Patterns in Potamoplankton of the Saginaw River and Shiawassee National Wildlife Refuge, Michigan

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Abstract

As part of ongoing research evaluating the baseline conditions of the Shiawassee National Wildlife Refuge (SNWR), Michigan, prior to a large scale floodplain wetland restoration, this project focused the variation in phytoplankton and water chemistry; spatially, seasonally, and hydrologically. During the growing season of 2014, phytoplankton and water chemistry parameters were surveyed throughout the SNWR and Saginaw River. These samples were synthesized and data were compared for patterns by season, sample location, and longitudinal position on the Saginaw River. Phytoplankton and water chemistry were also compared to hydrologic data including river slope (which served as an indicator of hydraulic residence time) as well as the occurrence of reverse or stalled flow in the Saginaw River.

Results indicated that phytoplankton communities in floodplain wetlands, tributaries, and the main river channel varied significantly by taxonomic composition and abundance, as did key water chemistry parameters (Total Phosphorus, Nitrate, Total Dissolved Solids). Additionally, potamoplankton communities in the Saginaw River varied longitudinally, becoming more abundant, taxonomically rich, and diverse from upstream to downstream. Prolonged residence times due to low slopes also showed more diverse and abundant potamoplankton communities with fewer diatoms than times of high slopes. The occurrence of reverse flow was found to be associated with a homogenizing effect along the course of the Saginaw River both in terms of biology and water chemistry.

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Introduction

Floodplain wetlands play a crucial role in the ecology of riverine systems. There are many ways in which they influence important biotic and abiotic processes including flood attenuation, baseflow yields, fish spawning habitat, nutrient processing, and carbon dynamics (Junk et al. 1989, Racchetti et al. 2011, Lizzote et al. 2012, Mackay et al. 2012, Powers et al. 2013). Floodplain systems also affect the quantity and composition of riverine phytoplankton, (potamoplankton) found within the water column of main channel of the river itself (Köhler et al. 2002, Nabout et al. 2006, Walks 2007, Weilhoefer et al. 2008, Houser et al. 2010, Mackay et al. 2012).

The Saginaw River in Michigan (Figure 1) constitutes as much as 90% of the tributary nutrient loading to the Saginaw Bay (, Bierman and Dolan 1986, Cha et al. 2013) and plays an important part in shaping the phytoplankton productivity in the inner bay (Stoermer and Theriot 1985). A number of algal taxa common in the Saginaw Bay plankton community are reported to be riverine in origin, including *Rhodomonas (Cryptophyte), Gloeotila (Green Algae), Cyclotella*, *Aulacoseira*, *Thallasiorsira (Diatoms), Aphanizomenon,* and *Oscillatora* (*Cyanobacteria*) (Stoermer and Theriot 1985). The Saginaw River therefore provides both key nutrients and inoculum for phytoplankton populations in the bay (Stoermer and Theriot 1985, Bridgeman et al. 2013). The Saginaw River and Bay are both designated as Areas of Concern by the U.S. Environmental Protection Agency with twelve Beneficial Use Impairments (BUIs) including loss of fish and wildlife habitat, eutrophication or undesirable algae, and degradation of phytoplankton and zooplankton populations (Newman 2011, Buchanan et al. 2013).

The study of riverine plankton communities dates back as early as 1898 when Zacharias coined the term “potamoplankton”, (stemming from potamos, the Greek word for river; Reynolds 2000). But, research related to potamoplankton has been relatively rare in comparison to the plankton of other aquatic systems such as lakes, estuaries, and wetlands (Mercado 2003, Bergstöm et al. 2008). This in part reflects the fact that for many years, it was debated whether true potamoplankton could even exist in rivers, given that their populations would be limited constant advective losses, turbulence, and light limitation (Allen and Castillo 2007). Indeed, downstream washout is often a limiting factor for these organisms since they cannot maintain position against currents (Walks 2007). However, it has been more recently shown that phytoplankton do in fact occur in most major rivers of the world, with some works estimating that all rivers of 4^{th} order or greater carry a phytoplankton population (Reynolds 2000, Dokulil 2013). The Saginaw River is a 7^{th} order river putting it well beyond this size threshold and in fact places it near the upper limit of rivers able to sustain a population of plankton due to light limitation and turbidity (Houser et al. 2010).

It is generally held that secondary production in larger rivers depends largely on internal autochthonous carbon production from algae (Vannote et al 1980, Thorp and Delong 1994). In addition, algae often makes up a substantial proportion of the total suspended carbon in large rivers, ranging from 10% (Ohio River) to greater than 60% (River Meuse and Rhine River) (Houser et al. 2010). This implies that the planktonic algae could be an important component of riverine food webs (Walks 2007) and provide an important energy source for planktonic grazers such as *Keratella* and *Brachionus*, benthic filter feeders such as bivalves, and collector-gatherer invertebrates such as benthic chironomids (Vannote et al. 1980, Reynolds 2000, Wu et al. 2013). Potamoplankton can also be an important factor in river management (Wehr 1998) because they can affect the quality of water (drinking and irrigation), complicate river navigation and recreation, and influence fisheries.

There are several major differences between riverine and lentic phytoplankton. Potamoplankton must be able to tolerant high levels of turbulence, light limitation, sedimentation, and advective downstream transport (Bukavecas et al. 2011). As a result, potamoplankton often have very high and constant concentrations of photosynthetic pigment in order to maximize exposure to favorable light conditions (Descy and Metens 1996). These conditions favor hardy, quickly reproducing, “r” selective species such as small centric diatoms and small chlorococcal green algae (Descy and Metens 1996, Lair and Reyes-Marchant 1997, Mercado 2003, Dokulil 2013), and therefore river plankton communities generally have a lower biomass than their lentic counterparts (Bellinger and Sigee 2010) . Indeed 90% of the potamoplankton biomass in many rivers is composed of nanoplankton that is 20 µm or less in diameter (Chételat et al. 2006). Other significant types of algae that dominate in high turbulence and low light include *Scenedesmus, Chlamydomonas*, and *Cryptomonas*, which require as little as 5 hours of time in the photoactive zone of the water column per day (Reynolds 2000, Bellinger and Sigee 2010). However, the small size of these riverine plankton can make them susceptible to zooplankton grazing if the river is large enough for a significant population (Everbecq et al. 2001).

In tropical and subtropical systems, cyanobacteria can be a common constituent of the riverine plankton community (Allan and Castillo 2007). Some studies have suggested that Great Lakes tributary rivers and associated coastal wetlands can act as inocula for harmful algal blooms (HABs) of species such as *Microcystis aeruginosa* (Irvine and Murphy 2009, Bridgeman et al. 2013). Others have suggested that extremely long residence times in floodplain environments can lead to the development of nuisance cyanobacteria populations (Wehr 1998). Floodwaters from the river main channel can provide a stock of algal colonizers to a wetland, and algae within a wetland are also often flushed into the main river channel during flood pulses (Mackay et al. 2012, Mayora et al. 2013,Weilhoefer et al. 2013). It has been reported that while planktonic diatom diversity is often higher in river channels than in adjacent floodplain wetlands, the magnitude and duration of flooding often influences the degree of this difference (Weilheofer et al. 2013).

In the lower Saginaw River system, the combination of low slope, variable Lake Huron surface elevations and seiche activity can influence the river's velocity and even direction of flow. Due to the river being located at the end of a long shallow embayment with large lake-ward fetch, it can be easily affected by wind-driven seiches. The Bay experiences some of the largest magnitudes seiches of the entire Laurentian Great Lakes (Trebitz et al 2002). Due to the very low slope of the Saginaw River, small changes in water surface elevation of Saginaw Bay due to seiches can be enough to completely stall flows in the river channel and occasionally cause the river to flow backwards into the Shiawassee Flats region and back up the lower connecting reaches of the Saginaw's tributaries. Reversed flow from seiche activity has been recorded as far upstream as the village of St. Charles on the Bad River (a tributary of the Shiawassee), which is nearly 50 kilometers upstream of where the Saginaw meets Lake Huron (Newman 2011) (Figure 1). These events greatly increase the water residence time within the main river channel and likely alter nutrient availability, temperature, and phytoplankton production due to mixing of lake, wetland, and tributary waters (Trebitz et al. 2002, Reid and Hamilton 2007, Larson et al. 2012). However, the river may also experience stalled flows due to lack of upstream catchment flow as well.

This project was part of a large scale wetland restoration at the U.S, Fish and Wildlife Service (USFWS) Shiawassee National Wildlife Refuge (SNWR) (Buchanan et al. 2013). The SNWR restoration project was initiated in 2010 with a $1.5 million grant from the Great Lakes Restoration Initiative (GLRI) and involves restoring and reconnecting 915 hectares of floodplain in the National Wildlife Refuge. The goal of this restoration is to provide improved habitat for fish, birds, and insects, as well as to contribute to the delisting of the Saginaw River and Bay's BUIs, of which algae and phytoplankton are directly related (Buchanan et al 2013). As part of pre-restoration monitoring, graduate students from the University of Michigan performed studies on various aspects of the refuge's biology and hydrology. I was interested in the role of potamoplankton in the Saginaw River system and if the refuge had any effect on downstream populations and water quality. I hypothesized that potamoplankton composition and abundance would vary with time of year and would increase downstream of the SNWR due to flushing and downstream advective transport from floodplain habitats. I also suspected that periodic seiche events in the Saginaw Bay might be related to changes in potamoplankton due to the prolonged hydraulic residence in heterogeneous backwater and floodplain habitat found within the SNWR and Shiawassee Flats as a whole. To test these hypotheses, I conducted survey of the riverine plankton community and documented flow events throughout the growing season of 2014.

My study was initiated in the spring of 2014 with the following objectives:

1. To document phytoplankton communities in the Shiawassee Flats wetlands and rivers prior to a large scale wetland restoration at the USFWS Shiawassee National Wildlife Refuge;
2. To provide a first look at the potamoplankton populations of the Saginaw River system and its composition longitudinally and seasonally
3. To examine responses in the Saginaw River algal community to reverse- and stalled flow events which are common, particularly in the Shiawassee Flats area.

Methods

Sampling sites

The Shiawassee Flats (SF) ecosystem is composed of massive floodplain habitats interspersed among the confluences of several of the largest rivers in Michigan. The Saginaw River (16,350 square kilometers in drainage area) is formed by the confluence of the Shiawassee, Flint, Cass, Bad, and Tittabaswassee Rivers, flowing 36 kilometers from the Shiawassee National Wildlife Refuge to Lake Huron, passing through the large urban areas of Saginaw and Bay City. Unusually for a river of its size, the Saginaw flows to the Bay uninterrupted by locks or dams; however, it is dredged and maintained for navigation purposes to depths of between 7.6 and 9 meters (Cardenas et al. 1995). The Saginaw has a sporadic gaging history dating back as early as 1908, but consistent discharge measurement has been in place since the 1970's. Its hydrograph shows great variation in discharge with a

90% exceedance flow of 36.0 cms, a 50% exceedance flow of 114.7 cms, and a 10% exceedance flow of 543.7 cms. There is a clear relationship between the flow of the upstream rivers and the occurrence of stalled flow (Figure 2) (Wiley 2015, personal correspondence), with stalled flows often occurring when the input of upstream rivers is low. Also, the distribution of daily averaged slopes from the river shows that low to stalled flow is fairly typical (Figure 3) (Wiley 2015, personal correspondence).

Sample sites in this study were chosen to represent longitudinal variation in the Saginaw River and Shiawassee Flats, as well as to highlight differences between the main river channel, its tributaries, and the managed wetland units within the Shiawassee National Wildlife Refuge (Figure 1). Specifically, sampling sites included two managed wetland units in the Shiawassee National Wildlife Refuge, two tributary rivers flowing into the SNWR wetland complex, and 5 stations on the main river channel below the refuge, distributed longitudinally from the refuge to the Saginaw River mouth (referred to as Wetland, Tributary, and Main Channel units below).

The two wetland units lay within the wildlife refuge and are bounded on all sides by artificial levees and water-control structures. The first one is known as the Ferguson Bayou and is a mostly lowland hardwood swamp with an abandoned paleochannel of the Flint River passing through the length of it. This abandoned channel actively conveys flow only during high floods (Heitmeyer et al. 2013). The second wetland is known as the Grefe Pool. This is a hydrologically managed deepwater marsh with predominantly open water and dense submerged vegetation, with some emergent aquatic vegetation and small shrubs along the edges. The wetland is 0.5 to 1.0 meter in depth throughout most its 63.5 acres (maximum depth ~ 1 meter) and only actively receives river water during large flood events on the Flint and/or Shiawassee River (Newman 2011, Heitmeyer et al. 2013).

Tributary rivers examined included the Spaulding Drain (Flint River) and the Cass River. The Spaulding Drain is connected to the two sampled wetland units via spillways and artificial water-control structures. It is an artificial diversion channel that carries the bulk of the Flint River discharge from its historic channel directly to the Shiawassee River. The Flint drains approximately 3,440 square kilometers (Table 1) of largely rural agricultural land of the "Thumb" region of Michigan as well as the highly urbanized area of Flint, Michigan (population: 99,763 census.gov) (Figure 1), receiving as much as 1.4 cubic meters per second of wastewater effluent from the city of Flint (Newman 2011). My sampling site on the Spaulding Drain is downstream of several intermittently connected wetlands (including the two I sampled) and represents a tributary site that experiences significant outputs from the adjacent wetlands depending on hydrologic conditions. The second tributary sampling site was on the Cass River. This river also drains the rural agricultural land of the "Thumb" region of Michigan and enters into the main river channel downstream of the Flint River (Spaulding) confluence (Figure 1). The Cass River drains 2,350 square kilometers of land (Table1) and is considered a very flashy river, with highest flows in March and lowest flows in August (Newman 2011). The Cass does also connect to some adjacent wetland units, but my site was located 2km upstream of these connections. Thus, the Cass samples represent a tributary river prior to entering the Shiawassee Flats wetlands area.

My five main Saginaw River channel sites were named based on their closest geographic locations. The Gage site was the furthest upstream main channel site and was named for its proximity to the USFWS SNWR Shiawassee Gaging Station. It was located within the wildlife refuge near the large backwater (Flats) areas that lies between the confluence with the historical Flint River channel and the mouth of Spaulding Drain and can be thought of as the uppermost regions of the Saginaw River. The Greenpoint site was next downstream of the Gage site and was named for its proximity to Greenpoint Island, which lies at the confluence with Tittabawassee River. This site was meant to represent mixed river conditions immediately downstream of the tributary confluence and Flats areas. The Zilwaukee site was chosen to represent river conditions after it had passed through the major city of Saginaw (population: 49,844, census.gov). The Bay City site was located just upstream of Bay City (population: 34,149, census.gov) near Middle Ground Island. It is below the influence of the Crow Island State Game Area, which is a DNR-managed wildlife area composed of large managed wetland units similar to those of the Shiawassee NWR. My final site was the Rivermouth, which was downstream of the city of Bay City and located just before (around 0.8 km) from where the open waters of the Saginaw Bay begin. This site was chosen to represent what the Saginaw River water was delivering to the Saginaw Bay after passage through the whole system.

Sampling Protocols

Sampling was taken during the growing season of 2014. Samples were taken May 6^{th}, 7^{th}, and 22^{nd}, June 6^{th} and 20^{th}, July 1^{st}, 2^{nd}, 17^{th}, 18^{th}, and 31^{st}, August 14^{th} and 28^{th}, September 19^{th}, and October 18^{th}. This provided for a total of 11 total sampling "events". Samples were collected at all sites except for on the 6^{th} and 7^{th} of May and the 20^{th} of June. The total number of samples collected was 89. River sites were sampled from a 4.5 meter flat bottom aluminum boat with a jet motor. The two wetland units were accessed using a 4.3 meter aluminum canoe. All sites were sampled within the same day with three exceptions. The May 6th, July 1st , and July 17th sampling events which were split up into two consecutive days' work.

A YSI 6600 V2 Multi-Parameter Water Quality Sonde was used to collect data on Temperature (°C), Conductivity (μS), Total Dissolved Solids (g/l), Turbidity (NTU), Chlorophyll-a (μg/l), and Phycocyanin (an accessory photosynthetic pigment, cell equivalents/ml). Water was pumped from approximately 0.5 m depth to the sonde using a 227 liter/minute marine bilge pump. Measurements were recorded for around 30 seconds and then averaged in order to ensure representative water-quality measurements. In order to account for variation in the fluorescence used for the Chlorophyll-a parameter, the raw values collected from the sonde were corrected for the Turbidity at the time of sample. The Phycocyanin values were corrected for both Turbidity and Chlorophyll values. These corrections were performed according the YSI 6600 Sonde user manual (YSI Inc. 2009).

In addition to these water quality parameters, a 0.5 liter grab sample of the water was collected from 0.5 meter depth at each site. The single sampling depth was chosen because the main channels of rivers in general tend to be turbulent and well mixed, so a sample taken from one location should be representative of the entire flow. These samples were kept on ice and frozen within 12 hours of being collected. The majority of these samples were sent to Heidelberg University Center for National Water Quality Research for nutrient analyses that included total phosphorus (TP), soluble reactive phosphorus (SRP), nitrate (NO3), nitrite (NO2), ammonia (NH3), chloride (Cl), sulphate (SO4), silica (SiO2), and iron (Fe). In addition, two weeks' worth of samples were analyzed at the University of Michigan

School of Natural Resources for Total Phosphorus, Nitrate, Nitrite, and Total Reactive Phosphorus. Measurements were made manually using standardized Hach reagents and a ThermoSpectronic UV 1 spectrophotometer equipped with flow through cell and sipper (HACH Methods # 8192, 8048, and 8190). These results were compared to results from Heidelberg replicate samples to evaluate consistency.

Total Phosphorus (TP) samples were pretreated with acid digestion and permanganate oxidation following standard methods (APHA 1995) prior to measurement of orthophosphate content by the ascorbic acid method. Soluble reactive phosphorus (SRP) samples were filtered in the laboratory and then directly assayed for orthophosphate.

Saginaw River water-surface slope, which was used as a proxy for hydraulic residence time within the system (see below), was calculated using stage data from the USFWS gaging station at SNWR and the USGS gaging station located in Essexville (USGS Gage # 04157063) (Figure 1). The USFWS gage represented water levels at the upstream end of the Saginaw River, while the USGS gage represented water levels at the river mouth (downstream). Fifteen-minute stage data from each gage were averaged for the date and then the slope was calculated using the difference between the upstream and downstream elevations divided by the distance between the two stations (40km).

Potamoplankton

Phytoplankton samples were collected using a 227 liter/minute marine bilge pump at 0.5-1.0 m depth, to fill a 1-liter, dark brown Nalgene sample bottle (Bellinger and Sigee 2010, APHA 1995). Samples were preserved immediately adding 10 ml of Lugol's Iodine to the slightly less than 1 liter sample to create a 1% Lugol's Iodine preserved solution (APHA 1995). The Lugol's solution served a threefold purpose. First, it served as a preservative;

second it infiltrated the cell walls of buoyant alga and caused them to settle more rapidly during concentration; and third, it facilitated identification by staining the starch of green algae a dark purple to black color (Prescott 1970, Bellinger and Sigee 2010). In the laboratory, samples were set out and allowed to settle for a minimum of 48 hours before the top 900 mL of the sample were siphoned off, leaving a 100 mL 10:1 concentrated phytoplankton solution (APHA 1995).

These concentrated phytoplankton samples were analyzed using a 0.6 mL circular counting chamber and Bausch and Lamb Microzoom 2 High Performance microscope (250x working magnification). All phytoplankton visible in the field of view down to roughly 3-5 µm in size were counted along a minimum of two diametric transects in the counting chamber. All phytoplankton counted were identified to the genus level. A Leitz Wetzler Dialuxe 20 microscope with oil immersion microscopy of up to 1,000x magnification was used to observe samples in greater resolution as well, in order to verify and ease identifications made with the Bausch and Lamb microscope. Cell counts in cells/ml were calculated by dividing the average number of cells counted by the volume of the transect then converting to milliliters (Bellinger and Sigee 2010, 1995). A list of the genera identified and enumerated was compiled for all samples (Appendix 1).

References for algae identification included Lewis Tiffany's "Algae of Illinois" (1952), Bellinger and Sigee's "Freshwater Algae: Identification and Use as Bioindicators" (2010), Gilbert Smith's "Freshwater Algae of the United States" 1950, Eileen Cox's "Identification of Freshwater Diatoms from Live Material" (1996), and G.W. Prescott's "How to Know the Freshwater Algae" (1978). Additionally numerous online resources were consulted including "Diatoms of the United States" developed by the University of

Colorado along with the USGS (www.westerndiatoms.colorado.edu), Michigan Technological University's "Keweenaw Algae" (www.keweenawalgae.mtu.edu), the University of New Hampshire's "PhycoKey" (www.cfb.unh.edu) , Craticula University's "Common Freshwater Diatoms of Britain and Ireland" (www.craticula.ncl.ac.uk), "Algaebase" (algaebase.org), the "Protisit Information Server" (www.protisti.i.hosei.ac.jp), and NOAA GLERL's "Great Lakes Water Life Photo Gallery" (www.glerl.noaa.gov).

Statistical Methodology

Data were compiled and synthesized in Microsoft Excel as well as R Open Source Statistical Software. All statistical analyses were performed either using R or IBM SPSS. Statistical methods used included descriptive statistics, Person's R correlation, NMDS, ANOVA, and linear regression. The Pearson's R correlation was run using both SPSS and R; with a 2-tailed 95% confidence interval and pairwise missing case deletion. The correlation was run in SPSS for ease of visual interpretation, and was run in R for ease of export and formatting (results from both matched). A multi-factor ANOVA involving both site category (see Sampling Sites Section), season (indicated by sequential order of sampling event), and an interaction term was run using both SPSS and R, with a 2-tailed 95% confidence interval, and pairwise missing case deletion. For significant differences among site categories, a Tukey HSD Post-Hoc Comparison was run in order to assess how the categories varied. Linear regressions were run in R using a 2-tailed 95% confidence interval and pairwise missing case deletion. A non-metric multi-dimensional scaling analysis (NMDS) was also performed on the phytoplankton taxonomic data normalized by cell count of sample, using the metaMDS function of the "Vegan" package in R-Studio. Results were considered significant if p-values < 0.05 and were considered highly significant if p-values $<$ 0.01

Results

Categorical and Seasonal Variations in Water Quality

Nitrate varied widely (mean = 1.27 ppm; range: 0 – 6 ppm, Table 2), with the biggest differences occurring between the wetland and river sites. Concentrations varied significantly (Table 3) between all three site categories with tributaries having the highest concentrations, wetlands having the lowest concentrations, and the main river channel having intermediate concentrations. In *a posteriori* contrasts, the differences between rivers and wetlands were highly significant. However, there was no significant difference between main channel river and tributary (Table 3). There was no significant difference in nitrate by season (Table 3). Measured nitrate concentrations were highest at the Spaulding Drain, Cass River, and Saginaw Rivermouth sites (Table 2). Ammonia (NH_3) concentrations were much lower than nitrate, with a mean of 66 ppb but also exhibited a relatively large range from 16 to 141 ppb. However, no statistically significant differences were found among sites, time of year, or site category. TP had a mean concentration of 82 ppb and ranged from below detection (nominal 0) to 471 ppb. The river sites had highly significantly lower average values than the wetland sites (Table 3). TP also varied significantly by season (Table 3). Total dissolved solids (TDS), a proxy for the other major dissolved chemical constituents of the water, ranged from 220.5 ppm to 543.4 ppm (mean= 409 ppm) (Table 2). TDS was significantly lower in the wetlands than the river sites (highly significant) (Table 3) and also varied significantly by season (highly significant) (Table 3).

Temperature in the river site ranged from 12.2 to 26.7 and had a mean of 20 degrees Celsius (Table 2), but of course it fluctuated greatly with time of year. It was highest at the middle Saginaw River sites including Bay City and Zilwaukee. However, it did not vary significantly within each site category. Turbidity had a mean value of 17 NTU but ranged between 3 and 64 NTU (Table 2). The highest values for this parameter were collected at river samples sites during the high flow event in mid-May. Despite this, I found no statistically significant differences in turbidity by either site category or season. All data used for this analysis can be found in Appendix 2.

Categorical and Seasonal Trends in Potamoplankton

Chlorophyll-a showed a wide range of values from 1.0 to 36.6 µg/L with a mean of 11.3 µg/L (Table 4). Wetlands sites had much higher chlorophyll-a concentrations than the river and tributary sites (highly significant). In contrasts the main channel sites had a slightly higher average concentration than the tributaries (not significant) (Table 3). Chlorophyll-a also varied significantly with season with highest values in mid-summer and lower values in early spring and fall. Phycocyanin, the pigment used a proxy for cyanobacteria abundance, showed a mean of 754.1 cell eqv./ml but ranged as high as 4275.7 cell eqv./ml. Phycocyanin did not vary significant by either site or season (Table 3). There are several large outliers, which correspond with cyanobacterial algal blooms in the wetland sites during July (see below), as well as some high flow events in May. The Cass River site had concentrations lower than the detection limits of the YSI sonde on several dates.

Potamoplankton cell densities had mean value for all sites was 8,305 cells/ml, with a range from 670 to 47,900 cells/ml (Table 4). The wetlands had a much larger range than the river sites. The maximum cell density observed in this study was nearly 48,000 cells/ml at the Ferguson Bayou and was composed of a bloom of mostly Euglenophytes and Cryptophytes. Phytoplankton abundance varied significantly by season (Table 3). The average proportion of diatoms to other algae was 46% but ranged as high as 100% and as low as 3% (Table 4). The highest average proportions of diatoms were observed at the Cass River, Greenpoint, and Spaulding Drain sites (Table 4). The ratio of diatoms to other algae was significantly different between site categories. Tributary rivers showed higher average proportions of diatoms than either the main channel or wetlands (both highly significant). The proportion of diatoms also varied significantly by season (highly significant) (Table 3). The ratio of green algae to diatoms was actually quite different from just the diatom ratio alone. The wetlands had significantly higher ratios of greens to diatoms than all river sites, and the main channel had higher ratios than the tributaries (but not significant).

Phytoplankton diversity and abundance showed similar trends to one another and varied significantly between sample site categories. Diversity (Simpson) was highest in the main river sites and lowest in the tributary sites (highly significant) with a mean of 11.5 and a range of 3.0 to 19.8. Average phytoplankton diversity was significantly different between the main channel and tributary sites but was not significantly different between either of these and the wetland sites. Plankton diversity varied significantly by season (Table 3). The mean value for genus richness was 29.82, but this ranged as high as 60 and as low as 7. Richness was highest in the main river and wetland sites but lowest in the tributary sites (significant). The main channel had a higher average richness than the tributaries (highly significant), as did the wetlands (significant). Richness also varied highly significantly by season (Table 3). All data used for this analysis can be found in Appendix 2.

Longitudinal Trends

Several key variables were significantly correlated with longitudinal position (river mile), that is, this distance of the sampling site upstream from where the Saginaw River flows into Saginaw Bay. The three strongest longitudinal trends were in the green algae to diatom ratio (r = -0.35), turbidity (r = 0.34), and the phytoplankton richness (r = -0.33) (Table 5). Significant trends were also found in proportion of diatoms (r = 0.33), and chlorophyll-a (r = -0.32). These correlations imply that these parameters all increased from upstream to downstream (Figure 4), presumably reaching their highest values at the river mouth. In contrast, the proportion of diatoms decreased from upstream to downstream.

