PRELIMINARY DRAFT REPORT

2011 Alum Treatment and Associated Water Quality Monitoring for

GRAND LAKE ST. MARYS

Prepared for

OHIO ENVIRONMENTAL PROTECTION AGENCY

&

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Columbus, Ohio

PREPARED BY:

Tetra Tech, Inc.

1420 5th Ave

Suite 550

Seattle, WA 98101

September 2011

(This Page Intentionally Left Blank)

TABLE OF CONTENTS

1. INTRODUCTION 4

1.1. REPORT PURPOSE 4

2. LAKE SAMPLING 5

3. RESULTS AND DISCUSSION 7

3.1. TREATMENT EFFECTS 7

3.2. DISSOLVED OXYGEN, pH AND TEMPERATURE 13

4. SUMMARY AND CONCLUSIONS 17

5. REFERENCES 18

APPENDIX: GRAND LAKE ST. MARYS WATER QUALITY DATA PRE- AND POST-ALUM TREATMENT 19

LIST OF TABLES

Table 1. Mean TP and SRPconcentrations (µg/L) before and after 2011 Alum Treatment (began 6/6/11 and ended 6/29/11). Post-treatment 1 was prior to the alum application reaching Sites L-1 and L-2. Station L-3 and the four YSI sonde buoy sites served as controls. 8

Table 2. Mean Chl *a* concentrations (µg/L) before and after 2011 Alum Treatment (began 6/6/11 and ended 6/29/11). Post-treatment 1 was prior to the alum application reaching Sites L-1 and L-2. Station L-3 and the four YSI sonde buoy sites served as controls. 8

Table 3. Mean plankton algae in cells/mL x 10^6, biovolume in mm^3/L and percent cyanobacteria biomass before and after 2011 alum treatment. 10

TABLE OF FIGURES

Figure 1. Location of sampling sites relative to the 2011 alum treatment application area, June 2011. ... 6

Figure 2. Secchi Disk Depth vs. Chlorophyll a in Grand Lake St. Marys, 2011, as compared to Carlson (1977) relationship between Secchi disk depth and chlorophyll a. 12

Figure 3. Relationship between Average Daily RTRM (24-hour) and Average Daily Difference between surface and bottom DO concentrations at the USGS continuous monitoring station, Grand Lake St. Marys, June/July 2011. 14

Figure 4. Average Daily RTRM (24-hour) at the USGS continuous monitoring station and minimum bottom DO concentrations for Grand Lake St. Marys, June/July 2011 15

Figure 5. Maximum surface pH vs. maximum surface DO concentrations, Grand Lake St. Marys, June 1st through August 8th, 2011. USGS Station data is only from June 1st through July 31st. 16

1. INTRODUCTION

Grand Lake St. Marys (GLSM) is a large (5,000 ha), shallow (1.4 m mean depth) body of water that is highly hypereutrophic due to high phosphorus (P) inflows. Efforts to improve the lake's water quality have concentrated on reducing the nonpoint P loading from external sources. However, reducing those inputs sufficiently to realize substantially reduced P concentrations in the lake (and subsequent cyanobacteria blooms) will take possibly a decade or as long as three to four. (That estimate will be refined in the December 2011 summary lake report with a total phosphorus (TP) mass balance model.) Part of the reason to expect a slow recovery is due to recycling of P from sediments, or internal loading. To partially alleviate the adverse effects of the lake's poor quality, the center 40% of the lake area (1,620 ha; 4,000 a) was treated with aluminum sulfate (alum) to remove P from the water column and inactivate mobile P and labile organic P in the bottom sediments.

In order to maximize the effectiveness of as alum treatment, external sources of P need to be sufficiently reduced allowing internal loading to become a large fraction of the remaining P supply. Nevertheless, the magnitude of the water quality problem necessitated that GLSM be treated with alum in June, 2011 to inactivate sediment P and curtail internal loading while external P sources are being reduced. If P in the water column was substantially depleted by this treatment and internal P loading curtained within the treatment area, much of that effect could last for at least a year and possibly two, while water column P is restored from inflows, but probably not to levels as high as those existing previously, before sediment inactivation.

Unfortunately, funds were not sufficient to treat the entire lake at the dose considered necessary for multi-year inactivation of sediment P. Instead, a reduced dose (35.9 mg Al/L, 50 g/m²) was applied to the middle 40% of lake area (Figure 1), rather than 86 mg Al/L (120 g/m²) to the whole lake as originally recommended. The higher dose was based on sediment P analysis plus water column P content and experience with alum treatments in other lakes. Also, nearshore experiments in GLSM in September 2010 showed that high algal abundance limited treatment effectiveness (Tetra Tech, 2010). Therefore, treatment of the lake was recommended prior to the onset of early summer algal blooms. However, a bloom was well underway by the time treatment began on 2 June 2011. The treatment ended 29 June2011. Despite an ongoing early bloom, nearshore experiments in April 2011 showed greater initial effectiveness (~90%) reducing TP and chlorophyll *a* (chl *a*) alike at the higher dose (86 mg Al/L), than did a lower dose (32 mg/L) in 2010 (Tetra Tech, 2011).

1.1. REPORT PURPOSE

The purpose of this report is to provide a preliminary technical assessment of the partial lake P inactivation treatment through alum addition that was conducted in June 2011. Specifically, this report provides a basic understanding of the direct effect of the alum treatment on P and chl *a* concentrations in the lake and on the indirect treatments impacts on the general water quality of the lake. The complete effectiveness evaluation of the alum treatment will be presented in the December 2011 summary report that will include a comparison analysis of sediment inactivation based on pre- and post-treatment sediment cores. This future analysis plus the P mass balance model will allow, not only, a more in-depth assessment of alum treatment effectiveness, but it will also, provide the premise for estimating the potential benefits of future P inactivation treatments relative to managing the water quality of GLSM.

2. LAKE SAMPLING

There were 17 water quality and sediment monitoring sites in the lake (Figure 1). Data from only 8 are considered in this report (7 monitoring sites by OEPA and one maintained by USGS, however only the 7 OEPA sites had both water column field and laboratory data). Three previously established mid-lake sites (L-1, L-2, and L-3) had been regularly sampled by Ohio-EPA since spring 2010 excluding winter, and were sampled weekly from the end of March through June 2011, and every two weeks from 12 July through 8 August 2011. Two of the sites (L-2 and L-1) were positioned inside the treated area, while L-3 was outside (Figure 1). Water samples were collected from these sites at 0.5 m below the surface and usually near the bottom (1.4-2.2 m) and were analyzed for TP and chl *a*. Data were unavailable due to technical issues for 6 June and 13 June at L-2 and L-3, as well as chl *a* for 31 May for three sonde buoy sites.

In situ YSI water quality sondes monitored dissolved oxygen (DO), pH, temperature, and other variables, continuously at the surface at four locations. These locations were all outside the treated area, but near the corners of the treatment area and, thus, served as controls (Figure 1). Water samples were collected weekly from 31 May to 27 June and every two weeks from 12 July to 8 August at these four sites at surface (0.5 m) and bottom (1.4-1.9 m) and analyzed for the same constituents as at the other long-term monitoring sites. Transparency was determined at all sites with a Secchi disc. Thus, there are two test sites (L-1, L-2) and five control sites for TP, chl *a* and transparency.

The continuous monitoring for DO, pH and temperature served to determine if there were any adverse, short-term chemical effects of the treatment, as well as to provide an additional continuous source of data from within the treatment area. Alum was buffered with sodium aluminate, so no lowering of pH to critical levels should have occurred. DO levels were used to guide the alum application, which could proceed only if DO were $\geq$ 5 mg/L. As the data will show, however, algal photosynthesis and temporary thermal stratification determined DO levels that were independent of the alum treatment activities. A fifth continuous monitoring site located inside the treated area was operated by the U.S. Geological Survey (USGS) for DO, pH and temperature at surface and bottom. Water quality grab samples were not collected at the USGS water quality monitoring sonde.

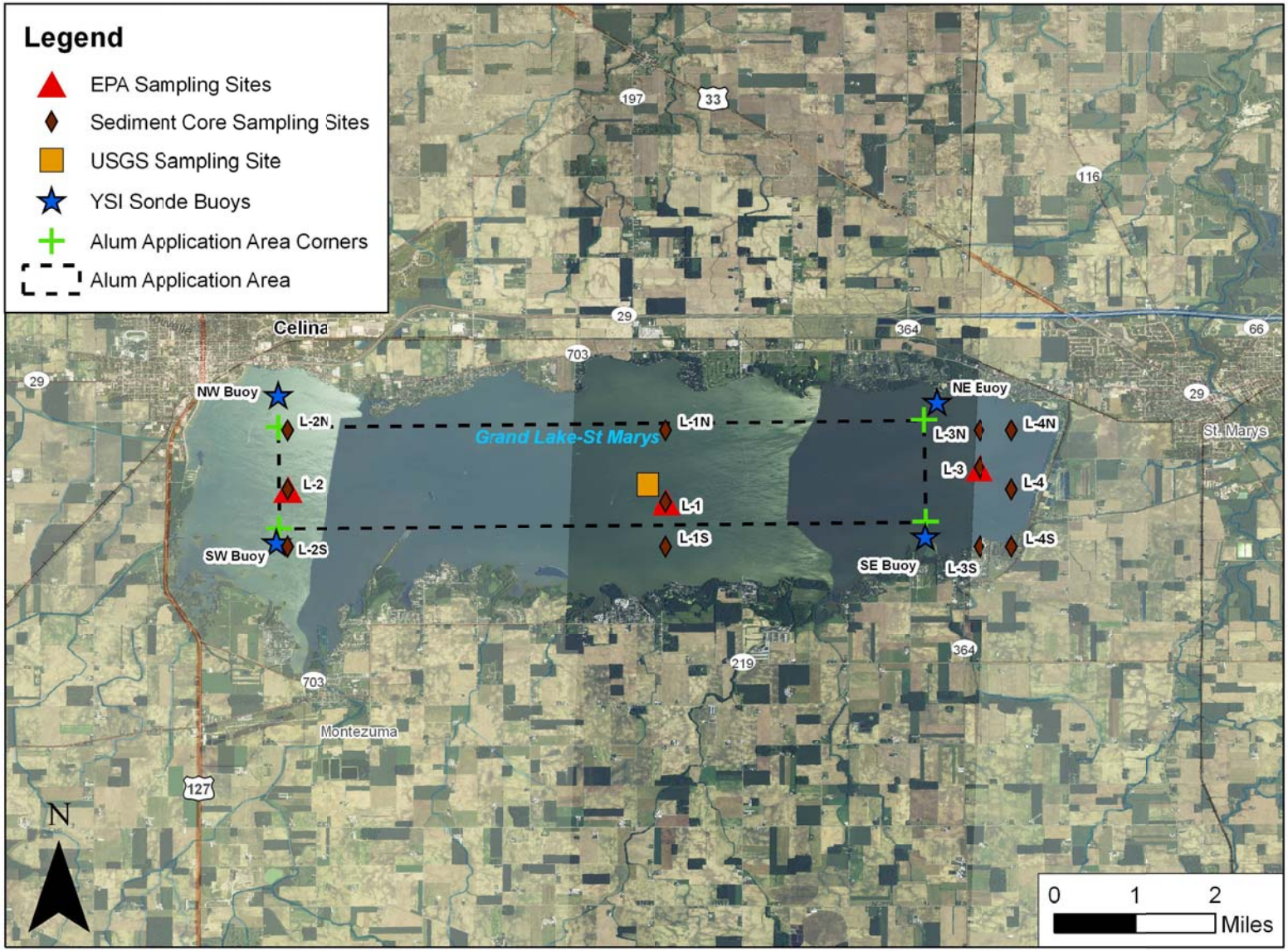

Figure 1. Location of sampling sites relative to the 2011 alum treatment application area, June 2011.

3. RESULTS AND DISCUSSION

3.1. TREATMENT EFFECTS

Even though the 2011 alum treatment began on June 2th the alum application did not reach the water quality monitoring stations until after 13 June for Station L-2 and 21 June for Station L-1. (This reflects the large treatment area that needed to be covered in a systematic pattern.) Because of this gap in timing, post treatment water quality results have been broken out into separate periods of time for analysis. Another factor to keep in mind when reviewing the data is that the wind induced mixing that distributed both P and chl *a* across the treatment area. That was particularly true for Station L-2. Also, Station L-3 is directly downwind of the treatment area and may have been influenced by the dilution effect of the treatment area.

A possible reduction in lake TP that could be a direct effect of the 2011 alum treatment occurred after the treatment reached Station L-1, when the mean TP concentration dropped from 196 to 90 µg/L and remained lower at 87 µg/L after two weeks (Table 1). Another direct indicator of the effect of the alum treatment was the trend of soluble reactive phosphorus (SRP). Prior to 2 June, the SRP concentration was below detection limit of 3 µg/L. By, post-treatment 1 (13 June), SRP at Station L-1 had risen to 14 µg/L on 13 June, following a similar pattern observed in the four control stations (Table 1). This lake-wide increase in SRP suggested that internal loading of P was occurring and increasing throughout the lake during the treatment. Also, the bloom had reached a magnitude that further growth was restricted, so SRP, the available form of P for uptake by algae was accumulating un-used. When the alum treatment reached Station L-1 the SRP was immediately reduced to and remained near or below detection limit. This is in direct contrast to the control stations that continued to exhibit elevated SRP concentrations (Table 1 and Appendix).

In contrast, however, mean TP concentrations at Station L-2 of 193 and 151 µg/L post-treatment indicated no reduction in lake TP comparing pre to post treatment (Table 1). However, there are two mitigating circumstances to consider relative to TP concentrations at Station L-2. One, the four control stations also experience an increase in TP from pre- to post-treatment 3 (27 percent). Two, Station L-2 may have been more influenced by water column transport due to wind from west to east then station L-1. Not surprising then, if TP at station L-1 and L-2 were together, there is limited treatment effect. The post-treatment periods 2 and 3 mean TP inside the treatment area (Stations L-1 and L-2) was 130 ± 59 µg/L (21 June through 8 August). Mean post-treatment TP concentrations at the four YSI buoys and Station L-3, outside the treatment area for the same period, averaged 143 ± 26 µg/L, not significantly different from the mean TP concentration inside the treatment area (Table 1). Station L-1 however, was the only station in which mean TP and SRP concentrations decreased from pre-treatment conditions (Table 1). At all other stations TP concentrations increased from pre-treatment levels. Several factors contributed to this trend, but a significant one is that the lake-wide cyanobacteria bloom increased as the treatment began (Table 2), as apparently did internal P recycling.

Total Phosphorus was expected to decrease about 50%, based on results from the 2010 nearshore experiment using the same low alum dose (Tetra Tech, 2010). If only Station L-1 is considered, there was a 56% reduction from before to after the treatment reached the site, i.e.; 196 versus 87 µg/L. However, TP of 193 µg/L, after the treatment reached Station L-2, was not much less than the mean (207 µg/L) for all sites during the post-treatment 1 period (Table 1). Therefore another explanation for

the low mean of 90 µg/L during post-treatment 2 and 87 µg/L during post-treatment 3 at Station L-1, may be partly the result of a general reduction of about 20 to 30% throughout the lake from a post-treatment 1, all-site mean of 207 µg/L to 160 µg/L during post-treatment 2 to 144 µg/L during post-treatment 3 (Table 1). However, this may or may not be directly or indirectly due to the alum treatment. Post treatment sediment analysis will help address that question and will be reported in the December 2011 summary report.

Table 1. Mean TP and SRP concentrations (µg/L) before and after 2011 Alum Treatment (began 6/6/11 and ended 6/29/11). Post-treatment 1 was prior to the alum application reaching Sites L-1 and L-2. Station L-3 and the four YSI sonde buoy sites served as controls.

Site	Before 6/6		6/6 - 6/13		6/6 - 6/13		7/27 - 8/8	
	Pre-Treat N = 1-4		Post-Treat 1 N = 2		Post-Treat 1 N = 2		Post-Treat 3 N = 2	
	TP	SRP	TP	SRP	TP	SRP	TP	SRP
L-1	112	0	196	9.6	196	0.2	87	0
L-2	106	0	ND	ND	ND	16.4	151	14.2
L-3	101	0	ND	ND	ND	13.5	117	3.1
NW	136	0	242	17.6	242	14.1	174	22.1
SW	117	0	218	20.2	218	22.7	177	25
NE	127	0	207	16.0	207	7.7	161	5.0
SE	135	0	176	8.9	176	15.7	143	8.6
All Sites (Mean +/- SD)	115 ± 32	0	207 ± 50	10 ± 8	207 ± 50	13 ± 7	144 ± 53	11 ± 10

*** N = number of sample dates ND = no data and SD = standard deviation.**

The decline in TP concentrations observed after the treatment reached Station L-1 is in contrast to chl *a* concentrations that did not decrease proportionately (Table 2). Chlorophyll *a* had decreased by 50%, along with TP, as a result of applying alum at a low dose (32 mg Al/L) in two of the three nearshore experiments in 2010 (Tetra Tech, 2010). Thus, the alum floc should have removed particulate algae as well as particulate P in the 2011 mid-lake treatment, because most of the P is usually in the algae. However, the inconsistency of TP and chl *a* may be due to the wind induced movement of buoyant cyanobacteria, as well as, to very high chl:TP ratios known to be typical in hypereutrophic lakes. Again, algae reached light-self-limiting levels (~250 µg/L is considered a theoretical maximum) and may have been losing cellular P.

Table 2. Mean Chl *a* concentrations (µg/L) before and after 2011 Alum Treatment (began 6/6/11 and ended 6/29/11). Post-treatment 1 was prior to the alum application reaching Sites L-1 and L-2. Station L-3 and the four YSI sonde buoy sites served as controls.

Site	Before 6/6	6/6 - 6/13	6/21 - 7/12	7/27 - 8/8
	Pre-Treat N = 1-4	Post-Treat 1 N = 2	Post-Treat 2 N = 3	Post-Treat 3 N = 2

L-1	162	219	211	258
L-2	180	ND	266	282
L-3	180	ND	213	267
NW	ND	257	275	257
SW	ND	268	286	235
NE	257	198	169	260
SE	ND	242	214	263
All Sites (Mean +/- SD)	189 ± 93	236 ± 49	234 ± 63	260 ± 16

*** N = number of sample dates ND = no data and SD = standard deviation.**

Plankton algal biomass data are consistent with chl *a* data (Table 3). There was actually an increase in algal biomass at Station L-1 and L-2 after treatment, as was the case for chl *a* although biomass did decline at Station L-1 during post-treatment 3 (Table 2). Biomass and cell density (counts) were extremely high and variable in the lake at all sites, yet the all-site means were similar throughout the four periods. Cyanobacteria comprised over 90% of the biomass with *Planktothrix agardhii* being by far the dominant species. At the beginning of August, other cyanobacteria species began to have a presence in the lake, including, *Anabaena sp., Aphanizomenon sp.,* and *Cylindrospermopsis raciborskii*.

Table 3. Mean plankton algae in cells/mL x 10^6, biovolume in mm^3/L and percent cyanobacteria biomass before and after 2011 alum treatment.

