Blue-green algae in northern Indiana lakes: An analysis of the algal toxin, microcystin, over 2010-2013 in lakes of Kosciusko County, Ind.

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Executive Summary

One of the most alarming current human health concerns related to lakes is the presence of blue-green algae toxins. Health guidelines have been established which are based on concentrations of the common blue-green algae toxin called microcystin as well as on algae counts which quantify and identify individual types of algae and groups such as blue-green algae. Alarming results from a small 2010 pilot study including a few Kosciusko County lakes prompted the Center for Lakes & Streams at Grace College to launch a comprehensive research project to determine the extent and severity of the common blue-green algae toxin, microcystin, in local lakes. Observed microcystin concentrations over 2010-2013 indicate that microcystin does not pose a consistent health threat at the present time in Kosciusko County lakes. However, algae count results may indicate higher human health threats from other blue-green algae toxins which were not tested for in the present study. Furthermore, our research indicates that microcystin detections are more common but currently at lower levels in Kosciusko County lakes compared to national and regional data which demonstrates a potential for major microcystin problems in the future under the right conditions. Visual cues of blue-green algae (such as water clarity as measured by secchi disk) are helpful but not reliable indicating that a better method of determining the safety of the water is necessary. A unique pigment to blue-green algae, phycocyanin, can be measured by a simple hand-held device in the field and was found to be the most promising predictor for both microcystin and algae counts. The present study warrants further research with Kosciusko County lakes in order to protect human health, including ongoing monitoring, testing of new prediction techniques, and exploration of additional toxin threats.

Keywords: blue-green algae, Kosciusko County, nutrients, streams, lakes, microcystin

Introduction

One of the most alarming current human health concerns related to lakes is the presence of blue-green algae toxins. Funari and Testai (2008) review the state of present knowledge in the area of blue-green algae toxins as a human health threat. They describe several different classes of toxins which can be hapatotoxins (affecting liver), neurotoxins (affecting nervous system), cytotoxins (affecting specialized cells of the body), gastrointestinal toxins (affecting digestive system), and skin irritants. Research has shown that high levels of these toxins can be lethal to humans, and emerging research is indicating that chronic low-level toxin exposure can also lead to terminal health problems. Toxin exposure can come from less serious skin exposure to more serious ingestion (Funari and Testai, 2008). Research on two lakes in California has even shown that exposure can occur through inhalation of toxin aerosols near lakes with high blue-green algae populations (Backer et al., 2009). More recent research by Manganelli et al. (2010) has also demonstrated that more toxic blue-green algae can live farther below the water surface making visual detection difficult.

To protect human health, the World Health Organization and the Indiana Department of Environmental Management have set human health guidelines related to blue-green algae in recreational waters. These guidelines are based on concentrations of the common blue-green algae toxin called microcystin as well as on algae counts which quantify and identify individual types of algae and groups such as blue-green algae. The guidelines prescribe low, medium, and high health risks based on either microcystin or blue-green algae counts, and they suggest precautions people should take based on each health risk category. At high risk levels, for example, both organizations suggest avoiding contact with the water.

Blue-green algae toxins have been identified as a human health problem recently in Kosciusko County. In 2007, the U.S. EPA conducted an assessment of the nation's lakes and found detectable levels of algal toxins in 68 percent of Indiana lakes, compared to the national average of 32 percent. A pilot study including seven Kosciusko County lakes was conducted in September 2009 and found moderate blue-green algae toxin levels in four of the lakes sampled and high levels in Lake Wawasee according to guidelines published by the World Health Organization and the Indiana Department of Environmental Management.

Early research by the Center for Lakes & Streams, partially funded by K21 Health Foundation, in 2010 and 2011 found detectable levels of blue-green algae toxins in 40 of the 44 lakes sampled. Four lakes, Big Chapman, Dewart, Muskelunge, and Wawasee, had toxin levels above the Indiana Department of Environmental Management safety threshold, advising the public to reduce recreational contact with water from those lakes. At that time, the center found some promising results with predicting toxin levels and potentially reducing these levels in the future, but these relationships were inconsistent among some lakes and prompted further study.