Flow and Residence Time Related Trends

Water-surface slope from the Shiawassee River Gage in the SNWR to the lower Saginaw near Essexville (Figure 1) also correlated with a number of variables. Slope values are positive for a normal downstream slope and negative for an upstream slope. The variables most highly correlated with river slope were turbidity (r = 0.66), total dissolved solids (r = -0.62), and proportion of diatoms in a sample (r = 0.36) (Table 4). Other significant correlations included the proportion of green algae to diatoms (r = -0.35), phytoplankton richness (r = -0.30), and NH_3 (r = 0.34).

The correlation between chlorophyll-a and slope was not statistically significant. However, the partial correlation, controlling for river mile and season, was negative and significant (r = -0.42) (Table 5). This implies that when the river slope was high (hydraulic residence time is low) there were lower chlorophyll-a concentrations and when slope was low (hydraulic residence time is high), there were higher chlorophyll-a concentrations. The relation of average cell count per sample to river slope paralleled that of chlorophyll-a. When a bivariate linear correlation was run, there was no significant relationship (p-value 0.086) (Table 6). When a partial correlation controlling for date and river mile was run, the p-value became significant (r = 0.51) (Table 6).

I also found differences in the taxonomic composition of the phytoplankton samples between normal and reverse periods of flow in the main river channel. Non-metric multi-dimensional scaling analysis of the phytoplankton taxonomic data indicated that potamoplankton composition varied with respect to the relative contribution of diatoms relative to other algae, and in proportion of pennate and centric diatoms (Figure 5). Samples taken during downstream flows had a composition consisting mainly of diatoms, while on reverse flow dates samples had more green algae, euglenophytes, cyanobacteria, and dinoflagellates. NMDS scores for all sites and taxa were compiled from the NMDS analysis (Table 7, Table 8).

Dates with reverse flows were significantly correlated with five variables including river slope (r = -0.35), NH3 (r = -0.39), NO3 (r = -0.33), green algae to diatom ratio (r = 0.43), and diatom ratio (r = -0.37) (Table 5). This indicates an association between low or reversed (negative) slopes and ADP registered reverse flow events at the USGS Gage in Saginaw Michigan (Gage # 04157005). Likewise, it implies that reverse flow events lead to lower ammonia and nitrate concentrations, reduced dominance of diatoms, and increased green algae.

Other variables, including chlorophyll-a, phytoplankton diversity, phytoplankton richness, nitrate, and total phosphorus had very different longitudinal patterns depending on whether or not a reverse flow had recently occurred (Figure 6). During times of regular flow, these variables river mile produced statistically significant results. However, for dates associated with reverse flows, no significant relationship could be found. To summarize, samples from times of regular downstream flow, showed distinct longitudinal patterns in the variables discussed above, but samples taken after times of reverse flow showed no significant longitudinal variation between sites.

Discussion

Potamoplankton Community Trends

Overall, diatoms predominated in the Saginaw River samples (Figure 7). This differs somewhat from other studies that have examined the phytoplankton communities of Great Lakes tributaries. Irvine and Murphy 2009, found that the potamoplankton of the Buffalo River, New York, had green algae as the dominant taxa nearly as often as diatoms. Bridgeman et al. 2013 found diatoms and green algae to be codominant in the Maumee River, Ohio, throughout most of the year, but also identified evidence of *Microcystis* blooms in the river that possibly served as inocula for the blooms in Lake Erie's Western Basin. The Saginaw did not show such trends in the summer of 2014, with diatoms remaining fairly dominant over the whole season. This is likely due to the fact that in the potamoplankton, one often finds meroplanktonic or tychoplanktonic organisms (Wehr 1998, Reynolds 2000, Lair and Reyes-Marchant 1997), that is organisms that either pass only a part of their life phase in the plankton, or are in fact benthic or epiphytic algae that have been sheared from their substrate and are drifting downstream (Weilhoefer et al. 2008). Sloughing of benthic algae and immigration can often show up in the plankton as well (Stevenson 1981). However as the season progressed, green algae and cyanobacteria did become more important. Overall algal abundance, diversity and richness increased over the growing season, and then decreased in the fall (Figure 7, Figure 8). This is a common pattern in aquatic ecosystems (Wetzel 2003, Allan and Castillo 2007, Bellinger and Sigee 2010), and also consistent with most literature on potamoplankton, biomass and diversity increased from upstream to downstream (Mercado 2003, Sabater et al. 2008, Seo et al. 2012).

The tributary sites had the least variation in their taxonomic composition, either seasonally or otherwise (Figure 8). The big river sites had some differences over the course of the season, and the wetlands had dramatic shifts in phytoplankton community compositions and abundance. Furthermore, flood events during the month of May had a homogenizing effect on differences between the river and wetland sites (Table 9), probably due to flushing of the wetlands by floodwaters as also described in numerous studies (Nabout et al. 2006, Weilhoefer et al. 2008, Mayora et al. 2013, Mackay et al. 2012). The wetlands generally had high proportions of cyanobacteria and cryptophytes before flooding, and afterwards had more diatoms. Similarly the rivers were composed almost entirely of diatoms prior to the flood but afterwards showed increases in the proportions of cyanobacteria and cryptophytes. However, this trend could not be tested statistically because of inadequate sampling prior to and directly after the flood, and one of the post-flood wetland samples became compromised while in transit to the lab.

Longitudinal Variation Within the Saginaw River

Statistical analyses confirmed that the Saginaw River exhibits longitudinal trends in water residence time and phytoplankton community composition, abundance, and diversity (Figure 4, Table 5). In other river systems, studies have found that water residence time increases from upstream to downstream and is accompanied by an increase in planktonic chlorophyll-a concentrations (Mercado 2003, Sabater et al. 2008, Irvine and Murphy 2009, Bucavecas et al. 2011). This trend was borne out in the data of this study, with chlorophyll-a increasing significantly from upstream to downstream ($r= 0.32$, $p =0.02$) (Table 5). Also, moving from upstream to downstream I found a general trend away from mainly diatoms to a community typified by a more diverse assemblage at both phylum and generic levels (Table 4, Figure 8). The proportion of green algae and cyanobacteria increased from upstream to downstream regardless of seasonal or other influences. There are a number of possible explanations for this. The first is simply that as the algae move downriver they have more time in which to reproduce, so further downstream we begin to see a true planktonic community as opposed to mainly benthic diatoms that have been sheared from a periphytic or epiphytic habitat (Chételat et al. 2006). Another possibility is that as water moves downstream it has more and more interaction with side channels, backwaters, and other types of heterogeneous flow features that can provide inocula for the populations found in the main channel. As has been mentioned throughout this paper, the Shiawassee Flats area has innumerable backwaters, side channels, and floodplains with which the river can freely exchange water. Downstream of the Flats there are several other locations for a similar process to be occurring. Even within the city of Saginaw there are several small drains, side channels such as Ojibway Island and the Carrolton Bar, several marinas, and Great Lakes freighter shipping berths both abandoned and currently in use. As the river progresses past the city of Saginaw it passes through a large area with managed wetland units in the Crow Island State Game Area. It is not clear what level of exchange there is with the river with these wetland units, but any outputs from these wetlands are likely to include more typically wetland taxa as part of the potamoplankton population. Downstream of the State Game Area is a large backwater area known as Saginaw Lake which holds water through most of the year in a similar fashion to the large backwater area in the Shiawassee Flats. Again in Bay City and further downstream there are numerous side channels, old shipping berths, marinas, and agricultural drains connected with the main channel. By the time that river water reaches the bay it has undoubtedly received exchanges from some or all of these sources, possibly leading to much higher and diverse planktonic populations (Reynolds 2000, Neal et al. 2006, Bowes et al 2012).

Additional factors influencing upstream to downstream differences could include average water velocity, hydraulic residence time, and light limitation. As the water proceeds downstream, it flows into a greatly enlarged river channel that has been regularly dredged for shipping access for many decades. Based on mass balance constraints for channel geometry and water velocity, a larger cross sectional area with a constant rate of flow must lead to a slower velocity of the water passing through that cross section. This deceleration is not an uncommon occurrence in many of the larger lowland rivers in the Great Lakes region (Irvine and Murphy 2009, Bridgeman et al 2013), as many have been dredged for shipping accessibility. There are a number of possible effects this could have on the phytoplankton including reduced turbulence and turbidity. Algal taxa that rely on turbulent mixing to avoid sedimentation (e.g. diatoms) could in such conditions be disadvantaged and non-flagellated or floating mat forms benefited. Decreased turbidity would allow light penetration to a greater depth (Reynolds 2000). This could benefit types of algae for which light limitation is an important factor and it would also allow for a greater biomass of algae to occupy a greater proportion of the water column at any one time (Dokulil 2013). Finally reduced velocity implies longer residence time in the river and allowing biomass accumulation in the river and likely increases in phytoplankton diversity, concepts explored in more detail below (Kowe et al. 1998).

Influence of Residence Time

The issue of residence time in this system is particularly complex, and interesting due to the complex hydraulic patterns within the river and associated tributaries and wetlands. Hydraulic residence time is a common point of discussion in scientific papers on riverine phytoplankton (Reynolds 2000, Everbecq et al. 2001, Wehr 2007, Neal et al. 2006, Houser et al. 2010, Bowes et al. 2012). Potamoplankton populations are constantly being transported downstream; and conceptually are only sustainable if (a) there is sufficient travel time to allow the reproduction of algae as water moves downstream (Bowes et al. 2012) or (b) there is sufficient heterogeneity of flow and habitat laterally and longitudinally (Reynolds 2000, Everbecq et al. 2001) to provide temporal refuges. While the Saginaw is certainly one of the largest river systems in Michigan, it is far from being considered a "long" river. From the upper headwaters of the Saginaw's tributaries, it is about 120-130 miles to the river's mouth at the Southern end of Saginaw Bay (www.nationalmap.gov/streamer). In comparison, downstream locations on the Mississippi

River may have water that has been travelling for more than 1,500 miles. What the Saginaw River lacks in length it makes up for in the complexity and heterogeneity of flow within its low-gradient and often sluggish channel. Furthermore, the Shiawassee Flats ecosystem provides a vast area for the river to exchange water with large backwater, side channel, and floodplain areas. These areas serve as inocula for the dispersal of algae from wetland habitats to the Saginaw River. I, like others have found these fluvial wetlands often have much higher densities of phytoplankton which can be washed into the main channel at a rate proportional to discharge (Walks 2007, Houser et al. 2010). Residence time in particular is of interest in the relatively short Saginaw River system due to the river's often low and sometimes reversed energy gradients, as well as the heterogeneity of its floodplain, backwater, and side channel habitat.

I indexed the residence time of water within the Shiawassee Flats and Saginaw River system using the overall river slope from the Shiawassee National Wildlife Refuge to the Essexville USGS river gauging station. The reason this variable was used was that gauging operations at both sites allow daily (even hourly) estimation of slope through the study period. Higher water surface slopes reflect a greater energy gradient from upstream to downstream and therefore a more rapid transfer of water through the river channel (higher velocity). A lower slope on the other hand would be associated with very little potential energy difference between upstream and downstream and therefore very slow movement of water through the system. Negative slopes imply reversed flow direction.

The reason that residence time plays such a particularly important role in this system was alluded to in the Saginaw River site description and reference to figures 2 and 3. The Saginaw's slopes are often very close to or at zero, indicating that there is very little flow occurring most the time. As such the Saginaw is in a state that its residence times are highly subject to change depending on hydrologic factors both upstream and downstream. This concept is illustrated in great detail when a model for residence time in the channel is computing using water velocities at the USGS Holland Avenue Gauging Station (Figure 9). Using this approximation it can be seen that water leaving the SNWR in 2014 reached Saginaw Bay in as little as 8.5 hours and as much as 7.5 days depending on whether flood conditions or frequent reverse or stalled flows were common. These values are likely an underestimate because the code does not account for deceleration of water as it encounters larger cross sectional areas downstream. The amount of variation in residence time is of great importance to the potamoplankton of the system. During times of low and stalled flows they are subjected to very long residence times in which they can proliferate and form diverse assemblages, but a high-flow event can easily flush a population out to the Saginaw Bay in very short time, reducing in-stream populations to hardy species tolerant of light-limited conditions.

So as we can see the hydraulic residence time, which is a crucial limiting factor for the population growth of potamoplankton, is inextricably tied with the velocity of the parcel of water containing said plankton over the course of its journey downstream. We also know that velocity is directly related to the river water surface slope (Manning's Equation). Therefore river slope will necessarily be causally linked and correlated with the hydraulic residence time of system. Low discharge and falling velocities are often associated with higher phytoplankton biomass (Reynolds 2000, Allan and Castillo 2007) and seiche induced mixing can increase the interaction of these waters with the main channel (Trebitz et al. 2002) . Areas connected to the river that do not actively convey very much flow can be rapidly colonized and exploited by planktonic populations due to lower velocity, greater transparency, and higher temperatures in these habitats. These conditions allow the algae to take advantage of high nutrient concentrations and maximize photosynthesis (Van Nieuwenhuyse et al. 1996).

These effects can be seen in the data of my study. When accounting for river mile and time of year, the chlorophyll-a concentrations were significantly correlated with slope and therefore inversely with residence time (Table 6). Relating this to the research of Descy and Metens 1996, we can infer that there is also a proportional increase in the biomass of riverine phytoplankton. This relationship is also borne out in the data of this study (Table 6), and is as would be expected conceptually. As the hydraulic residence time of the water increases, velocity is expected to decrease, and the turbidity of the water would then decrease due to the waters decreased ability to carry a sediment load. The increased water clarity would likely help contribute to the increase in phytoplankton population that is seen in the data. The phytoplankton would become less light-limited and therefore be able to utilize more nutrients in the water and achieve higher population numbers (Reynolds 2000). The increase of green algae to diatoms that is seen therefore would also reflect indirect effects of slower velocities: less-light limitation, and higher sedimentation rates of diatoms (Kowe et al 1998, Houser et al. 2010). Genus richness would be expected to increase as well, as the increased residence time would allow more time for floristic succession within the parcel of water as it progresses downstream. Another factor, not explicitly quantified in this study but, perhaps implied by Scott's 2014 study of nutrient flux through the Shiawassee Flats, is that during times of low flow (i.e. lower velocities, lower slopes, greater residence times), a greater proportion of the total flow of the Saginaw is accounted for by flux from storage in floodplain wetlands (Buchannan et al. 2013, Scott 2014). Over the course of the summer much of the water in the Saginaw River comes from floodplain wetland habitats and backwater storage (up to 80%). Algae that flourished in the wetlands of the SF and would then be swept into the main river channel could also account for a significant proportion of the change in algal biomass and diversity of taxa seen during times of low river slope.

My analysis of reverse flow dates based on the USGS Holland bridge ADP, though conceptually related, was not quite as clear cut as my slope based estimates of hydraulic residence time. Forward and reversed flow were coded as a binary variable (1) if there had been a reverse flow measured on the USGS Holland Avenue Saginaw River Gage within 24 hours of the sample being taken. This is at best a rough approximation of the influence of the seiche induced reverse flow because it does not take into account the magnitude or duration of the seiche, variability in which would likely have significant effects. However, it does specify generally, whether or not a reverse flow was in fact experienced by the majority of the sampling sites. If the reverse flow event reached as far upstream as the Holland Avenue Gage it must have definitely passed the Zilwaukee, Bay City, and Saginaw Rivermouth sites, and was within several kilometers of reaching the Greenpoint and Shiawassee River Gage sites.

Two variables that showed the strong correlation with the reverse flow variable were ammonia and nitrate concentrations (Table 5). While it is beyond the scope of this study to say anything definitive, this could be related to denitrification in the wetlands of the SF. Connections with floodplain wetlands often enhance denitrification (Racchetti et al. 2011). As the water stalls or flows in reverse it may be exposed for a longer period to reducing influences related to bacterial respiration in the sediments of the Shiawassee Flats ecosystem, thus facilitating microbial reduction of nitrate and ammonia to free nitrogen (Wetzel 2003, Bartoli et al. 2011). At the same time it could also be that as the hydraulic residence time increases, the algae (both periphytic and planktonic) are limited less by factors such as light and turbulence and are therefore able to utilize a greater proportion of the nitrogen in the water. However, the small number of reverse flow days I observed (n = 4) are insufficient to really formally test any hypotheses.

For a number of variables which were not correlated with changes in hydraulic residence times or flow reversals, I still observed an interesting change in longitudinal distribution during these events. The variables that exhibited this effect included chlorophyll-a, phytoplankton diversity, phytoplankton richness, the proportion of green algae to diatoms, nitrate, ammonia, and total phosphorus (Figure 6). During times of normal flow all of these variables showed a tendency to increase from upstream to downstream, but within 24 hours of a reverse flow event they showed very little trend of any sort from upstream to downstream ,i.e., they were longitudinally well mixed. While this result is based upon a limited dataset, it implies that a reverse flow event in the river has a homogenizing effect on the water chemistry and potamoplankton community throughout the river. Both reversed and stalled flows result in increased channel storage and rising water surface elevations. This in turn allows greater exchange with floodplain and edge environments and a mixing of local waters from upstream, downstream and adjoining floodplains. Similar enhanced mixing was found in a study examining seiche effects on the Western Lake Superior shoreline (Trebitz et al 2002). Sites furthest downstream on the river such as the Saginaw Rivermouth and Bay City, may even experience mixing of bay water and river water depending on the magnitude and duration of the seiche. After the reverse flow ends and the water once again begins to drain back downstream, it could become even more well mixed as was observed in this study (Figure 6).

In order to explore the differences in phytoplankton community composition after times of reverse flow, I used an NMDS dimension reduction analysis. This type of analysis is not a strictly quantitative one but is more of a graphical interpretation, as it consolidates the relationship between numerous parameters (in this case, 120 taxa) down to two axes that best represent the variation. When the data were plotted, two convex hull polygons were fitted to the "clusters" of sites that were associated with either a reverse flow event or regular flow (Figure 5). The result was not exclusive since there were 28 overlapping taxa, but there were numerous distinct taxa in each group. Based on a general review of the taxa with respect to the x-axis, it is apparent that samples falling on the negative side of the x-axis are dominated by diatoms as well as a single cryptophyte taxa (*Cryptomonas*). Small centric and pennate diatoms are commonly accepted as dominant riverine taxa (Reynolds 2000, Reynolds et al. 2002, Neal et al. 2006, Mihaljević et al. 2013). On the positive side of the x-axis the taxa are composed mainly green algae, cyanobacteria, dinoflagellates, and euglenophytes which in general would be indicative of less light-limitation and mixing (Reynolds et al 2002). Based on this observation, times of normal flow, which fall on the negative side of the x-axis, have more of a distinctive diatom population including taxa such as *Fragilaria*, *Navicula*, *Pinnularia*, *Cymatopleura*, and *Cyclotella*. According to Reynolds et al. 2002, these taxa may be indicative of eutrophic and well-mixed conditions. Samples collected after times of reversed flow had a taxonomic composition with fewer diatoms and more taxa such as *Euglena*, *Scenedesmus*, *Kirchneriella*, *Pediastrum*, *Cosmarium*, and

Oscillatora which may be more indicative of non-light-limiting eutrophic river environments with high biological oxygen demand (Reynolds et al. 2002).

There were also many taxa that were common to both conditions, but tended to be more associated with one flow configuration than the other. For normal downstream flow conditions these included *Aualcoseira, Gyrosigma, Amphora, Cocconeis,* and *Roicosphenia*, which are all diatoms. This is consistent with the idea that diatoms are more prevalent during times of normal flow. Taxa that were common to both conditions but more prevalent in reverse flow included *Dinobryon*, *Nostoc*, *Coelastrum*, *Rhodomonas*, and *Closterium*. Again the NMDS results reinforce the idea the reverse flows were are characterized by a more taxonomically diverse assemblage reflecting wetland influences. There were a few taxa that seemed to straddle the y-axis nearly perfectly, showing a tendency toward neither flow condition. These included *Aphanocapsa*, *Microcystis*, and *Synechoccus*. It is possible that these small colonial cyanobacteria are common to either condition because during times of normal flow they are flushed out of wetlands and backwaters upstream, and they persist in the river channel during times of stalled or reverse flow due to their buoyancy and tolerance of fluctuations in nutrient ratios and pH.

Phytoplankton of SNWR and Saginaw River

This snapshot of the phytoplankton in the Shiawassee National Wildlife Refuge and the Saginaw River indicated that the community varied greatly with respect to types of sites, time of year, and hydrologic status. We can infer much about the typical community composition by looking at the most abundant taxa in each sample and what proportion of the total sample they represent (Table 9). Breaking up the results by sample site category (Wetland, Tributary, and Main River), a general overview is as follows.

The wetland sampling sites in the SNWR were quite varied over the course of the sampling season. The Ferguson Bayou contained a variety of planktonic organisms ranging from nanoplanktonic diatoms to large euglenophytes. This location showed an early summer assemblage of green algae (*Coelastrum*), diatoms (*Fragilaria*), and cyanobacteria (*Aphanocapsa*), with the vast majority of organisms belonging to the cyanobacteria. However, in mid-summer, the bayou experienced a bloom of various cryptophytes (*Cryptomonas* and *Rhodomonas*) and euglenophytes (*Phacus*), with these organisms accounting for upwards of 60% of the total phytoplankton population. After this bloom there was a period of dominance by diatoms (*Cyclotella*, *Navicula*, *Nitzschia*), followed by increasing dominance by cyanobacteria (*Aphanocapsa* and *Anabaena*) late in the summer and into the fall.

The Grefe Pool wetland also showed great seasonal variation in taxonomic composition. The earliest sample from this location showed a composition of mainly cyanobacteria (*Aphanocapsa* and *Aphanothece*) and dinoflagellates (*Gymnodinium*). However, after the flooding event of mid-May, the wetland was dominated by mainly diatoms (*Navicula* and *Cyclotella*) and cryptophytes (*Cryptomonas*). During the summer, it experienced some interesting blooms and community succession. In early July, it was dominated by *Anabaena* and cryptophytes, but by mid-July, there was a bloom of *Euglena*. After this, it transitioned to mainly cryptophytes and green algae, and then in late summer became dominated by cyanobacteria including *Microcystis* and *Aphanocapsa*. By October, it was mainly composed of diatoms (*Cocconeis* and *Navicula*) as well as some green algae (*Scenedesmus*).

River sites had plankton assemblages that were typified by a much large proportion of diatoms compared to other types of algae. However, there was some variation in the rivers between the tributary sites and the main river channel sites. The two tributary sites had a very different community composition than that of the wetlands. The earliest sample for the Spaulding Drain was May 22nd, which was after the flooding event of May 16th and 17th, so it is unknown how this changed from before to after the flood. However, after the flood, this site was typified by mainly diatoms (*Navicula* and *Nitzschia*) as well as *Crytpomonas*. Early summer showed a trend of *Navicula, Cyclotella*, as well as the green algae *Scenedesmus*. Somewhat unexpectedly, the sample from July 17th was dominated by cyanobacteria and dinoflagellates, but then after this the river resumed a more typical composition of diatoms with some cyanobacteria, although it exhibits a much higher proportion of the genus *Gyrosigma* than any of the other sites do. In October, the Spaulding was dominated by *Navicula*, *Aphanocapsa*, and *Rhodomonas*.

The Cass River showed perhaps the least amount of variation in composition out of all of the sites. Throughout most the season, this site was typified by diatoms such as *Navicula, Nitzschia, Cyclotella,* and *Synedra,* with occasional cryptophytes or green algae appearing a co-dominant taxa. The only main exception to this was the September sample, where the river was dominated by colonial cyanobacteria such as *Aphanocapsa*, *Microcystis*, and *Aphanothece*.

The Shiawassee Gage site showed some variation, but throughout almost the entire season, was dominated by diatoms, cryptophytes, and green algae. The dominant diatoms included *Navicula, Nitzschia, Cyclotella*, and *Synedra*, the typical cryptophytes were *Crytpomonas* and *Rhodomonas*, while the typical dominant green were *Scenedesmus* and *Chlamydomonas*. The only small variation to this trend was in mid-July, September, and October when cyanobacteria such as *Aphanocapsa* and *Microcystis* were co-dominant with the other taxa.

Greenpoint shows similar trends to the Shiawassee Gage in that it is most often dominated by diatoms, cryptophytes, and green algae. However, Greenpoint has cyanobacteria occurring as codominant on more occasions. Additionally, it can be seen that a few of the dominant taxa were different, such as *Fragilaria*, the colonial diatom, or *Chlorella*, a small unicellular green algae. It can be seen as well that Greenpoint had a larger portion of diatoms over the course of the seasons compared to the Shiawassee Gage site. This could be due in part to influences of the Tittabawassee River, which was not sampled so its taxonomic compositions are not known. Additionally it could be due to influences from the Cass River, which as previously stated, is typically composed of mostly diatoms.

At the Zilwaukee sampling site on the Saginaw River, there began to be profound differences in the potamoplankton community. Early in the season, it was dominated by diatoms and cryptophytes, just like most of the other sites discussed so far. However, in late July the assemblage was dominated by a large proportion of *Scenedesmus* (roughly 28%) and interestingly *Chromulina* (a chrysophyte) as well. By Mid-August the site was dominated by *Chlorella, Microcystis*, as well as *Oscillatora* (a filamentous cyanobacteria), and by late August by *Gloeotila* (a filamentous green algae) as well as *Aphanocapsa* and

Scenedesmus. In the fall, the site reverted back to its similarity to the upstream sites, with diatoms, cryptophytes, and cyanobacteria resuming dominance.

Bay City showed some similar trends to Zilwaukee, in that it showed distinct community changes in July and August and actually had a chrysophyte (*Chromulina*) as a dominant taxa for one sampling date. Also of interest at the Bay City site, it that it had cryptophytes as a dominant taxa more often than the other sites. Either *Cryptomonas* or *Rhodomonas* were dominant 6 of the 9 dates this site was sampled.

The Saginaw Rivermouth site was distinct from all of the other river sites because it had cyanobacteria as a dominant taxa much more frequently. The cyanobacteria at this site were mainly composed of *Aphanocapsa* and *Microcystis*. Also of interest at this site was the continued prevalence of the green algae Scenedesmus throughout the season, as well as the appearance of the dinoflagellate *Gymnodinium* as a dominant taxa in June and August.

Conclusions

This study of phytoplankton community, flow, and nutrient conditions in the Shiawassee Flats and Saginaw River has revealed some interesting information about longitudinal and seasonal patterns in the lowland Great Lakes Tributary.

(1) There are diverse and distinct communities of phytoplankton in the river, floodplain wetlands and tributaries. (2) These algal communities are highly dynamic and change dramatically throughout the growing season and in response to hydraulic factors. (3) There is a distinctive potamoplankton population in the Saginaw River and it increases significantly both in abundance and diversity from the Shiawassee National Wildlife Refuge to where the river meets Saginaw Bay. (4) There is also evidence of interaction of phytoplankton communities within floodplain wetlands

and the main river. (5) Consistent with the previous point, there was a significant relationship between the potamoplankton community metrics and community composition with hydraulic residence time within the Shiawassee Flats system. Taken together these results illustrate the integral role that the Shiawassee Flats plays in affecting the Saginaw River as far downstream as the Saginaw Bay. There is much room future studies involving phytoplankton in this system. Possibilities include a La Grangian monitoring of algal biomass and taxonomic composition for a single parcel of water as it moves down the river (Bahnwart et al. 1999). Other interesting studies would include interactions and changes in chlorophyll-a and phytoplankton assemblage before and after large-scale flooding events in the Shiawassee National Wildlife Refuge, or monitoring of chlorophyll-a and nutrient concentrations at a single site over the entire course of a seiche induced reverse flow event. To facilitate a better understanding of water residence times within this system, tracers and/or isotopic analysis might be used to measure suspended and dissolved load transport and dispersion under various hydrologic conditions.