Site	Before 6/6			6/6 - 6/13			6/21 - 7/12			7/27 - 8/8		
	Pre-Treat N=1-2			Post-Treat 1 N=2			Post-Treat 2 N=2-3			Post-Treat 3 N=2		
	Cells	BioVol	%C	Cells	BioVol	%C	Cells	BioVol	%C	Cells	BioVol	%C
L-1	2.37	42.16	98%	2.11	46.17	97%	2.13	53.82	90%	1.95	22.51	97%
L-2	1.12	15.25	68%	ND	ND	ND	2.04	37.17	96%	2.43	27.81	85%
L-3	2.65	17.41	95%	ND	ND	ND	1.58	28.37	87%	2.13	30.00	93%
NW	1.94	44.05	93%	2.36	51.14	98%	3.90	69.47	95%	2.07	51.44	92%
SW	1.39	30.87	95%	1.72	38.12	96%	2.37	23.23	96%	2.67	29.85	84%
NE	1.56	33.88	97%	2.60	62.39	85%	1.72	25.41	93%	1.46	24.57	92%
SE	1.45	76.32	40%	2.18	51.00	91%	2.13	22.62	89%	2.08	43.30	81%
All Sites (Mean +/- SD)	1.80 ± 0.67	36.99 ± 17.7	88% ± 19	2.19 ± 0.68	49.77 ± 13.9	93% ± 8	2.18 ± 0.9	36.94 ± 26.7	92% ± 8	2.11 ± 0.64	32.78 ± 14.8	89% ± 11

*** N = number of sample dates ND = no data and SD = standard deviation.**

Water in the treated portion of the lake would have mixed with the untreated portion due to wind. Therefore, suppose the 2011 alum treatment, which was applied to 40% of the lake surface, had reduced TP by 50%, as the low dose did in the two partially successful 2010 nearshore experiments and results from six other shallow lakes has shown (Cooke et.al., 2005) Then the overall reduction in the whole-lake TP, once mixing occurred, would have been considerably less than 50%.

The expected whole-lake, mixed TP concentration should have been 166 µg/L, assuming the pre-effect mean TP of 207 µg/L (post-treatment 1 all sites, Table 1) were reduced by 50% [(0.6x207) + (0.4x104)]. The observed TP mean was actually slightly less at 152 µg/L (mean of post-treatment 2 and 3 all sites, Table 1). An even larger reduction may have been observed, had sampling sites been more centrally located in the treated area or if there had been additional sampling locations within the treated area. Although there was no change in chl *a* at Station L-1 or L-2 with the alum treatment, an effect may have actually occurred but remained undetected due to a lack in number of stations centrally located within the alum-treated area.

Transparency was consistent at Stations L-1, 2 and 3, before treatment, averaging 0.30 ± 0.01 m, but decreased to 0.18 ± 0.01 m during the post-treatment period consistent with the increase in algal density and the under dosing of the lake at only 12.5 percent of the recommended dose. Transparency averaged about the same (0.17 ± 0.02 m) at the four outside sonde buoys after treatment began. This indicates a general worsening in lake quality unassociated with the alum treatment. There was a slight increase in "whole-lake" chl *a* (~20 to 40%, Table 2), but seemingly not enough to account for a halving in transparency. Also, mean algal biomass did not decrease, another indication that reduced transparency was not due to an increase in algae. However, transparency becomes a rather poor indicator of chl *a* at very high chl *a* concentrations, and vice versa, as Figure 2 shows, i.e., little change occurs in transparency over a wide range at high chl *a*. In order to see much improvement in transparency due to chl *a* reduction, a reduction of chl *a* to near 30 µg/L would be required (Figure 2). Therefore, the variation in transparency observed was probably due to changes in other dissolved or particulate substances and possibly to algal species changes, or distribution of cyanobacteria throughout the water column by mixing, decreasing transparency, as opposed to concentrating on the surface as a scum that would allow greater light penetration..

The possible effect of sample station placement on the evaluation of the treatment effectiveness is potentially important. Specifically, stations L-1, L-2, and L-3 are long-term monitoring stations for the lake establish in 2010. The lack of a clear-cut effect of the treatment, one in which TP and chl *a* should have both decreased by approximately 50%, even with a low dose, may be partly due to the established position of the sampling locations not well inside the treatment area, as well as the import of TP and chl *a* due to wind. Positioning the sampling locations near the treatment boundary may have obscured much of the treatment effect that should have occurred and been more detectable in the open treated area.

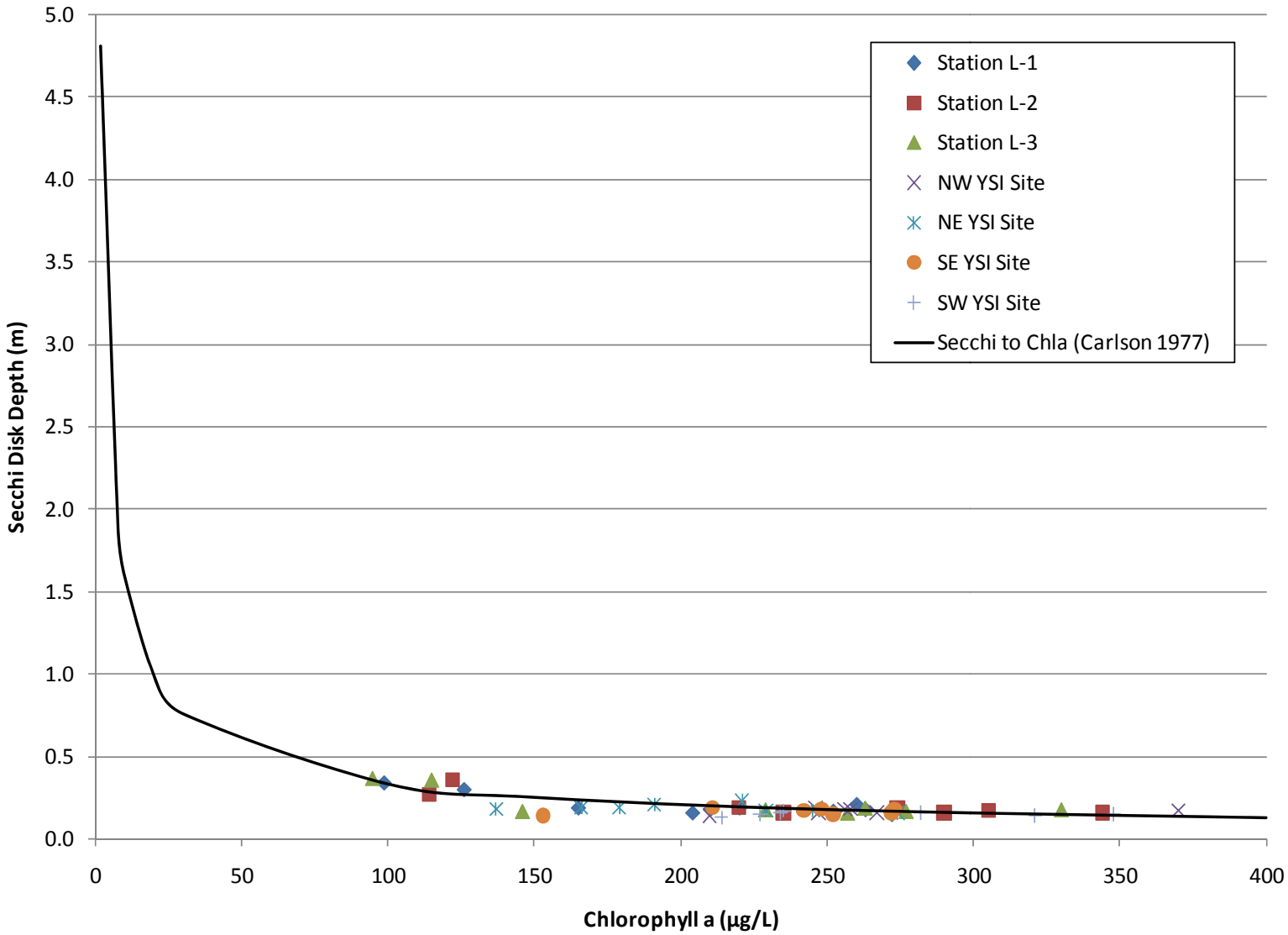

Figure 2. Secchi Disk Depth vs. Chlorophyll a in Grand Lake St. Marys, 2011, as compared to Carlson (1977) relationship between Secchi disk depth and chlorophyll a.

3.2. DISSOLVED OXYGEN, pH AND TEMPERATURE

Due to oxygen demand created by the cyanobacteria bloom, there was concern that the alum treatment could adversely affect DO by concentrating the oxygen demand; if it were already low and that could precipitate a fish kill. Alum might exacerbate an already critical DO problem by flocculating and settling the large algal mass to the lake bottom where it would respire, but not photosynthesize, i.e., remove DO without replacing it. Thus, treatment with alum was allowed only when DO at the surface was 5 mg/L or higher.

The extensive, continuous data for DO, pH and temperature show that critical DO conditions were caused by high algal biomass and the strength of stratification. While the lake is shallow and is usually well mixed, the water column can nevertheless stratify temporally if wind speed is low. When stratified, the buoyant cyanobacteria can remain near the surface producing DO through photosynthesis to supersaturated levels. At the same time, the respiration by algae and bacteria in the water and in the surficial sediment lowers DO at the bottom. With mixing, bottom water would frequently be aerated at the surface and DO produced would be distributed throughout the water column, minimizing either severely under or supersaturated conditions. Those effects are shown by a direct relation between RTRM and the difference between surface and bottom DO on a daily average basis (Figure 3). RTRM is relative thermal resistance to mixing, defined as:

$$(D_b - D_s)/(D_4 - D_5)$$

Where D_s is surface density, D_b is bottom density and D_4 and D_5 are densities at 4°C and 5°C. As temperature increases the density difference between successive temperatures increases, so that slight differences between surface and bottom temperatures at high temperature can result in sufficient density differences to temporarily stratify the water column, so long as wind speed is low. In Moses Lake, WA, a 1.5 m water column stratified enough that bottom DO began to decline if wind speed were < 3 m/s. Wind speed had a similar effect on RTRM and surface-to-bottom DO difference in Klamath Lake, OR (Kann and Welch, 2005).

There was also a tendency for minimum daily bottom DO to relate to water column RTRM (Figure 4). If RTRM exceeded 30, bottom DOs were almost always < 4 mg/L, but for bottom DO to exceed 4 mg/L required RTRMs well below 30 (Figure 4).

High rates of photosynthesis also raised pH to well above levels that can adversely affect aquatic animals. Most of the maximum pH levels were above 9.0 (Figure 5). Except for lower pH levels in the 8-9 range at the NW and NE YSI sonde sites, maximum daily pH levels were generally related to maximum daily DOs, showing that algal photosynthesis causes high pH and supersaturated DO to over 200% at times. Reasons for the lower pH and DO levels at the NW and NE sites (Figure 5) are not apparent. Chlorophyll *a* levels were lower at the NE site than SE and SW, but not at the NW site.

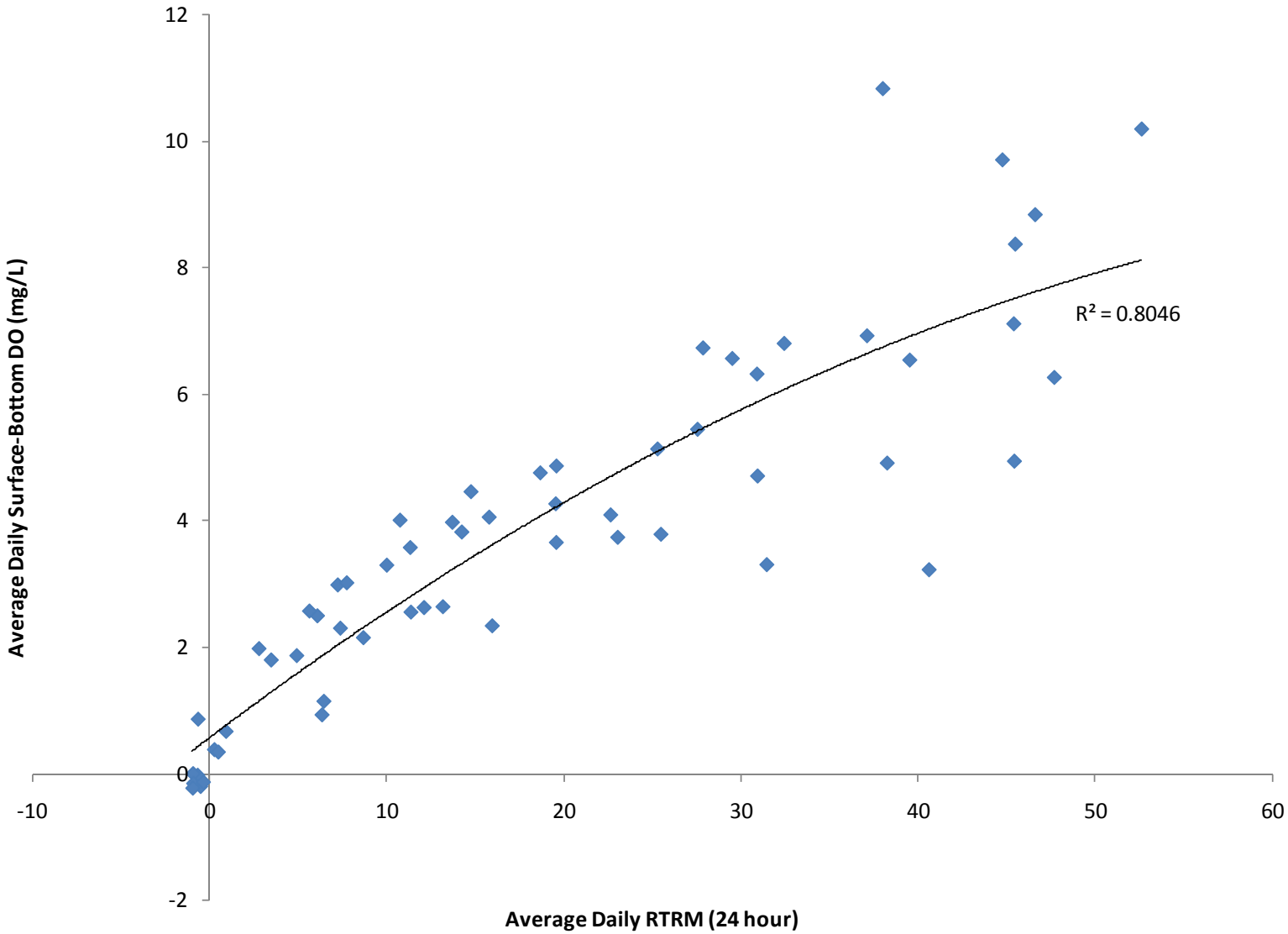

Figure 3. Relationship between Average Daily RTRM (24-hour) and Average Daily Difference between surface and bottom DO concentrations at the USGS continuous monitoring station, Grand Lake St. Marys, June/July 2011.

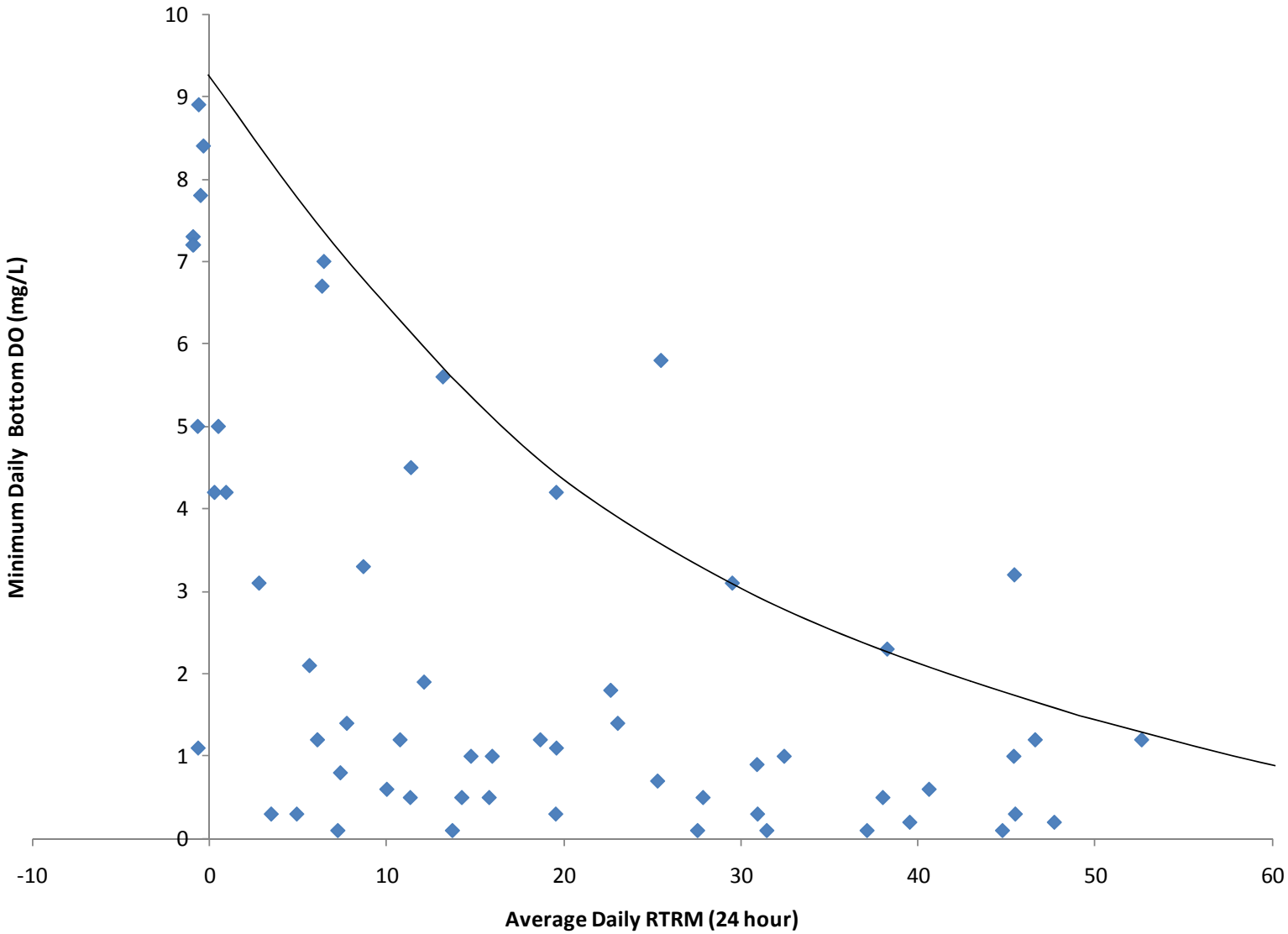

Figure 4. Average Daily RTRM (24-hour) at the USGS continuous monitoring station and minimum bottom DO concentrations for Grand Lake St. Marys, June/July 2011.

