1	0	1	0	3	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	0	0	0	0	1	0	1	0	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	2	4	4	2	4	2	1	5	3	4	4	2
<i>species</i>	0	0	0	0	0	0	0	0	0	1	1	0
<i>virescens</i> var. <i>capitata</i>	0	4	0	0	0	0	0	0	0	0	0	0
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	2	1	3	0	0	1	0	0	0	0	0	1
<i>angustatum</i> var. <i>obtusatum</i>	0	2	0	2	1	1	0	3	0	1	2	0
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	0	6	2	2	1	2	0	4	1	1	0	1

Appendix 2. The number of diatoms counted at each station 3-27-98 Collection (number 6)

[illegible]

Appendix 2. The number of diatoms counted at each station
3-27-98 Collection (number 6)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>elginensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elmorei</i>	0	0	1	0	0	1	0	0	0	0	0	0
<i>globulifera</i>	0	7	2	10	6	6	7	9	0	5	0	5
<i>gregaria</i>	101	14	134	127	114	68	98	51	117	102	114	101
<i>halophila</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	0	0	0	0	0	1	0	1	1	0	2	0
<i>integra</i>	0	1	0	0	0	0	2	0	2	1	0	0
<i>keeleyi</i>	0	0	0	0	0	0	0	1	0	0	0	0
<i>lacustris</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>menisculus</i>	0	2	0	0	0	0	0	1	0	0	0	0
<i>minima</i>	16	12	32	14	11	11	16	11	17	14	16	19
<i>mutica</i>	2	2	4	4	1	4	4	0	1	3	1	0
<i>odiosa</i>	75	35	21	25	24	34	41	28	27	25	14	12
<i>peregrina</i>	13	9	34	21	8	9	1	8	0	5	0	0
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschyi</i>	9	0	9	0	1	0	0	0	1	1	0	0
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	2	0	0	0	0	1	0
<i>pupula</i> var. <i>capitata</i>	1	1	1	1	0	0	1	3	0	1	2	3
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	2	0	0	0	0	0
<i>pupula</i> var. <i>rectangularis</i>	0	0	0	1	0	1	0	0	1	0	0	0
<i>pusilla</i>	0	2	0	0	0	3	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
3-27-98 Collection (number 6)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>pygmaea</i>	1	3	1	3	1	0	2	2	0	1	5	4
<i>rhynchocephala</i>	0	3	0	0	0	0	0	0	0	0	0	0
<i>salinarum</i> var. <i>intermedia</i>	39	6	11	17	10	14	7	27	23	28	27	45
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>secura</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	0	0	0	0	3	0	1	1	5	4	1	0
<i>tripunctata</i>	0	0	0	0	6	5	2	7	4	0	1	6
<i>tuscula</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>vanheurckii</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	35	24	13	13	23	12	17	30	23	18	23	18
<i>viridula</i> var. <i>rostellata</i>	10	4	5	4	5	4	1	1	0	6	8	2
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>												
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>amphibia</i>	0	2	1	5	6	3	0	1	5	7	7	3
<i>apiculata</i>	0	0	0	0	1	0	0	1	2	0	3	3
<i>brevissima</i>	5	32	10	27	15	20	20	13	8	18	6	3
<i>dissipata</i>	6	4	4	3	0	3	3	4	12	3	6	8
<i>filiformis</i>	3	3	2	6	3	2	5	8	2	4	0	0
<i>fonticola</i>	1	1	0	2	1	1	0	1	0	1	0	2
<i>frustrulum</i>	3	0	0	5	0	1	1	0	1	1	6	4
<i>frustrulum</i> var. <i>perpusilla</i>	13	13	1	13	10	12	16	13	11	9	17	15
<i>heufliana</i>	0	2	1	1	0	0	0	0	0	0	0	1

Appendix 2. The number of diatoms counted at each station
3-27-98 Collection (number 6)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Pinnularia viridis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Plagiotropis lepidoptera</i>	0	2	0	0	0	0	0	0	0	0	0	0
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphiceros</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	0	0	0	0	0	2	0	2	0	1	1	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>gibberula</i>	0	0	4	0	1	6	2	0	0	0	0	0
<i>Stauroneis anceps</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus species</i>	0	1	0	0	0	0	0	0	0	0	0	0
<i>Surirella birostrata</i>	0	0	0	0	1	0	0	0	0	0	0	0
<i>biseriata</i>	2	0	0	1	0	0	0	0	0	0	0	1
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	3	5	0	4	1	0	7	7	1	3	0	0
<i>acus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	0	2	1	4	0	0	4	2	2	4	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pulchella</i>	3	1	1	1	1	3	0	4	1	0	0	0
<i>pulchella</i> var. <i>lanceolata</i>	0	1	0	0	1	0	0	0	1	0	0	0

Appendix 2. The number of diatoms counted at each station
3-27-98 Collection (number 6)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	0	2	0	2	2	3	0	1	1	2	0	1
<i>ulna</i> var. <i>amphirhynchus</i>	0	1	0	0	0	0	0	0	0	0	0	2
<i>Tabellaria</i>												
species	1	1	0	2	0	0	0	0	0	0	0	0
Total diatoms	629	566	564	578	489	466	419	450	433	428	435	425

Appendix 2. The number of diatoms counted at each station
4-30-98 Collection (number 7)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	6	0	1	5	1	8	0	0	0	0	3	5
<i>clevei</i>	0	0	0	0	0	0	0	1	1	1	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	1	0
<i>coarctata</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>exigua</i>	3	0	0	0	0	1	0	0	0	0	0	0
<i>haukiana</i>	13	13	19	9	14	10	3	29	18	13	5	7
<i>haukiana</i> var. <i>rostrata</i>	22	8	108	12	10	9	11	28	15	8	2	6
<i>hungarica</i>	0	0	0	0	0	0	1	9	16	14	0	0
<i>lanceolata</i>	10	36	36	11	13	21	26	20	0	0	7	16
<i>lemmermannii</i>	0	0	0	0	0	0	0	3	0	0	0	0
<i>linearis</i>	2	0	0	0	0	0	0	0	0	0	0	0
<i>petersenii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>polaris</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>normanii</i>	2	9	2	2	0	10	8	4	13	15	10	12
<i>Actinocyclus</i>												
<i>senarius</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Actinopterychus</i>												
<i>pellucida</i>	0	0	1	1	0	3	2	0	1	0	0	2
<i>Amphipleura</i>												
<i>ovalis</i>	4	2	0	0	0	2	0	2	0	2	0	0
<i>perpusilla</i>	2	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>styriaca</i>	4	0	0	0	0	0	0	0	0	0	0	0
<i>Bacillaria</i>												
<i>paradoxa</i>	0	4	0	5	4	14	26	7	9	2	5	0
<i>Caloneis</i>												
<i>bacillum</i>	0	3	1	3	1	5	0	5	2	0	0	2

Appendix 2. The number of diatoms counted at each station
4-30-98 Collection (number 7)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluvialis</i>	0	2	0	1	0	0	1	3	2	3	2	3
<i>neodiminuta</i>	1	9	7	6	1	15	4	11	10	12	16	14
<i>placentula</i> var. <i>lineata</i>	9	46	18	14	14	23	21	19	30	19	25	16
<i>placentula</i> var. <i>euglypta</i>	0	0	1	0	1	0	0	1	0	0	1	4
<i>rugosa</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>kuetzingiana</i>	0	7	1	10	4	3	3	9	5	5	12	3
<i>meneghiniana</i>	27	43	6	17	7	22	18	15	14	29	33	34
<i>planktonia</i>	0	0	0	0	0	1	0	0	0	0	0	1
<i>Cymatopleura</i>												
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>												
<i>affinis</i>	0	0	0	0	0	0	2	2	0	0	0	1
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	0	0	0	0	2
<i>minuta</i>	2	0	5	3	1	7	2	3	2	2	1	2
<i>minuta</i> var. <i>latens</i>	0	0	0	0	0	0	0	0	0	0	1	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	1	0	0	0	0	1	0	0
<i>silesiaca</i>	0	1	8	1	0	0	0	2	1	1	1	1
<i>tumida</i>	2	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	2	2	5	5	0	0	7	1	6	3	10	2

Appendix 2. The number of diatoms counted at each station
4-30-98 Collection (number 7)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>	1	1	4	0	0	1	0	0	1	1	0	3
<i>Diploneis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i> var. <i>linearis</i>												
<i>bombus</i>												
<i>elliptica</i>	0	0	1	1	0	0	4	8	1	1	2	1
<i>smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	2	3	1	2	2	4	3	4	1	0	0
<i>Epithemia</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>sorex</i>												
<i>turgida</i>	0	0	0	0	0	0	0	0	0	0	1	0
<i>Eunotia</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>hexaglyphis</i>												
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenella</i>	0	0	1	0	0	0	0	0	2	1	0	0
<i>Fragilaria</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>												
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	1	0	0	0	1	4	2	2	1	4	0	0
<i>pinnata</i> var. <i>pinnata</i>	0	2	0	3	1	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	1	0	0	0	0	0	0	0	0	0	0	0
<i>Gomphonema</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminatum</i>												
<i>angustatum</i>	0	0	0	0	0	0	0	0	2	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	1	3	3	2	0	2	3	0	0	1	7	5
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	0	0	0	2	1	6	0	1	0	2	1	2

Appendix 2. The number of diatoms counted at each station
4-30-98 Collection (number 7)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Navicula</i>												
<i>pygmaea</i>	1	1	0	1	4	0	0	1	4	9	5	0
<i>rhynchocephala</i>	3	0	0	0	0	0	0	0	0	0	0	0
<i>salinarum</i> var. <i>intermedia</i>	36	16	10	16	11	11	7	11	10	37	26	30
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>secura</i>	0	1	2	0	0	0	0	0	0	0	0	0
<i>tenera</i>	4	3	0	0	1	5	0	2	1	0	1	1
<i>tripunctata</i>	0	5	2	5	6	6	1	5	2	2	4	2
<i>tuscula</i>	0	0	2	0	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	10	22	13	8	3	16	21	11	8	1	22	18
<i>viridula</i> var. <i>rostellata</i>	0	0	2	1	0	0	2	1	1	0	2	3
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>												
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>amphibia</i>	0	3	2	0	1	3	2	1	4	2	1	1
<i>apiculata</i>	0	1	0	0	2	0	0	0	1	0	0	0
<i>brevissima</i>	6	10	6	8	6	11	10	5	8	15	17	2
<i>dissipata</i>	0	3	1	5	3	1	4	1	6	2	2	1
<i>filiformis</i>	1	0	1	0	1	4	3	1	0	3	1	0
<i>fonticola</i>	5	0	0	1	0	1	0	1	0	1	0	0
<i>frustrulum</i>	2	4	3	2	0	1	0	1	2	1	2	0
<i>frustrulum</i> var. <i>perpusilla</i>	11	35	16	20	21	18	22	15	14	11	16	13
<i>heufleriana</i>	0	0	0	0	0	2	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station 4-30-98 Collection (number 7)

[illegible]

Appendix 2. The number of diatoms counted at each station
4-30-98 Collection (number 7)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	0	2	1	0	2	1	0	0	0	0	0	3
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>Tabellaria</i>												
species	0	0	0	0	0	0	0	0	0	0	0	0
Total diatoms	449	471	419	391	402	475	443	425	417	413	419	411

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Achnanthes</i>												
<i>chilidanos</i>	4	12	4	0	1	1	5	7	0	0	2	26
<i>clevei</i>	0	0	2	0	0	0	2	3	0	0	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	0	22	0	0	0	1	1	0	0	0	0	0
<i>exigua</i>	0	1	0	0	0	0	1	0	0	0	0	2
<i>haukiana</i>	12	11	11	9	9	9	2	15	10	5	16	11
<i>haukiana</i> var. <i>rostrata</i>	27	17	59	10	14	6	10	36	9	14	5	17
<i>hungarica</i>	1	2	2	0	0	0	0	0	1	1	3	0
<i>lanceolata</i>	7	17	16	17	21	33	14	38	24	14	15	9
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	2	0	0	1	0	3	4	0	0	0	13
<i>petersenii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>polaris</i>	0	0	0	0	0	2	0	1	0	1	0	0
<i>normanii</i>	4	9	3	6	1	9	2	4	1	1	0	4
<i>Actinocyclus</i>												
<i>Actinoptychus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Amphipleura</i>												
<i>pellucida</i>	0	2	1	1	0	0	2	0	0	0	4	0
<i>ovalis</i>	0	0	0	2	1	0	0	4	2	0	6	2
<i>perpusilla</i>	0	0	0	0	0	0	0	2	0	0	0	8
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>												
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>styriaca</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Bacillaria</i>												
<i>paradoxa</i>	2	6	3	4	8	1	6	15	11	3	0	2
<i>Caloneis</i>												
<i>bacillum</i>	0	5	10	1	4	6	3	0	3	1	0	2

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Caloneis</i>												
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	1	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>												
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>												
<i>fluviatilis</i>	0	2	3	1	1	1	1	1	2	0	2	0
<i>neodiminuta</i>	0	15	1	5	8	14	3	4	6	8	21	13
<i>placentula</i> var. <i>lineata</i>	9	40	25	28	30	39	13	17	25	16	50	24
<i>placentula</i> var. <i>euglypta</i>	1	1	0	0	0	0	0	0	0	0	1	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>												
<i>bodanica</i>	2	0	0	0	0	0	0	1	0	1	2	0
<i>kuetzingiana</i>	3	7	1	4	6	5	2	2	8	6	5	4
<i>meneghiniana</i>	17	48	15	11	20	16	13	27	23	28	32	23
<i>planktonia</i>	0	0	0	0	0	0	1	0	0	0	1	0
<i>Cymatopleura</i>												
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>												
<i>affinis</i>	1	0	0	2	3	0	0	0	3	0	2	1
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	1	0	0	0	0	0	0	0
<i>minuta</i>	0	4	2	3	1	7	2	4	3	1	3	8
<i>minuta</i> var. <i>latens</i>	0	0	0	0	0	0	0	3	0	0	1	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	1	1	1	0	0	0	0	1	0	0	1
<i>tumida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>												
<i>vulgare</i> var. <i>breve</i>	5	0	3	2	4	5	2	2	1	6	14	12

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Diatoma</i>												
<i>Diploneis</i>												
<i>vulgare</i> var. <i>linearis</i>	0	1	1	0	1	1	0	0	2	1	0	2
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	0	1	5	1	3	2	4	0	1	0	0	0
<i>smithii</i>	0	1	0	0	0	0	3	0	0	0	0	0
<i>species</i>	0	5	6	5	6	4	2	1	3	1	1	1
<i>sorex</i>	1	0	0	0	0	2	0	0	0	0	0	0
<i>turgida</i>	0	0	2	0	0	1	0	0	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	2	0	1	0	0	0	1
<i>tenella</i>	0	1	0	0	0	0	0	0	2	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	1	0	2	0	0	0	0	1	1	1	0	0
<i>pinnata</i> var. <i>pinnata</i>	2	3	14	2	4	2	5	1	1	1	3	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	2	4	1	1	0	2	2	1	0	1	4
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	1
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	2	0	2	3	1	5	0	1	1	1	6	3

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12
<i>Gomphonema parvulum</i>	0	3	0	0	0	1	1	0	0	0	0	6
<i>sphaerophorum</i>	0	4	0	0	0	0	0	0	0	0	0	2
<i>truncatum</i>	0	0	0	0	0	0	0	0	0	0	1	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>Gyrosigma attenuatum</i>	0	3	0	0	0	0	0	0	0	0	0	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalpoides</i>	2	0	0	0	2	6	0	3	0	0	1	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>Melosira alpigena</i>	0	0	5	0	0	2	0	2	3	2	0	4
<i>distans</i>	0	2	0	0	3	2	2	0	0	0	3	2
<i>circulare</i>	0	0	1	1	0	2	0	0	1	0	3	3
<i>circulare</i> var. <i>constrictum</i>	0	1	1	0	0	0	0	0	1	0	0	0
<i>aurora</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>capitata</i>	1	11	0	3	5	2	0	0	2	1	3	4
<i>capitata</i> var. <i>luneburgensis</i>	0	4	0	1	0	0	0	0	0	0	1	4
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	4	0	0	1	1	0	3	0	0	1	0	0
<i>cryptocephala</i> var. <i>veneta</i>	0	0	0	0	0	1	0	2	0	1	1	2
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	2	2	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station 5-16-98 Collection (number 8)

[illegible]

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Nitzschia</i>												
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	0	4	1	0	0	3	2	1	1	0	2	0
<i>linearis</i>	0	2	1	0	0	1	2	2	0	0	0	0
<i>microcephala</i>	46	6	0	0	0	0	0	2	0	0	2	0
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	0	2	0	4	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>sigma</i>	0	0	0	0	1	0	0	0	0	1	0	0
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>tryblionella</i>	0	0	0	2	0	2	0	1	1	0	1	1
<i>tryblionella</i> var. <i>debilis</i>	0	3	0	3	2	3	6	3	1	0	2	0
<i>tryblionella</i> var. <i>victoriae</i>	2	3	1	0	1	2	1	3	2	1	4	1
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	1	0	0	0	0	1	0	0
<i>brebissoni</i>	0	0	1	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	1	0	0	1	0	0	0	0	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Pinnularia viridis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Plagiotropis lepidoptera</i>	0	3	0	0	0	0	0	0	0	0	0	0
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphiceros</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	0	0	0	0	0	4	2	0	0	0	0	4
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>gibberula</i>	0	0	5	2	0	0	0	1	0	1	0	0
<i>anceps</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus species</i>	0	2	0	0	0	0	0	0	0	0	0	0
<i>Surirella birostrata</i>	0	0	0	0	0	0	0	9	0	0	0	1
<i>biseriata</i>	0	3	0	0	0	1	0	0	0	2	1	0
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	1	2	1	7	1	4	4	2	3	2	0	5
<i>acus</i>	0	0	0	0	0	0	0	0	0	0	2	3
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	0	0	0	0	1	0	3	2	1	1	1	2
<i>parasitica</i> var. <i>subconstricta</i>	0	0	0	0	0	1	0	0	0	0	0	0
<i>pulchella</i>	0	0	1	0	0	1	0	1	1	0	0	0
<i>pulchella</i> var. <i>lanceolata</i>	0	2	0	0	0	0	0	2	0	0	0	0

Appendix 2. The number of diatoms counted at each station
5-16-98 Collection (number 8)

Taxa	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Synedra</i>												
<i>rumpens</i>	1	0	1	2	2	0	0	1	0	2	0	2
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	3	0	0	0	0	0	0	0	0	1
<i>Tabellaria</i>												
species	0	0	0	0	0	0	0	0	0	0	0	0
Total diatoms	401	509	465	399	397	481	447	534	425	399	471	516

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidanos</i>	1	0	5	1	1	2	0	0	0	1	0	0	4	0	0
<i>clevei</i>	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0
<i>clevei</i> var. <i>bottnica</i>	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0
<i>coarctata</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
<i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	5	24	15	15	10	14	6	16	14	9	8	17	17	16	16
<i>haukiana</i> var. <i>rostrata</i>	14	7	32	10	12	6	19	19	20	5	9	7	8	10	13
<i>hungarica</i>	0	1	3	0	0	1	0	0	2	2	2	1	2	0	0
<i>lanceolata</i>	9	28	16	11	11	20	7	16	19	10	10	17	10	7	10
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1
<i>petersenii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>polaris</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>normanii</i>	7	21	3	12	18	6	9	8	17	16	61	32	18	18	26
<i>Actinocyclus</i>															
<i>senarius</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
<i>Amphipleura</i>															
<i>pellucida</i>	0	2	1	0	0	0	0	1	0	0	1	0	0	0	0
<i>Amphora</i>															
<i>ovalis</i>	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
<i>perpusilla</i>	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	2	1	0	0	2	0	0	2	8	0	0	0
<i>Anomoeoneis</i>															
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>styriaca</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Bacillaria</i>															
<i>paradoxa</i>	2	3	3	14	5	5	23	8	7	7	10	3	0	3	5
<i>Caloneis</i>															
<i>bacillum</i>	0	2	3	2	1	1	4	1	1	0	0	1	0	5	2

Appendix 2. The number of diatoms counted at each station

5-30-98 Collection (number 9)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	0	3	0	1	1	0	2	1	1	1	0	2	0	1	0
<i>neodiminuta</i>	2	7	2	3	9	6	4	5	9	4	8	9	7	5	6
<i>placentula</i> var. <i>lineata</i>	12	23	11	22	29	26	10	18	30	16	36	26	29	21	32
<i>placentula</i> var. <i>euglypta</i>	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	1	1	0	0	0	1	0	0	0	2	5	1	1	0	0
<i>kuetzingiana</i>	6	3	3	5	6	1	2	3	7	2	8	1	6	2	4
<i>meneghiniana</i>	9	30	8	16	30	13	12	25	26	42	51	29	53	38	23
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	6	4	2	1	1
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>															
<i>affinis</i>	0	0	2	1	1	0	3	1	0	1	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>minuta</i>	1	0	2	3	2	2	1	1	2	1	2	2	6	2	2
<i>minuta</i> var. <i>latens</i>	0	0	1	1	0	1	0	0	1	0	0	0	0	2	0
<i>muellerii</i>	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	2	1	0	1	0	0	0	0	1	1	0	2	1	1
<i>tumida</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	4	3	4	2	7	2	0	11	4	3	1	3	7	4	2

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i>Diploneis</i>															
<i>vulgare</i> var. <i>linearis</i>	1	0	3	0	1	0	1	1	0	2	1	0	3	0	2
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	0	0	1	0	0	4	1	5	1	1	2	1	1	3	2
<i>smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	1	0	0	2	4	3	6	3	1	1	1	0	2	0
<i>sorex</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>turgida</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
<i>tenella</i>	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
<i>pinnata</i> var. <i>pinnata</i>	2	1	2	0	1	1	1	4	0	1	0	0	1	1	1
<i>species</i>	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	2	2	0	0	3	0	1	3	2	0	2	4	1	0
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	2	1	1	0	1	0	2	4	1	1	3	4	4	0	5

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema parvulum</i>	0	0	0	0	0	0	0	0	0	0	0	1	5	0	1
<i>sphaerophorum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	1	0	0	0	0	3	1	0	1	0	1	0	3	0
<i>Gyrosigma attenuatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalproides</i>	1	0	0	2	0	2	1	1	3	1	1	0	2	3	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Melosira alpigena</i>	0	2	0	0	7	2	0	0	2	0	2	0	0	0	2
<i>distans</i>	0	7	0	0	0	1	0	0	2	0	7	0	2	1	0
<i>Meridion circulare</i>	0	0	4	0	0	1	0	0	0	0	1	0	2	0	0
<i>circulare</i> var. <i>constrictum</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>aurora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>capitata</i>	6	3	0	0	11	5	4	2	0	6	3	10	8	2	11
<i>capitata</i> var. <i>luneburgensis</i>	0	0	0	0	0	0	0	0	2	0	3	4	9	2	6
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	5	0	0	2	0	0	1	0	1	0	0	0	0	0	0
<i>cryptocephala</i> var. <i>veneta</i>	0	3	1	0	1	0	1	2	2	1	1	1	1	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

[illegible]

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
<i>kuetzingiana</i>	0	1	0	0	1	2	0	0	0	0	0	1	0	2	0
<i>linearis</i>	0	0	0	0	4	0	2	0	3	3	2	0	1	0	1
<i>microcephala</i>	73	2	1	0	4	1	3	0	0	0	0	0	1	1	0
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	0	2	1	2	0	0	0	0
<i>reversa</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>sigma</i>	0	0	0	0	1	1	0	0	1	0	1	0	0	3	0
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tryblionella</i>	0	2	0	2	2	1	1	2	2	2	4	0	1	2	1
<i>tryblionella</i> var. <i>debilis</i>	0	0	4	2	2	3	5	1	0	3	2	4	0	2	1
<i>tryblionella</i> var. <i>victoriae</i>	2	2	3	3	1	1	4	2	4	8	1	1	7	1	4
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>brebissoni</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Pinnularia viridis</i>	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0
<i>Plagiotropis lepidoptera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphicerus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>gibberula</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>anceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Surirella birostrata</i>	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>biseriata</i>	0	3	0	0	1	2	1	1	0	0	0	1	1	0	0
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>ovata</i>	2	3	0	1	2	4	2	3	3	0	3	4	2	0	1
<i>acus</i>	1	3	3	0	0	1	0	0	0	0	2	0	0	0	2
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	0	0	2	1	1	2	0	1	0	0	0	1	0	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0
<i>pulchella</i>	0	0	0	0	1	1	1	0	0	0	0	2	0	0	0
<i>pulchella</i> var. <i>lanceolata</i>	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0

Appendix 2. The number of diatoms counted at each station
5-30-98 Collection (number 9)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
Total diatoms	413	450	439	393	440	441	422	427	472	437	474	427	462	428	390

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidanos</i>	2	0	13	1	3	1	1	1	7	1	4	5	2	3	1
<i>clevei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>coarctata</i>	1	0	0	1	0	0	0	0	1	4	1	0	2	0	0
<i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	13	9	24	9	18	8	8	15	10	14	5	14	10	9	14
<i>haukiana</i> var. <i>rostrata</i>	19	8	60	20	21	2	6	27	15	3	1	7	10	26	11
<i>hungarica</i>	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	7	45	23	11	18	21	20	21	19	8	6	19	14	25	13
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	5	0	0	0	0	0	0	0	0	0	0	2	0	0	0
<i>petersenii</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
<i>polaris</i>	0	0	0	0	0	0	0	0	0	0	2	2	1	3	0
<i>normanii</i>	5	29	3	15	15	24	2	17	15	17	73	21	29	15	26
<i>senarius</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pellucida</i>	0	1	1	1	0	2	0	2	0	0	0	0	0	0	0
<i>ovalis</i>	5	0	2	0	2	2	0	4	1	1	0	4	2	0	5
<i>perpusilla</i>	0	3	18	4	2	2	1	0	4	0	0	6	4	0	3
<i>species</i>	0	1	0	0	0	0	0	0	0	8	0	0	0	0	10
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	1	2	9	0	0	6	4	1	4	9	1	7
<i>styriaca</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>paradoxa</i>	0	4	3	11	13	11	9	17	21	6	11	2	4	0	6
<i>bacillum</i>	0	0	2	1	1	3	4	7	3	3	1	2	4	1	0

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	0	1	2	3	1	0	1	0	3	3	2	0	1	2	3
<i>neodiminuta</i>	5	9	3	2	8	5	4	3	4	9	17	8	7	7	11
<i>placentula</i> var. <i>lineata</i>	12	40	12	27	36	36	10	22	35	26	33	30	43	15	61
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	0	0	0	2	1	0	4	1	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	2	0	0	1	0	1	0	0	0	1	4	1	1	1	2
<i>kuetzingiana</i>	4	4	2	6	4	1	3	7	8	5	16	8	2	1	2
<i>meneghiniana</i>	22	63	15	26	34	50	15	27	28	53	126	49	57	13	80
<i>planktonia</i>	0	0	0	2	0	1	0	0	0	0	0	0	2	0	1
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>															
<i>affinis</i>	0	2	0	0	1	0	0	0	1	1	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	1	0	0	0	0	0	0	0	0	3	3	0	1	0
<i>minuta</i>	1	1	5	3	3	6	2	2	3	2	4	0	0	2	0
<i>minuta</i> var. <i>latens</i>	0	1	3	1	1	0	0	0	0	0	0	2	1	0	0
<i>muellerii</i>	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	2	0	2	1	1	1	0	1	0	1	3	2	0	1
<i>tumida</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	4	3	0	4	3	6	2	2	0	6	0	5	11	1	0

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>	0	1	1	2	0	1	0	0	0	1	1	1	0	0	0
<i>Diploneis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i> var. <i>linearis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>bombus</i>	0	2	0	3	1	4	1	2	4	0	3	3	2	2	0
<i>elliptica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>smithii</i>	0	2	0	3	1	2	1	4	3	2	0	2	8	3	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>sorex</i>	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
<i>Epithemia</i>	0	2	1	0	1	2	0	0	0	1	0	0	0	0	0
<i>turgida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eunotia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>tenella</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Fragilaria</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>leptostauran</i>	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	0	0	0	0	3	1	2	0	1	0	1	1	0	0	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gomphonema</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	0	8	3	0	0	0	0	2	1	0	1	1	0	1
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	1	0	2	0	0	0	0	1	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	2	2	2	1	0	2	1	1	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema parvulum</i>	0	2	2	0	0	1	0	2	2	4	1	6	0	0	2
<i>sphaerophorum</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>truncatum</i>	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	1	0	0	0	3	0	1	1	0	0	0	3	2	0
<i>Gyrosigma attenuatum</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalproides</i>	1	0	0	1	1	1	1	3	1	1	1	0	5	2	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Melosira alpigenia</i>	0	4	0	0	5	0	5	0	0	6	7	0	2	0	0
<i>distans</i>	0	0	0	0	2	2	0	0	2	0	1	6	13	0	4
<i>circulare</i>	0	2	1	2	1	0	0	1	2	0	0	9	0	0	1
<i>circulare</i> var. <i>constrictum</i>	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
<i>aurora</i>	0	2	5	2	6	4	2	5	4	4	6	9	0	0	3
<i>capitata</i>	2	6	2	1	4	4	0	3	2	5	3	5	5	4	0
<i>capitata</i> var. <i>luneburgensis</i>	0	7	5	0	6	8	1	2	0	0	0	0	5	0	0
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	4	1	0	1	0	1	0	0	0	1	0	0	0	0	0
<i>cryptocephala</i> var. <i>veneta</i>	0	0	2	1	0	0	0	0	2	0	0	3	2	1	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	0	1	0	1	3	1	0	0	2	1	0	0	0	0	0
<i>linearis</i>	0	4	0	0	0	4	3	0	2	4	1	3	1	2	3
<i>microcephala</i>	76	1	0	0	3	0	2	0	0	0	0	0	0	0	0
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>sigma</i>	1	0	1	0	0	1	0	0	1	3	0	1	5	1	4
<i>sinuata</i> var. <i>tabellaria</i>	0	2	0	2	0	0	0	2	0	0	0	0	0	0	0
<i>tryblionella</i>	0	3	1	2	3	4	2	3	2	3	2	3	2	0	3
<i>tryblionella</i> var. <i>debilis</i>	0	1	4	0	3	3	5	4	0	4	0	0	1	3	0
<i>tryblionella</i> var. <i>victoriae</i>	1	3	1	1	1	0	0	4	5	5	7	4	4	2	3
<i>Pinnularia</i>															
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>brebissoni</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	1	0	0	1	3	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Appendix 2. The number of diatoms counted at each station
6-10-98 Collection (number 10)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	0	3	2	0	2	2	2	1	0	0	1	3	0	0	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	4	0	1	0	0	2	0	0	0	0	2	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Total diatoms	414	487	504	426	473	507	414	479	495	478	509	519	539	402	424

Appendix 2. The number of diatoms counted at each station
6-25-98 Collection (number 11)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
<i>schumanniana</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	1	2	4	1	0	2	1	1	4	2	2	0	1	0	4
<i>neodiminuta</i>	4	11	16	3	1	3	3	6	4	4	6	0	4	14	13
<i>placentula</i> var. <i>lineata</i>	18	24	53	24	26	28	11	29	26	28	27	0	24	41	39
<i>placentula</i> var. <i>euglypta</i>	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	0	1	0	1	0	0	0	0	0	0	1	0	0	0	1
<i>kuetzingiana</i>	10	3	1	3	5	3	1	4	3	3	6	0	8	5	4
<i>meneghiniana</i>	39	53	19	39	50	33	27	26	21	40	60	0	38	55	44
<i>planktonia</i>	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>															
<i>affinis</i>	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	10	0
<i>minuta</i>	1	2	1	1	2	3	0	7	2	5	1	0	8	1	2
<i>minuta</i> var. <i>latens</i>	1	2	1	1	1	0	0	0	0	0	0	0	1	1	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	1	1	0	1	2	0	0	2	0	1	0	1	0	1
<i>tumida</i>	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	4	6	3	6	6	5	2	2	0	4	9	0	6	4	7

Appendix 2. The number of diatoms counted at each station
6-25-98 Collection (number 11)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i>vulgare</i> var. <i>linearis</i>	1	1	2	0	2	0	1	2	1	3	0	0	3	0	0
<i>Diploneis</i>															
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	0	4	10	2	1	18	3	0	2	1	1	0	0	3	2
<i>smithii</i>	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0
<i>species</i>	0	0	5	0	3	5	0	2	2	2	0	0	0	5	7
<i>sorex</i>	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
<i>turgida</i>	0	0	6	0	0	1	0	0	0	0	0	0	0	0	1
<i>Eunotia</i>															
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Fragilaria</i>															
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	0	1	2	1	1	0	0	1	0	0	0	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	3	4	2	5	3	1	1	2	2	0	2	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gomphonema</i>															
<i>acuminatum</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	0	2	5	2	1	1	0	0	0	0	1	0	4	0	0
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	1	0	3	6	2	2	0	1	3	3	1	0	7	0	5

Appendix 2. The number of diatoms counted at each station
6-25-98 Collection (number 11)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>pygmaea</i>	1	1	0	5	5	3	4	4	3	4	6	0	1	2	4
<i>rhynchocephala</i>	0	3	20	3	6	0	0	1	1	1	2	0	9	0	1
<i>salinarum</i> var. <i>intermedia</i>	30	16	13	17	21	8	10	12	18	35	22	0	18	12	36
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>secura</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	5	3	0	4	2	5	0	1	3	1	0	0	2	1	3
<i>tripunctata</i>	0	4	0	0	5	1	3	0	1	3	5	0	3	1	4
<i>tuscula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	9	9	7	12	10	14	14	16	23	16	8	0	9	23	18
<i>viridula</i> var. <i>rostellata</i>	5	2	0	0	4	0	0	0	0	6	0	0	2	7	3
<i>affine</i>	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>amphibia</i>	1	0	10	4	4	2	0	4	4	0	3	0	1	3	0
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brevissima</i>	2	18	9	10	18	20	34	16	23	20	23	0	5	12	4
<i>dissipata</i>	3	4	2	2	1	3	3	3	6	1	0	0	7	3	3
<i>filiformis</i>	1	2	1	0	1	7	6	5	6	1	1	0	1	0	3
<i>fonticola</i>	0	1	0	3	2	0	5	4	2	1	5	0	5	2	1
<i>frustrulum</i>	5	5	2	3	2	0	2	0	1	0	3	0	3	3	1
<i>frustrulum</i> var. <i>perpusilla</i>	43	31	12	18	10	6	18	6	8	11	10	0	18	26	14
<i>heufleriana</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Neidium

Nitzschia

Appendix 2. The number of diatoms counted at each station

6-25-98 Collection (number 11)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	1	0	1	0	0	0	0	0	0	1	0	0	0	3	1
<i>linearis</i>	0	0	0	0	2	4	5	4	5	1	3	0	1	0	0
<i>microcephala</i>	17	2	1	0	6	1	2	2	1	0	0	0	0	0	2
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>sigma</i>	1	2	0	1	0	0	0	0	5	1	0	0	0	0	1
<i>sinuata</i> var. <i>tabellaria</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tryblionella</i>	1	0	0	0	0	2	0	1	0	0	2	0	2	3	5
<i>tryblionella</i> var. <i>debilis</i>	0	1	0	5	4	3	3	5	3	3	1	0	0	4	3
<i>tryblionella</i> var. <i>victoriae</i>	2	1	1	1	5	3	0	2	2	2	7	0	1	0	3
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station
6-25-98 Collection (number 11)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	0	0	0	0	0	3	0	1	0	1	0	0	4	0	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Total Diatoms	464	445	505	469	496	499	445	457	471	455	494	0	457	453	482

Appendix 2. The number of diatoms counted at each station

7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidos</i>	10	11	10	3	4	2	0	10	6	8	14	34	6	13	23
<i>clevei</i>	2	1	0	4	0	0	0	1	0	0	0	0	1	0	1
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	0	0	2	0	4	0	5	0	0	0	2	0	3	0	0
<i>exigua</i>	0	0	0	0	0	3	1	3	1	0	0	5	0	2	0
<i>haukiana</i>	17	19	16	5	11	16	6	11	15	13	11	13	15	11	12
<i>haukiana</i> var. <i>rostrata</i>	42	11	102	21	20	17	17	29	32	14	8	21	10	21	6
<i>hungarica</i>	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	21	22	42	12	23	27	20	35	24	16	16	32	16	29	34
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	2	7	19	0	2	0	0	2	4	2	10	17	4	5	8
<i>petersenii</i>	0	3	1	0	2	0	0	0	0	0	2	6	0	2	0
<i>polaris</i>	0	0	0	0	2	4	0	1	0	0	0	0	0	0	0
<i>normanii</i>	16	17	3	18	5	5	5	9	4	5	7	10	24	8	17
<i>senarius</i>	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0
<i>pellucida</i>	0	0	2	3	1	0	0	3	0	1	0	0	2	0	0
<i>ovalis</i>	2	5	12	12	4	3	2	8	2	0	0	5	2	12	2
<i>perpusilla</i>	0	7	24	4	2	2	6	4	2	4	0	2	4	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>sphaerophora</i> f. <i>costata</i>	2	2	0	0	4	0	0	0	1	2	0	0	2	0	2
<i>styriaca</i>	0	0	0	0	1	3	1	0	1	0	1	0	1	3	1
<i>paradoxa</i>	0	8	4	27	29	19	39	15	12	11	3	2	6	0	2
<i>bacillum</i>	2	3	5	6	3	3	7	10	5	4	5	2	0	1	0

Appendix 2. The number of diatoms counted at each station

7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	1	2	3	4	3	0	2	4	2	2	2	1	0	3	4
<i>neodiminuta</i>	9	8	3	8	5	12	12	9	8	17	20	13	19	20	22
<i>placentula</i> var. <i>lineata</i>	25	127	53	133	78	49	19	27	32	73	16	41	47	38	39
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	1	0	0	1	0	2	0	0	9	3	1
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	2	2	1	0	0	2	1	0	1	0	0	1	0	0	0
<i>kuetzingiana</i>	2	3	1	3	0	1	1	0	2	3	3	1	1	4	5
<i>meneghiniana</i>	39	52	17	67	52	50	25	38	30	38	47	59	41	38	75
<i>planktonia</i>	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>															
<i>affinis</i>	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>minuta</i>	3	2	15	2	3	1	4	10	0	7	6	9	8	5	8
<i>minuta</i> var. <i>latens</i>	1	0	3	0	0	1	0	0	1	2	2	3	0	0	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	0	1	0	1	4	0	1	0	1	0	3	0	1	0
<i>tumida</i>	0	0	3	2	0	1	0	1	1	0	1	1	1	2	1
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	6	0	1	3	4	6	4	6	4	5	10	8	3	12	9