This study contributes to the broad ecological dataset of the Shiawassee National Wildlife Refuge, as well as provides a valuable baseline of the phytoplankton ecology of the Saginaw River prior to the GLRI restoration work. Also this analysis shows how the Shiawassee Flats play an important role in shaping the water chemistry and phytoplankton communities as far downstream as Saginaw Bay. The prolonged residence times and reversed flows in the Shiawassee Flats have a significant impact on the potamoplankton of the river. Restoring the floodplain wetlands to a more natural, hydrologically connected condition could help return the potamoplankton of the river to a less impacted state and improve several BUIs in the Saginaw River/Bay AOC.

Figures and Tables

Figure 1 Maps of Saginaw River Watershed and Sampling Sites

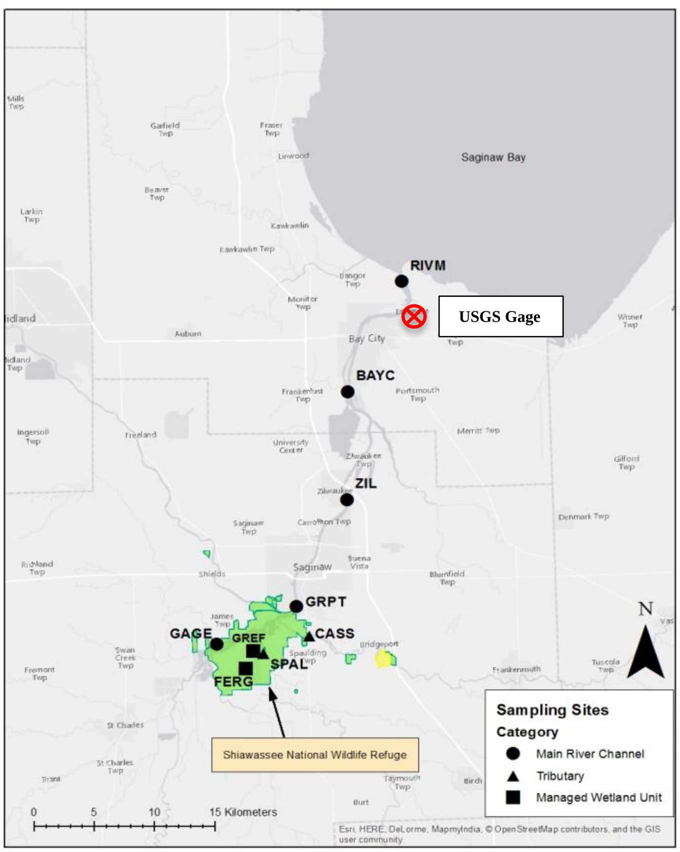


Figure 1. Maps depicting study area. Top: Map of Saginaw River Watershed. Bottom: Map showing locations of sampling sites as well as USGS gage used for slope calculations.

Figure 2 Shiawassee National Wildlife Refuge Gage and Upstream Discharge

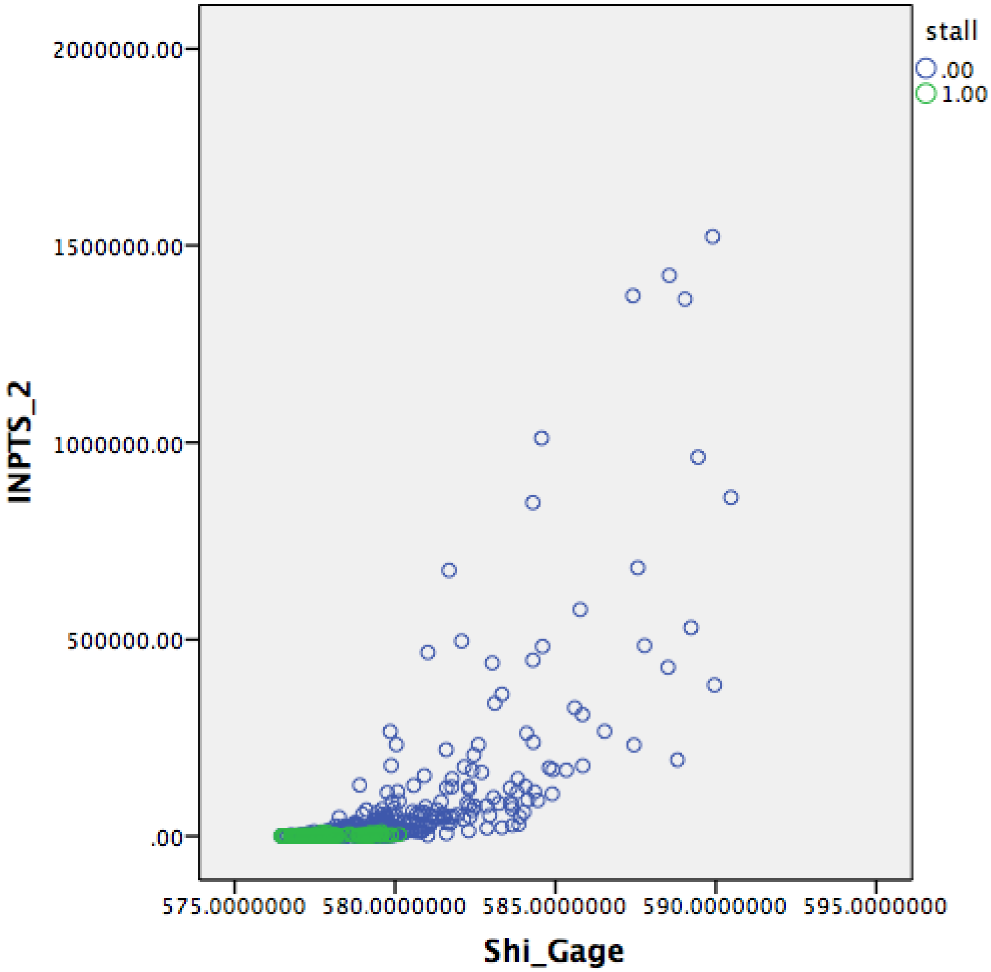


Figure 10. Scatterplot of the Shiawassee National Wildlife Refuge Gaging Station daily water surface elevation (IGLD85) (x-axis) compared to the sum of the daily input flows to the Shiawassee Flats (y-axis) in cubic feet per second. The green dots represent times of "stalled flow" and blue represents times of normal downstream flow.

Figure 3 Histogram Of Saginaw River Daily Averaged Slopes

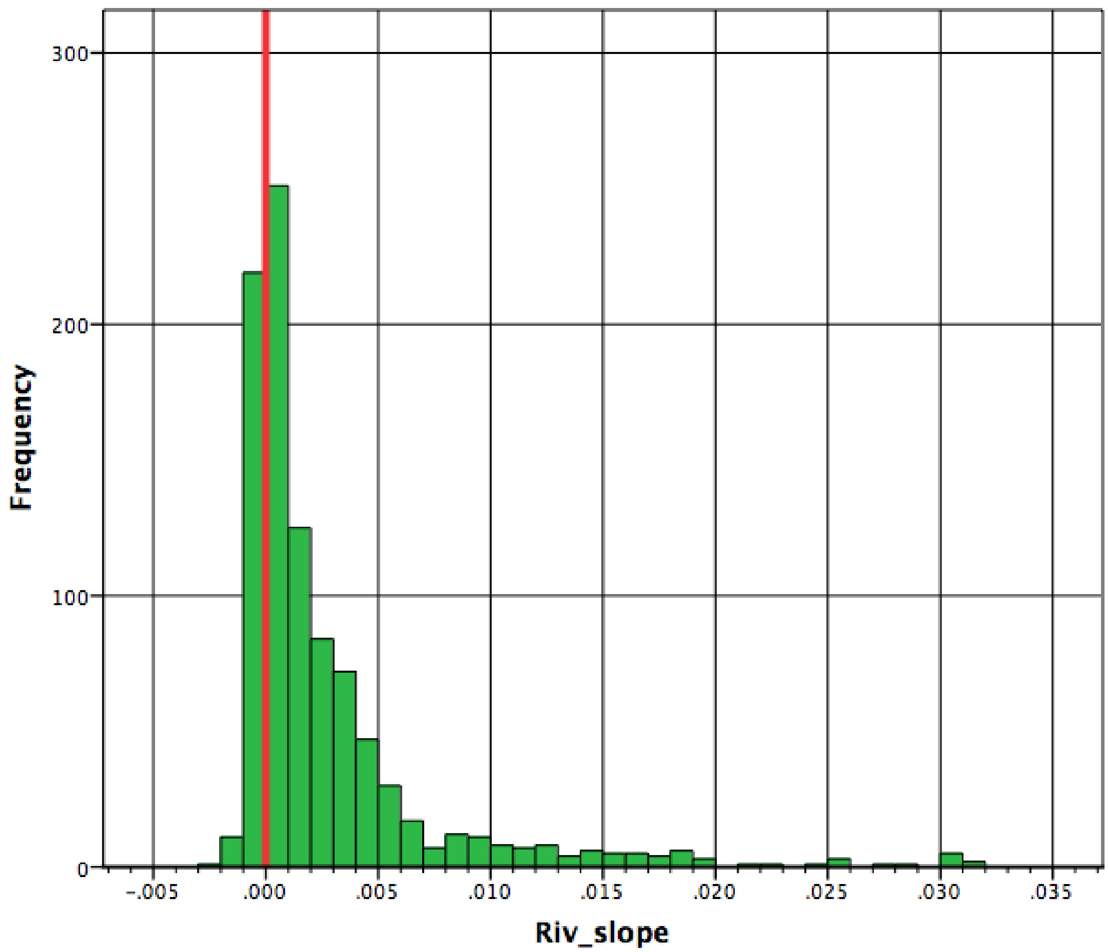


Figure 9. Histogram of daily averaged water surface slopes for the Saginaw River. Positive numbers imply regular downstream slopes and normal flow. Negative numbers imply reverse slopes and reverse flows. Values near 0 imply very slow or stalled flows. The red vertical line denotes zero slope.

Figure 4 Boxplots of Longitudinal Correlations

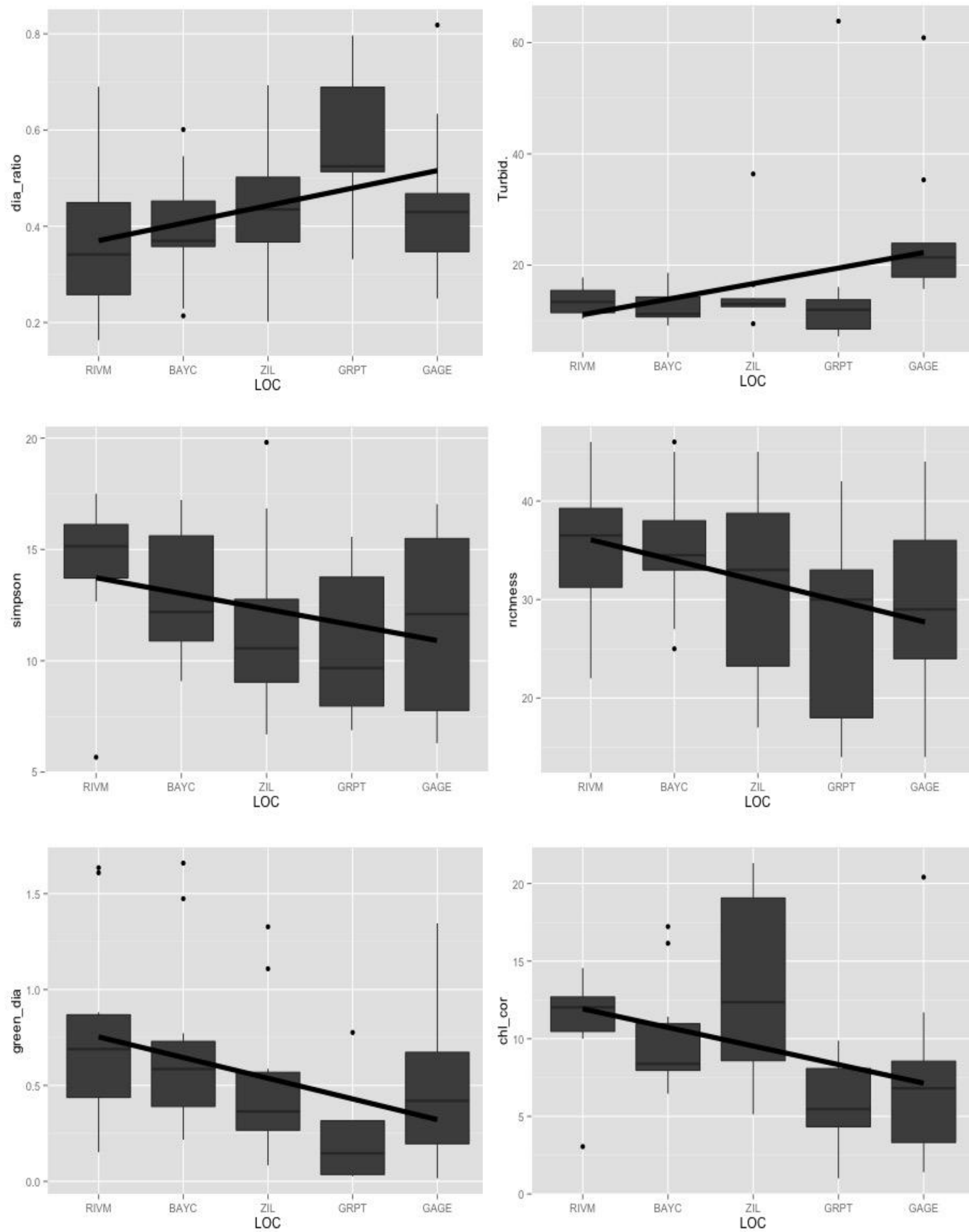


Figure 2. Longitudinal trends of selected variables. Left is downstream (RIVM), right is upstream (GAGE). Top left diatom ratio, top right turbidity (NTU), middle left diversity (Simpson), middle right richness, bottom left green:diatom ratio, bottom right chlorophyll-a (ppb).

Figure 5 NMDS Plot of Potamoplankton Communities By Flow Type

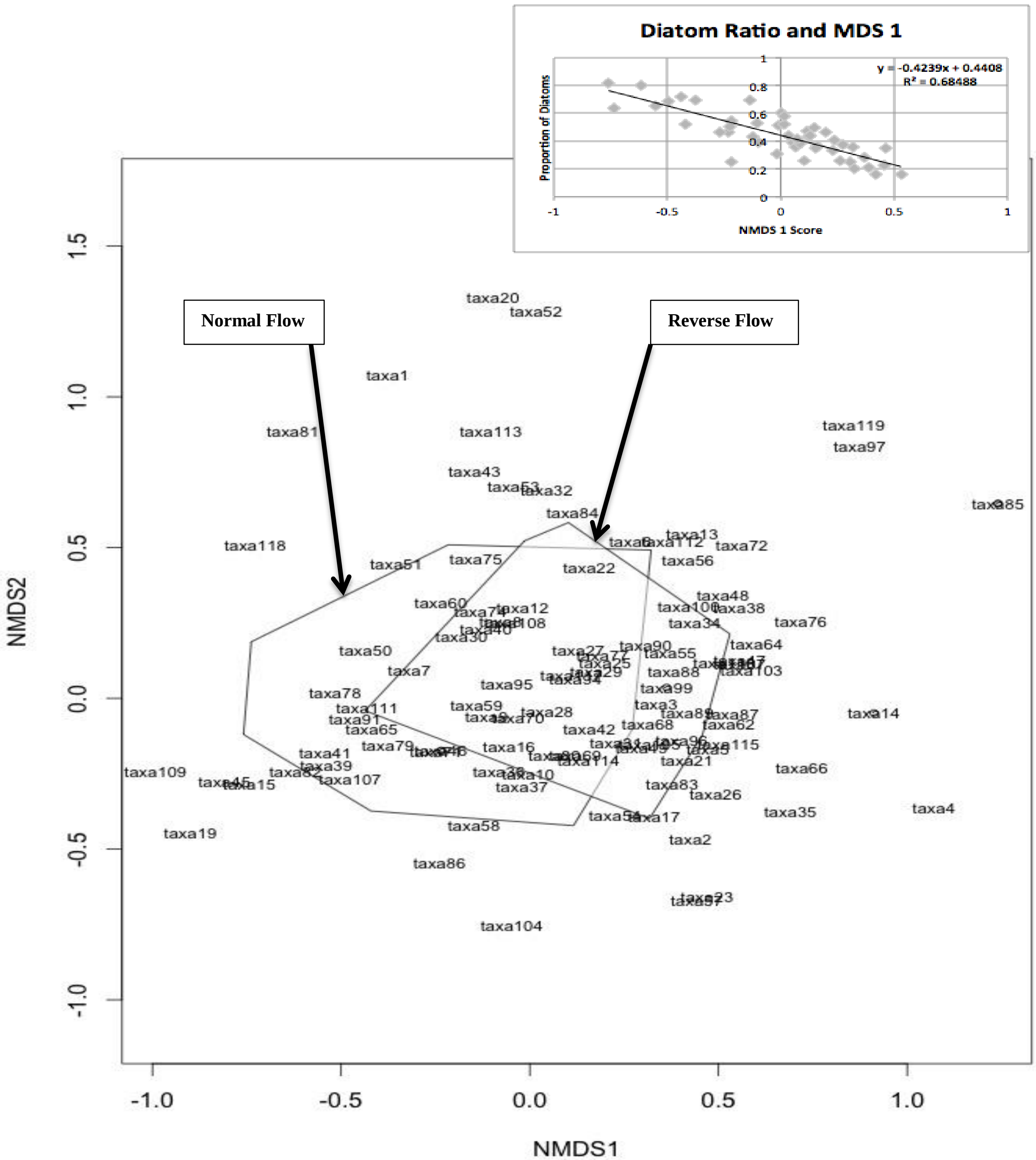


Figure 8. NMDS plot of potamoplankton taxa (genus) for all samples (normalized by total count). Two axes represent two components of variation among samples that explain the largest proportion of total variation. Taxa that are near one another on the plot are likely to be found together. The two polygons on this plot represent regular downstream flow conditions (left) and reverse flow conditions (right). 68% of variation in the MDS1 axis is explained by the proportion of diatoms in the sample (top right)

Figure 6 Differences in Longitudinal Variations By Flow Type

Linear Correlation with River mile	Regular Flow		Reverse Flow	
	P-value	R-Value	P-value	R-Value
Chlorophyll-a	0.03	-0.45	0.89	-0.04
Diversity	0.04	-0.41	0.71	-0.11
Richness	0.00	-0.58	0.81	-0.07
Nitrate	0.00	-0.55	0.17	0.39
Total P	0.03	0.42	0.91	0.03
	n= 26		n=14	

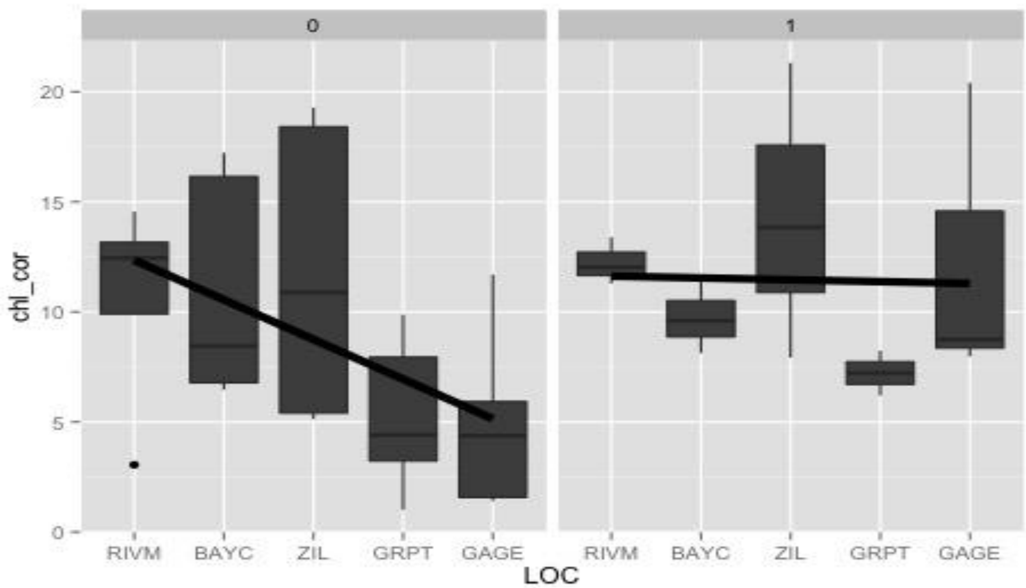
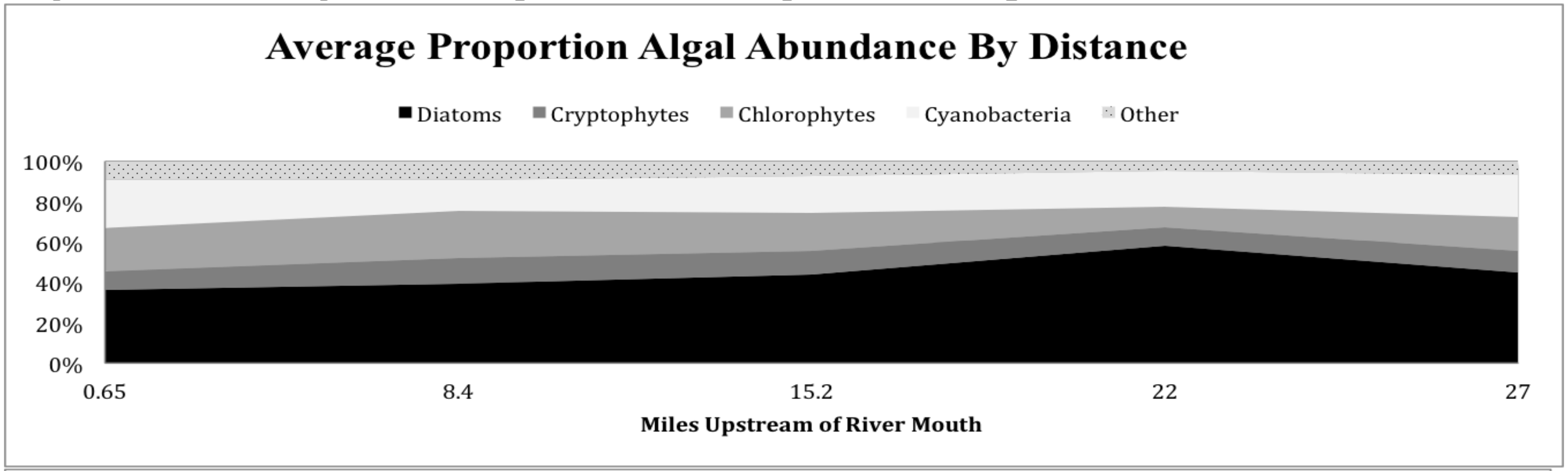


Figure 5. Example of difference in longitudinal patterns between regular flow (left, p = 0.03) and reverse flow (right, p 0.89). This example is chlorophyll-a concentrations (ppb).

Figure 7 Average Potamoplankton Composition by Rivermile and Date



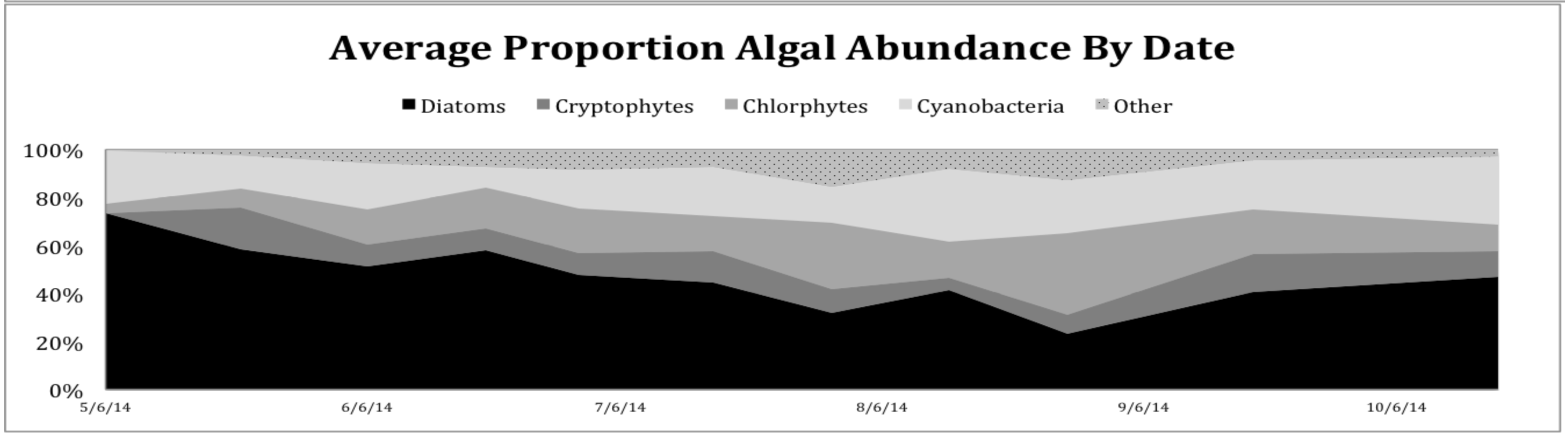


Figure 6. Plots of average potamoplankton composition by site (top) and date (bottom).