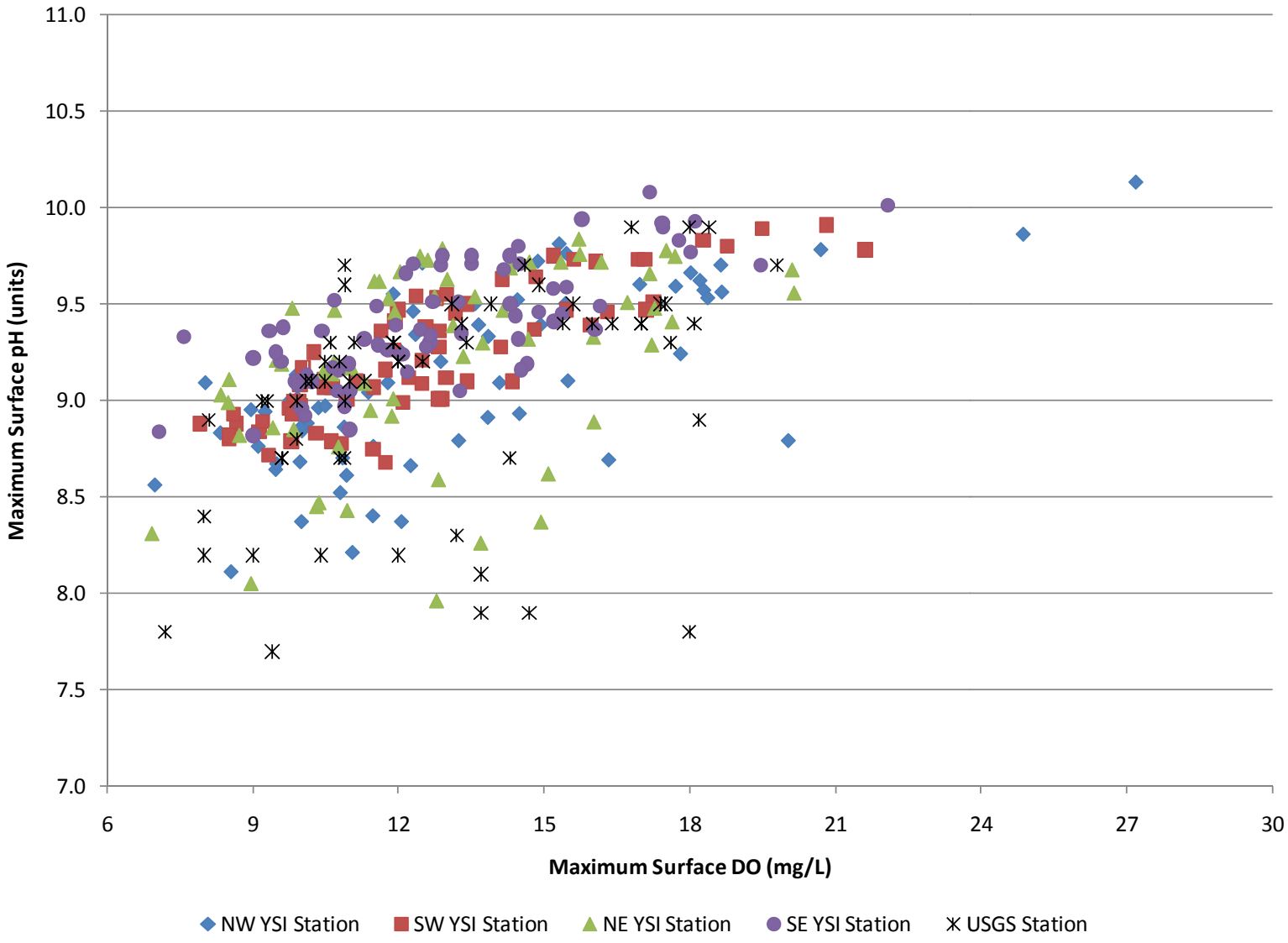

Figure 5. Maximum surface pH vs. maximum surface DO concentrations, Grand Lake St. Marys, June 1st through August 8th, 2011. USGS Station data is only from June 1st through July 31st.

4. SUMMARY AND CONCLUSIONS

1. TP declined at Station L-1 by 56%. The extent of success for TP at this site is indicative of what can be expected when a whole lake alum treatment is conducted in accordance with the recommendations. The 2011 reduction is consistent with the results in the 2010 nearshore experiments where chl *a* as well as TP decreased by ~50% in two of three nearshore embayments. Moreover, the mixed whole-lake reduction in TP was at the level expected (20-30%). Although possibly due to a general lake-wide TP decrease, results of the 100% reduction in SRP at station L-1, indicates alum was responsible for reducing P in the lake.

2. There was no apparent decrease in TP or chl *a* at Station L-2, although it was barely inside the treated area, and probably influenced by wind transport and mixing with water outside the treated area. The location of sampling Station L-2 was such that they were close to the boundary between the treated and untreated areas of the lake and may have hindered a clear detection of treatment effect due to mixing of water between the two areas. Wind transport of cyanobacteria into the treated areas immediately after alum application and alum floc water clarification was observed during the treatment.

3. The apparent TP decrease by the end of the treatment and study period by 20 to 30 percent throughout the lake may indicate a direct influence of the alum treatment; this decrease occurred despite continued internal and external P loading throughout the untreated portions of the lake that added P to the water column, along with the expanding cyanobacteria bloom. The cyanobacteria bloom may have been actually higher if the alum treatment had not limited P availability to some degree. This is consistent with expectations for a partial alum treatment to provide a short-term decrease in P concentration. In addition, pending post-treatment sediment analysis, it appears that repeat alum treatments (treating the entire lake to inactivate sediment and strip the water column of P) will be advantageous and necessary to maintain the beneficial uses of the lake until watershed loading of P is reduced significantly.

4. The perception by the lake users of the alum treatment effect was positive. For example, speed boat "rooster tails" were perceived to be less green than in previous years and the Governor's Cup Inboard Hydroplane race was allowed to commence in August 2011. The race had been canceled in 2010 due to poor lake water quality and toxic conditions produced by the large cyanobacteria bloom. The public perception this year is that lake water quality was improved and that both the cyanobacteria bloom and toxicity was less intense than in the previous year.

5. Transparency decreased by nearly half at most all sites after the treatment began. However, that change was not entirely due to chl *a*, which essentially increased only 20-40% during and after the treatment. Little effect on transparency would be expected from a 50% decrease in chl *a* from 200 to 100 µg/L. Also, algal biomass did not change appreciably. Decreased transparency may have been due to non-algal matter, or algae distributed throughout the water column rather than forming a surface scum.

6. The cause of low DOs near the lake bottom, due to respiration, and/or the large difference between supersaturated surface DO, due to photosynthesis during the day and minimum DO at

the bottom was related to wind induced mixing. When there was low wind speed the result was a temporary thermal-density stable water column, which limited the vertical distribution of water and DO and hence, reaeration.

7. High pHs reaching 10 were generally related to maximum surface DO, both as an effect of a large biomass of photosynthesizing algae. Any impact of pH or DO on fish was clearly independent of the alum treatment. Therefore, there was no apparent fish distress or kills related to the alum treatment.

5. REFERENCES

Carlson, R.E. 1977. A trophic state index for lakes. *Limnol. Oceanogr*. 22:361-368.

Cooke, G.D., E.B. Welch, S.A. Peterson, and S.A. Nichols. 2005. Restoration and Management of Lakes and Reservoirs. CRC Press, 3rd., Boca Raton, FL.

Tetra Tech. 2010. Effectiveness of alum treatment demonstration projects in Grand lake St. Marys Technical Memo, 6 pp. December 2010.

Tetra Tech. 2011. Experimental treatments to reduce phosphorus and algae in nearshore coves of Grand Lake St. Marys Technical Memo, 4 pp. July 2011.

Kahn, J. and E.B. Welch. 2005. Wind control on water quality in shallow, hypereutrophic Upper Klamath Lake, Oregon. *Lake and Reserv. Manage.* 21:149-158.

APPENDIX: GRAND LAKE ST. MARYS WATER QUALITY DATA PRE- AND POST-ALUM TREATMENT

***Numbers in Red were below detection limit of 10 µg/L for Ortho-P as Phosphate**
***Ortho-Phosphate numbers have been converted from as phosphate to as P**
***Last Sample collected on 7/12/2011; do not have data as of 7/18/2011**
***Estimate that Alum treatment passed over Station L-1 sometime between 6/13/2011 and 6/21/2011**
***Estimate that Alum treatment passed over Station L-2 sometime between 6/9/2011 and 6/13/2011**

Station L-1

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
3/28/11	0.5	119	3.3	--	0.36	122
4/13/11	0.5	99	3.3	126	0.30	125
5/4/11	0.5	122	3.3	98.7	0.34	118
5/31/11	0.5	106	3.3	260	0.21	85.5
ALUM TREATMENT BEGINS 6/2/2011						
6/6/11	0.5	162	4.6	272	0.15	87
	2.2	216	5.5	--	--	85.7
6/13/11	0.5	184	16.0	165	0.19	95
	2.2	221	12.4	--	--	97.2
Alum Treatment Reaches L-1						
6/21/11	0.5	74	3.3	220	0.19	104
	2.2	120	3.3	--	--	100
6/27/11	0.5	91	3.6	210	0.18	103
	2.1	91	3.3	--	--	104
	0.5	71	3.3	204	0.16	93.2
7/12/11	2.2	93	3.6	--	--	97.3
	0.5	93	3.3	252	0.17	114
7/27/11	2	71	3.3	--	--	111
	0.5	73	3.3	263	0.18	106
8/8/11	1.7	111	3.3	--	--	106

Station L-2

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
3/28/11	0.5	116	3.3	--	0.38	124
4/13/11	0.5	91	3.3	114	0.27	130
5/4/11	0.5	58	3.3	122	0.36	117
5/31/11	0.5	158	3.3	305	0.17	99.3
ALUM TREATMENT BEGINS 6/2/2011						
6/6/11	--	--	--	--	--	--
	--	--	--	--	--	--
Alum Treatment Reaches L-2						
6/13/11	--	--	--	--	--	--
	--	--	--	--	--	--
6/21/11	0.5	311	27.1	220	0.19	109
	--	--	--	--	--	--
6/27/11	0.5	158	3.3	344	0.16	109
	2	152	3.3	--	--	108
7/12/11	0.5	189	24.1	235.0	0.16	101
	1.7	156	19.9	--	--	105
7/27/11	0.5	144	13.7	290	0.16	113
	1.7	150	16.3	--	--	115
8/8/11	0.5	137	13.4	274	0.19	111
	1.5	172	13.4	--	--	113

Station L-3

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
3/28/11	0.5	108	3.3	--	0.36	119
4/13/11	0.5	117	3.3	115	0.36	121
5/4/11	0.5	49	3.3	94.8	0.37	115
5/31/11	0.5	130	3.3	330	0.18	97.1
ALUM TREATMENT BEGINS 6/2/2011						
6/6/11	--	--	--	--	--	--
	--	--	--	--	--	--
6/13/11	--	--	--	--	--	--
	--	--	--	--	--	--
6/21/11	0.5	254	23.5	229	0.18	102
	--	--	--	--	--	--
6/27/11	0.5	115	7.2	263	0.19	105

	1.7	184	6.8	--	--	108
7/12/11	0.5	135	9.5	146.0	0.17	95.5
	1.4	122	10.4	--	--	95.2
7/27/11	0.5	119	6.2	257	0.16	110
	1.4	99	5.9	--	--	111
8/8/11	0.5	156	3.3	277	0.17	97
	1.4	93	3.3	--	--	97.1

Station NW YSI Sonde

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
5/31/11	0.5	136	3.3	--	0.19	93.8
	1.9	135	3.3	--	--	94.5
ALUM TREATMENT BEGINS 6/2/2011						
6/6/11	0.5	143	7.8	247	0.16	81.6
	1.8	247	8.5	--	--	90.8
6/13/11	0.5	248	26.4	267	0.16	96.4
	1.7	328	27.4	--	--	94.1
6/21/11	0.5	146	17.3	246	0.19	106
	1.7	143	17.0	--	--	103
6/27/11	0.5	140	3.3	370	0.17	107
	1.8	81	3.3	--	--	106
7/12/11	0.5	162	23.2	210	0.14	102
	1.6	173	26.7	--	--	106
7/27/11	0.5	206	28.0	258	0.18	110
	1.6	185	28.4	--	--	112
8/8/11	0.5	144	16.0	256	0.18	114
	1.5	161	16.0	--	--	113

Station NE YSI Sonde

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
5/31/11	0.34	120	3.3	221	0.23	80
	1.6	134	3.3	293	--	81
ALUM TREATMENT BEGINS 6/2/2011						
6/6/11	0.38	266	6.5	229	0.17	86.1
	1.5	132	8.8	--	--	88.4
6/13/11	0.2	190	24.5	166	0.19	93.9
	1.5	238	24.1	--	--	93.8

6/21/11	0.5	220	16.6	191	0.21	107
	1.5	139	17.9	--	--	101
6/27/11	0.5	208	3.3	179	0.19	99.3
	1.5	130	3.3	--	--	103
7/12/11	0.5	105	5.9	137	0.18	94.4
	1.4	102	5.5	--	--	95.5
7/27/11	0.5	128	9.5	245	0.17	103
	1.2	110	10.4	--	--	111
8/8/11	0.47	310	3.3	274	0.16	101
	1.2	96	3.3	--	--	96.9

Station SE YSI Sonde

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
5/31/11	0.5	87	3.3	--	0.19	95
	1.5	182	3.3	--	--	98
ALUM TREATMENT BEGINS 6/2/2011						
6/6/11	0.5	221	3.3	272	0.16	89.8
	1.5	185	4.6	--	--	88.7
6/13/11	0.5	137	16.0	211	0.19	95.5
	1.5	159	15.0	--	--	99
6/21/11	0.5	253	19.2	248	0.18	109
	1.5	143	18.9	--	--	108
6/27/11	0.5	196	9.1	242	0.17	109
	1.5	139	9.5	--	--	107
7/12/11	0.5	189	18.6	153	0.14	98.3
	1.3	170	18.6	--	--	97.7
7/27/11	0.5	119	10.1	252	0.15	107
	1.2	124	9.1	--	--	110
8/8/11	0.5	92	7.8	273	0.18	103
	1.2	238	7.2	--	--	103

Station SW YSI Sonde

Date	Depth	Total Phosphorus (µg/L as P)	Ortho-Phosphorus (µg/L as P)	Chlorophyll *a* (µg/L)	Secchi Disk (m)	Alkalinity (mg/L)
5/31/11	0.5	84	3.3	--	0.2	107
	2	149	3.3	--	--	104
ALUM TREATMENT BEGINS 6/2/2011						

6/6/11	0.5	267	9.8	321	0.14	96.8
	1.7	204	10.1	--	--	98.6
6/13/11	0.5	212	30.0	214	0.13	106
	1.9	189	31.0	--	--	107
6/21/11	0.5	351	23.5	282	0.16	112
	1.9	152	23.8	--	--	107
6/27/11	0.5	191	8.5	348	0.15	111
	1.7	114	8.2	--	--	117
	0.5	203	33.9	227	0.15	104
7/12/11	1.6	236	37.8	--	--	107
	0.5	203	30.3	234	0.16	117
7/27/11	1.5	197	30.3	--	--	113
	0.5	149	19.9	235	0.17	113
8/8/11	1.5	160	19.2	--	--	115

5/31/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
203761 L-1	5/31/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	17	6.17E+05	6.17E+02	1.33E+08	0.13
203761 L-1	5/31/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	3.63E+04	3.63E+01	1.45E+07	0.01
203761 L-1	5/31/2011	0.50	1	8	Stephanodiscus hantzschii	Bacillariophyta	2	5.35E+05	5.35E+02	2.54E+08	0.25
203761 L-1	5/31/2011	0.50	1	8	Closteriopsis acicularis	Chlorophyta	1	2.67E+05	2.67E+02	7.10E+07	0.07
203761 L-1	5/31/2011	0.50	1	1	Oocystis parva	Chlorophyta	4	1.45E+05	1.45E+02	1.05E+07	0.01
203761 L-1	5/31/2011	0.50	1	8	Rhodomonas sp.	Cryptophyta	10	2.67E+06	2.67E+03	2.27E+08	0.23
203761 L-1	5/31/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	12260	3.28E+09	3.28E+06	3.09E+10	30.88
					TOTAL		12295	3.28E+09	3.28E+06	3.16E+10	31.59
203753 L-2	5/31/2011	0.50	1	12	Aulacoseira granulata	Bacillariophyta	104	1.85E+07	1.85E+04	4.73E+09	4.73
203753 L-2	5/31/2011	0.50	1	12	Nitzschia palea	Bacillariophyta	1	1.78E+05	1.78E+02	3.34E+07	0.03
203753 L-2	5/31/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	2.00E+03	2.00E+00	3.40E+05	0.00
203753 L-2	5/31/2011	0.50	1	12	Rhodomonas sp.	Cryptophyta	8	1.43E+06	1.43E+03	1.21E+08	0.12
203753 L-2	5/31/2011	0.50	1	12	Planktothrix agardhii	Cyanobacteria	6172	1.10E+09	1.10E+06	1.04E+10	10.36
					TOTAL		6286	1.12E+09	1.12E+06	1.52E+10	15.25
203764 L-3	5/31/2011	0.50	1	8	Aulacoseira granulata	Bacillariophyta	10	2.67E+06	2.67E+03	3.02E+08	0.30
203764 L-3	5/31/2011	0.50	1	1	Discostella pseudostelligera	Bacillariophyta	1	3.63E+04	3.63E+01	5.48E+06	0.01
203764 L-3	5/31/2011	0.50	1	8	Closteriopsis acicularis	Chlorophyta	3	8.02E+05	8.02E+02	3.66E+08	0.37
203764 L-3	5/31/2011	0.50	1	8	Rhodomonas sp.	Cryptophyta	4	1.07E+06	1.07E+03	1.11E+08	0.11
203764 L-3	5/31/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	9904	2.65E+09	2.65E+06	1.66E+10	16.63
					TOTAL		9922	2.65E+09	2.65E+06	1.74E+10	17.41