Appendix 2. The number of diatoms counted at each station
7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i>Diploneis</i>															
<i>vulgare</i> var. <i>linearis</i>	1	2	0	0	0	2	1	0	0	0	0	0	1	2	2
<i>bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>elliptica</i>	2	4	9	1	1	6	2	4	0	2	0	1	2	5	2
<i>smithii</i>	0	1	3	0	2	0	0	0	0	1	1	0	2	0	0
<i>species</i>	1	1	5	5	2	3	5	5	4	6	2	0	5	1	1
<i>sorex</i>	0	0	1	1	0	2	0	0	0	2	0	0	0	1	0
<i>turgida</i>	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	2	1	0	1	0	0	2	0	0	2	0	0	2	0	1
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>leptostauran</i>	1	0	1	1	2	0	1	0	0	0	0	0	1	0	0
<i>pinnata</i> var. <i>pinnata</i>	4	1	2	0	2	3	0	1	1	1	0	3	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	3	0	1	4	1	1	0	3	3	6	0	2	1	4
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	5	3	6	2	2	2	1	3	0	1	0	2	2	3	3
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	2	4	3	6	5	4	0	3	0	2	5	0	4	5	6

Appendix 2. The number of diatoms counted at each station

7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>elginensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elginensis</i> var. <i>lata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elmorei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>globulifera</i>	3	8	14	11	21	12	6	8	8	5	4	9	13	5	12
<i>gregaria</i>	88	59	27	64	60	71	101	76	109	90	103	75	66	74	37
<i>halophila</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>ilopangoensis</i>	1	0	0	1	0	1	0	1	0	0	2	0	0	0	2
<i>integra</i>	0	1	0	0	2	0	4	2	1	0	1	3	5	0	0
<i>keeleyi</i>	0	0	0	0	0	0	4	0	0	3	1	0	0	1	0
<i>lacustris</i>	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0
<i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>menisculus</i>	0	0	5	5	6	11	7	7	2	0	6	2	1	3	1
<i>minima</i>	15	19	6	3	6	6	8	14	6	5	5	6	6	4	1
<i>mutica</i>	0	0	2	0	6	4	12	7	7	9	4	0	2	1	2
<i>odiosa</i>	18	18	11	6	14	17	22	9	19	18	18	5	7	11	4
<i>peregrina</i>	3	7	6	30	14	12	6	0	8	14	11	9	16	17	14
<i>placenta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pseudokotschy</i>	4	0	2	0	1	0	0	0	1	1	0	0	2	0	0
<i>punctata</i> var. <i>coactata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>capitata</i>	0	4	6	3	2	2	0	3	8	3	6	12	9	6	0
<i>pupula</i> var. <i>mutata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pupula</i> var. <i>rectangularis</i>	0	0	2	0	0	0	0	0	0	1	0	0	0	2	2
<i>pusilla</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	1	5	0	4	1	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	1	3	1	4	5	5	2	2	2	1	4	1	0	3	5
<i>linearis</i>	24	0	0	0	0	2	9	7	1	4	0	0	0	2	4
<i>microcephala</i>	0	0	1	0	0	3	0	0	3	1	2	0	0	0	0
<i>punctata</i> var. <i>coarctata</i>	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0
<i>reversa</i>	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
<i>sigma</i>	0	0	0	0	5	4	1	0	1	0	1	1	3	1	0
<i>sinuata</i> var. <i>tabellaria</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0
<i>tryblionella</i>	3	1	1	0	1	0	0	0	0	0	3	0	4	2	3
<i>tryblionella</i> var. <i>debilis</i>	0	9	3	3	2	8	12	1	8	8	1	1	1	2	1
<i>tryblionella</i> var. <i>victoriae</i>	3	3	3	2	6	0	1	1	0	3	7	1	8	3	5
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>nodosa</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station
7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Pinnularia viridis</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>Plagiotropis lepidoptera</i>	0	0	0	1	4	2	1	2	1	1	4	0	3	2	3
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis ampiceros</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	0	1	2	2	2	0	2	1	2	1	0	4	3	0	2
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>gibberula</i>	0	2	0	1	0	0	0	0	0	1	0	1	0	0	0
<i>Stauroneis anceps</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus species</i>	3	11	6	15	4	4	1	6	5	6	8	2	2	5	3
<i>Surirella birostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>biseriata</i>	0	1	0	1	0	0	1	0	0	1	2	0	2	2	2
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	0	4	0	9	4	3	10	10	9	7	5	6	2	1	8
<i>acus</i>	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	1	0	0	0	1	2	5	0	1	0	4	4	0	0	2
<i>parasitica</i> var. <i>subconstricta</i>	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0
<i>pulchella</i>	3	0	5	0	3	3	0	5	0	2	1	1	2	0	1
<i>pulchella</i> var. <i>lanceolata</i>	0	1	0	0	1	0	0	3	0	0	0	1	1	1	1

Appendix 2. The number of diatoms counted at each station
7-14-98 Collection (number 12)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	0	1	1	0	1	0	3	1	2	2	0	0	0	0	0
<i>ulna</i> var. <i>amphirhynchus</i>	4	0	0	0	2	0	0	0	0	2	0	0	0	0	1
<i>Tabellaria</i>															
species	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1
Total diatoms	520	629	573	622	590	559	516	530	526	580	595	594	588	530	545

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidanos</i>	11	4	18	0	6	2	5	8	2	4	2	16	6	3	7
<i>clevei</i>	0	0	1	0	0	0	0	0	0	0	0	0	4	1	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
<i>coarctata</i>	0	0	0	0	9	0	0	0	0	1	3	0	4	3	3
<i>exigua</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
<i>haukiana</i>	17	15	12	13	12	10	4	14	12	15	17	29	13	12	13
<i>haukiana</i> var. <i>rostrata</i>	65	4	56	17	12	22	11	34	27	5	2	16	20	14	15
<i>hungarica</i>	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0
<i>lanceolata</i>	20	19	39	19	10	25	30	32	23	18	12	38	12	18	10
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	0	0	6	2	0	1	1	0	3	2	4	1	5	1	8
<i>petersenii</i>	0	0	2	4	1	0	0	0	0	0	0	0	2	1	2
<i>polaris</i>	0	1	0	0	0	0	1	2	0	0	0	0	2	0	0
<i>normanii</i>	18	24	7	7	23	12	8	10	18	17	50	20	17	27	26
<i>Actinocyclus</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Actinopterychus</i>	0	0	0	0	0	0	0	2	4	1	0	0	0	0	0
<i>Amphipleura</i>	4	5	0	4	1	4	2	2	0	4	0	2	2	2	2
<i>ovalis</i>	5	2	24	6	4	2	0	0	0	2	2	2	6	4	4
<i>perpusilla</i>	0	0	0	2	6	2	0	2	4	1	8	0	5	2	10
<i>species</i>	0	6	0	1	3	0	1	0	5	4	2	2	0	4	0
<i>Anomoeoneis</i>	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
<i>sphaerophora</i> f. <i>costata</i>	1	3	23	15	15	8	15	5	13	5	4	3	5	3	0
<i>styriaca</i>	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0
<i>paradoxa</i>	0	1	4	1	2	2	6	0	1	3	0	0	1	0	0
<i>bacillum</i>	0	1	4	1	2	2	6	0	1	3	0	0	1	0	0

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	1	3	0	1	1	0	1	1	0	2	3	2	2	0	0
<i>neodiminuta</i>	3	9	3	5	9	8	4	1	5	9	5	14	10	21	17
<i>placentula</i> var. <i>lineata</i>	15	34	23	25	32	24	16	17	25	27	43	43	36	35	50
<i>placentula</i> var. <i>euglypta</i>	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	0	0	0	0	1	2	0	0	0	0	0	0	1	1	0
<i>kuetzingiana</i>	7	8	2	5	4	4	3	4	5	5	7	3	8	3	5
<i>meneghiniana</i>	28	35	13	31	41	30	23	22	34	37	71	54	46	44	34
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>															
<i>affinis</i>	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	2	0	0	0	0	0	1	0	0	0	0	0	1	4
<i>minuta</i>	4	2	5	2	2	2	3	0	0	2	3	5	5	2	2
<i>minuta</i> var. <i>latens</i>	0	0	0	0	0	0	0	0	0	0	0	5	0	1	2
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	0	1	1	0	0	0	0	1	0	1	2	0	0	3
<i>tumida</i>	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	3	3	3	4	1	0	4	2	3	2	3	7	1	5	7

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>	0	0	0	1	1	2	0	1	1	0	1	7	1	1	1
<i>Diploneis</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>elliptica</i>	1	2	1	1	3	3	2	0	1	7	4	0	1	2	0
<i>smithii</i>	0	0	0	0	1	0	0	0	0	1	1	0	2	0	0
<i>species</i>	0	0	2	1	1	6	3	1	1	2	1	0	0	2	1
<i>sorex</i>	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
<i>turgida</i>	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0
<i>leptostauran</i>	0	0	0	0	0	1	0	5	0	0	1	0	1	0	0
<i>pinnata</i> var. <i>pinnata</i>	3	2	5	1	2	2	0	0	0	0	1	1	0	3	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
<i>Gomphonema</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	2	3	6	2	1	1	1	0	0	1	0	0	0	0	0
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>olivaceum</i>	2	0	0	0	1	2	0	1	0	4	1	1	2	1	1

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema parvulum</i>	0	1	1	0	2	0	2	0	1	1	3	3	1	1	2
<i>sphaerophorum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i>	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma acuminatum</i>	0	0	0	0	1	0	0	0	0	0	0	1	2	0	1
<i>Gyrosigma attenuatum</i>	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalpoides</i>	2	1	0	2	1	3	4	3	0	0	1	2	3	0	0
<i>Hantzschia amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia smithii</i>	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0
<i>Melosira alpigena</i>	3	0	0	0	0	0	3	0	2	0	2	0	0	0	0
<i>distans</i>	3	3	0	3	0	0	0	0	0	1	1	2	6	2	2
<i>circulare</i>	0	2	0	0	0	6	0	0	0	0	1	1	0	0	1
<i>circulare</i> var. <i>constrictum</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>aurora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>capitata</i>	4	5	0	0	17	4	0	0	2	4	3	0	2	2	2
<i>capitata</i> var. <i>luneburgensis</i>	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	5	0	0	1	2	0	4	0	4	0	4	0	2	1	0
<i>cryptocephala</i> var. <i>veneta</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	1	0	2	0	0	0	0	2	0	0	1	0	0

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>pygmaea</i>	9	0	0	1	7	1	0	0	4	6	8	0	9	4	4
<i>rhynchocephala</i>	5	5	2	4	4	4	0	0	3	1	1	2	2	0	4
<i>salinarum</i> var. <i>intermedia</i>	14	14	11	14	20	19	10	13	15	42	23	15	19	49	31
<i>salinarum</i>	0	4	0	1	0	0	1	0	0	0	0	0	0	0	0
<i>secura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	1	6	0	0	3	4	2	2	4	1	0	1	0	0	0
<i>tripunctata</i>	3	2	9	1	5	1	4	0	5	3	6	5	2	6	4
<i>tuscula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	2	0	0	0	0	0	1	1	0	0
<i>viridula</i>	11	17	19	12	10	15	13	17	26	13	15	12	8	7	8
<i>viridula</i> var. <i>rostellata</i>	9	2	10	6	2	3	0	8	12	1	4	10	9	2	7
<i>Neidium</i>	0	0	0	1	0	1	1	0	1	0	0	0	0	2	0
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acicularis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>amphibia</i>	2	1	4	3	2	6	1	6	2	1	2	4	2	4	2
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brevissima</i>	2	26	16	16	19	17	25	11	18	22	12	14	14	6	4
<i>dissipata</i>	2	2	4	0	5	4	4	1	4	3	6	6	8	2	2
<i>filiformis</i>	1	1	5	2	0	2	3	1	2	3	1	2	0	1	0
<i>fonticola</i>	4	5	4	1	1	5	4	4	2	1	3	11	1	2	5
<i>frustrulum</i>	3	1	1	0	0	0	0	1	1	5	0	1	1	0	3
<i>frustrulum</i> var. <i>perpusilla</i>	32	30	26	15	14	13	9	8	10	15	8	17	19	10	16
<i>heufleriana</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	0	0	1	0	0	0	3	4	1	0	2	3	2	1	0
<i>linearis</i>	0	0	4	3	2	0	6	2	2	0	2	2	3	2	3
<i>microcephala</i>	22	2	1	1	0	3	1	0	1	0	1	0	0	3	1
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1
<i>sigma</i>	0	0	0	0	1	0	1	2	1	1	1	2	2	0	1
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0
<i>tryblionella</i>	0	3	1	0	1	2	0	1	2	4	6	0	5	1	7
<i>tryblionella</i> var. <i>debilis</i>	0	2	2	6	2	5	6	2	3	8	2	2	6	3	5
<i>tryblionella</i> var. <i>victoriae</i>	0	2	1	3	0	4	1	4	3	3	9	3	4	3	6
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station
7-27-98 Collection (number 13)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	1	0	1	0	0	0	0	0	2	0	0	0	4	1	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total diatoms	467	460	480	446	472	463	452	431	455	482	519	446	492	491	449

Appendix 2. The number of diatoms counted at each station
8-13-98 Collection (number 14)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidanos</i>	28	20	15	0	13	13	7	11	15	6	2	12	7	10	50
<i>clevei</i>	0	0	0	4	0	0	0	4	3	0	0	0	2	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	0	4	2	2	1	0	0	0	3	4	0	0	6	3	0
<i>exigua</i>	0	0	6	14	15	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	17	9	12	20	6	20	9	34	22	15	3	8	11	13	11
<i>haukiana</i> var. <i>rostrata</i>	65	13	38	0	4	17	5	9	8	4	2	7	2	9	7
<i>hungarica</i>	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	20	39	31	20	19	24	28	33	41	14	8	30	19	29	25
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	6	1	16	0	0	1	2	2	4	0	4	2	4	6	7
<i>petersenii</i>	5	6	0	0	0	0	2	0	0	0	0	0	0	1	0
<i>polaris</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<i>normanii</i>	10	32	13	14	22	4	3	8	8	24	39	15	37	20	14
<i>Actinocyclus</i>															
<i>Actinopterychus</i>	0	4	0	0	0	0	0	1	0	1	0	0	0	0	0
<i>Amphipleura</i>															
<i>pellucida</i>	0	0	1	0	0	0	1	2	0	2	0	2	0	0	2
<i>Amphora</i>															
<i>ovalis</i>	0	2	2	0	7	10	5	4	0	6	7	4	8	7	4
<i>perpusilla</i>	6	0	12	3	2	2	0	6	4	2	2	0	0	6	5
<i>species</i>	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>															
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	18	7	0	0	2	2	10	6	2	7	2	2
<i>styriaca</i>	1	1	1	5	2	0	0	1	9	10	6	3	6	9	6
<i>Bacillaria</i>															
<i>paradoxa</i>	1	12	5	1	5	11	4	5	2	6	2	4	2	3	2
<i>Caloneis</i>															
<i>bacillum</i>	0	2	2	16	15	6	20	15	2	3	7	7	11	2	0

Appendix 2. The number of diatoms counted at each station

8-13-98 Collection (number 14)		Stations														
Taxa		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>	<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
	<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>	<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	<i>fluvialis</i>	0	0	0	0	0	1	0	2	0	1	3	2	3	6	2
<i>Cocconeis</i>	<i>neodiminuta</i>	5	6	2	3	7	15	5	7	3	8	6	15	14	16	18
	<i>placentula</i> var. <i>lineata</i>	17	46	20	48	40	38	19	52	20	52	29	42	51	38	52
	<i>placentula</i> var. <i>euglypta</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	<i>rugosa</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>	<i>bodanica</i>	0	0	0	1	2	1	0	0	0	0	0	0	1	1	0
	<i>kuetzingiana</i>	5	10	8	2	4	2	2	1	5	0	3	5	2	0	1
	<i>meneghiniana</i>	21	63	28	53	44	36	30	26	36	65	72	60	60	63	40
	<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>	<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>	<i>affinis</i>	1	0	0	0	0	0	1	0	1	0	0	0	1	0	1
	<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	<i>minuta</i>	0	7	4	2	2	6	2	5	1	1	5	1	4	6	0
	<i>minuta</i> var. <i>latens</i>	0	1	0	0	0	1	1	0	0	1	0	0	1	0	3
	<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	<i>silesiaca</i>	1	0	2	1	1	0	0	1	0	0	1	0	0	0	1
	<i>tumida</i>	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>	<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>vulgare</i> var. <i>breve</i>	6	1	3	2	4	3	3	2	2	4	10	4	3	4	7

Appendix 2. The number of diatoms counted at each station
8-13-98 Collection (number 14)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i>vulgare</i> var. <i>linearis</i>	0	2	0	0	0	0	0	0	0	0	1	1	4	2	2
<i>Diploneis</i>															
<i>bombus</i>	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
<i>elliptica</i>	2	0	2	3	7	7	3	6	3	9	2	2	4	4	1
<i>smithii</i>	0	0	0	0	3	1	0	3	0	1	0	2	1	4	3
<i>species</i>	0	2	3	2	1	5	2	4	4	3	0	0	4	2	0
<i>sorex</i>	0	1	1	1	0	3	0	0	0	1	0	0	0	1	0
<i>Epithemia</i>															
<i>turgida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eunotia</i>															
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	1	0	2	0	0	0	0	0	1	2	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Fragilaria</i>															
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	1	0	2	0	2	2	0	2	1	0	0	0	2	1	1
<i>pinnata</i> var. <i>pinnata</i>	3	2	2	0	0	5	2	0	2	0	0	3	4	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	0	2	0	0	2	0	1	0	0	0	4	1	6	4	0
<i>Gomphonema</i>															
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>angustatum</i> var. <i>obtusatum</i>	0	0	0	1	3	0	0	2	0	0	2	0	2	4	1
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>olivaceum</i>	3	1	1	1	3	4	0	3	2	0	4	4	0	4	0

Appendix 2. The number of diatoms counted at each station
8-13-98 Collection (number 14)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema</i>															
<i>parvulum</i>	3	5	3	1	4	0	0	1	1	4	2	0	0	0	2
<i>sphaerophorum</i>	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
<i>truncatum</i>	0	1	0	0	0	0	0	1	0	0	2	0	0	1	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma</i>															
<i>acuminatum</i>	0	1	0	0	1	1	2	2	0	0	0	0	2	2	0
<i>Gyrosigma</i>															
<i>attenuatum</i>	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0
<i>obscurum</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>scalpoides</i>	0	0	0	2	2	3	4	2	1	3	1	4	0	2	0
<i>Hantzschia</i>															
<i>amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mastogloia</i>															
<i>smithii</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
<i>Melosira</i>															
<i>alpigena</i>	0	6	0	4	0	2	0	0	2	5	5	0	1	0	2
<i>distans</i>	0	1	0	0	0	0	5	2	0	1	4	1	7	2	2
<i>Meridion</i>															
<i>circulare</i>	0	0	0	0	1	2	0	0	0	1	0	0	2	1	0
<i>circulare</i> var. <i>constrictum</i>	0	0	1	0	0	0	1	2	0	1	0	0	1	0	0
<i>Navicula</i>															
<i>aurora</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>capitata</i>	2	2	2	0	5	1	1	1	0	8	11	1	2	3	2
<i>capitata</i> var. <i>luneburgensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	4	0	0	2	1	1	3	2	1	4	0	0	0	0	0
<i>cryptocephala</i> var. <i>veneta</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
8-13-98 Collection (number 14)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>pygmaea</i>	9	3	1	6	2	6	0	4	1	11	3	2	6	10	6
<i>rhynchocephala</i>	0	0	0	0	4	1	0	3	2	3	0	2	4	4	1
<i>salinarum</i> var. <i>intermedia</i>	30	9	14	6	16	17	11	10	11	39	21	17	13	36	49
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>secura</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	0	1	4	0	0	1	2	4	4	2	0	5	0	0	0
<i>tripunctata</i>	5	10	9	4	10	7	7	12	4	3	2	8	3	6	6
<i>tuscula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	16	22	59	26	14	19	13	15	24	8	20	27	26	25	22
<i>viridula</i> var. <i>rostellata</i>	12	6	38	15	3	4	5	5	5	5	3	7	1	3	0
<i>Neidium</i>	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0
<i>affine</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>acicularis</i>	1	3	2	0	0	2	4	1	3	1	1	1	5	3	0
<i>amphibia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brevissima</i>	3	17	14	18	20	20	44	13	26	18	19	10	5	6	8
<i>dissipata</i>	0	2	0	2	0	4	3	0	1	0	0	0	0	4	0
<i>filiformis</i>	0	0	1	1	0	2	6	2	0	0	0	1	0	1	0
<i>fonticola</i>	1	1	2	1	0	2	1	2	1	5	1	0	3	2	0
<i>frustrulum</i>	1	1	4	1	1	0	0	1	2	0	2	0	0	0	0
<i>frustrulum</i> var. <i>perpusilla</i>	37	21	19	13	11	13	16	12	12	5	8	21	11	11	23
<i>heufleriana</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
8-13-98 Collection (number 14)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	0	2	1	1	1	3	1	3	3	4	4	2	2	2	2
<i>linearis</i>	2	2	2	5	0	0	5	3	3	0	0	3	6	0	4
<i>microcephala</i>	10	0	8	2	2	2	1	0	1	0	0	2	0	0	1
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>sigma</i>	1	0	0	1	0	1	0	0	1	4	2	0	4	3	0
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tryblionella</i>	2	4	1	0	3	1	3	2	1	0	5	6	3	4	1
<i>tryblionella</i> var. <i>debilis</i>	1	4	5	4	2	2	13	7	5	5	5	1	6	3	1
<i>tryblionella</i> var. <i>victoriae</i>	0	12	0	7	3	2	2	1	2	9	7	5	4	7	3
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
species 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station

8-13-98 Collection (number 14)		Stations														
Taxa		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>	<i>rumpens</i>	0	1	2	0	1	1	0	0	0	0	1	0	0	1	0
	<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
<i>Tabellaria</i>	species	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total Diatoms		491	534	549	483	331	492	502	514	306	370	366	479	525	527	509

Appendix 2. The number of diatoms counted at each station
8-30-98 Collection (number 15)

Taxa		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>	<i>chilidanos</i>	21	33	13	9	17	14	10	12	8	11	7	20	10	4	61
	<i>clevei</i>	0	0	0	0	1	0	0	2	1	0	0	0	1	0	0
	<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>coarctata</i>	0	0	9	0	0	0	2	0	2	2	0	0	0	3	0
	<i>exigua</i>	9	0	4	0	0	3	3	0	0	0	0	2	0	2	0
	<i>haukiana</i>	13	5	6	6	6	8	7	18	7	12	8	14	14	13	1
	<i>haukiana</i> var. <i>rostrata</i>	63	17	31	25	16	34	20	36	28	4	5	15	9	23	4
	<i>hungarica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>lanceolata</i>	22	38	51	9	26	30	33	22	26	28	18	32	15	41	33
	<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Actinocyclus</i> <i>Actinopterychus</i> <i>Amphipleura</i> <i>Amphora</i>	<i>linearis</i>	4	2	2	0	0	2	0	6	2	4	0	8	3	0	4
	<i>petersenii</i>	0	2	0	0	0	2	2	0	0	4	2	0	0	0	4
	<i>polaris</i>	0	0	5	0	0	0	1	0	1	0	0	2	0	1	0
	<i>normanii</i>	10	14	0	9	11	21	8	5	4	19	27	17	56	25	14
	<i>senarius</i>	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
	<i>pellucida</i>	0	0	0	0	0	2	0	2	2	0	0	2	0	0	0
	<i>ovalis</i>	2	6	2	6	1	10	0	2	2	5	4	2	8	3	2
	<i>perpusilla</i>	4	2	4	0	4	3	4	2	2	0	0	4	2	2	2
	<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>sphaerophora</i> f. <i>costata</i>	0	0	0	2	2	2	0	0	0	2	4	0	0	2	2
<i>Anomoeoneis</i> <i>Bacillaria</i> <i>Caloneis</i>	<i>styriaca</i>	0	0	0	0	0	0	0	0	0	0	3	0	0	1	4
	<i>paradoxa</i>	0	4	3	5	21	14	8	21	11	7	8	3	4	4	7
	<i>bacillum</i>	1	2	6	7	4	7	4	8	4	3	0	0	0	2	0

Appendix 2. The number of diatoms counted at each station

8-30-98 Collection (number 15)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	0	1	16	1	2	2	2	2	0	0	0	0	1	9	0
<i>neodiminuta</i>	4	13	12	7	5	9	4	3	6	14	11	9	11	16	6
<i>placentula</i> var. <i>lineata</i>	29	37	24	39	36	28	12	29	28	31	44	32	30	35	31
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	0	0	0	1	2	1	0	1	1	2	2	2	0	0	3
<i>kuetzingiana</i>	4	0	0	0	0	1	0	1	0	1	0	0	2	4	3
<i>meneghiniana</i>	45	29	17	42	49	43	16	43	29	50	58	71	72	32	51
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymbella</i>															
<i>affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>minuta</i>	2	3	6	1	1	2	0	3	4	1	9	7	2	4	4
<i>minuta</i> var. <i>latens</i>	0	0	3	0	0	3	0	0	1	1	0	0	0	0	1
<i>muellerii</i>	2	2	0	0	0	0	0	1	1	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
<i>silesiaca</i>	0	2	2	0	1	1	0	0	0	0	0	3	1	1	1
<i>tumida</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	6	4	9	0	2	4	5	0	5	9	4	5	6	5	4

Appendix 2. The number of diatoms counted at each station
8-30-98 Collection (number 15)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i>Diploneis</i>															
<i>vulgare</i> var. <i>linearis</i>	0	0	0	0	0	2	2	3	0	1	3	2	0	0	0
<i>bombus</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elliptica</i>	1	1	2	0	2	12	2	4	0	2	1	1	0	0	0
<i>smithii</i>	1	4	0	1	0	5	0	0	2	0	3	0	1	2	1
<i>species</i>	0	3	3	2	3	11	4	6	4	0	0	1	5	11	0
<i>sorex</i>	1	0	0	1	0	1	0	0	0	0	0	0	0	3	0
<i>turgida</i>	0	0	1	2	0	1	0	0	0	0	0	0	0	1	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	1	0	1	0	0	0	1	2	1	1	0	0	0	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	0	0	0	1	2	0	2	0	0	1	0	0	0	0
<i>pinnata</i> var. <i>pinnata</i>	1	1	0	6	3	0	0	2	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	1	1	0	4	2	3	0	1	1	2	13	4	4	4	2
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	1	0	2	1	2	0	0	1	0	2	0	2	1	1	2
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>grovei</i>	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
<i>olivaceum</i>	0	2	1	1	1	0	0	1	2	6	0	0	3	2	5

Appendix 2. The number of diatoms counted at each station 8-30-98 Collection (number 15)

[illegible]

Appendix 2. The number of diatoms counted at each station
8-30-98 Collection (number 15)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Nitzschia</i>															
<i>hybrida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>kuetzingiana</i>	5	4	0	1	2	0	0	7	3	2	1	4	6	1	5
<i>linearis</i>	0	0	0	6	5	6	0	0	1	4	0	0	1	2	0
<i>microcephala</i>	14	2	0	3	0	0	3	1	0	0	0	0	1	1	2
<i>punctata</i> var. <i>coarctata</i>	0	0	0	0	0	0	0	1	0	1	3	0	0	0	0
<i>reversa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalaris</i>	0	0	0	0	2	0	1	0	0	0	0	0	2	0	0
<i>sigma</i>	0	0	0	1	3	0	1	1	0	2	0	0	0	2	1
<i>sinuata</i> var. <i>tabellaria</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tryblionella</i>	1	3	1	1	1	0	0	1	1	1	4	1	1	1	2
<i>tryblionella</i> var. <i>debilis</i>	2	4	10	1	4	5	2	3	7	3	5	6	5	2	0
<i>tryblionella</i> var. <i>victoriae</i>	0	2	1	2	7	1	0	4	3	2	3	5	3	2	1
<i>abaujensis</i> var. <i>rostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acuminata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>borealis</i> var. <i>rectangularis</i>	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
<i>brebissoni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brebissoni</i> var. <i>diminuta</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
<i>nodosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>obscura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
species 1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
species 2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
<i>viridis</i> var. <i>commutata</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Pinnularia

Appendix 2. The number of diatoms counted at each station 8-30-98 Collection (number 15)

[illegible]

Appendix 2. The number of diatoms counted at each station

8-30-98 Collection (number 15)																
		Stations														
Taxa		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Synedra	<i>rumpens</i>	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0
	<i>ulna</i> var. <i>amphirhynchus</i>	1	0	1	0	0	0	0	0	0	0	1	1	1	1	0
Tabellaria	species	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Total Diatoms		538	490	523	515	513	550	465	508	492	528	561	550	513	537	530

Appendix 2. The number of diatoms counted at each station
9-12-98 Collection (number 16)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidanos</i>	33	65	33	8	2	8	9	7	1	0	10	7	15	8	22
<i>clevei</i>	3	0	5	0	0	0	0	2	2	0	0	0	0	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
<i>coarctata</i>	2	6	0	4	0	5	0	2	2	0	0	0	2	2	0
<i>exigua</i>	6	0	7	0	0	2	0	2	2	0	2	1	1	0	0
<i>haukiana</i>	2	4	6	6	5	6	3	8	4	7	7	17	11	7	2
<i>haukiana</i> var. <i>rostrata</i>	28	3	29	9	12	30	25	29	19	14	8	7	4	14	8
<i>hungarica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>lanceolata</i>	46	55	39	19	30	27	26	51	26	15	24	26	31	38	28
<i>lemmermannii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	2	5	21	2	2	3	11	0	6	2	6	17	4	4	8
<i>petersenii</i>	2	6	6	0	0	0	0	2	0	4	2	0	0	0	0
<i>polaris</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>normanii</i>	22	19	9	2	27	10	13	7	21	17	34	23	33	28	30
<i>Actinocyclus</i>															
<i>senarius</i>	0	0	0	0	0	0	0	0	3	0	1	0	0	1	0
<i>Actinopterychus</i>															
<i>pellucida</i>	0	0	0	0	0	0	0	2	5	0	0	1	0	0	0
<i>Amphipleura</i>															
<i>ovalis</i>	8	7	3	4	6	0	2	6	6	7	2	2	0	4	0
<i>Amphora</i>															
<i>perpusilla</i>	0	4	35	4	4	4	2	0	2	6	0	4	0	2	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>															
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	0	2	5	2	1	0	5	2	4	4	2	2
<i>styriaca</i>	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
<i>Bacillaria</i>															
<i>paradoxa</i>	2	5	12	15	43	30	30	20	11	10	5	5	12	7	6
<i>Caloneis</i>															
<i>bacillum</i>	7	0	3	5	2	8	14	4	3	6	0	4	0	2	0

Appendix 2. The number of diatoms counted at each station
9-12-98 Collection (number 16)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluvialis</i>	0	3	0	1	4	0	6	0	1	0	1	0	0	2	1
<i>neodiminuta</i>	11	10	5	3	7	7	5	7	9	11	6	13	8	22	13
<i>placentula</i> var. <i>lineata</i>	74	97	43	29	28	59	30	36	47	24	35	28	39	37	51
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	0	0	0	0	0	1	0	0	0	1	0	1	2	1	1
<i>kuetzingiana</i>	1	3	0	2	1	0	0	2	0	2	1	0	1	1	8
<i>meneghiniana</i>	49	54	21	26	45	36	30	24	41	72	70	71	52	34	69
<i>planktonia</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>															
<i>solea</i>	0	0	3	0	0	0	0	0	0	2	0	0	1	0	0
<i>Cymbella</i>															
<i>affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>minuta</i>	5	4	7	2	1	4	3	7	8	1	4	4	2	3	3
<i>minuta</i> var. <i>latens</i>	2	1	5	0	0	0	0	0	0	0	0	1	1	1	0
<i>muellerii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>naviculiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>silesiaca</i>	0	0	0	0	0	0	0	1	0	0	2	3	0	0	0
<i>tumida</i>	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	2	2	6	5	5	6	6	4	1	3	8	10	2	4	10

Appendix 2. The number of diatoms counted at each station
9-12-98 Collection (number 16)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i> vulgare</i> var. <i>linearis</i>	1	0	1	0	0	0	2	2	0	0	0	3	1	0	4
<i>Diploneis</i>															
<i> bombus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i> elliptica</i>	4	6	2	0	2	7	3	9	6	2	3	2	2	2	0
<i> smithii</i>	1	0	0	3	0	4	2	2	0	0	1	0	0	0	0
<i> species</i>	4	2	0	1	0	7	4	2	1	0	1	1	0	0	1
<i> sorex</i>	2	0	0	0	0	0	0	0	1	1	0	0	1	0	0
<i> turgida</i>	1	2	0	0	0	0	0	0	0	0	0	0	1	0	0
<i> hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i> indica</i>	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
<i> pectinalis</i> var. <i>minor</i>	0	1	2	0	0	0	0	0	0	0	2	0	0	0	1
<i> tenella</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i> constricta</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i> construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i> leptostauran</i>	0	1	0	0	0	0	0	1	0	2	2	2	0	1	0
<i> pinnata</i> var. <i>pinnata</i>	3	0	0	0	1	1	1	0	0	0	0	0	0	3	0
<i> species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i> virescens</i> var. <i>capitata</i>	1	1	0	1	1	2	0	1	2	2	5	2	7	2	3
<i>Gomphonema</i>															
<i> acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i> angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i> angustatum</i> var. <i>obtusatum</i>	4	0	3	1	1	0	0	0	3	1	0	2	0	0	1
<i> angustatum</i> var. <i>sarcophagus</i>	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0
<i> grovei</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i> olivaceum</i>	2	2	2	0	2	2	0	2	2	2	7	2	0	4	4

Appendix 2. The number of diatoms counted at each station
9-12-98 Collection (number 16)

9-12-98 Collection (number 16)																
Taxa		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema</i>	<i>parvulum</i>	3	3	1	1	1	0	1	1	1	1	1	1	1	1	0
	<i>sphaerophorum</i>	0	0	0	0	0	0	2	0	0	0	0	3	0	0	0
	<i>truncatum</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma</i>	<i>acuminatum</i>	0	1	3	2	2	4	0	3	2	0	0	1	0	0	0
<i>Gyrosigma</i>	<i>attenuatum</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	<i>obscurum</i>	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	<i>scalproides</i>	0	0	0	1	1	2	3	1	2	1	3	0	0	0	0
<i>Hantzschia</i>	<i>amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>Mastogloia</i>	<i>smithii</i>	2	0	0	2	2	4	0	0	2	0	0	0	0	0	0
	<i>alpigenia</i>	0	2	0	2	0	0	0	0	2	0	4	0	0	0	0
	<i>distans</i>	2	0	0	0	0	2	2	0	0	2	3	2	0	0	1
<i>Meridion</i>	<i>circulare</i>	1	0	0	1	0	0	0	0	0	0	2	1	1	0	2
	<i>circulare</i> var. <i>constrictum</i>	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
<i>Navicula</i>	<i>aurora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>capitata</i>	3	4	2	4	7	2	0	9	4	9	17	12	2	9	6
	<i>capitata</i> var. <i>luneburgensis</i>	7	9	1	1	1	6	0	4	3	3	4	2	0	8	11
	<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<i>circumtexta</i>	2	0	0	0	0	0	2	1	0	1	0	0	0	0	0
	<i>cryptocephala</i> var. <i>veneta</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	<i>delawarensis</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	<i>elegans</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
9-12-98 Collection (number 16)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>pygmaea</i>	2	4	2	2	9	2	4	5	3	14	10	6	5	4	6
<i>rhynchocephala</i>	4	2	3	4	5	6	0	0	3	4	2	17	6	3	2
<i>salinarum</i> var. <i>intermedia</i>	9	7	11	12	7	2	8	9	15	50	31	15	40	39	48
<i>salinarum</i>	0	0	0	0	1	0	2	0	0	0	0	0	0	6	2
<i>secura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	1	2	1	2	0	2	4	4	1	0	0	2	0	2	2
<i>tripunctata</i>	2	0	9	6	8	7	0	5	2	3	3	0	0	0	2
<i>tuscula</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>vanheurnckii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	19	25	30	9	22	17	20	15	35	9	12	27	9	15	22
<i>viridula</i> var. <i>rostellata</i>	16	3	9	10	5	23	4	10	10	5	3	9	5	9	1
<i>Neidium</i>	0	0	0	0	1	0	0	1	2	0	0	0	2	0	0
<i>affine</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acicularis</i>	22	1	0	2	1	3	1	7	3	3	4	5	1	0	5
<i>amphibia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brevissima</i>	2	22	6	8	13	12	31	11	26	14	10	10	7	7	8
<i>dissipata</i>	0	0	6	2	2	2	3	0	0	0	1	0	4	0	3
<i>filiformis</i>	0	1	2	2	0	0	6	1	3	1	1	0	0	0	1
<i>fonticola</i>	0	5	4	0	2	2	3	0	3	4	3	7	0	3	1
<i>frustrulum</i>	5	7	4	1	0	6	2	4	1	3	3	4	2	1	3
<i>frustrulum</i> var. <i>perpusilla</i>	19	24	34	11	14	0	13	0	0	0	12	30	13	16	20
<i>heufleriana</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Appendix 2. The number of diatoms counted at each station
9-12-98 Collection (number 16)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Pinnularia viridis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>Plagiotropis lepidoptera</i>	3	3	0	12	26	21	3	11	0	10	2	9	4	17	7
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphicerus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	2	0	0	1	0	2	2	0	1	0	0	1	0	1	2
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	1	1	2	4	2	1	0	0	0
<i>gibberula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stauroneis anceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Stephanodiscus species</i>	22	7	8	2	10	15	3	8	1	9	3	4	20	6	11
<i>Surirella birostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biseriata</i>	2	0	0	0	1	1	0	0	0	2	2	0	7	1	2
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	1	5	4	3	10	9	3	10	5	4	6	1	2	7	5
<i>acus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Synedra fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	1	0	8	0	0	1	4	1	0	1	1	0	3	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
<i>pulchella</i>	1	0	1	1	3	0	0	4	2	0	2	0	0	0	0
<i>pulchella</i> var. <i>lanceolata</i>	9	0	1	0	0	0	3	0	0	0	1	0	0	2	0