The present study focuses on the human health threat of blue-green algae through the production of the common toxin microcystin in the lakes of Kosciusko County. Data from 2010-2013 was used in this analysis, including in-lake measurements at all depths, inflowing stream measurements, and near shore and open lake sampling. The goals of the study were to accurately characterize the human health threat of microcystin in local lakes and explore ways to predict toxin occurrence. Part of this study included identification and quantification of algae species in a small subset of the lakes to further aide in characterization and prediction of microcystin threats.

Methods

Study area

Kosciusko County contains 104 lakes greater than 5 acres in surface area (Figure 1). Most of these lakes are glacially formed and have varying lake bottom substrates (see www.lakes.grace.edu for individual lake details). All lakes with a surface area greater than 25 acres were selected for near shore sampling in the present study by the Center for Lakes & Streams at Grace College (Table 1). The 13 all-sports lakes had two sampling sites – one near shore and one off shore. The near shore sampling sites were at representative swimming areas. The off shore, or open lake, sampling sites were at the deepest point of the lake. Syracuse Lake had two public swimming beaches, so both of these near shore sites were sampled as well as an off shore site.

Field sampling

Lake sampling was conducted at monthly intervals during August-September in 2010 and May-September in 2011 and then at biweekly intervals during May-September in both 2012 and 2013. All lakes were sampled within the same week to allow comparisons between lakes at a given time.

Near shore sampling occurred at all 44 lakes included in the study (Table 1), including two near shore sites at the public swimming beaches of Syracuse Lake. At each site a Secchi depth measurement was made to determine water clarity. Next, dissolved oxygen, conductivity, pH, and water temperature were measured at the surface, 0.5 m, and 1 m depths using a Hydrolab Quanta meter. Finally, an integrated water sample from the surface to bottom was taken using a vertical Van Dorn sampler. This integrated water sample was used for the blue-green algae toxin (microcystin) samples for later lab analysis as well as blue-green algae pigment (phycocyanin) analyses (only during 2013) using a Turner Designs AquaFluor fluorometer in the field.

Open lake sampling occurred at thirteen all-sports lakes included in the study (Table 1). At each site a Secchi depth measurement was made to determine water clarity. Next, dissolved oxygen, conductivity, pH, and water temperature were measured at each meter from the surface to the lake bottom. An integrated water sample from the surface to 2 m depth was taken using a vertical Van Dorn sampler. This integrated water sample was used for the blue-green algae toxin (microcystin) samples for later lab analysis as well as blue-green algae pigment (phycocyanin) analyses (only during 2013) using a Turner Designs AquaFluor fluorometer in the field. In 2012 and 2013, this integrated water sample was also used for algae count samples for Dewart, James, Wawasee, Winona, and Yellow Creek lakes which were collected for later lab analysis.

Beginning in 2011, a multi-parameter sample was added which included suspended solids, conductivity, chloride, fluoride, sulfate, silicon dioxide, total phosphorus (TP), soluble reactive phosphorus, total nitrogen (TN), total Kjeldahl nitrogen, ammonia, nitrate, and nitrite.

Samples were taken at open lake sites at a depth of 1 m below the lake surface and 1 m above the lake bottom using a vertical Van Dorn sampler.

Stream sampling occurred in the week preceding lake sampling during 2012 and 2013 for inflowing streams to Dewart, James, Wawasee, Winona, and Yellow Creek lakes (Table 2). A multi-parameter sample was taken from the center of the stream which included same parameters as listed above for lake samples. Next, dissolved oxygen, conductivity, pH, and water temperature were measured in the center of the stream using a Hydrolab Quanta meter. Total stream flow was calculated from measurements across the entire cross section of the stream with an OTT MF Pro Flow Meter.

Lab analysis

Water samples obtained in the field for later lab analysis were stored in the dark near 2° C until returning to Grace College each day. Microcystin, multi-parameter, and algae count samples were kept at 2° C. All samples were transported to the National Center for Water Quality Research at Heidelberg University for analysis within 7 days of field sampling.

Data analysis

Data was collected in the field and immediately recorded electronically throughout project to avoid any loss of data. Data was always checked twice for accuracy when transferred from field log sheets to computer spreadsheets. Several microcystin samples yielded concentrations below detection limits of 0.15 ppb. To aid in data summarization and statistical analyses, these data values were recorded as 0.075 ppb.