6/1/2011 Phytoplankton Data

STATION	SAMPLE	DEPTH	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE		ALIQUOT (mL)				REP 1	REP 1	cells/ml	um^3/L	mm^3/L
L-1	6/1/2011	0.5	1	20	Aulacoseira ambigua	Bacillariophyta	20	2.14E+06	2.14E+03	1.08E+09	1.08
L-1	6/1/2011	0.5	1	1	Aulacoseira granulata	Bacillariophyta	20	4.00E+04	4.00E+01	1.13E+07	0.01
L-1	6/1/2011	0.5	1	1	Cymatopleura solea	Bacillariophyta	1	2.00E+03	2.00E+00	8.51E+06	0.01
L-1	6/1/2011	0.5	1	1	Stephanocyclus meneghiniana	Bacillariophyta	3	1.09E+05	1.09E+02	6.42E+06	0.01
L-1	6/1/2011	0.5	1	1	Synedra sp.	Bacillariophyta	2	7.26E+04	7.26E+01	8.99E+07	0.09
L-1	6/1/2011	0.5	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	2.48E+07	0.02
L-1	6/1/2011	0.5	1	1	Staurastrum sp.	Chlorophyta	1	2.00E+03	2.00E+00	8.05E+07	0.08
L-1	6/1/2011	0.5	1	1	Rhodomonas minuta	Cryptophyta	8	2.91E+05	2.91E+02	3.01E+07	0.03
L-1	6/1/2011	0.5	1	1	Aphanocapsa incerta	Cyanobacteria	3866	7.73E+06	7.73E+03	3.24E+07	0.03
L-1	6/1/2011	0.5	1	20	Planktothrix agardhii	Cyanobacteria	13594	1.45E+09	1.45E+06	5.14E+10	51.38
					Total		17516	1.46E+09	1.46E+06	5.27E+10	52.74
301484 NW	6/1/2011	0.5	1	14	Aulacoseira granulata	Bacillariophyta	39	5.96E+06	5.96E+03	1.85E+09	1.85
301484 NW	6/1/2011	0.5	1	14	Discostella pseudostelligera	Bacillariophyta	2	3.06E+05	3.06E+02	4.61E+07	0.05
301484 NW	6/1/2011	0.5	1	14	Stephanocyclus meneghiniana	Bacillariophyta	2	3.06E+05	3.06E+02	4.33E+08	0.43
301484 NW	6/1/2011	0.5	1	14	Stephanodiscus hantzschii	Bacillariophyta	7	1.07E+06	1.07E+03	2.52E+08	0.25
301484 NW	6/1/2011	0.5	1	14	Stephanodiscus parvus	Bacillariophyta	2	3.06E+05	3.06E+02	2.59E+07	0.03
301484 NW	6/1/2011	0.5	1	14	Closteriopsis acicularis	Chlorophyta	2	3.06E+05	3.06E+02	3.19E+08	0.32
301484 NW	6/1/2011	0.5	1	1	Gonium sociale	Chlorophyta	4	8.00E+03	8.00E+00	2.16E+05	0.00
301484 NW	6/1/2011	0.5	1	14	Pyramimonas tetrarhynchus	Chlorophyta	2	3.06E+05	3.06E+02	6.14E+07	0.06
301484 NW	6/1/2011	0.5	1	14	Ochromonas variabilis	Chrysophyta	2	3.06E+05	3.06E+02	6.34E+07	0.06
301484 NW	6/1/2011	0.5	1	14	Rhodomonas sp.	Cryptophyta	27	4.13E+06	4.13E+03	2.16E+08	0.22
301484 NW	6/1/2011	0.5	1	14	Planktothrix agardhii	Cyanobacteria	12584	1.92E+09	1.92E+06	4.08E+10	40.78
301484 NW	6/1/2011	0.5	1	1	Gymnodinium discoidale	Pyrrophyta	1	2.00E+03	2.00E+00	5.76E+05	0.00
					Total		12674	1.94E+09	1.94E+06	4.40E+10	44.05
301485 NE-1	6/1/2011		1	1	Aulacoseira granulata	Bacillariophyta	29	1.05E+06	1.05E+03	2.27E+08	0.23
301485 NE-1	6/1/2011		1	1	Navicula trivialis	Bacillariophyta	1	3.63E+04	3.63E+01	5.28E+07	0.05
301485 NE-1	6/1/2011		1	14	Pseudostaurosira pseudoconstruens	Bacillariophyta	2	3.06E+05	3.06E+02	1.30E+07	0.01
301485 NE-1	6/1/2011		1	14	Staurosira elliptica	Bacillariophyta	4	6.11E+05	6.11E+02	1.58E+08	0.16
301485 NE-1	6/1/2011		1	1	Stephanodiscus hantzschii	Bacillariophyta	4	1.45E+05	1.45E+02	4.14E+07	0.04
301485 NE-1	6/1/2011		1	1	Ulnaria delicatissima var. angustissima	Bacillariophyta	1	3.63E+04	3.63E+01	5.90E+07	0.06
301485 NE-1	6/1/2011		1	14	Closteriopsis acicularis	Chlorophyta	2	3.06E+05	3.06E+02	2.02E+08	0.20
301485 NE-1	6/1/2011		1	1	Staurastrum sp.	Chlorophyta	1	2.00E+03	2.00E+00	4.05E+07	0.04
301485 NE-1	6/1/2011		1	1	Ochromonas variabilis	Chrysophyta	1	2.00E+03	2.00E+00	4.90E+05	0.00
301485 NE-1	6/1/2011		1	14	Rhodomonas sp.	Cryptophyta	20	3.06E+06	3.06E+03	2.59E+08	0.26
301485 NE-1	6/1/2011		1	1	Anabaena sp.	Cyanobacteria	132	4.79E+06	4.79E+03	1.69E+08	0.17
301485 NE-1	6/1/2011		1	14	Planktothrix agardhii	Cyanobacteria	10704	1.64E+09	1.64E+06	3.47E+10	34.69
					Total		10901	1.65E+09	1.65E+06	3.59E+10	35.91
301485 NE-2	6/1/2011		1	14	Aulacoseira granulata	Bacillariophyta	2	3.06E+05	3.06E+02	7.80E+07	0.08
301485 NE-2	6/1/2011		1	14	Fragilaria crotonensis	Bacillariophyta	2	3.06E+05	3.06E+02	1.47E+08	0.15
301485 NE-2	6/1/2011		1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	2.00E+03	2.00E+00	9.50E+05	0.00
301485 NE-2	6/1/2011		1	14	Stephanodiscus parvus	Bacillariophyta	4	6.11E+05	6.11E+02	1.54E+07	0.02
301485 NE-2	6/1/2011		1	1	Closteriopsis acicularis	Chlorophyta	1	2.00E+03	2.00E+00	1.10E+06	0.00
301485 NE-2	6/1/2011		1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	2.00E+03	2.00E+00	1.44E+06	0.00
301485 NE-2	6/1/2011		1	14	Rhodomonas sp.	Cryptophyta	12	1.83E+06	1.83E+03	3.99E+08	0.40
301485 NE-2	6/1/2011		1	14	Planktothrix agardhii	Cyanobacteria	10902	1.67E+09	1.67E+06	3.53E+10	35.33
301485 NE-2	6/1/2011		1	1	Gymnodinium discoidale	Pyrrophyta	1	3.63E+04	3.63E+01	1.26E+07	0.01
					Total		10926	1.67E+09	1.67E+06	3.60E+10	35.98
301485 NE-3	6/1/2011		1	1	Aulacoseira alpigena	Bacillariophyta	3	6.00E+03	6.00E+00	5.09E+05	0.00
301485 NE-3	6/1/2011		1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	4.00E+03	4.00E+00	4.54E+06	0.00
301485 NE-3	6/1/2011		1	1	Stephanodiscus hantzschii	Bacillariophyta	2	4.00E+03	4.00E+00	9.42E+05	0.00
301485 NE-3	6/1/2011		1	1	Stephanodiscus niagarae	Bacillariophyta	1	2.00E+03	2.00E+00	1.61E+07	0.02
301485 NE-3	6/1/2011		1	1	Closteriopsis acicularis	Chlorophyta	5	1.00E+04	1.00E+01	2.96E+07	0.03
301485 NE-3	6/1/2011		1	1	Pediastrum duplex	Chlorophyta	29	5.80E+04	5.80E+01	4.21E+08	0.42
301485 NE-3	6/1/2011		1	14	Pyramimonas tetrarhynchus	Chlorophyta	2	3.06E+05	3.06E+02	1.01E+08	0.10
301485 NE-3	6/1/2011		1	14	Rhodomonas sp.	Cryptophyta	12	1.83E+06	1.83E+03	1.56E+08	0.16
301485 NE-3	6/1/2011		1	14	Planktothrix agardhii	Cyanobacteria	8916	1.36E+09	1.36E+06	2.89E+10	28.89
301485 NE-3	6/1/2011		1	1	Phacus sp.	Euglenophyta	1	2.00E+03	2.00E+00	3.20E+06	0.00
301485 NE-3	6/1/2011		1	14	Gymnodinium sp.	Pyrrophyta	1	1.53E+05	1.53E+02	1.25E+08	0.13
					Total		8974	1.36E+09	1.36E+06	2.97E+10	29.75
301487 SE	6/1/2011	0.5	1	1	Aulacoseira granulata	Bacillariophyta	42	1.53E+06	1.53E+03	9.97E+08	1.00
301487 SE	6/1/2011	0.5	1	1	Aulacoseira sp.	Bacillariophyta	52	1.89E+06	1.89E+03	1.87E+08	0.19
301487 SE	6/1/2011	0.5	1	1	Craticula sp.	Bacillariophyta	1	3.63E+04	3.63E+01	1.28E+07	0.01
301487 SE	6/1/2011	0.5	1	14	Discostella pseudostelligera	Bacillariophyta	2	3.06E+05	3.06E+02	4.61E+07	0.05
301487 SE	6/1/2011	0.5	1	14	Stephanocyclus meneghiniana	Bacillariophyta	2	3.06E+05	3.06E+02	1.74E+08	0.17
301487 SE	6/1/2011	0.5	1	1	Stephanodiscus hantzschii	Bacillariophyta	1	3.63E+04	3.63E+01	1.04E+07	0.01
301487 SE	6/1/2011	0.5	1	1	Surirella angusta	Bacillariophyta	1	2.00E+03	2.00E+00	4.46E+06	0.00
301487 SE	6/1/2011	0.5	1	1	Ulnaria delicatissima var. angustissima	Bacillariophyta	3	1.09E+05	1.09E+02	1.59E+08	0.16
301487 SE	6/1/2011	0.5	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.30E+07	0.01
301487 SE	6/1/2011	0.5	1	14	Pediastrum duplex	Chlorophyta	30	4.58E+06	4.58E+03	4.35E+10	43.52
301487 SE	6/1/2011	0.5	1	14	Pyramimonas tetrarhynchus	Chlorophyta	2	3.06E+05	3.06E+02	1.56E+08	0.16
301487 SE	6/1/2011	0.5	1	14	Rhodomonas sp.	Cryptophyta	14	2.14E+06	2.14E+03	4.66E+08	0.47
301487 SE	6/1/2011	0.5	1	14	Planktothrix agardhii	Cyanobacteria	9434	1.44E+09	1.44E+06	3.06E+10	30.57
					Total		9585	1.45E+09	1.45E+06	7.63E+10	76.32
301487 SW	6/1/2011	0.5	1	18	Aulacoseira granulata	Bacillariophyta	15	1.78E+06	1.78E+03	2.24E+08	0.22
301487 SW	6/1/2011	0.5	1	18	Discostella pseudostelligera	Bacillariophyta	2	2.38E+05	2.38E+02	5.60E+07	0.06
301487 SW	6/1/2011	0.5	1	1	Nitzschia acicularis	Bacillariophyta	1	3.63E+04	3.63E+01	8.83E+06	0.01
301487 SW	6/1/2011	0.5	1	18	Stephanocyclus meneghiniana	Bacillariophyta	4	4.75E+05	4.75E+02	1.36E+08	0.14
301487 SW	6/1/2011	0.5	1	18	Stephanodiscus hantzschii	Bacillariophyta	2	2.38E+05	2.38E+02	1.13E+08	0.11
301487 SW	6/1/2011	0.5	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.28E+08	0.13
301487 SW	6/1/2011	0.5	1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	2.00E+03	2.00E+00	5.28E+05	0.00
301487 SW	6/1/2011	0.5	1	1	Scenedesmus dimorphus	Chlorophyta	4	8.00E+03	8.00E+00	3.77E+05	0.00
301487 SW	6/1/2011	0.5	1	18	Rhodomonas sp.	Cryptophyta	33	3.92E+06	3.92E+03	8.54E+08	0.85
301487 SW	6/1/2011	0.5	1	18	Planktothrix agardhii	Cyanobacteria	11644	1.38E+09	1.38E+06	2.93E+10	29.35
					Total		11707	1.39E+09	1.39E+06	3.09E+10	30.87

6/6/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH (mL)	ALIQUOT (mL)				REP 1	REP 1	cells/ml	um^3/L	mm^3/L
203761 L-1	6/6/2011	0.05	1	1	Aulacoseira ambigua	Bacillariophyta	22	7.99E+05	7.99E+02	2.26E+08	0.23
203761 L-1	6/6/2011	0.05	1	10	Aulacoseira granulata	Bacillariophyta	24	5.13E+06	5.13E+03	1.11E+09	1.11
203761 L-1	6/6/2011	0.05	1	1	Cyclotella ocellata	Bacillariophyta	1	3.63E+04	3.63E+01	3.08E+06	0.00
203761 L-1	6/6/2011	0.05	1	1	Navicula gregaria	Bacillariophyta	1	2.00E+03	2.00E+00	1.02E+06	0.00
203761 L-1	6/6/2011	0.05	1	1	Nitzschia sp.	Bacillariophyta	1	3.63E+04	3.63E+01	2.25E+07	0.02
203761 L-1	6/6/2011	0.05	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	2.04E+07	0.02
203761 L-1	6/6/2011	0.05	1	10	Rhodomonas sp.	Cryptophyta	10	2.14E+06	2.14E+03	2.22E+08	0.22
203761 L-1	6/6/2011	0.05	1	1	Anabaena sp.	Cyanobacteria	150	5.45E+06	5.45E+03	5.35E+08	0.53
203761 L-1	6/6/2011	0.05	1	1	Aphanizomenon sp.	Cyanobacteria	59	2.14E+06	2.14E+03	4.54E+07	0.05
203761 L-1	6/6/2011	0.05	1	10	Planktothrix agardhii	Cyanobacteria	13586	2.91E+09	2.91E+06	6.16E+10	61.64
					TOTAL		13855	2.92E+09	2.92E+06	6.38E+10	63.82
301484 NW	6/6/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	3	1.09E+05	1.09E+02	3.29E+07	0.03
301484 NW	6/6/2011	0.50	1	1	Planothidium sp.	Bacillariophyta	1	2.00E+03	2.00E+00	4.52E+05	0.00
301484 NW	6/6/2011	0.50	1	1	Actinastrum hantzschii	Chlorophyta	7	1.40E+04	1.40E+01	1.58E+06	0.00
301484 NW	6/6/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	2.89E+07	0.03
301484 NW	6/6/2011	0.50	1	1	Aphanizomenon flos-aquae	Cyanobacteria	88	3.20E+06	3.20E+03	1.13E+08	0.11
301484 NW	6/6/2011	0.50	1	16	Planktothrix agardhii	Cyanobacteria	16800	2.25E+09	2.25E+06	4.76E+10	47.64
					TOTAL		16900	2.25E+09	2.25E+06	4.78E+10	47.81
301485 NE	6/6/2011		1	1	Aulacoseira granulata	Bacillariophyta	9	3.27E+05	3.27E+02	1.02E+08	0.10
301485 NE	6/6/2011		1	8	Discostella pseudostelligera	Bacillariophyta	2	5.35E+05	5.35E+02	4.54E+07	0.05
301485 NE	6/6/2011		1	8	Stephanocyclus meneghiniana	Bacillariophyta	2	5.35E+05	5.35E+02	6.07E+08	0.61
301485 NE	6/6/2011		1	1	Stephanodiscus hantzschii	Bacillariophyta	1	3.63E+04	3.63E+01	1.45E+07	0.01
301485 NE	6/6/2011		1	1	Ulnaria delicatissima	Bacillariophyta	1	3.63E+04	3.63E+01	6.50E+07	0.07
301485 NE	6/6/2011		1	1	Closteriopsis acicularis	Chlorophyta	3	1.09E+05	1.09E+02	5.97E+07	0.06
301485 NE	6/6/2011		1	1	Oocystis parva	Chlorophyta	2	7.26E+04	7.26E+01	6.54E+06	0.01
301485 NE	6/6/2011		1	1	Pediastrum duplex	Chlorophyta	8	2.91E+05	2.91E+02	7.67E+08	0.77
301485 NE	6/6/2011		1	1	Pyramimonas tetrarhynchus	Chlorophyta	2	4.00E+03	4.00E+00	4.90E+05	0.00
301485 NE	6/6/2011		1	1	Scenedesmus quadricauda	Chlorophyta	2	7.26E+04	7.26E+01	2.74E+06	0.00
301485 NE	6/6/2011		1	1	Aphanizomenon sp.	Cyanobacteria	27	9.81E+05	9.81E+02	3.47E+07	0.03
301485 NE	6/6/2011		1	8	Planktothrix agardhii	Cyanobacteria	13248	3.54E+09	3.54E+06	7.51E+10	75.13
					TOTAL		13307	3.55E+09	3.55E+06	7.68E+10	76.83
301486 SE	6/6/2011	0.50	1	8	Aulacoseira granulata	Bacillariophyta	71	1.90E+07	1.90E+04	1.74E+09	1.74
301486 SE	6/6/2011	0.50	1	8	Cyclotella ocellata	Bacillariophyta	3	8.02E+05	8.02E+02	1.21E+08	0.12
301486 SE	6/6/2011	0.50	1	8	Discostella pseudostelligera	Bacillariophyta	4	1.07E+06	1.07E+03	9.07E+07	0.09
301486 SE	6/6/2011	0.50	1	1	Navicula gregaria	Bacillariophyta	1	3.63E+04	3.63E+01	1.64E+07	0.02
301486 SE	6/6/2011	0.50	1	8	Stephanodiscus hantzschii	Bacillariophyta	6	1.60E+06	1.60E+03	6.39E+08	0.64
301486 SE	6/6/2011	0.50	1	8	Synedra sp.	Bacillariophyta	4	1.07E+06	1.07E+03	1.18E+09	1.18
301486 SE	6/6/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	8.16E+06	0.01
301486 SE	6/6/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	8	1.60E+04	1.60E+01	1.81E+06	0.00
301486 SE	6/6/2011	0.50	1	1	Anabaena sp.	Cyanobacteria	18	6.54E+05	6.54E+02	1.39E+07	0.01
301486 SE	6/6/2011	0.50	1	8	Aphanizomenon sp.	Cyanobacteria	262	7.01E+07	7.01E+04	2.48E+09	2.48
301486 SE	6/6/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	8774	2.35E+09	2.35E+06	4.98E+10	49.76
					TOTAL		9152	2.44E+09	2.44E+06	5.61E+10	56.05
301487 SW	6/6/2011	0.50	1	1	Aulacoseira ambigua	Bacillariophyta	62	1.24E+05	1.24E+02	3.51E+07	0.04
301487 SW	6/6/2011	0.50	1	14	Aulacoseira granulata	Bacillariophyta	12	1.83E+06	1.83E+03	5.18E+08	0.52
301487 SW	6/6/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	2.00E+03	2.00E+00	1.33E+06	0.00
301487 SW	6/6/2011	0.50	1	14	Stephanodiscus hantzschii	Bacillariophyta	7	1.07E+06	1.07E+03	3.05E+08	0.30
301487 SW	6/6/2011	0.50	1	14	Ulnaria delicatissima	Bacillariophyta	2	3.06E+05	3.06E+02	7.13E+08	0.71
301487 SW	6/6/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	2	4.00E+03	4.00E+00	2.47E+06	0.00
301487 SW	6/6/2011	0.50	1	1	Oocystis parva	Chlorophyta	8	1.60E+04	1.60E+01	1.44E+06	0.00
301487 SW	6/6/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	2.00E+03	2.00E+00	6.03E+05	0.00
301487 SW	6/6/2011	0.50	1	14	Aphanizomenon sp.	Cyanobacteria	296	4.52E+07	4.52E+04	9.59E+08	0.96
301487 SW	6/6/2011	0.50	1	14	Planktothrix agardhii	Cyanobacteria	11284	1.72E+09	1.72E+06	3.66E+10	36.57
					TOTAL		11675	1.77E+09	1.77E+06	3.91E+10	39.10