Appendix 2. The number of diatoms counted at each station

9-12-98 Collection (number 16)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	0	0	0	1	0	0	0	0	3	0	0	0	0	1	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0
Total Diatoms	562	572	562	329	474	550	495	517	492	501	528	542	479	507	543

Appendix 2. The number of diatoms counted at each station
9-30-98 Collection (number 17)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Caloneis</i>															
<i>lewisii</i> var. <i>inflata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>schumanniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Capartogramma</i>															
<i>crucicula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cocconeis</i>															
<i>fluviatilis</i>	0	2	1	1	0	2	4	3	2	2	0	1	1	0	0
<i>neodiminuta</i>	2	6	8	15	5	13	3	12	20	7	6	13	15	19	10
<i>placentula</i> var. <i>lineata</i>	13	29	22	52	79	105	32	46	27	31	51	46	51	56	27
<i>placentula</i> var. <i>euglypta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>rugosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cyclotella</i>															
<i>bodanica</i>	0	0	0	2	1	0	0	0	0	1	1	1	1	0	1
<i>kuetzingiana</i>	5	5	5	1	2	0	4	2	2	3	5	3	1	2	4
<i>meneghiniana</i>	24	36	18	37	48	18	29	27	22	53	93	73	90	60	40
<i>planktonia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Cymatopleura</i>															
<i>solea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Cymbella</i>															
<i>affinis</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
<i>cymbiformis</i> var. <i>nonpunctata</i>	2	0	0	1	0	0	0	0	0	1	0	0	0	0	0
<i>minuta</i>	1	2	3	2	1	2	1	3	5	3	5	5	3	5	2
<i>minuta</i> var. <i>latens</i>	0	0	2	0	0	1	0	0	0	2	1	1	0	0	0
<i>muellerii</i>	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
<i>naviculiformis</i>	0	0	0	0	1	0	0	0	0	1	0	0	2	0	1
<i>silesiaca</i>	0	0	2	2	0	0	1	0	0	1	0	3	1	0	0
<i>tumida</i>	0	1	0	0	0	1	0	0	0	0	1	0	0	1	1
<i>vulgare</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Diatoma</i>															
<i>vulgare</i> var. <i>breve</i>	2	4	2	5	8	2	2	1	2	12	9	14	5	3	4

Appendix 2. The number of diatoms counted at each station
9-30-98 Collection (number 17)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>															
<i>vulgare</i> var. <i>linearis</i>	0	0	0	1	2	0	2	0	0	1	2	0	4	0	2
<i>Diploneis</i>															
<i>bombus</i>	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0
<i>elliptica</i>	0	0	0	2	1	4	5	7	0	2	3	1	2	3	0
<i>smithii</i>	2	0	0	0	0	0	0	2	3	1	3	2	0	0	0
<i>species</i>	0	3	1	2	2	3	6	0	1	0	2	0	0	2	1
<i>sorex</i>	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0
<i>turgida</i>	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Eunotia</i>															
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Fragilaria</i>															
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	0	0	1	0	0	1	1	0	0	2	0	1	1	3
<i>pinnata</i> var. <i>pinnata</i>	1	0	2	1	1	7	1	5	4	0	0	2	3	0	1
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>virescens</i> var. <i>capitata</i>	1	2	1	3	1	3	0	1	1	1	7	6	3	3	0
<i>Gomphonema</i>															
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	1	0	1	2	1	1	2	3	1	1	4	1	0	1	0
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	1	1	4	2	6	5	1	3	3	2	6	4	1	1	0

Appendix 2. The number of diatoms counted at each station
9-30-98 Collection (number 17)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema</i>															
<i>parvulum</i>	2	0	1	1	0	0	0	1	0	0	3	1	0	3	5
<i>sphaerophorum</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
<i>truncatum</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
<i>Gyrosigma</i>															
<i>acuminatum</i>	0	1	0	0	1	3	0	0	0	0	0	0	0	0	0
<i>Gyrosigma</i>															
<i>attenuatum</i>	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0
<i>obscurum</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>scalproides</i>	0	0	2	0	1	1	6	4	2	2	2	2	2	2	0
<i>Hantzschia</i>															
<i>amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	2	4	3	2	0
<i>Mastogloia</i>															
<i>smithii</i>	0	0	0	2	0	2	2	0	0	0	5	0	0	3	0
<i>Melosira</i>															
<i>alpigenia</i>	0	0	0	3	0	0	0	8	0	0	0	4	7	1	4
<i>distans</i>	0	0	0	0	0	2	1	2	2	1	0	2	0	0	0
<i>circulare</i>	1	0	0	2	0	1	0	0	1	0	0	0	0	0	0
<i>circulare</i> var. <i>constrictum</i>	0	0	0	0	0	0	2	2	2	6	4	4	0	6	0
<i>Navicula</i>															
<i>aurora</i>	0	0	0	0	0	0	0	0	0	2	0	1	0	9	0
<i>capitata</i>	3	4	6	7	9	2	1	2	0	0	0	0	0	0	6
<i>capitata</i> var. <i>luneburgensis</i>	0	0	0	0	0	0	0	0	7	0	0	0	0	0	10
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	3	2	2	0	5	2	1	1	0	0	1	0	0	0	2
<i>cryptocephala</i> var. <i>veneta</i>	6	0	1	0	1	0	0	0	0	0	0	0	0	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station

9-30-98 Collection (number 17)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>pygmaea</i>	10	8	9	11	9	6	2	2	4	16	8	2	8	2	1
<i>rhynchocephala</i>	1	3	2	5	2	1	1	5	2	0	5	10	8	3	0
<i>salinarum</i> var. <i>intermedia</i>	23	12	15	12	12	13	11	14	19	39	7	6	27	36	35
<i>salinarum</i>	0	0	1	2	3	0	0	0	0	0	1	4	0	1	1
<i>secura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>tenera</i>	3	0	4	2	0	0	2	7	2	2	0	1	0	0	4
<i>tripunctata</i>	7	1	0	7	11	1	10	5	0	4	6	6	1	0	4
<i>tuscula</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>viridula</i>	13	17	47	20	14	26	6	14	20	12	16	28	9	11	36
<i>viridula</i> var. <i>rostellata</i>	12	8	19	8	8	9	6	6	10	4	8	12	4	5	5
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0
<i>acicularis</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>amphibia</i>	4	3	0	5	2	1	5	0	3	4	3	4	1	0	0
<i>apiculata</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>brevissima</i>	4	16	9	18	20	20	42	24	18	11	7	2	17	5	1
<i>dissipata</i>	2	0	2	2	0	1	5	2	2	3	3	1	0	0	0
<i>filiformis</i>	0	1	1	1	0	3	5	4	1	1	0	1	0	0	1
<i>fonticola</i>	9	3	7	1	0	5	4	3	9	1	7	10	6	2	0
<i>frustrulum</i>	7	1	1	1	0	0	0	0	0	0	0	1	1	0	1
<i>frustrulum</i> var. <i>perpusilla</i>	30	22	41	20	8	22	12	10	27	16	24	22	10	10	46
<i>heyfleriana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Neidium**Nitzschia*

Appendix 2. The number of diatoms counted at each station
9-30-98 Collection (number 17)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Pinnularia viridis</i>	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0
<i>Plagiotropis lepidoptera</i>	0	0	0	2	24	8	3	6	3	4	18	4	15	34	3
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphicerus</i>	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Rhoicosphenia curvata</i>	0	2	0	1	0	0	0	1	2	8	2	5	0	2	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	2	0	0	0	1	0	0	1	0	0	0
<i>gibberula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>anceps</i>	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
<i>Stephanodiscus species</i>	7	5	4	4	6	4	3	2	1	7	15	7	13	13	11
<i>Surirella birostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biseriata</i>	0	0	0	0	0	0	2	0	0	1	0	2	3	1	0
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	1	1	2	3	6	2	2	3	0	9	4	2	2	0	2
<i>acus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>parasitica</i>	0	2	2	0	3	3	2	1	0	0	1	0	1	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
<i>pulchella</i>	1	0	2	0	6	0	0	0	0	2	0	0	3	2	0
<i>pulchella</i> var. <i>lanceolata</i>	0	0	0	0	0	3	1	2	3	0	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station

9-30-98 Collection (number 17)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	1	1	1	2	0	0	0	0	0	0	0	1	0	0	0
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Total Diatoms	447	485	501	534	533	579	536	542	527	574	619	585	543	517	504

Appendix 2. The number of diatoms counted at each station
10-24-98 Collection (number 18)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Achnanthes</i>															
<i>chilidanos</i>	9	39	10	4	11	8	7	11	16	10	6	15	0	10	50
<i>clevei</i>	0	0	0	0	0	0	0	2	2	2	1	2	8	0	0
<i>clevei</i> var. <i>bottnica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>coarctata</i>	2	0	2	2	0	0	3	0	4	1	2	0	8	0	0
<i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>haukiana</i>	19	24	8	13	7	10	9	17	18	21	10	10	32	15	17
<i>haukiana</i> var. <i>rostrata</i>	45	10	32	6	0	18	13	53	28	13	7	40	15	31	11
<i>hungarica</i>	0	0	4	2	0	0	1	0	0	0	0	0	0	0	0
<i>lanceolata</i>	26	44	16	25	29	20	31	32	40	28	10	46	21	22	49
<i>lemmermannii</i>	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0
<i>linearis</i>	2	2	0	0	0	0	1	0	0	0	2	0	4	0	2
<i>petersenii</i>	0	8	2	2	2	0	0	2	0	0	3	0	2	2	4
<i>polaris</i>	0	0	0	1	0	0	0	0	0	6	0	1	0	0	2
<i>normanii</i>	19	16	0	10	22	7	4	9	10	19	50	13	38	23	30
<i>Actinocyclus</i>															
<i>Actinopterychus</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Amphipleura</i>	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1
<i>ovalis</i>	1	0	3	1	4	0	2	6	5	0	4	2	11	0	0
<i>perpusilla</i>	0	4	0	2	2	4	0	0	2	0	3	5	0	0	2
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anomoeoneis</i>															
<i>sphaerophora</i> f. <i>costata</i>	0	0	0	2	2	0	1	2	0	2	5	2	3	2	0
<i>styriaca</i>	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
<i>Bacillaria</i>	13	16	3	11	32	28	19	11	37	23	13	7	4	7	7
<i>paradoxa</i>															
<i>Caloneis</i>															
<i>bacillum</i>	0	0	2	5	3	8	6	1	7	3	1	0	1	4	1

Appendix 2. The number of diatoms counted at each station

10-24-98 Collection (number 18)																
Taxa		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Caloneis	lewisii var. inflata	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	schumanniana	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Capartogramma	crucicula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cocconeis	fluvialis	1	1	0	2	2	2	0	2	4	3	5	1	0	0	0
	neodiminuta	14	10	8	5	4	4	2	5	1	6	18	6	12	7	6
	placentula var. lineata	49	45	13	26	40	55	70	78	48	38	67	51	104	66	47
	placentula var. euglypta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	rugosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	bodanica	1	1	0	0	1	0	1	0	0	2	3	1	0	0	1
Cyclotella	kuetzingiana	1	0	3	4	2	5	3	2	1	0	4	2	1	0	0
	meneghiniana	67	37	20	32	36	32	18	23	52	59	82	64	76	27	59
Cymatopleura	planktonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	solea	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Cymbella	affinis	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	cymbiformis var. nonpunctata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	minuta	1	6	0	2	3	1	1	4	0	3	9	4	3	3	3
	minuta var. latens	0	0	0	0	0	1	1	1	0	2	1	0	1	0	0
	muellerii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	naviculiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	silesiaca	2	0	0	0	0	1	0	1	0	0	0	0	1	0	0
	tumida	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Diatoma	vulgare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	vulgare var. breve	1	1	3	7	1	6	5	6	2	7	9	2	7	6	7

Appendix 2. The number of diatoms counted at each station
10-24-98 Collection (number 18)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Diatoma</i>	0	0	0	0	0	0	0	1	0	2	1	0	0	0	2
<i>Diploneis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vulgare</i> var. <i>linearis</i>	0	6	1	4	4	1	1	2	5	2	3	2	2	2	1
<i>bombus</i>	0	0	0	0	1	0	0	2	1	0	2	0	0	1	0
<i>elliptica</i>	0	0	0	2	0	0	1	2	4	4	0	0	3	4	0
<i>smithii</i>	0	0	0	1	0	2	0	1	0	0	0	0	1	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>sorex</i>	0	0	0	1	0	2	0	1	0	0	0	0	1	0	0
<i>turgida</i>	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0
<i>hexaglyphis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>indica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>pectinalis</i> var. <i>minor</i>	0	1	0	1	0	1	1	0	0	2	0	1	0	1	0
<i>tenella</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>constricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>construens</i> var. <i>binodis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>leptostauran</i>	0	1	0	7	0	0	0	1	0	0	1	0	2	0	0
<i>pinnata</i> var. <i>pinnata</i>	0	1	4	4	2	1	1	1	0	2	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>virescens</i> var. <i>capitata</i>	2	3	0	3	2	0	0	0	0	0	2	1	4	4	0
<i>acuminatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>angustatum</i> var. <i>obtusatum</i>	1	0	3	1	0	2	0	1	0	1	0	2	0	1	0
<i>angustatum</i> var. <i>sarcophagus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>grovei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>olivaceum</i>	0	1	2	2	0	1	1	0	1	0	6	0	5	2	4

Appendix 2. The number of diatoms counted at each station
10-24-98 Collection (number 18)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Gomphonema</i>															
<i>parvulum</i>	2	0	2	0	2	3	0	2	2	4	2	0	1	1	1
<i>sphaerophorum</i>	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
<i>truncatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>truncatum</i> var. <i>capitatum</i>	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Gyrosigma</i>															
<i>acuminatum</i>	0	0	0	2	0	0	0	1	2	0	0	0	0	0	0
<i>Gyrosigma</i>															
<i>attenuatum</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
<i>obscurum</i>	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0
<i>scalpoides</i>	2	0	4	5	4	0	1	0	0	5	1	1	1	0	0
<i>Hantzschia</i>															
<i>amphioxys</i> var. <i>capitata</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Mastogloia</i>															
<i>smithii</i>	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
<i>Melosira</i>															
<i>alpigenia</i>	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0
<i>distans</i>	4	0	0	0	1	0	0	0	0	3	7	0	0	5	3
<i>circulare</i>	4	3	0	0	0	0	0	0	0	0	2	1	3	0	4
<i>circulare</i> var. <i>constrictum</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Navicula</i>															
<i>aurora</i>	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
<i>capitata</i>	2	7	0	5	3	0	5	8	6	17	6	4	4	2	2
<i>capitata</i> var. <i>luneburgensis</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>caroliniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>circumtexta</i>	4	0	4	3	0	0	3	0	0	3	0	1	0	1	0
<i>cryptocephala</i> var. <i>veneta</i>	0	1	0	1	2	0	0	1	0	0	0	2	0	0	0
<i>cuspidata</i> var. <i>major</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>delawarensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>elegans</i>	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0

Appendix 2. The number of diatoms counted at each station
10-24-98 Collection (number 18)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Navicula</i>															
<i>pygmaea</i>	9	2	0	7	4	4	6	6	3	9	6	6	11	14	4
<i>rhynchocephala</i>	0	3	0	3	3	4	0	2	1	1	1	0	5	0	5
<i>salinarum</i> var. <i>intermedia</i>	21	11	28	9	15	12	4	13	12	35	17	14	38	30	9
<i>salinarum</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>secura</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>tenera</i>	1	1	8	0	0	0	1	8	0	5	0	0	0	0	5
<i>tripunctata</i>	1	2	0	2	6	1	1	5	1	7	10	9	10	3	4
<i>tuscula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>vanheurckii</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>viridula</i>	11	12	31	22	12	24	18	16	26	25	23	26	10	44	15
<i>viridula</i> var. <i>rostellata</i>	13	5	8	16	1	4	1	10	6	8	13	4	7	6	3
<i>Neidium</i>	0	1	0	0	0	0	0	0	0	2	0	0	1	0	0
<i>affine</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>iridis</i> var. <i>ampliatum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitzschia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>acicularis</i>	3	2	0	2	0	0	2	2	1	0	2	3	5	0	2
<i>amphibia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>apiculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>brevissima</i>	2	10	2	3	11	13	21	22	19	18	13	7	16	9	4
<i>dissipata</i>	0	0	3	0	1	2	0	6	8	3	0	1	1	0	0
<i>filiformis</i>	2	1	5	0	0	3	0	6	1	2	0	0	1	5	0
<i>fonticola</i>	2	13	3	6	5	4	4	1	0	4	8	1	3	10	5
<i>frustrulum</i>	2	4	0	1	3	0	0	0	1	2	2	0	0	0	0
<i>frustrulum</i> var. <i>perpusilla</i>	18	44	30	18	6	18	13	23	22	18	17	18	21	23	27
<i>heufleriana</i>	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0

Appendix 2. The number of diatoms counted at each station
10-24-98 Collection (number 18)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Pinnularia viridis</i>	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0
<i>Plagiotropis lepidoptera</i>	5	0	0	6	5	4	1	8	5	7	11	4	5	4	6
<i>Pleurosira laevis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Raphoneis amphicerus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhoicosphenia curvata</i>	0	0	0	0	0	2	2	1	0	2	5	0	0	1	0
<i>species</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Rhopalodia gibba</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>gibberula</i>	0	0	0	0	0	0	0	1	3	1	0	1	0	0	0
<i>anceps</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>phoenicenteron</i> var. <i>gracilis</i>	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Stephanodiscus species</i>	11	11	8	7	8	4	2	4	7	5	8	14	12	4	12
<i>Surirella birostrata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>biseriata</i>	2	0	0	0	0	1	0	0	1	0	2	0	1	1	1
<i>minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>ovata</i>	2	2	2	3	5	3	2	1	5	3	2	3	9	2	3
<i>acus</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Synedra fasciculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>fasciculata</i> var. <i>truncata</i>	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>parasitica</i>	0	3	2	0	3	1	2	2	1	0	1	0	0	0	0
<i>parasitica</i> var. <i>subconstricta</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>pulchella</i>	1	0	2	0	0	0	0	0	0	0	2	1	2	0	0
<i>pulchella</i> var. <i>lanceolata</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Appendix 2. The number of diatoms counted at each station
10-24-98 Collection (number 18)

Taxa	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Synedra</i>															
<i>rumpens</i>	0	1	2	3	1	1	0	0	0	0	1	4	1	2	4
<i>ulna</i> var. <i>amphirhynchus</i>	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0
<i>Tabellaria</i>															
species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Diatoms	485	524	394	462	435	453	470	581	583	605	661	542	720	578	524

Appendix 3. Formulas that we used to calculate richness, diversity and evenness.

Richness

Margalef:

$$R1 = \frac{S-1}{\ln(n)}$$

Menhinick:

$$R2 = \frac{S}{\sqrt{n}}$$

Diversity

Shannon:

$$H = -\sum_{j=1}^s p_j \log p_j$$

Simpson:

$$P = \sum_{i=1}^s p_i^2$$

Hill Numbers:

$$H_1 = -\sum_{i=1}^s p_i \log p_i$$

$$N_1 = \exp(H_1)$$

$$H_2 = -\log \sum_{i=1}^s p_i^2$$

$$N_2 = 1 / \sum_{i=1}^s p_i^2$$

Evenness

Pielou's:

$$J' = \frac{H'}{H_{\max}}$$

Sheldon:

$$E2 = \frac{e^{H'}}{S} = \frac{N1}{N0}$$

Heip:

$$E3 = \frac{e^{H'-1}}{S-1} = \frac{N1-1}{N0-1}$$

Hill:

$$E4 = \frac{(1/\lambda)^{H'}}{e} = \frac{N2}{N1}$$

Modified Hill:

$$E5 = \frac{(1/\lambda)^{H'}-1}{e^{H'}-1} = \frac{N2-1}{N1-1}$$

Appendix 4. Richness, Diversity and Evenness for each collection date

9/18/1997 collection		Stations											
		1	2	3	4	5	6	7	8	9	10	11	12
Richness													
Margalef (R1)		6.79	8.92	4.64	11.04	8.14	9.84	10.63	10.85	10.27	10.87	8.28	8.83
Menhinick (R2)		2.05	2.67	1.52	3.17	2.46	2.99	3.10	3.10	3.08	3.02	2.39	2.49
Diatoms/ Site		419	425	338	474	412	402	453	480	418	521	472	507
Diversity													
# of species		42	55	28	69	50	60	66	68	63	69	52	56
Hill N1		15.48	30.08	6.91	30.00	29.52	24.28	30.61	32.73	28.09	27.82	18.58	27.31
Hill N2		9.85	21.95	3.41	17.38	22.27	14.54	19.00	19.67	17.70	15.97	10.60	16.97
Simpson (λ)		0.10	0.05	0.29	0.06	0.04	0.07	0.05	0.05	0.06	0.06	0.09	0.06
Shannon (H')		2.74	3.40	1.93	3.40	3.39	3.19	3.42	3.49	3.34	3.33	2.92	3.31
Diatoms/Site		419	425	338	474	412	402	453	480	418	521	472	507
Evenness													
Pielou (E1)		0.73	0.85	0.58	0.80	0.87	0.78	0.82	0.83	0.81	0.79	0.74	0.82
Sheldon (E2)		0.37	0.55	0.25	0.43	0.59	0.40	0.46	0.48	0.45	0.40	0.36	0.49
Heip (E3)		0.35	0.54	0.22	0.43	0.58	0.39	0.46	0.47	0.44	0.39	0.34	0.48
Hill's Ratio (E4)		0.64	0.73	0.49	0.58	0.75	0.60	0.62	0.60	0.63	0.57	0.57	0.62
Hill's Ratio (E5)		0.61	0.72	0.41	0.56	0.75	0.58	0.61	0.59	0.62	0.56	0.55	0.61

Appendix 4. Richness, Diversity and Evenness for each collection date

	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
10-7-97 collection												
Richness												
Margalef (R1)	4.26	11.17	8.41	9.43	7.77	10.68	9.24	8.77	9.23	7.13	5.60	10.76
Menhinick (R2)	1.18	2.91	2.41	2.44	2.04	2.95	2.56	2.43	2.64	1.96	1.58	2.93
Diatoms/ Site	564	631	483	646	624	530	533	529	481	549	516	554
Diversity												
# of species	28	73	53	62	51	68	59	56	58	46	36	69
Hill N1	12.11	36.63	28.31	28.10	22.80	30.05	18.89	23.64	25.31	15.56	10.19	34.14
Hill N2	7.40	25.31	20.47	18.95	14.06	17.56	8.36	15.09	16.54	7.54	5.47	20.07
Simpson (λ)	0.14	0.04	0.05	0.05	0.07	0.06	0.12	0.07	0.06	0.13	0.18	0.05
Shannon (H')	2.49	3.60	3.34	3.34	3.13	3.40	2.94	3.16	3.23	2.74	2.32	3.53
Diatoms/Site	564	631	483	646	624	530	533	529	481	549	516	554
Evenness												
Pielou (E1)	0.75	0.84	0.84	0.81	0.80	0.81	0.72	0.79	0.80	0.72	0.65	0.83
Sheldon (E2)	0.43	0.50	0.53	0.45	0.45	0.44	0.32	0.42	0.44	0.34	0.28	0.49
Heip (E3)	0.41	0.49	0.53	0.44	0.44	0.43	0.31	0.41	0.43	0.32	0.26	0.49
Hill's Ratio (E4)	0.61	0.69	0.72	0.67	0.62	0.58	0.44	0.64	0.65	0.48	0.54	0.59
Hill's Ratio (E5)	0.58	0.68	0.71	0.66	0.60	0.57	0.41	0.62	0.64	0.45	0.49	0.58

Appendix 4. Richness, Diversity and Evenness for each collection date

	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
10/30/1997 collection												
Richness												
Margalef (R1)	7.00	10.28	7.57	9.04	8.21	9.28	8.97	9.62	9.32	11.92	8.38	10.28
Menhinick (R2)	2.71	2.80	2.25	2.57	3.33	2.59	2.41	2.70	2.63	3.27	2.29	2.79
Diatoms/ Site	197	557	436	491	167	518	577	511	505	541	558	558
Diversity												
# of species	38	66	47	57	43	59	58	61	59	76	54	66
Hill N1	24.09	28.72	16.60	27.24	23.97	21.53	21.98	26.71	28.54	36.78	28.60	29.09
Hill N2	19.74	18.21	7.26	17.72	15.00	11.92	11.27	14.90	18.88	23.89	18.63	18.06
Simpson (λ)	0.05	0.05	0.14	0.06	0.07	0.08	0.09	0.07	0.05	0.04	0.05	0.06
Shannon (H')	3.18	3.36	2.81	3.30	3.18	3.07	3.09	3.28	3.35	3.60	3.35	3.37
Diatoms/Site	197	557	436	491	167	518	577	511	505	541	558	558
Evenness												
Pielou (E1)	0.87	0.80	0.73	0.82	0.84	0.75	0.76	0.80	0.82	0.83	0.84	0.80
Sheldon (E2)	0.63	0.44	0.35	0.48	0.56	0.36	0.38	0.44	0.48	0.48	0.53	0.44
Heip (E3)	0.62	0.43	0.34	0.47	0.55	0.35	0.37	0.43	0.47	0.48	0.52	0.43
Hill's Ratio (E4)	0.82	0.63	0.44	0.65	0.63	0.55	0.51	0.56	0.66	0.65	0.65	0.62
Hill's Ratio (E5)	0.81	0.62	0.40	0.64	0.61	0.53	0.49	0.54	0.65	0.64	0.64	0.61

Note that only 1 sediment sample was counted at stations one and five

Appendix 4. Richness, Diversity and Evenness for each collection date

1/6/1998 collection		Stations											
		1	2	3	4	5	6	7	8	9	10	11	12
Richness													
Margalef (R1)		9.90	11.64	11.01	10.04	10.40	12.05	9.87	11.69	9.98	10.65	10.24	10.14
Menhinick (R2)		2.65	3.13	3.05	2.87	2.90	3.20	2.73	3.26	3.12	3.43	2.76	2.77
Diatoms/ Site		582	576	527	481	518	596	533	516	370	338	571	551
Diversity													
# of species		64	75	70	63	66	78	63	74	60	63	66	65
Hill N1		29.19	30.13	33.08	29.48	32.97	36.42	23.20	32.19	32.01	31.14	29.65	29.20
Hill N2		18.65	16.56	20.36	18.78	19.60	20.62	12.17	18.49	20.09	17.92	16.32	16.08
Simpson (λ)		0.05	0.06	0.05	0.05	0.05	0.05	0.08	0.05	0.05	0.06	0.06	0.06
Shannon (H')		3.37	3.41	3.50	3.38	3.50	3.60	3.14	3.47	3.47	3.44	3.39	3.37
Diatoms/Site		582	576	527	481	518	596	533	516	370	338	571	551
Evenness													
Pielou (E1)		0.81	0.79	0.82	0.82	0.83	0.83	0.76	0.81	0.85	0.83	0.81	0.81
Sheldon (E2)		0.46	0.40	0.47	0.47	0.50	0.47	0.37	0.44	0.53	0.49	0.45	0.45
Heip (E3)		0.45	0.39	0.46	0.46	0.49	0.46	0.36	0.43	0.53	0.49	0.44	0.44
Hill's Ratio (E4)		0.64	0.55	0.62	0.64	0.59	0.57	0.52	0.57	0.63	0.58	0.55	0.55
Hill's Ratio (E5)		0.63	0.53	0.60	0.62	0.58	0.55	0.50	0.56	0.62	0.56	0.53	0.53

Appendix 4. Richness, Diversity and Evenness for each collection date

2/3/1998 collection		Stations											
		1	2	3	4	5	6	7	8	9	10	11	12
Richness													
Margalef (R1)		8.49	9.11	8.55	8.38	9.70	11.92	7.98	9.33	7.03	9.52	8.30	8.86
Menhinick (R2)		2.48	2.73	2.53	2.48	2.87	3.36	2.42	2.84	2.17	2.81	2.41	2.61
Diatoms/ Site		458	420	439	439	437	497	411	403	393	442	465	443
Diversity													
# of species		53	56	53	52	60	75	49	57	43	59	52	55
Hill N1		26.46	29.65	28.07	28.07	28.63	36.74	21.28	28.08	19.65	26.83	25.69	23.72
Hill N2		17.94	21.18	20.48	19.58	16.75	24.13	12.33	20.14	11.96	16.39	17.54	13.01
Simpson (λ)		0.06	0.05	0.05	0.05	0.06	0.04	0.08	0.05	0.08	0.06	0.06	0.08
Shannon (H')		3.28	3.39	3.33	3.33	3.35	3.60	3.06	3.33	2.98	3.29	3.25	3.17
Diatoms/Site		458	420	439	439	437	497	411	403	393	442	465	443
Evenness													
Pielou (E1)		0.83	0.84	0.84	0.84	0.82	0.83	0.79	0.82	0.79	0.81	0.82	0.79
Sheldon (E2)		0.50	0.53	0.53	0.54	0.48	0.49	0.43	0.49	0.46	0.45	0.49	0.43
Heip (E3)		0.49	0.52	0.52	0.53	0.47	0.48	0.42	0.48	0.44	0.45	0.48	0.42
Hill's Ratio (E4)		0.68	0.71	0.73	0.70	0.59	0.66	0.58	0.72	0.61	0.61	0.68	0.55
Hill's Ratio (E5)		0.67	0.70	0.72	0.69	0.57	0.65	0.56	0.71	0.59	0.60	0.67	0.53

Appendix 4. Richness, Diversity and Evenness for each collection date

3/27/1998 collection		Stations											
		1	2	3	4	5	6	7	8	9	10	11	12
Richness													
Margalef (R1)	6.98	11.67	6.79	8.18	9.20	11.07	8.61	9.98	8.40	8.58	7.24	7.60	
Menhinick (R2)	1.83	3.15	1.85	2.20	2.62	3.20	2.59	2.92	2.50	2.56	2.16	2.28	
Diatoms/ Site	629	566	564	578	489	466	419	450	433	428	435	425	
Diversity													
# of species	46	75	44	53	58	69	53	62	52	53	45	47	
Hill N1	19.90	32.98	17.76	23.24	24.33	33.28	23.22	31.03	20.94	23.87	20.97	21.55	
Hill N2	13.00	18.86	9.93	12.82	12.62	20.53	12.29	20.61	10.46	12.51	10.97	11.81	
Simpson (λ)	0.08	0.05	0.10	0.08	0.08	0.05	0.08	0.05	0.10	0.08	0.09	0.08	
Shannon (H')	2.99	3.50	2.88	3.15	3.19	3.51	3.14	3.43	3.04	3.17	3.04	3.07	
Diatoms/Site	629	566	564	578	489	466	419	450	433	428	435	425	
Evenness													
Pielou (E1)	0.78	0.81	0.76	0.79	0.79	0.83	0.79	0.83	0.77	0.80	0.80	0.80	
Sheldon (E2)	0.43	0.44	0.40	0.44	0.42	0.48	0.44	0.50	0.40	0.45	0.47	0.46	
Heip (E3)	0.42	0.43	0.39	0.43	0.41	0.47	0.43	0.49	0.39	0.44	0.45	0.45	
Hill's Ratio (E4)	0.65	0.57	0.56	0.55	0.52	0.62	0.53	0.66	0.50	0.52	0.52	0.55	
Hill's Ratio (E5)	0.64	0.56	0.53	0.53	0.50	0.60	0.51	0.65	0.47	0.50	0.50	0.53	

Appendix 4. Richness, Diversity and Evenness for each collection date

4/30/1998 collection		Stations											
		1	2	3	4	5	6	7	8	9	10	11	12
Richness													
Margalef (R1)	7.04	8.45	8.28	7.54	7.17	9.57	7.71	9.25	8.62	9.13	8.45	9.47	
Menhinick (R2)	2.08	2.44	2.49	2.33	2.19	2.75	2.28	2.76	2.60	2.76	2.54	2.86	
Diatoms/ Site	449	471	419	391	402	475	443	425	417	413	419	411	
Diversity													
# of species	44	53	51	46	44	60	48	57	53	56	52	58	
Hill N1	13.22	25.03	18.75	13.99	10.86	24.92	19.71	27.18	21.38	19.08	24.17	20.89	
Hill N2	5.37	16.83	9.88	5.50	4.54	11.28	9.89	16.25	10.63	8.58	13.94	10.02	
Simpson (λ)	0.19	0.06	0.10	0.18	0.22	0.09	0.10	0.06	0.09	0.12	0.07	0.10	
Shannon (H')	2.58	3.22	2.93	2.64	2.38	3.22	2.98	3.30	3.06	2.95	3.19	3.04	
Diatoms/Site	449	471	419	391	402	475	443	425	417	413	419	411	
Evenness													
Pielou (E1)	0.68	0.81	0.75	0.69	0.63	0.79	0.77	0.82	0.77	0.73	0.81	0.75	
Sheldon (E2)	0.30	0.47	0.37	0.30	0.25	0.42	0.41	0.48	0.40	0.34	0.46	0.36	
Heip (E3)	0.28	0.46	0.36	0.29	0.23	0.41	0.40	0.47	0.39	0.33	0.45	0.35	
Hill's Ratio (E4)	0.41	0.67	0.53	0.39	0.42	0.45	0.50	0.60	0.50	0.45	0.58	0.48	
Hill's Ratio (E5)	0.36	0.66	0.50	0.35	0.36	0.43	0.48	0.58	0.47	0.42	0.56	0.45	

Appendix 4. Richness, Diversity and Evenness for each collection date

5/16/1998 collection	Stations											
	1	2	3	4	5	6	7	8	9	10	11	12
Richness												
Margalef (R1)	6.67	10.91	9.61	8.35	8.86	10.04	9.34	10.19	9.75	8.68	9.91	9.45
Menhinick (R2)	2.05	3.06	2.78	2.55	2.71	2.87	2.74	2.81	2.91	2.65	2.86	2.64
Diatoms/ Site	401	509	465	399	397	481	447	534	425	399	471	516
Diversity												
# of species	41	69	60	51	54	63	58	65	60	53	62	60
Hill N1	17.19	34.00	24.69	18.05	20.76	24.88	19.75	27.98	21.90	17.47	28.82	24.23
Hill N2	11.57	22.67	12.72	7.39	9.95	12.14	7.88	15.08	10.26	8.26	17.74	10.32
Simpson (λ)	0.09	0.04	0.08	0.14	0.10	0.08	0.13	0.07	0.10	0.12	0.06	0.10
Shannon (H')	2.84	3.53	3.21	2.89	3.03	3.21	2.98	3.33	3.09	2.86	3.36	3.19
Diatoms/Site	401	509	465	399	397	481	447	534	425	399	471	516
Evenness												
Pielou (E1)	0.77	0.83	0.78	0.74	0.76	0.78	0.73	0.80	0.75	0.72	0.81	0.78
Sheldon (E2)	0.42	0.49	0.41	0.35	0.38	0.39	0.34	0.43	0.37	0.33	0.46	0.40
Heip (E3)	0.40	0.49	0.40	0.34	0.37	0.39	0.33	0.42	0.35	0.32	0.46	0.39
Hill's Ratio (E4)	0.67	0.67	0.52	0.41	0.48	0.49	0.40	0.54	0.47	0.47	0.62	0.43
Hill's Ratio (E5)	0.65	0.66	0.49	0.37	0.45	0.47	0.37	0.52	0.44	0.44	0.60	0.40

Appendix 4. Richness, Diversity and Evenness for each collection date

	Stations														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5/30/1998 collection															
Richness															
Margalef (R1)	7.30	9.33	9.37	8.20	10.35	10.67	8.77	9.91	9.26	9.54	10.23	8.75	10.43	8.09	7.54
Menhinick (R2)	2.21	2.73	2.77	2.52	3.05	3.14	2.63	2.95	2.67	2.82	2.94	2.61	3.02	2.42	2.33
Diatoms/ Site	413	450	439	393	440	441	422	427	472	437	474	427	462	428	390
Diversity															
# of species	45	58	58	50	64	66	54	61	58	59	64	54	65	50	46
Hill N1	18.01	26.42	21.29	17.56	23.47	19.89	19.83	23.53	29.48	24.42	28.49	22.52	28.29	16.97	21.42
Hill N2	10.55	16.67	9.59	7.70	10.56	7.89	8.58	10.68	18.69	14.09	17.17	13.02	14.43	7.41	13.15
Simpson (λ)	0.09	0.06	0.10	0.13	0.09	0.13	0.12	0.09	0.05	0.07	0.06	0.08	0.07	0.13	0.08
Shannon (H')	2.89	3.27	3.06	2.87	3.16	2.99	2.99	3.16	3.38	3.20	3.35	3.11	3.34	2.83	3.06
Diatoms/Site	413	450	439	393	440	441	422	427	472	437	474	427	462	428	390
Evenness															
Pielou (E1)	0.76	0.81	0.75	0.73	0.76	0.71	0.75	0.77	0.83	0.78	0.81	0.78	0.80	0.72	0.80
Sheldon (E2)	0.40	0.46	0.37	0.35	0.37	0.30	0.37	0.39	0.51	0.41	0.45	0.42	0.44	0.34	0.47
Heip (E3)	0.39	0.45	0.36	0.34	0.36	0.29	0.36	0.38	0.50	0.40	0.44	0.41	0.43	0.33	0.45
Hill's Ratio (E4)	0.59	0.63	0.45	0.44	0.45	0.40	0.43	0.45	0.63	0.58	0.60	0.58	0.51	0.44	0.61
Hill's Ratio (E5)	0.56	0.62	0.42	0.40	0.43	0.36	0.40	0.43	0.62	0.56	0.59	0.56	0.49	0.40	0.59