Figure 8 Potamoplankton Composition By Site and Date

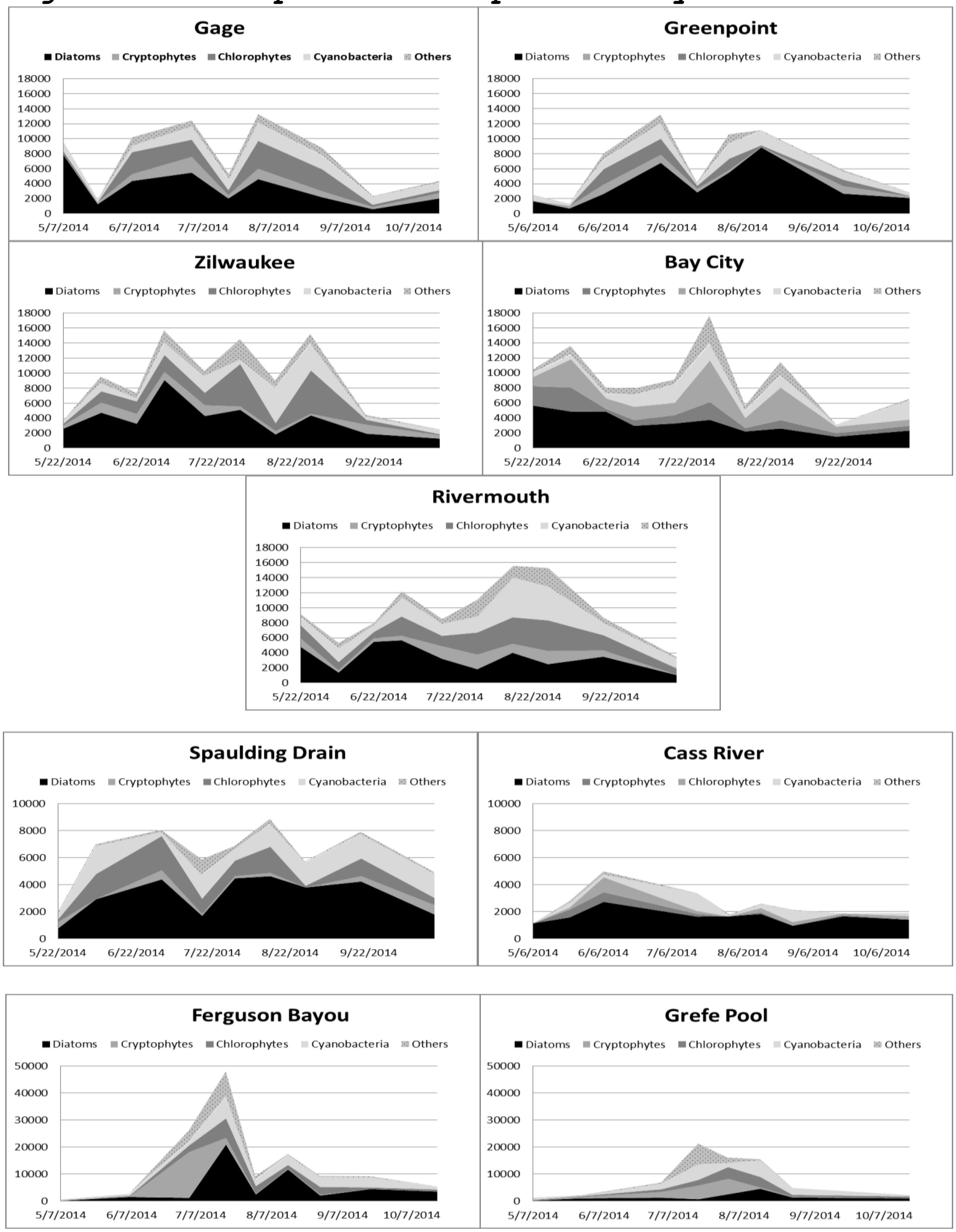


Figure 7. Potamoplankton community composition (phylum) for each sampling site by sampling date. The Y-axis is cell density in cells/ml The top five plots are main river sites, the middle two are tributary sites, and the bottom two are wetland sites.

Figure 9 Approximated Residence Times of the Saginaw River

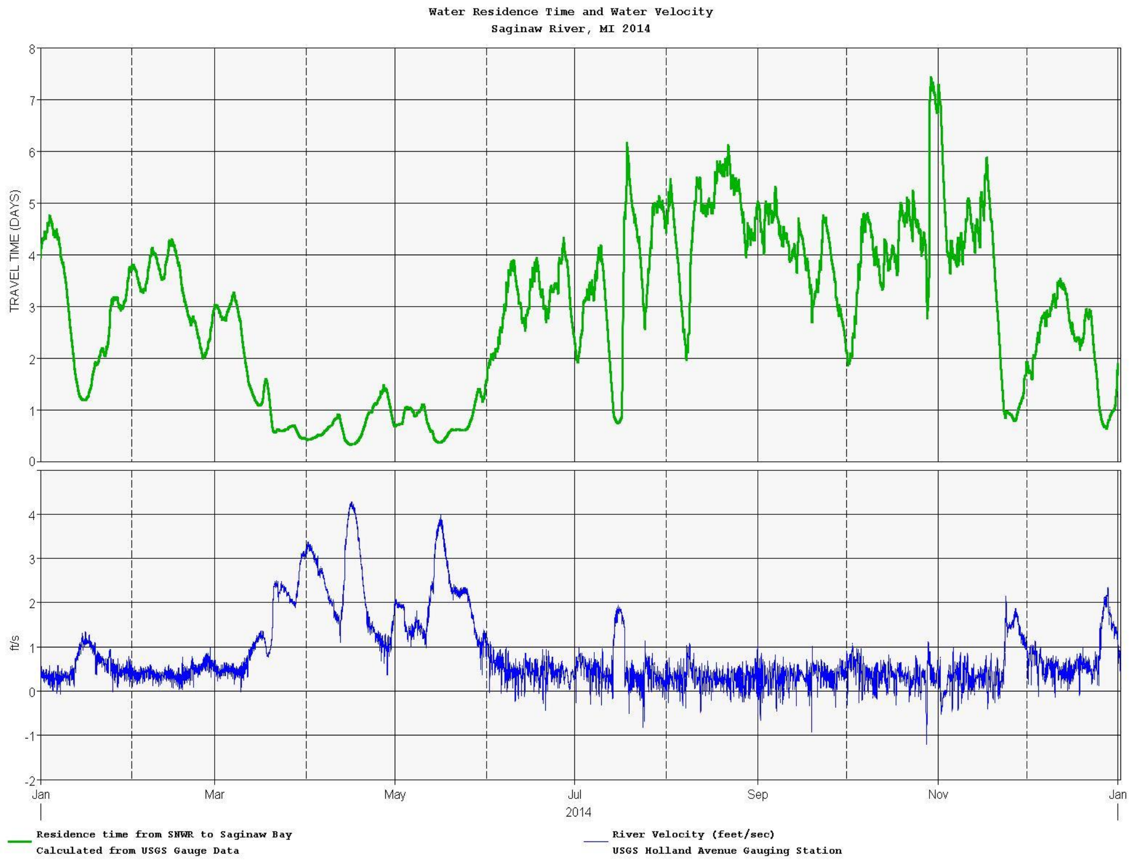


Figure 11. The top figure (green) shows the approximated residence time of water from the Shiawassee National Wildlife Refuge to the Saginaw Bay in days for 2014. The residence time values were calculated by python code (Figure 12) using the velocity values from the USGS Holland Avenue Gauging Station (bottom, blue).

Figure 10 Boxplots of Biological Parameters

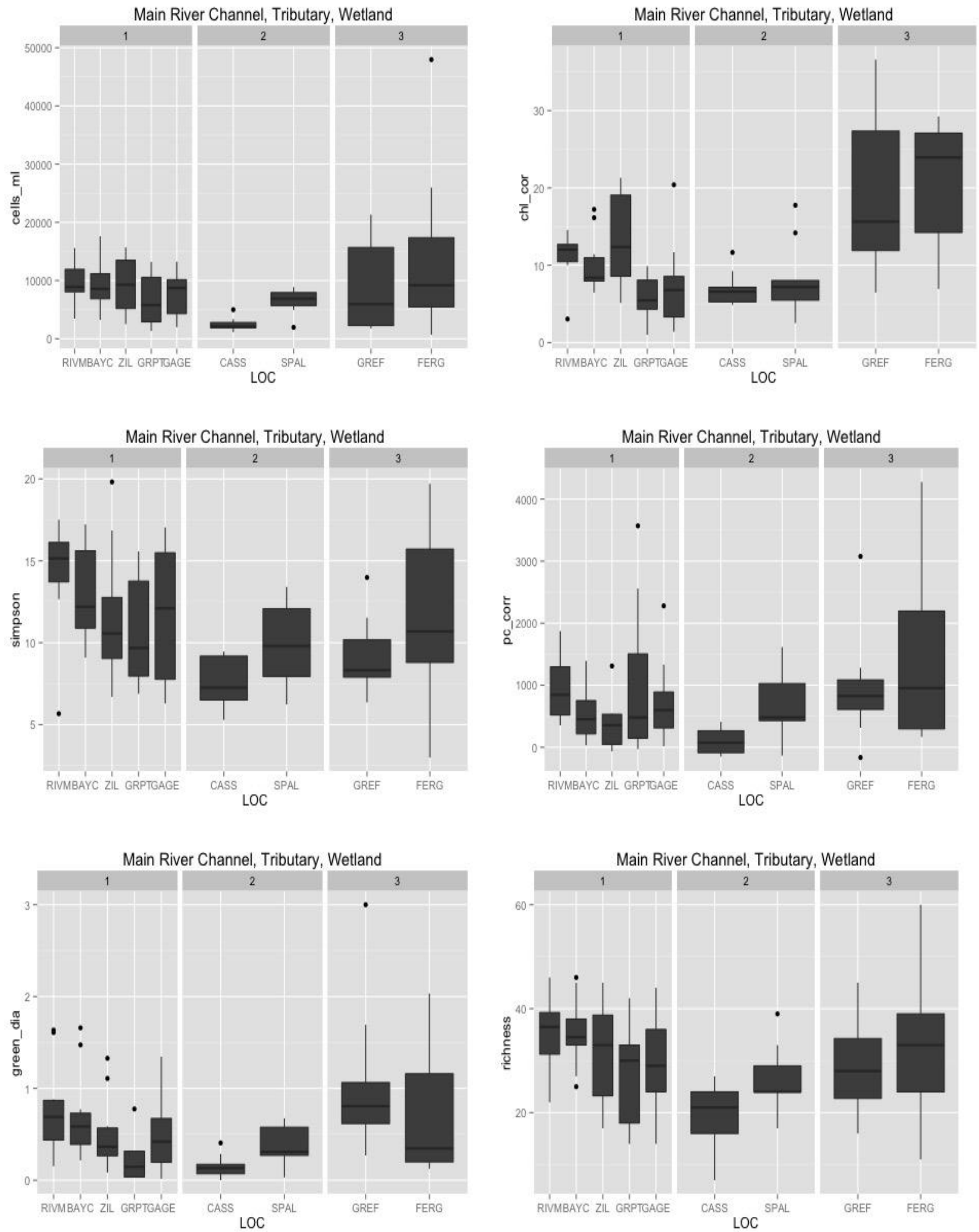
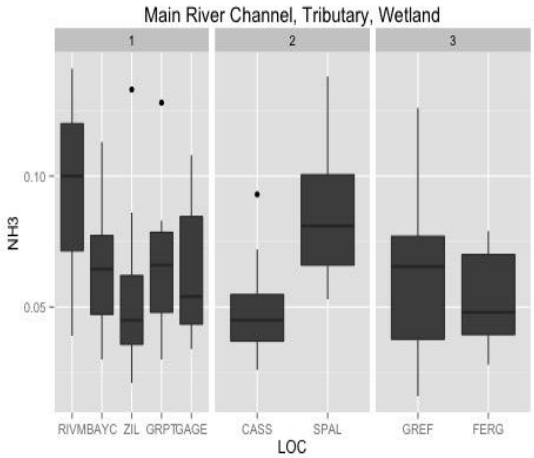
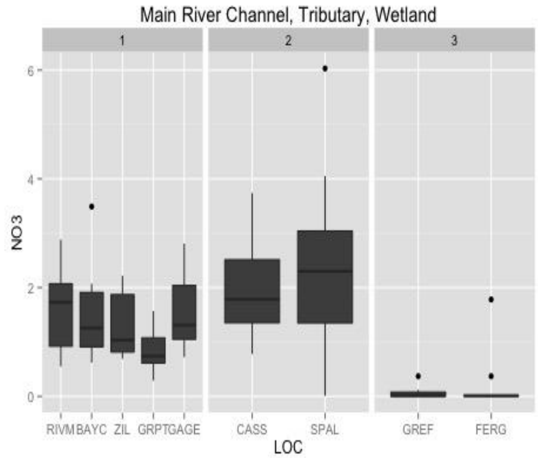
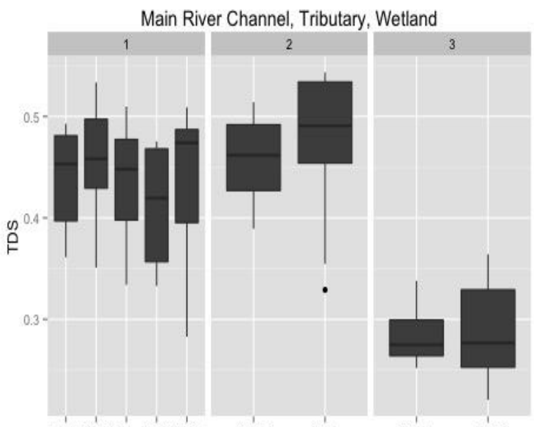


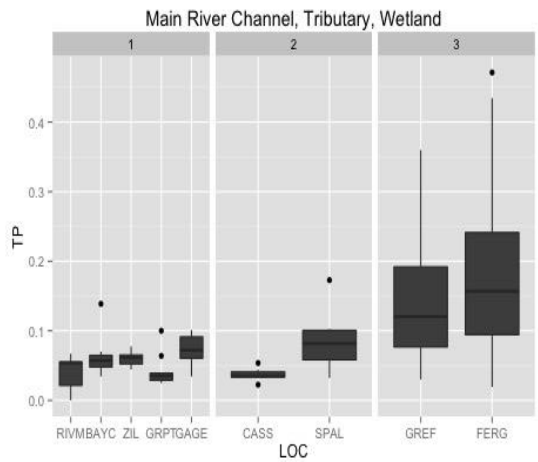
Figure 3. Boxplots of biological parameters for each sample site. Top left abundance (cells/ml), top right, chlorophyll-a (ppb), middle left diversity (Simpson), middle right phycocyanin (cell eqvs./ml) , bottom left green:diatom ratio, bottom right genus richness.

Figure 11 Boxplots of Water Chemistry Parameters









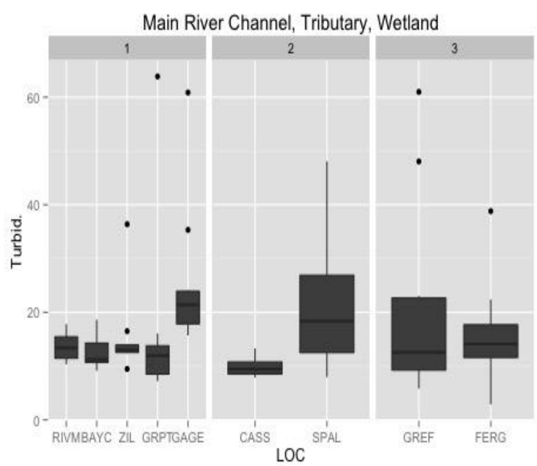


Figure 4. Boxplots of chemical parameters for each sample site. From top to bottom: NH3 (ppm), NO3(ppm), TDS(ppt), TP(ppm), Turbidity(NTU).

Figure 12 Method for Calculating Residence Time (Python Code)

```
import csv
#####CSV OF VELOCITIES IN FEET PER MINUTE######
with open ('sagvel.csv','rU') as hydro:
    reader = csv.reader(hydro, dialect=csv.excel_tab)
    #print reader
    vel_list = list(reader)

###RIVER LENGTH IN FEET###
riverlength = 117700.
###GAUGING TIME INTERVAL IN MINUTES####
tinterval = 12.
timelist = [ ]
distsum = 0
counter = 0
tracker = 0

for i in vel_list:
    #print len(vel_list[tracker:])
    for v in vel_list[tracker:]:
        if distsum >= riverlength:
            templist = [(counter*tinterval)]
            timelist.append(templist)
            counter = 0
            distsum = 0
            break
        else:
            b = v[0]
            c = float(b)
            distsum = distsum + (c * tinterval)
            counter = counter + 1
    tracker = tracker + 1
#print timelist
#print len(timelist)

with open( "output_res_time.txt", "w") as o:
    writer = csv.writer(o)
    writer.writerows(timelist)
```

Table 1 Sampling Site Characteristics

Site	Site Code	Latitude	Longitude	Category	Distance to Lake	Catchment Area
Saginaw Rivermouth	*RIVM*	43.6391 N	83.8476 W	*RIVER*	1.05 KM	16,120 SQKM
South Bay City (Middle Ground Island)	*BAYC*	43.5547 N	83.9059 W	*RIVER*	13.52 KM	15,980 SQKM
City of Zilwaukee	*ZIL*	43.471 N	83.9099 W	*RIVER*	24.46 KM	15,600 SQKM
Greenpoint Island/ Wickes Park	*GRPT*	43.3891 N	84.0177 W	*RIVER*	35.41 KM	15,470 SQKM
USFWS SNWR Gaging Station	*GAGE*	43.3611 N	84.0466 W	*RIVER*	43.45 KM	3,280 SQKM
Cass River	*CASS*	43.3659 N	83.9646 W	*TRIBUTARY*	41.04 KM	2,350 SQKM
Spaulding Drain (Flint River Diversion)	*SPAL*	43.3533 N	83.9991 W	*TRIBUTARY*	41.52 KM	3,440 SQKM
Grefe Pool Wetland Unit	*GREF*	43.3557 N	84.0099 W	*WETLAND*	-	-
Ferguson Bayou Wetland Unit	*FERG*	43.3421 N	84.0175 W	*WETLAND*	-	-

Table 1. Characteristics for all sample sites from this study. Note there are three categories: Main River, Tributary, and Wetland.

Table 2 Mean Values of Chemical Parameters

Site/ Category	NO3 (ppm)	NH3 (ppb)	TP (ppb)	TDS (ppm)	Temp (C.)	Turbidity (NTU)	n =
RIVM/River	1.62	94.7	41.4	440.4	20.8	13.7	10
BAYC/River	1.5	66.5	62.8	454.9	21.2	12.6	10
ZIL/River	1.29	56.4	59.7	435.6	21.1	15.3	10
GRPT/River	0.85	68.0	42.1	412.1	19.6	16.4	10
GAGE/River	1.61	64.6	73.0	438.2	19.1	25.5	10
CASS/Trib	2.01	50.2	36.9	457.7	19.2	9.9	10
SPAL/Trib	2.37	86.4	83.8	471.9	19.8	20.8	9
GREF/Wetland	0.06	62.5	143.5	284.2	20.2	20.9	10
FERG/Wetland	0.22	53.1	195.8	286.2	18.5	15.6	10

Table 2. Mean values for selected chemical parameters. These means were derived from all samples for each sample site.

Table 3 Two-Way ANOVA With Interactions Results

	NO3 (ppm)						TP (ppm)						TDS (g/L)						Chlorophyll-a (µg/L)						Phycocyanin (cell eqv./ml)					
I	1		2		3		1		2		3		1		2		3		1		2		3		1		2		3	
J	2	3	1	3	1	2	2	3	1	3	1	2	2	3	1	3	1	2	2	3	1	3	1	2	2	3	1	3	1	2
p-value	0.127	<0.001	0.127	<0.001	<0.001	<0.001	0.969	<0.001	0.969	<0.001	<0.001	<0.001	0.118	<0.001	0.118	<0.001	<0.001	<0.001	0.372	<0.001	3.720	<0.001	<0.001	<0.001	0.557	0.641	0.557	0.247	0.641	0.247
mean difference (I-J)	-0.380	1.226	0.380	1.606	-1.226	-1.606	-0.003	-0.099	0.003	-0.062	0.099	0.096	-0.025	0.133	0.025	0.159	-0.134	-0.159	2.41	-10.72	-2.41	-13.13	10.72	13.13	242.0	-210.9	-242.2	-454.1	210.9	453.1
	Diatom Percentage						Green:Diatom						Abundance (cells/mL)						Richness						Diversity (Simpson)					
I	1		2		3		1		2		3		1		2		3		1		2		3		1		2		3	
J	2	3	1	3	1	2	2	3	1	3	1	2	2	3	1	3	1	2	2	3	1	3	1	2	2	3	1	3	1	2
p-value	0.094	0.012	0.094	<0.001	0.012	<0.001	0.515	0.006	0.515	0.002	0.006	0.002	0.290	0.300	0.290	<0.001	0.300	<0.001	0.001	0.975	0.001	0.013	0.975	0.013	0.019	0.250	0.019	0.561	0.250	0.561
mean difference (I-J)	-0.104	0.148	0.104	0.252	-0.148	-0.252	0.155	-0.461	-0.155	-0.616	0.461	0.616	4051	-4045	-4051	-8096	4045	8096	9.390	0.530	-9.390	-8.860	-0.530	8.860	3.120	1.771	-3.120	-1.349	-1.771	1.349

Table 6. Results of a two-way ANOVA with interactions between site category and time of season (sampling event) as well as corresponding Tukey HSD post hoc test for site category. The topmost table is reporting p-values for the ANOVA. The bottom table is reporting the results of the post-hoc test. I is the category of comparison and J is the category I is being compared to. The mean difference reports the magnitude of difference in the means between I and J. Categories: 1 = Main River, 2 = Tributary, 3 = Wetland.

Table 4 Mean Values of Biological Parameters

Site/ Category	Chl-a (µg/L)	Phycocyanin (cell eqv./mL)	Abundance (cells/mL)	Diatom %	Green:Diatom	Richness	Diversity
RIVM/River	11.1	975	9707	36.1%	0.77	35.5	14.3
BAYC/River	10.4	571	9341	39.1%	0.70	35.4	12.9
ZIL/River	13.3	385	9243	44.0%	0.50	32.0	11.6
GRPT/River	5.8	1004	6620	57.9%	0.22	27.3	11.0
GAGE/River	7.3	742	7555	44.8%	0.48	29.1	11.8
CASS/Trib	6.9	98	2520	70.1%	0.15	19.0	7.6
SPAL/Trib	8.1	690	6361	48.7%	0.39	26.3	10.0
GREF/Wetland	19.1	956	8893	25.4%	1.08	28.9	9.3
FERG/Wetland	20.7	1385	14190	39.9%	0.69	33.2	11.2

Table 4. Mean values for selected biological parameters. These means are derived from all samples for each sample site.

Table 5 Pearson's R Linear Correlation Matrix

	Rivermile	Backflow	NH3	NO3	TP	TDS	Turb.	Chl-a	Phyco.	Cells/ml	Green:Diatom	Diatom %	Simpson	Richness	Slope
Rivermile		0.04	0.25	0.16	0.22	0.12	-0.34	0.32	0.01	0.24	0.35	-0.33	0.29	0.33	0.02
Backflow	0.80		-0.39	-0.33	-0.03	0.17	-0.22	0.27	-0.14	0.09	0.43	-0.37	0.20	0.10	0.35
NH3	0.13	0.04		0.08	0.08	-0.32	0.09	-0.23	0.17	-0.17	-0.21	0.17	-0.14	-0.23	-0.34
NO3	0.26	0.04	0.63		0.16	0.17	0.10	0.14	-0.21	-0.07	-0.24	0.02	0.06	0.04	-0.04
TP	0.13	0.86	0.62	0.29		-0.14	0.43	0.06	0.03	-0.16	-0.07	0.06	-0.18	-0.26	-0.22
TDS	0.41	0.31	0.05	0.26	0.34		-0.49	0.34	-0.51	0.18	0.19	-0.17	0.07	0.17	0.62
Turb.	0.02	0.18	0.60	0.49	0.00	< 0.001		-0.17	0.32	-0.26	-0.26	0.24	-0.27	-0.33	-0.66
Chl-a	0.02	0.10	0.17	0.33	0.67	0.02	0.23		-0.39	0.41	0.18	-0.04	0.01	0.35	0.14
Phyco.	0.96	0.40	0.32	0.16	0.82	< 0.001	0.03	0.01		-0.03	0.06	0.05	-0.03	-0.15	-0.30
Cells/ml	0.11	0.61	0.32	0.66	0.29	0.22	0.07	< 0.001	0.86		0.55	-0.33	0.46	0.80	0.27
Green:diatom	0.01	0.01	0.21	0.10	0.63	0.20	0.07	0.22	0.70	< 0.001		-0.82	0.52	0.53	0.35
Diatom %	0.02	0.02	0.32	0.90	0.69	0.24	0.11	0.80	0.75	0.02	< 0.001		-0.55	-0.40	-0.36
Simpson	0.04	0.22	0.40	0.71	0.22	0.66	0.07	0.97	0.84	< 0.001	< 0.001	< 0.001		0.74	0.25
Richness	0.02	0.55	0.16	0.80	0.08	0.25	0.02	0.02	0.32	< 0.001	< 0.001	< 0.001	< 0.001		0.30
Slope	0.88	0.03	0.04	0.80	0.13	< 0.001	< 0.001	0.34	0.04	0.06	0.02	0.01	0.08	0.04	

Table 1. Pearson's R correlation matrix. The bottom/left half of the matrix displays p-values, and the top/right half displays Pearson's r value. Green shaded cells indicate a statistically significant correlation ($p<0.05$)

Table 6 Partial Correlation Matrix

Partial	Backflow	NH3	NO3	TP	TDS	Turb.	Chl-a	Phyco.	Cells/ml	Green:Diatom	Diatom %	Simpson	Richness	Slope
Backflow		-0.21	-0.08	-0.04	0.21	-0.09	0.33	-0.24	-0.02	0.25	-0.24	-0.01	-0.05	0.16
NH3	0.33		-0.24	-0.15	-0.26	0.04	-0.57	0.35	-0.27	-0.34	0.25	-0.22	-0.46	-0.19
NO3	0.70	0.27		0.48	0.26	0.16	0.34	-0.14	0.21	-0.08	-0.04	0.09	0.25	0.06
TP	0.87	0.49	0.02		-0.03	0.64	0.09	0.01	-0.12	-0.08	-0.15	-0.02	-0.03	-0.29
TDS	0.32	0.22	0.22	0.88		-0.56	0.65	-0.68	0.49	0.29	-0.08	0.21	0.49	0.75
Turb.	0.69	0.86	0.46	0.00	0.00		-0.22	0.25	-0.51	-0.31	0.08	-0.32	-0.46	-0.68
Chl-a	0.12	0.00	0.10	0.67	0.00	0.30		-0.60	0.42	0.15	-0.05	0.13	0.42	0.42
Phyco.	0.26	0.09	0.52	0.97	0.00	0.23	0.00		-0.40	-0.30	0.18	-0.27	-0.42	-0.29
Cells/ml	0.91	0.20	0.33	0.57	0.02	0.01	0.04	0.05		0.25	-0.08	0.33	0.75	0.51
Green:diatom	0.25	0.11	0.72	0.70	0.16	0.14	0.49	0.16	0.25		-0.86	0.58	0.45	0.48
Diatom %	0.27	0.23	0.86	0.49	0.70	0.72	0.84	0.40	0.71	0.00		-0.53	-0.28	-0.26
Simpson	0.97	0.30	0.69	0.95	0.32	0.13	0.55	0.21	0.12	0.00	0.01		0.66	0.18
Richness	0.83	0.02	0.23	0.90	0.02	0.02	0.04	0.04	0.00	0.03	0.18	0.00		0.43
Slope	0.45	0.36	0.77	0.17	0.00	0.00	0.04	0.17	0.01	0.02	0.23	0.40	0.04	

Table 2 Pearson's R partial correlation matrix controlling for rivermile and time of season. The bottom/left half of the matrix displays p-values, and the top/right half displays Pearson's r value. Green shaded cells indicate a statistically significant correlation ($p<0.05$).