6/13/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH (mL)	ALIQUOT (mL)				REP 1	REP 1	cells/ml	um^3/L	mm^3/L
203761 L-1	6/13/2011	0.50	1	22	Aulacoseira granulata	Bacillariophyta	21	2.04E+06	2.04E+03	7.50E+08	0.75
203761 L-1	6/13/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	2.00E+03	2.00E+00	2.01E+06	0.00
203761 L-1	6/13/2011	0.50	1	22	Stephanodiscus hantzschii	Bacillariophyta	6	5.83E+05	5.83E+02	2.77E+08	0.28
203761 L-1	6/13/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	3.63E+04	3.63E+01	6.80E+07	0.07
203761 L-1	6/13/2011	0.50	1	22	Rhodomonas sp.	Cryptophyta	10	9.72E+05	9.72E+02	1.01E+08	0.10
203761 L-1	6/13/2011	0.50	1	22	Planktothrix agardhii	Cyanobacteria	13252	1.29E+09	1.29E+06	2.73E+10	27.33
					TOTAL		13291	1.29E+09	1.29E+06	2.85E+10	28.53
301484 NW	6/13/2011	0.50	1	10	Aulacoseira granulata	Bacillariophyta	18	3.85E+06	3.85E+03	1.42E+09	1.42
301484 NW	6/13/2011	0.50	1	10	Discostella pseudostelligera	Bacillariophyta	3	6.42E+05	6.42E+02	3.78E+07	0.04
301484 NW	6/13/2011	0.50	1	1	Nitzschia acicularis	Bacillariophyta	1	3.63E+04	3.63E+01	1.11E+07	0.01
301484 NW	6/13/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	3	1.09E+05	1.09E+02	1.10E+08	0.11
301484 NW	6/13/2011	0.50	1	1	Stephanodiscus hantzschii	Bacillariophyta	1	3.63E+04	3.63E+01	1.04E+07	0.01
301484 NW	6/13/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	2.00E+03	2.00E+00	4.06E+06	0.00
301484 NW	6/13/2011	0.50	1	10	Mallomonas sp.	Chrysophyta	1	2.14E+05	2.14E+02	9.32E+07	0.09
301484 NW	6/13/2011	0.50	1	10	Rhodomonas sp.	Cryptophyta	16	3.42E+06	3.42E+03	3.55E+08	0.35
301484 NW	6/13/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	82	1.64E+05	1.64E+02	5.80E+06	0.01
301484 NW	6/13/2011	0.50	1	10	Planktothrix agardhii	Cyanobacteria	11558	2.47E+09	2.47E+06	5.24E+10	52.44
					TOTAL		11684	2.48E+09	2.48E+06	5.45E+10	54.48
301485 NE	6/13/2011		1	12	Aulacoseira granulata	Bacillariophyta	48	8.56E+06	8.56E+03	6.59E+09	6.59
301485 NE	6/13/2011		1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	7.26E+04	7.26E+01	5.59E+07	0.06
301485 NE	6/13/2011		1	12	Stephanodiscus hantzschii	Bacillariophyta	3	5.35E+05	5.35E+02	2.13E+08	0.21
301485 NE	6/13/2011		1	1	Synedra sp.	Bacillariophyta	1	2.00E+03	2.00E+00	1.84E+06	0.00
301485 NE	6/13/2011		1	1	Pediastrum duplex	Chlorophyta	36	1.31E+06	1.31E+03	5.96E+09	5.96
301485 NE	6/13/2011		1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	1.20E+07	0.01
301485 NE	6/13/2011		1	12	Rhodomonas sp.	Cryptophyta	6	1.07E+06	1.07E+03	2.33E+08	0.23
301485 NE	6/13/2011		1	1	Aphanizomenon sp.	Cyanobacteria	71	2.58E+06	2.58E+03	5.47E+07	0.05
301485 NE	6/13/2011		1	12	Planktothrix agardhii	Cyanobacteria	9212	1.64E+09	1.64E+06	3.48E+10	34.83
					TOTAL		9380	1.66E+09	1.66E+06	4.79E+10	47.95
301486 SE	6/13/2011	0.50	1	10	Aulacoseira granulata	Bacillariophyta	41	8.77E+06	8.77E+03	5.00E+09	5.00
301486 SE	6/13/2011	0.50	1	1	Cyclotella ocellata	Bacillariophyta	1	3.63E+04	3.63E+01	5.48E+06	0.01
301486 SE	6/13/2011	0.50	1	10	Ulnaria delicatissima	Bacillariophyta	1	2.14E+05	2.14E+02	1.68E+08	0.17
301486 SE	6/13/2011	0.50	1	1	Actinastrum hantzschii	Chlorophyta	7	2.54E+05	2.54E+02	3.41E+07	0.03
301486 SE	6/13/2011	0.50	1	10	Oocystis parva	Chlorophyta	4	8.56E+05	8.56E+02	1.23E+08	0.12
301486 SE	6/13/2011	0.50	1	10	Tetraedron minimum	Chlorophyta	1	2.14E+05	2.14E+02	1.60E+07	0.02
301486 SE	6/13/2011	0.50	1	10	Rhodomonas sp.	Cryptophyta	2	4.28E+05	4.28E+02	9.32E+07	0.09
301486 SE	6/13/2011	0.50	1	10	Planktothrix agardhii	Cyanobacteria	8928	1.91E+09	1.91E+06	4.05E+10	40.50
					TOTAL		8985	1.92E+09	1.92E+06	4.59E+10	45.94
301487 SW	6/13/2011	0.50	1	12	Aulacoseira granulata	Bacillariophyta	4	7.13E+05	7.13E+02	2.22E+08	0.22
301487 SW	6/13/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	4	8.00E+03	8.00E+00	6.16E+06	0.01
301487 SW	6/13/2011	0.50	1	12	Stephanodiscus hantzschii	Bacillariophyta	2	3.56E+05	3.56E+02	8.40E+07	0.08
301487 SW	6/13/2011	0.50	1	12	Stephanodiscus niagarae	Bacillariophyta	3	5.35E+05	5.35E+02	1.13E+09	1.13
301487 SW	6/13/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	2.00E+03	2.00E+00	8.91E+05	0.00
301487 SW	6/13/2011	0.50	1	12	Oocystis parva	Chlorophyta	10	1.78E+06	1.78E+03	8.02E+07	0.08
301487 SW	6/13/2011	0.50	1	1	Cryptomonas ovata	Cryptophyta	1	2.00E+03	2.00E+00	3.14E+06	0.00
301487 SW	6/13/2011	0.50	1	12	Rhodomonas sp.	Cryptophyta	16	2.85E+06	2.85E+03	2.96E+08	0.30
301487 SW	6/13/2011	0.50	1	12	Planktothrix agardhii	Cyanobacteria	9342	1.67E+09	1.67E+06	3.53E+10	35.32
					TOTAL		9383	1.67E+09	1.67E+06	3.71E+10	37.14

6/21/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
203761 L-1	6/21/2011	0.50	1	21	Aulacoseira granulata	Bacillariophyta	5	5.09E+05	5.09E+02	8.00E+07	0.08
203761 L-1	6/21/2011	0.50	1	21	Stephanodiscus hantzschii	Bacillariophyta	1	1.02E+05	1.02E+02	4.70E+07	0.05
203761 L-1	6/21/2011	0.50	1	21	Stephanodiscus parvus	Bacillariophyta	4	4.07E+05	4.07E+02	9.60E+07	0.10
203761 L-1	6/21/2011	0.50	1	21	Rhodomonas sp.	Cryptophyta	14	1.43E+06	1.43E+03	3.11E+08	0.31
203761 L-1	6/21/2011	0.50	1	21	Anabaena sp.	Cyanobacteria	92	9.37E+06	9.37E+03	3.31E+08	0.33
203761 L-1	6/21/2011	0.50	1	21	Planktothrix agardhii	Cyanobacteria	11776	1.20E+09	1.20E+06	2.54E+10	25.44
					TOTAL		11892	1.21E+09	1.21E+06	2.63E+10	26.31
L-2	6/21/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	27	9.81E+05	9.81E+02	2.50E+08	0.25
L-2	6/21/2011	0.50	1	16	Cyclotella ocellata	Bacillariophyta	6	8.02E+05	8.02E+02	1.21E+08	0.12
L-2	6/21/2011	0.50	1	1	Discostella pseudostelligera	Bacillariophyta	3	1.09E+05	1.09E+02	2.57E+07	0.03
L-2	6/21/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	7.26E+04	7.26E+01	2.07E+07	0.02
L-2	6/21/2011	0.50	1	16	Stephanodiscus hantzschii	Bacillariophyta	2	2.67E+05	2.67E+02	6.30E+07	0.06
L-2	6/21/2011	0.50	1	1	Surirella angusta	Bacillariophyta	1	3.63E+04	3.63E+01	2.74E+07	0.03
L-2	6/21/2011	0.50	1	1	Kirchneriella contorta	Chlorophyta	4	1.45E+05	1.45E+02	1.83E+06	0.00
L-2	6/21/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	5	1.82E+05	1.82E+02	8.22E+07	0.08
L-2	6/21/2011	0.50	1	1	Mallomonas alpina	Chrysophyta	1	3.63E+04	3.63E+01	2.56E+07	0.03
L-2	6/21/2011	0.50	1	16	Rhodomonas sp.	Cryptophyta	46	6.15E+06	6.15E+03	6.38E+08	0.64
L-2	6/21/2011	0.50	1	16	Planktothrix agardhii	Cyanobacteria	12382	1.66E+09	1.66E+06	3.51E+10	35.11
					TOTAL		12479	1.66E+09	1.66E+06	3.64E+10	36.36
L-3	6/21/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	40	1.45E+06	1.45E+03	5.84E+08	0.58
L-3	6/21/2011	0.50	1	20	Navicula cryptocephala	Bacillariophyta	1	1.07E+05	1.07E+02	7.66E+07	0.08
L-3	6/21/2011	0.50	1	20	Stephanocyclus meneghiniana	Bacillariophyta	10	1.07E+06	1.07E+03	8.23E+08	0.82
L-3	6/21/2011	0.50	1	20	Stephanodiscus sp.	Bacillariophyta	4	4.28E+05	4.28E+02	2.03E+08	0.20
L-3	6/21/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	2.00E+03	2.00E+00	2.24E+06	0.00
L-3	6/21/2011	0.50	1	20	Pyramimonas tetrarhynchus	Chlorophyta	2	2.14E+05	2.14E+02	7.06E+07	0.07
L-3	6/21/2011	0.50	1	1	Scenedesmus opoliensis	Chlorophyta	4	1.45E+05	1.45E+02	1.83E+06	0.00
L-3	6/21/2011	0.50	1	20	Rhodomonas sp.	Cryptophyta	44	4.71E+06	4.71E+03	1.02E+09	1.02
L-3	6/21/2011	0.50	1	20	Planktothrix agardhii	Cyanobacteria	10236	1.09E+09	1.09E+06	1.03E+10	10.31
					TOTAL		10342	1.10E+09	1.10E+06	1.31E+10	13.10
301485 NE	6/21/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	28	1.02E+06	1.02E+03	3.39E+08	0.34
301485 NE	6/21/2011	0.50	1	24	Cyclotella ocellata	Bacillariophyta	2	1.78E+05	1.78E+02	2.69E+07	0.03
301485 NE	6/21/2011	0.50	1	24	Nitzschia acicularis	Bacillariophyta	1	8.91E+04	8.91E+01	2.37E+07	0.02
301485 NE	6/21/2011	0.50	1	24	Nitzschia sp.	Bacillariophyta	2	1.78E+05	1.78E+02	3.53E+07	0.04
301485 NE	6/21/2011	0.50	1	24	Stephanocyclus meneghiniana	Bacillariophyta	2	1.78E+05	1.78E+02	8.40E+07	0.08
301485 NE	6/21/2011	0.50	1	24	Stephanodiscus hantzschii	Bacillariophyta	6	5.35E+05	5.35E+02	1.26E+08	0.13
301485 NE	6/21/2011	0.50	1	24	Stephanodiscus niagarae	Bacillariophyta	4	3.56E+05	3.56E+02	8.13E+08	0.81
301485 NE	6/21/2011	0.50	1	24	Stephanodiscus parvus	Bacillariophyta	2	1.78E+05	1.78E+02	8.40E+07	0.08
301485 NE	6/21/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	3.63E+04	3.63E+01	2.85E+07	0.03
301485 NE	6/21/2011	0.50	1	1	Oocystis sp.	Chlorophyta	2	7.26E+04	7.26E+01	3.27E+06	0.00
301485 NE	6/21/2011	0.50	1	1	Pediastrum duplex	Chlorophyta	3	6.00E+03	6.00E+00	5.68E+07	0.06
301485 NE	6/21/2011	0.50	1	1	Mallomonas sp.	Chrysophyta	1	3.63E+04	3.63E+01	2.31E+07	0.02
301485 NE	6/21/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	2.00E+03	2.00E+00	2.30E+06	0.00
301485 NE	6/21/2011	0.50	1	24	Rhodomonas sp.	Cryptophyta	10	8.91E+05	8.91E+02	9.24E+07	0.09
301485 NE	6/21/2011	0.50	1	24	Aphanizomenon sp.	Cyanobacteria	288	2.57E+07	2.57E+04	9.07E+08	0.91
301485 NE	6/21/2011	0.50	1	24	Planktothrix agardhii	Cyanobacteria	14042	1.25E+09	1.25E+06	1.18E+10	11.79
					TOTAL		14395	1.28E+09	1.28E+06	1.44E+10	14.43

6/27/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/ml	um^3/L	mm^3/L
203758 L-2	6/27/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	3	1.09E+05	1.09E+02	5.78E+07	0.06
203758 L-2	6/27/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	3.63E+04	3.63E+01	3.86E+07	0.04
203758 L-2	6/27/2011	0.50	1	8	Stephanodiscus hantzschii	Bacillariophyta	4	1.07E+06	1.07E+03	7.10E+08	0.71
203758 L-2	6/27/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	2.00E+03	2.00E+00	2.83E+06	0.00
203758 L-2	6/27/2011	0.50	1	8	Pyramimonas tetrarhynchus	Chlorophyta	4	1.07E+06	1.07E+03	4.48E+08	0.45
203758 L-2	6/27/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	2.00E+03	2.00E+00	3.04E+06	0.00
203758 L-2	6/27/2011	0.50	1	8	Rhodomonas sp.	Cryptophyta	6	1.60E+06	1.60E+03	1.66E+08	0.17
203758 L-2	6/27/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	6950	1.86E+09	1.86E+06	1.75E+10	17.50
					TOTAL		6970	1.86E+09	1.86E+06	1.89E+10	18.93
203761 L-1	6/27/2011	0.50	1	6	Aulacoseira granulata	Bacillariophyta	20	7.13E+06	7.13E+03	2.02E+09	2.02
203761 L-1	6/27/2011	0.50	1	1	Nitzschia sp.	Bacillariophyta	2	7.26E+04	7.26E+01	1.05E+07	0.01
203761 L-1	6/27/2011	0.50	1	6	Stephanocyclus meneghiniana	Bacillariophyta	1	3.56E+05	3.56E+02	8.40E+07	0.08
203761 L-1	6/27/2011	0.50	1	6	Stephanodiscus hantzschii	Bacillariophyta	3	1.07E+06	1.07E+03	5.08E+08	0.51
203761 L-1	6/27/2011	0.50	1	1	Stephanodiscus parvus	Bacillariophyta	3	1.09E+05	1.09E+02	9.24E+06	0.01
203761 L-1	6/27/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	2	7.26E+04	7.26E+01	1.64E+08	0.16
203761 L-1	6/27/2011	0.50	1	1	Actinastrum hantzschii	Chlorophyta	8	2.91E+05	2.91E+02	1.19E+07	0.01
203761 L-1	6/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.38E+08	0.14
203761 L-1	6/27/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	52	1.04E+05	1.04E+02	1.47E+06	0.00
203761 L-1	6/27/2011	0.50	1	6	Pediastrum duplex	Chlorophyta	12	4.28E+06	4.28E+03	2.13E+10	21.29
203761 L-1	6/27/2011	0.50	1	6	Pyramimonas tetrarhynchus	Chlorophyta	4	1.43E+06	1.43E+03	2.51E+08	0.25
203761 L-1	6/27/2011	0.50	1	1	Scenedesmus communis	Chlorophyta	4	1.45E+05	1.45E+02	4.11E+06	0.00
203761 L-1	6/27/2011	0.50	1	6	Rhodomonas sp.	Cryptophyta	10	3.56E+06	3.56E+03	7.77E+08	0.78
203761 L-1	6/27/2011	0.50	1	6	Planktothrix agardhii	Cyanobacteria	9050	3.23E+09	3.23E+06	6.84E+10	68.43
					TOTAL		9172	3.24E+09	3.24E+06	9.37E+10	93.69
203764 L-3	6/27/2011	0.50	1	12	Aulacoseira granulata	Bacillariophyta	117	2.09E+07	2.09E+04	5.32E+09	5.32
203764 L-3	6/27/2011	0.50	1	12	Stephanocyclus meneghiniana	Bacillariophyta	4	7.13E+05	7.13E+02	8.09E+08	0.81
203764 L-3	6/27/2011	0.50	1	12	Stephanodiscus hantzschii	Bacillariophyta	2	3.56E+05	3.56E+02	1.02E+08	0.10
203764 L-3	6/27/2011	0.50	1	1	Stephanodiscus parvus	Bacillariophyta	1	3.63E+04	3.63E+01	3.08E+06	0.00
203764 L-3	6/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	2.00E+03	2.00E+00	1.01E+06	0.00
203764 L-3	6/27/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	15	3.00E+04	3.00E+01	2.83E+06	0.00
203764 L-3	6/27/2011	0.50	1	1	Pediastrum duplex	Chlorophyta	7	1.40E+04	1.40E+01	3.64E+07	0.04
203764 L-3	6/27/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	3	1.09E+05	1.09E+02	2.60E+07	0.03
203764 L-3	6/27/2011	0.50	1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	4.26E+06	0.00
203764 L-3	6/27/2011	0.50	1	1	Staurastrum sp.	Chlorophyta	1	2.00E+03	2.00E+00	4.83E+07	0.05
203764 L-3	6/27/2011	0.50	1	12	Rhodomonas sp.	Cryptophyta	20	3.56E+06	3.56E+03	3.70E+08	0.37
203764 L-3	6/27/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	63	1.26E+05	1.26E+02	4.45E+06	0.00
203764 L-3	6/27/2011	0.50	1	1	Merismopedia sp.	Cyanobacteria	31	6.20E+04	6.20E+01	2.60E+05	0.00
203764 L-3	6/27/2011	0.50	1	12	Planktothrix agardhii	Cyanobacteria	10736	1.91E+09	1.91E+06	4.06E+10	40.59
203764 L-3	6/27/2011	0.50	1	1	Trachelomonas varians	Euglenophyta	1	2.00E+03	2.00E+00	1.42E+06	0.00
					TOTAL		11006	1.94E+09	1.94E+06	4.73E+10	47.32
301484 NW	6/27/2011	0.50	1	1	Aulacoseira ambigua	Bacillariophyta	114	4.14E+06	4.14E+03	2.08E+09	2.08
301484 NW	6/27/2011	0.50	1	4	Cyclotella ocellata	Bacillariophyta	2	1.07E+06	1.07E+03	9.07E+07	0.09
301484 NW	6/27/2011	0.50	1	4	Stephanocyclus meneghiniana	Bacillariophyta	2	1.07E+06	1.07E+03	5.04E+08	0.50
301484 NW	6/27/2011	0.50	1	4	Stephanodiscus hantzschii	Bacillariophyta	1	5.35E+05	5.35E+02	2.13E+08	0.21
301484 NW	6/27/2011	0.50	1	4	Oocystis parva	Chlorophyta	4	2.14E+06	2.14E+03	9.63E+07	0.10
301484 NW	6/27/2011	0.50	1	4	Pyramimonas tetrarhynchus	Chlorophyta	4	2.14E+06	2.14E+03	5.82E+08	0.58
301484 NW	6/27/2011	0.50	1	4	Tetraedron minimum	Chlorophyta	2	1.07E+06	1.07E+03	2.89E+07	0.03
301484 NW	6/27/2011	0.50	1	4	Cryptomonas sp.	Cryptophyta	1	5.35E+05	5.35E+02	6.72E+08	0.67
301484 NW	6/27/2011	0.50	1	4	Rhodomonas sp.	Cryptophyta	6	3.21E+06	3.21E+03	3.33E+08	0.33
301484 NW	6/27/2011	0.50	1	4	Planktothrix agardhii	Cyanobacteria	9414	5.03E+09	5.03E+06	1.07E+11	106.77
					TOTAL		9550	5.05E+09	5.05E+06	1.11E+11	111.37