Appendix 4. Richness, Diversity and Evenness for each collection date

6/10/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)	6.64	9.37	8.36	9.25	9.42	10.44	8.30	8.10	9.99	9.40	7.70	9.92	9.86	7.34	7.27	
Menhinick (R2)	2.02	2.67	2.36	2.76	2.71	2.93	2.51	2.33	2.83	2.70	2.17	2.77	2.71	2.24	2.19	
Diatoms/ Site	414	487	504	426	473	507	414	479	495	478	509	519	539	402	424	
Diversity																
# of species	43	69	60	66	69	77	58	61	71	69	56	73	70	51	50	
Hill N1	17.49	31.16	25.19	21.41	26.46	32.74	19.86	27.68	30.87	28.99	20.45	36.16	28.02	16.25	22.36	
Hill N2	10.94	18.62	12.75	8.64	12.35	17.45	8.75	13.84	16.15	15.42	10.25	20.78	14.11	7.05	13.32	
Simpson (λ)	0.09	0.05	0.08	0.12	0.08	0.06	0.11	0.07	0.06	0.06	0.10	0.05	0.07	0.14	0.08	
Shannon (H')	2.86	3.44	3.23	3.06	3.28	3.49	2.99	3.32	3.43	3.37	3.02	3.59	3.33	2.79	3.11	
Diatoms/Site	414	487	504	426	473	507	414	479	495	478	509	519	539	402	424	
Evenness																
Pielou (E1)	0.76	0.81	0.79	0.73	0.77	0.80	0.74	0.81	0.80	0.80	0.75	0.84	0.78	0.71	0.79	
Sheldon (E2)	0.41	0.45	0.42	0.32	0.38	0.43	0.34	0.45	0.43	0.42	0.37	0.50	0.40	0.32	0.45	
Heip (E3)	0.39	0.44	0.41	0.31	0.37	0.42	0.33	0.44	0.43	0.41	0.35	0.49	0.39	0.31	0.44	
Hill's Ratio (E4)	0.63	0.60	0.51	0.40	0.47	0.53	0.44	0.50	0.52	0.53	0.50	0.57	0.50	0.43	0.60	
Hill's Ratio (E5)	0.60	0.58	0.49	0.37	0.45	0.52	0.41	0.48	0.51	0.52	0.48	0.56	0.49	0.40	0.58	

Appendix 4. Richness, Diversity and Evenness for each collection date

6/25/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)	9.12	9.68	10.92	9.76	10.63	10.95	8.86	9.80	10.40	10.29	10.80	10.80	0.00	10.94	8.50	10.52
Menhinick (R2)	2.65	2.84	3.07	2.82	3.01	3.09	2.61	2.85	3.00	3.00	3.06	3.06	0.00	3.18	2.49	3.01
Diatoms/ Site	464	445	505	469	496	499	445	457	471	455	494	494	0	457	453	482
Diversity																
# of species	57	60	69	61	67	69	55	61	65	64	68	68	0	68	53	66
Hill N1	25.82	28.53	29.75	23.97	31.04	31.30	21.17	25.35	28.11	27.33	30.32	30.32	0.00	33.20	25.73	30.82
Hill N2	16.32	18.09	17.96	10.38	15.63	15.39	10.58	11.57	14.46	15.19	16.90	16.90	0.00	19.39	17.08	18.22
Simpson (λ)	0.06	0.06	0.06	0.10	0.06	0.06	0.09	0.09	0.07	0.07	0.06	0.06	0.00	0.05	0.06	0.05
Shannon (H')	3.25	3.35	3.39	3.18	3.44	3.44	3.05	3.23	3.34	3.31	3.41	3.41	0.00	3.50	3.25	3.43
Diatoms/Site	464	445	505	469	496	499	445	457	471	455	494	494	0	457	453	482
Evenness																
Pielou (E1)	0.80	0.82	0.80	0.77	0.82	0.81	0.76	0.79	0.80	0.80	0.81	0.81	0.00	0.83	0.82	0.82
Sheldon (E2)	0.45	0.48	0.43	0.39	0.46	0.45	0.38	0.42	0.43	0.43	0.45	0.45	0.00	0.49	0.49	0.47
Heip (E3)	0.44	0.47	0.42	0.38	0.46	0.45	0.37	0.41	0.42	0.42	0.44	0.44	0.00	0.48	0.48	0.46
Hill's Ratio (E4)	0.63	0.63	0.60	0.43	0.50	0.49	0.50	0.46	0.51	0.56	0.56	0.56	0.00	0.58	0.66	0.59
Hill's Ratio (E5)	0.62	0.62	0.59	0.41	0.49	0.47	0.47	0.43	0.50	0.54	0.54	0.54	0.00	0.57	0.65	0.58

Appendix 4. Richness, Diversity and Evenness for each collection date

7/14/1998 collection		Stations													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness															
Margalef (R1)	9.43	9.93	11.65	10.57	12.85	12.33	10.57	10.52	10.37	11.94	10.49	10.65	12.08	11.48	10.63
Menhinick (R2)	2.63	2.59	3.13	2.77	3.42	3.34	2.95	2.91	2.88	3.20	2.79	2.83	3.22	3.17	2.91
Diatoms/ Site	520	629	573	622	590	559	516	530	526	580	595	594	588	530	545
Diversity															
# of species	60	65	75	69	83	79	67	67	66	77	68	69	78	73	68
Hill N1	27.18	27.42	32.28	26.18	36.38	38.88	28.64	34.58	29.22	33.00	34.63	32.71	37.46	34.63	33.30
Hill N2	16.76	14.55	17.36	12.87	20.77	22.82	15.33	21.78	15.42	17.90	19.18	21.20	23.67	20.71	21.19
Simpson (λ)	0.06	0.07	0.06	0.08	0.05	0.04	0.07	0.05	0.06	0.06	0.05	0.05	0.04	0.05	0.05
Shannon (H')	3.30	3.31	3.47	3.27	3.59	3.66	3.35	3.54	3.37	3.50	3.54	3.49	3.62	3.54	3.51
Diatoms/Site	520	629	573	622	590	559	516	530	526	580	595	594	588	530	545
Evenness															
Pielou (E1)	0.81	0.79	0.80	0.77	0.81	0.84	0.80	0.84	0.81	0.80	0.84	0.82	0.83	0.83	0.83
Sheldon (E2)	0.45	0.42	0.43	0.38	0.44	0.49	0.43	0.52	0.44	0.43	0.51	0.47	0.48	0.47	0.49
Heip (E3)	0.44	0.41	0.42	0.37	0.43	0.49	0.42	0.51	0.43	0.42	0.50	0.47	0.47	0.47	0.48
Hill's Ratio (E4)	0.62	0.53	0.54	0.49	0.57	0.59	0.54	0.63	0.53	0.54	0.55	0.65	0.63	0.60	0.64
Hill's Ratio (E5)	0.60	0.51	0.52	0.47	0.56	0.58	0.52	0.62	0.51	0.53	0.54	0.64	0.62	0.59	0.62

Appendix 4. Richness, Diversity and Evenness for each collection date

	7/27/1998 collection														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness															
Margalef (R1)	8.62	10.28	9.88	10.00	11.04	10.26	10.30	8.41	10.46	11.82	11.36	10.33	11.29	10.17	9.33
Menhinick (R2)	2.50	2.98	2.83	2.94	3.18	2.97	3.01	2.50	3.05	3.37	3.16	3.03	3.20	2.89	2.74
Diatoms/ Site	467	460	480	446	472	463	452	431	455	482	519	446	492	491	449
Diversity															
# of species	54	64	62	62	69	64	64	52	65	74	72	64	71	64	58
Hill N1	27.97	31.99	31.69	24.22	32.33	27.82	22.21	21.83	31.21	34.52	31.48	31.84	36.03	32.80	26.90
Hill N2	19.23	22.17	22.42	11.11	18.56	13.79	8.83	11.01	18.63	20.63	18.71	21.10	22.13	19.82	14.71
Simpson (λ)	0.05	0.05	0.04	0.09	0.05	0.07	0.11	0.09	0.05	0.05	0.05	0.05	0.05	0.05	0.07
Shannon (H')	3.33	3.47	3.46	3.19	3.48	3.33	3.10	3.08	3.44	3.54	3.45	3.46	3.58	3.49	3.29
Diatoms/Site	467	460	480	446	472	463	452	431	455	482	519	446	492	491	449
Evenness															
Pielou (E1)	0.84	0.83	0.84	0.77	0.82	0.80	0.75	0.78	0.82	0.82	0.81	0.83	0.84	0.84	0.81
Sheldon (E2)	0.52	0.50	0.51	0.39	0.47	0.43	0.35	0.42	0.48	0.47	0.44	0.50	0.51	0.51	0.46
Heip (E3)	0.51	0.49	0.50	0.38	0.46	0.43	0.34	0.41	0.47	0.46	0.43	0.49	0.50	0.50	0.45
Hill's Ratio (E4)	0.69	0.69	0.71	0.46	0.57	0.50	0.40	0.50	0.60	0.60	0.59	0.66	0.61	0.60	0.55
Hill's Ratio (E5)	0.68	0.68	0.70	0.44	0.56	0.48	0.37	0.48	0.58	0.59	0.58	0.65	0.60	0.59	0.53

Appendix 4. Richness, Diversity and Evenness for each collection date

8/13/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)	8.55	10.67	10.62	9.87	9.82	11.29	10.45	12.18	9.26	9.81	10.50	9.72	11.81	11.49	9.31	
Menhinick (R2)	2.44	2.94	2.90	2.82	3.19	3.20	2.95	3.40	3.09	3.07	3.29	2.79	3.27	3.18	2.62	
Diatoms/ Site	491	534	549	483	331	492	502	514	306	370	366	479	525	527	509	
Diversity																
# of species	54	68	68	62	58	71	66	77	54	59	63	61	75	73	59	
Hill N1	25.86	33.51	33.22	30.58	32.49	33.43	27.53	36.35	23.85	30.38	29.27	29.95	37.27	35.81	25.81	
Hill N2	17.32	22.41	22.47	20.18	23.19	20.94	13.76	20.45	12.73	19.33	16.78	18.91	22.62	22.04	17.20	
Simpson (λ)	0.06	0.04	0.04	0.05	0.04	0.05	0.07	0.05	0.08	0.05	0.06	0.05	0.04	0.05	0.06	
Shannon (H')	3.25	3.51	3.50	3.42	3.48	3.51	3.32	3.59	3.17	3.41	3.38	3.40	3.62	3.58	3.25	
Diatoms/Site	491	534	549	483	331	492	502	514	306	370	366	479	525	527	509	
Evenness																
Pielou (E1)	0.82	0.83	0.83	0.83	0.86	0.82	0.79	0.83	0.80	0.84	0.81	0.83	0.84	0.83	0.80	
Sheldon (E2)	0.48	0.49	0.49	0.49	0.56	0.47	0.42	0.47	0.44	0.51	0.46	0.49	0.50	0.49	0.44	
Heip (E3)	0.47	0.49	0.48	0.48	0.55	0.46	0.41	0.47	0.43	0.51	0.46	0.48	0.49	0.48	0.43	
Hill's Ratio (E4)	0.67	0.67	0.68	0.66	0.71	0.63	0.50	0.56	0.53	0.64	0.57	0.63	0.61	0.62	0.67	
Hill's Ratio (E5)	0.66	0.66	0.67	0.65	0.70	0.61	0.48	0.55	0.51	0.62	0.56	0.62	0.60	0.60	0.65	

Appendix 4. Richness, Diversity and Evenness for each collection date

8/30/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)	9.70	10.01	10.54	10.73	10.90	10.78	8.30	11.72	10.33	10.05	9.80	10.14	8.49	11.14	9.56	
Menhinick (R2)	2.67	2.85	2.93	3.00	3.05	2.94	2.41	3.28	2.93	2.79	2.66	2.77	2.38	3.06	2.65	
Diatoms/ Site	538	490	523	515	513	550	465	508	492	528	561	550	513	537	530	
Diversity																
# of species	62	63	67	68	69	69	52	74	65	64	63	65	54	71	61	
Hill N1	29.31	34.03	32.60	30.32	35.58	37.47	20.39	36.01	26.53	30.60	32.07	31.22	26.25	33.47	27.69	
Hill N2	20.09	24.52	20.30	16.00	23.77	25.84	10.51	24.33	13.30	19.12	20.45	18.99	16.95	21.59	18.30	
Simpson (λ)	0.05	0.04	0.05	0.06	0.04	0.04	0.10	0.04	0.08	0.05	0.05	0.05	0.06	0.05	0.05	
Shannon (H')	3.38	3.53	3.48	3.41	3.57	3.62	3.01	3.58	3.28	3.42	3.47	3.44	3.27	3.51	3.32	
Diatoms/Site	538	490	523	515	513	550	465	508	492	528	561	550	513	537	530	
Evenness																
Pielou (E1)	0.82	0.85	0.83	0.81	0.84	0.86	0.76	0.83	0.79	0.82	0.84	0.82	0.82	0.82	0.81	
Sheldon (E2)	0.47	0.54	0.49	0.45	0.52	0.54	0.39	0.49	0.41	0.48	0.51	0.48	0.49	0.47	0.45	
Heip (E3)	0.46	0.53	0.48	0.44	0.51	0.54	0.38	0.48	0.40	0.47	0.50	0.47	0.48	0.46	0.44	
Hill's Ratio (E4)	0.69	0.72	0.62	0.53	0.67	0.69	0.52	0.68	0.50	0.62	0.64	0.61	0.65	0.64	0.66	
Hill's Ratio (E5)	0.67	0.71	0.61	0.51	0.66	0.68	0.49	0.67	0.48	0.61	0.63	0.60	0.63	0.63	0.65	

Appendix 4. Richness, Diversity and Evenness for each collection date

9/12/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)		11.37	9.77	9.32	10.35	10.87	10.14	9.67	10.88	11.13	10.30	11.96	10.01	9.40	9.95	10.00
Menhinick (R2)		3.08	2.63	2.53	3.36	3.12	2.77	2.74	3.03	3.16	2.90	3.31	2.75	2.70	2.80	2.75
Diatoms/ Site		562	572	562	329	474	550	495	517	492	501	528	542	479	507	543
Diversity																
# of species		73	63	60	61	68	65	61	69	70	65	76	64	59	63	64
Hill N1		32.19	25.32	33.19	36.19	34.00	35.76	30.66	34.64	32.28	30.16	35.40	31.65	28.71	33.55	28.92
Hill N2		20.32	14.49	24.34	26.24	23.86	24.74	20.49	21.50	19.97	17.31	20.97	20.13	19.73	23.90	18.93
Simpson (λ)		0.05	0.07	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.04	0.05
Shannon (H')		3.47	3.23	3.50	3.59	3.53	3.58	3.42	3.54	3.47	3.41	3.57	3.45	3.36	3.51	3.36
Diatoms/Site		562	572	562	329	474	550	495	517	492	501	528	542	479	507	543
Evenness																
Pielou (E1)		0.81	0.78	0.86	0.87	0.84	0.86	0.83	0.84	0.82	0.82	0.82	0.83	0.82	0.85	0.81
Sheldon (E2)		0.44	0.40	0.55	0.59	0.50	0.55	0.50	0.50	0.46	0.46	0.47	0.49	0.49	0.53	0.45
Heip (E3)		0.43	0.39	0.55	0.59	0.49	0.54	0.49	0.49	0.45	0.46	0.46	0.49	0.48	0.53	0.44
Hill's Ratio (E4)		0.63	0.57	0.73	0.73	0.70	0.69	0.67	0.62	0.62	0.57	0.59	0.64	0.69	0.71	0.65
Hill's Ratio (E5)		0.62	0.55	0.73	0.72	0.69	0.68	0.66	0.61	0.61	0.56	0.58	0.62	0.68	0.70	0.64

Appendix 4. Richness, Diversity and Evenness for each collection date

9/30/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)	9.18	9.22	9.81	11.94	9.87	11.32	12.73	12.23	10.21	11.33	11.51	11.77	10.96	10.40	8.68	
Menhinick (R2)	2.70	2.63	2.77	3.29	2.73	3.03	3.50	3.35	2.83	3.05	3.01	3.14	3.00	2.90	2.45	
Diatoms/ Site	447	485	501	534	533	579	536	542	527	574	619	585	543	517	504	
Diversity																
# of species	57	58	62	76	63	73	81	78	65	73	75	76	70	66	55	
Hill N1	28.45	25.27	30.46	36.16	31.58	30.02	36.89	37.66	31.11	34.85	34.37	34.93	31.62	30.28	25.02	
Hill N2	19.72	13.90	21.61	22.62	19.39	15.79	22.54	24.35	19.40	22.75	18.95	21.44	18.20	19.52	17.57	
Simpson (λ)	0.05	0.07	0.05	0.04	0.05	0.06	0.04	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.06	
Shannon (H')	3.35	3.23	3.42	3.59	3.45	3.40	3.61	3.63	3.44	3.55	3.54	3.55	3.45	3.41	3.22	
Diatoms/Site	447	485	501	534	533	579	536	542	527	574	619	585	543	517	504	
Evenness																
Pielou (E1)	0.83	0.80	0.83	0.83	0.83	0.79	0.82	0.83	0.82	0.83	0.82	0.82	0.81	0.81	0.80	
Sheldon (E2)	0.50	0.44	0.49	0.48	0.50	0.41	0.46	0.48	0.48	0.48	0.46	0.46	0.45	0.46	0.45	
Heip (E3)	0.49	0.43	0.48	0.47	0.49	0.40	0.45	0.48	0.47	0.47	0.45	0.45	0.44	0.45	0.44	
Hill's Ratio (E4)	0.69	0.55	0.71	0.63	0.61	0.53	0.61	0.65	0.62	0.65	0.55	0.61	0.58	0.64	0.70	
Hill's Ratio (E5)	0.68	0.53	0.70	0.61	0.60	0.51	0.60	0.64	0.61	0.64	0.54	0.60	0.56	0.63	0.69	

Appendix 4. Richness, Diversity, and Evenness for each collection date

10/24/1998 collection		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Richness																
Margalef (R1)	8.73	8.46	7.70	11.08	9.55	8.99	9.91	11.16	9.58	10.62	11.70	9.69	10.94	8.49	9.26	
Menhinick (R2)	2.50	2.36	2.37	3.21	2.83	2.63	2.86	2.99	2.57	2.81	2.99	2.66	2.72	2.29	2.58	
Diatoms/ Site	485	524	394	462	435	453	470	581	583	605	661	542	720	578	524	
Diversity																
# of species	55	54	47	69	59	56	62	72	62	69	77	62	73	55	59	
Hill N1	26.46	27.76	28.99	36.31	30.18	26.48	22.84	32.33	28.31	33.82	33.90	26.47	31.31	25.75	26.89	
Hill N2	18.04	20.41	21.83	23.35	20.24	16.74	12.34	19.49	18.63	22.39	19.89	16.82	18.45	16.23	18.06	
Simpson (λ)	0.06	0.05	0.05	0.04	0.05	0.06	0.08	0.05	0.05	0.04	0.05	0.06	0.05	0.06	0.06	
Shannon (H')	3.28	3.32	3.37	3.59	3.41	3.28	3.13	3.48	3.34	3.52	3.52	3.28	3.44	3.25	3.29	
Diatoms/Site	485	524	394	462	435	453	470	581	583	605	661	542	720	578	524	
Evenness																
Pielou (E1)	0.82	0.83	0.87	0.85	0.84	0.81	0.76	0.81	0.81	0.83	0.81	0.79	0.80	0.81	0.81	
Sheldon (E2)	0.48	0.51	0.62	0.53	0.51	0.47	0.37	0.45	0.46	0.49	0.44	0.43	0.43	0.47	0.46	
Heip (E3)	0.47	0.50	0.61	0.52	0.50	0.46	0.36	0.44	0.45	0.48	0.43	0.42	0.42	0.46	0.45	
Hill's Ratio (E4)	0.68	0.74	0.75	0.64	0.67	0.63	0.54	0.60	0.66	0.66	0.59	0.64	0.59	0.63	0.67	
Hill's Ratio (E5)	0.67	0.73	0.74	0.63	0.66	0.62	0.52	0.59	0.65	0.65	0.57	0.62	0.58	0.62	0.66	

Appendix 5. Diversity indices, Hill's N1, N2, Shannon for stations and collections (collections for stations 13-15 started at collection 9)

Hill's N1 diversity																			
Station	Collection dates and corresponding collection numbers																		mean
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
9/18/97	15.5	12.1	24.1	29.2	26.5	19.9	13.2	17.2	18.0	17.5	25.8	27.2	28.0	25.9	29.3	32.2	28.4	26.5	23.1
10/7/97	30.1	36.6	28.7	30.1	29.6	33.0	25.0	34.0	26.4	31.2	28.5	27.4	32.0	33.5	34.0	25.3	25.3	27.8	29.9
10/30/97	6.9	28.3	16.6	33.1	28.1	17.8	18.8	24.7	21.3	25.2	29.7	32.3	31.7	33.2	32.6	33.2	30.5	29.0	26.3
	30.0	28.1	27.2	29.5	28.1	23.2	14.0	18.0	17.6	21.4	24.0	26.2	24.2	30.6	30.3	36.2	36.2	36.3	26.7
	29.5	22.8	24.0	33.0	28.6	24.3	10.9	20.8	23.5	26.5	31.0	36.4	32.3	32.5	35.6	34.0	31.6	30.2	28.2
	24.3	30.1	21.5	36.4	36.7	33.3	24.9	24.9	19.9	32.7	31.3	38.9	27.8	33.4	37.5	35.8	30.0	26.5	30.3
	30.6	18.9	22.0	23.2	21.3	23.2	19.7	19.8	19.8	19.9	21.2	28.6	22.2	27.5	20.4	30.7	36.9	22.8	23.8
	32.7	23.6	26.7	32.2	28.1	31.0	27.2	28.0	23.5	27.7	25.4	34.6	21.8	36.4	36.0	34.6	37.7	32.3	30.0
	28.1	25.3	28.5	32.0	19.7	20.9	21.4	21.9	29.5	30.9	28.1	29.2	31.2	23.9	26.5	32.3	31.1	28.3	27.5
	27.8	15.6	36.8	31.1	26.8	23.9	19.1	17.5	24.4	29.0	27.3	33.0	34.5	30.4	30.6	30.2	34.9	33.8	28.1
	18.6	10.2	28.6	29.7	25.7	21.0	24.2	28.8	28.5	20.5	30.3	34.6	31.5	29.3	32.1	35.4	34.4	33.9	27.6
	27.3	34.1	29.1	29.2	23.7	21.6	20.9	24.2	22.5	36.2	0.0	32.7	31.8	30.0	31.2	31.6	34.9	26.5	27.1
13									28.3	28.0	33.2	37.5	36.0	37.3	26.2	28.7	31.6	31.3	31.8
14									17.0	16.3	25.7	34.6	32.8	35.8	33.5	33.6	30.3	25.8	28.5
15									21.4	22.4	30.8	33.3	26.9	25.8	27.7	28.9	25.0	26.9	26.9
	mean																		
	25.1	23.8	26.2	30.7	26.9	24.4	19.9	23.3	22.8	25.7	26.2	32.4	29.7	31	30.9	32.2	31.9	29.2	

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 1	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa																		
<i>Achnanthes chilidanos</i>																		
<i>A. haukiana</i> var. <i>rostrata</i>			8				5	7				8	14	13	12	13		
<i>Cocconeis placentula</i> var. <i>lineata</i>			5	13		6										13		10
<i>Cyclotella kuetzingiana</i>		6																
<i>C. meneghiniana</i>	6	7	9	10	7	13	6			5	8	8	6					14
<i>Navicula gregaria</i>			5			16	41	15	15	13	17	17	9	13	10		10	
<i>N. minima</i>		6			5								6					
<i>N. odiosa</i>	18	27	7	10	13	12	5	18	17	17	7			5				
<i>N. salinarum</i> var. <i>intermedia</i>						6	8			6	7			6				
<i>N. viridula</i>	6	7	9			6		6										
<i>Nitzschia fonticula</i>	11		5	8														
<i>N. frustrulum</i>												7						
<i>N. frustrulum</i> var. <i>perpusilla</i>	12		10					8	9		9		7	8				
<i>N. microcephala</i>	18	21	7		14	8		12	18	18								

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 2	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa																		
<i>Achnanthes chilidanos</i>		7														11	21	
<i>A. haukiana</i>			7				8		5	6	9			7				
<i>A. lanceolata</i>																		
<i>Actinocyclus normanii</i>										6			5	6				
<i>Cocconeis placentula</i> var. <i>lineata</i>	9	11	9	16	6	15	10	8	5	8	5	20	7	9		17		
<i>Cyclotella meneghiniana</i>	9	9	9	13	12	12	9	9	7	13	12	8	8	12		9		
<i>Navicula gregaria</i>	8		11	5	7		14	10	17	11	14	9	11	6	9			
<i>N. minima</i>					7		6		8				6					
<i>N. odiosa</i>					6	6												
<i>N. peregrina</i>				5														
<i>N. salinarum</i> var. <i>intermedia</i>								5										
<i>N. viridula</i>	9				6													
<i>Nitzschia brevissima</i>						6							6					
<i>N. frustrulum</i>												5						
<i>N. frustrulum</i> var. <i>perpusilla</i>		5	11		6		7	8	7		7		7					
<i>N. microcephala</i>		12																

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 3	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Achnanthes haukiana</i>	12																	
<i>A. haukiana</i> var. <i>rostrata</i>	52	9	34	13	9	16	26	13	7	12	9	18	12	7				
<i>A. lanceolata</i>	9	6					9				13	7	8	6	10			
<i>Amphora perpusilla</i>													5					
<i>Cocconeis placentula</i> var. <i>lineata</i>						5		5			11	9						
<i>C. meneghiniana</i>	6	6	6	7	7	5								5				
<i>Navicula gregaria</i>				10	12	24	12	22	29	22	10		7	10				10
<i>N. minima</i>						6	6	6	9	6								
<i>N. odiosa</i>					6													
<i>N. peregrina</i>						6												
<i>N. viridula</i>	6			5	5									11				
<i>N. viridula</i> var. <i>rostellata</i>														7				
<i>N. frustrulum</i>	12			6	6													
<i>N. frustrulum</i> var. <i>perpusilla</i>		9	6					5					5		14			
<i>N. microcephala</i>		10																

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 4	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa																		
<i>Achnanthes haukiana</i>	12																	
<i>A. haukiana</i> var. <i>rostrata</i>						5												
<i>A. lanceolata</i>	5																	
<i>Bacillaria paradoxa</i>					6													
<i>Cocconeis placentula</i> var. <i>lineata</i>	14		8	9	5	5		7	6	6	5	21	6	10				
<i>Cyclotella meneghiniana</i>	9		13	11	10	11				6	8	11	7	11				
<i>Navicula gregaria</i>	14		13	13	14	22	41	34	33	31	28	10	27	11	19	10	12	13
<i>N. odiosa</i>	6	7	5	8			5	5	6									
<i>N. viridula</i>					6									5				
<i>Nitzschia brevissima</i>				6														
<i>N. frustulum</i> var. <i>perpusilla</i>			7				5											
<i>N. microcephala</i>	10																	

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 5	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Achnanthes haukiana</i>	5																	
<i>A. haukiana</i> var. <i>rostrata</i>	6		7	6	6													
<i>A. lanceolata</i>	6							5										
<i>Actinocyclus normanii</i>													5					
<i>Cocconeis placentula</i> var. <i>lineata</i>		10	11	6				8	7	8	5	13	7	8			15	
<i>Cyclotella meneghiniana</i>	10	19	6	10	8	9		5	7	7	10	9	9	9		10		
<i>Navicula gregaria</i>	10	19	20	15	19	23	45	28	27	24	20	10	17	13	11			12
<i>N. minima</i>		6																
<i>N. odiosa</i>		7			5		11	7	5									
<i>N. salinarum</i> var. <i>intermedia</i>								5										
<i>N. viridula</i>				5	5													
<i>Nitzschia brevissima</i>																	5	
<i>N. frustrulum</i> var. <i>perpusilla</i>	7	5					5											

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 6	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa																		
<i>A. haukiana</i> var. <i>rostrata</i>	13																	
<i>A. lanceolata</i>	11	5	6					7			5		5	5				
<i>Cocconeis placentula</i> var. <i>lineata</i>		6	17	15	6	6		8	6	7	6	9	5	8		11	18	12
<i>Cyclotella meneghiniana</i>	10	7	8	6	7	8				10	7	9	7	7				
<i>Diploneis elliptica</i>				7		5												
<i>Navicula gregaria</i>	14	18	18	9	13	15	27	24	33	17	21	13	23	14	11		12	15
<i>N. odiosa</i>		5			8	7	6	7	7									
<i>Nitzschia brevissima</i>										5								
<i>N. frustrulum</i> var. <i>perpusilla</i>			7					7										

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station	7	Collection dates and corresponding collection numbers																	
		9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa																			
<i>Achnanthes lanceolata</i>	5							6				5		7	6				
<i>Bacillaria paradoxa</i>		7			6	7		6		6			8						
<i>Cocconeis placentula</i> var. <i>lineata</i>			22	14															15
<i>Cyclotella meneghiniana</i>	8		6	6	7	6						6		5	6				
<i>Navicula gregaria</i>	15	31	16	21	22	23	28	33	33	31	30	26	20	31	22	25	14	13	20
<i>N. odiosa</i>	7	10	6		11	10	8	9	9	8	9	11			6	11			
<i>N. viridula</i>				5	5														
<i>Nitzschia brevissima</i>	6								6	5	6	8	10	6	9				
<i>N. frustrulum</i> var. <i>perpusilla</i>								5											

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 8	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	#	#	#	#	#	#	#	#	#
<i>Achnanthes exigua</i>	7																	
<i>A. haukiana</i>	9						7			6				7				
<i>A. haukiana</i> var. <i>rostrata</i>			6		7		7	7				6	8					
<i>A. lanceolata</i>	5			5				7				7	7	6				
<i>Bacillaria paradoxa</i>					5													
<i>Cocconeis placentula</i> var. <i>lineata</i>	11	8	6	6		12					6	5		10				13
<i>Cyclotella meneghiniana</i>	7	6	9	13	10	5		5	6	6	6	7	5	5				
<i>Navicula gregaria</i>	14	17	20	13	12	11	19	20	27	23	26	14	26	15	10	13	10	11
<i>N. minima</i>							5											
<i>N. odiosa</i>	5		6		8	6	7		6		6							
<i>N. salinarum</i> var. <i>intermedia</i>						6												
<i>N. viridula</i>	6			6		7			5									
<i>Nitzschia brevissima</i>								7		5		5						
<i>N. frustrulum</i> var. <i>perpusilla</i>			5															

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 9	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa																		
<i>Achnanthes haukiana</i>			5															
<i>A. haukiana</i> var. <i>rostrata</i>				5	5							6	6					
<i>A. lanceolata</i>	5	7						6			6		5	9				
<i>Bacillaria paradoxa</i>		5																
<i>Cocconeis placentula</i> var. <i>lineata</i>	10	8	7		6	6	7	6	6	7	6	6	6					
<i>Cyclotella meneghiniana</i>	8	7	13	8	10			5	6	6		6	8	8				
<i>Navicula gregaria</i>	15	16	12	16	22	27	27	27	17	20	22	21	17	17	23	13	16	14
<i>N. minima</i>					7													
<i>N. odiosa</i>		7			6	6	7	6	7		5							
<i>N. salinarum</i> var. <i>intermedia</i>						5		6										
<i>N. viridula</i>	7			8	6	5					5		6	5				
<i>Nitzschia brevissima</i>								5			5							
<i>N. frustulum</i> var. <i>perpusilla</i>	5		8		5													

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 10	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Actinocyclus normanii</i>	5																	
<i>Cocconeis placentula</i> var. <i>lineata</i>	16	6	6		6	6				5	6	13	6	10				
<i>Cyclotella meneghiniana</i>	10	8	11	10	10	6	7	7	10	11	9	7	8	12	10	14		
<i>Navicula gregaria</i>	11	13	9	17	17	24	31	29	17	18	19	16	14	11	15	13	11	12
<i>N. odiosa</i>	31				8	6												
<i>N. salinarum</i> var. <i>intermedia</i>	9	6	7		6	7	9	15	14	8	8		9	7		10		
<i>Nitzschia brevissima</i>									5									

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 11	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Actinocyclus normanii</i>									13	14	6		10	8			11	
<i>Cocconeis neominuta</i>		15		7	10													
<i>C. placentula</i> var. <i>lineata</i>	16	10	9	17	6		6	11	8	7	6		8	6				10
<i>Cyclotella meneghiniana</i>	8		15	11	13	6	8	7	11	25	12	8	14	14	10	13	15	12
<i>Navicula gregaria</i>	6		7	8	9	26	21	16	11	7	17	17	8	15	13	10		10
<i>N. odiosa</i>	19	37																
<i>N. peregrina</i>													7					
<i>N. salinarum</i> var. <i>intermedia</i>					7	6	6	7	8			7						
<i>N. viridula</i>	15		9		10	5	5											
<i>N. frustrulum</i> var. <i>perpusilla</i>		12										5						

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 12	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Achnanthes chilidanos</i>								5				6						
<i>A. haukiana</i>													7					
<i>A. lanceolata</i>	5											5	9	6				
<i>Actinocyclus normanii</i>									8									
<i>Cocconeis placentula</i> var. <i>lineata</i>	16	6	13	18	6				6	6		7	10	9				
<i>Cyclotella kuetzingia</i>						5												
<i>C. meneghiniana</i>	7	11	12	6	8		8		7	9		10	12	13	13	13	13	12
<i>Navicula gregaria</i>	11	14	10	10	22	24	27	28	21	15		13		12	14	12	11	13
<i>N. minima</i>							7			5								
<i>N. salinarum</i> var. <i>intermedia</i>				8	8	11	7		11									
<i>N. viridula</i>	5		6		6										6			
<i>N. frustrulum</i> var. <i>perpusilla</i>	7		5															

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 13	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Actinocyclus normanii</i>									5					7	11			
<i>Cocconeis placentula</i> var. <i>lineata</i>									6	8	5	8	7	10				14
<i>Cyclotella meneghiniana</i>									12	11	8	7	9	11	14	11	17	11
<i>Navicula gregaria</i>									21	20	17	11	14	9		9		9
<i>N. salinarum</i> var. <i>intermedia</i>									5			8						
<i>N. viridula</i>															5			

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 14	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Achnanthes haukiana</i> var. <i>rostrata</i>										7								
<i>A. lanceolata</i>										6	6	6		6				
<i>Actinocyclus normanii</i>													6					
<i>Cocconeis placentula</i> var. <i>lineata</i>									5		9	7		7			11	11
<i>Cyclotella meneghiniana</i>									9		12	7	10	12			12	
<i>Navicula gregaria</i>									34	35	13	14	11	10	13	9	8	16
<i>N. odiosa</i>										5								
<i>N. salinarum</i> var. <i>intermedia</i>									5	6		9	11	7				
<i>N. viridula</i>											5							
<i>N. frustrulum</i> var. <i>perpusilla</i>											6							

Appendix 6. Diatoms with relative abundances (percent) equal to or greater than 5% for stations on collection dates one through 18.

station 15	Collection dates and corresponding collection numbers																	
	9/18/97	10/7/97	10/30/97	1/6/98	2/3/98	3/27/98	4/30/98	5/16/98	5/30/98	6/10/98	6/25/98	7/14/98	7/27/98	8/13/98	8/31/98	9/12/98	9/30/98	10/24/98
Taxa	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<i>Achnanthes chilidanos</i>														10	12			10
<i>A. lanceolata</i>									7	6	5	6		5				
<i>Actinocyclus normanii</i>									8	14	8	7	10	10				
<i>Cocconeis placentula</i> var. <i>lineata</i>									6	19	9	14	7	8	10	13		11
<i>Cyclotella meneghiniana</i>									21	4	16	7	13	11	9	8	11	8
<i>Navicula gregaria</i>									9	7	8		6	10				
<i>N. salinarum</i> var. <i>intermedia</i>																		
<i>N. viridula</i>												5						
<i>N. frustrulum</i> var. <i>perpusilla</i>												6						

Appendix 7. Mean heavy metal concentrations, stations 13-15 were collected during 5-30-98 to 10-24-98

Collection	Date	Cadmium concentrations µg/L														
		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	9/18/1997	0.1	1.6	0.0	11.6	0.5	3.1	3.4	3.7	4.3	1.9	0.1	0.0			
2	10/7/1997	0.2	3.0	0.1	11.6	5.5	2.5	4.3	4.9	2.9	0.3	0.1	0.0			
3	10/30/1997	0.1	2.1	0.1	8.2	13.7	4.3	5.3	4.1	3.2	0.4	0.1	0.1			
4	1/6/1998	0.3	0.8	0.1	2.1	1.8	1.0	1.4	2.0	2.9	0.4	0.1	0.0			
5	2/3/1998	0.2	1.7	0.2	5.8	6.8	2.7	2.5	3.2	3.8	0.2	0.1	1.6			
6	3/27/1998	0.2	1.2	0.1	11.0	4.7	3.4	2.4	4.6	3.9	0.4	0.1	0.0			
7	4/30/1998	0.0	2.4	0.1	8.7	10.8	6.7	3.4	6.7	5.1	1.7	0.2	0.0			
8	5/16/1998	1.0	2.9	0.3	10.6	8.5	2.3	3.9	5.0	5.9	1.8	0.2	0.0			
9	5/30/1998	0.2	2.4	0.2	7.6	6.8	6.5	2.8	3.4	4.4	1.5	0.2	0.0	0.1	0.1	0.1
10	6/10/1998	0.2	2.5	0.2	5.7	7.7	4.7	3.4	4.2	4.1	1.2	0.2	0.0	0.1	0.2	0.1
11	6/25/1998	0.3	2.4	0.1	10.2	8.2	2.6	3.8	3.6	6.8	1.7	0.2	0.2	0.0	0.1	0.1
12	7/14/1998	0.2	2.2	0.2	8.4	7.0	3.7	2.2	4.2	5.0	0.7	0.2	0.0	0.1	0.2	0.1
13	7/27/1998	0.2	2.8	0.7	13.5	9.1	4.7	3.1	7.0	3.5	0.7	0.2	0.1	0.1	0.2	0.2
14	8/13/1998	0.1	1.8	0.3	5.6	7.0	2.8	4.0	2.6	3.2	0.9	0.1	0.0	0.1	0.1	0.2
15	8/31/1998	0.1	2.2	0.1	7.6	6.8	3.9	3.4	4.2	3.7	1.3	0.1	0.0	0.1	0.1	0.1
16	9/12/1998	0.1	2.0	0.3	9.2	7.9	3.8	3.6	5.7	4.8	1.4	0.2	0.0	0.1	0.1	0.1
17	9/30/1998	0.2	1.6	0.4	8.5	4.6	4.1	3.1	3.6	4.4	1.3	0.1	0.0	0.1	0.1	0.1
18	10/24/1998	0.2	1.6	0.4	8.5	8.6	4.3	3.6	4.8	4.0	2.6	0.1	0.1	0.1	0.1	0.1