Table 7 NMDS Scores for Main River Channel Samples

Site	Date	MDS1	MDS2	Site	Date	MDS1	MDS2
BAYC	5/22/2014	-0.21572	-0.27948	GRPT	7/31/2014	0.012983	-0.06147
BAYC	6/6/2014	0.317264	-0.3988	GRPT	8/14/2014	-0.6176	-0.15848
BAYC	6/20/2014	0.00404	-0.30178	GRPT	9/19/2014	-0.26832	0.292268
BAYC	7/1/2014	0.271557	-0.10318	GRPT	10/18/2014	-0.43661	-0.04111
BAYC	7/17/2014	0.1616	0.171672	RIVM	5/22/2014	-0.10226	-0.18044
BAYC	7/31/2014	0.389599	-0.01603	RIVM	6/6/2014	0.102238	0.582963
BAYC	8/14/2014	0.051767	-0.0627	RIVM	6/20/2014	-0.13681	-0.33213
BAYC	8/28/2014	0.457593	-0.12058	RIVM	7/1/2014	0.196864	-0.12229
BAYC	9/19/2014	0.115671	-0.4223	RIVM	7/17/2014	0.082468	0.046611
BAYC	10/18/2014	0.067489	0.143562	RIVM	7/31/2014	0.417367	0.108753
GAGE	5/7/2014	-0.75865	-0.12004	RIVM	8/14/2014	0.258304	0.293726
GAGE	5/22/2014	-0.73818	0.187381	RIVM	8/28/2014	0.530092	0.213528
GAGE	6/6/2014	0.122121	-0.09204	RIVM	9/19/2014	0.237536	0.037161
GAGE	7/1/2014	0.131218	-0.16187	RIVM	10/18/2014	-0.01396	0.522525
GAGE	7/18/2014	-0.10053	-0.05727	ZIL	5/22/2014	-0.37735	-0.10412
GAGE	7/31/2014	0.15487	0.011969	ZIL	6/6/2014	0.146499	-0.24596
GAGE	8/28/2014	0.307135	0.084278	ZIL	6/20/2014	0.03674	-0.33056
GAGE	9/19/2014	-0.21622	0.509293	ZIL	7/1/2014	0.018321	-0.19458
GAGE	10/18/2014	-0.23029	0.139281	ZIL	7/17/2014	0.071109	0.237754
GRPT	5/6/2014	-0.55087	0.065949	ZIL	7/31/2014	0.463093	-0.50967
GRPT	5/22/2014	-0.4212	-0.37361	ZIL	8/14/2014	0.321406	0.491681
GRPT	6/6/2014	0.22895	-0.01743	ZIL	8/28/2014	0.367	0.299973
GRPT	7/1/2014	-0.01299	-0.00926	ZIL	9/19/2014	-0.1237	0.108596
GRPT	7/17/2014	-0.49775	0.350809	ZIL	10/18/2014	-0.22388	-0.08252

Table 7. NMDS Scores for main river sample sites based on normalized phytoplankton counts. See Appendix 1 for count data.

Table 8 NMDS Scores for Main River Channel Taxa

Phylum	Genus	MDS1	MDS2	Phylum	Genus	MDS1	MDS2
Bacilliarophyta	Achnanthes	-0.37623	1.071901	Chlorophyta	Gonium	0.527826	-0.08542
Bacilliarophyta	Actinocyclus	0.335163	-0.01709	Chlorophyta	Haematococcus	0.720933	-0.23074
Bacilliarophyta	Amononeis	-0.00365	-0.25143	Chlorophyta	Hydrodictyon	0.555963	0.112442
Bacilliarophyta	Amphipleura	0.266935	0.520022	Chlorophyta	Kirchneriella	0.313479	-0.08658
Bacilliarophyta	Amphora	-0.31917	0.091878	Chlorophyta	Microspora	-0.14282	0.462109
Bacilliarophyta	Aneumastus	-0.11457	-0.06076	Chlorophyta	Monoraphidium	0.718861	0.255007
Bacilliarophyta	Asterionella	-0.74305	-0.28611	Chlorophyta	Mougeotia	0.193019	0.141033
Bacilliarophyta	Aulacoseira	-0.05445	-0.15782	Chlorophyta	Oedigonium	-0.62103	-0.24434
Bacilliarophyta	Caloneis	-0.89933	-0.4461	Chlorophyta	Oocystis	0.377431	-0.2832
Bacilliarophyta	Centronella	0.157961	0.434385	Chlorophyta	Palmella	1.240702	0.646085
Bacilliarophyta	Cocconeis	-0.18026	0.203399	Chlorophyta	Palmodictyon	-0.23934	-0.54597
Bacilliarophyta	Cyclotella	-0.02008	-0.29046	Chlorophyta	Pandorina	0.537718	-0.0507
Bacilliarophyta	Cymatopleura	-0.53894	-0.22084	Chlorophyta	Pediastrum	0.381882	0.088951
Bacilliarophyta	Cymbella	-0.11578	0.230072	Chlorophyta	Scenedesmus	0.403234	-0.14033
Bacilliarophyta	Diatoma	-0.54185	-0.1784	Chlorophyta	Selenastrum	0.87462	0.836093
Bacilliarophyta	Diploneis	-0.14595	0.75394	Chlorophyta	Spaerocystis	0.421295	0.30374
Bacilliarophyta	Encyonema	-0.80911	-0.27499	Chlorophyta	Spirogyra	1.240702	0.646085
Bacilliarophyta	Epithemia	-0.23531	-0.1733	Chlorophyta	Staurastrum	0.588151	0.093604
Bacilliarophyta	Eunotia	-0.43471	0.159953	Chlorophyta	Tetraedon	-0.10259	0.886217
Bacilliarophyta	Fragilaria	-0.35362	0.446384	Chlorophyta	Ulothrix	0.110899	0.077185
Bacilliarophyta	Gomphoneis	-0.14755	-0.42312	Chlorophyta	Volvox	1.240702	0.646085
Bacilliarophyta	Gomphonema	-0.1406	-0.02354	Chrysophyta	Chromulina	0.49264	-0.31815
Bacilliarophyta	Gyrosigma	-0.4182	-0.09994	Chrysophyta	Dinobryon	0.158359	-0.10092
Bacilliarophyta	Melosira	-0.03062	-0.0633	Chrysophyta	Mallomonas	0.121163	-0.18972
Bacilliarophyta	Meridion	-0.24895	-0.17776	Chrysophyta	Ochromonas	-0.62802	0.884337
Bacilliarophyta	Navicula	-0.51587	0.020145	Chrysophyta	Synura	0.516137	0.120114
Bacilliarophyta	Nitzschia	-0.37545	-0.15641	Cryptophyta	Cryptomonas	-0.08171	-0.24079
Bacilliarophyta	Pinnularia	-0.46299	-0.06644	Cryptophyta	Crytophyta spp	0.046529	-0.04506
Bacilliarophyta	Rhoicosphenia	-0.06082	0.047048	Cryptophyta	Rhodomonas	0.121395	0.066365
Bacilliarophyta	Stauroneis	-0.04771	-0.75338	Cyanophyta	Anabaena	-0.07712	0.255235
Bacilliarophyta	Stephanodiscus	0.317448	-0.15293	Cyanophyta	Aphanizomenon	0.362479	0.036217
Bacilliarophyta	Surirella	-0.47569	-0.26849	Cyanophyta	Aphanocapsa	-0.01895	0.298878
Bacilliarophyta	Synedra	-0.9915	-0.24081	Cyanophyta	Aphanothece	0.430597	0.545081
Bacilliarophyta	Tabellaria	-0.43045	-0.03233	Cyanophyta	Calothrix	-0.09711	1.331479
Bacilliarophyta	Tetracyclus	0.378232	0.519439	Cyanophyta	Chroococcus	0.12949	0.158469
Bacilliarophyta	Thallasiosira	0.156026	-0.20623	Cyanophyta	Coleosphaerum	0.044502	0.690247
Bacilliarophyta	Urosolenia	-0.72717	0.507342	Cyanophyta	Cylindrospermum	0.555511	0.302443
Chlorophyta	Actinastrum	0.425851	-0.46683	Cyanophyta	Eucapsis	0.556149	0.128198
Chlorophyta	Actinotaenium	1.071014	-0.36485	Cyanophyta	Gloeocapsa	0.226223	-0.38932
Chlorophyta	Ankinestrodesmus	0.47183	-0.16753	Cyanophyta	Gomphospaeria	-0.23547	0.315945
Chlorophyta	Apiocystis	0.911873	-0.0485	Cyanophyta	Merismopedia	0.562427	0.506974
Chlorophyta	Botryococcus	0.329617	-0.39232	Cyanophyta	Microcystis	-0.13017	0.286431
Chlorophyta	Carteria	0.416913	-0.20402	Cyanophyta	Nostoc	0.06518	-0.18743
Chlorophyta	Chladophora	-0.23531	-0.1733	Cyanophyta	Oscillatora	0.113533	0.61706
Chlorophyta	Chlamydomonas	0.200169	0.11988	Cyanophyta	Snowella	0.362479	0.036217
Chlorophyta	Closterium	0.176117	0.087326	Cyanophyta	Synechoccus	-0.0386	0.249042
Chlorophyta	Coelastrum	0.228352	-0.14746	Dinophyta	Ceratium	0.470054	-0.6567
Chlorophyta	Cosmarium	0.437667	0.25117	Dinophyta	Glenodinium	-0.04295	0.702663
Chlorophyta	Crucigenia	0.690969	-0.3763	Dinophyta	Gymnodinium	0.601511	0.178812
Chlorophyta	Drapnaraldia	-0.23531	-0.1733	Dinophyta	Perindinium	0.41749	-0.04861
Chlorophyta	Eudorina	0.512196	0.343166	Euglenophyta	Euglena	0.296336	-0.16498
Chlorophyta	Geminella	0.016908	1.282808	Euglenophyta	Phacus	0.307582	0.178104
Chlorophyta	Gloeocystis	0.372927	0.152907	Euglenophyta	Trachelomonas	0.526891	-0.15073
Chlorophyta	Gloeotilia	0.419955	0.459043	Xanthophyta	Tribonema	0.911873	-0.0485
Chlorophyta	Golenkina	0.44298	-0.66833	Xanthophyta	Vaucheria	0.858979	0.907651

Table 8. NMDS scores for algal taxa in main river sample sites. (See Appendix 1 for count data).

Table 9 Dominant Potamoplankton Genera by Site and Date

Date / Site	5/6/2014	5/22/2014	6/6/2014	6/20/2014	7/1/2014	7/17/2014	7/31/2014	8/14/2014	8/28/2014	9/19/2014	10/18/2014
RIVM		Cyclotella (17.0%)	Aphanocapsa (19.4%)	Cyclotella (38.0%)	Cyclotella (20.8%)	Rhodomonas (12.1%)	Scenedesmus (11.4%)	Aphanocapsa (14.2%)	Scenedesmus (10.9%)	Cyclotella (11.5%)	Aphanocapsa (13.2%)
		Aphanocapsa (8.7%)	Gymnodinium (9.7%)	Navicula (11.0%)	Aphanocapsa (9.4%)	Cyclotella (11.2%)	Aphanocapsa (10.4%)	Scenedesmus (11.7%)	Aphanocapsa (9.6%)	Scenedesmus (8.7%)	Microcystis (10.9%)
		Cryptomonas (7.8%)	Navicula (6.7%)	Aphanocapsa (9.0%)	Microcystis (6.2%)	Aphanocapsa (8.9%)	Rhodomonas (9.7%)	Microcystis (9.4%)	Gymnodinium (9.3%)	Cocconeis (10.4%)	Scenedesmus (10.3%)
BAYC		Cyclotella 16.8%	Cryptomonas (20.2%)	Cyclotella (22.7%)	Cyclotella (17.7%)	Aphanocapsa (14.8%)	Scenedesmus (12.0%)	Cyclotella (15.9%)	Scenedesmus (13.2%)	Cyclotella (24.5%)	Aphanocapsa (21.2%)
		Cryptomonas 13.3%	Scenedesmus (15.2%)	Navicula (10.3%)	Scenedesmus (11.7%)	Scenedesmus (8.7%)	Chromulina (9.7%)	Navicula (9.1%)	Cyclotella (11.5%)	Cryptomonas (11.0%)	Cyclotella (18.2%)
		Rhodomonas 11.5%	Cyclotella (12.3%)	Nitzschia (8.9%)	Rhodomonas (8.6%)	Cyclotella (7.0%)	Chlamydomonas (9.3%)	Scenedesmus (7.9%)	Chlamydomonas (10.5%)	Scenedesmus (10.4%)	Aphanothece (11.5%)
ZIL		Navicula (22.7%)	Cyclotella (25.4%)	Cyclotella (19.9%)	Cyclotella (23.7%)	Cyclotella (8.8%)	Scenedesmus (27.8%)	Chlorella (16.7%)	Gloeotila (13.3%)	Rhodomonas (11.9%)	Cyclotella (19.7%)
		Cyclotella (15.9%)	Aphanocapsa (7.1%)	Scenedesmus (11.8%)	Navicula (8.6%)	Aphanocapsa (8.8%)	Cyclotella (22.6%)	Oscillatora (16.7%)	Aphanocapsa (11.2%)	Navicula (3.4%)	Microcystis (18.1%)
		Nitzschia (10.6%)	Cryptomonas (6.7%)	Rhodomonas (11.8%)	Scenedesmus (7.6%)	Chlorella (8.5%)	Chromulina (10.9%)	Microcystis (13.2%)	Scenedesmus (10.2%)	Melosira (3.4%)	Cryptomonas (11.0%)
GRPT	Nitzschia (17.8%)	Cryptomonas (23.8%)	Rhodomonas (12.4%)		Cyclotella (13.8%)	Navicula (24.4%)	Cyclotella (19.9%)	Navicula (20.0%)		Navicula (15.4%)	Navicula (23.5%)
	Aphanocapsa (17.1%)	Aphanocapsa (15.8%)	Cyclotella (11.4%)		Navicula (11.4%)	Fragilaria (15.3%)	Navicula (8.6%)	Cyclotella (15.7%)		Rhodomonas (13.0%)	Cyclotella (19.4%)
	Navicula (14.7%)	Cyclotella (15.8%)	Scenedesmus (10.9%)		Scenedesmus (7.2%)	Cyclotella (9.1%)	Aphanocapsa (7.5%)	Chlorella (12.1%)		Aphanocapsa (11.3%)	Aphanocapsa (11.2%)
GAGE	Navicula (28.5%)	Nitzschia (23.8%)	Scenedesmus (19.1%)		Cyclotella (21.7%)	Cyclotella (18.2%)	Cyclotella (23.3%)		Scenedesmus (15.0%)	Aphanocapsa (33.0%)	Navicula (13.8%)
	Synedra (14.5%)	Navicula (18.9%)	Cyclotella (13.3%)%)		Scenedesmus (11.2%)	Microcystis (11.3%)	Scenedesmus (10.5%)		Cyclotella (8.7%)	Chlamydomonas (11.0%)	Aphanocapsa (9.2%)
	Cyclotella (10.3%)	Cryptomonas (12.9%)	Navicula (7.0%)		Cryptomonas (8.3%)	Navicula (9.1%)	Rhodomonas (8.4%)		Rhodomonas (8.6%)	Navicula (10.2%)	Cryptomonas (8.3%)
CASS	Navicula (31.3%)	Navicucla (20.4%)	Cyclotella (18.3%)			Microcystis (23.4%)	Navicula (33.3%)	Navicula (28.0%)	Aphanocapsa (32.4%)	Aphanocapsa (25.4%)	Cyclotella (23.8%)
	Nitzschia (20.7%)	Cryptomonas (5.7%)	Scenedesmus (15.1%)			Navicula (17.5%)	Synedra (11.1%)	Cyclotella (18.2%)	Navicula (13.9%)	Microcystis (12.4%)	Navicula (19.0%)
	Gomphonema (13.8%)	Nitzschia (11.8%)	Cryptomonas (14.3%)			Nitzschia (11.7%)	Nitzschia (8.9%)	Nitzschia (9.1%)	Cyclotella (9.3%)	Aphanothece (8.1%)	Nitzschia (14.3%)
SPAL		Cryptomonas (23.8%)	Scenedesmus (13.6%)		Navicula (22.1%)	Perindinium (15.2%)	Cyclotella (32.6%)	Navicula (18.5%)	Aphanocapsa (27.8%)	Cocconeis (19.0%)	Navicula (23.2%)
		Navicula (15.0%)	Navicula (13.1%)		Scenedesmus (15.2%)	Aphanocapsa (14.2%)	Cocconeis (8.0%)	Cocconeis (11.3%)	Gyrosigma (18.1%)	Navicula (14.0%)	Aphanothece (10.8%)
		Aphanocapsa (14.3%)	Cyclotella (12.5%)		Cyclotella (10.8%)	Aphanothece (10.1%)	Navicula (7.5%)	Aphanocapsa (10.4%)	Navicula (9.7%)	Aphanocapsa (8.0%)	Rhodomonas (10.8%)
GREF	Aphanocapsa (32.4%)	Navicula (15.7%)			Anabaena (25.2%)	Euglena (27.5%)	Cryptomonas (23.5%)	Cyclotella (13.9%)	Aphanocapsa (28.8%)		Cocconeis (22.0%)
	Aphanothece (14.7%)	Cryptomonas (14.5%)			Rhodomonas (14.3%)	Cryptomonas (15.2%)	Rhodomonas (11.9%)	Aphanocapsa (12.4%)	Cocconeis (12.8%)		Scenedesmus (16.9%)
	Gymnodinium (12.5%)	Cyclotella (11.9%)			Cryptomonas (10.9%)	Aphanocapsa (10.3%)	Scenedesmus (9.4%)	Microcystis (10.5%)	Microcystis (8.8%)		Navicula (16.1%)
FERG	Aphanocapsa (50.1%)		Aphanocapsa (15.5%)		Cryptomonas (56.1%)	Navicula (11.9%)	Melosira (14.0%)	Cyclotella (17.4%)	Anabaena (13.7%)	Anabaena (27.6%)	Gyrosigma (23.2%)
	Fragilaria (7.8%)		Navicula (14.1%)		Rhodomonas (10.2%)	Nitzschia (10.6%)	Gymnodinium (8.8%)	Navicula (16.9%)	Aphanocapsa (12.4%)	Aphanocapsa (10.5%)	Aphanocapsa (16.7%)
	Coelastrum (7.8%)		Nitzschia (9.2%)		Phacus (5.6%)	Cyclotella (6.2%)	Aphanocapsa (8.3%)	Nitzschia (11.0%)	Navicula (8.6%)	Melosira (9.2%)	Botryococcus (8.0%)
Slope	**0.00247**	**0.0083**	**0.00059**	**0.00074**	**0.00011**	**0.00144**	**0.00051**	**0.00059**	**0.0003**	**0.00044**	**-0.000125**

Table 7. Table showing the dominant taxa for each sample. Rows are each sampling site and columns are sampling date. Colors indicate type of algae. Brown is diatom, blue is cyanobacteria, pink is dinoflagellate, dark green is green algae, light green is cryptophyte, red is euglenophyte, and yellow is chrysophyte.

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Appendix 1: Potamoplankton Counts

	Site	BAYC05 /22/201	BAYC06 /06/201	BAYC06 /20/201	BAYC07 /01/201	BAYC07 /17/201	BAYC07 /31/201	BAYC08 /14/201	BAYC08 /28/201	BAYC09 /19/201	BAYC10 /18/201	CASS05/ 06/2014	CASS05/ 22/2014	CASS06/ 06/2014	CASS07/ 17/2014	CASS07/ 31/2015	CASS08/ 14/2014	CASS08/ 28/2014	CASS09/ 19/2014	CASS10/ 18/2014	FERG05/ 07/2014	FERG06/ 06/2014	FERG07/ 02/2014	FERG07/ 18/2014	FERG07/ 31/2014	FERG08/ 14/2014	FERG08/ 28/2014	FERG09/ 19/2014	FERG10/ 18/2014
Genus	Taxa Code	sample1	sample2	sample3	sample4	sample5	sample6	sample7	sample8	sample9	sample10	sample11	sample12	sample13	sample14	sample15	sample16	sample17	sample18	sample19	sample20	sample21	sample22	sample23	sample24	sample25	sample26	sample27	sample28
Achnanthes	taxa1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
Actinastrum	taxa2	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actinocyclus	taxa3	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actinotaenium	taxa4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ankistrodesmus	taxa5	0.0	0.0	0.0	0.0	2.0	5.0	1.0	7.0	2.5	1.0	0.0	0.0	2.0	1.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	0.0	4.0	0.0	2.0	0.0	0.0	0.0
Amphipleura	taxa6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	14.0	0.0	0.0	0.0
Amphora	taxa7	6.0	1.0	2.0	2.0	0.0	2.0	0.3	3.0	1.0	0.0	0.0	0.7	2.0	1.0	0.0	2.0	0.0	3.0	0.3	0.0	0.0	0.0	6.0	0.0	6.0	1.0	1.0	0.0
Anabaena	taxa8	2.0	1.0	0.0	1.0	0.0	1.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5	0.3	0.0	0.0	6.0	17.0	6.0	0.0	32.0	63.0	0.0
Aneumastus	taxa9	1.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.7	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
Anomoeneis	taxa10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aphanizomenon	taxa11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0
Aphanocapsa	taxa12	11.0	8.0	9.0	15.0	34.0	28.0	6.0	19.5	3.0	35.0	0.0	1.0	5.0	9.0	2.0	6.0	17.5	26.5	5.7	8.7	11.0	4.0	40.0	19.0	33.0	29.0	24.0	23.0
Aphanothece	taxa13	0.0	0.0	0.0	0.0	2.0	7.0	0.0	7.5	0.0	19.0	0.0	7.7	0.0	3.0	0.0	0.0	0.0	8.5	0.0	0.0	0.0	3.0	15.0	0.0	0.0	0.0	0.0	0.0
Apiocystis	taxa14	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Asterionella	taxa15	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aulacoseira	taxa16	3.0	9.0	2.0	3.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
Botryococcus	taxa17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.0	0.0	7.0	0.0	0.0	0.0	11.0
Bulbochaete	taxa18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	0.0	1.0	0.0	0.0
Caloneis	taxa19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Calothrix	taxa20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0
Carteria	taxa21	0.0	9.0	4.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Centronella	taxa22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ceratium	taxa23	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chladophora	taxa24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	17.0	0.0	0.0	0.0
Chlamydomonas	taxa25	17.0	0.0	3.0	10.0	9.0	41.0	8.3	30.0	1.0	5.0	0.0	0.0	0.0	3.0	0.0	4.5	4.0	0.0	3.3	1.0	3.0	27.0	22.0	10.0	0.0	6.0	4.0	5.0
Chromulina	taxa26	5.0	11.0	7.0	10.0	8.0	43.0	4.0	8.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chroococcus	taxa27	0.0	0.0	3.0	0.0	7.0	4.0	3.0	9.0	1.5	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.0	0.0	0.7	1.5	2.0	3.0	4.0	4.0	8.0	1.0	1.0
Chroomonas	taxa28	0.0	0.0	0.0	0.0	16.0	0.0	5.3	0.0	2.5	3.0	0.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.0	0.0	0.0	0.0	0.0	0.0
Closterium	taxa29	0.0	4.0	0.0	2.0	3.0	0.0	0.0	1.5	0.0	0.0	0.0	0.7	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	4.0	1.0	0.0	0.0
Cocconeis	taxa30	3.0	0.0	5.0	2.0	5.0	0.0	3.7	1.0	1.5	0.0	0.0	1.0	2.0	2.0	0.0	0.0	3.5	2.0	0.0	0.0	1.0	2.0	17.0	4.0	13.0	0.0	4.0	7.0
Coelastrum	taxa31	0.0	6.0	5.0	1.0	2.0	4.0	6.0	5.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	1.0	0.5	0.0	0.0	1.3	0.0	0.0	4.0	0.0	0.0	1.0	0.0	0.0
Coleosphaerum	taxa32	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	13.0	4.0	0.0	0.0	0.0	3.0
Coscinodiscus	taxa33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cosmarium	taxa34	0.0	0.0	0.0	1.0	1.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.0	0.0	1.0	3.0	2.0	0.0
Crucigenia	taxa35	0.0	0.0	3.0	0.0	0.0	0.0	0.0	7.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cryptomonas	taxa36	35.0	69.0	4.0	2.0	4.0	19.0	3.7	28.0	9.0	5.0	0.0	4.0	18.0	1.5	0.0	1.0	0.0	0.0	0.7	0.7	3.0	362.0	20.0	5.0	5.0	7.0	0.0	1.0
Cyclotella	taxa37	44.0	42.0	46.0	35.0	16.0	37.0	22.7	32.0	20.0	30.0	3.0	6.0	23.0	8.0	4.0	12.0	5.0	5.5	11.7	0.0	5.0	9.0	74.0	0.0	76.0	10.0	9.0	6.0
Cylindrospermum	taxa38	0.0	1.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	6.0	0.0	2.0	0.0	0.0	0.0
Cymatopleura	taxa39	4.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	2.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Cymbella	taxa40	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	2.0	0.5	0.0	1.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Diatoma	taxa41	5.0	2.0	2.0	0.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	5.0	0.0
Dinobryon	taxa42	2.0	4.0	0.0	3.0	0.0	4.0	0.0	0.0	1.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Diploneis	taxa43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Draparnaldia	taxa44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Encyonema	taxa45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0
Epithemia	taxa46	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eucapsis	taxa47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
Eudorina	taxa48	0.0	0.0	0.0	0.0	0.0	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	1.0	0.0	0.0
Euglena	taxa49	3.0	1.0	2.0	1.0	1.0	6.0	1.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	26.0	60.0	4.0	4.0	2.0	0.0	0.0
Eunotia	taxa50	1.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	15.0	3.0	1.0	4.0	12.0	4.0
Fragilaria	taxa51	1.0	1.0	1.0	0.0	5.0	2.0	0.0	2.5	0.0	0.0	0.0	1.0	2.0	0.0	0.0	0.0	0.0	0.5	0.0	1.3	3.0	0.0	11.0	0.0	2.0	0.0	3.0	6.0
Geminella	taxa52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	2.0	0.0
Glenodinium	taxa53	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	35.0	0.0	1.0	5.0	3.0	0.0
Gloeocapsa	taxa54	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	7.0	11.0	0.0	0.0
Gloeocystis	taxa55	0.0	3.0	0.0	3.0	0.0	3.0	0.3	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	7.0	5.0	6.0	0.0	0.0	0.0	0.0
Gloeotila	taxa56	0.0	4.0	0.0	2.0	0.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	10.0	0.0	0.0	9.0	0.0	0.0
Golenkinia	taxa57	1.0	5.0	0.0	0.0	0.0	3.0	0.3	1.0	3.5	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Gomphoneis	taxa58	0.0	3.0	7.0	0.0	1.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.5	0.0	0.0	0.7	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0
Gomphonema	taxa59	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	2.0	0.0	1.0	4.0	0.0	0.0	2.5	0.0	0.0	0.5	0.0	13.0	3.0	9.0	0.0	3.0	2.0
Gomphosphaeria	taxa60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	3.0	0.0	3.0	0.0
Gomphosphenia	taxa61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gonium	taxa62	0.0	4.0	2.0	0.0	2.0	3.0	2.0	7.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Gonystomum	taxa63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gymnodinium	taxa64	0.0	10.0	2.0	1.0	0.0	12.0	3.0	16.5	1.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	1.5	11.0	0.0	20.0	0.0	0.0	0.0	0.0
Gyrosigma	taxa65	0.0	0.0	1.0	2.0	2.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	1.5	0.0	7.0	0.0	3.0	0.0	13.0	32.0
Haematococcus	taxa66	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	7.0	4.0	0.0	0.0	0.0	0.0
Hydrodictyon	taxa67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Kirchneriella	taxa68	2.0	0.0	3.0	0.0	0.0	5.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0
Mallomonas	taxa69	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Melosira	taxa70	7.0	15.0	5.0	11.0	10.0	15.0	5.3	15.5	6.0	11.0	0.0	0.0	7.0	2.0	0.0	1.5	1.0	7.0	2.0	0.3	4.5	3.0	13.0	32.0	25.0	7.0	21.0	6.0
Meridion	taxa71	6.0	3.0	0.0	0.0	3.0	2.0	0.7	0.0	0.0	0.0	2.0	0.0	3.0	0.5	4.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0	13.0	0.0	1.0	0.0	5.0	1.0
Merismopedia	taxa72	0.0	0.0	1.0	1.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	1.0	2.0	0.0	2.0	0.0	0.0	0.0
Micrasterias	taxa73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Microcystis	taxa74	0.0	0.0	0.0	15.0	9.0	12.0	10.7	0.0	1.0	8.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	13.0	0.0	0.0	4.5	2.0	68.0	8.0	39.0	8.0	0.0	0.0
Microspora	taxa75	3.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0
Monoraphidium	taxa76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mougeotia	taxa77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0
Navicula	taxa78	24.0	8.0	21.0	1.0	13.0	10.0	13.0	3.0	4.0	5.0	9.0	14.3	17.0	15.0	15.0	18.5	7.5	6.0	9.3	0.7	10.0	4.0	143.0	11.0	74.0	20.0	15.0	6.0
Nitzschia	taxa79	22.0	22.0	18.0	3.0	8.0	11.0	4.0	9.0	3.5	5.0	6.0	8.3	6.0	10.0	4.0	6.0	3.0	6.5	7.0	0.0	6.5	3.0	127.0	9.0	48.0	8.0	4.0	7.0
Nostoc	taxa80	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ochromonas	taxa81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oedigonium	taxa82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	3.0	0.0	0.0	0.0
Oocystis	taxa83	0.0	0.0	2.0	0.0	0.0	2.0	0.0	5.0	1.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0
Oscillatoria	taxa84	0.0	0.0	3.0	0.0	0.0	0.0	0.3	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	2.0	2.0	2.0	4.0	0.0	3.0	2.0	0.0
Palmella	taxa85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palmodictyon	taxa86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	5.0	2.0	0.0
Pandorina	taxa87	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0	0.0	2.0	0.0	0.0
Pediastrum	taxa88	0.0	1.0	1.0	2.0	1.0	2.0	2.7	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	8.0	0.0	0.0	0.0	0.0
Perindinum	taxa89	0.0	2.0	9.0	4.0	3.0	21.0	1.7	15.5	0.5	5.0	0.0	2.3	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	12.0	71.0	2.0	0.0	0.0	0.0	1.0
Phacus	taxa90	0.0	0.0	0.0	1.0	3.0	5.0	2.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.0	51.0	0.0	0.0	0.0	4.0	0.0
Pinnularia	taxa91	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.0	0.0	0.0	1.0	4.0	2.0	0.0	2.0	2.0	0.0	1.0	1.0	18.0	0.0	0.0	0.0	4.0	7.0
Radiofilum	taxa92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rhizosolenia	taxa93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rhodomonas	taxa94	30.0	12.0	5.0	17.0	8.0	41.0	2.7	0.0	0.0	8.0	0.0	0.0	0.0	3.5	0.0	2.0	0.0	2.5	0.0	0.0	0.0	66.0	4.0	0.0	0.0	0.0	0.0	0.0
Rhoicosphenia	taxa95	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Scenedesmus	taxa96	3.0	52.0	13.0	23.0	20.0	53.0	11.3	38.0	8.5	10.0	0.0	1.3	19.0	0.5	0.0	0.0	2.5	0.0	0.7	0.0	2.0	1.0	74.0	17.0	3.0	16.0	1.0	1.0
Selenastrum	taxa97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0
Skeletonema	taxa98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowella	taxa99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sphaerocystis	taxa100	1.0	3.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	1.0	0.0	0.0
Spirogyra	taxa101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spirulina	taxa102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Staurastrum	taxa103	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	1.0	0.0	2.0	1.0
Stauroneis	taxa104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	5.0	2.0	0.0	0.0	1.0	1.0	0.0
Stephanodiscus	taxa105	2.0	11.0	8.0	0.0	5.0	12.0	1.3	0.0	0.5	3.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	2.0	0.0	6.0	0.0	0.0	0.0
Stigeoclonum	taxa106	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0
Surirella	taxa107	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
Synechoccus	taxa108	0.0	4.0	0.0	7.0	10.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0	0.0	0.0	11.0	9.0	0.0	2.0	0.0	0.0
Synedra	taxa109	3.0	4.0	0.0	1.0	0.0	3.0	0.3	0.0	0.0	1.0	3.0	3.3	0.0	0.0	5.0	0.5	0.0	0.0	0.7	0.7	0.0	3.0	23.0	0.0	1.0	0.0	3.0	0.0
Synura	taxa110	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tabellaria	taxa111	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tetracyclus	taxa112	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Tetradron	taxa113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	2.0	0.0	0.0	0.0	0.0
Thallasoria	taxa114	3.0	0.0	3.0	12.0	6.0	0.0	0.7	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	26.0	0.0	11.0	0.0	0.0	2.0
Trachelomonas	taxa115	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	17.0	1.0	4.0	0.0	0.0	0.0
Tribonema	taxa116	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Ulothrix	taxa117	4.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urosolenia	taxa118	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Vaucheria	taxa119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Volvox	taxa120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0
Zygnema	taxa121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
Total Count		262.0	342.0	203.0	198.0	229.0	443.0	142.7	288.5	81.5	165.0	29.0	70.3	126.0	85.5	45.0	66.0	54.0	104.5	49.0	17.0	71.0	645.0	1203.0	228.0	438.0	233.0	228.0	138.0
Cells/ml		10386	13557	8047	7849	9077	17560	5655	11436	3231	6541	1150	2788	4995	3389	1784	2616	2141	4142	1942	674	2814	25568	47686	9038	17362	9236	9038	5470