6/27/2011 Phytoplankton Data (Continued…)

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/ml	um^3/L	mm^3/L
301485 NE	6/27/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	11	4.00E+05	4.00E+02	4.52E+07	0.05
301485 NE	6/27/2011	0.50	1	1	Nitzschia acicularis	Bacillariophyta	1	3.63E+04	3.63E+01	1.03E+07	0.01
301485 NE	6/27/2011	0.50	1	18	Stephanocyclus meneghiniana	Bacillariophyta	8	9.51E+05	9.51E+02	5.42E+08	0.54
301485 NE	6/27/2011	0.50	1	18	Stephanodiscus hantzschii	Bacillariophyta	6	7.13E+05	7.13E+02	1.68E+08	0.17
301485 NE	6/27/2011	0.50	1	1	Stephanodiscus niagarae	Bacillariophyta	2	7.26E+04	7.26E+01	5.70E+08	0.57
301485 NE	6/27/2011	0.50	1	18	Stephanodiscus parvus	Bacillariophyta	1	1.19E+05	1.19E+02	1.01E+07	0.01
301485 NE	6/27/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	3.63E+04	3.63E+01	8.13E+07	0.08
301485 NE	6/27/2011	0.50	1	1	Actinastrum hantzschii	Chlorophyta	8	1.60E+04	1.60E+01	5.53E+05	0.00
301485 NE	6/27/2011	0.50	1	1	Oocystis parva	Chlorophyta	4	8.00E+03	8.00E+00	7.20E+05	0.00
301485 NE	6/27/2011	0.50	1	18	Pyramimonas tetrarhynchus	Chlorophyta	6	7.13E+05	7.13E+02	2.13E+08	0.21
301485 NE	6/27/2011	0.50	1	18	Scenedesmus subspicatus	Chlorophyta	2	2.38E+05	2.38E+02	2.49E+06	0.00
301485 NE	6/27/2011	0.50	1	18	Rhodomonas sp.	Cryptophyta	12	1.43E+06	1.43E+03	1.21E+08	0.12
301485 NE	6/27/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	92	3.34E+06	3.34E+03	1.18E+08	0.12
301485 NE	6/27/2011	0.50	1	18	Planktothrix agardhii	Cyanobacteria	16582	1.97E+09	1.97E+06	1.86E+10	18.56
					TOTAL		16736	1.98E+09	1.98E+06	2.04E+10	20.44
301486 SE	6/27/2011	0.50	1	8	Aulacoseira granulata	Bacillariophyta	20	5.35E+06	5.35E+03	1.97E+09	1.97
301486 SE	6/27/2011	0.50	1	1	Nitzschia sp.	Bacillariophyta	1	3.63E+04	3.63E+01	3.81E+06	0.00
301486 SE	6/27/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	4	1.45E+05	1.45E+02	1.79E+08	0.18
301486 SE	6/27/2011	0.50	1	8	Stephanodiscus hantzschii	Bacillariophyta	2	5.35E+05	5.35E+02	5.08E+08	0.51
301486 SE	6/27/2011	0.50	1	1	Stephanodiscus parvus	Bacillariophyta	3	1.09E+05	1.09E+02	9.24E+06	0.01
301486 SE	6/27/2011	0.50	1	1	Ulnaria delicatissima	Bacillariophyta	1	3.63E+04	3.63E+01	4.85E+07	0.05
301486 SE	6/27/2011	0.50	1	1	Actinastrum hantzschii	Chlorophyta	8	1.60E+04	1.60E+01	5.53E+05	0.00
301486 SE	6/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	2.00E+03	2.00E+00	8.98E+05	0.00
301486 SE	6/27/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	12	4.36E+05	4.36E+02	6.16E+06	0.01
301486 SE	6/27/2011	0.50	1	1	Oocystis parva	Chlorophyta	2	7.26E+04	7.26E+01	6.54E+06	0.01
301486 SE	6/27/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	9.70E+06	0.01
301486 SE	6/27/2011	0.50	1	1	Radiococcus planktonicus	Chlorophyta	4	1.45E+05	1.45E+02	9.51E+06	0.01
301486 SE	6/27/2011	0.50	1	1	Staurastrum sp.	Chlorophyta	1	3.63E+04	3.63E+01	1.36E+09	1.36
301486 SE	6/27/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	3.63E+04	3.63E+01	7.36E+07	0.07
301486 SE	6/27/2011	0.50	1	8	Rhodomonas sp.	Cryptophyta	21	5.61E+06	5.61E+03	5.82E+08	0.58
301486 SE	6/27/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	14	5.08E+05	5.08E+02	1.80E+07	0.02
301486 SE	6/27/2011	0.50	1	1	Aphanocapsa sp.	Cyanobacteria	222	4.44E+05	4.44E+02	2.31E+05	0.00
301486 SE	6/27/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	8478	2.27E+09	2.27E+06	2.14E+10	21.35
					TOTAL		8796	2.28E+09	2.28E+06	2.61E+10	26.13
301487 SW	6/27/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	24	8.72E+05	8.72E+02	2.46E+08	0.25
301487 SW	6/27/2011	0.50	1	1	Nitzschia palea	Bacillariophyta	1	3.63E+04	3.63E+01	2.78E+06	0.00
301487 SW	6/27/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	7.26E+04	7.26E+01	4.82E+07	0.05
301487 SW	6/27/2011	0.50	1	10	Stephanodiscus hantzschii	Bacillariophyta	4	8.56E+05	8.56E+02	6.50E+08	0.65
301487 SW	6/27/2011	0.50	1	1	Stephanodiscus parvus	Bacillariophyta	3	1.09E+05	1.09E+02	9.24E+06	0.01
301487 SW	6/27/2011	0.50	1	10	Actinastrum hantzschii	Chlorophyta	6	1.28E+06	1.28E+03	6.45E+07	0.06
301487 SW	6/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	4.43E+07	0.04
301487 SW	6/27/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	2.00E+03	2.00E+00	4.78E+05	0.00
301487 SW	6/27/2011	0.50	1	1	Radiococcus planktonicus	Chlorophyta	3	1.09E+05	1.09E+02	7.13E+06	0.01
301487 SW	6/27/2011	0.50	1	10	Scenedesmus abundans	Chlorophyta	2	4.28E+05	4.28E+02	4.48E+06	0.00
301487 SW	6/27/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	3.63E+04	3.63E+01	5.75E+07	0.06
301487 SW	6/27/2011	0.50	1	10	Rhodomonas sp.	Cryptophyta	28	5.99E+06	5.99E+03	3.14E+08	0.31
301487 SW	6/27/2011	0.50	1	1	Anabaena sp.	Cyanobacteria	47	9.40E+04	9.40E+01	3.99E+06	0.00
301487 SW	6/27/2011	0.50	1	10	Planktothrix agardhii	Cyanobacteria	11994	2.57E+09	2.57E+06	2.42E+10	24.17
301487 SW	6/27/2011	0.50	1	1	Raphidiopsis curvata	Cyanobacteria	3	1.09E+05	1.09E+02	1.71E+06	0.00
					TOTAL		12120	2.58E+09	2.58E+06	2.56E+10	25.62

7/12/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
203758 L-2	7/12/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	9	1.80E+04	1.80E+01	6.62E+06	0.01
203758 L-2	7/12/2011	0.50	1	1	Discostella pseudostelligera	Bacillariophyta	2	7.26E+04	7.26E+01	1.10E+07	0.01
203758 L-2	7/12/2011	0.50	1	8	Stephanocyclus meneghiniana	Bacillariophyta	2	5.35E+05	5.35E+02	2.13E+08	0.21
203758 L-2	7/12/2011	0.50	1	8	Dictyosphaerium pulchellum	Chlorophyta	13	3.48E+06	3.48E+03	2.27E+08	0.23
203758 L-2	7/12/2011	0.50	1	1	Oocystis parva	Chlorophyta	4	1.45E+05	1.45E+02	3.49E+06	0.00
203758 L-2	7/12/2011	0.50	1	8	Pyramimonas tetrarhynchus	Chlorophyta	2	5.35E+05	5.35E+02	3.39E+08	0.34
203758 L-2	7/12/2011	0.50	1	8	Scenedesmus quadricauda	Chlorophyta	4	1.07E+06	1.07E+03	5.04E+07	0.05
203758 L-2	7/12/2011	0.50	1	8	Aphanizomenon sp.	Cyanobacteria	66	1.76E+07	1.76E+04	6.24E+08	0.62
203758 L-2	7/12/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	9652	2.58E+09	2.58E+06	5.47E+10	54.74
203758 L-2	7/12/2011	0.50	1	1	Euglena sp.	Euglenophyta	1	2.00E+03	2.00E+00	1.56E+06	0.00
					TOTAL		9755	2.60E+09	2.60E+06	5.62E+10	56.21
203761 L-1	7/12/2011	0.50	1	8	Stephanocyclus meneghiniana	Bacillariophyta	2	5.35E+05	5.35E+02	2.13E+08	0.21
203761 L-1	7/12/2011	0.50	1	1	Stephanodiscus hantzschii	Bacillariophyta	1	3.63E+04	3.63E+01	1.73E+07	0.02
203761 L-1	7/12/2011	0.50	1	1	Actinastrum hantzschii	Chlorophyta	8	2.91E+05	2.91E+02	2.26E+07	0.02
203761 L-1	7/12/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.99E+07	0.02
203761 L-1	7/12/2011	0.50	1	1	Pediastrum duplex	Chlorophyta	24	4.80E+04	4.80E+01	2.83E+08	0.28
203761 L-1	7/12/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	2	7.26E+04	7.26E+01	1.55E+07	0.02
203761 L-1	7/12/2011	0.50	1	8	Rhodomonas sp.	Cryptophyta	21	5.61E+06	5.61E+03	2.94E+08	0.29
203761 L-1	7/12/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	17	3.40E+04	3.40E+01	1.20E+06	0.00
203761 L-1	7/12/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	7160	1.91E+09	1.91E+06	4.06E+10	40.60
					TOTAL		7236	1.92E+09	1.92E+06	4.15E+10	41.47
203764 L-3	7/12/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	10	2.00E+04	2.00E+01	6.22E+06	0.01
203764 L-3	7/12/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	4.00E+03	4.00E+00	1.90E+06	0.00
203764 L-3	7/12/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	9	3.27E+05	3.27E+02	1.44E+07	0.01
203764 L-3	7/12/2011	0.50	1	1	Characium sp.	Chlorophyta	1	2.00E+03	2.00E+00	2.73E+05	0.00
203764 L-3	7/12/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	5	1.82E+05	1.82E+02	2.91E+07	0.03
203764 L-3	7/12/2011	0.50	1	1	Scenedesmus sp.	Chlorophyta	3	6.00E+03	6.00E+00	2.28E+06	0.00
203764 L-3	7/12/2011	0.50	1	10	Rhodomonas sp.	Cryptophyta	8	1.71E+06	1.71E+03	6.72E+08	0.67
203764 L-3	7/12/2011	0.50	1	10	cf. Anabaena circinalis	Cyanobacteria	162	3.47E+07	3.47E+04	1.22E+09	1.22
203764 L-3	7/12/2011	0.50	1	10	Aphanizomenon sp.	Cyanobacteria	384	8.21E+07	8.21E+04	8.06E+09	8.06
203764 L-3	7/12/2011	0.50	1	10	Aphanocapsa sp.	Cyanobacteria	76	1.63E+07	1.63E+04	6.81E+07	0.07
203764 L-3	7/12/2011	0.50	1	10	Planktothrix agardhii	Cyanobacteria	7252	1.55E+09	1.55E+06	1.46E+10	14.61
203764 L-3	7/12/2011	0.50	1	1	Trachelomonas sp.	Euglenophyta	1	3.63E+04	3.63E+01	2.22E+06	0.00
					TOTAL		7913	1.69E+09	1.69E+06	2.47E+10	24.70
301484 NW	7/12/2011	0.50	1	8	Aulacoseira granulata	Bacillariophyta	8	2.14E+06	2.14E+03	6.65E+08	0.67
301484 NW	7/12/2011	0.50	1	8	Discostella pseudostelligera	Bacillariophyta	1	2.67E+05	2.67E+02	6.30E+07	0.06
301484 NW	7/12/2011	0.50	1	1	Stephanodiscus hantzschii	Bacillariophyta	2	7.26E+04	7.26E+01	2.07E+07	0.02
301484 NW	7/12/2011	0.50	1	8	Closteriopsis acicularis	Chlorophyta	2	5.35E+05	5.35E+02	3.12E+08	0.31
301484 NW	7/12/2011	0.50	1	1	Oocystis parva	Chlorophyta	12	4.36E+05	4.36E+02	1.96E+07	0.02
301484 NW	7/12/2011	0.50	1	8	Pyramimonas tetrarhynchus	Chlorophyta	4	1.07E+06	1.07E+03	2.55E+08	0.26
301484 NW	7/12/2011	0.50	1	8	Rhodomonas sp.	Cryptophyta	1	2.67E+05	2.67E+02	2.13E+08	0.21
301484 NW	7/12/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	109	3.96E+06	3.96E+03	1.40E+08	0.14
301484 NW	7/12/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	10276	2.75E+09	2.75E+06	2.59E+10	25.88
					TOTAL		10415	2.76E+09	2.76E+06	2.76E+10	27.57
301485 NE	7/12/2011	0.50	1	1	Discostella pseudostelligera	Bacillariophyta	1	3.63E+04	3.63E+01	3.08E+06	0.00
301485 NE	7/12/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	3.63E+04	3.63E+01	2.89E+07	0.03
301485 NE	7/12/2011	0.50	1	10	Actinastrum gracilimum	Chlorophyta	14	2.99E+06	2.99E+03	4.58E+08	0.46
301485 NE	7/12/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	2.00E+03	2.00E+00	3.30E+05	0.00
301485 NE	7/12/2011	0.50	1	1	Pediastrum tetras	Chlorophyta	4	8.00E+03	8.00E+00	3.19E+06	0.00
301485 NE	7/12/2011	0.50	1	10	Pyramimonas tetrarhynchus	Chlorophyta	4	8.56E+05	8.56E+02	1.13E+08	0.11
301485 NE	7/12/2011	0.50	1	10	cf. Anabaena circinalis	Cyanobacteria	14	2.99E+06	2.99E+03	1.06E+08	0.11
301485 NE	7/12/2011	0.50	1	10	Aphanizomenon sp.	Cyanobacteria	123	2.63E+07	2.63E+04	9.30E+08	0.93
301485 NE	7/12/2011	0.50	1	10	Planktothrix agardhii	Cyanobacteria	8748	1.87E+09	1.87E+06	3.97E+10	39.69
301485 NE	7/12/2011	0.50	1	1	Trachelomonas hispida	Euglenophyta	1	2.00E+03	2.00E+00	3.49E+06	0.00
301485 NE	7/12/2011	0.50	1	1	Trachelomonas sp.	Euglenophyta	1	3.63E+04	3.63E+01	1.15E+07	0.01
					TOTAL		8912	1.90E+09	1.90E+06	4.13E+10	41.34

7/12/2011 Phytoplankton Data (Continued…)

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
301486 SE	7/12/2011	0.50	1	12	Aulacoseira granulata	Bacillariophyta	4	7.13E+05	7.13E+02	1.96E+08	0.20
301486 SE	7/12/2011	0.50	1	12	Discostella pseudostelligera	Bacillariophyta	2	3.56E+05	3.56E+02	5.38E+07	0.05
301486 SE	7/12/2011	0.50	1	12	Nitzschia acicularis	Bacillariophyta	1	1.78E+05	1.78E+02	6.02E+07	0.06
301486 SE	7/12/2011	0.50	1	1	Nitzschia amphibia	Bacillariophyta	1	3.63E+04	3.63E+01	2.72E+06	0.00
301486 SE	7/12/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	7.26E+04	7.26E+01	3.35E+07	0.03
301486 SE	7/12/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	32	6.40E+04	6.40E+01	3.58E+06	0.00
301486 SE	7/12/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	23	4.60E+04	4.60E+01	6.50E+05	0.00
301486 SE	7/12/2011	0.50	1	1	Oocystis parva	Chlorophyta	16	3.20E+04	3.20E+01	2.88E+06	0.00
301486 SE	7/12/2011	0.50	1	12	Pyramimonas tetrarhynchus	Chlorophyta	4	7.13E+05	7.13E+02	1.79E+08	0.18
301486 SE	7/12/2011	0.50	1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	4.26E+06	0.00
301486 SE	7/12/2011	0.50	1	12	Rhodomonas sp.	Cryptophyta	1	1.78E+05	1.78E+02	3.29E+07	0.03
301486 SE	7/12/2011	0.50	1	1	cf. Anabaena circinalis	Cyanobacteria	31	6.20E+04	6.20E+01	6.09E+06	0.01
301486 SE	7/12/2011	0.50	1	12	Aphanizomenon sp.	Cyanobacteria	14	2.50E+06	2.50E+03	5.29E+07	0.05
301486 SE	7/12/2011	0.50	1	1	Aphanocapsa sp.	Cyanobacteria	557	2.02E+07	2.02E+04	1.05E+07	0.01
301486 SE	7/12/2011	0.50	1	12	Planktothrix agardhii	Cyanobacteria	10932	1.95E+09	1.95E+06	1.84E+10	18.36
301486 SE	7/12/2011	0.50	1	12	Lepocinclis sp.	Euglenophyta	1	1.78E+05	1.78E+02	9.80E+07	0.10
301486 SE	7/12/2011	0.50	1	1	Peridinium umbonatum	Pyrrophyta	1	3.63E+04	3.63E+01	1.67E+07	0.02
					TOTAL		11626	1.97E+09	1.97E+06	1.91E+10	19.11
301482 SW	7/12/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	8	1.60E+04	1.60E+01	4.40E+06	0.00
301482 SW	7/12/2011	0.50	1	1	Stephanocyclus meneghiniana	Bacillariophyta	1	3.63E+04	3.63E+01	1.45E+07	0.01
301482 SW	7/12/2011	0.50	1	12	Closteriopsis acicularis	Chlorophyta	1	1.78E+05	1.78E+02	2.02E+08	0.20
301482 SW	7/12/2011	0.50	1	1	Gonium sociale	Chlorophyta	4	1.45E+05	1.45E+02	3.92E+06	0.00
301482 SW	7/12/2011	0.50	1	12	Kirchneriella contorta	Chlorophyta	5	8.91E+05	8.91E+02	1.12E+07	0.01
301482 SW	7/12/2011	0.50	1	12	Pyramimonas tetrarhynchus	Chlorophyta	2	3.56E+05	3.56E+02	7.28E+07	0.07
301482 SW	7/12/2011	0.50	1	1	Cryptomonas sp.	Cryptophyta	1	3.63E+04	3.63E+01	3.53E+07	0.04
301482 SW	7/12/2011	0.50	1	12	Rhodomonas sp.	Cryptophyta	1	1.78E+05	1.78E+02	9.33E+06	0.01
301482 SW	7/12/2011	0.50	1	1	Aphanizomenon sp.	Cyanobacteria	66	2.40E+06	2.40E+03	8.47E+07	0.08
301482 SW	7/12/2011	0.50	1	12	Planktothrix agardhii	Cyanobacteria	12150	2.17E+09	2.17E+06	2.04E+10	20.40
					TOTAL		12239	2.17E+09	2.17E+06	2.08E+10	20.84