Appendix 7. Mean heavy metal concentrations, stations 13-15 were collected during 5-30-98 to 10-24-98

Collection	Date	nickel concentrations $\mu\text{g/L}$														
		Stations														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	9/18/1997	0.2	1.6	0.2	8.7	1	2	3.2	2.8	4.1	2	1.3	0.7			
2	10/7/1997	0.8	3	0.2	4.2	3.2	1.7	3.3	3.3	2.5	1	1.6	0.8			
3	10/30/1997	0.3	1.9	0.6	3.6	5.3	2.9	3.1	2.7	2.4	1.3	1.1	0.7			
4	1/6/1998	1	2.6	0.4	1.5	1.2	1.6	1.2	1.3	1.7	0.1	0.1	0.8			
5	2/3/1998	0.5	1.5	0.6	2.6	2.8	2.6	1.5	1.6	2.1	0.5	0.7	1.1			
6	3/27/1998	1	1.6	0.5	8.5	2.8	3.5	2.4	3.2	2.1	1.3	1	0.8			
7	4/30/1998	0.1	1.8	0.6	5.4	6.3	6.9	2.9	4	4.3	1.6	1.2	0.8			
8	5/16/1998	1.3	2	0.7	5.7	4.8	3.1	3.2	3.2	3.4	1.6	1.2	0.6			
9	5/30/1998	0.6	2.5	0.7	4.1	3.4	6.4	2.5	2.2	2.5	1.5	1	0.5	1.1	1	1
10	6/10/1998	0.7	1.9	0.7	2.8	3.3	2.4	2.8	2.3	2.5	1.3	1	0.5	1	1	1
11	6/25/1998	0.8	1.8	1	4.1	3.1	2.6	3	2.6	3.1	1.6	1.1	1.1	0.6	1	1
12	7/14/1998	0.8	2.1	0.7	3.7	4	3.3	2.8	2.7	3.1	1.1	1.2	0.6	1.1	1.1	1.1
13	7/27/1998	0.5	2.2	1.1	4.2	4.2	2.5	2.3	2.9	2.6	1.3	1	0.5	0.6	1	1
14	8/13/1998	0.5	1.9	1	2.5	3.7	2.3	3.5	2.8	2.1	1.1	0.7	0.6	0.8	0.8	1.8
15	8/31/1998	0.4	1.7	0.7	3.1	3	2.6	2.4	2.5	2.6	1.2	0.8	0.4	0.8	0.9	0.8
16	9/12/1998	0.8	1.7	0.9	3.4	3.8	2.4	2.5	2.9	3.3	1.6	1.1	0.6	0.8	1	0.8
17	9/30/1998	0.5	1.5	0.8	2.7	3	2.8	2.2	2.2	2.5	1.2	0.8	0.4	0.9	0.7	0.7
18	10/24/1998	0.8	1.8	1	3.5	4.8	4.7	3.5	3	3.3	2	1.3	0.8	1.2	1.2	1.2

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
9/18/1997	1	1	0.07	0.06	0.16	0.13	0.34	0.44	0.06	0.15	0.39
9/18/1997	1	1	0.04	0.02	0.12	0.08	0.16	0.25	0.03	0.10	0.20
9/18/1997	1	1	0.10	0.08	0.19	0.15	0.58	0.47	0.09	0.17	0.52
9/18/1997	1	2	2.04	2.19	0.43	0.38	1.94	2.03	2.11	0.40	1.98
9/18/1997	1	2	1.08	1.10	0.31	0.27	1.16	1.19	1.09	0.29	1.18
9/18/1997	1	2	1.58	1.66	0.37	0.32	1.67	1.70	1.62	0.34	1.68
9/18/1997	1	3	0.06	0.05	0.15	0.11	0.17	0.24	0.06	0.13	0.20
9/18/1997	1	3	0.02	0.00	0.14	0.09	0.06	0.13	0.01	0.11	0.10
9/18/1997	1	3	0.03	0.02	0.09	0.05	0.10	0.37	0.02	0.07	0.24
9/18/1997	1	4	7.14	7.80	0.57	0.50	6.57	6.44	7.47	0.53	6.51
9/18/1997	1	44	7.57	7.90	0.50	0.47	4.86	5.73	7.74	0.48	5.30
9/18/1997	1	4	14.30	15.48	0.71	0.62	9.75	9.42	14.89	0.67	9.58
9/18/1997	1	4	15.64	16.88	0.77	0.67	10.37	9.93	16.26	0.72	10.15
9/18/1997	1	5	0.46	0.46	0.21	0.17	0.84	0.84	0.46	0.19	0.84
9/18/1997	1	5	0.35	0.35	0.18	0.14	0.74	0.75	0.35	0.16	0.75
9/18/1997	1	5	0.77	0.79	0.29	0.24	1.43	1.36	0.78	0.27	1.40
9/18/1997	1	6	1.34	1.40	0.27	0.22	1.66	1.55	1.37	0.24	1.61
9/18/1997	1	66	1.43	1.46	0.21	0.19	1.19	1.51	1.44	0.20	1.35
9/18/1997	1	6	0.72	0.77	0.31	0.25	1.52	1.46	0.74	0.28	1.49
9/18/1997	1	666	0.80	0.83	0.29	0.26	1.16	1.57	0.81	0.27	1.37
9/18/1997	1	6	6.15	6.67	0.38	0.31	3.01	2.78	6.41	0.35	2.89
9/18/1997	1	6666	7.81	8.16	0.37	0.35	2.39	2.97	7.99	0.36	2.68
9/18/1997	1	7	3.04	3.29	0.40	0.32	3.25	2.98	3.16	0.36	3.11
9/18/1997	1	7	3.36	3.66	0.40	0.32	3.30	3.01	3.51	0.36	3.15
9/18/1997	1	7	3.26	3.51	0.41	0.34	3.57	3.21	3.38	0.37	3.39

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
9/18/1997	1	8	3.72	4.05	0.34	0.28	3.12	2.74	3.89	0.31	2.93
9/18/1997	1	8	4.08	4.48	0.36	0.29	3.10	2.75	4.28	0.32	2.93
9/18/1997	1	8	2.97	3.18	0.36	0.29	2.90	2.54	3.08	0.33	2.72
9/18/1997	1	9	2.32	2.52	0.37	0.29	3.01	2.64	2.42	0.33	2.82
9/18/1997	1	9	5.67	6.12	0.51	0.42	5.90	5.02	5.89	0.46	5.46
9/18/1997	1	9	4.38	4.98	0.50	0.40	4.41	3.91	4.68	0.45	4.16
9/18/1997	1	10	1.43	1.52	0.36	0.29	1.85	1.64	1.47	0.32	1.75
9/18/1997	1	1010	1.93	2.03	0.41	0.38	1.51	2.18	1.98	0.39	1.85
9/18/1997	1	10	2.66	2.86	0.43	0.34	2.70	2.38	2.76	0.39	2.54
9/18/1997	1	1010	3.62	3.77	0.48	0.45	2.17	2.92	3.69	0.47	2.55
9/18/1997	1	10	0.68	0.74	0.40	0.30	1.99	1.80	0.71	0.35	1.89
9/18/1997	1	1010	0.95	0.98	0.47	0.43	1.70	2.56	0.96	0.45	2.13
9/18/1997	1	11	0.08	0.07	0.39	0.30	1.60	1.49	0.08	0.35	1.54
9/18/1997	1	11	0.04	0.03	0.27	0.21	1.02	0.92	0.03	0.24	0.97
9/18/1997	1	11	0.09	0.08	0.36	0.28	1.41	1.25	0.09	0.32	1.33
9/18/1997	1	12	0.00	0.00	0.18	0.13	0.50	0.48	0.00	0.15	0.49
9/18/1997	1	12	0.01	0.01	0.21	0.16	0.71	0.65	0.01	0.18	0.68
9/18/1997	1	12	0.02	0.01	0.24	0.18	0.81	0.75	0.02	0.21	0.78
10/7/1997	2	1	0.03	0.11	0.30	0.24		0.62	0.07	0.27	0.62
10/7/1997	2	1	0.33	0.05	0.22	0.18		0.51	0.19	0.20	0.51
10/7/1997	2	1	0.18	0.38	0.42	0.38		1.40	0.28	0.40	1.40
10/7/1997	2	11	0.33	0.33	0.45	0.42	1.44	1.90	0.33	0.44	1.67
10/7/1997	2	2	2.60	2.82	0.57	0.53	1.33	3.01	2.71	0.55	2.17
10/7/1997	2	2	3.24	3.45	0.66	0.63	3.39	4.17	3.34	0.64	3.78
10/7/1997	2	2	2.97	3.08	0.54	0.50	2.59	3.17	3.03	0.52	2.88

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cadmium 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean	Ni mean
10/7/1997	2	3	0.02	0.10	0.21	0.17		0.44	0.06	0.19	0.44
10/7/1997	2	3	0.02	0.02	0.07	0.05	0.17	0.25	0.02	0.06	0.21
10/7/1997	2	3	0.08	0.07	0.08	0.06	0.19	0.27	0.08	0.07	0.23
10/7/1997	2	4	13.64	13.76	0.58	0.56	2.88	4.84	13.70	0.57	3.86
10/7/1997	2	4	10.79	11.00	0.60	0.57	3.14	5.05	10.89	0.58	4.09
10/7/1997	2	4	10.14	10.53	0.53	0.51	4.25	4.78	10.33	0.52	4.52
10/7/1997	2	5	5.54	5.77	0.57	0.54	4.13	4.65	5.66	0.55	4.39
10/7/1997	2	5	3.77	3.87	0.35	0.33	2.43	2.75	3.82	0.34	2.59
10/7/1997	2	5	6.95	7.13	0.36	0.34	2.40	2.72	7.04	0.35	2.56
10/7/1997	2	6	4.01	4.05	0.37	0.35	2.57	2.90	4.03	0.36	2.74
10/7/1997	2	6	2.26	2.26	0.17	0.16	1.38	1.52	2.26	0.16	1.45
10/7/1997	2	6	1.24	1.24	0.11	0.10	0.84	0.94	1.24	0.10	0.89
10/7/1997	2	7	3.23	3.30	0.42	0.40	1.71	2.98	3.27	0.41	2.35
10/7/1997	2	7	1.84	1.87	0.20	0.20	1.53	1.73	1.86	0.20	1.63
10/7/1997	2	7	6.22	6.44	0.67	0.64	2.44	4.46	6.33	0.66	3.45
10/7/1997	2	7	5.43	5.70	0.57	0.55	3.88	4.53	5.56	0.56	4.21
10/7/1997	2	8	5.11	5.33	0.56	0.54	3.58	4.21	5.22	0.55	3.90
10/7/1997	2	8	4.30	4.30	0.34	0.33	1.70	2.66	4.30	0.33	2.18
10/7/1997	2	8	5.44	5.71	0.58	0.55	3.51	4.24	5.58	0.56	3.88
10/7/1997	2	8	4.86	5.04	0.73	0.72	5.24	6.00	4.95	0.72	5.62
10/7/1997	2	9	2.71	2.74	0.39	0.38	2.84	3.21	2.73	0.39	3.03
10/7/1997	2	9	3.42	3.53	0.31	0.30	2.12	2.46	3.47	0.30	2.29
10/7/1997	2	9	2.38	2.44	0.31	0.30	2.09	2.39	2.41	0.30	2.24
10/7/1997	2	10	0.23	0.23	0.25	0.23	0.89	1.19	0.23	0.24	1.04
10/7/1997	2	10	0.25	0.24	0.25	0.24	0.91	1.21	0.24	0.25	1.06

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
10/30/1997	3	6	5.62	5.22	0.43	0.34	2.29	3.58	5.42	0.39	2.94
10/30/1997	3	6	3.64	3.28	0.38	0.30	2.31	3.54	3.46	0.34	2.93
10/30/1997	3	6	4.16	3.71	0.41	0.32	2.23	3.41	3.94	0.36	2.82
10/30/1997	3	7	5.37	4.85	0.41	0.32	2.22	3.45	5.11	0.37	2.84
10/30/1997	3	7	5.87	5.31	0.49	0.39	2.80	4.32	5.59	0.44	3.56
10/30/1997	3	7	5.38	4.86	0.43	0.34	2.34	3.64	5.12	0.39	2.99
10/30/1997	3	8	4.20	3.76	0.46	0.36	2.30	3.57	3.98	0.41	2.94
10/30/1997	3	8	4.17	3.70	0.45	0.36	2.45	3.75	3.94	0.41	3.10
10/30/1997	3	8	4.48	4.01	0.37	0.29	1.72	2.67	4.24	0.33	2.19
10/30/1997	3	9	3.41	3.04	0.37	0.29	1.76	2.73	3.23	0.33	2.24
10/30/1997	3	9	3.33	2.93	0.41	0.32	2.01	3.13	3.13	0.36	2.57
10/30/1997	3	9	3.30	2.92	0.39	0.31	1.83	2.87	3.11	0.35	2.35
10/30/1997	3	10	0.48	0.42	0.34	0.26	0.95	1.51	0.45	0.30	1.23
10/30/1997	3	10	6.61	5.93	0.47	0.37	2.84	4.39	6.27	0.42	3.62
10/30/1997	3	1010	0.35	0.35	0.33	0.29	0.21	1.20	0.35	0.31	0.70
10/30/1997	3	10	0.48	0.43	0.38	0.30	0.99	1.57	0.45	0.34	1.28
10/30/1997	3	10	0.41	0.36	0.47	0.37	1.13	1.83	0.38	0.42	1.48
10/30/1997	3	11	0.07	0.06	0.36	0.28	0.89	1.44	0.06	0.32	1.16
10/30/1997	3	11	0.09	0.07	0.34	0.26	0.82	1.34	0.08	0.30	1.08
10/30/1997	3	11	0.09	0.08	0.35	0.27	0.87	1.43	0.08	0.31	1.15
10/30/1997	3	12	0.05	0.04	0.25	0.19	0.47	0.76	0.05	0.22	0.62
10/30/1997	3	12	0.05	0.08	0.27	0.21	0.51	0.87	0.07	0.24	0.69
10/30/1997	3	12	0.04	0.04	0.24	0.22	0.62	0.96	0.04	0.23	0.79
1/6/1998	4	1	0.41	0.42	0.53	0.40	1.10	1.89	0.41	0.46	1.49
1/6/1998	4	1	0.44	0.45	0.57	0.44	1.21	1.97	0.44	0.50	1.59

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
1/6/1998	4	1	0.05	0.04	0.10	0.07	0.13	0.31	0.04	0.08	0.22			
1/6/1998	4	2	1.32	1.36	0.23	0.17	1.02	1.07	1.34	0.20	1.05			
1/6/1998	4	2	0.56	0.58	0.20	0.15	0.75	0.85	0.57	0.18	0.80			
1/6/1998	4	2	0.51	0.53	0.20	0.15	0.74	0.84	0.52	0.18	0.79			
1/6/1998	4	3	0.11	0.11	0.13	0.09	0.28	0.43	0.11	0.11	0.35			
1/6/1998	4	3	0.22	0.22	0.16	0.12	0.46	0.58	0.22	0.14	0.52			
1/6/1998	4	3	0.06	0.05	0.18	0.13	0.33	0.54	0.06	0.15	0.43			
1/6/1998	4	4	1.46	1.52	0.21	0.16	1.61	1.58	1.49	0.19	1.60			
1/6/1998	4	4	2.64	2.74	0.22	0.17	1.50	1.47	2.69	0.19	1.48			
1/6/1998	4	4	2.09	2.20	0.22	0.17	1.41	1.39	2.14	0.19	1.40			
1/6/1998	4	5	1.96	2.00	0.19	0.17	1.19	1.46	1.98	0.18	1.33			
1/6/1998	4	5	1.37	1.37	0.18	0.13	0.96	0.96	1.37	0.15	0.96			
1/6/1998	4	5	2.08	2.13	0.22	0.17	1.41	1.34	2.10	0.19	1.38			
1/6/1998	4	6	0.19	0.18	0.28	0.22	0.63	0.79	0.19	0.25	0.71			
1/6/1998	4	66	0.17	0.18	0.33	0.31	0.25	1.02	0.18	0.32	0.64			
1/6/1998	4	6	2.00	2.03	0.24	0.19	1.62	1.53	2.01	0.21	1.57			
1/6/1998	4	6	1.56	1.60	0.20	0.16	1.67	1.59	1.58	0.18	1.63			
1/6/1998	4	7	1.31	1.34	0.20	0.15	1.26	1.26	1.32	0.18	1.26			
1/6/1998	4	7	1.40	1.46	0.20	0.16	1.37	1.38	1.43	0.18	1.37			
1/6/1998	4	7	1.34	1.37	0.19	0.14	1.18	1.17	1.36	0.16	1.18			
1/6/1998	4	8	2.27	2.39	0.20	0.16	1.45	1.43	2.33	0.18	1.44			
1/6/1998	4	8	1.39	1.42	0.19	0.15	1.16	1.17	1.40	0.17	1.16			
1/6/1998	4	8	2.16	2.26	0.20	0.15	1.38	1.35	2.21	0.18	1.36			
1/6/1998	4	9	3.46	3.55	0.29	0.27	1.94	2.45	3.50	0.28	2.20			
1/6/1998	4	9	3.27	3.32	0.27	0.25	1.75	2.24	3.29	0.26	2.00			

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
1/6/1998	4	9	1.90	1.98	0.21	0.16	1.34	1.33	1.94	0.18	1.34
1/6/1998	4	10	0.40	0.40	0.19	0.14	0.59	0.70	0.40	0.16	0.65
1/6/1998	4	10	0.42	0.43	0.33	0.28	1.23	1.26	0.42	0.30	1.24
1/6/1998	4	10	0.43	0.46	0.33	0.28	1.22	1.23	0.44	0.31	1.23
1/6/1998	4	11	0.18	0.19	0.32	0.28	1.05	1.06	0.19	0.30	1.06
1/6/1998	4	11	0.20	0.19	0.30	0.25	0.99	1.01	0.20	0.28	1.00
1/6/1998	4	11	0.07	0.06	0.26	0.22	0.87	0.88	0.07	0.24	0.87
1/6/1998	4	12	0.05	0.04	0.29	0.25	0.74	0.77	0.04	0.27	0.75
1/6/1998	4	12	0.05	0.03	0.31	0.27	0.88	0.90	0.04	0.29	0.89
1/6/1998	4	12	0.05	0.04	0.32	0.27	0.88	0.91	0.04	0.30	0.89
2/3/1998	5	1	0.07	0.59	0.11	0.09	0.23	0.28	0.33	0.10	0.25
2/3/1998	5	1	0.15	0.15	0.23	0.21	0.61	0.72	0.15	0.22	0.66
2/3/1998	5	1	0.12	0.11	0.16	0.14	0.40	0.47	0.12	0.15	0.44
2/3/1998	5	2	1.86	1.98	0.35	0.33	1.35	1.57	1.92	0.34	1.46
2/3/1998	5	2	1.22	1.30	0.38	0.36	1.54	1.80	1.26	0.37	1.67
2/3/1998	5	22	1.58	1.63	0.31	0.29	0.61	1.47	1.61	0.30	1.04
2/3/1998	5	2	1.65	1.81	0.42	0.39	1.79	2.12	1.73	0.40	1.95
2/3/1998	5	222	1.74	1.79	0.41	0.39	0.77	1.76	1.77	0.40	1.27
2/3/1998	5	3	0.14	0.14	0.18	0.16	0.50	0.63	0.14	0.17	0.57
2/3/1998	5	3	0.19	0.18	0.21	0.18	0.54	0.65	0.18	0.19	0.59
2/3/1998	5	3	0.32	0.32	0.23	0.20	0.76	0.87	0.32	0.22	0.81
2/3/1998	5	4	5.50	6.01	0.42	0.38	2.80	3.16	5.75	0.40	2.98
2/3/1998	5	44	6.82	6.88	0.29	0.28	1.44	2.42	6.85	0.29	1.93
2/3/1998	5	4	5.26	5.76	0.43	0.39	2.82	3.17	5.51	0.41	2.99
2/3/1998	5	444	5.39	5.50	0.30	0.28	1.57	2.52	5.45	0.29	2.05

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
2/3/1998	5	4	5.23	5.46	0.30	0.32	1.86	2.00	5.34	0.31	1.93
2/3/1998	5	5	6.48	7.08	0.47	0.43	3.57	3.93	6.78	0.45	3.75
2/3/1998	5	5	7.06	7.69	0.42	0.40	2.71	3.22	7.37	0.41	2.96
2/3/1998	5	5	6.21	6.07	0.34	0.32	1.19	2.18	6.14	0.33	1.69
2/3/1998	5	6	3.67	3.65	0.36	0.34	1.46	2.45	3.66	0.35	1.95
2/3/1998	5	6	2.28	2.38	0.56	0.52	2.47	2.67	2.33	0.54	2.57
2/3/1998	5	6	1.96	2.07	0.39	0.35	3.14	3.37	2.01	0.37	3.25
2/3/1998	5	7	1.62	1.65	0.21	0.20	0.85	1.49	1.63	0.21	1.17
2/3/1998	5	7	3.11	3.22	0.34	0.32	1.22	2.23	3.16	0.33	1.73
2/3/1998	5	7	2.83	2.87	0.31	0.29	1.17	2.09	2.85	0.30	1.63
2/3/1998	5	8	2.54	2.57	0.29	0.28	0.88	1.86	2.55	0.28	1.37
2/3/1998	5	8	4.30	4.30	0.34	0.33	1.70	2.66	4.30	0.33	2.18
2/3/1998	5	8	2.69	2.73	0.29	0.27	0.80	1.78	2.71	0.28	1.29
2/3/1998	5	9	7.60	8.11	0.65	0.60	3.13	4.74	7.86	0.62	3.94
2/3/1998	5	99	2.41	2.44	0.38	0.36	1.60	2.70	2.43	0.37	2.15
2/3/1998	5	9	2.78	2.82	0.35	0.33	2.24	2.78	2.80	0.34	2.51
2/3/1998	5	999	3.15	3.19	0.31	0.30	1.06	2.05	3.17	0.30	1.56
2/3/1998	5	9	3.87	4.00	0.39	0.36	1.62	2.75	3.94	0.38	2.19
2/3/1998	5	9999	2.40	2.42	0.34	0.32	1.14	2.20	2.41	0.33	1.67
2/3/1998	5	10	0.16	0.25	0.27	0.25	0.07	0.93	0.21	0.26	0.50
2/3/1998	5	10	0.19	0.26	0.28	0.26	0.05	0.96	0.22	0.27	0.51
2/3/1998	5	10	0.19	0.27	0.29	0.27	0.07	0.97	0.23	0.28	0.52
2/3/1998	5	11	0.06	0.06	0.18	0.17	0.57	0.84	0.06	0.18	0.70
2/3/1998	5	11	0.04	0.05	0.24	0.23	0.64	0.86	0.04	0.23	0.75
2/3/1998	5	11	0.06	0.07	0.15	0.13	0.49	0.53	0.06	0.14	0.51

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cadmium 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean	Ni mean
2/3/1998	5	12	0.02	0.18	0.21	0.20	0.70	1.06	0.10	0.20	0.88
2/3/1998	5	12	0.09	0.08	0.32	0.30	0.98	1.27	0.09	0.31	1.13
2/3/1998	5	12	4.46	4.69	0.34	0.31	1.26	2.24	4.58	0.32	1.75
3/27/1998	6	1	0.21	0.21	0.33	0.28	0.96	1.08	0.21	0.30	1.02
3/27/1998	6	1	0.19	0.19	0.27	0.23	0.82	0.91	0.19	0.25	0.87
3/27/1998	6	1	0.19	0.19	0.31	0.26	0.93	1.04	0.19	0.29	0.98
3/27/1998	6	2	0.81	0.85	0.37	0.32	1.42	1.55	0.83	0.35	1.49
3/27/1998	6	2	1.45	1.55	0.37	0.33	1.62	1.75	1.50	0.35	1.68
3/27/1998	6	2	1.27	1.35	0.38	0.33	1.61	1.72	1.31	0.35	1.66
3/27/1998	6	3	0.10	0.09	0.20	0.16	0.57	0.62	0.10	0.18	0.60
3/27/1998	6	3	0.21	0.21	0.16	0.12	0.42	0.46	0.21	0.14	0.44
3/27/1998	6	3	0.09	0.08	0.19	0.15	0.49	0.53	0.09	0.17	0.51
3/27/1998	6	4	3.89	4.00	0.39	0.37	2.39	2.99	3.95	0.38	2.69
3/27/1998	6	4	5.81	6.35	0.63	0.57	8.52	8.66	6.08	0.60	8.59
3/27/1998	6	44	0.18	0.18	0.34	0.31	0.25	1.04	0.18	0.32	0.64
3/27/1998	6	4	26.41	27.85	1.19	1.11	21.94	21.87	27.13	1.15	21.90
3/27/1998	6	444	26.66	27.78	1.18	1.14	17.80	20.50	27.22	1.16	19.15
3/27/1998	6	444	1.67	1.67	0.12	0.11	1.96	2.13	1.67	0.11	2.05
3/27/1998	6	5	2.67	2.77	0.33	0.28	2.29	2.29	2.72	0.30	2.29
3/27/1998	6	55	2.88	2.90	0.29	0.27	2.10	2.52	2.89	0.28	2.31
3/27/1998	6	5	7.02	7.47	0.45	0.39	3.82	3.82	7.24	0.42	3.82
3/27/1998	6	555	6.99	7.24	0.42	0.39	2.46	3.58	7.11	0.40	3.02
3/27/1998	6	5	3.90	4.17	0.38	0.33	2.41	2.44	4.03	0.36	2.43
3/27/1998	6	5555	4.16	4.37	0.35	0.33	2.13	2.57	4.27	0.34	2.35
3/27/1998	6	6	3.73	4.09	0.43	0.38	3.88	3.92	3.91	0.40	3.90

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean	Co mean	Ni mean
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm			
3/27/1998	6	6	2.75	2.91	0.43	0.38	3.90	3.89	2.83	0.40	3.90
3/27/1998	6	6	3.25	3.41	0.42	0.36	2.66	2.65	3.33	0.39	2.65
3/27/1998	6	7	2.09	2.24	0.39	0.34	2.57	2.60	2.17	0.36	2.59
3/27/1998	6	7	2.30	2.43	0.36	0.31	2.35	2.35	2.37	0.33	2.35
3/27/1998	6	7	2.70	2.52	0.37	0.32	2.56	2.58	2.61	0.35	2.57
3/27/1998	6	8	6.60	7.22	0.38	0.33	2.60	2.59	6.91	0.36	2.59
3/27/1998	6	8	5.35	5.74	0.37	0.32	2.59	2.56	5.55	0.34	2.57
3/27/1998	6	8	2.80	2.96	0.51	0.45	4.55	4.49	2.88	0.48	4.52
3/27/1998	6	88	3.01	3.14	0.55	0.52	3.39	4.76	3.07	0.53	4.08
3/27/1998	6	9	4.51	4.86	0.49	0.43	4.17	4.13	4.69	0.46	4.15
3/27/1998	6	99	4.93	5.19	0.52	0.49	2.96	4.35	5.06	0.51	3.66
3/27/1998	6	9	3.52	3.66	0.43	0.37	3.53	3.45	3.59	0.40	3.49
3/27/1998	6	9	2.40	2.51	0.36	0.31	2.33	2.30	2.46	0.34	2.32
3/27/1998	6	10	0.40	0.42	0.31	0.33	1.30	1.32	0.41	0.32	1.31
3/27/1998	6	10	0.42	0.43	0.33	0.28	1.23	1.26	0.42	0.30	1.24
3/27/1998	6	10	0.46	0.46	0.33	0.28	1.22	1.23	0.46	0.31	1.23
3/27/1998	6	11	0.12	0.11	0.32	0.28	1.05	1.06	0.12	0.30	1.06
3/27/1998	6	11	0.10	0.09	0.30	0.26	0.99	1.01	0.10	0.28	1.00
3/27/1998	6	11	0.07	0.06	0.26	0.22	0.87	0.88	0.07	0.24	0.87
3/27/1998	6	12	0.05	0.04	0.29	0.25	0.74	0.77	0.04	0.27	0.75
3/27/1998	6	12	0.05	0.03	0.31	0.27	0.88	0.90	0.04	0.29	0.89
3/27/1998	6	12	0.05	0.04	0.32	0.27	0.88	0.91	0.04	0.30	0.89
4/30/1998	7	1	0.03	0.02	0.09	0.06	0.11	0.17	0.02	0.08	0.14
4/30/1998	7	1	0.03	0.02	0.00	0.00	0.01	0.02	0.03	0.00	0.02
4/30/1998	7	1	0.04	0.03	0.10	0.09	0.11	0.17	0.03	0.09	0.14

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
4/30/1998	7	2	1.56	1.64	0.39	0.36	1.56	2.02	1.60	0.37	1.79
4/30/1998	7	2	2.98	3.14	0.44	0.42	2.19	2.79	3.06	0.43	2.49
4/30/1998	7	22	2.77	2.90	0.35	0.33	1.42	2.34	2.84	0.34	1.88
4/30/1998	7	2	1.96	2.07	0.44	0.41	1.61	2.07	2.02	0.42	1.84
4/30/1998	7	3	0.07	0.06	0.34	0.31	0.68	0.91	0.06	0.32	0.79
4/30/1998	7	3	0.08	0.07	0.31	0.30	0.52	0.61	0.07	0.31	0.57
4/30/1998	7	3	0.10	0.08	0.20	0.17	0.31	0.43	0.09	0.18	0.37
4/30/1998	7	4	7.24	8.03	0.75	0.73	3.89	5.20	7.64	0.74	4.54
4/30/1998	7	4	5.54	5.95	0.52	0.49	2.71	3.59	5.74	0.51	3.15
4/30/1998	7	444	7.96	8.30	0.67	0.64	4.03	5.01	8.13	0.66	4.52
4/30/1998	7	4	10.80	11.49	0.72	0.70	4.64	6.11	11.15	0.71	5.38
4/30/1998	7	4	10.44	11.06	0.74	0.72	6.75	8.87	10.75	0.73	7.81
4/30/1998	7	5	13.03	13.73	0.84	0.83	8.17	10.74	13.38	0.83	9.45
4/30/1998	7	55	12.53	13.21	0.73	0.70	7.28	9.11	12.87	0.71	8.20
4/30/1998	7	5	8.62	9.15	0.64	0.61	4.03	5.38	8.88	0.62	4.71
4/30/1998	7	5	7.64	8.11	0.64	0.62	4.12	5.45	7.87	0.63	4.78
4/30/1998	7	6	3.42	3.52	0.53	0.51	3.59	4.77	3.47	0.52	4.18
4/30/1998	7	66	3.36	3.43	0.42	0.40	3.66	4.35	3.39	0.41	4.01
4/30/1998	7	6	13.14	13.88	0.95	0.95	9.81	13.23	13.51	0.95	11.52
4/30/1998	7	666	12.14	12.77	0.80	0.76	8.54	10.50	12.45	0.78	9.52
4/30/1998	7	6	3.78	3.91	0.58	0.57	4.20	5.67	3.85	0.57	4.94
4/30/1998		6666	3.59	3.65	0.44	0.43	4.11	4.77	3.62	0.43	4.44
4/30/1998	7	7	3.16	3.34	0.52	0.50	2.68	3.66	3.25	0.51	3.17
4/30/1998	7	7	3.55	3.70	0.46	0.44	2.30	3.12	3.62	0.45	2.71
4/30/1998	7	7	3.19	3.36	0.49	0.47	2.53	3.46	3.27	0.48	3.00

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cadmium 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean	Ni mean
4/30/1998	7	8	6.38	6.81	0.55	0.53	3.31	4.51	6.60	0.54	3.91
4/30/1998	7	8	5.90	6.27	0.56	0.54	3.54	4.79	6.09	0.55	4.16
4/30/1998	7	8	7.11	7.51	0.52	0.50	3.34	4.52	7.31	0.51	3.93
4/30/1998	7	9	5.86	6.31	0.62	0.60	3.64	5.04	6.09	0.61	4.34
4/30/1998	7	9	4.37	4.63	0.59	0.57	3.61	4.99	4.50	0.58	4.30
4/30/1998	7	9	4.52	4.76	0.60	0.58	3.62	4.99	4.64	0.59	4.30
4/30/1998	7	10	0.90	0.94	0.37	0.35	1.10	1.58	0.92	0.36	1.34
4/30/1998	7	10	2.02	2.13	0.41	0.39	1.50	2.09	2.08	0.40	1.79
4/30/1998	7	1010	1.85	1.93	0.33	0.30	0.73	1.70	1.89	0.31	1.22
4/30/1998	7	10	1.85	1.94	0.46	0.44	1.43	2.00	1.89	0.45	1.72
4/30/1998	7	11	0.16	0.15	0.38	0.36	0.94	1.33	0.15	0.37	1.14
4/30/1998	7	11	0.20	0.19	0.31	0.28	0.77	1.19	0.19	0.29	0.98
4/30/1998	7	11	0.20	0.19	0.41	0.39	1.08	1.55	0.19	0.40	1.32
4/30/1998	7	12	0.06	0.04	0.38	0.36	0.73	1.06	0.05	0.37	0.89
4/30/1998	7	12	0.05	0.04	0.36	0.34	0.70	1.02	0.05	0.35	0.86
4/30/1998	7	12	0.06	0.04	0.37	0.35	0.71	1.03	0.05	0.36	0.87
5/16/1998	8	1	0.27	0.27	0.35	0.33	0.85	0.94	0.27	0.34	0.90
5/16/1998	8	11	0.20	0.19	0.31	0.28	0.77	1.09	0.19	0.29	0.93
5/16/1998	8	1	2.68	2.85	0.40	0.38	2.29	2.48	2.76	0.39	2.38
5/16/1998	8	111	2.61	2.68	0.36	0.34	2.05	2.39	2.64	0.35	2.22
5/16/1998	8	1	0.23	0.22	0.33	0.30	0.85	0.92	0.22	0.32	0.89
5/16/1998	8	1111	0.14	0.13	0.27	0.23	0.73	1.09	0.13	0.25	0.91
5/16/1998	8	2	2.41	2.59	0.52	0.50	1.95	2.10	2.50	0.51	2.03
5/16/1998	8	2	3.49	3.77	0.44	0.42	1.76	1.88	3.63	0.43	1.82
5/16/1998	8	2	2.36	2.50	0.42	0.40	1.95	2.08	2.43	0.41	2.02

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean.		Co mean		Ni mean
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm					
5/16/1998	8	3	0.32	0.32	0.25	0.22	0.75	0.81	0.32	0.23			0.78
5/16/1998	8	33	0.14	0.14	0.18	0.16	0.53	0.72	0.14	0.17			0.63
5/16/1998	8	3	0.17	0.17	0.21	0.19	0.54	0.59	0.17	0.20			0.57
5/16/1998	8	333	0.36	0.35	0.24	0.20	0.82	1.11	0.35	0.22			0.96
5/16/1998	8	3	0.37	0.36	0.25	0.22	0.86	0.93	0.36	0.24			0.89
5/16/1998	8	4	12.95	14.12	0.70	0.68	7.25	7.88	13.53	0.69			7.57
5/16/1998	8	44	13.04	13.60	0.66	0.63	6.87	7.30	13.32	0.65			7.09
5/16/1998	8	4	10.95	11.83	0.61	0.59	5.69	6.14	11.39	0.60			5.91
5/16/1998	8	444	11.16	11.61	0.59	0.55	5.49	5.93	11.38	0.57			5.71
5/16/1998	8	4	8.07	8.72	0.49	0.47	3.66	3.93	8.39	0.48			3.80
5/16/1998	8	4444	8.36	8.68	0.48	0.45	3.58	4.00	8.52	0.46			3.79
5/16/1998	8	5	7.84	8.43	0.57	0.55	3.83	4.12	8.13	0.56			3.98
5/16/1998	8	5	7.07	7.74	0.60	0.58	4.37	4.69	7.40	0.59			4.53
5/16/1998	8	5	9.24	10.42	0.74	0.72	5.82	6.35	9.83	0.73			6.08
5/16/1998	8	6	2.58	2.78	0.45	0.44	2.99	3.20	2.68	0.44			3.10
5/16/1998	8	6	2.95	3.25	0.51	0.49	3.79	4.06	3.10	0.50			3.92
5/16/1998	8	6	1.21	1.31	0.42	0.40	2.15	2.31	1.26	0.41			2.23
5/16/1998	8	7	3.89	4.28	0.50	0.48	3.08	3.29	4.08	0.49			3.19
5/16/1998	8	7	3.97	4.02	0.44	0.41	2.90	3.60	4.00	0.43			3.25
5/16/1998	8	7											
5/16/1998	8	8											
5/16/1998	8	8											
5/16/1998	8	8											
5/16/1998	8	8											
5/16/1998	8	8											
5/16/1998	8	9	4.17	4.54	0.46	0.44	2.74	2.90	4.36	0.45			2.82
5/16/1998	8	9	4.04	4.41	0.51	0.49	3.29	3.49	4.23	0.50			3.39