	Site	GAGE05/07/201	GAGE05/22/201	GAGE06/06/201	GAGE07/01/201	GAGE07/18/201	GAGE07/31/201	GAGE08/28/201	GAGE09/19/201	GAGE10/18/201	GREF05/07/2014	GREF05/27/2014	GREF07/02/2014	GREF07/18/2014	GREF07/31/2014	GREF08/14/2014	GREF08/28/2014	GREF09/19/2014	GREF10/18/2014	GRPT05/06/201	GRPT05/22/201	GRPT06/06/201	GRPT07/01/201	GRPT07/17/201	GRPT07/31/201	GRPT08/14/201	GRPT09/19/201	GRPT10/18/201
Genus	**Taxa Code**	sample29	sample30	sample31	sample32	sample33	sample34	sample35	sample36	sample37	sample38	sample39	sample40	sample41	sample42	sample43	sample44	sample45	sample46	sample47	sample48	sample49	sample50	sample51	sample52	sample53	sample54	sample55
Achnanthes	taxa1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0
Actinastrum	taxa2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actinocyclus	taxa3	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	1.5	0.0
Actinotaenium	taxa4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ankistrodesmus	taxa5	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amphipleura	taxa6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Amphora	taxa7	3.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	5.0	10.0	4.5	3.3
Anabaena	taxa8	0.0	0.0	0.0	0.0	1.0	3.0	0.0	0.0	1.0	0.0	1.0	44.0	17.0	11.0	2.0	6.0	0.0	6.5	0.0	0.0	1.0	0.0	1.0	2.0	4.0	1.5	0.0
Aneumastus	taxa9	1.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Anomoeneis	taxa10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0
Aphanizomenon	taxa11	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aphanocapsa	taxa12	9.0	5.5	13.0	22.0	9.0	27.0	19.0	19.5	10.0	14.7	0.0	3.0	55.0	4.0	47.0	36.0	0.0	0.0	11.0	5.3	17.0	24.0	0.0	20.0	7.0	16.5	8.3
Aphanothece	taxa13	0.0	0.0	0.0	8.0	0.0	6.0	2.0	0.0	0.0	6.7	0.0	0.0	30.0	2.0	21.0	9.0	0.0	0.0	0.0	0.0	3.0	8.0	0.0	4.0	0.0	0.0	0.0
Apiocystis	taxa14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Asterionella	taxa15	5.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Aulacoseira	taxa16	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0
Botryococcus	taxa17	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulbochaete	taxa18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caloneis	taxa19	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0
Calothrix	taxa20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carteria	taxa21	0.0	0.0	3.0	0.0	0.0	3.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Centronella	taxa22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ceratium	taxa23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	5.0	0.0	0.0	0.0
Chladophora	taxa24	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chlamydomonas	taxa25	3.0	0.5	11.0	10.0	0.0	17.0	11.0	6.5	6.0	0.0	0.0	4.5	17.0	35.0	12.0	3.0	0.0	0.0	0.0	0.0	14.0	14.0	2.5	11.0	0.0	6.5	0.0
Chromulina	taxa26	0.0	0.0	7.0	9.0	0.0	2.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	12.0	0.0	14.0	0.0	0.0	0.0
Chroococcus	taxa27	0.0	0.0	0.0	3.0	6.0	4.0	8.0	0.0	3.0	0.0	0.0	0.0	5.0	6.0	5.0	0.0	0.0	0.0	0.0	1.7	6.0	0.0	2.0	2.0	0.0	4.0	0.0
Chroomonas	taxa28	0.0	0.0	0.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	9.0	81.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5
Closterium	taxa29	2.0	0.0	1.0	1.0	0.0	1.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	2.0	2.0	0.0	2.0	0.0	0.3	0.0	2.0	0.5	1.0	1.0	0.0	0.0
Cocconeis	taxa30	1.0	0.0	4.0	9.0	0.0	3.0	4.0	2.0	5.0	0.0	1.0	17.0	2.0	37.0	26.0	16.0	0.0	13.0	0.0	0.0	0.0	6.0	9.0	9.0	24.0	7.0	2.5
Coelastrum	taxa31	0.0	0.0	5.0	4.0	1.0	10.0	2.0	1.0	2.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.3	2.0	4.0	0.5	1.0	1.0	1.5	0.0
Coleosphaerum	taxa32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.5	0.0
Coscinodiscus	taxa33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cosmarium	taxa34	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.7	0.0	2.5	2.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
Crucigenia	taxa35	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	1.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Cryptomonas	taxa36	0.0	6.5	9.0	20.0	2.0	7.0	1.0	4.0	9.0	1.0	7.7	19.0	34.0	95.0	5.0	0.0	0.0	0.0	0.0	8.0	6.0	10.0	6.0	5.0	1.0	6.0	0.0
Cyclotella	taxa37	25.0	2.0	34.0	68.0	24.0	44.0	19.0	4.5	6.0	1.7	6.3	1.5	6.0	5.0	53.0	2.0	0.0	0.0	9.0	5.3	23.0	46.0	9.5	53.0	44.0	4.5	14.3
Cylindrospermum	taxa38	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cymatopleura	taxa39	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	3.0	0.0	1.0	8.0	1.5	0.0
Cymbella	taxa40	0.0	0.0	1.0	3.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	1.0	1.0	0.0	0.0	4.0	5.5	0.0
Diatoma	taxa41	7.0	0.5	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.5	0.7	2.0	6.0	0.0	1.0	6.0	0.0	1.0
Dinobryon	taxa42	0.0	0.0	1.0	1.0	1.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.5	0.0
Diploneis	taxa43	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Draparnaldia	taxa44	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Encyonema	taxa45	5.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Epithemia	taxa46	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eucapsis	taxa47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eudorina	taxa48	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Euglena	taxa49	0.0	0.0	4.0	0.0	2.0	7.0	0.0	0.0	2.0	0.3	1.0	1.5	147.0	5.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	4.0	0.5	0.0	0.0	0.0	0.0
Eunotia	taxa50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	2.0	0.0	0.0
Fragilaria	taxa51	0.0	0.0	4.0	0.0	0.0	0.0	1.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.0	16.0	0.0	0.0	0.0	0.8
Geminella	taxa52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glenodinium	taxa53	0.0	1.5	0.0	7.0	0.0	0.0	0.0	2.0	0.0	5.7	3.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5
Gloeocapsa	taxa54	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0
Gloeocystis	taxa55	0.0	0.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	18.0	4.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0	0.0
Gloeotila	taxa56	0.0	0.0	0.0	1.0	0.0	2.0	7.0	0.0	0.0	0.0	1.7	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	6.0	7.0	2.5	2.0	0.0	1.5	0.0
Golenkinia	taxa57	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	6.5	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Gomphoneis	taxa58	4.0	0.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0	0.0	1.0	0.0	0.0	1.5
Gomphonema	taxa59	0.0	0.0	1.0	1.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	1.0	0.0	1.5	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Gomphosphaeria	taxa60	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gomphosphenia	taxa61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gonium	taxa62	0.0	0.0	0.0	2.0	0.0	3.0	5.0	0.0	1.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	0.0	1.5	0.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Gonystomum	taxa63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gymnodinium	taxa64	0.0	0.0	7.0	2.0	2.0	0.0	9.0	0.0	0.0	0.0	0.0	4.0	0.0	21.0	0.0	0.0	0.0	0.0	1.0	0.0	6.0	4.0	0.0	4.0	2.0	0.0	0.0
Gyrosigma	taxa65	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	18.0	0.0	0.8
Haematococcus	taxa66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydrodictyon	taxa67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kirchneriella	taxa68	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	14.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	4.0	0.0
Mallomonas	taxa69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Melosira	taxa70	5.0	1.5	12.0	6.0	4.0	16.0	8.0	2.0	5.0	0.0	0.0	0.0	0.0	5.0	7.0	0.0	0.0	0.0	3.5	1.7	14.0	18.0	4.0	16.0	23.0	5.5	6.0
Meridion	taxa71	13.0	0.0	6.0	3.0	0.0	3.0	2.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	1.0	3.0	0.0	0.0	0.0
Merismopedia	taxa72	0.0	0.0	0.0	4.0	0.0	0.0	3.0	1.5	0.0	0.0	0.0	0.0	0.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0
Micrasterias	taxa73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microcystis	taxa74	11.0	2.5	7.0	8.0	15.0	18.0	10.0	5.5	6.0	0.0	0.0	4.0	7.0	7.0	40.0	11.0	0.0	1.5	8.0	0.0	0.0	20.0	4.0	17.0	34.0	3.0	3.8
Microspora	taxa75	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.5	0.0
Monoraphidium	taxa76	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mougeotia	taxa77	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Navicula	taxa78	69.0	9.5	18.0	22.0	12.0	16.0	9.0	6.0	15.0	1.3	8.3	3.5	0.0	6.0	4.0	4.0	0.0	9.5	9.5	3.3	7.0	38.0	25.5	23.0	56.0	22.5	17.3
Nitzschia	taxa79	14.0	12.0	15.0	7.0	5.0	13.0	7.0	0.0	8.0	2.7	3.3	7.0	7.0	6.0	6.0	10.0	0.0	2.5	11.5	5.0	11.0	22.0	0.0	10.0	7.0	8.5	2.5
Nostoc	taxa80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Ochromonas	taxa81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Oedigonium	taxa82	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	6.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Oocystis	taxa83	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	1.0	0.0
Oscillatoria	taxa84	3.0	2.0	2.0	0.0	3.0	0.0	4.0	0.0	1.0	0.0	0.0	2.0	0.0	0.0	0.0	1.0	0.0	2.5	0.0	0.0	3.0	0.0	0.0	4.0	2.0	0.0	0.0
Palmella	taxa85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palmodictyon	taxa86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pandorina	taxa87	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.7	0.0	2.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
Pediastrum	taxa88	0.0	0.0	0.0	1.0	0.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0	0.0	0.0
Peridinium	taxa89	0.0	0.0	3.0	0.0	10.0	6.0	5.0	0.0	2.0	3.0	2.0	2.5	15.0	16.0	4.0	0.0	0.0	0.0	0.0	0.0	4.0	8.0	1.5	5.0	0.0	0.0	0.0
Phacus	taxa90	0.0	0.0	4.0	0.0	3.0	7.0	0.0	0.0	1.0	0.0	0.0	0.5	22.0	5.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Pinnularia	taxa91	8.0	0.5	2.0	0.0	3.0	5.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5	2.0	0.0	0.0	1.0
Radiofilum	taxa92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rhizosolenia	taxa93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rhodomonas	taxa94	0.0	0.0	14.0	7.0	9.0	28.0	19.0	3.5	9.0	0.0	0.0	25.0	12.0	48.0	6.0	5.0	0.0	0.5	0.0	0.0	25.0	17.0	5.5	3.0	0.0	19.0	0.0
Rhoicosphenia	taxa95	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scenedesmus	taxa96	6.0	0.0	49.0	35.0	10.0	35.0	33.0	0.0	1.0	0.3	1.3	0.5	3.0	38.0	36.0	4.0	0.0	10.0	1.0	0.0	22.0	24.0	2.5	16.0	3.0	5.0	1.8
Selenastrum	taxa97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skeletonema	taxa98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowella	taxa99	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sphaerocystis	taxa100	1.0	0.0	0.0	0.0	1.0	7.0	4.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spirogyra	taxa101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spirulina	taxa102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Staurastrum	taxa103	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	1.0	6.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Stauroneis	taxa104	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stephanodiscus	taxa105	0.0	0.0	0.0	10.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.5	0.0	4.0	0.0	0.0
Stigeoclonum	taxa106	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surirella	taxa107	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	5.0	0.0	0.0
Synechoccus	taxa108	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	18.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Synedra	taxa109	35.0	1.5	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0	2.0	0.0	0.0	1.0	0.0	0.0	0.0
Synura	taxa110	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tabellaria	taxa111	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.3	0.0	2.0	1.0	0.0	0.0	0.5	0.0
Tetracyclus	taxa112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tetradron	taxa113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Thallasoria	taxa114	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	3.0	1.0	1.0
Trachelomonas	taxa115	0.0	0.0	1.0	0.0	0.0	4.0	0.0	0.0	0.0	0.3	0.0	0.0	2.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tribonema	taxa116	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ulothrix	taxa117	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urosolenia	taxa118	0.0	4.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	1.0	0.0	0.0	1.5	0.0
Vaucheria	taxa119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volvox	taxa120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zygnema	taxa121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Count		242.0	50.5	256.0	313.0	132.0	334.0	220.0	59.0	109.0	45.3	53.0	174.5	534.0	405.0	380.0	125.0	0.0	59.0	64.5	33.7	202.0	333.0	104.5	266.0	280.0	146.0	73.5
Cells/ml		9593	2002	10148	12407	5232	13240	8721	2339	4321	1797	2101	6917	21168	16054	15063	4955	0	2339	2557	1335	8007	13200	4142	10544	11099	5787	2914

Genus	Site / Taxa Code	RIVM05/22/2014	RIVM06/06/2014	RIVM06/20/2014	RIVM07/01/2014	RIVM07/17/2014	RIVM07/31/2014	RIVM08/14/2014	RIVM08/28/2014	RIVM09/19/2014	RIVM10/18/2014	SPAL05/22/2014	SPAL06/06/2014	SPAL07/01/2014	SPAL07/18/2014	SPAL07/31/2014	SPAL08/14/2014	SPAL08/28/2014	SPAL09/19/2014	SPAL10/18/2014	ZIL05/22/2014	ZIL06/06/2014	ZIL06/20/2014	ZIL07/01/2014	ZIL07/17/2014	ZIL07/31/2014	ZIL08/14/2014	ZIL08/28/2014	ZIL09/19/2014	ZIL10/18/2014
Genus	Taxa Code	sample56	sample57	sample58	sample59	sample60	sample61	sample62	sample63	sample64	sample65	sample66	sample67	sample68	sample69	sample70	sample71	sample72	sample73	sample74	sample75	sample76	sample77	sample78	sample79	sample80	sample81	sample82	sample83	sample84
Achnanthes	taxa1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	3.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Actinastrum	taxa2	0.0	0.0	0.0	4.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.0	3.0	0.0	0.0	0.0	1.0	0.0	0.0
Actinocyclus	taxa3	0.0	0.0	0.0	14.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	10.0	3.0	0.0	0.0	9.0	0.0	8.0	0.0	0.0	6.0	0.0	0.0	0.0
Actinotaenium	taxa4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ankistrodesmus	taxa5	3.0	0.0	0.0	3.0	0.0	0.0	7.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	4.0	2.0	0.0
Amphipleura	taxa6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	3.0	0.0	0.0
Amphora	taxa7	1.0	1.0	0.0	2.0	2.0	0.0	4.0	2.0	0.0	3.0	0.0	0.0	1.0	1.0	0.0	0.0	6.0	4.0	0.5	0.0	0.0	0.0	2.0	4.0	0.0	0.0	0.0	0.5	0.5
Anabaena	taxa8	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	2.0	4.5	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0
Aneumastus	taxa9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Anomoeneis	taxa10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aphanizomenon	taxa11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aphanocapsa	taxa12	20.0	26.0	18.0	29.0	19.0	29.0	56.0	37.0	19.0	11.5	7.0	20.0	7.0	21.0	9.0	23.0	40.0	16.0	12.0	8.5	17.0	4.0	21.0	22.0	6.0	38.0	43.0	7.5	5.0
Aphanothece	taxa13	0.0	6.0	0.0	8.0	8.0	11.0	16.0	15.0	3.0	4.0	0.0	13.0	0.0	15.0	1.0	0.0	0.0	13.0	13.5	0.0	4.0	0.0	0.0	23.0	0.0	12.0	8.0	0.0	0.0
Apiocystis	taxa14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Asterionella	taxa15	5.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aulacoseira	taxa16	15.0	6.0	0.0	5.0	2.0	1.0	0.0	4.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	4.0	0.0	0.0	0.0	5.0	0.0	0.0
Botryococcus	taxa17	0.0	0.0	0.0	5.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Bulbochaete	taxa18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caloneis	taxa19	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Calothrix	taxa20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carteria	taxa21	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	11.0	0.0	0.0
Centronella	taxa22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ceratium	taxa23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	8.0	0.0	0.0	0.0	0.0
Chladophora	taxa24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chlamydomonas	taxa25	7.0	8.0	6.0	10.0	13.0	19.0	0.0	19.0	0.0	0.0	2.3	7.0	13.0	12.5	5.0	5.0	0.0	12.0	3.5	0.5	8.0	3.0	11.0	8.0	6.0	0.0	7.0	8.0	1.5
Chromulina	taxa26	0.0	0.0	0.0	12.0	11.0	9.0	16.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	5.0	19.0	7.0	40.0	0.0	0.0	0.0	0.0
Chroococcus	taxa27	2.0	8.0	0.0	0.0	4.0	3.0	8.0	5.0	0.0	0.0	0.0	5.0	1.0	1.5	1.0	0.0	0.0	0.0	5.5	0.0	2.0	2.0	2.0	0.0	0.0	0.0	8.0	0.0	0.0
Chroomonas	taxa28	0.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	6.0	4.0	0.0	12.0	0.0	5.0	11.0	0.0	0.0	0.0	5.0	0.0
Closterium	taxa29	0.0	0.0	0.0	1.0	1.0	2.0	0.0	4.0	1.0	2.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	3.0	0.0	5.0	2.0	1.0	1.0	0.0	0.0
Cocconeis	taxa30	3.0	0.0	4.0	3.0	1.0	4.0	20.0	4.0	20.0	1.5	0.0	0.0	12.0	5.0	14.0	25.0	12.0	38.0	3.5	0.0	3.0	0.0	3.0	7.0	0.0	0.0	10.0	4.5	0.5
Coelastrum	taxa31	0.0	0.0	4.0	2.0	0.0	2.0	6.0	1.0	0.0	0.0	0.0	0.0	18.0	0.0	6.0	5.0	2.0	6.0	0.0	1.0	4.0	7.0	2.0	1.0	6.0	1.0	16.0	0.0	0.0
Coleosphaerum	taxa32	0.0	0.0	0.0	1.0	0.0	0.0	4.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coscinodiscus	taxa33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cosmarium	taxa34	2.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	3.0	3.0	0.0	0.0	0.0
Crucigenia	taxa35	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	4.0	0.0	0.0	0.0	0.0
Cryptomonas	taxa36	18.0	3.0	12.0	11.0	16.0	22.0	5.0	12.0	8.0	0.5	11.7	0.0	5.0	0.0	1.0	1.0	0.0	0.0	0.0	3.5	16.0	11.0	8.0	21.0	6.0	6.0	0.0	11.5	7.0
Cyclotella	taxa37	39.0	7.0	76.0	64.0	24.0	17.0	21.0	5.0	25.0	6.0	6.0	22.0	22.0	6.0	63.0	12.0	0.0	3.0	4.5	15.0	61.0	37.0	94.0	23.0	83.0	25.0	25.0	9.5	12.5
Cylindrospermum	taxa38	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	4.0	0.0	0.0	0.0
Cymatopleura	taxa39	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cymbella	taxa40	2.0	0.0	0.0	0.0	0.0	0.0	2.0	11.0	1.0	0.5	0.0	0.0	4.0	1.0	1.0	2.0	0.0	0.0	0.0	0.5	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
Diatoma	taxa41	2.0	0.0	1.0	0.0	1.0	0.0	3.0	2.0	1.0	0.5	0.0	6.0	2.0	0.0	0.0	2.0	0.0	3.0	0.0	1.5	1.0	2.0	5.0	3.0	0.0	0.0	1.0	0.0	0.0
Dinobryon	taxa42	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.5	0.0
Diploneis	taxa43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0
Draparnaldia	taxa44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Encyonema	taxa45	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Epithemia	taxa46	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eucapsis	taxa47	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	3.0	0.0	1.0	0.0	6.0	0.0	0.0
Eudorina	taxa48	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0	0.0
Euglena	taxa49	1.0	0.0	1.0	1.0	0.0	2.0	4.0	5.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	2.0	3.0	4.0	1.0	8.0	3.0	5.0	0.0	0.0
Eunotia	taxa50	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.5	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Fragilaria	taxa51	2.0	0.0	5.0	2.0	6.0	0.0	0.0	0.0	0.0	2.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	1.0	17.0	0.0	0.0	2.0	0.5	1.5
Geminella	taxa52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glenodinium	taxa53	3.0	13.0	2.0	0.0	0.0	0.0	10.0	0.0	0.0	3.0	0.0	0.0	3.0	5.5	0.0	0.0	0.0	2.0	2.0	0.0	8.0	0.0	8.0	3.0	0.0	0.0	12.0	0.0	0.0
Gloeocapsa	taxa54	3.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	4.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0	1.0	1.0	0.0	2.0	4.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Gloeocystis	taxa55	0.0	4.0	0.0	1.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Gloeotila	taxa56	2.0	9.0	1.0	12.0	2.0	4.0	2.0	4.0	13.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	1.0	0.0	0.0	51.0	0.0	1.0
Golenkinia	taxa57	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gomphoneis	taxa58	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Gomphonema	taxa59	1.0	0.0	3.0	2.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.0	1.0	0.0	2.0	0.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0
Gomphosphaeria	taxa60	0.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gomphosphenia	taxa61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gonium	taxa62	0.0	0.0	0.0	3.0	0.0	5.0	2.0	5.0	3.0	0.0	0.0	0.0	0.0	0.5	0.0	3.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	8.0	0.0	0.0
Gonystomum	taxa63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gymnodinium	taxa64	0.0	0.0	0.0	2.0	3.0	15.0	5.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	10.0	3.5	0.0
Gyrosigma	taxa65	0.0	0.0	1.0	0.0	1.0	0.0	0.0	4.0	2.0	0.0	0.0	0.0	0.0	0.5	1.0	4.0	26.0	2.0	0.5	0.0	0.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.5
Haematococcus	taxa66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hydrodictyon	taxa67	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kirchneriella	taxa68	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	2.0	0.0	0.0	3.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	2.0	8.0	0.0	0.0	0.0	0.0
Mallomonas	taxa69	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Melosira	taxa70	11.0	6.0	7.0	16.0	11.0	2.0	15.0	8.0	14.0	3.5	2.7	4.0	2.0	7.5	4.0	7.0	5.0	3.0	3.0	1.0	11.0	2.0	25.0	4.0	24.0	4.0	13.0	12.0	5.0
Meridion	taxa71	0.0	0.0	0.0	3.0	4.0	1.0	0.0	0.0	3.0	0.0	1.0	3.0	0.0	0.0	2.0	8.0	0.0	0.0	0.5	0.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0	2.5	1.5
Merismopedia	taxa72	1.0	0.0	0.0	0.0	0.0	2.0	6.0	23.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	1.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0
Micrasterias	taxa73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Microcystis	taxa74	0.0	0.0	0.0	19.0	7.0	7.0	37.0	26.0	12.0	9.5	0.0	13.0	0.0	0.0	9.0	12.0	0.0	13.0	5.0	3.5	1.0	1.0	12.0	9.0	0.0	30.0	21.0	0.0	11.5
Microspora	taxa75	1.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.5	0.0
Monoraphidium	taxa76	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mougeotia	taxa77	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Navicula	taxa78	15.0	9.0	22.0	10.0	11.0	8.0	13.0	5.0	4.0	8.0	7.3	23.0	45.0	8.5	13.0	41.0	14.0	28.0	29.0	21.5	10.0	21.0	34.0	14.0	4.0	6.0	13.0	12.5	6.0
Nitzschia	taxa79	15.0	3.0	4.0	3.0	7.0	5.0	8.0	9.0	7.0	0.0	2.0	3.0	9.0	8.0	12.0	6.0	10.0	0.0	1.5	10.0	2.0	16.0	19.0	10.0	5.0	2.0	9.0	3.0	3.0
Nostoc	taxa80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ochromonas	taxa81	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oedigonium	taxa82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oocystis	taxa83	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Oscillatoria	taxa84	1.0	2.0	5.0	1.0	2.0	0.0	6.0	0.0	1.0	2.0	0.7	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	1.0	0.0	2.0	0.0	2.0	38.0	3.0	3.0	0.0
Palmella	taxa85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palmodictyon	taxa86	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pandorina	taxa87	0.0	0.0	0.0	0.0	0.0	2.0	0.0	3.0	0.0	0.5	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	2.0	0.0	0.0
Pediastrum	taxa88	0.0	0.0	0.0	0.0	2.0	0.0	5.0	1.0	0.0	1.5	0.3	0.0	0.0	0.0	3.0	4.0	0.0	3.0	0.5	0.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	0.0	0.0
Perindinum	taxa89	4.0	4.0	3.0	5.0	0.0	23.0	1.0	22.0	8.0	0.5	2.0	2.0	1.0	22.5	1.0	2.0	0.0	0.0	0.0	0.5	5.0	8.0	5.0	3.0	12.0	3.0	2.0	0.0	0.0
Phacus	taxa90	0.0	0.0	0.0	0.0	1.0	5.0	1.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	1.0	3.0	0.0	1.0	0.0	0.0	0.0	1.0	3.0	1.0	0.0	2.0	2.0	0.0	0.0
Pinnularia	taxa91	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	2.0	3.0	0.5	0.0	2.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
Radiofilum	taxa92	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rhizosolenia	taxa93	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rhodomonas	taxa94	10.0	4.0	0.0	4.0	26.0	27.0	12.0	32.0	13.0	0.0	0.0	0.0	9.0	0.0	3.0	5.0	0.0	4.0	13.5	7.5	6.0	22.0	14.0	4.0	5.0	5.0	5.0	13.5	4.5
Rhoicosphenia	taxa95	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.5	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	5.0	2.0	0.0	2.0	0.0	0.0
Scenedesmus	taxa96	10.0	4.0	9.0	17.0	12.0	32.0	46.0	42.0	23.0	9.0	1.0	24.0	31.0	6.5	8.0	12.0	1.0	8.0	8.5	3.5	11.0	22.0	30.0	16.0	102.0	15.0	39.0	6.0	1.0
Selenastrum	taxa97	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0
Skeletonema	taxa98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowella	taxa99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sphaerocystis	taxa100	0.0	0.0	0.0	0.0	2.0	4.0	4.0	5.0	0.0	3.0	0.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	0.5	0.0	0.0	0.0	2.0	0.0	3.0	0.0	0.0	0.0	0.0
Spirogyra	taxa101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Spirulina	taxa102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Staurastrum	taxa103	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Stauroneis	taxa104	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Stephanodiscus	taxa105	0.0	1.0	4.0	9.0	4.0	0.0	3.0	7.0	4.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	8.0	0.0	0.0	9.0	0.0	0.0	4.0	4.0	3.0	9.0	2.0	0.0
Stigeoclonum	taxa106	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surirella	taxa107	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Synechoccus	taxa108	0.0	5.0	0.0	5.0	0.0	0.0	0.0	1.0	0.0	0.0	0.7	0.0	0.0	2.0	0.0	2.0	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Synedra	taxa109	3.0	0.0	1.0	2.0	3.0	0.0	0.0	0.0	2.0	0.0	0.3	5.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
Synura	taxa110	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tabellaria	taxa111	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Tetracyclus	taxa112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tetradron	taxa113	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thallasoria	taxa114	2.0	0.0	2.0	6.0	0.0	7.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	5.0	0.0	0.0	2.0	2.0	18.0	0.0	3.0	0.0	6.0	1.5	0.0
Trachelomonas	taxa115	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0
Tribonema	taxa116	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ulothrix	taxa117	10.0	3.0	1.0	7.0	1.0	0.0	0.0	0.0	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	6.0	0.0	0.0	0.0	2.0	0.0	0.0
Urosolenia	taxa118	0.0	2.0	0.0	2.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	1.0	0.0	3.0	0.0	0.0
Voucheria	taxa119	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Volvox	taxa120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zygnema	taxa121	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Count		230.0	134.0	200.0	308.0	214.0	279.0	393.0	386.0	218.0	87.0	49.0	176.0	204.0	148.0	174.0	222.0	144.0	200.0	125.0	94.5	240.0	186.0	396.0	260.0	367.0	228.0	384.0	113.0	63.5
Cells/ml		9117	5312	7928	12209	8483	11059	15578	15301	8641	3449	1942	6977	8086	5867	6897	8800	5708	7928	4955	3746	9514	7373	15697	10306	14548	9038	15222	4479	2517