7/27/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
L-2	7/27/2011	0.50	1	4	Achnanthidium minutissimum	Bacillariophyta	1	5.35E+05	5.35E+02	2.77E+07	0.03
L-2	7/27/2011	0.50	1	1	Asterionella formosa	Bacillariophyta	10	2.00E+04	2.00E+01	2.10E+07	0.02
L-2	7/27/2011	0.50	1	4	Discostella pseudostelligera	Bacillariophyta	3	1.60E+06	1.60E+03	2.42E+08	0.24
L-2	7/27/2011	0.50	1	4	Stephanocyclus meneghiniana	Bacillariophyta	1	5.35E+05	5.35E+02	2.54E+08	0.25
L-2	7/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	2	4.00E+03	4.00E+00	8.13E+06	0.01
L-2	7/27/2011	0.50	1	4	Dictyosphaerium pulchellum	Chlorophyta	12	6.42E+06	6.42E+03	6.45E+08	0.65
L-2	7/27/2011	0.50	1	4	Anabaena circinalis	Cyanobacteria	13	6.95E+06	6.95E+03	6.82E+08	0.68
L-2	7/27/2011	0.50	1	4	Aphanizomenon flos-aquae	Cyanobacteria	56	2.99E+07	2.99E+04	1.06E+09	1.06
L-2	7/27/2011	0.50	1	4	Planktothrix agardhii	Cyanobacteria	6680	3.57E+09	3.57E+06	3.36E+10	33.65
					TOTAL		6778	3.62E+09	3.62E+06	3.66E+10	36.59
L-1	7/27/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	28	1.02E+06	1.02E+03	1.01E+08	0.10
L-1	7/27/2011	0.50	1	8	Cyclotella ocellata	Bacillariophyta	1	2.67E+05	2.67E+02	2.27E+07	0.02
L-1	7/27/2011	0.50	1	8	Discostella pseudostelligera	Bacillariophyta	1	2.67E+05	2.67E+02	6.30E+07	0.06
L-1	7/27/2011	0.50	1	1	Nitzschia acicularis	Bacillariophyta	1	3.63E+04	3.63E+01	1.77E+07	0.02
L-1	7/27/2011	0.50	1	8	Stephanocyclus meneghiniana	Bacillariophyta	1	2.67E+05	2.67E+02	1.27E+08	0.13
L-1	7/27/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	15	5.45E+05	5.45E+02	3.05E+07	0.03
L-1	7/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.86E+07	0.02
L-1	7/27/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	16	3.20E+04	3.20E+01	2.09E+06	0.00
L-1	7/27/2011	0.50	1	8	Scenedesmus dimorphus	Chlorophyta	4	1.07E+06	1.07E+03	1.06E+08	0.11
L-1	7/27/2011	0.50	1	8	Anabaena sp.	Cyanobacteria	102	2.73E+07	2.73E+04	2.68E+09	2.68
L-1	7/27/2011	0.50	1	8	Aphanizomenon flos-aquae	Cyanobacteria	139	3.72E+07	3.72E+04	1.58E+09	1.58
L-1	7/27/2011	0.50	1	8	Aphanocapsa sp.	Cyanobacteria	225	6.02E+07	6.02E+04	2.52E+08	0.25
L-1	7/27/2011	0.50	1	8	Cylindrospermopsis raciborskii	Cyanobacteria	175	4.68E+07	4.68E+04	4.41E+08	0.44
L-1	7/27/2011	0.50	1	1	Limnothrix redekei	Cyanobacteria	36	1.31E+06	1.31E+03	3.09E+06	0.00
L-1	7/27/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	7951	2.13E+09	2.13E+06	2.00E+10	20.03
L-1	7/27/2011	0.50	1	1	Raphidiopsis curvata	Cyanobacteria	15	5.45E+05	5.45E+02	1.29E+06	0.00
					TOTAL		8711	2.30E+09	2.30E+06	2.55E+10	25.46
L-3	7/27/2011	0.50	1	1	Actinocyclus normanii	Bacillariophyta	1	3.63E+04	3.63E+01	3.65E+07	0.04
L-3	7/27/2011	0.50	1	8	Aulacoseira granulata	Bacillariophyta	16	4.28E+06	4.28E+03	1.33E+09	1.33
L-3	7/27/2011	0.50	1	1	Discostella pseudostelligera	Bacillariophyta	2	7.26E+04	7.26E+01	1.71E+07	0.02
L-3	7/27/2011	0.50	1	8	Nitzschia palea	Bacillariophyta	1	2.67E+05	2.67E+02	9.22E+07	0.09
L-3	7/27/2011	0.50	1	8	Stephanocyclus meneghiniana	Bacillariophyta	1	2.67E+05	2.67E+02	6.30E+07	0.06
L-3	7/27/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	22	7.99E+05	7.99E+02	5.11E+07	0.05
L-3	7/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	4.16E+06	0.00
L-3	7/27/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	13	2.60E+04	2.60E+01	3.68E+05	0.00
L-3	7/27/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	6.28E+06	0.01
L-3	7/27/2011	0.50	1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	4.26E+06	0.00
L-3	7/27/2011	0.50	1	1	Staurastrum sp.	Chlorophyta	1	2.00E+03	2.00E+00	1.39E+07	0.01
L-3	7/27/2011	0.50	1	8	Anabaena circinalis	Cyanobacteria	442	1.18E+08	1.18E+05	1.16E+10	11.60
L-3	7/27/2011	0.50	1	8	Anabaena sp.	Cyanobacteria	44	1.18E+07	1.18E+04	5.91E+08	0.59
L-3	7/27/2011	0.50	1	8	Aphanizomenon flos-aquae	Cyanobacteria	297	7.94E+07	7.94E+04	2.81E+09	2.81
L-3	7/27/2011	0.50	1	8	Aphanocapsa sp.	Cyanobacteria	108	2.89E+07	2.89E+04	1.50E+07	0.02
L-3	7/27/2011	0.50	1	8	Cylindrospermopsis raciborskii	Cyanobacteria	95	2.54E+07	2.54E+04	2.39E+08	0.24
L-3	7/27/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	6497	1.74E+09	1.74E+06	1.64E+10	16.36
L-3	7/27/2011	0.50	1	1	Pseudanabaena sp.	Cyanobacteria	39	1.42E+06	1.42E+03	2.22E+06	0.00
L-3	7/27/2011	0.50	1	1	Raphidiopsis curvata	Cyanobacteria	13	2.60E+04	2.60E+01	2.45E+05	0.00
					TOTAL		7598	2.01E+09	2.01E+06	3.32E+10	33.24
NW	7/27/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	4	1.45E+05	1.45E+02	7.84E+06	0.01
NW	7/27/2011	0.50	1	8	Characium sp.	Chlorophyta	2	5.35E+05	5.35E+02	7.31E+07	0.07
NW	7/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	2.00E+03	2.00E+00	4.30E+05	0.00
NW	7/27/2011	0.50	1	1	Oocystis parva	Chlorophyta	4	1.45E+05	1.45E+02	2.18E+07	0.02
NW	7/27/2011	0.50	1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	5.48E+06	0.01
NW	7/27/2011	0.50	1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	1.44E+07	0.01
NW	7/27/2011	0.50	1	8	Anabaena circinalis	Cyanobacteria	24	6.42E+06	6.42E+03	6.30E+08	0.63
NW	7/27/2011	0.50	1	8	Anabaena sp.	Cyanobacteria	3	8.02E+05	8.02E+02	7.87E+07	0.08
NW	7/27/2011	0.50	1	1	Aphanizomenon flos-aquae	Cyanobacteria	118	4.29E+06	4.29E+03	1.51E+08	0.15
NW	7/27/2011	0.50	1	8	Cylindrospermopsis raciborskii	Cyanobacteria	48	1.28E+07	1.28E+04	1.21E+08	0.12
NW	7/27/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	7497	2.00E+09	2.00E+06	7.08E+10	70.84
NW	7/27/2011	0.50	1	1	Raphidiopsis curvata	Cyanobacteria	5	1.82E+05	1.82E+02	4.29E+05	0.00
					TOTAL		7711	2.03E+09	2.03E+06	7.19E+10	71.94

7/27/2011 Phytoplankton Data (Continued…)

STATION	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
NE	7/27/2011	SONDE DEPTH	1	1	Asterionella formosa	Bacillariophyta	1	3.63E+04	3.63E+01	1.63E+07	0.02
NE	7/27/2011	SONDE DEPTH	1	1	Aulacoseira granulata	Bacillariophyta	8	2.91E+05	2.91E+02	7.42E+07	0.07
NE	7/27/2011	SONDE DEPTH	1	1	Nitzschia palea	Bacillariophyta	1	2.00E+03	2.00E+00	7.35E+05	0.00
NE	7/27/2011	SONDE DEPTH	1	12	Stephanocyclus meneghiniana	Bacillariophyta	6	1.07E+06	1.07E+03	4.26E+08	0.43
NE	7/27/2011	SONDE DEPTH	1	1	Actinastrum gracilimum	Chlorophyta	8	2.91E+05	2.91E+02	1.16E+07	0.01
NE	7/27/2011	SONDE DEPTH	1	1	Closteriopsis acicularis	Chlorophyta	2	7.26E+04	7.26E+01	9.47E+06	0.01
NE	7/27/2011	SONDE DEPTH	1	1	Dictyosphaerium pulchellum	Chlorophyta	15	3.00E+04	3.00E+01	1.96E+06	0.00
NE	7/27/2011	SONDE DEPTH	1	1	Pyramimonas tetrarhynchus	Chlorophyta	2	7.26E+04	7.26E+01	1.10E+07	0.01
NE	7/27/2011	SONDE DEPTH	1	12	Anabaena circinalis	Cyanobacteria	80	1.43E+07	1.43E+04	1.40E+09	1.40
NE	7/27/2011	SONDE DEPTH	1	1	Anabaenopsis elenkinii	Cyanobacteria	23	8.35E+05	8.35E+02	2.95E+07	0.03
NE	7/27/2011	SONDE DEPTH	1	1	Aphanizomenon flos-aquae	Cyanobacteria	155	5.63E+06	5.63E+03	1.99E+08	0.20
NE	7/27/2011	SONDE DEPTH	1	12	Cylindrospermopsis raciborskii	Cyanobacteria	104	1.85E+07	1.85E+04	6.55E+08	0.66
NE	7/27/2011	SONDE DEPTH	1	12	Planktothrix agardhii	Cyanobacteria	7524	1.34E+09	1.34E+06	2.84E+10	28.45
NE	7/27/2011	SONDE DEPTH	1	1	Euglena sp.	Euglenophyta	1	3.63E+04	3.63E+01	1.92E+07	0.02
					TOTAL		7930	1.38E+09	1.38E+06	3.13E+10	31.30
SE	7/27/2011	0.50	1	10	Aulacoseira granulata	Bacillariophyta	14	2.99E+06	2.99E+03	1.96E+09	1.96
SE	7/27/2011	0.50	1	10	Cyclotella ocellata	Bacillariophyta	1	2.14E+05	2.14E+02	5.04E+07	0.05
SE	7/27/2011	0.50	1	10	Discostella pseudostelligera	Bacillariophyta	4	8.56E+05	8.56E+02	2.02E+08	0.20
SE	7/27/2011	0.50	1	10	Nitzschia sp.	Bacillariophyta	2	4.28E+05	4.28E+02	7.96E+07	0.08
SE	7/27/2011	0.50	1	10	Stephanocyclus meneghiniana	Bacillariophyta	8	1.71E+06	1.71E+03	2.42E+08	0.24
SE	7/27/2011	0.50	1	1	Stephanodiscus niagarae	Bacillariophyta	1	3.63E+04	3.63E+01	6.86E+08	0.69
SE	7/27/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	24	8.72E+05	8.72E+02	4.88E+07	0.05
SE	7/27/2011	0.50	1	1	Dictyosphaerium pulchellum	Chlorophyta	24	8.72E+05	8.72E+02	2.05E+07	0.02
SE	7/27/2011	0.50	1	1	Oocystis parva	Chlorophyta	4	8.00E+03	8.00E+00	4.32E+05	0.00
SE	7/27/2011	0.50	1	10	Pyramimonas tetrarhynchus	Chlorophyta	1	2.14E+05	2.14E+02	2.62E+07	0.03
SE	7/27/2011	0.50	1	1	Scenedesmus dimorphus	Chlorophyta	8	2.91E+05	2.91E+02	3.42E+07	0.03
SE	7/27/2011	0.50	1	1	Scenedesmus quadricauda	Chlorophyta	6	2.18E+05	2.18E+02	6.16E+06	0.01
SE	7/27/2011	0.50	1	10	Anabaena circinalis	Cyanobacteria	142	3.04E+07	3.04E+04	2.98E+09	2.98
SE	7/27/2011	0.50	1	10	Anabaena sp.	Cyanobacteria	76	1.63E+07	1.63E+04	5.74E+08	0.57
SE	7/27/2011	0.50	1	1	Anabaenopsis elenkinii	Cyanobacteria	52	1.89E+06	1.89E+03	6.67E+07	0.07
SE	7/27/2011	0.50	1	10	Aphanizomenon flos-aquae	Cyanobacteria	162	3.47E+07	3.47E+04	1.22E+09	1.22
SE	7/27/2011	0.50	1	10	Cylindrospermopsis raciborskii	Cyanobacteria	212	4.53E+07	4.53E+04	1.60E+09	1.60
SE	7/27/2011	0.50	1	10	Limnothrix redekei	Cyanobacteria	380	8.13E+07	8.13E+04	1.92E+08	0.19
SE	7/27/2011	0.50	1	10	Planktothrix agardhii	Cyanobacteria	10322	2.21E+09	2.21E+06	4.68E+10	46.83
SE	7/27/2011	0.50	1	1	Trachelomonas volvocina	Euglenophyta	1	3.63E+04	3.63E+01	1.84E+07	0.02
					TOTAL		11444	2.43E+09	2.43E+06	5.68E+10	56.84
SW	7/27/2011	0.50	1	1	Aulacoseira granulata	Bacillariophyta	23	8.35E+05	8.35E+02	2.13E+08	0.21
SW	7/27/2011	0.50	1	1	Discostella pseudostelligera	Bacillariophyta	5	1.82E+05	1.82E+02	2.74E+07	0.03
SW	7/27/2011	0.50	1	8	Stephanocyclus meneghiniana	Bacillariophyta	4	1.07E+06	1.07E+03	1.51E+08	0.15
SW	7/27/2011	0.50	1	1	Actinastrum gracilimum	Chlorophyta	8	2.91E+05	2.91E+02	1.86E+07	0.02
SW	7/27/2011	0.50	1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.42E+07	0.01
SW	7/27/2011	0.50	1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	4.26E+06	0.00
SW	7/27/2011	0.50	1	8	Aphanizomenon flos-aquae	Cyanobacteria	84	2.25E+07	2.25E+04	9.52E+08	0.95
SW	7/27/2011	0.50	1	8	Limnothrix redekei	Cyanobacteria	126	3.37E+07	3.37E+04	5.29E+07	0.05
SW	7/27/2011	0.50	1	8	Planktothrix agardhii	Cyanobacteria	11032	2.95E+09	2.95E+06	2.78E+10	27.79
					TOTAL		11287	3.01E+09	3.01E+06	2.92E+10	29.22