Appendix 8. Cadmium, nickel and cobalt ICP results in µg/L. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
5/16/1998	8	9	8.66	9.68	0.73	0.71	4.64	50.74	9.17	0.72	27.69
5/16/1998	8	10	1.90	2.05	0.43	0.41	1.55	1.61	1.97	0.42	1.58
5/16/1998	8	10	1.68	1.79	0.43	0.41	1.50	1.55	1.74	0.42	1.52
5/16/1998	8	10	1.73	1.87	0.45	0.43	1.71	1.78	1.80	0.44	1.75
5/16/1998	8	11	0.19	0.18	0.38	0.36	1.13	1.15	0.18	0.37	1.14
5/16/1998	8	11	0.20	0.19	0.42	0.40	1.22	1.25	0.19	0.41	1.23
5/16/1998	8	11	0.22	0.21	0.40	0.38	1.19	1.22	0.21	0.39	1.21
5/16/1998	8	12	0.04	0.03	0.25	0.24	0.52	0.55	0.03	0.24	0.53
5/16/1998	8	12	0.05	0.04	0.30	0.28	0.60	0.63	0.04	0.29	0.61
5/16/1998	8	12	0.06	0.04	0.30	0.28	0.60	0.62	0.05	0.29	0.61
5/30/1998	9	1	0.11	0.11	0.19	0.17	0.42	0.61	0.11	0.18	0.52
5/30/1998	9	1	0.13	0.12	0.18	0.16	0.45	0.65	0.12	0.17	0.55
5/30/1998	9	1	0.22	0.22	0.33	0.30	0.69	1.00	0.22	0.32	0.84
5/30/1998	9	2	2.76	2.95	0.53	0.48	2.46	3.40	2.85	0.50	2.93
5/30/1998	9	2	1.87	1.92	0.38	0.34	1.73	2.37	1.90	0.36	2.05
5/30/1998	9	2	2.29	2.35	0.42	0.37	1.62	2.27	2.32	0.40	1.95
5/30/1998	9	3	0.23	0.22	0.22	0.19	0.57	0.84	0.23	0.21	0.70
5/30/1998	9	3	0.18	0.17	0.25	0.21	0.64	0.94	0.18	0.23	0.79
5/30/1998	9	3	0.23	0.21	0.25	0.21	0.60	0.88	0.22	0.23	0.74
5/30/1998	9	4	8.46	8.26	0.44	0.37	2.85	3.92	8.36	0.40	3.38
5/30/1998	9	44	8.89	9.34	0.45	0.41	2.38	3.68	9.11	0.43	3.03
5/30/1998	9	4	7.21	6.83	0.53	0.46	4.81	6.52	7.02	0.50	5.66
5/30/1998	9	4	6.15	5.92	0.47	0.40	2.94	4.06	6.03	0.43	3.50
5/30/1998	9	5	6.51	6.23	0.44	0.37	2.59	3.58	6.37	0.41	3.08
5/30/1998	9	5	5.12	4.84	0.39	0.32	2.13	3.02	4.98	0.36	2.58

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt	cobalt	nickel	nickel	Cd mean	Co mean	Ni mean
			214.440 nm	228.802 nm							
5/30/1998	9	5	9.32	8.63	0.52	0.43	3.66	5.09	8.98	0.47	4.37
5/30/1998	9	6	8.61	7.95	0.59	0.49	5.33	7.47	8.28	0.54	6.40
5/30/1998	9	6	6.72	6.29	0.62	0.51	5.29	7.48	6.50	0.57	6.38
5/30/1998	9	6	4.82	4.57	0.65	0.54	5.27	7.52	4.70	0.59	6.40
5/30/1998	9	7	2.95	2.67	0.39	0.31	2.11	3.03	2.81	0.35	2.57
5/30/1998	9	7	3.27	2.97	0.42	0.34	2.19	3.17	3.12	0.38	2.68
5/30/1998	9	7	2.62	2.35	0.37	0.30	1.90	2.73	2.49	0.33	2.31
5/30/1998	9	8	2.19	1.89	0.17	0.13	0.96	1.36	2.04	0.15	1.16
5/30/1998	9	8	4.90	4.42	0.43	0.34	2.39	3.45	4.66	0.39	2.92
5/30/1998	9	88	4.27	4.46	0.37	0.34	1.73	2.71	4.36	0.35	2.22
5/30/1998	9	8	2.82	2.56	0.44	0.35	2.87	4.19	2.69	0.39	3.53
5/30/1998	9	9	4.82	4.36	0.43	0.34	2.37	3.48	4.59	0.39	2.92
5/30/1998	9	9	4.83	4.49	0.38	0.30	1.92	2.89	4.66	0.34	2.40
5/30/1998	9	9	4.29	3.87	0.36	0.28	1.86	2.76	4.08	0.32	2.31
5/30/1998	9	10	1.89	1.68	0.34	0.27	1.15	1.68	1.78	0.31	1.41
5/30/1998	9	10	1.60	1.42	0.40	0.31	1.24	1.89	1.51	0.36	1.57
5/30/1998	9	10	1.39	1.24	0.40	0.32	1.19	1.82	1.31	0.36	1.51
5/30/1998	9	11	0.17	0.14	0.34	0.26	0.86	1.33	0.15	0.30	1.09
5/30/1998	9	11	0.18	0.16	0.30	0.24	0.79	1.22	0.17	0.27	1.00
5/30/1998	9	11	0.16	0.14	0.32	0.25	0.82	1.29	0.15	0.28	1.06
5/30/1998	9	12	0.05	0.04	0.23	0.18	0.41	0.64	0.04	0.21	0.53
5/30/1998	9	12	0.04	0.03	0.24	0.18	0.42	0.69	0.03	0.21	0.56
5/30/1998	9	12	0.04	0.03	0.21	0.16	0.37	0.58	0.04	0.19	0.47
5/30/1998	9	13	0.13	0.11	0.33	0.26	0.80	1.25	0.12	0.30	1.03
5/30/1998	9	13	0.14	0.12	0.33	0.26	0.79	1.25	0.13	0.30	1.02

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
5/30/1998	9	13	0.15	0.14	0.38	0.30	0.93	1.52	0.14	0.34	1.22			
5/30/1998	9	14	0.12	0.10	0.36	0.28	0.89	1.40	0.11	0.32	1.15			
5/30/1998	9	14	0.12	0.10	0.31	0.24	0.75	1.15	0.11	0.27	0.95			
5/30/1998	9	14	0.16	0.14	0.31	0.24	0.75	1.17	0.15	0.27	0.96			
5/30/1998	9	15	0.09	0.08	0.38	0.30	0.85	1.39	0.08	0.34	1.12			
5/30/1998	9	15	0.10	0.09	0.38	0.30	0.83	1.37	0.09	0.34	1.10			
5/30/1998	9	15	0.09	0.07	0.36	0.29	0.75	1.19	0.08	0.33	0.97			
6/10/1998	10	1	0.15	0.15	0.22	0.19	0.51	0.71	0.15	0.21	0.61			
6/10/1998	10	1	0.08	0.07	0.17	0.14	0.29	0.41	0.08	0.16	0.35			
6/10/1998	10	1	0.20	0.20	0.26	0.24	0.65	0.89	0.20	0.25	0.77			
6/10/1998	10	1	0.21	0.21	0.27	0.24	0.63	0.87	0.21	0.26	0.75			
6/10/1998	10	2	2.63	2.80	0.42	0.40	1.45	1.90	2.71	0.41	1.67			
6/10/1998	10	2	2.36	2.53	0.46	0.44	1.96	2.60	2.45	0.45	2.28			
6/10/1998	10	2	2.15	2.26	0.41	0.39	1.68	2.20	2.21	0.40	1.94			
6/10/1998	10	3	0.23	0.22	0.26	0.23	0.62	0.85	0.22	0.24	0.73			
6/10/1998	10	3	0.19	0.18	0.24	0.21	0.55	0.75	0.19	0.23	0.65			
6/10/1998	10	3	0.18	0.17	0.25	0.22	0.56	0.74	0.17	0.24	0.65			
6/10/1998	10	4	6.17	6.59	0.49	0.47	2.64	3.49	6.38	0.48	3.06			
6/10/1998	10	4	5.74	6.10	0.44	0.43	2.35	3.08	5.92	0.44	2.71			
6/10/1998	10	4	4.75	5.14	0.47	0.45	2.37	3.13	4.94	0.46	2.75			
6/10/1998	10	5	8.06	8.70	0.56	0.55	3.01	3.98	8.38	0.55	3.49			
6/10/1998	10	5	7.47	8.02	0.54	0.53	3.08	4.03	7.74	0.54	3.56			
6/10/1998	10	5	6.82	7.31	0.48	0.46	2.44	3.17	7.06	0.47	2.81			
6/10/1998	10	6	2.40	2.50	0.33	0.32	1.47	1.92	2.45	0.32	1.70			
6/10/1998	10	6	3.10	3.32	0.43	0.41	1.93	2.53	3.21	0.42	2.23			

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
6/10/1998	10	6	6.70	7.12	0.52	0.51	2.74	3.58	6.91	0.51			3.16	
6/10/1998	10	66	5.99	6.22	0.44	0.41	2.06	3.20	6.10	0.42			2.63	
6/10/1998	10	7	3.28	3.53	0.50	0.49	2.58	3.38	3.40	0.50			2.98	
6/10/1998	10	7	3.10	3.34	0.46	0.45	2.44	3.20	3.22	0.46			2.82	
6/10/1998	10	7	3.31	3.55	0.43	0.41	2.12	2.78	3.43	0.42			2.45	
6/10/1998	10	8	4.42	4.72	0.41	0.39	1.86	2.42	4.57	0.40			2.14	
6/10/1998	10	8	3.86	4.07	0.42	0.40	2.07	2.67	3.96	0.41			2.37	
6/10/1998	10	8	3.90	4.23	0.45	0.44	2.20	2.85	4.06	0.45			2.52	
6/10/1998	10	9	4.56	4.94	0.45	0.44	2.41	3.10	4.75	0.44			2.75	
6/10/1998	10	9	3.70	3.99	0.45	0.44	2.13	2.75	3.85	0.44			2.44	
6/10/1998	10	9	3.52	3.75	0.39	0.38	2.16	2.77	3.64	0.38			2.47	
6/10/1998	10	10	1.34	1.42	0.39	0.38	1.14	1.49	1.38	0.38			1.31	
6/10/1998	10	10	1.40	1.48	0.39	0.38	1.12	1.47	1.44	0.39			1.29	
6/10/1998	10	10	0.71	0.74	0.39	0.38	1.09	1.41	0.73	0.38			1.25	
6/10/1998	10	11	0.18	0.17	0.35	0.34	0.88	1.13	0.18	0.35			1.01	
6/10/1998	10	11	0.20	0.20	0.36	0.34	0.91	1.19	0.20	0.35			1.05	
6/10/1998	10	11	0.17	0.17	0.35	0.34	0.88	1.14	0.17	0.35			1.01	
6/10/1998	10	12	0.04	0.03	0.22	0.21	0.39	0.52	0.04	0.22			0.45	
6/10/1998	10	12	0.04	0.04	0.23	0.23	0.39	0.56	0.04	0.23			0.47	
6/10/1998	10	12	0.03	0.03	0.24	0.22	0.41	0.55	0.03	0.23			0.48	
6/10/1998	10	13	0.17	0.16	0.38	0.36	0.92	1.20	0.16	0.37			1.06	
6/10/1998	10	13	0.11	0.10	0.35	0.33	0.80	1.05	0.11	0.34			0.93	
6/10/1998	10	13	0.08	0.07	0.37	0.36	0.93	1.23	0.07	0.37			1.08	
6/10/1998	10	14	0.18	0.18	0.34	0.33	0.83	1.08	0.18	0.34			0.96	
6/10/1998	10	14	0.14	0.14	0.36	0.35	0.86	1.12	0.14	0.35			0.99	

Appendix 8. Cadmium, nickel and cobalt ICP results in µg/L. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
6/10/1998	10	14	0.18	0.18	0.40	0.39	0.98	1.26	0.18	0.40	1.12
6/10/1998	10	15	0.10	0.09	0.39	0.37	0.84	1.11	0.10	0.38	0.98
6/10/1998	10	15	0.11	0.10	0.39	0.38	0.84	1.10	0.11	0.39	0.97
6/10/1998	10	15	0.11	0.10	0.42	0.41	0.89	1.18	0.10	0.41	1.03
6/25/1998	11	1	0.21	0.21	0.25	0.23	0.64	0.86	0.21	0.24	0.75
6/25/1998	11	1	0.26	0.26	0.24	0.20	0.59	0.80	0.26	0.22	0.70
6/25/1998	11	1	0.48	0.49	0.31	0.28	0.86	1.10	0.49	0.30	0.98
6/25/1998	11	2	2.54	2.62	0.42	0.39	1.77	2.32	2.58	0.41	2.05
6/25/1998	11	2	2.48	2.60	0.46	0.44	1.66	2.04	2.54	0.45	1.85
6/25/1998	11	2	2.03	2.12	0.44	0.42	1.52	1.86	2.08	0.43	1.69
6/25/1998	11	3	0.25	0.24	0.33	0.29	0.80	1.04	0.24	0.31	0.92
6/25/1998	11	3	0.12	0.10	0.36	0.33	0.87	1.14	0.11	0.34	1.00
6/25/1998	11	3	0.05	0.04	0.35	0.32	0.80	1.06	0.04	0.33	0.93
6/25/1998	11	4	9.90	10.56	0.56	0.54	3.48	4.24	10.23	0.55	3.86
6/25/1998	11	4	11.00	11.66	0.58	0.55	3.95	4.76	11.33	0.56	4.35
6/25/1998	11	4	8.87	9.45	0.56	0.53	3.76	4.55	9.16	0.54	4.16
6/25/1998	11	5	8.70	8.84	0.41	0.39	2.81	3.41	8.77	0.40	3.11
6/25/1998	11	5	5.84	6.14	0.43	0.41	2.44	2.97	5.99	0.42	2.71
6/25/1998	11	5	9.64	10.15	0.54	0.51	3.03	3.68	9.90	0.52	3.35
6/25/1998	11	6	1.28	1.29	0.24	0.22	1.05	1.25	1.29	0.23	1.15
6/25/1998	11	6	3.56	3.72	0.52	0.50	3.51	4.23	3.64	0.51	3.87
6/25/1998	11	6	2.80	2.79	0.34	0.32	2.45	2.90	2.80	0.33	2.68
6/25/1998	11	7	4.21	4.52	0.56	0.53	3.03	3.72	4.37	0.54	3.38
6/25/1998	11	7	4.17	4.11	0.47	0.44	3.02	3.77	4.14	0.46	3.40
6/25/1998	11	7	2.85	2.98	0.40	0.38	2.11	2.56	2.91	0.39	2.33

Appendix 8. Cadmium, nickel and cobalt ICP results in µg/L. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
6/25/1998	11	8	3.60	3.78	0.44	0.42	2.23	2.73	3.69	0.43	2.48
6/25/1998	11	8	3.34	3.51	0.42	0.40	2.20	2.69	3.43	0.41	2.45
6/25/1998	11	8	3.45	3.69	0.53	0.51	2.63	3.25	3.57	0.52	2.94
6/25/1998	11	9	9.54	10.25	0.67	0.65	4.55	5.55	9.90	0.66	5.05
6/25/1998	11	99	9.31	9.46	0.56	0.54	4.56	5.37	9.39	0.55	4.97
6/25/1998	11	9	3.50	3.75	0.47	0.45	2.60	3.22	3.62	0.46	2.91
6/25/1998	11	9	5.25	5.57	0.50	0.48	2.66	3.27	5.41	0.49	2.97
6/25/1998	11	9	5.44	5.71	0.50	0.49	3.05	3.70	5.58	0.50	3.37
6/25/1998	11	10	1.31	1.39	0.41	0.38	1.24	1.55	1.35	0.39	1.40
6/25/1998	11	10	1.85	2.02	0.45	0.43	1.46	1.86	1.94	0.44	1.66
6/25/1998	11	10	1.79	1.83	0.34	0.32	1.41	1.85	1.81	0.33	1.63
6/25/1998	11	11	0.16	0.15	0.35	0.33	0.89	1.15	0.15	0.34	1.02
6/25/1998	11	11	0.16	0.16	0.39	0.37	1.02	1.29	0.16	0.38	1.16
6/25/1998	11	11	0.17	0.16	0.41	0.39	1.06	1.36	0.16	0.40	1.21
6/25/1998	11	12	0.15	0.15	0.36	0.35	0.84	1.31	0.15	0.36	1.08
6/25/1998	11	12	0.18	0.17	0.42	0.41	0.97	1.56	0.17	0.41	1.27
6/25/1998	11	12	0.16	0.15	0.41	0.38	0.91	1.44	0.15	0.40	1.17
6/25/1998	11	13	0.04	0.04	0.25	0.23	0.50	0.63	0.04	0.24	0.56
6/25/1998	11	13	0.05	0.04	0.29	0.26	0.53	0.68	0.04	0.27	0.60
6/25/1998	11	13	0.03	0.04	0.32	0.31	0.66	0.72	0.04	0.32	0.69
6/25/1998	11	14	0.11	0.10	0.35	0.33	0.85	1.08	0.10	0.34	0.97
6/25/1998	11	14	0.13	0.09	0.35	0.33	0.82	1.06	0.11	0.34	0.94
6/25/1998	11	14	0.09	0.08	0.36	0.34	0.87	1.13	0.09	0.35	1.00
6/25/1998	11	15	0.12	0.11	0.35	0.33	0.85	1.10	0.11	0.34	0.97
6/25/1998	11	15	0.13	0.12	0.38	0.36	0.91	1.15	0.13	0.37	1.03

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
6/25/1998	11	15	0.12	0.12	0.32	0.35	0.90	1.00	0.12	0.34	0.95			
7/14/1998	12	1	0.20	0.19	0.30	0.27	0.65	0.96	0.19	0.29	0.81			
7/14/1998	12	1	0.20	0.20	0.30	0.27	0.68	1.00	0.20	0.28	0.84			
7/14/1998	12	1	0.19	0.19	0.31	2.74	0.66	0.99	0.19	1.52	0.83			
7/14/1998	12	2	2.30	2.39	0.45	0.44	1.88	2.69	2.35	0.45	2.28			
7/14/1998	12	2	2.04	2.16	0.44	0.43	1.76	2.56	2.10	0.43	2.16			
7/14/1998	12	2	2.24	2.35	0.42	0.39	1.79	2.58	2.29	0.41	2.19			
7/14/1998	12	3	0.21	0.20	0.36	0.34	0.56	0.83	0.20	0.35	0.69			
7/14/1998	12	3	0.18	0.18	0.30	0.27	0.67	1.01	0.18	0.29	0.84			
7/14/1998	12	3	0.16	0.15	0.27	0.24	0.58	0.87	0.15	0.25	0.73			
7/14/1998	12	4	9.76	10.24	0.58	0.56	3.79	5.49	10.00	0.57	4.64			
7/14/1998	12	4	6.30	6.89	0.51	0.49	2.76	4.07	6.59	0.50	3.42			
7/14/1998	12	4	8.43	8.88	0.52	0.50	3.07	4.53	8.66	0.51	3.80			
7/14/1998	12	5	5.65	5.91	0.54	0.53	2.91	4.27	5.78	0.53	3.59			
7/14/1998	12	5	8.50	8.95	0.65	0.64	3.87	5.67	8.73	0.65	4.77			
7/14/1998	12	5	6.35	6.67	0.52	0.51	2.93	4.31	6.51	0.51	3.62			
7/14/1998	12	6	4.16	4.42	0.69	0.67	4.01	6.00	4.29	0.68	5.00			
7/14/1998	12	6	5.23	5.78	0.52	0.50	2.83	4.38	5.51	0.51	3.61			
7/14/1998	12	6	2.61	2.73	0.47	0.46	2.91	4.37	2.67	0.46	3.64			
7/14/1998	12	66	2.34	2.44	0.37	0.35	2.21	3.24	2.39	0.36	2.73			
7/14/1998	12	7	2.93	3.05	0.44	0.43	2.16	3.23	2.99	0.43	2.70			
7/14/1998	12	7	3.59	3.81	0.46	0.44	2.34	3.57	3.70	0.45	2.95			
7/14/1998	12	7	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
7/14/1998	12	8	3.60	3.82	0.41	0.40	1.98	2.99	3.71	0.40	2.49			
7/14/1998	12	8	4.21	4.52	0.46	0.44	2.22	3.42	4.36	0.45	2.82			

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cadmium 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
7/14/1998	12	8	4.37	4.74	0.48	4.64	2.43	3.76	4.56	2.56	3.10
7/14/1998	12	9	3.98	4.03	0.44	4.42	2.95	3.65	4.00	0.43	3.30
7/14/1998	12	9	4.88	5.26	0.50	4.48	2.37	3.68	5.07	0.49	3.03
7/14/1998	12	9	5.67	6.04	0.46	4.44	2.21	3.38	5.85	0.45	2.80
7/14/1998	12	10	0.06	0.05	0.21	0.19	0.56	0.89	0.05	0.20	0.72
7/14/1998	12	10	0.61	0.64	0.37	0.35	1.03	1.63	0.62	0.36	1.33
7/14/1998	12	10	1.13	1.19	0.41	0.39	1.21	1.90	1.16	0.40	1.56
7/14/1998	12	1010	0.91	0.94	0.31	0.28	0.38	1.36	0.93	0.29	0.87
7/14/1998	12	11	0.16	0.15	0.36	0.34	0.88	1.37	0.15	0.35	1.13
7/14/1998	12	11	0.17	0.16	0.39	0.36	0.95	1.50	0.17	0.37	1.23
7/14/1998	12	11	0.19	0.18	0.39	0.37	0.95	1.48	0.19	0.38	1.22
7/14/1998	12	12	0.04	0.04	0.26	0.24	0.44	0.69	0.04	0.25	0.57
7/14/1998	12	12	0.05	0.04	0.29	0.27	0.49	0.78	0.05	0.28	0.63
7/14/1998	12	12	0.05	0.04	0.28	0.27	0.44	0.70	0.04	0.27	0.57
7/14/1998	12	13	0.13	0.13	0.37	0.36	0.91	1.44	0.13	0.36	1.18
7/14/1998	12	13	0.15	0.14	0.40	0.38	0.94	1.51	0.15	0.39	1.23
7/14/1998	12	13	0.15	0.14	0.34	0.32	0.81	1.25	0.14	0.33	1.03
7/14/1998	12	14	0.15	0.15	0.36	0.35	0.84	1.31	0.15	0.36	1.08
7/14/1998	12	14	0.17	0.17	0.42	0.41	0.97	1.56	0.17	0.41	1.27
7/14/1998	12	14	0.16	0.15	0.40	0.38	0.91	1.44	0.15	0.39	1.17
7/14/1998	12	15	0.12	0.11	0.42	0.40	0.98	1.63	0.11	0.41	1.31
7/14/1998	12	15	0.12	0.11	0.38	0.35	0.86	1.42	0.12	0.36	1.14
7/14/1998	12	15	0.15	0.15	0.38	0.37	0.88	1.40	0.15	0.37	1.14
7/27/1998	13	1	0.16	0.16	0.16	0.14	0.26	0.35	0.16	0.15	0.30
7/27/1998	13	1	0.23	0.23	0.22	0.20	0.45	0.59	0.23	0.21	0.52

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean, Co mean		Ni mean
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm			
7/27/1998	13	1	0.21	0.21	0.28	0.25	0.56	0.75	0.21	0.27	0.66
7/27/1998	13	2	3.09	3.32	0.46	0.45	1.99	2.52	3.21	0.46	2.25
7/27/1998	13	2	2.14	2.16	0.45	0.43	1.76	2.45	2.15	0.44	2.11
7/27/1998	13	2	2.79	3.03	0.44	0.43	1.87	2.40	2.91	0.43	2.13
7/27/1998	13	3	1.35	1.44	0.35	0.34	1.33	1.71	1.39	0.34	1.52
7/27/1998	13	33	0.99	1.03	0.25	0.22	0.72	1.43	1.01	0.23	1.08
7/27/1998	13	3	0.23	0.23	0.29	0.27	0.68	0.90	0.23	0.28	0.79
7/27/1998	13	3	0.24	0.24	0.29	0.27	0.62	0.82	0.24	0.28	0.72
7/27/1998	13	4	12.85	13.84	0.52	0.51	3.14	3.97	13.35	0.51	3.56
7/27/1998	13	4	13.21	13.60	0.53	0.52	3.19	3.87	13.41	0.52	3.53
7/27/1998	13	4	13.01	14.22	0.65	0.66	4.45	5.61	13.62	0.66	5.03
7/27/1998	13	5	9.71	10.64	0.62	0.62	3.77	4.80	10.18	0.62	4.28
7/27/1998	13	5	9.32	10.53	0.79	0.79	4.56	5.85	9.93	0.79	5.21
7/27/1998	13	5	6.89	7.43	0.52	0.52	2.82	3.57	7.16	0.52	3.19
7/27/1998	13	6	4.07	4.47	0.47	0.47	2.40	3.06	4.27	0.47	2.73
7/27/1998	13	6	5.04	5.56	0.43	0.43	2.04	2.58	5.30	0.43	2.31
7/27/1998	13	6	4.41	4.82	0.48	0.47	2.40	3.03	4.61	0.47	2.71
7/27/1998	13	7	3.85	4.22	0.52	0.52	2.49	3.19	4.04	0.52	2.84
7/27/1998	13	7	1.62	1.69	0.22	0.21	0.97	1.21	1.66	0.21	1.09
7/27/1998	13	7	3.54	3.85	0.48	0.48	2.29	2.88	3.69	0.48	2.58
7/27/1998	13	8	7.31	7.97	0.51	0.51	2.58	3.27	7.64	0.51	2.93
7/27/1998	13	8	6.28	6.81	0.53	0.53	2.81	3.54	6.55	0.53	3.17
7/27/1998	13	8	6.50	7.06	0.50	0.49	2.45	3.09	6.78	0.49	2.77
7/27/1998	13	9	5.69	6.24	0.58	0.59	3.15	4.00	5.97	0.58	3.58
7/27/1998	13	9	1.06	1.13	0.25	0.23	1.47	1.85	1.09	0.24	1.66

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean.		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
7/27/1998	13	9	3.23	3.51	0.47	0.47	2.35	2.96	3.37	0.47	2.65			
7/27/1998	13	10	0.89	0.95	0.43	0.42	1.14	1.45	0.92	0.42	1.30			
7/27/1998	13	10	0.38	0.39	0.37	0.36	0.91	1.17	0.39	0.36	1.04			
7/27/1998	13	10	0.69	0.74	0.50	0.49	1.33	1.72	0.72	0.50	1.52			
7/27/1998	13	11	0.14	0.13	0.38	0.37	0.86	1.10	0.13	0.37	0.98			
7/27/1998	13	11	0.15	0.15	0.39	0.39	0.92	1.19	0.15	0.39	1.05			
7/27/1998	13	11	0.21	0.21	0.42	0.42	0.95	1.22	0.21	0.42	1.09			
7/27/1998	13	12	0.07	0.05	0.32	0.31	0.49	0.60	0.06	0.32	0.54			
7/27/1998	13	12	0.05	0.05	0.30	0.29	0.48	0.61	0.05	0.30	0.54			
7/27/1998	13	12	0.06	0.06	0.31	0.30	0.50	0.60	0.06	0.31	0.55			
7/27/1998	13	13	0.06	0.05	0.31	0.30	0.51	0.65	0.05	0.31	0.58			
7/27/1998	13	13	0.14	0.14	0.38	0.38	0.86	1.09	0.14	0.38	0.97			
7/27/1998	13	13	0.08	0.08	0.22	0.22	0.30	0.40	0.08	0.22	0.35			
7/27/1998	13	14	0.16	0.17	0.41	0.41	0.90	1.01	0.16	0.41	0.95			
7/27/1998	13	14	0.18	0.18	0.42	0.42	0.90	1.15	0.18	0.42	1.03			
7/27/1998	13	14	0.19	0.19	0.45	0.45	0.96	1.23	0.19	0.45	1.09			
7/27/1998	13	15	0.20	0.20	0.39	0.39	0.84	1.06	0.20	0.39	0.95			
7/27/1998	13	15	0.17	0.17	0.40	0.39	0.84	1.06	0.17	0.39	0.95			
7/27/1998	13	15	0.19	0.19	0.44	0.43	0.94	1.20	0.19	0.43	1.07			
8/13/1998	14	1	0.08	0.07	0.11	0.08	0.22	0.29	0.08	0.10	0.26			
8/13/1998	14	1	0.14	0.13	0.15	0.13	0.56	0.67	0.14	0.14	0.62			
8/13/1998	14	1	0.11	0.11	0.17	0.15	0.57	0.64	0.11	0.16	0.61			
8/13/1998	14	2	1.45	1.54	0.31	0.27	2.03	1.71	1.50	0.29	1.87			
8/13/1998	14	2	1.91	2.03	0.33	0.31	1.91	2.01	1.97	0.32	1.96			
8/13/1998	14	2	1.92	2.05	0.33	0.29	1.96	2.04	1.99	0.31	2.00			

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean	Ni mean
8/13/1998	14	3	0.33	0.33	0.22	0.18	0.97	1.02	0.33	0.20	1.00
8/13/1998	14	3	0.31	0.31	0.19	0.16	0.95	0.99	0.31	0.18	0.97
8/13/1998	14	3	0.35	0.32	0.22	0.21	0.99	1.00	0.34	0.22	0.99
8/13/1998	14	4	5.93	6.45	0.36	0.31	2.99	3.01	6.19	0.34	3.00
8/13/1998	14	44	5.85	6.06	0.31	0.28	1.71	2.63	5.96	0.30	2.17
8/13/1998	14	4	4.91	5.32	0.37	0.32	3.04	3.04	5.12	0.35	3.04
8/13/1998	14	4	5.04	5.49	0.33	0.28	2.64	2.56	5.27	0.31	2.60
8/13/1998	14	5	6.53	7.19	0.46	0.39	3.81	3.66	6.86	0.43	3.74
8/13/1998	14	5	6.04	6.71	0.45	0.38	3.71	3.59	6.38	0.42	3.65
8/13/1998	14	5	7.32	8.43	0.62	0.54	7.28	7.25	7.88	0.58	7.27
8/13/1998	14	6									
8/13/1998	14	6									
8/13/1998	14	6	2.75	2.97	0.32	0.27	2.39	2.28	2.86	0.30	2.34
8/13/1998	14	7	3.64	3.97	0.36	0.31	3.03	2.88	3.81	0.34	2.96
8/13/1998	14	7	3.25	3.56	0.42	0.35	3.67	3.44	3.41	0.39	3.56
8/13/1998	14	7	4.42	4.92	0.49	0.41	3.94	3.69	4.67	0.45	3.82
8/13/1998	14	8	4.85	5.26	0.38	0.32	3.39	3.12	5.06	0.35	3.26
8/13/1998	14	8	4.85	5.26	0.38	0.32	3.39	3.12	5.06	0.35	3.26
8/13/1998	14	8	0.12	0.13	0.15	0.11	0.82	1.01	0.12	0.13	0.92
8/13/1998	14	88	0.08	0.10	0.16	0.14	0.62	1.26	0.09	0.15	0.94
8/13/1998	14	9	2.86	3.07	0.25	0.21	1.86	1.96	2.97	0.23	1.91
8/13/1998	14	9	2.76	2.99	0.27	0.22	1.74	1.89	2.88	0.25	1.82
8/13/1998	14	9	3.66	4.12	0.33	0.27	2.55	2.65	3.89	0.30	2.60
8/13/1998	14	10	0.65	0.68	0.22	0.18	0.80	1.00	0.67	0.20	0.90
8/13/1998	14	10	0.38	0.40	0.23	0.18	0.67	0.94	0.39	0.21	0.80

Appendix 8. Cadmium, nickel and cobalt ICP results in µg/L. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
8/13/1998	14	10	1.07	1.18	0.28	0.23	1.12	1.40	1.13	0.25	1.26
8/13/1998	14	1010	1.48	1.53	0.34	0.32	0.76	1.74	1.51	0.33	1.25
8/13/1998	14	11	0.08	0.07	0.21	0.17	0.63	0.86	0.07	0.19	0.75
8/13/1998	14	11	0.07	0.06	0.20	0.16	0.62	0.84	0.06	0.18	0.73
8/13/1998	14	11									
8/13/1998	14	12	0.02	0.02	0.18	0.14	0.48	0.65	0.02	0.16	0.57
8/13/1998	14	12	0.01	0.01	0.18	0.14	0.44	0.57	0.01	0.16	0.51
8/13/1998	14	12	0.02	0.02	0.19	0.14	0.75	0.87	0.02	0.17	0.81
8/13/1998	14	13	0.07	0.06	0.21	0.17	0.66	0.86	0.06	0.19	0.76
8/13/1998	14	13	0.10	0.10	0.20	0.15	0.67	0.80	0.10	0.17	0.73
8/13/1998	14	13	0.07	0.07	0.23	0.18	0.79	1.03	0.07	0.21	0.91
8/13/1998	14	14	0.07	0.06	0.22	0.17	0.66	0.82	0.06	0.19	0.74
8/13/1998	14	14	0.07	0.07	0.21	0.16	0.63	0.80	0.07	0.19	0.71
8/13/1998	14	14	0.08	0.08	0.24	0.19	0.74	0.97	0.08	0.22	0.85
8/13/1998	14	15	0.09	0.09	0.20	0.16	0.63	0.76	0.09	0.18	0.69
8/13/1998	14	15	0.30	0.31	0.67	0.54	2.06	2.89	0.31	0.61	2.47
8/13/1998	14	15	0.33	0.34	0.71	0.56	2.19	3.01	0.33	0.64	2.60
8/31/1998	15	1	0.10	0.09	0.21	0.19	0.32	0.42	0.10	0.20	0.37
8/31/1998	15	1	0.18	0.18	0.24	0.21	0.45	0.59	0.18	0.22	0.52
8/31/1998	15	1	0.17	0.16	0.18	0.15	0.33	0.44	0.17	0.16	0.39
8/31/1998	15	2	2.38	2.48	0.40	0.38	1.65	2.12	2.43	0.39	1.89
8/31/1998	15	2	3.00	3.17	0.42	0.39	1.67	2.15	3.09	0.41	1.91
8/31/1998	15	2	1.15	1.16	0.21	0.20	0.72	0.91	1.15	0.21	0.81
8/31/1998	15	3	0.13	0.12	0.28	0.25	0.64	0.85	0.12	0.27	0.74
8/31/1998	15	3	0.05	0.04	0.26	0.24	0.57	0.77	0.04	0.25	0.67

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt	cobalt	cobalt	nickel	nickel	Cd mean.	Co mean	Ni mean
			214.440 nm	228.802 nm								
8/31/1998	15	3										
8/31/1998	15	4	10.10	10.75	0.52	0.49	3.22	4.21	10.43	0.50		3.72
8/31/1998	15	4	4.44	4.73	0.40	0.38	2.33	3.02	4.59	0.39		2.68
8/31/1998	15	44	4.96	5.22	0.41	0.37	2.04	3.23	5.09	0.39		2.64
8/31/1998	15	4	8.89	9.32	0.47	0.45	3.10	3.97	9.11	0.46		3.53
8/31/1998	15	444	8.72	9.11	0.42	0.38	2.51	3.63	8.91	0.40		3.07
8/31/1998	15	5	7.42	7.78	0.50	0.47	3.06	3.92	7.60	0.48		3.49
8/31/1998	15	5	6.22	6.49	0.46	0.44	2.64	3.43	6.35	0.45		3.04
8/31/1998	15	5										
8/31/1998	15	6	3.86	4.05	0.39	0.37	2.28	2.94	3.95	0.38		2.61
8/31/1998	15	6	4.30	4.52	0.39	0.36	2.24	2.89	4.41	0.38		2.56
8/31/1998	15	6	3.21	3.38	0.36	0.34	2.28	2.96	3.29	0.35		2.62
8/31/1998	15	7	3.34	3.50	0.37	0.35	1.95	2.53	3.42	0.36		2.24
8/31/1998	15	7	3.11	3.25	0.41	0.38	2.06	2.64	3.18	0.39		2.35
8/31/1998	15	7	3.55	3.74	0.40	0.38	2.19	2.82	3.65	0.39		2.50
8/31/1998	15	8	4.54	4.80	0.36	0.33	1.76	2.27	4.67	0.35		2.01
8/31/1998	15	8	4.04	4.25	0.38	0.35	1.96	2.54	4.14	0.37		2.25
8/31/1998	15	8	3.74	3.96	0.44	0.41	2.49	3.26	3.85	0.43		2.87
8/31/1998	15	9	4.12	4.39	0.46	0.43	2.47	3.25	4.26	0.44		2.86
8/31/1998	15	9	4.12	4.34	0.47	0.45	2.60	3.40	4.23	0.46		3.00
8/31/1998	15	9	2.63	2.65	0.25	0.23	1.42	1.81	2.64	0.24		1.62
8/31/1998	15	10	1.62	1.67	0.38	0.36	1.12	1.46	1.64	0.37		1.29
8/31/1998	15	10	1.13	1.16	0.34	0.32	1.02	1.32	1.15	0.33		1.17
8/31/1998	15	10	1.03	1.05	0.44	0.42	1.12	1.50	1.04	0.43		1.31
8/31/1998	15	11	0.14	0.13	0.32	0.30	0.79	1.03	0.13	0.31		0.91

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
8/31/1998	15	11	0.14	0.13	0.29	0.27	0.68	0.89	0.13	0.28	0.79			
8/31/1998	15	11	0.13	0.12	0.31	0.29	0.76	1.01	0.12	0.30	0.89			
8/31/1998	15	12	0.04	0.03	0.22	0.23	0.40	0.51	0.04	0.23	0.45			
8/31/1998	15	12	0.03	0.02	0.18	0.17	0.30	0.39	0.03	0.18	0.34			
8/31/1998	15	12	0.03	0.03	0.20	0.19	0.35	0.46	0.03	0.20	0.40			
8/31/1998	15	13	0.15	0.14	0.31	0.29	0.75	0.96	0.14	0.30	0.85			
8/31/1998	15	13	0.14	0.13	0.32	0.30	0.77	1.00	0.13	0.31	0.89			
8/31/1998	15	13	0.12	0.11	0.28	0.26	0.66	0.89	0.12	0.27	0.77			
8/31/1998	15	14	0.13	0.12	0.32	0.29	0.75	1.00	0.12	0.30	0.88			
8/31/1998	15	14	0.08	0.06	0.35	0.32	0.78	1.06	0.07	0.34	0.92			
8/31/1998	15	14	0.15	0.13	0.34	0.32	0.84	1.10	0.14	0.33	0.97			
8/31/1998	15	15	0.10	0.09	0.32	0.30	0.74	0.98	0.09	0.31	0.86			
8/31/1998	15	15	0.10	0.09	0.31	0.29	0.71	0.94	0.10	0.30	0.82			
8/31/1998	15	15	0.09	0.08	0.31	0.29	0.71	0.93	0.08	0.30	0.82			
9/12/1998	16	1												
9/12/1998	16	1	0.13	0.11	0.16	0.14	0.61	0.70	0.12	0.15	0.65			
9/12/1998	16	1	0.13	0.11	0.29	0.27	0.99	1.11	0.12	0.28	1.05			
9/12/1998	16	2	2.09	2.14	0.38	0.36	1.86	2.04	2.11	0.37	1.95			
9/12/1998	16	2	2.09	2.13	0.32	0.30	1.44	1.57	2.11	0.31	1.51			
9/12/1998	16	2	1.87	1.92	0.39	0.37	1.66	1.82	1.89	0.38	1.74			
9/12/1998	16	3	0.39	0.37	0.24	0.22	0.94	1.06	0.38	0.23	1.00			
9/12/1998	16	3	0.48	0.45	0.29	0.25	0.89	1.00	0.46	0.27	0.94			
9/12/1998	16	3	0.19	0.17	0.22	0.19	0.81	0.91	0.18	0.20	0.86			
9/12/1998	16	4	7.88	8.14	0.45	0.43	3.26	3.56	8.01	0.44	3.41			
9/12/1998	16	4	11.16	11.60	0.46	0.44	3.40	3.71	11.38	0.45	3.56			