Appendix 2: Sample Data (Chemistry, Hydrologic, and Potamoplankton Community Metrics)

LOC	DATE	TIME	CAT	EVENT	RIVMILE	wshd_area	slope_day	backflow_1day	D.O. USGS	pH USGS	Velocity USGS	DISCHARGE LOCAL
BAYC	5/22/2014	13:08	1	2	8.4	15982.93	0.0083	0	7.7	7.7	2.24	
BAYC	6/6/2014	11:42	1	3	8.4	15982.93	0.00059	1	6.9	7.8	0.61	
BAYC	6/20/2014	11:59	1	4	8.4	15982.93	0.00074	0	6.7	7.9	0.55	3413.56
BAYC	7/1/2014	11:40	1	5	8.4	15982.93	0.00011	0	5.9	7.9	0.38	
BAYC	7/17/2014	12:29	1	6	8.4	15982.93	0.00144		6.9	7.8		
BAYC	7/31/2014	15:25	1	7	8.4	15982.93	0.00051		6.5	8	0.19	4446.97
BAYC	8/14/2014	15:04	1	8	8.4	15982.93	0.00059	0	6.2	7.7	0.27	3517.24
BAYC	8/28/2014	15:00	1	9	8.4	15982.93	0.0003	1	6.8	7.9	0.38	
BAYC	9/19/2014	15:20	1	10	8.4	15982.93	0.00044	0	8.8	8	0.29	
BAYC	10/18/2014	10:45	1	11	8.4	15982.93	-0.000125	1	7.4	7.9	0.05	
CASS	5/6/2014		2	1	25.5	2350.454	0.00221	0	10.4	8	1.17	
CASS	5/22/2014	16:42	2	2	25.5	2350.454	0.0083	0	7.8	7.7	2.3	
CASS	6/6/2014	15:30	2	3	25.5	2350.454	0.00059	0	10.5	8	1.19	254.12
CASS	7/1/2014	15:08	2	5	25.5	2350.454	0.00011	0	6.4	7.9	0.72	
CASS	7/17/2014	15:44	2	6	25.5	2350.454	0.00144		7.3	7.8		680.45
CASS	7/31/2014	9:58	2	7	25.5	2350.454	0.00051		7.8	8	0.62	586.33
CASS	8/14/2014	9:33	2	8	25.5	2350.454	0.00059	0	6.3	7.8	0.79	453.86
CASS	8/28/2014	9:28	2	9	25.5	2350.454	0.0003	1	7.9	8	0.38	85.81
CASS	9/19/2014	9:39	2	10	25.5	2350.454	0.00044	0	8	8	0.34	100.14
CASS	10/18/2014	14:45	2	11	25.5	2350.454	-0.000125	1	8.1	7.9	0.66	
FERG	5/7/2014	16:13	3	1		0	0.00247	0	10.4	8.1	1.28	
FERG	5/22/2014		3	2		0	0.0083	0				
FERG	6/6/2014	20:55	3	3		0	0.00059	0	6.8	7.8	0.31	
FERG	7/2/2014	11:48	3	5		0	0.0000651	1	6.5	7.9	0.38	
FERG	7/18/2014	16:53	3	6		0	0.00084		7.7	7.9		
FERG	7/31/2014	19:23	3	7		0	0.00051		7.3	8	0.14	
FERG	8/14/2014	18:38	3	8		0	0.00059	0	7.2	7.8	0.08	
FERG	8/28/2014	18:14	3	9		0	0.0003	1	7.4	7.9	0.1	
FERG	9/19/2014	18:30	3	10		0	0.00044	0	8.7	8.1	0.18	
FERG	10/18/2014	17:40	3	11		0	-0.000125	1	8.6	8	0.79	
GAGE	5/7/2014	12:33	1	1	27	3275.721	0.00247	0	10.4	8.1	1.42	
GAGE	5/22/2014	18:49	1	2	27	3275.721	0.0083	0	7.8	7.7	2.22	
GAGE	6/6/2014	17:42	1	3	27	3275.721	0.00059	0	6.4	7.8	0.29	694.82
GAGE	7/2/2014	9:34	1	5	27	3275.721	0.0000651	1	6.2	7.8	0.54	
GAGE	7/18/2014	9:32	1	6	27	3275.721	0.00084		7.4	7.9		1119.04
GAGE	7/31/2014	11:56	1	7	27	3275.721	0.00051		7.8	8	0.41	1392.87
GAGE	8/14/2014	11:20	1	8	27	3275.721	0.00059	0	6.3	7.7	0.7	
GAGE	8/28/2014	11:23	1	9	27	3275.721	0.0003	1	7.4	7.9	0.33	538.27
GAGE	9/19/2014	11:58	1	10	27	3275.721	0.00044	0	8.4	8	0.22	
GAGE	10/18/2014	16:40	1	11	27	3275.721	-0.000125	1	8.4	8	0.7	
GREF	5/7/2014	14:45	3	1		0	0.00247	0	10.4	8.1	1.31	
GREF	5/27/2014	17:27	3	2		0	0.00183	0	6.8	7.6	0.59	
GREF	6/6/2014	21:29	3	3		0	0.00059	0	6.8	7.8	0.36	
GREF	7/2/2014	10:39	3	5		0	0.0000651	1	6.6	7.8	0.42	
GREF	7/18/2014	10:52	3	6		0	0.00084		7.4	7.9		
GREF	7/31/2014	20:04	3	7		0	0.00051		7.6	8	0.21	
GREF	8/14/2014	19:23	3	8		0	0.00059	0	6.2	7.7	0.07	
GREF	8/28/2014	18:55	3	9		0	0.0003	1	6.5	7.9	0.14	
GREF	9/19/2014	19:05	3	10		0	0.00044	0	9	8.1	0.12	
GREF	10/18/2014	16:20	3	11		0	-0.000125	1	8.5	8	0.73	
GRPT	5/6/2014	14:56	1	1	22	15470.41	0.00221	0	10.5	8	1.2	
GRPT	5/22/2014	17:23	1	2	22	15470.41	0.0083	0	7.8	7.7	2.24	
GRPT	6/6/2014	16:21	1	3	22	15470.41	0.00059	0	6.2	7.7	0.34	2513.03
GRPT	7/1/2014	14:23	1	5	22	15470.41	0.00011	0	6.8	7.9	0.65	
GRPT	7/17/2014	14:31	1	6	22	15470.41	0.00144		6.9	7.8		2870.00
GRPT	7/31/2014	10:38	1	7	22	15470.41	0.00051		7.9	8	0.59	3225.72
GRPT	8/14/2014	10:12	1	8	22	15470.41	0.00059	0	5.6	7.7	0.83	4613.60
GRPT	8/28/2014	10:06	1	9	22	15470.41	0.0003	1	7.8	8	0.29	1224.24
GRPT	9/19/2014	11:00	1	10	22	15470.41	0.00044	0	8.6	8	0.26	
GRPT	10/18/2014	15:30	1	11	22	15470.41	-0.000125	1	8.3	7.9	0.74	
RIVM	5/22/2014	11:00	1	2	0.65	16120.72	0.0083	0	7.7	7.7	2.26	
RIVM	6/6/2014	9:49	1	3	0.65	16120.72	0.00059	1	6.6	7.8	0.35	
RIVM	6/20/2014	9:52	1	4	0.65	16120.72	0.00074	0	6.8	7.9	0.59	
RIVM	7/1/2014	9:56	1	5	0.65	16120.72	0.00011	0	6.6	7.8	0.65	
RIVM	7/17/2014	10:23	1	6	0.65	16120.72	0.00144		6.8	7.8		
RIVM	7/31/2014	17:02	1	7	0.65	16120.72	0.00051		7.6	7.9	0.14	
RIVM	8/14/2014	15:10	1	8	0.65	16120.72	0.00059	0	6.2	7.7	0.27	
RIVM	8/28/2014	16:25	1	9	0.65	16120.72	0.0003	1	6.8	7.9	0.29	
RIVM	9/19/2014	16:40	1	10	0.65	16120.72	0.00044	0	8.4	8	0.31	
RIVM	10/18/2014	9:45	1	11	0.65	16120.72	-0.000125	1	7.6	7.9	0.02	
SPAL	5/22/2014	18:16	2	2	25.8	3443.877	0.0083	0	7.8	7.7	2.23	
SPAL	6/6/2014	17:07	2	3	25.8	3443.877	0.00059	0	6.1	7.7	0.32	334.15
SPAL	7/2/2014	12:55	2	5	25.8	3443.877	0.0000651	1	5.7	7.9	0.34	
SPAL	7/18/2014	11:47	2	6	25.8	3443.877	0.00084		7.4	7.9		653.37
SPAL	8/14/2014	10:48	2	7	25.8	3443.877	0.00059	0	6.3	7.7	0.63	
SPAL	8/28/2014	10:42	2	8	25.8	3443.877	0.0003	1	7.6	7.9	0.35	161.90
SPAL	9/19/2014	11:29	2	9	25.8	3443.877	0.00044	0	8.6	8	0.28	
SPAL	10/18/2014	16:10	2	10	25.8	3443.877	-0.000125	1	8.4	8	0.75	
SPAL	7/31/2015	11:19	2	11	25.8	3443.877	-0.000125		7.8	8	0.48	500.52
ZIL	5/22/2014	15:14	1	2	15.2	15607.58	0.0083	0	7.8	7.7	2.22	
ZIL	6/6/2014	13:43	1	3	15.2	15607.58	0.00059	1	7.1	7.8	0.42	2980.79
ZIL	6/20/2014	13:55	1	4	15.2	15607.58	0.00074	0	6.5	7.9	0.52	2765.58
ZIL	7/1/2014	13:10	1	5	15.2	15607.58	0.00011	0	6.3	7.9	0.63	
ZIL	7/17/2014	13:13	1	6	15.2	15607.58	0.00144		6.2	7.8		
ZIL	7/31/2014	13:45	1	7	15.2	15607.58	0.00051		7.7	8	0.45	2640.59
ZIL	8/14/2014	13:31	1	8	15.2	15607.58	0.00059	0	5	7.7	0.32	5560.47
ZIL	8/28/2014	13:24	1	9	15.2	15607.58	0.0003	1	7.3	7.9	0.4	
ZIL	9/19/2014	13:45	1	10	15.2	15607.58	0.00044	0	8.6	8	0.27	
ZIL	10/18/2014	13:00	1	11	15.2	15607.58	-0.000125	1	7.9	7.9	0.26	

Explanation of Variables: LOC = Site Location, DATE = Date of Sample, TIME = Time of sample, CAT = Site Category (1=River, 2=Tributary, 3=Wetland), EVENT = Sequential Order of Sampling Event, RIVMILE = Distance of site upstream of Saginaw Bay, wshd_area = Catchment area, slope_day = Daily averaged slope value of Saginaw River, backflow_1day = Occurrence of reverse flow within 24 hours of sample, D.O. USGS = Dissolved oxygen concentrations in mg/L from the USGS gauging station in Saginaw, pH USGS = pH from the USGS gauging station in Saginaw, Velocity USGS = Velocity values (ft/s) at time of sample from the USGS gauging station, Discharge_Local = On site discharge measurements in cfs made with Sontek ADP

LOC	DATE	NH3	CL	S04	NO2	NO3	SIO2	SRP	TP	F	Temp	Conductivity
BAYC	5/22/2014	0.113	36.7	22.6	0.01	1.61	3.58	0.0053	0.0577	0.09	17.89	539.47
BAYC	6/6/2014	0.062	62.9	26.9	0.01	0.85	3.18	0.0044	0.0453	0.1	22.82	696.06
BAYC	6/20/2014	0.105	84.9	32.6	0.02	1.22	2.22	0.0022	0.0670	0.13	23.31	820.65
BAYC	7/1/2014	0.03	60.5	29.2	0.02	3.49	3.29	0.0046	0.0700	0.1	25.17	714.90
BAYC	7/17/2014	0.067	45	24.8	0.01	2.07	5.17	0.0096	0.0560	0.08	22.69	610.04
BAYC	7/31/2014	0.036	67.1	28.9	0.01	0.62	2.39	0.0035	0.0576	0.11	22.08	732.20
BAYC	8/14/2014	0.068	66	26	0.01	1	3.52	0.0102	0.0568	0.1	22.71	658.43
BAYC	8/28/2014					0.88			0.1387		24.96	666.00
BAYC	9/19/2014					2.01			0.0344		16.81	775.76
BAYC	10/18/2014	0.051	87.5	33.3	0.17	1.29	4.99	0.003	0.0441	0.13	13.43	786.00
CASS	5/6/2014	0.049	15	27.2	0	1.33	2.64	0.0018	0.0225	0	18.32	654.61
CASS	5/22/2014	0.072	28	44.7	0.01	3.45	3.39	0.0019	0.0319	0.08	23.36	711.48
CASS	6/6/2014	0.038	34	49.1	0.01	1.02	1.89	0.0036	0.0373	0.1	26.23	737.53
CASS	7/1/2014	0.034	40.2	55	0	1.5	2.67	0.0052	0.0347	0.1	21.56	649.16
CASS	7/17/2014	0.043	21.3	30.4	0.01	2.63	6.36	0.004	0.0348	0.07	19.50	599.00
CASS	7/31/2014	0.047	30.8	35.5	0	2.07	3.94	0.0058	0.0420	0.07	20.07	665.00
CASS	8/14/2014	0.093	20.3	23	0.01	0.78	3.83	0.0032	0.0536	0.08	22.75	709.00
CASS	8/28/2014					1.42			0.0441		13.68	763.06
CASS	9/19/2014					3.74			0.0344		13.68	763.06
CASS	10/18/2014	0.026	60.4	57.4	0	2.16	4.88	0.006	0.0333	0	12.58	791.00
FERG	5/7/2014	0.079	40.5	14.9	0	0.01	4.12	0.0227	0.0939	0.05	14.20	560.15
FERG	5/22/2014	0.079	38.7	10.9	0	0.01	2.14	0.0807	0.2249	0.08		
FERG	6/6/2014	0.035	84.2	25.6	0	1.78	2.4	0.0157	0.0958	0.1	17.14	518.56
FERG	7/2/2014	0.042	37	4.7	0	0	1.21	0.1425	0.4344	0.07	24.43	506.54
FERG	7/18/2014	0.041	34.7	3.5	0	0	0.68	0.0503	0.2144	0.06	20.30	455.00
FERG	7/31/2014	0.054	32	4	0	0.01	0.05	0.0328	0.2467	0.07	21.19	425.65
FERG	8/14/2014	0.028	29.6	3.5	0	0.01	0.45	0.0204	0.0992	0.05	21.41	388.97
FERG	8/28/2014					0.37			0.4714		20.89	377.00
FERG	9/19/2014					0.02			0.0191		14.51	339.47
FERG	10/18/2014	0.067	32.2	3.6	0	0.01	0.53	0.013	0.0585	0.06	12.16	392.00
GAGE	5/7/2014	0.063	44.9	25.3	0	0.84	0.88	0.0007	0.0598	0.07	12.19	731.00
GAGE	5/22/2014	0.04	28.6	14.7	0.02	1.31	3.54	0.0065	0.0912	0.07	19.00	434.93
GAGE	6/6/2014	0.054	60.1	26.9	0.01	1.31	3.24	0.0139	0.0740	0.09	23.19	745.00
GAGE	7/2/2014	0.047	62	29	0.02	2.81	3.85	0.0044	0.0697	0.09	25.07	763.80
GAGE	7/18/2014	0.106	48.5	24.5	0.01	2.52	4.93	0.0125	0.0721	0.07	19.23	669.00
GAGE	7/31/2014										20.89	587.68
GAGE	8/14/2014	0.108	45.7	20	0.01	1.05	5.94	0.0209	0.0948	0.09	20.07	550.27
GAGE	8/28/2014					0.72			0.0344		23.19	727.70
GAGE	9/19/2014					2.04			0.0604		14.87	750.53
GAGE	10/18/2014	0.034	73.6	33.3	0	1.96	6.59	0.008	0.1009	0.11	12.84	783.00
GREF	5/7/2014	0.076	39.4	8.5	0	0.01	0.07	0.0003	0.0507	0.06	13.19	519.93
GREF	5/27/2014	0.126	46.7	2.7	0	0.01	1.2	0.0602	0.1858	0.1	21.67	501.20
GREF	6/6/2014	0.08	41	12.5	0	0.02	0.26	0.1071	0.3599	0.02	22.49	403.71
GREF	7/2/2014	0.04	47	5	0	0	0.99	0.1162	0.2126	0.1	23.64	422.41
GREF	7/18/2014	0.031	38.1	16.9	0.02	0.37	2.28	0.0129	0.0894	0.08	21.29	466.29
GREF	7/31/2014	0.073	41.8	2.1	0	0	0.76	0.0155	0.1940	0.09	24.12	442.69
GREF	8/14/2014	0.016	34.4	2	0	0	0.69	0.0192	0.1257	0.08	21.99	414.10
GREF	8/28/2014					0.12			0.0724		23.31	390.43
GREF	9/19/2014					0.09			0.0300		18.15	423.52
GREF	10/18/2014	0.058	42.8	2.1	0	0.04	0.3	0.024	0.1148	0.09	12.51	388.00
GRPT	5/6/2014	0.128	41.8	27	0	1.1	3.29	0.0024	0.0326	0.07	12.69	536.44
GRPT	5/22/2014	0.083	35.1	20.6	0.01	1.57	3.4	0.0136	0.1000	0.08	18.83	512.20
GRPT	6/6/2014	0.065	76.1	27.3	0.01	0.67	3.29	0.0069	0.0380	0.12	22.30	725.41
GRPT	7/1/2014	0.077	65.6	31	0.01	0.61	3.81	0.0083	0.0377	0.13	25.75	667.86
GRPT	7/17/2014	0.049	51.8	27.5	0.01	1.39	4.64	0.0035	0.0393	0.1	21.75	623.00
GRPT	7/31/2014	0.045	96.3	31.4	0	0.29	3.18	0.0032	0.0263	0.15	21.87	731.34
GRPT	8/14/2014	0.067	59.1	25.2	0.01	0.81	5.23	0.0115	0.0639	0.11	20.79	585.91
GRPT	8/28/2014					0.49			0.0246		23.34	521.57
GRPT	9/19/2014					1			0.0300		15.59	713.73
GRPT	10/18/2014	0.03	86.7	32.3	0.01	0.62	5.17	0.001	0.0284	0.11	12.85	722.00
RIVM	5/22/2014	0.1	36.7	21.9	0.01	1.7	4.68	0.0023	0.0546	0.07	17.25	571.23
RIVM	6/6/2014	0.141	63.8	29.2	0.02	1.08	3.19	0.0062	0.0670	0.1	22.63	727.56
RIVM	6/20/2014	0.14	74.1	30.4	0.04	1.76	2.19	0.0066	0.0551	0.12	21.96	740.00
RIVM	7/1/2014	0.1	61.2	28.7	0.04	2.88	3.77	0.0055	0.0635	0.1	24.36	697.03
RIVM	7/17/2014	0.082	44.2	24.8	0.01	2.11	4.53	0.0058	0.0545	0.07	22.47	611.00
RIVM	7/31/2014	0.039	55.9	24.8	0.01	0.67	3.46	0.0071	0.0478	0.11	23.74	754.78
RIVM	8/14/2014					1.95			0.0000			
RIVM	8/28/2014					0.87			0.0126		24.86	682.57
RIVM	9/19/2014					2.64			0.0061		17.23	758.29
RIVM	10/18/2014	0.061	49.4	24.3	0.02	0.55	3.72	0.006	0.0531	0.06	12.33	555.73
SPAL	5/22/2014	0.138	45.2	18.9	0.01	0.72	3.87	0.0076	0.1027	0.07	18.35	545.45
SPAL	6/6/2014	0.081	87.8	27.3	0.02	2.3	3.32	0.0439	0.1728	0.1	22.56	836.00
SPAL	7/2/2014	0.096	40.4	11.8	0	0.01	0.49	0.0066	0.0563	0.07	24.96	794.00
SPAL	7/18/2014	0.059	61.7	26.6	0	1.45	3.79	0.0055	0.0816	0.09	21.84	698.73
SPAL	8/14/2014	0.105	52.3	18.9	0.01	1.35	5.29	0.02	0.0678	0.09	20.60	506.03
SPAL	8/28/2014					6.03			0.0823		22.24	821.00
SPAL	9/19/2014					4.05			0.0583		14.55	755.00
SPAL	10/18/2014	0.073	106.8	30.7	0.01	3.04	5.34	0.032	0.0322	0.14	12.62	830.00
SPAL	7/31/2015	0.053	71.4	27.2	0.01	2.42	3.57	0.0068	0.1006	0.12	20.60	747.00
ZIL	5/22/2014	0.133	27	18.7	0.01	1.09	-0.36	0.0012	0.0605	0.07	17.89	513.34
ZIL	6/6/2014	0.021	65.6	28.3	0.01	0.75	3.34	0.0042	0.0627	0.1	21.88	711.57
ZIL	6/20/2014	0.038	81.9	30.6	0.01	1.27	3.56	0.0052	0.0630	0.12	23.19	762.45
ZIL	7/1/2014	0.054	78.9	31	0.01	2.22	2.67	0.0053	0.0775	0.12	26.66	784.23
ZIL	7/17/2014	0.046	41.2	24.7	0.01	2.11	3.91	0.0105	0.0522	0.08	22.14	602.53
ZIL	7/31/2014	0.044	58.6	26.3	0	0.98	3.89	0.0041	0.0447	0.09	21.83	639.86
ZIL	8/14/2014	0.086	54.2	21.3	0.01	0.69	4.6	0.0159	0.0659	0.11	22.19	559.90
ZIL	8/28/2014					0.76			0.0528		24.76	666.77
ZIL	9/19/2014					2.07			0.0735		16.78	722.10
ZIL	10/18/2014	0.029	68.9	32.4	0.01	0.98	5.14	0.004	0.0444	0.1	13.77	739.00