8/8/2011 Phytoplankton Data

STATION	SAMPLE	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	TIME	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
L-2	8/8/2011	0.50		1	6	Aulacoseira granulata	Bacillariophyta	36	1.28E+07	1.28E+04	3.99E+09	3.99
L-2	8/8/2011	0.50		1	6	Aulacoseira sp.	Bacillariophyta	3	1.07E+06	1.07E+03	4.54E+07	0.05
L-2	8/8/2011	0.50		1	6	Cyclotella ocellata	Bacillariophyta	4	1.43E+06	1.43E+03	2.15E+08	0.22
L-2	8/8/2011	0.50		1	6	Discostella pseudostelligera	Bacillariophyta	1	3.56E+05	3.56E+02	1.40E+08	0.14
L-2	8/8/2011	0.50		1	1	Nitzschia fruticosa	Bacillariophyta	4	1.45E+05	1.45E+02	4.36E+07	0.04
L-2	8/8/2011	0.50		1	6	Stephanocyclus meneghiniana	Bacillariophyta	3	1.07E+06	1.07E+03	1.61E+08	0.16
L-2	8/8/2011	0.50		1	1	Actinastrum gracilimum	Chlorophyta	15	5.45E+05	5.45E+02	3.05E+07	0.03
L-2	8/8/2011	0.50		1	1	Coelastrum microporum	Chlorophyta	8	2.91E+05	2.91E+02	4.11E+06	0.00
L-2	8/8/2011	0.50		1	1	Dictyosphaerium pulchellum	Chlorophyta	32	1.16E+06	1.16E+03	7.61E+07	0.08
L-2	8/8/2011	0.50		1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	9.13E+06	0.01
L-2	8/8/2011	0.50		1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	6.39E+06	0.01
L-2	8/8/2011	0.50		1	6	Rhodomonas sp.	Cryptophyta	8	2.85E+06	2.85E+03	2.96E+08	0.30
L-2	8/8/2011	0.50		1	6	Anabaena circinalis	Cyanobacteria	134	4.78E+07	4.78E+04	4.69E+09	4.69
L-2	8/8/2011	0.50		1	6	Anabaena sp.	Cyanobacteria	52	1.85E+07	1.85E+04	1.82E+09	1.82
L-2	8/8/2011	0.50		1	1	Aphanizomenon sp.	Cyanobacteria	128	4.65E+06	4.65E+03	1.64E+08	0.16
L-2	8/8/2011	0.50		1	1	Aphanocapsa sp.	Cyanobacteria	192	6.97E+06	6.97E+03	2.92E+07	0.03
L-2	8/8/2011	0.50		1	6	Cylindrospermopsis raciborskii	Cyanobacteria	34	1.21E+07	1.21E+04	1.14E+08	0.11
L-2	8/8/2011	0.50		1	1	Microcystis sp.	Cyanobacteria	16	5.81E+05	5.81E+02	8.22E+06	0.01
L-2	8/8/2011	0.50		1	6	Planktothrix agardhii	Cyanobacteria	3051	1.09E+09	1.09E+06	6.83E+09	6.83
L-2	8/8/2011	0.50		1	6	Pseudanabaena sp.	Cyanobacteria	104	3.71E+07	3.71E+04	3.49E+08	0.35
						TOTAL		3830	1.24E+09	1.24E+06	1.90E+10	19.02
L-1	8/8/2011	0.50		1	14	Aulacoseira granulata	Bacillariophyta	4	6.11E+05	6.11E+02	1.68E+08	0.17
L-1	8/8/2011	0.50		1	14	Discostella pseudostelligera	Bacillariophyta	1	1.53E+05	1.53E+02	6.00E+07	0.06
L-1	8/8/2011	0.50		1	14	Nitzschia sp.	Bacillariophyta	3	4.58E+05	4.58E+02	1.24E+08	0.12
L-1	8/8/2011	0.50		1	14	Stephanocyclus meneghiniana	Bacillariophyta	6	9.17E+05	9.17E+02	3.60E+08	0.36
L-1	8/8/2011	0.50		1	1	Actinastrum gracilimum	Chlorophyta	11	4.00E+05	4.00E+02	2.56E+07	0.03
L-1	8/8/2011	0.50		1	1	Closteriopsis sp.	Chlorophyta	1	3.63E+04	3.63E+01	7.93E+06	0.01
L-1	8/8/2011	0.50		1	1	Pediastrum tetras	Chlorophyta	4	1.45E+05	1.45E+02	4.14E+07	0.04
L-1	8/8/2011	0.50		1	1	Scenedesmus dimorphus	Chlorophyta	3	1.09E+05	1.09E+02	5.70E+06	0.01
L-1	8/8/2011	0.50		1	14	Rhodomonas sp.	Cryptophyta	10	1.53E+06	1.53E+03	8.00E+07	0.08
L-1	8/8/2011	0.50		1	14	Anabaena circinalis	Cyanobacteria	238	3.64E+07	3.64E+04	3.57E+09	3.57
L-1	8/8/2011	0.50		1	14	Aphanizomenon sp.	Cyanobacteria	426	6.51E+07	6.51E+04	1.38E+09	1.38
L-1	8/8/2011	0.50		1	14	Aphanocapsa sp.	Cyanobacteria	164	2.51E+07	2.51E+04	1.30E+07	0.01
L-1	8/8/2011	0.50		1	14	Cylindrospermopsis raciborskii	Cyanobacteria	682	1.04E+08	1.04E+05	9.82E+08	0.98
L-1	8/8/2011	0.50		1	14	Merismopedia sp.	Cyanobacteria	16	2.44E+06	2.44E+03	1.27E+06	0.00
L-1	8/8/2011	0.50		1	14	Planktothrix agardhii	Cyanobacteria	8484	1.30E+09	1.30E+06	1.22E+10	12.21
L-1	8/8/2011	0.50		1	14	Pseudanabaena sp.	Cyanobacteria	370	5.65E+07	5.65E+04	5.33E+08	0.53
L-1	8/8/2011	0.50		1	1	Raphidiopsis curvata	Cyanobacteria	3	1.09E+05	1.09E+02	1.71E+06	0.00
						TOTAL		10426	1.59E+09	1.59E+06	1.96E+10	19.56
L-3	8/8/2011	0.50		1	10	Aulacoseira granulata	Bacillariophyta	17	3.64E+06	3.64E+03	1.34E+09	1.34
L-3	8/8/2011	0.50		1	1	Nitzschia acicularis	Bacillariophyta	1	3.63E+04	3.63E+01	9.37E+06	0.01
L-3	8/8/2011	0.50		1	10	Nitzschia sp.	Bacillariophyta	1	2.14E+05	2.14E+02	7.38E+07	0.07
L-3	8/8/2011	0.50		1	10	Stephanocyclus meneghiniana	Bacillariophyta	6	1.28E+06	1.28E+03	7.32E+08	0.73
L-3	8/8/2011	0.50		1	10	Actinastrum gracilimum	Chlorophyta	30	6.42E+06	6.42E+03	2.82E+08	0.28
L-3	8/8/2011	0.50		1	1	Closteriopsis acicularis	Chlorophyta	2	7.26E+04	7.26E+01	2.85E+07	0.03
L-3	8/8/2011	0.50		1	1	Dictyosphaerium pulchellum	Chlorophyta	10	2.00E+04	2.00E+01	4.71E+05	0.00
L-3	8/8/2011	0.50		1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	9.89E+06	0.01
L-3	8/8/2011	0.50		1	1	Scenedesmus dimorphus	Chlorophyta	7	2.54E+05	2.54E+02	2.64E+07	0.03
L-3	8/8/2011	0.50		1	10	Anabaena circinalis	Cyanobacteria	502	1.07E+08	1.07E+05	1.05E+10	10.54
L-3	8/8/2011	0.50		1	1	Aphanizomenon sp.	Cyanobacteria	430	1.56E+07	1.56E+04	5.52E+08	0.55
L-3	8/8/2011	0.50		1	1	Aphanocapsa sp.	Cyanobacteria	468	1.70E+07	1.70E+04	8.84E+06	0.01
L-3	8/8/2011	0.50		1	10	Cylindrospermopsis raciborskii	Cyanobacteria	898	1.92E+08	1.92E+05	1.21E+09	1.21
L-3	8/8/2011	0.50		1	10	Planktothrix agardhii	Cyanobacteria	8816	1.89E+09	1.89E+06	1.18E+10	11.84
L-3	8/8/2011	0.50		1	10	Pseudanabaena sp.	Cyanobacteria	56	1.20E+07	1.20E+04	1.13E+08	0.11
L-3	8/8/2011	0.50		1	1	Raphidiopsis curvata	Cyanobacteria	5	1.82E+05	1.82E+02	1.14E+06	0.00
						TOTAL		11250	2.24E+09	2.24E+06	2.68E+10	26.76
NW	8/8/2011	0.50		1	10	Aulacoseira granulata	Bacillariophyta	24	5.13E+06	5.13E+03	1.01E+09	1.01
NW	8/8/2011	0.50		1	1	Nitzschia acicularis	Bacillariophyta	2	7.26E+04	7.26E+01	2.19E+07	0.02
NW	8/8/2011	0.50		1	1	Nitzschia fruticosa	Bacillariophyta	3	1.09E+05	1.09E+02	2.35E+07	0.02
NW	8/8/2011	0.50		1	10	Nitzschia sp.	Bacillariophyta	1	2.14E+05	2.14E+02	3.08E+07	0.03
NW	8/8/2011	0.50		1	10	Stephanocyclus meneghiniana	Bacillariophyta	2	4.28E+05	4.28E+02	1.08E+08	0.11
NW	8/8/2011	0.50		1	1	Actinastrum gracilimum	Chlorophyta	8	1.60E+04	1.60E+01	8.32E+05	0.00
NW	8/8/2011	0.50		1	1	Dictyosphaerium pulchellum	Chlorophyta	31	1.13E+06	1.13E+03	7.07E+06	0.01
NW	8/8/2011	0.50		1	1	Oocystis parva	Chlorophyta	2	7.26E+04	7.26E+01	3.27E+06	0.00
NW	8/8/2011	0.50		1	1	Pediastrum duplex	Chlorophyta	9	3.27E+05	3.27E+02	3.50E+09	3.50
NW	8/8/2011	0.50		1	1	Scenedesmus dimorphus	Chlorophyta	4	8.00E+03	8.00E+00	9.42E+05	0.00
NW	8/8/2011	0.50		1	10	Anabaena circinalis	Cyanobacteria	321	6.87E+07	6.87E+04	6.74E+09	6.74
NW	8/8/2011	0.50		1	10	Aphanizomenon sp.	Cyanobacteria	394	8.43E+07	8.43E+04	2.98E+09	2.98
NW	8/8/2011	0.50		1	10	Aphanocapsa sp.	Cyanobacteria	822	1.76E+08	1.76E+05	9.14E+07	0.09
NW	8/8/2011	0.50		1	10	Cylindrospermopsis raciborskii	Cyanobacteria	432	9.24E+07	9.24E+04	5.80E+08	0.58
NW	8/8/2011	0.50		1	10	Planktothrix agardhii	Cyanobacteria	7862	1.68E+09	1.68E+06	1.58E+10	15.84
						TOTAL		9917	2.11E+09	2.11E+06	3.09E+10	30.94

8/8/2011 Phytoplankton Data (Continued…)

STATION	SAMPLE	SAMPLE	SAMPLE	SAMPLE	FIELDS	GENUS	DIVISION	TALLY	DENSITY (cells/L)		TOTAL BV	
	DATE	DEPTH	TIME	ALIQUOT (mL)				REP 1	REP 1	cells/mL	um^3/L	mm^3/L
NE	8/8/2011	Sonde Depth		1	12	Aulacoseira granulata	Bacillariophyta	31	5.53E+06	5.53E+03	1.72E+09	1.72
NE	8/8/2011	Sonde Depth		1	1	Discostella pseudostelligera	Bacillariophyta	5	1.82E+05	1.82E+02	4.28E+07	0.04
NE	8/8/2011	Sonde Depth		1	12	Nitzschia acicularis	Bacillariophyta	6	1.07E+06	1.07E+03	3.69E+08	0.37
NE	8/8/2011	Sonde Depth		1	1	Stephanocyclus meneghiniana	Bacillariophyta	2	7.26E+04	7.26E+01	1.10E+07	0.01
NE	8/8/2011	Sonde Depth		1	1	Actinastrum gracilimum	Chlorophyta	25	9.08E+05	9.08E+02	5.08E+07	0.05
NE	8/8/2011	Sonde Depth		1	12	Ankyra judayi	Chlorophyta	1	1.78E+05	1.78E+02	3.11E+07	0.03
NE	8/8/2011	Sonde Depth		1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	1.91E+07	0.02
NE	8/8/2011	Sonde Depth		1	1	Dictyosphaerium pulchellum	Chlorophyta	14	2.80E+04	2.80E+01	3.96E+05	0.00
NE	8/8/2011	Sonde Depth		1	1	Kirchneriella contorta	Chlorophyta	8	2.91E+05	2.91E+02	3.04E+06	0.00
NE	8/8/2011	Sonde Depth		1	1	Oocystis parva	Chlorophyta	4	1.45E+05	1.45E+02	2.61E+06	0.00
NE	8/8/2011	Sonde Depth		1	1	Quadrigula closterioides	Chlorophyta	10	2.00E+04	2.00E+01	6.91E+05	0.00
NE	8/8/2011	Sonde Depth		1	12	Scenedesmus dimorphus	Chlorophyta	6	1.07E+06	1.07E+03	1.26E+08	0.13
NE	8/8/2011	Sonde Depth		1	1	Tetraedron sp.	Chlorophyta	1	2.00E+03	2.00E+00	5.18E+06	0.01
NE	8/8/2011	Sonde Depth		1	12	Ochromonas sp.	Chrysophyta	8	1.43E+06	1.43E+03	2.69E+08	0.27
NE	8/8/2011	Sonde Depth		1	12	Anabaena circinalis	Cyanobacteria	24	4.28E+06	4.28E+03	1.51E+08	0.15
NE	8/8/2011	Sonde Depth		1	12	Aphanizomenon sp.	Cyanobacteria	151	2.69E+07	2.69E+04	9.51E+08	0.95
NE	8/8/2011	Sonde Depth		1	1	Aphanocapsa sp.	Cyanobacteria	57	2.07E+06	2.07E+03	8.67E+06	0.01
NE	8/8/2011	Sonde Depth		1	12	Cylindrospermopsis raciborskii	Cyanobacteria	1030	1.84E+08	1.84E+05	1.73E+09	1.73
NE	8/8/2011	Sonde Depth		1	12	Planktothrix agardhii	Cyanobacteria	7114	1.27E+09	1.27E+06	1.19E+10	11.94
NE	8/8/2011	Sonde Depth		1	12	Pseudanabaena sp.	Cyanobacteria	244	4.35E+07	4.35E+04	4.10E+08	0.41
NE	8/8/2011	Sonde Depth		1	1	Euglena sp.	Euglenophyta	2	4.00E+03	4.00E+00	2.76E+06	0.00
						TOTAL		8744	1.54E+09	1.54E+06	1.78E+10	17.85
SE	8/8/2011	0.50		1	6	Aulacoseira granulata	Bacillariophyta	52	1.85E+07	1.85E+04	6.81E+09	6.81
SE	8/8/2011	0.50		1	1	Discostella pseudostelligera	Bacillariophyta	1	3.63E+04	3.63E+01	3.08E+06	0.00
SE	8/8/2011	0.50		1	6	Nitzschia acicularis	Bacillariophyta	1	3.56E+05	3.56E+02	6.74E+07	0.07
SE	8/8/2011	0.50		1	1	Nitzschia fruticosa	Bacillariophyta	2	7.26E+04	7.26E+01	1.44E+07	0.01
SE	8/8/2011	0.50		1	6	Stephanocyclus meneghiniana	Bacillariophyta	15	5.35E+06	5.35E+03	9.07E+08	0.91
SE	8/8/2011	0.50		1	1	Actinastrum gracilimum	Chlorophyta	8	2.91E+05	2.91E+02	1.86E+07	0.02
SE	8/8/2011	0.50		1	1	Closteriopsis acicularis	Chlorophyta	1	3.63E+04	3.63E+01	2.32E+07	0.02
SE	8/8/2011	0.50		1	6	Crucigenia quadrata	Chlorophyta	32	1.14E+07	1.14E+04	3.42E+08	0.34
SE	8/8/2011	0.50		1	1	Dictyosphaerium pulchellum	Chlorophyta	4	1.45E+05	1.45E+02	1.37E+07	0.01
SE	8/8/2011	0.50		1	1	Kirchneriella contorta	Chlorophyta	17	6.17E+05	6.17E+02	6.46E+06	0.01
SE	8/8/2011	0.50		1	6	Oocystis parva	Chlorophyta	8	2.85E+06	2.85E+03	1.54E+08	0.15
SE	8/8/2011	0.50		1	1	Pediastrum duplex	Chlorophyta	21	4.20E+04	4.20E+01	6.68E+07	0.07
SE	8/8/2011	0.50		1	1	Pyramimonas tetrarhynchus	Chlorophyta	1	3.63E+04	3.63E+01	7.76E+06	0.01
SE	8/8/2011	0.50		1	1	Scenedesmus dimorphus	Chlorophyta	7	2.54E+05	2.54E+02	3.23E+07	0.03
SE	8/8/2011	0.50		1	1	Scenedesmus quadricauda	Chlorophyta	4	8.00E+03	8.00E+00	2.26E+05	0.00
SE	8/8/2011	0.50		1	6	Ochromonas sp.	Chrysophyta	3	1.07E+06	1.07E+03	2.62E+08	0.26
SE	8/8/2011	0.50		1	6	Cryptomonas sp.	Cryptophyta	6	2.14E+06	2.14E+03	6.85E+08	0.69
SE	8/8/2011	0.50		1	6	Anabaena circinalis	Cyanobacteria	124	4.42E+07	4.42E+04	4.34E+09	4.34
SE	8/8/2011	0.50		1	6	Aphanizomenon sp.	Cyanobacteria	174	6.20E+07	6.20E+04	2.19E+09	2.19
SE	8/8/2011	0.50		1	1	Aphanocapsa sp.	Cyanobacteria	248	9.01E+06	9.01E+03	4.68E+06	0.00
SE	8/8/2011	0.50		1	6	Cylindrospermopsis raciborskii	Cyanobacteria	696	2.48E+08	2.48E+05	2.34E+09	2.34
SE	8/8/2011	0.50		1	6	Merismopedia sp.	Cyanobacteria	280	9.98E+07	9.98E+04	5.19E+07	0.05
SE	8/8/2011	0.50		1	6	Planktothrix agardhii	Cyanobacteria	3378	1.20E+09	1.20E+06	1.13E+10	11.34
SE	8/8/2011	0.50		1	6	Pseudanabaena sp.	Cyanobacteria	36	1.28E+07	1.28E+04	3.03E+07	0.03
SE	8/8/2011	0.50		1	1	Raphidiopsis curvata	Cyanobacteria	38	1.38E+06	1.38E+03	1.30E+07	0.01
SE	8/8/2011	0.50		1	1	Euglena sp.	Euglenophyta	2	7.26E+04	7.26E+01	2.74E+07	0.03
						TOTAL		5159	1.72E+09	1.72E+06	2.98E+10	29.76
SW	8/8/2011	0.50		1	8	Discostella pseudostelligera	Bacillariophyta	4	1.07E+06	1.07E+03	1.61E+08	0.16
SW	8/8/2011	0.50		1	8	Nitzschia acicularis	Bacillariophyta	4	1.07E+06	1.07E+03	5.37E+08	0.54
SW	8/8/2011	0.50		1	8	Nitzschia fruticosa	Bacillariophyta	6	1.60E+06	1.60E+03	3.68E+08	0.37
SW	8/8/2011	0.50		1	8	Stephanocyclus meneghiniana	Bacillariophyta	10	2.67E+06	2.67E+03	1.05E+09	1.05
SW	8/8/2011	0.50		1	1	Actinastrum gracilimum	Chlorophyta	5	1.82E+05	1.82E+02	7.99E+06	0.01
SW	8/8/2011	0.50		1	8	Ankyra judayi	Chlorophyta	6	1.60E+06	1.60E+03	1.21E+08	0.12
SW	8/8/2011	0.50		1	1	Dictyosphaerium pulchellum	Chlorophyta	24	4.80E+04	4.80E+01	6.79E+05	0.00
SW	8/8/2011	0.50		1	1	Scenedesmus dimorphus	Chlorophyta	4	1.45E+05	1.45E+02	6.39E+06	0.01
SW	8/8/2011	0.50		1	8	Ochromonas sp.	Chrysophyta	2	5.35E+05	5.35E+02	1.31E+08	0.13
SW	8/8/2011	0.50		1	8	Rhodomonas sp.	Cryptophyta	6	1.60E+06	1.60E+03	6.10E+09	6.10
SW	8/8/2011	0.50		1	8	Aphanizomenon sp.	Cyanobacteria	198	5.29E+07	5.29E+04	1.87E+09	1.87
SW	8/8/2011	0.50		1	8	Aphanocapsa sp.	Cyanobacteria	842	2.25E+08	2.25E+05	1.17E+08	0.12
SW	8/8/2011	0.50		1	8	Aphanothece sp.	Cyanobacteria	20	5.35E+06	5.35E+03	3.36E+07	0.03
SW	8/8/2011	0.50		1	8	Cylindrospermopsis raciborskii	Cyanobacteria	626	1.67E+08	1.67E+05	1.58E+09	1.58
SW	8/8/2011	0.50		1	8	Planktothrix agardhii	Cyanobacteria	6982	1.87E+09	1.87E+06	1.76E+10	17.59
SW	8/8/2011	0.50		1	8	Phacus sp.	Euglenophyta	1	2.67E+05	2.67E+02	8.16E+08	0.82
						TOTAL		8740	2.33E+09	2.33E+06	3.05E+10	30.48