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean.		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
9/12/1998	16	4	7.89	8.32	0.43	0.40	3.07	3.42	8.10	0.42			3.24	
9/12/1998	16	5	9.10	9.64	0.57	0.55	4.19	4.63	9.37	0.56			4.41	
9/12/1998	16	5	7.04	7.28	0.45	0.43	3.21	3.54	7.16	0.44			3.37	
9/12/1998	16	5	7.02	7.27	0.54	0.52	3.72	4.07	7.15	0.53			3.89	
9/12/1998	16	6	3.94	4.15	0.42	0.40	2.33	2.53	4.04	0.41			2.43	
9/12/1998	16	6	3.47	3.63	0.36	0.34	2.18	2.38	3.55	0.35			2.28	
9/12/1998	16	6	3.80	3.96	0.38	0.35	2.30	2.52	3.88	0.36			2.41	
9/12/1998	16	7	3.11	3.22	0.37	0.35	1.98	2.15	3.17	0.36			2.06	
9/12/1998	16	7	4.60	4.76	0.44	0.42	2.79	3.04	4.68	0.43			2.92	
9/12/1998	16	7	2.85	2.99	0.39	0.37	2.47	2.67	2.92	0.38			2.57	
9/12/1998	16	8	6.94	7.31	0.43	0.41	2.69	3.00	7.12	0.42			2.85	
9/12/1998	16	8	4.64	4.82	0.42	0.40	2.78	3.06	4.73	0.41			2.92	
9/12/1998	16	8	5.08	5.28	0.43	0.42	2.89	3.19	5.18	0.43			3.04	
9/12/1998	16	9	4.69	4.88	0.47	0.44	3.17	3.48	4.79	0.45			3.33	
9/12/1998	16	9												
9/12/1998	16	9												
9/12/1998	16	10	1.46	1.51	0.41	0.39	1.71	1.85	1.48	0.40			1.78	
9/12/1998	16	10	1.34	1.37	0.39	0.37	1.48	1.59	1.35	0.38			1.53	
9/12/1998	16	10	1.41	1.45	0.37	0.36	1.50	1.62	1.43	0.37			1.56	
9/12/1998	16	11	0.19	0.17	0.32	0.31	0.91	0.98	0.18	0.32			0.94	
9/12/1998	16	11	0.18	0.16	0.32	0.29	1.13	1.21	0.17	0.30			1.17	
9/12/1998	16	11	0.16	0.15	0.30	0.29	1.09	1.16	0.15	0.29			1.12	
9/12/1998	16	12	0.03	0.02	0.19	0.18	0.54	0.60	0.03	0.19			0.57	
9/12/1998	16	12	0.05	0.04	0.25	0.23	0.76	0.84	0.05	0.24			0.80	
9/12/1998	16	12	0.04	0.03	0.21	0.20	0.62	0.68	0.03	0.21			0.65	

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean.	Co mean.	Ni mean
9/12/1998	16	13									
9/12/1998	16	13									
9/12/1998	16	13									
9/12/1998	16	14									
9/12/1998	16	14									
9/12/1998	16	14									
9/12/1998	16	15									
9/12/1998	16	15									
9/12/1998	16	15									
9/30/1998	17	1	0.29	0.28	0.20	0.17	0.43	0.53	0.29	0.19	0.48
9/30/1998	17	1	0.16	0.15	2.40	0.21	0.60	0.72	0.16	1.31	0.66
9/30/1998	17	1	0.14	0.12	0.20	0.18	0.44	0.53	0.13	0.19	0.48
9/30/1998	17	1	0.12	0.10	0.17	0.15	0.35	0.44	0.11	0.16	0.40
9/30/1998	17	2	1.59	1.65	0.41	0.39	1.55	1.88	1.62	0.40	1.72
9/30/1998	17	2	1.77	1.84	0.37	0.35	1.34	1.62	1.80	0.36	1.48
9/30/1998	17	2	1.46	1.53	0.35	0.32	1.29	1.57	1.49	0.34	1.43
9/30/1998	17	3	0.32	0.31	0.22	0.20	0.68	0.81	0.31	0.21	0.75
9/30/1998	17	3	0.49	0.49	0.26	0.24	0.82	0.99	0.49	0.25	0.90
9/30/1998	17	3	0.34	0.33	0.23	0.21	0.65	0.79	0.34	0.22	0.72
9/30/1998	17	4	5.21	5.47	0.39	0.38	2.29	2.78	5.34	0.38	2.54
9/30/1998	17	4	4.78	5.01	0.39	0.37	2.17	2.64	4.90	0.38	2.40
9/30/1998	17	4	10.55	11.34	0.46	0.44	2.90	3.56	10.94	0.45	3.23
9/30/1998	17	44	12.35	13.04	0.46	0.43	2.30	3.68	12.70	0.44	2.99
9/30/1998	17	5	4.24	4.45	0.40	0.37	2.65	3.23	4.35	0.39	2.94
9/30/1998	17	5	5.10	5.38	0.44	0.42	2.87	3.51	5.24	0.43	3.19

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
9/30/1998	17	5									
9/30/1998	17	6	3.99	4.26	0.37	0.35	2.44	2.99	4.12	0.36	2.72
9/30/1998	17	6	3.59	3.89	0.38	0.37	2.66	3.27	3.74	0.37	2.97
9/30/1998	17	6	4.36	4.61	0.40	0.37	2.58	3.14	4.49	0.38	2.86
9/30/1998	17	7	2.74	2.94	0.36	0.34	1.98	2.37	2.84	0.35	2.17
9/30/1998	17	7	2.71	2.90	0.35	0.33	1.94	2.32	2.81	0.34	2.13
9/30/1998	17	7	2.92	3.13	0.37	0.35	2.20	2.65	3.02	0.36	2.42
9/30/1998	17	7	3.46	3.75	0.37	0.36	2.14	2.59	3.61	0.36	2.36
9/30/1998	17	8	3.51	3.76	0.34	0.33	1.95	2.33	3.63	0.33	2.14
9/30/1998	17	8	3.50	3.76	0.36	0.34	2.02	2.43	3.63	0.35	2.23
9/30/1998	17	8	3.52	3.80	0.35	0.33	1.93	2.34	3.66	0.34	2.13
9/30/1998	17	9	4.83	5.12	0.44	0.42	2.66	3.22	4.97	0.43	2.94
9/30/1998	17	9	4.53	4.82	0.37	0.35	2.00	2.42	4.67	0.36	2.21
9/30/1998	17	9	3.49	3.76	0.42	0.40	2.40	2.89	3.62	0.41	2.65
9/30/1998	17	10									
9/30/1998	17	10	1.14	1.18	0.36	0.34	1.10	1.29	1.16	0.35	1.19
9/30/1998	17	10									
9/30/1998	17	11	0.12	0.10	0.29	0.27	0.79	0.90	0.11	0.28	0.84
9/30/1998	17	11	0.12	0.10	0.29	0.27	0.79	0.92	0.11	0.28	0.85
9/30/1998	17	11	0.11	0.10	0.29	0.26	0.76	0.89	0.11	0.27	0.83
9/30/1998	17	12	0.04	0.03	0.21	0.19	0.38	0.44	0.04	0.20	0.41
9/30/1998	17	12	0.06	0.05	0.25	0.23	0.48	0.57	0.06	0.24	0.52
9/30/1998	17	12	0.04	0.03	0.21	0.19	0.38	0.45	0.04	0.20	0.41
9/30/1998	17	13	0.12	0.11	0.28	0.27	0.74	0.86	0.12	0.27	0.80
9/30/1998	17	13	0.13	0.12	0.31	0.29	0.83	0.97	0.12	0.30	0.90

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

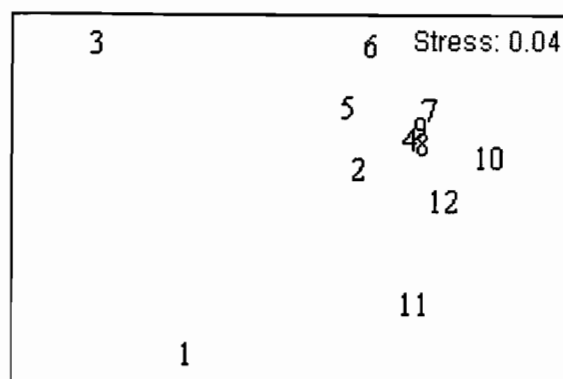
Dates	Day	Sites	cadmium		cobalt		nickel		Cd mean		Co mean		Ni mean	
			214.440 nm	228.802 nm	228.616 nm	230.786 nm	232.003 nm	341.476 nm						
9/30/1998	17	13	0.16	0.15	0.38	0.36	1.03	1.20	0.16	0.37	1.12			
9/30/1998	17	14	0.10	0.09	0.21	0.20	0.53	0.61	0.10	0.20	0.57			
9/30/1998	17	14	0.12	0.11	0.26	0.24	0.65	0.79	0.11	0.25	0.72			
9/30/1998	17	14	0.14	0.13	0.29	0.28	0.75	0.90	0.14	0.28	0.83			
9/30/1998	17	15	0.09	0.07	0.27	0.26	0.69	0.83	0.08	0.27	0.76			
9/30/1998	17	15	0.09	0.07	0.27	0.26	0.68	0.82	0.08	0.27	0.75			
9/30/1998	17	15	0.09	0.08	0.27	0.25	0.67	0.80	0.08	0.26	0.73			
10/24/1998	18	1	0.21	0.19	0.25	0.23	0.76	1.03	0.20	0.24	0.89			
10/24/1998	18	1	0.21	0.20	0.23	0.22	0.79	1.06	0.20	0.22	0.93			
10/24/1998	18	1	0.13	0.10	0.19	0.17	0.61	0.84	0.12	0.18	0.72			
10/24/1998	18	2	1.21	1.25	0.29	0.27	1.42	1.58	1.23	0.28	1.50			
10/24/1998	18	2	1.81	1.94	0.47	0.46	1.98	2.51	1.88	0.47	2.24			
10/24/1998	18	2												
10/24/1998	18	3	0.31	0.31	0.23	0.21	0.92	1.09	0.31	0.22	1.00			
10/24/1998	18	3	0.31	0.31	0.25	0.24	1.15	1.51	0.31	0.25	1.33			
10/24/1998	18	3	0.54	0.55	0.27	0.25	0.95	1.12	0.54	0.26	1.04			
10/24/1998	18	3	0.35	0.35	0.23	0.20	0.88	1.05	0.35	0.21	0.97			
10/24/1998	18	4	11.07	11.94	0.56	0.53	4.08	4.81	11.51	0.54	4.44			
10/24/1998	18	44	10.01	10.55	0.44	0.40	2.34	3.55	10.28	0.42	2.95			
10/24/1998	18	4	5.88	6.31	0.45	0.43	3.13	3.74	6.09	0.44	3.43			
10/24/1998	18	4	6.93	7.38	0.48	0.46	3.37	4.06	7.16	0.47	3.72			
10/24/1998	18	4	7.47	7.93	0.52	0.50	3.61	4.39	7.70	0.51	4.00			
10/24/1998	18	5	7.09	7.66	0.56	0.53	4.07	4.98	7.37	0.55	4.52			
10/24/1998	18	5	9.06	9.61	0.58	0.55	4.32	5.29	9.33	0.57	4.81			
10/24/1998	18	5	8.88	9.48	0.68	0.66	5.00	6.20	9.18	0.67	5.60			

Appendix 8. Cadmium, nickel and cobalt ICP results in $\mu\text{g/L}$. Replicates are expressed as repeated integers. Blank spaces indicate lost or missing data.

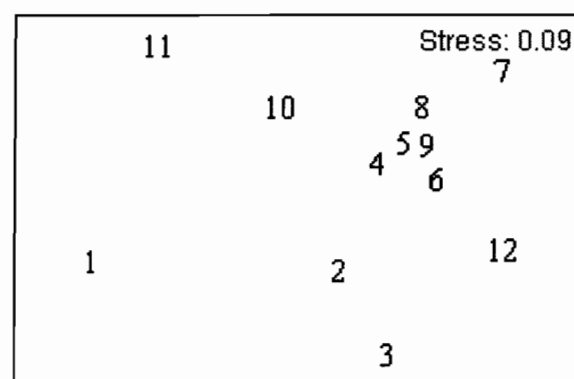
Dates	Day	Sites	cadmium 214.440 nm	cadmium 228.802 nm	cobalt 228.616 nm	cobalt 230.786 nm	nickel 232.003 nm	nickel 341.476 nm	Cd mean	Co mean	Ni mean
10/24/1998	18	6	3.74	3.93	0.51	0.49	3.43	4.23	3.84	0.50	3.83
10/24/1998	18	6	4.74	5.05	0.67	0.65	5.75	7.20	4.90	0.66	6.48
10/24/1998	18	6	4.06	4.26	0.51	0.48	3.45	4.29	4.16	0.49	3.87
10/24/1998	18	7	3.76	4.00	0.59	0.57	3.84	4.81	3.88	0.58	4.33
10/24/1998	18	7	3.28	3.50	0.45	0.43	2.79	3.50	3.39	0.44	3.14
10/24/1998	18	7	3.35	3.54	0.51	0.49	3.15	3.97	3.45	0.50	3.56
10/24/1998	18	8	5.68	6.07	0.49	0.47	2.83	3.57	5.87	0.48	3.20
10/24/1998	18	8	4.23	4.59	0.46	0.44	2.71	3.43	4.41	0.45	3.07
10/24/1998	18	8	4.04	4.24	0.43	0.42	2.39	3.04	4.14	0.43	2.71
10/24/1998	18	9	4.50	4.81	0.52	0.50	3.09	3.96	4.66	0.51	3.53
10/24/1998	18	9	3.53	3.79	0.47	0.46	2.76	3.56	3.66	0.47	3.16
10/24/1998	18	9									
10/24/1998	18	10	1.94	2.05	0.46	0.44	1.83	2.32	1.99	0.45	2.07
10/24/1998	18	10	1.46	1.53	0.44	0.43	1.72	2.17	1.50	0.43	1.95
10/24/1998	18	10	4.46	4.85	0.46	0.45	2.59	3.35	4.65	0.45	2.97
10/24/1998	18	1010	3.55	3.76	0.33	0.31	1.39	2.39	3.66	0.32	1.89
10/24/1998	18	10	1.27	1.33	0.39	0.37	1.54	1.91	1.30	0.38	1.72
10/24/1998	18	11	0.17	0.15	0.33	0.31	1.11	1.38	0.16	0.32	1.24
10/24/1998	18	11	0.13	0.12	0.27	0.26	0.92	1.14	0.13	0.27	1.03
10/24/1998	18	11	0.15	0.13	0.34	0.32	1.18	1.49	0.14	0.33	1.33
10/24/1998	18	12	0.05	0.04	0.23	0.22	0.62	0.80	0.05	0.22	0.71
10/24/1998	18	12	0.05	0.03	0.21	0.20	0.60	0.78	0.04	0.20	0.69
10/24/1998	18	12	0.04	0.03	0.21	0.20	0.59	0.75	0.03	0.21	0.67
10/24/1998	18	12	0.12	0.10	0.32	0.31	1.03	1.29	0.11	0.31	1.16
10/24/1998	18	13	0.15	0.13	0.35	0.34	1.12	1.40	0.14	0.34	1.26

Appendix 9. Multidimensional Scaling (MDS) plots of Bray-Curtis similarities of diatom percentages for each collection from 9-18-97 through 10-24-98. Numbers on the plots refer to station numbers.

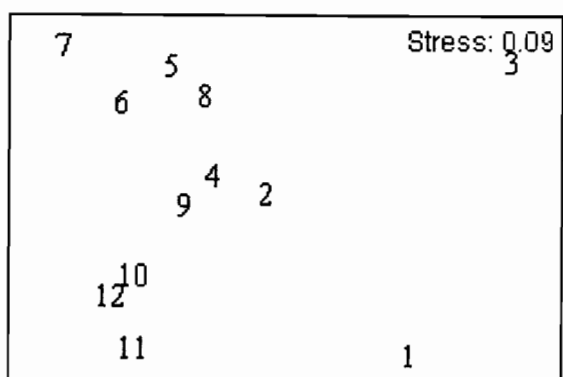
9-18-97 collection



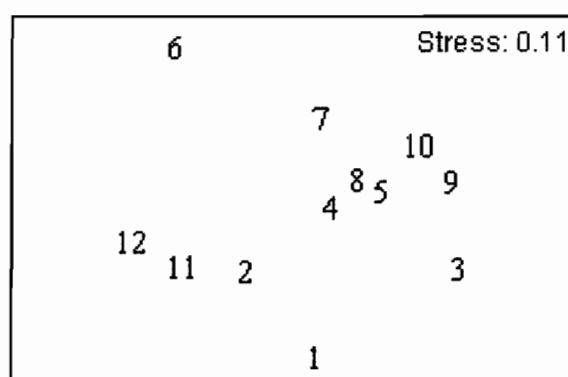
10-7-97 collection



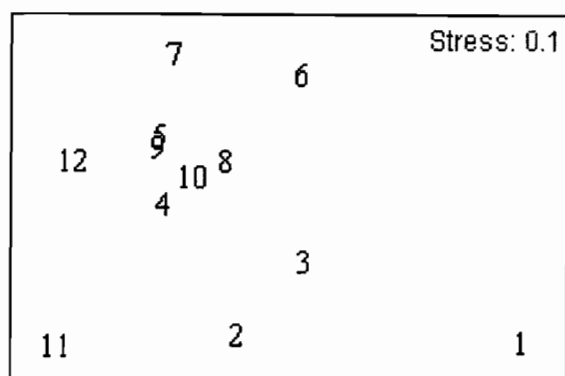
10-30-97 collection



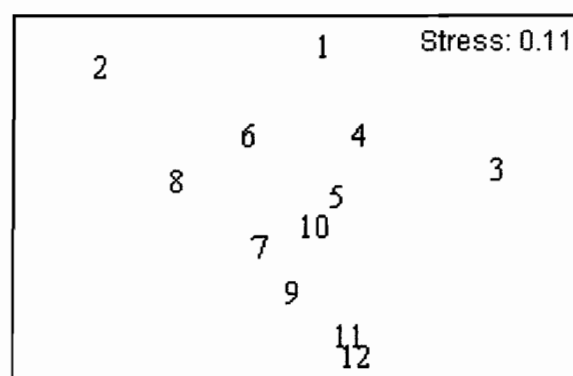
1-6-98 collection



2-3-98 collection

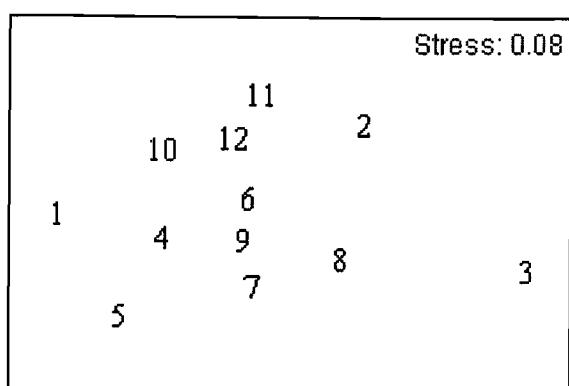


3-27-98 collection

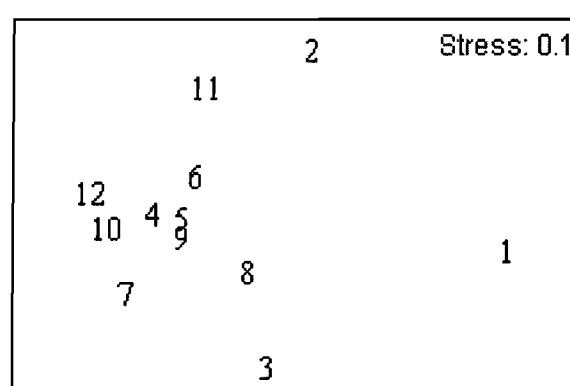


Appendix 9. MDS plots of Bray-Curtis similarities of diatom percentages.

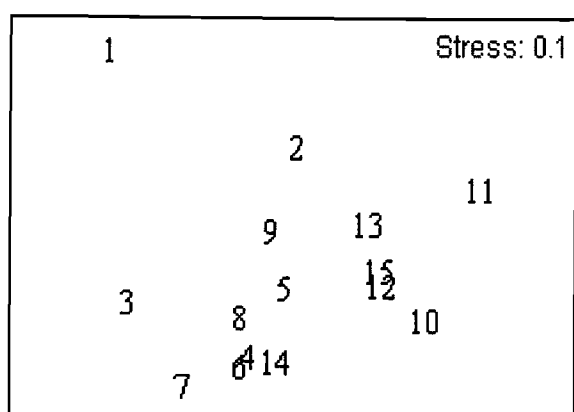
4-30-98 collecton



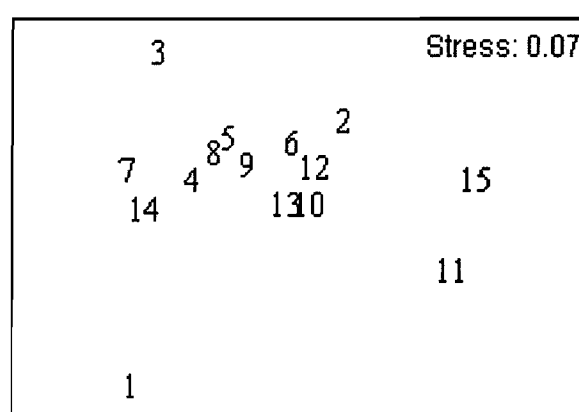
5-16-98 collecton



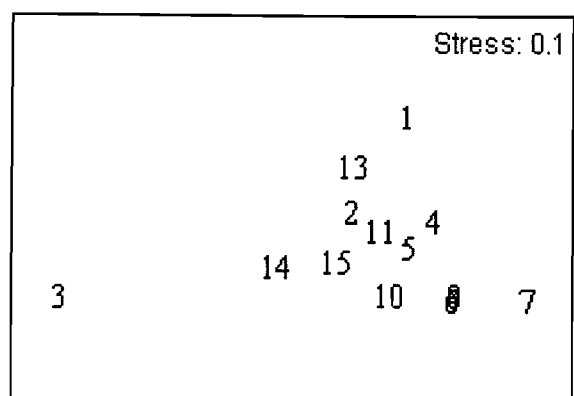
5-30-98 collecton



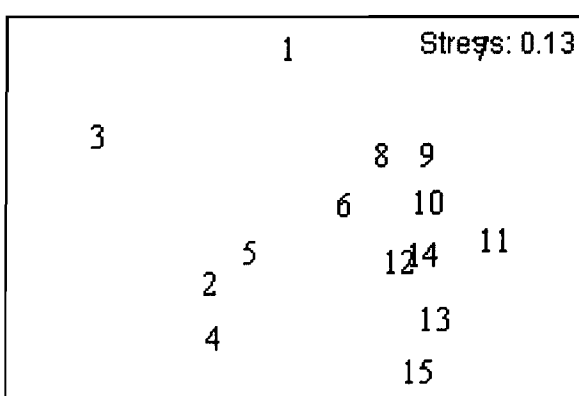
6-10-98 collecton



6-25-98 collecton

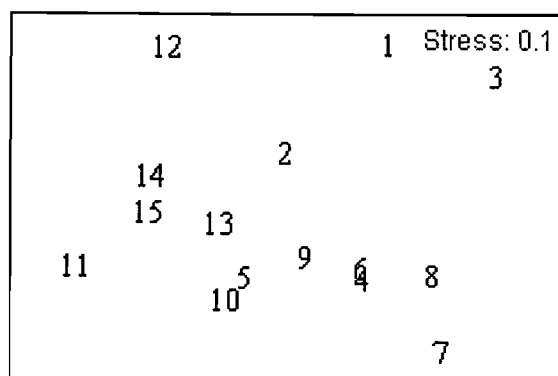


7-14-98 collecton

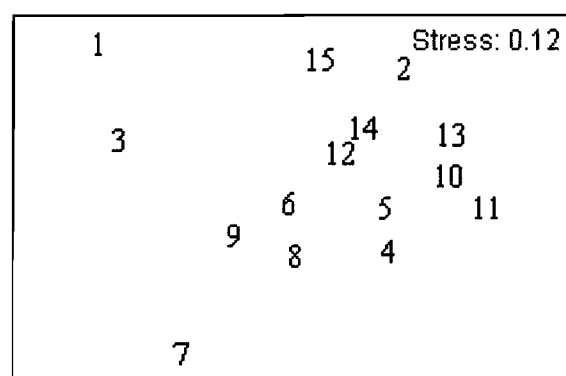


Appendix 9. MDS plots of Bray-Curtis similarities of diatom percentages.

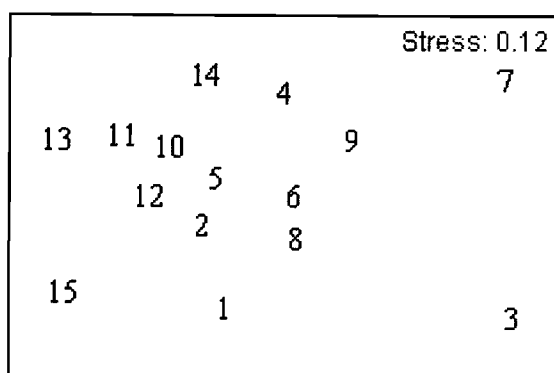
7-27-98 collection



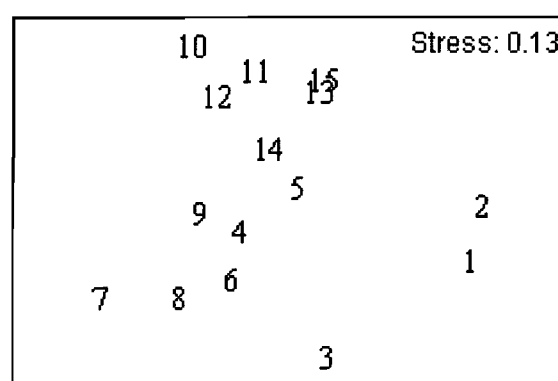
8-13-98 collection



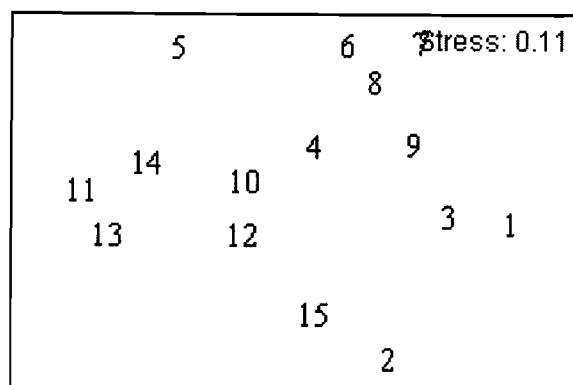
8-30-98 collections



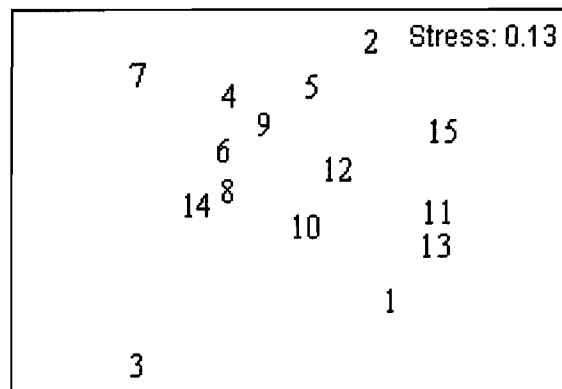
9-12-98 collection



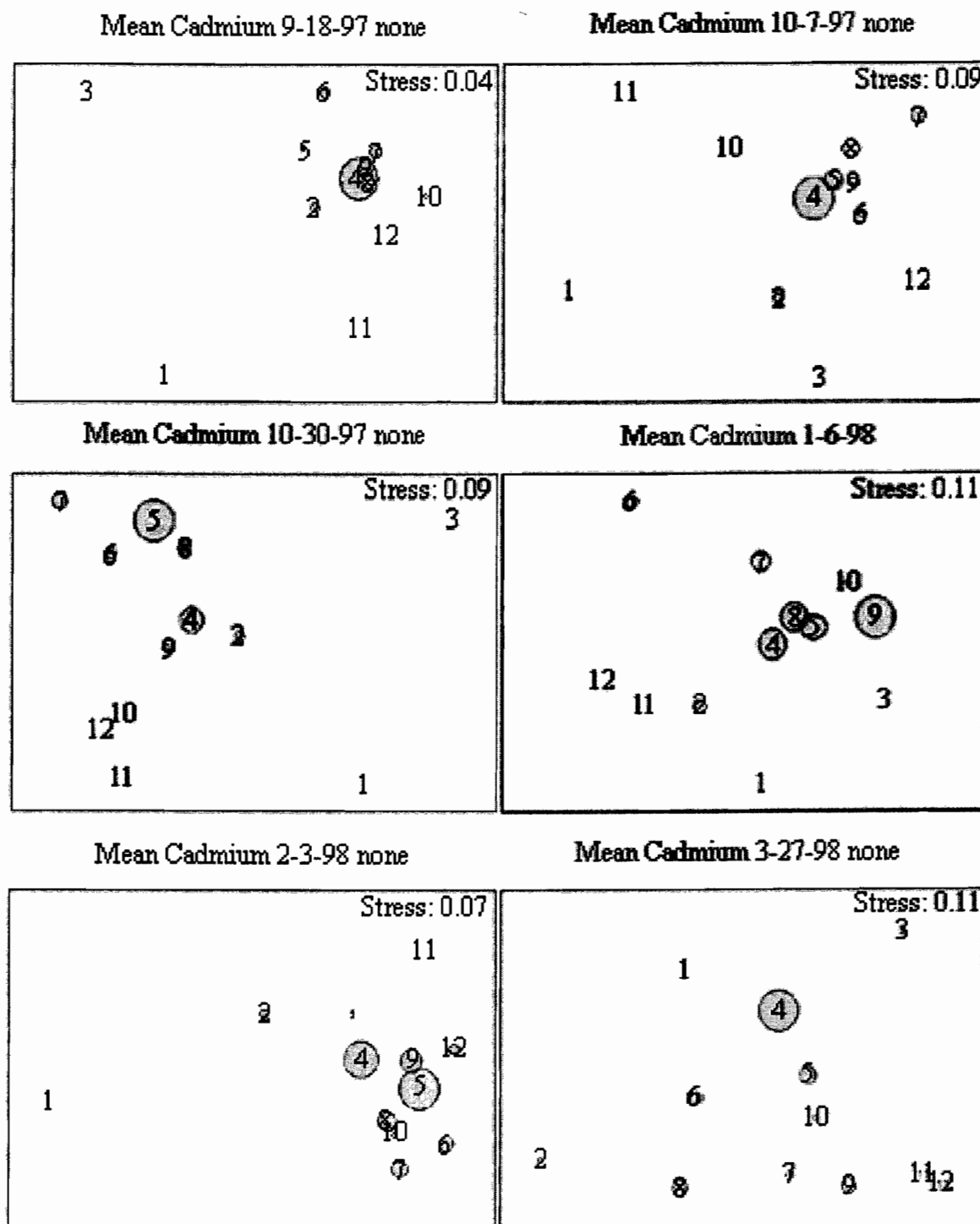
9-30-98 collection



10-24-98 collection

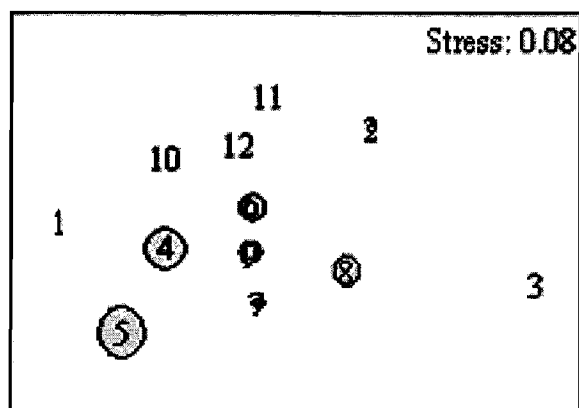


Appendix 10. Multidimensional Scaling (MDS) plots of Bray Curtis similarities of diatom percentages for each collection from 9-18-97 through 10-24-98. Numbers on the plots refer to station numbers, and circles indicate the relative concentration of Cadmium.

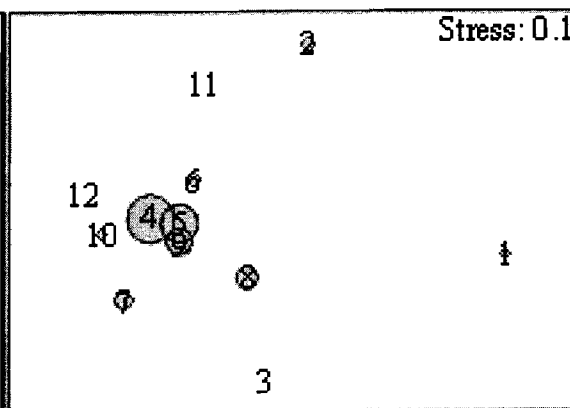


Appendix 10. Multidimensional Scaling (MDS) plots of Bray Curtis similarities of diatom percentages for each collection from 9-18-97 through 10-24-98. Numbers on the plots refer to station numbers, and circles indicate the relative concentration of Cadmium.

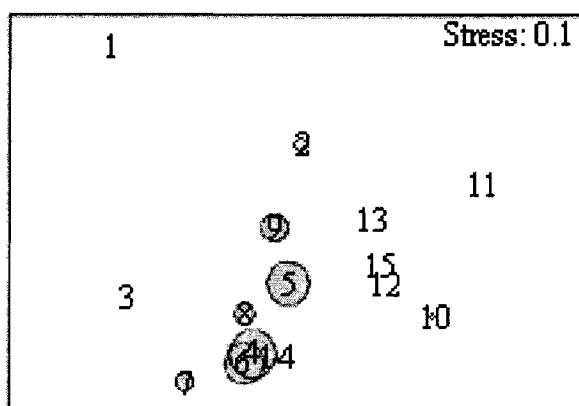
Mean Cadmium 4-30-98



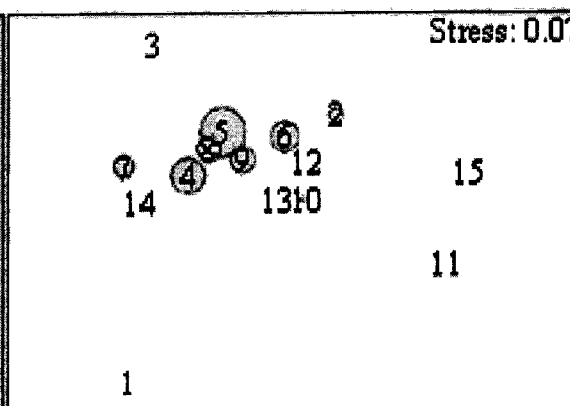
Mean Cadmium 5-16-98



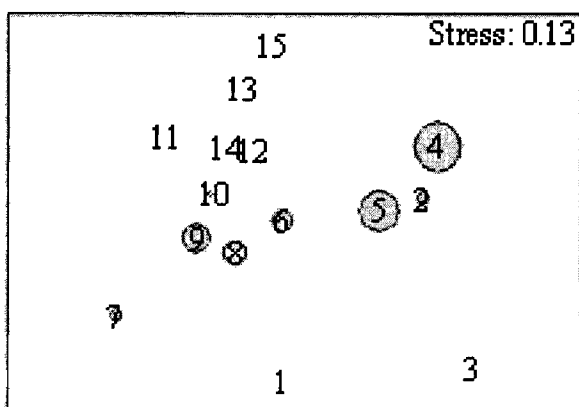
Mean Cadmium 5-30-98



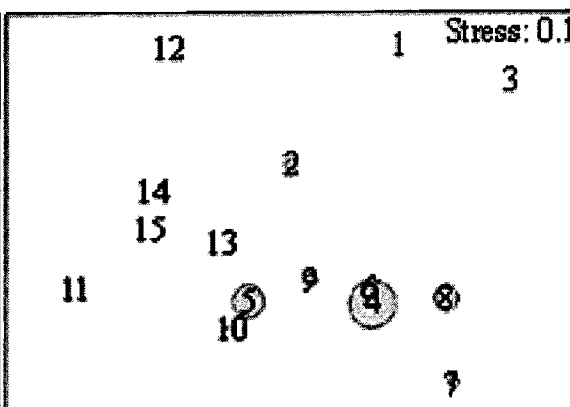
Mean Cadmium 6-10-98



Mean Cadmium 7-14-98

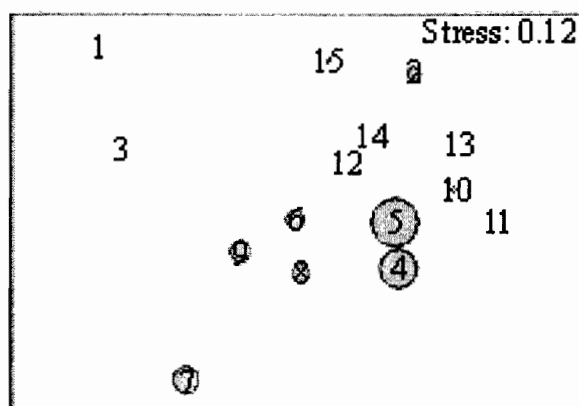


Mean Cadmium 7-27-98

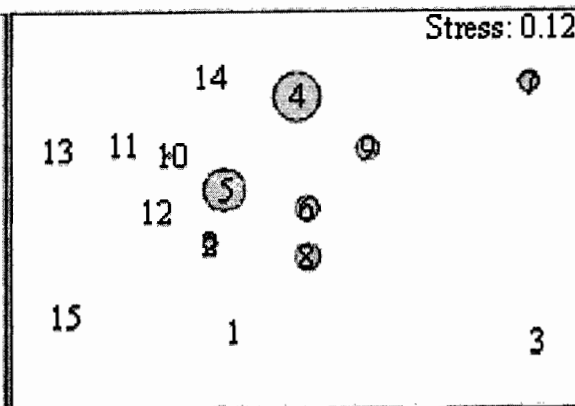


Appendix 10. Multidimensional Scaling (MDS) plots of Bray Curtis similarities of diatom percentages for each collection from 9-18-97 through 10-24-98. Numbers on the plots refer to station numbers, and circles indicate the relative concentration of Cadmium.