Explanation of Variables: LOC = Site Location, DATE = Date of Sample, NH3 = Ammonia concentration (ppm), CL = Chloride concentration (ppm), SO4 = Sulfate concentration (ppm), NO2 =Nitrite concentration (ppm), NO3 = Nitrate concentration (ppm), SIO2 = Silica concentration (ppm), SRP = Soluble Reactive Phosphorus concentration (ppm), TP = Total Phosphorus concentration (ppm), F = Iron concentration (ppm), Temp = Water temperature (Celsius), Conductivity = Conductivity of water (µs/cm)

LOC	DATE	TDS	Turbid	Chlorophyll-a	Phycocyanin	Bacilliarophyta	Chlorophyta	Cryptophyta	Chrysophyta	Cyanophyta	Dinophyta	Euglenophyta	Xanthophyta
BAYC	5/22/2014	0.35	18.61	6.46	452.52	143.00	31.00	65.00	7.00	13.00	0.00	3.00	0.00
BAYC	6/6/2014	0.45	10.69	11.42	32.08	123.00	95.00	81.00	15.00	15.00	12.00	1.00	0.00
BAYC	6/20/2014	0.53	16.75	17.22	275.95	122.00	36.00	9.00	7.00	16.00	11.00	2.00	0.00
BAYC	7/1/2014	0.46	15.13	16.15	170.51	75.00	45.00	19.00	13.00	40.00	5.00	2.00	0.00
BAYC	7/17/2014	0.40	11.48	8.32	720.82	83.00	41.00	28.00	8.00	62.00	3.00	4.00	0.00
BAYC	7/31/2014	0.48	11.67	7.91	1393.15	95.00	140.00	60.00	47.00	56.00	33.00	12.00	1.00
BAYC	8/14/2014	0.43	10.62	8.44	752.35	56.00	33.67	11.67	4.67	24.00	9.00	3.67	0.00
BAYC	8/28/2014	0.43	10.69	9.60	1130.21	66.00	109.50	28.00	8.00	41.50	32.00	3.50	0.00
BAYC	9/19/2014	0.50	9.13	6.78	217.78	38.50	22.00	11.50	1.00	7.00	1.50	0.00	0.00
BAYC	10/18/2014	0.51	10.94	8.13		59.00	21.00	16.00	0.00	64.00	5.00	0.00	0.00
CASS	5/6/2014	0.43	8.24	5.20	411.44	29.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CASS	5/22/2014	0.46	8.35	11.66	173.53	40.00	4.00	14.33	0.33	9.33	2.33	0.00	0.00
CASS	6/6/2014	0.48	11.13	9.25	-150.32	69.00	28.00	18.00	4.00	5.00	2.00	0.00	0.00
CASS	7/1/2014	0.42	9.67	6.72	-58.88								
CASS	7/17/2014	0.39	13.28	7.28	278.47	41.50	5.50	5.00	0.00	33.50	0.00	0.00	0.00
CASS	7/31/2014	0.43	9.09	4.88	315.88	42.00	0.00	0.00	1.00	2.00	0.00	0.00	0.00
CASS	8/14/2014	0.46	12.78	6.45	-25.23	46.50	8.00	3.00	0.00	7.00	1.00	0.50	0.00
CASS	8/28/2014	0.50	9.43	5.27	-95.77	24.50	7.00	0.00	0.00	21.50	1.00	0.00	0.00
CASS	9/19/2014	0.50	9.43	5.27	-95.77	42.00	3.00	2.50	0.00	0.00	0.00	0.00	0.00
CASS	10/18/2014	0.51	7.87	6.74	231.23	35.67	6.00	0.67	0.00	6.00	0.67	0.00	0.00
FERG	5/7/2014	0.36	2.89	6.94	166.99	4.00	2.33	0.67	0.67	9.33	0.00	0.00	0.00
FERG	5/22/2014												
FERG	6/6/2014	0.34	22.37	27.09	2194.30	39.00	8.50	3.00	0.00	19.00	1.50	0.00	0.00
FERG	7/2/2014	0.33	3.80	29.24	2395.30	31.00	63.00	428.00	2.00	35.00	23.00	73.00	0.00
FERG	7/18/2014	0.30	14.10	26.81	298.11	529.00	183.00	61.00	0.00	203.00	106.00	128.00	0.00
FERG	7/31/2014	0.28	11.60	23.94	289.15	63.00	73.00	5.00	2.00	59.00	22.00	5.00	3.00
FERG	8/14/2014	0.25	12.12	27.68	426.64	296.00	37.00	5.00	0.00	91.00	1.00	8.00	0.00
FERG	8/28/2014	0.25	16.80	14.24	1469.30	53.00	73.00	7.00	0.00	93.00	5.00	2.00	0.00
FERG	9/19/2014	0.22	17.68	20.49	4275.65	113.00	15.00	0.00	0.00	93.00	3.00	4.00	0.00
FERG	10/18/2014	0.26	38.81	9.53	954.70	90.00	18.00	1.00	0.00	27.00	1.00	0.00	1.00
GAGE	5/7/2014	0.48	20.30	11.69	595.79	198.00	12.00	0.00	0.00	32.00	0.00	0.00	0.00
GAGE	5/22/2014	0.28	60.87	5.92	2279.67	32.00	0.50	6.50	0.00	10.00	1.50	0.00	0.00
GAGE	6/6/2014	0.48	19.22	4.37	751.01	110.00	74.00	23.00	8.00	22.00	10.00	9.00	0.00
GAGE	7/2/2014	0.50	24.05	20.41	601.14	138.00	58.00	53.00	10.00	45.00	9.00	0.00	0.00
GAGE	7/18/2014	0.44	15.71	7.70	249.38	51.00	17.00	11.00	1.00	35.00	12.00	5.00	0.00
GAGE	7/31/2014	0.38	35.32	2.97	1332.72	116.00	94.00	35.00	4.00	61.00	6.00	18.00	0.00
GAGE	8/14/2014	0.36	22.45	1.41	935.99								
GAGE	8/28/2014	0.47	23.55	8.74	502.28	55.00	74.00	20.00	11.00	46.00	14.00	0.00	0.00
GAGE	9/19/2014	0.49	16.46	1.57	161.41	15.00	7.50	7.50	0.00	27.00	2.00	0.00	0.00
GAGE	10/18/2014	0.51	17.39	7.97	17.55	51.00	10.00	18.00	0.00	25.00	2.00	3.00	0.00
GREF	5/7/2014	0.34	5.81	12.55	-164.05	6.33	5.33	1.00	2.00	21.33	8.67	0.67	0.00
GREF	5/27/2014	0.33	14.16	12.90	691.40	26.00	7.00	12.67	0.00	1.00	5.33	1.00	0.00
GREF	6/6/2014	0.26	60.99	11.69	1108.42								
GREF	7/2/2014	0.27	6.01	6.47	314.93	33.00	25.50	53.00	0.00	54.50	6.50	2.00	0.00
GREF	7/18/2014	0.30	9.64	18.38	3075.89	18.00	54.00	127.00	0.00	144.00	24.00	171.00	0.00
GREF	7/31/2014	0.29	10.95	32.29	584.66	65.00	110.00	143.00	2.00	42.00	37.00	10.00	0.00
GREF	8/14/2014	0.27	48.05	36.60	933.42	116.00	99.00	11.00	0.00	157.00	4.00	4.00	0.00
GREF	8/28/2014	0.25	9.12	7.44	720.81	35.00	19.00	5.00	0.00	65.00	0.00	0.00	1.00
GREF	9/19/2014	0.28	23.05	24.71	1017.34								
GREF	10/18/2014	0.25	21.47	28.23	1281.69	26.50	17.00	0.50	1.50	13.00	0.00	0.00	0.50
GRPT	5/6/2014	0.35	11.58	1.01	3568.69	42.00	1.50	0.00	0.00	20.00	1.00	0.00	0.00
GRPT	5/22/2014	0.33	63.86	2.89	1716.96	17.67	0.67	8.00	0.00	7.00	0.00	0.33	0.00
GRPT	6/6/2014	0.47	11.38	9.88	368.58	67.00	52.00	31.00	9.00	32.00	10.00	1.00	0.00
GRPT	7/1/2014	0.43	12.34	9.07	-29.14	171.00	54.00	27.00	12.00	52.00	13.00	4.00	0.00
GRPT	7/17/2014	0.41	13.95	7.60	96.93	72.00	10.50	11.50	1.50	7.00	1.50	0.50	0.00
GRPT	7/31/2014	0.48	13.20	4.73	592.87	139.00	38.00	8.00	14.00	52.00	14.00	1.00	0.00
GRPT	8/14/2014	0.38	16.05	4.56	2558.26	223.00	6.00	1.00	0.00	48.00	2.00	0.00	0.00
GRPT	8/28/2014	0.34	7.25	6.20	867.90								
GRPT	9/19/2014	0.46	7.19	4.25	294.11	67.50	21.50	25.00	2.50	27.00	2.50	0.00	0.00
GRPT	10/18/2014	0.47	7.55	8.24	11.15	52.75	1.75	5.50	0.00	12.00	1.50	0.00	0.00
RIVM	5/22/2014	0.37	13.38	12.69	1297.25	121.00	45.00	28.00	1.00	27.00	7.00	1.00	0.00
RIVM	6/6/2014	0.47	11.40	12.02	478.09	35.00	28.00	7.00	0.00	47.00	17.00	0.00	0.00
RIVM	6/20/2014	0.48	14.59	12.19	354.17	138.00	21.00	12.00	0.00	23.00	5.00	1.00	0.00
RIVM	7/1/2014	0.45	16.30	14.55	520.55	143.00	65.00	15.00	13.00	64.00	7.00	1.00	0.00
RIVM	7/17/2014	0.40	15.44	10.00	694.53	81.00	35.00	42.00	11.00	41.00	3.00	1.00	0.00
RIVM	7/31/2014	0.49	10.34	10.47	1873.36	46.00	74.00	49.00	9.00	55.00	38.00	8.00	0.00
RIVM	8/14/2014					101.00	89.00	30.00	17.00	135.00	16.00	5.00	0.00
RIVM	8/28/2014	0.44	11.47	13.40	1616.61	63.00	103.00	44.00	0.00	113.00	58.00	5.00	0.00
RIVM	9/19/2014	0.49	12.98	3.05	1099.35	88.00	51.00	21.00	8.00	41.00	8.00	1.00	0.00
RIVM	10/18/2014	0.36	17.79	11.29	844.92	26.50	22.00	0.50	0.00	33.50	3.50	1.00	0.00
SPAL	5/22/2014	0.35	48.09	7.19	1615.50	19.67	5.33	11.67	0.00	9.67	2.00	1.00	0.00
SPAL	6/6/2014	0.54	12.51	8.03	339.96	74.00	47.00	0.00	0.00	53.00	2.00	0.00	0.00
SPAL	7/2/2014	0.52	22.22	14.19	762.53	111.00	64.00	17.00	0.00	8.00	4.00	0.00	0.00
SPAL	7/18/2014	0.45	26.88	17.76	1238.73	43.00	29.00	3.00	0.00	45.00	28.00	0.00	0.00
SPAL	8/14/2014	0.33	28.65	2.53	1026.45	117.00	49.00	6.00	0.00	43.00	4.00	5.00	0.00
SPAL	8/28/2014	0.53	13.18	5.50	481.48	96.00	3.00	0.00	1.00	44.00	0.00	0.00	0.00
SPAL	9/19/2014	0.49	9.30	4.28	-133.70	107.00	33.00	10.00	1.00	46.00	2.00	1.00	0.00
SPAL	10/18/2014	0.54	7.94	5.97	430.08	45.50	13.50	17.50	0.00	45.50	2.00	1.00	0.00
SPAL	7/31/2015	0.49	18.36	7.66	451.57	113.00	29.00	4.00	1.00	22.00	4.00	1.00	0.00
ZIL	5/22/2014	0.33	36.38	10.88	532.00	65.50	5.50	11.00	0.00	12.00	0.50	0.00	0.00
ZIL	6/6/2014	0.46	12.39	21.31	356.23	119.00	38.00	34.00	6.00	28.00	13.00	2.00	0.00
ZIL	6/20/2014	0.50	13.48	19.29	48.85	82.00	42.00	33.00	5.00	12.00	8.00	4.00	0.00
ZIL	7/1/2014	0.51	16.49	18.41	275.73	229.00	57.00	27.00	19.00	43.00	13.00	8.00	0.00
ZIL	7/17/2014	0.39	14.07	10.58	418.94	108.00	42.00	36.00	7.00	58.00	7.00	2.00	0.00
ZIL	7/31/2014	0.42	12.66	20.61	46.11	129.00	143.00	11.00	40.00	15.00	20.00	9.00	0.00
ZIL	8/14/2014	0.36	12.51	5.12	1309.98	46.00	27.00	11.00	1.00	122.00	16.00	5.00	0.00
ZIL	8/28/2014	0.43	13.25	13.84	544.08	110.00	146.00	5.00	0.00	91.00	24.00	7.00	1.00
ZIL	9/19/2014	0.47	9.46	5.41	-63.88	48.50	16.50	30.00	1.50	13.00	3.50	0.00	0.00
ZIL	10/18/2014	0.48	12.81	7.93		32.00	3.50	11.50	0.00	16.50	0.00	0.00	0.00

Explanation of Variables: LOC = Site Location, DATE = Date of Sample, TDS = Total Dissolved Solids concentration (g/L), Turbid = Turbidity (NTU), Chlorophyll-a = Chlorophyll-a concentration measured in situ (ppb), Phycocyanin = Phycocyanin pigment concentration measured in situ (cell eqv./ml), Bacilliarophyta = Raw averaged count of Bacilliarophyta in plankton sample, Chlorophyta = Raw averaged count of Chlorophyta in plankton sample, Cryptophyta = Raw averaged count of Cryptophyta in plankton sample, Chrysophyta = Raw averaged count of Chrysophyta in plankton sample, Cyanophyta = Raw averaged count of Cyanophyta in plankton sample, Dinophyta = Raw averaged count of Dinophyta in plankton sample, Euglenophyta = Raw averaged count of Euglenophyta in plankton sample, Xanthophyta = Raw averaged count of Xanthophyta in plankton sample,

LOC	DATE	Cell Count	Cells/mL	Green:Diatom	Cyan:Diatom	GreenCyan:diatom	Diatom %	Cryptophyte %	Green %	Cyan %	Shannon Div	Simpson Div	Richness
BAYC	5/22/2014	262.00	10385.59	0.22	0.09	0.31	0.55	0.25	0.12	0.05	2.86	11.74	34
BAYC	6/6/2014	342.00	13556.76	0.77	0.12	0.89	0.36	0.24	0.28	0.04	2.87	10.70	38
BAYC	6/20/2014	203.00	8046.85	0.30	0.13	0.43	0.60	0.04	0.18	0.08	2.94	11.47	33
BAYC	7/1/2014	199.00	7888.29	0.60	0.53	1.13	0.38	0.10	0.23	0.20	2.91	12.65	35
BAYC	7/17/2014	229.00	9077.48	0.49	0.75	1.24	0.36	0.12	0.18	0.27	3.18	17.22	38
BAYC	7/31/2014	444.00	17600.00	1.47	0.59	2.06	0.21	0.14	0.32	0.13	3.13	16.07	45
BAYC	8/14/2014	142.67	5655.26	0.60	0.43	1.03	0.39	0.08	0.24	0.17	3.20	16.22	46
BAYC	8/28/2014	288.50	11436.04	1.66	0.63	2.29	0.23	0.10	0.38	0.14	2.94	14.25	33
BAYC	9/19/2014	81.50	3230.63	0.57	0.18	0.75	0.47	0.14	0.27	0.09	2.75	9.82	27
BAYC	10/18/2014	165.00	6540.54	0.36	1.08	1.44	0.36	0.10	0.13	0.39	2.59	9.09	25
CASS	5/6/2014	29.00	1149.55	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.80	5.29	7
CASS	5/22/2014	70.33	2787.99	0.10	0.23	0.33	0.57	0.20	0.06	0.13	2.57	9.41	24
CASS	6/6/2014	126.00	4994.60	0.41	0.07	0.48	0.55	0.14	0.22	0.04	2.61	9.46	25
CASS	7/1/2014												
CASS	7/17/2014	85.50	3389.19	0.13	0.81	0.94	0.49	0.06	0.06	0.39	2.43	7.96	22
CASS	7/31/2014	45.00	1783.78	0.00	0.05	0.05	0.93	0.00	0.00	0.04	2.05	5.97	10
CASS	8/14/2014	66.00	2616.22	0.17	0.15	0.32	0.70	0.05	0.12	0.11	2.41	7.19	21
CASS	8/28/2014	54.00	2140.54	0.29	0.88	1.16	0.45	0.00	0.13	0.40	2.27	6.50	16
CASS	9/19/2014	47.50	1882.88	0.07	0.00	0.07	0.88	0.05	0.06	0.00	2.66	9.18	27
CASS	10/18/2014	49.00	1942.34	0.17	0.17	0.34	0.73	0.01	0.12	0.12	2.30	7.26	19
FERG	5/7/2014	17.00	673.87	0.58	2.33	2.92	0.24	0.04	0.14	0.55	1.79	3.48	11
FERG	5/22/2014												
FERG	6/6/2014	71.00	2814.42	0.22	0.49	0.71	0.55	0.04	0.12	0.27	2.82	12.86	24
FERG	7/2/2014	655.00	25963.97	2.03	1.13	3.16	0.05	0.65	0.10	0.05	1.94	2.99	39
FERG	7/18/2014	1210.00	47963.97	0.35	0.38	0.73	0.44	0.05	0.15	0.17	3.40	19.70	60
FERG	7/31/2014	232.00	9196.40	1.16	0.94	2.10	0.27	0.02	0.31	0.25	3.13	17.21	33
FERG	8/14/2014	438.00	17362.17	0.13	0.31	0.43	0.68	0.01	0.08	0.21	2.83	10.70	43
FERG	8/28/2014	233.00	9236.04	1.38	1.75	3.13	0.23	0.03	0.31	0.40	3.08	15.71	35
FERG	9/19/2014	228.00	9037.84	0.13	0.82	0.96	0.50	0.00	0.07	0.41	2.73	8.80	30
FERG	10/18/2014	138.00	5470.27	0.20	0.30	0.50	0.65	0.01	0.13	0.20	2.64	9.34	24
GAGE	5/7/2014	242.00	9592.79	0.06	0.16	0.22	0.82	0.00	0.05	0.13	2.53	7.77	24
GAGE	5/22/2014	50.50	2001.80	0.02	0.31	0.33	0.63	0.13	0.01	0.20	2.26	7.40	15
GAGE	6/6/2014	256.00	10147.75	0.67	0.20	0.87	0.43	0.09	0.29	0.09	3.00	12.71	38
GAGE	7/2/2014	313.00	12407.21	0.42	0.33	0.75	0.44	0.17	0.19	0.14	2.89	11.30	36
GAGE	7/18/2014	132.00	5232.43	0.33	0.69	1.02	0.39	0.08	0.13	0.27	2.81	12.10	27
GAGE	7/31/2014	334.00	13239.64	0.81	0.53	1.34	0.35	0.10	0.28	0.18	3.22	17.04	44
GAGE	8/14/2014												
GAGE	8/28/2014	220.00	8720.72	1.35	0.84	2.18	0.25	0.09	0.34	0.21	3.12	16.19	35
GAGE	9/19/2014	59.00	2338.74	0.50	1.80	2.30	0.25	0.13	0.13	0.46	2.20	6.29	14
GAGE	10/18/2014	109.00	4320.72	0.20	0.49	0.69	0.47	0.17	0.09	0.23	2.99	15.49	29
GREF	5/7/2014	45.33	1797.00	0.84	3.37	4.21	0.14	0.02	0.12	0.47	2.30	6.36	19
GREF	5/27/2014	53.00	2100.90	0.27	0.04	0.31	0.49	0.24	0.13	0.02	2.73	11.53	24
GREF	6/6/2014												
GREF	7/2/2014	174.50	6917.12	0.77	1.65	2.42	0.19	0.30	0.15	0.31	2.62	8.62	30
GREF	7/18/2014	538.00	21326.13	3.00	8.00	11.00	0.03	0.24	0.10	0.03	2.62	8.03	33
GREF	7/31/2014	409.00	16212.62	1.69	0.65	2.34	0.16	0.35	0.27	0.00	2.77	9.73	38
GREF	8/14/2014	391.00	15499.10	0.85	1.35	2.21	0.30	0.03	0.25	0.40	3.05	13.98	45
GREF	8/28/2014	125.00	4954.96	0.54	1.86	2.40	0.28	0.04	0.15	0.52	2.57	7.86	26
GREF	9/19/2014												
GREF	10/18/2014	59.00	2338.74	0.64	0.49	1.13	0.45	0.01	0.29	0.22	2.35	7.91	16
GRPT	5/6/2014	64.50	2556.76	0.04	0.48	0.51	0.65	0.00	0.02	0.31	2.28	7.97	16
GRPT	5/22/2014	33.67	1334.53	0.04	0.40	0.43	0.52	0.24	0.02	0.21	2.14	6.88	14
GRPT	6/6/2014	202.00	8007.21	0.78	0.48	1.25	0.33	0.15	0.26	0.16	2.98	14.60	33
GRPT	7/1/2014	333.00	13200.00	0.32	0.30	0.62	0.51	0.08	0.16	0.16	3.04	15.57	33
GRPT	7/17/2014	104.50	4142.34	0.15	0.10	0.24	0.69	0.11	0.10	0.07	2.67	8.98	30
GRPT	7/31/2014	266.00	10544.15	0.27	0.37	0.65	0.52	0.03	0.14	0.20	3.07	13.36	42
GRPT	8/14/2014	280.00	11099.10	0.03	0.22	0.24	0.80	0.00	0.02	0.17	2.64	9.67	28
GRPT	8/28/2014												
GRPT	9/19/2014	146.00	5787.39	0.32	0.40	0.72	0.46	0.17	0.15	0.18	2.98	13.76	32
GRPT	10/18/2014	73.50	2913.51	0.03	0.23	0.26	0.72	0.07	0.02	0.16	2.40	7.89	18
RIVM	5/22/2014	230.00	9117.12	0.37	0.22	0.60	0.53	0.12	0.20	0.12	3.07	14.78	37
RIVM	6/6/2014	134.00	5311.71	0.80	1.34	2.14	0.26	0.05	0.21	0.35	2.81	12.66	22
RIVM	6/20/2014	200.00	7927.93	0.15	0.17	0.32	0.69	0.06	0.11	0.12	2.42	5.67	28
RIVM	7/1/2014	308.00	12209.01	0.45	0.45	0.90	0.46	0.05	0.21	0.21	3.10	13.38	40
RIVM	7/17/2014	214.00	8482.88	0.43	0.51	0.94	0.38	0.20	0.16	0.19	3.07	16.08	36
RIVM	7/31/2014	279.00	11059.46	1.61	1.20	2.80	0.16	0.18	0.27	0.20	3.02	15.52	35
RIVM	8/14/2014	393.00	15578.38	0.88	1.34	2.22	0.26	0.08	0.23	0.34	3.23	16.53	44
RIVM	8/28/2014	386.00	15300.90	1.63	1.79	3.43	0.16	0.11	0.27	0.29	3.21	17.51	46
RIVM	9/19/2014	218.00	8641.44	0.58	0.47	1.05	0.40	0.10	0.23	0.19	3.08	16.13	37
RIVM	10/18/2014	87.00	3448.65	0.83	1.26	2.09	0.30	0.01	0.25	0.39	2.97	14.73	30
SPAL	5/22/2014	49.33	1955.56	0.27	0.49	0.76	0.40	0.24	0.11	0.20	2.41	7.94	20
SPAL	6/6/2014	176.00	6976.58	0.64	0.72	1.35	0.42	0.00	0.27	0.30	2.74	11.87	24
SPAL	7/2/2014	204.00	8086.49	0.58	0.07	0.65	0.54	0.08	0.31	0.04	2.59	9.36	24
SPAL	7/18/2014	148.00	5866.67	0.67	1.05	1.72	0.29	0.02	0.20	0.30	2.77	12.39	24
SPAL	8/14/2014	224.00	8879.28	0.42	0.37	0.79	0.52	0.03	0.22	0.19	3.07	13.41	39
SPAL	8/28/2014	144.00	5708.11	0.03	0.46	0.49	0.67	0.00	0.02	0.31	2.30	7.05	17
SPAL	9/19/2014	200.00	7927.93	0.31	0.43	0.74	0.54	0.05	0.17	0.23	2.92	12.08	33
SPAL	10/18/2014	125.00	4954.96	0.30	1.00	1.30	0.36	0.14	0.11	0.36	2.69	9.81	29
SPAL	7/31/2015	174.00	6897.30	0.26	0.19	0.45	0.65	0.02	0.17	0.13	2.49	6.23	27
ZIL	5/22/2014	94.50	3745.95	0.08	0.18	0.27	0.69	0.12	0.06	0.13	2.45	8.57	21
ZIL	6/6/2014	240.00	9513.52	0.32	0.24	0.55	0.50	0.14	0.16	0.12	2.99	10.90	38
ZIL	6/20/2014	186.00	7372.97	0.51	0.15	0.66	0.44	0.18	0.23	0.06	2.69	10.22	28
ZIL	7/1/2014	396.00	15697.30	0.25	0.19	0.44	0.58	0.07	0.14	0.11	2.96	11.24	39
ZIL	7/17/2014	260.00	10306.31	0.39	0.54	0.93	0.42	0.14	0.16	0.22	3.29	19.81	45
ZIL	7/31/2014	367.00	14547.75	1.11	0.12	1.22	0.35	0.03	0.39	0.04	2.52	6.69	38
ZIL	8/14/2014	228.00	9037.84	0.59	2.65	3.24	0.20	0.05	0.12	0.54	2.65	10.05	27
ZIL	8/28/2014	384.00	15221.62	1.33	0.83	2.15	0.29	0.01	0.38	0.24	3.23	16.85	45
ZIL	9/19/2014	113.00	4479.28	0.34	0.27	0.61	0.43	0.27	0.15	0.12	2.76	13.27	22
ZIL	10/18/2014	63.50	2517.12	0.11	0.52	0.63	0.50	0.18	0.06	0.26	2.40	8.70	17

Explanation of Variables: LOC = Site Location, DATE = Date of Sample, Cell Count = Raw averaged total cell count of plankton sample, Cells/ml = Calculated cell density of plankton sample, Green:Diatom = The ratio of green algae to diatoms, Cyan:Diatom = The ratio of cyanobacteria to diatoms, GreenCyan:Diatom = The ratio of green algae and cyanobacteria to diatoms, Diatom % = The percentage of the sample composed of diatoms, Cryptophyte % = The percentage of the sample composed of cryptophytes, Green % = The percentage of the sample composed of green algae, Cyan % = The percentage of the sample composed of cyanobateria, Shannon Div = Computed Shannon-Weaver Diversity Index score for plankton sample, Simpson Div = Computed Simpson Diversity Index score for plankton sample, Richness = Total genus richness computed for plankton sample.