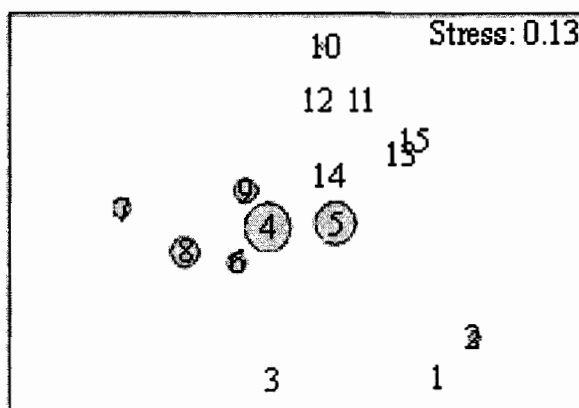
Mean Cadmium 8-13-98



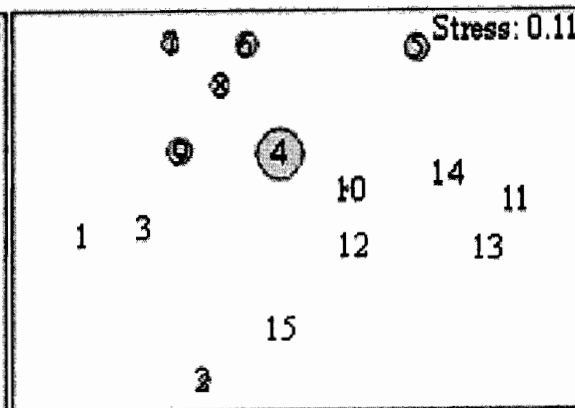
Mean Cadmium 8-30-98 none



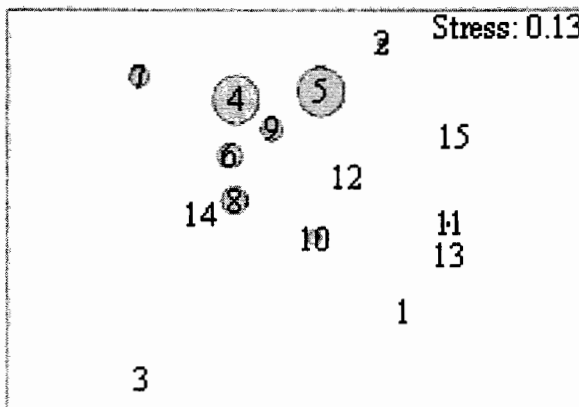
Mean Cadmium 9-12-98 none



Mean Cadmium 9-30-98



Mean Cadmium 10-24-98



Appendix 11. Similarity of percentages (SIMPER) of clusters A, B, C

CLUSTER A		CLUSTER B	
Stations 4 through 10	Stations 2, 11 through 15		
Taxa	Taxa	average similarity 84.94%	average similarity 81.59%
		% contribution	% contribution
<i>Navicula gregaria</i>	<i>Navicula gregaria</i>	19	12.4
<i>Cocconeis placentula</i> var. <i>lineata</i>	<i>Cyclotells meneghiniana</i>	7.7	11.3
<i>Cyclotells meneghiniana</i>	<i>Cocconeis placentula</i> var. <i>lineata</i>	7.2	9.9
<i>Navicula odiosa</i>	<i>Navicula salinarum</i> var. <i>intermedia</i>	4.9	4.8
<i>Navicula lanceolata</i>	<i>Actinocyclus normanii</i>	4.4	4.4
<i>Nitzschia brevissima</i>	<i>Navicula lanceolata</i>	3.4	4.3
<i>Navicula viridula</i>	<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	3.2	4
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	<i>Navicula viridula</i>	3.1	3.9
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	<i>Navicula peregrina</i>	2.9	2.9
<i>Bacillaria paradoxa</i> (paxillifer)	<i>Cocconeis neodiminuta</i>	2.7	2.7
<i>Navicula salinarum</i> var. <i>intermedia</i>	<i>Achnanthes haukiana</i>	2.6	2.6
<i>Achnanthes haukiana</i>	<i>Achnanthes haukiana</i> var. <i>rostrata</i>	2.3	2.1
<i>Actinocyclus normanii</i>	<i>Achnanthes chilidanos</i>	2.1	1.9
<i>Navicula peregrina</i>	<i>Navicula odiosa</i>	2	1.9
<i>Navicula minima</i>	<i>Navicula globulifera</i>	1.7	1.6
<i>Cocconeis neodiminuta</i>	<i>Nitzschia brevissima</i>	1.3	1.6
<i>Navicula globulifera</i>	<i>Navicula minima</i>	1.3	1.4
<i>Navicula viridula</i> var. <i>rostellata</i>	<i>Diatoma vulgare</i> var. <i>breve</i>	1	1.2
<i>Caloneis bacillum</i>	<i>Stephanodiscus species</i>	1	1
	<i>Navicula capitata</i> var. <i>capitata</i>		1
	<i>Bacillaria paradoxa</i> (paxillifer)		1
	<i>Navicula viridula</i> var. <i>rostellata</i>		1

Appendix 11. Similarity of percentages (SIMPER) of clusters A, B, C

CLUSTER C

Stations 1 & 3

Taxa

<i>Navicula gregaria</i>	14.6
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	8.6
<i>Cocconeis placentula</i> var. <i>lineata</i>	6.4
<i>Cyclotella meneghiniana</i>	5.3
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	5.2
<i>Navicula viridula</i>	5.1
<i>Navicula lanceolata</i>	4.4
<i>Navicula odiosa</i>	4.2
<i>Achnanthes haukiana</i>	3.1
<i>Navicula salinarum</i> var. <i>intermedia</i>	3
<i>Navicula minima</i>	2.9
<i>Navicula peregrina</i>	2.8
<i>Achnanthes chilidanos</i>	2.6
<i>Navicula viridula</i> var. <i>rostellata</i>	2.2
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	2.1
<i>Actinocyclus normanii</i>	1.3
<i>Cocconeis neodiminuta</i>	1.2
<i>Nitzschia vulgare</i> var. <i>breve</i>	1.2
<i>Navicula globulifera</i>	1.1
<i>Nitzschia brevissima</i>	1.1
<i>Navicula pseudokotschii</i>	1

Appendix 12. Dissimilarity between clusters calculated by SIMPER. Cluster A = stations 4 through 10, Cluster B = stations 2, 11 through 15, Cluster C = stations 1 and 3

DISSIMILARITY BETWEEN CLUSTER A & B		DISSIMILARITY BETWEEN CLUSTER A & C	
Taxa	average dissimilarity 24.30% % contribution	Taxa	average dissimilarity 28.56% % contribution
<i>Navicula gregaria</i>	11.6	<i>Achnanthes haukiana</i> var. <i>rostrata</i>	11.8
<i>Cyclotella meneghiniana</i>	6.1	<i>Navicula gregaria</i>	11.3
<i>Navicula salinarum</i> var. <i>intermedia</i>	5.3	<i>Nitzschia microcephala</i>	5.4
<i>Navicula odiosa</i>	4.9	<i>Navicula odiosa</i>	5.3
<i>Actinocyclus normanii</i>	4.5	<i>Cocconeis placentula</i> var. <i>lineata</i>	3.9
<i>Bacillaria paradoxa</i> (<i>paxillifer</i>)	3.7	<i>Nitzschia brevissima</i>	3.8
<i>Achnanthes chilidanos</i>	3.6	<i>Cyclotella meneghiniana</i>	3.6
<i>Nitzschia brevissima</i>	3.6	<i>Bacillaria paradoxa</i> (<i>paxillifer</i>)	3.2
<i>Cocconeis placentula</i> var. <i>lineata</i>	3.2	<i>Navicula salinarum</i> var. <i>intermedia</i>	2.6
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	2.7	<i>Nitzschia frustulum</i> var. <i>perpusilla</i>	2.6
<i>Achnanthes lanceolata</i>	2.6	<i>Achnanthes lanceolata</i>	2.5
<i>Cocconeis neodiminuta</i>	2.5	<i>Achnanthes frustulum</i>	2.5
<i>Nitzschia frustulum</i> var. <i>perpusilla</i>	2.2	<i>Achnanthes chilidanos</i>	1.9
<i>Navicula peregrina</i>	1.9	<i>Navicula viridula</i>	1.5
<i>Navicula viridula</i>	1.5	<i>Actinocyclus normanii</i>	1.5
<i>Caloneis bacillum</i>	1.4	<i>Navicula minima</i>	1.4
<i>Navicula minima</i>	1.3	<i>Amphora perpusilla</i>	1.3
<i>Navicula halophila</i>	1.2	<i>Navicula pseudokotschy</i>	1.2
<i>Navicula mutica</i>	1.1	<i>Navicula viridula</i> var. <i>rostellata</i>	1.2
<i>Stephanodiscus species</i>	1.1	<i>Caloneis bacillum</i>	1.1
<i>Achnanthes haukiana</i>	1.1	<i>Achnanthes haukiana</i>	1.1
<i>Navicula capitata</i> var. <i>capitata</i>	1.1		

Appendix 12. Dissimilarity between clusters calculated by SIMPER. Cluster A = stations 4 through 10, Cluster B = stations 2, 11 through 15, Cluster C = stations 1 and 3

DISSIMILARITY BETWEEN CLUSTER B & C		average dissimilarity 30.36%
Taxa	% contribution	
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	13	
<i>Cyclotella meneghiniana</i>	6.8	
<i>Navicula odiosa</i>	6.6	
<i>Cocconeis placentula</i> var. <i>lineata</i>	6	
<i>Nitzschia microcephala</i>	5.1	
<i>Actinocyclus normanii</i>	5	
<i>Navicula salinarum</i> var. <i>intermedia</i>	3.4	
<i>Navicula gregaria</i>	3.3	
<i>Achnanthes lanceolata</i>	2.6	
<i>Cocconeis neodiminuta</i>	2.5	
<i>Achnanthes frustrulum</i>	2.4	
<i>Achnanthes chilidanos</i>	2.2	
<i>Navicula minima</i>	1.8	
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	1.2	
<i>Navicula viridula</i> var. <i>rostellata</i>	1.2	
<i>Amphora perpusilla</i>	1.2	
<i>Navicula peregrina</i>	1.2	
<i>Navicula pseudokotschy</i>	1.1	
<i>Nitzschia brevissima</i>	1.1	
<i>Navicula pygmaea</i>	1	
<i>Navicula capitata</i> var. <i>capitata</i>	1	

Appendix 13. SIMPER of selected stations. Stations 4, 5, 6, 7, 8, 9 (Cd Ni) = Cluster 1, stations 13-15 (the reference site) = cluster 2

Taxa	Stations 4 & 5 similarity = 91.4% average abundance	Stations 13, 14, 15 similarity = 83.5% average abundance	dissimilarity between cluster 1 & 2 = 23.5% contribution of % dissimilarity
<i>Navicula gregaria</i>	0.17	0.13	10.2
<i>Navicula salinarum</i> var. <i>intermedia</i>	0.03	0.06	7.2
<i>Actinocyclus normanii</i>	0.02	0.05	5.2
<i>Navicula odiosa</i>	0.04	0.02	5.0
<i>Bacillaria paradoxa</i> (<i>paxillifer</i>)	0.03	0.01	4.5
<i>Cyclotella meneghiniana</i>	0.08	0.01	4.3
<i>Achnanthes chilidanos</i>	0.01	0.03	3.9
<i>Cocconeis neodiminuta</i>	0.01	0.03	2.9
<i>Nitzschia brevissima</i>	0.03	0.01	2.8
<i>Achnanthes lanceolata</i>	0.04	0.04	2.5
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	0.02	0.04	2.4
<i>Navicula peregrina</i>	0.02	0.03	1.9
<i>Navicula viridula</i>	0.03	0.02	1.8
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	0.03	0.02	1.8
<i>Achnanthes halophila</i>	0.01	0.00	1.7
<i>Cocconeis placentula</i> var. <i>lineata</i>	0.08	0.08	1.6
<i>Nitzschia frustrulum</i>	0.01	0.00	1.5
<i>Caloneis bacillum</i>	0.01	0.00	1.4
<i>Navicula minima</i>	0.02	0.01	1.3
<i>Nitzschia apiculata</i>	0.01	0.00	1.1
<i>Navicula viridula</i> var. <i>rostellata</i>	0.01	0.01	1.1
<i>Navicula pygmaea</i>	0.01	0.01	1.0

Appendix 13. SIMPER of selected stations. Stations 4, 5, 6, 7, 8, 9 (Cd Ni) = Cluster 1, stations 13-15 (the reference site) = cluster 2

Taxa	Stations 4 - 9 similarity = 86.2% average abundance	Stations 13, 14, 15 similarity = 83.2% average abundance	dissimilarity between cluster 1 & 2 = 25.3% contribution of % dissimilarity
<i>Navicula gregaria</i>	0.18	0.13	9.5
<i>Navicula salinarum</i> var. <i>intermedia</i>	0.02	0.06	6.3
<i>Cyclotella meneghiniana</i>	0.07	0.1	6.3
<i>Navicula odiosa</i>	0.05	0.02	6
<i>Actinocyclus normanii</i>	0.02	0.04	4.7
<i>Bacillaria paradoxa</i> (paxillifer)	0.03	0.01	4.2
<i>Nitzschia brevisima</i>	0.03	0.01	4.2
<i>Achnanthes chiladanos</i>	0.01	0.03	3.5
<i>Cocconeis neodiminuta</i>	0.01	0.02	2.5
<i>Cocconeis placentula</i> var. <i>lineata</i>	0.07	0.08	2.4
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	0.03	0.02	2.4
<i>Navicula peregrina</i>	0.02	0.03	2.1
<i>Nitzschia frustulum</i> var. <i>perpusilla</i>	0.03	0.04	1.9
<i>Achnanthes lanceolata</i>	0.04	0.05	1.6
<i>Caloneis bacillum</i>	0.01	0.00	1.5
<i>Navicula viridula</i>	0.03	0.03	1.4
<i>Navicula halophila</i>	0.01	0.00	1.3
<i>Navicula mutica</i>	0.01	0.00	1.2
<i>Stephanodiscus species</i>	0.00	0.01	1.1
<i>Navicula capitata</i> var. <i>capitata</i>	0.01	0.01	1
<i>Navicula viridula</i> var. <i>rostellata</i>	0.01	0.01	1

Appendix 13. SIMPER of selected stations. Stations 4, 5, 6, 7, 8, 9 (Cd Ni) = Cluster 1, stations 13-15 (the reference site) = cluster 2

Taxa	Stations 4 - 9 similarity = 86.2% average abundance	Stations 1. 2. 3 similarity = 73.6% average abundance		dissimilarity between cluster 1 & 2 = 26.7% contribution of % dissimilarity
<i>Navicula gregaria</i>	0.18	0.1		14.6
<i>Achnanthes haukiana</i> var. <i>rostrata</i>	0.03	0.07		9.1
<i>Cocconeis placentula</i> var. <i>lineata</i>	0.05	0.05		4.7
<i>Navicula odiosa</i>	0.07	0.05		4.7
<i>Cyclotella meneghiniana</i>	0.00	0.07		4
<i>Nitzschia microcephala</i>	0.07	0.01		4
<i>Bacillaria paradoxa</i> (<i>paxillifer</i>)	0.03	0.03		3.4
<i>Achnanthes chiladanos</i>	0.01	0.02		3.4
<i>Nitzschia brevissima</i>	0.03	0.04		3.3
<i>Nitzschia frustrulum</i> var. <i>perpusilla</i>	0.03	0.05		2.9
<i>Achnanthes lanceolata</i>	0.04	0.02		2.8
<i>Nitzschia frustrulum</i>	0.01	0.03		2.4
<i>Navicula minima</i>	0.02	0.03		1.6
<i>Navicula salinarum</i> var. <i>intermedia</i>	0.02	0.02		1.5
<i>Actinocyclus normanii</i>	0.02	0.00		1.5
<i>Caloneis bacillum</i>	0.01	0.04		1.3
<i>Navicula viridula</i>	0.03	0.03		1.2
<i>Achnanthes haukiana</i>	0.02	0.01		1.1

REFERENCES

- Absil, M.C.P. & van Scheppingen Y. 1996. Concentrations of selected heavy metals in benthic diatoms and sediment in the Westerschelde Estuary. *Bull. Environ. Contam. Toxicol.* 56: 1008-1015.
- Allen, H.E. 1993. The Significance of Trace Metal Speciation for Water, Sediment and Soil Quality Standards. *The Science of the Total Environment, Supplement Part 1*, 23-45.
- Anonymous. 1990. Hudson River significant tidal habitats: a guide to the functions, values and protection of the river's natural resources, New York State department of state division of coastal resources and waterfront revitalization and The Nature Conservancy. 184 pages.
- Arujo, M., Bernard, F.D., Van Grieken, R.E.. 1988. Heavy metal contamination in sediments from the Belgian Coast and Scheldt estuary. *Marine Pollution Bulletin* 19: 269-273.
- Archibald, R.E.M. 1972. Diversity in South African diatom associations and its relation to water quality. *Water Res. (Great Britain)* 6: 1229-1238.
- Barber, H.G. and Haworth, E.Y. 1981. A guide to the morphology of the diatom frustule with a key to the British freshwater genera. *Freshwater Biological Association Scientific Publication #44*, Ambleside, Cumbria, UK.
- Battarbee, R.W., Charles, D.F., Dixit, S. & Renberg, I. 1999. Diatoms as indicators of surface water acidity. In: *The Diatoms: applications for the environmental and earth sciences*. Eds: E.F. Stoermer & J.P. Smol. Pub: Cambridge University Press, Cambridge. pp. 85-127.
- Baxter, M. & Jensen, T.E. 1980a. Uptake of magnesium, strontium, barium and manganese by *Plectonema boryanum* (Cyanophyceae) with special reference to polyphosphate bodies. *Protoplasma* 104: 81-89.
- _____ 1980b. A study of methods for in situ X-ray energy dispersive analysis of polyphosphate bodies in *Plectonema boryanum*. *Arch. Microbiol.* 126: 213-215.
- Beaver, J. 1981. Apparent ecological characteristics of some common freshwater diatoms. Ontario Ministry of the Environment, Toronto, Canada, 517 pp.

- Blanck, H., Wangberg, S.-Å, and Molander, S. 1988. Pollution-induced Community Tolerance-A new ecotoxicological tool. In Cairns J. Jr. and Pratt, J. R. eds. Functional testing of aquatic biota for estimating hazards of chemicals. ASTM STP 988. American Society for testing of materials, Philadelphia, PA. Pp. 219-230.
- Bray, J.R., Curtis, K.R., 1957. An ordination of the upland forest communities of Southern Wisconsin. *Ecological Monographs* 27:325-349.
- Charles, D.F. 1985. Relationships between surface sediment diatom assemblages and lakewater characteristics in Adirondack lakes. *Ecology* 66:994-1011.
- Charles, D.F., R.W. Battarbee, I. Renberg, H. Van Dam, and J.P. Smol. 1989. Paleoecological analysis of lake acidification trends in North America and Europe using diatoms and chrysophytes. Pages 207-276 in S.A. Norton, S.E. Lindberg, and A.L. Page, eds. *Acidic precipitation. Soils, aquatic processes, and lake acidification*. Vol. 4. Springer-Verlag, New York.
- Clarke, K.R. Warwick, R.M. 2001. Change in marine communities: an approach to statistical analysis and interpretation. 2nd edition. PRIMER-E: Plymouth.
- Cumming, B.F., J.P. Smol, J.C. Kingston, D.F. Charles, H.J.B. Birks, K.E. Camburn, S.S. Dixit, A.J. Uutala, and A.R. Selle. 1992. How much acidification has occurred in Adirondack region lakes (New York, USA) since preindustrial times? *Canadian Journal of Fisheries and Aquatic Sciences* 49:128-141.
- De Gregori, H. Pincchet, H. Arancibia, M. Vidal B. 1996. Grain size effect on trace metals distribution in sediments from two coastal areas of Chile. *Bull Environ contam Toxicol* 57:163-170.
- de Groot, A.J., Aschuppe, K.H., Salomons, W. 1982. Standardization of methods of analysis for heavy metals in sediments. *Hydrobiologia* 92: 689-695.
- Descy, J.F. & Coste, M. 1990. Utilisation des diatomees benthiques pour l'évaluation de la qualite des eaux courantes. Rapport Final. Contrat CCe B-71-23, FNDP.
- Dixit, S.S. & Smol, J.P. (1994). Diatoms as indicators in the Environmental Monitoring and Assessment Program-Surface Waters (EMAP-SW) Environmental Monitoring and Assessment, 31:275-306.
- Dodd, J.J. 1987. *Diatoms (The Illustrated Flora of Illinois)*. Carbondale and Edwardsville, IL: Southern Illinois University Press.

- Facetti, J., Dekov, V.M., Van grieken, R. 1998. Heavy metals in sediments from the Paraguay River: a preliminary study. *The science of the total environment* 209. pp 79-86.
- Fjordingstad, E. 1950. The microflora of the River Molleaa with special reference to the relation of benthic algae to pollution. *Folia Limnologica Scandanavica*, 5:1-123.
- Genter, R.B. Cherry, D.S., Smith, E.P., Cairns, J. Jr. 1987. Algal-periphyton population and community changes from zinc stress in stream mesocosms. *Hydrobiologia* 153:261-275.
- Gold, C. Feurtet-Mazel, A., Coste, M. Boudou, A. 2002. Field transfer of periphytic diatoms communities to assess short-term structural effects of metals (Cd, Zn) in rivers. *Water Res. Aug.* 36:354-364.
- Gold, C., Feurtet-Mazel, A., Coste, M. Boudou, A. 2003. Impacts of Cd and Zn on the development of periphytic diatom communities in artificial streams located along a river pollution gradient. *Arch Environ Contam Toxicol* Feb. 44:189-97.
- Gray, B.R. Hill, W.R. 1995. Nickel sorption by periphyton exposed to different light intensities. *J.N Am Benthol Soc* 14:299-305.
- Green, R.H., Vascotto, G.L. 1978. A method for the analysis of environmental factors controlling patterns of species composition in aquatic communities. *Water Resources*. 12:583-590.
- Hazen, R.E. 1981. Cadmium in an aquatic ecosystem. Doctoral dissertation New York University, New York, NY. 135 pages.
- Heip, C. 1974. A new index measuring evenness. *J. Mar. Biol. Assoc. U.K.* 54:555-557.
- Hill, M.O. (1973). Diversity and evenness: a unifying notation and its consequences. *Ecology* 54:427-432.
- Hustedt, F. 1930. Bacillariophyta (Diatomeae). In A. Pascher, ed. *Die Susswasser-Flora Mitteleuropas*. Heft 10. Gustav Fischer Verlag, Jena. 466p.
- Hustedt, F. 1939. Systematische und ökologische Untersuchungen über die Diatomeen-Flora von Java, Bali und Sumatra nach dem Material der Deutschen Limnologischen Sunda-Expedition III. Die ökologischen Faktoren und ihr Einfluss auf die Diatomeenflora, *Archiv für Hydrobiologie, Supplement* 16:274-394.
- Hustedt, F. 1953. Diatomeen aus dem Naturschutzpark Seon. *Arch. Hydrobiol.* 47:625-635.

- Hustedt, F. 1959. Die Diatomeenflora der Unterwässer von der Lesummündung bis Bremerhaven mit Berücksichtigung des Unterlaufs der Hunte and Geeste. Veröff. Inst. Meeresforsch. Bremerhaven 6:13-176.
- Ivorra, N. 2000. Metal induces succession in benthic diatom consortia. Ph.D. dissertation Universiteit van Amsterdam, Amsterdam, The Netherlands. pp. 163.
- Ivorra, N. Barranguet, C., Jonker, M., Kraak, M. H., Admiraal, W. 2002. Metal-induced tolerance in the freshwater microbenthic diatom *Gomphonema parvulum*. Environ Pollut. 116:147-57.
- Jensen, N. 1985. The Pennate Diatoms (a translation of Hustedt's "Die Kieselalgen, 2 Teil"). Koeltz Scientific, Germany.
- Jensen, T.E., Baxter, M., Rachlin, J.W. & Jani, V. 1982a. Uptake of heavy metals by *Plectonema boryanum* (Cyanophyceae) into cellular components, especially polyphosphate bodies: An X-ray energy dispersive study. Environ. Pollution. Ser. A 27:119-127.
- Jensen, T.E., Rachlin, J.W. Jani, V. & Warkentine, B. 1982b. An X-ray energy dispersive study of cellular compartmentalization of lead and zinc in *Plectonema boryanum* (Cyanophyceae) *Chlorella sacchorophila* (Chlorophyta), *Navicula incerta* and *Nitzschia closterium* (Bacillariophyta). Environ. Exp. Bot. 22:319-328.
- Jensen, T.E. & Corpe, W.A. 1993. Elemental composition of the polyphosphate bodies in microbial cells from a small lake. Arch. Hydrobiol. 127:385-393.
- Kelagher, B.P., Levinton, J.S., Oomen, J., Allen, B.J. Wong, W.H. 2003. Changes in Benthos following the clean-up of a severely metal polluted cove in the Hudson River estuary: Environmental restoration or ecological disturbance? Estuaries Vol. 26 No. 6 p. 1505-1516.
- Kelly, M.G., Whitton, B.A. 1995. The Tropic Diatom Index: a new index for monitoring eutrophication in rivers. J. Appl Phycol 7:433-444.
- Kelly, M.G., Penny, C.J., Whitton, B.A. 1995. Comparative performance of benthic diatom indices used to assess river water quality. Hydrobiologia 302:179-188.
- Kevin, R., Worsfold P. 1990. Analytical approaches to the monitoring of toxicological levels of cadmium, in the environmental samples. Trend Anal Chem 9: 228-231.

- Kneip, T.J., Hazen, R.E. 1979. Deposit and mobility of cadmium in a marsh-cove ecosystem and the relation to cadmium concentration in biota. *Environ. Health Perspect.* 28:67-73.
- Knutson, A.B., Klerks, P.L., Levinton, J.S. 1987. The Fate of Metal Contaminated Sediments in Foundry Cove, New York. *Environmental Pollution* 45:291-304.
- Kolkwitz, R. & Marsson, M. 1908. Ökologie der pflanzlichen Saprobien. *Ber. Deutsch. Bot. Ges.*, 22:505-519.
- Krammer, K., Lange-Bertalot, H. 1986. Süßwasserflora von Mitteleuropa. Band 2. Bacillariophyceae. Teil 1. Naviculaceae. Gustav Fischer Verlag, Stuttgart.
- Krammer, K., Lange-Bertalot, H. 1988. Süßwasserflora von Mitteleuropa. Band 2. Bacillariophyceae. Teil 2. Bacillariaceae, Epithemiaceae, Surirellaceae. Gustav Fischer Verlag, Stuttgart.
- Krammer, K., Lange-Bertalot, H. 1991a. Süßwasserflora von Mitteleuropa. Band 2. Bacillariophyceae. Teil 3. Centrales, Fragilariaceae, Eunotiaceae. Gustav Fischer Verlag, Stuttgart.
- Krammer, K., Lange-Bertalot, H. 1991b. Süßwasserflora von Mitteleuropa. Band 2. Bacillariophyceae. Teil 4. Achnanthaceae, Kritische Ergänzungen zu Navicula (Lineolatae) and Gomphonema. Gustav Fischer Verlag, Stuttgart.
- Lakhan, V.C., Cabana, K., LaValee, P.D. 2003. Relationship between grain size and heavy metals in sediments from beaches along the coast of Guyana. *Journal of coastal Research* vol 19, No 3 pp 600-608.
- Lange-Bertalot, H. 1979. Pollution tolerance of diatoms as a criterion for water quality estimation. *Nova Hedwigia*, 64:285-304.
- Limburg, K.E., Moran, M.A., McDowell, W.H. 1986. The Hudson River Ecosystem. Springer-Verlag, New York, NY. 331 pages.
- Lofts, S., Tipping, E. 2000. Solid-solution metal partitioning in the Humber rivers: application of WHAM and SCAMP. *Science Total Environ* 251/252:381-399.
- Lowe, R.L. 1974. Environmental Requirements and Pollution Tolerance of Freshwater Diatoms. U.S. Environmental Protection Agency, EPA-670/4-74-005. Cincinnati, Ohio, USA.
- Margalef, R. 1957. La teoria de la informacion en ecologia. *Mem. R. Acad. Cien Artes* 32:373-449.

- Margalef, R. 1968. Perspectives in ecological theory. University of Chicago Press, Chicago. 111 pp.
- Mason, I.M., Guzkowska, M.A.J., Rapley, C.G. 1994. The response of lake levels and areas to climatic change. *Climatic Change* 27:161-197.
- Menhinick, E.F. 1964. A comparison of some species diversity indices applied to samples in field insects. *Ecology* 45:859-861.
- Michelutti, N., Hay, M.B., Marsh, P., Lesack, L., Smol, J.P. 2001. Diatom changes in lake sediments from the Mackenzie Delta, N.W.T., Canada: Paleohydrological applications. *Arctic, Antarctic, and Alpine Research* 33:1-12.
- Moore, J.N. Brook E.J., Jolms, C. 1989. Grain size partitioning of metals in contaminated coarse – grained river floodplain sediment: Clark Fork River, Montana, USA. *Envir Geol Wat Sci* 14:107-115.
- Moore, J.W., Ramamoorthy, S. 1984. Heavy metals in natural waters: Applied Monitoring and Impact Assessment. Springer-Verlag, Berlin: 268pp.
- Nakanishi, Y., Sumita, M., Yumita, K., Yamada, T., Hunjo, T. 2004. Heavy metal pollution and its state in algae in Kakehashi River and Godani River at the foot of Ogoya Mine, Ishikawa Prefecture. *Analytical Sciences* 20:73-78.
- Otero X.L. Macias, F. 2002. Spatial and seasonal variation in heavy metals in interstitial water of salt marsh soils. *Environ. Pollut.* 120:183-90.
- Pan, Y., Stevenson, R.J., Hill, B.H., Herlihy, A.T. & Collins, G.B. 1996. Using diatoms as indicators of ecological conditions in lotic systems: a regional assessment. *J. N. Am. Benthol. Soc.* 15:481-95.
- Patrick, R. 1963. The structure of diatom communities under varying ecological conditions. *Ann. New York Acad. Sci.* 108:353-358.
- Patrick, R. 1973. Use of algae, especially diatoms, in the assessment of water quality. American society for testing and materials, special technical publication 528:76-95.
- Patrick, R., Hohn M.H., Wallace, J.H.. 1954. A new method for determining the pattern of the diatom flora. *Notulae Naturae*, No. 259. 12 pp.
- Patrick, R., Reimer, C.W. 1967. The Diatoms of the United States, Exclusive of Alaska and Hawaii. Volume 1. Monograph of the Academy of Natural Sciences of Philadelphia, Number 13. pp. 668.

- Patrick, R., Reimer, C.W. 1975. The Diatoms of the United States, Exclusive of Alaska and Hawaii. Volume 2, Part 1. Monograph of the Academy of Natural Sciences of Philadelphia, Number 13. pp 213.
- Patrick, R., Strawbridge, D. 1963. Variation in the structure of natural diatom communities. *The American Naturalist*, 97:51-7.
- Pielou, E.C. 1977. *Mathematical Ecology*. John Wiley & Sons, Inc. N.Y. 385 pp.
- Pielou, E.C. 1984. *The Interpretation of Ecological Data, A Primer on Classification and Ordination*. John Wiley & Sons, New York. 263 pp.
- Prosi, F. 1981. Heavy metals in aquatic organisms. In *Metal Pollution in the Aquatic Environment*, Forstner, J. and Wittmann, G.T.W. eds, Springer-Verlag, Berlin:271-324.
- Rachlin, J.W., Jensen, T.E., Baxter, M. & Jani, V. 1982a. Utilization of morphometric analysis in evaluating response of *Plectonema boryanum* (Cyanophyceae) to exposure to eight heavy metals. *Arch. Environ. Contam. Toxicol.* 11:323-333.
- Rachlin, J.W., Warkentine, B.E., & Jensen, T.E. 1982b. The growth response of *Chlorella sacchorophila*, *Navicula incerta* and *Nitzschia closterium* to selected concentrations of cadmium. *Bull. Torrey Bot. Club* 109:129-135.
- Rachlin, J.W., Jensen, T.E., Baxter, M. & Jani, V. 1984. The toxicological response of the alga *Anabaena flos-aquae* (Cyanophyceae) to cadmium. *Arch. Environ. Contam. Toxicol.* 13:143-151.
- Rachlin, J.W., Jensen, T.E., & Warkentine, B.E. 1985. Morphometric analysis of the response of *Anabaena flos-aquae* and *Anabaena variabilis* (Cyanophyceae) to selected concentrations of zinc. *Arch. Environ. Contam. Toxicol.* 14:395-402.
- Rai, L.C., Jensen, T.E. & Rachlin J.W. 1990. A morphometric and X-ray energy dispersive approach to monitoring pH-altered cadmium toxicity in *Anabaena flos-aquae*. *Arch. Environ. Contam. Toxicol.* 19:479-487.
- Ramesh, R., Subramanian, V., Van Grieben, R. 1990. Heavy metal distribution in sediments of Krishna River Basin. India. *Environ Geol Wat Sci* 15:207-216.
- Ravera, O. 1979. Consideration on the effects of pollution at community and population level. *Experientia* 35:710-713.
- Reese, M.J. 1937. The microflora of the non-calcareous streams Rheidol and Melindwr with special reference to water pollution from lead mines in Cardiganshire. *J Ecol* 25:385-407.

- Resource Engineering 1983. Preliminary site background data analysis of Foundry Cove, prepared for Vinson & Elkins. Houston, TX.
- Shannon, C.E. 1948. A mathematical theory of communication. *Bell System Tech. J.* 27:379-423, 623-656.
- Sheldon, A.L. 1969. Equitability indices: dependence on the species count. *Ecology* 50: 466-467.
- Simpson, E.H. 1949. Measurement of diversity. *Nature* 163: 688pp.
- Statview 5 SAS Institute copyright 1999.
- Stevenson, R.J. 1984. Epilithic and epipellic diatoms in the Sandusky River, with emphasis on species diversity and water pollution. *Hydrobiologia* 114:161-175.
- Stoermer, E. F., Kreis, R. G. Jr. and Andresen, N. A. 1999. Checklist of diatoms from the Laurentian Great lakes. II. *J. Great Lakes Res.* 25:515-566.
- Stronkhorst, J., Vos, P.C., Misdorp, R. 1994. Trace metals, PCB's and PAHs in Benthic (Epipellic) diatoms from intertidal sediments; a pilot study. *Bull. Environ. Contamin. Toxicol.* 52:818-824.
- Thorne, L.T., Nickless, G. 1981. The relation between heavy metals and particles size fraction within the Severn Estuary (U.K.) inter-tidal sediments. *Science Total Environment* 19:207-213.
- Twiss, M.R., Campbell, P.G.C., Auclair, J.C. 1996. Regeneration, recycling, and trophic transfer of trace metals by microbial food-web organisms in the pelagic surface waters of Lake Erie. *Limnol. Oceanogr.* 47:1425-1437.
- U.S. Environmental Protection Agency (EPA). Unpublished Data. Marathon Battery Company Remedial Action Plan, EPA ID#NYD010959757.
- Vinyard, W. 1979. *Diatoms of North America*. Mad River Press.
- Weng, L., Temminghoff, E.J.M., Lofts, S., Tipping, E. Nan Riemsdijk, W.H. 2002. Complexations with dissolved organic matter and solubility control of heavy metals in a sandy soil. *Environmental Science and Technology*, vol 36 issue 22 pp 4804-4810.
- Whittaker, R.H. (1960). *Vegetation of the Siskiyou Mountains, Oregon and California*. *Ecological Monographs* 30:279-338.
- Whitton, B.A. 1971. Toxicity of heavy metals to freshwater algae: a review. *Phykos* 9:116-125.

- Williams, L.G. and C. Scott. 1962. Principal diatoms of major waterways of the United States. *Ecology* 7:365-379.
- Williams, L.G. & Mount, D.I. 1965. Influence of zinc on periphytic communities. *Am J Bot* 52:26-34.
- Wilhm, J.L. & Dorris, T.C. 1968. Biological parameters for water quality criteria. *Bio Science* 18:477-481.
- Wright, P. Mason, C.F. 1999. Spatial and seasonal variation in heavy metals in the sediments and biota of two adjacent estuaries, the Orwell and the Stour, in eastern England. *The science of the total environment* 226:139-156.

DIATOM IDENTIFICATION SITES

ADIAC diatom image database

<http://rbg-web2.rbge.org.uk/ADIAC/>

Bowling Green State University algae image archive

<http://www.bgsu.edu/departments/biology/facilities/algae/index.html>

California Academy of Sciences, diatom collection

<http://www.calacademy.org/research/diatoms/>

Fort Hays State University

<http://www.fhsu.edu/biology/Eberle/DiatomListHomepage.html>

Great Lakes diatom home page, University of Michigan

<http://www.umich.edu/~phytolab/GreatLakesDiatomHomePage/top.html>

South Florida periphyton research group

<http://www.serc.fiu.edu/periphyton/index.htm>