Results and Discussion

Algae toxin (microcystin)

Results for the blue-green algae toxin microcystin showed several interesting patterns and some sporadic and unexpected levels in certain lakes. Over the four-year study, there were 1,068 samples collected for microcystin analysis. Of these, 468 (44%) samples had detectable levels of microcystin found in them. By comparison, a 2007 study of 1,028 lakes across the U.S. found that 38% and 23% of lakes had detectable levels of microcystin nationally and in the Upper Midwest region, respectively (EPA, 2009). Kosciusko County lakes in the present study had an average microcystin concentration of 0.32 ppb, while the 2007 nation-wide study found averages of 1.00 ppb nationally and 0.56 ppb in the Upper Midwest region. From these overall microcystin results, we find that microcystin is more common but at lower levels in Kosciusko County lakes compared to other lakes in our region or nationally.

Average microcystin levels in Kosciusko County lakes varied over time during the four-year study. There was wide variation among the years of the study (Table 3). It was expected that 2012 would be lower compared to other years since it was a drought year which would lead to stream nutrient loads to these lakes being relatively small in 2012. There is also variation among the five months that were sampled for this study (Table 4). June and July microcystin concentrations were approximately double those observed in the other three months on average.

Microcystin levels also widely varied across lakes during the study period. Among the 13 all-sport lakes, Lake Wawasee and Dewart Lake had the highest average microcystin concentrations at 0.67 and 0.66 ppb, respectively, while Winona and Camelot lakes had the lowest average concentrations at 0.10 ppb for both lakes (Figure 2). Low toxin levels in Camelot was expected due to the low productivity of that lake in general and the lack of inflowing streams to bring in nutrients to promote algae growth. However, lower toxin levels in Winona compared to Dewart and Wawasee was surprising as the latter two lakes are typically less productive with relatively less nutrient inputs from inflowing streams and thus lower productivity of algae and other plants.

The Indiana Department of Environmental Management has set a threshold of 4 ppb of microcystin for reducing recreational contact with water for human health concerns. The World Health Organization has set a threshold for moderate health risk of 10 ppb and high health risk of 20 ppb. Lake Wawasee had a toxin concentration of 63 ppb in 2009 which prompted the present study. During 2010-2013, there were seven lakes which exceeded this 4 ppb threshold briefly – Big Chapman (4.5 ppb in July 2011), Dewart (5.9 ppb in June 2011), Diamond (5.3 ppb in May 2011), McClure's (4.2 ppb in May 2013), Muskellunge (12 ppb in August 2010), Syracuse (5.0 ppb in June 2013), and Wawasee (5.1 ppb in July 2011). According to the World Health Organization guidelines, only Muskellunge Lake was in the moderate health risk range, and none of the 1,068 samples taken during the 2010-2013 study period were in the high health risk range.

Microcystin concentrations were tested against several potential predictor variables with varying success. Relationships varied widely among lakes, indicating additional factors or combinations of factors were influencing blue-green algae toxins which were not included in the present study. For example, stream inflow measurements and most in-lake variables had no correlation with microcystin levels in the lakes, but there appears to be some influence of nitrate and phycocyanin concentrations in the epilimnion, dissolved oxygen in the hypolimnion, and Secchi disk measurements. Results from 13 all-sports lakes where near surface nitrate concentrations were measured show that there seems to be a higher likelihood of elevated microcystin levels with lower nitrate levels in these lakes (Figure 3). This is contrary to findings from a recent experimental lab study which showed blue-green algae produce less toxin at low nitrate concentrations (Harke and Gobler, 2013). New work by Molot et al. (2014) demonstrates that blue-green algae are controlled by ferrous iron coming from anoxic sediments since these algae have the ability to migrate down near the bottom to acquire this form of iron. Data from the present study on Kosciusko County lakes supports this mechanism as elevated microcystin concentrations consistently follow near-zero dissolved oxygen levels at the lake bottoms. Secchi disk measurements seem to show a threshold of 8 ft such that there are no instances where microcystin levels were over 2 ppb when Secchi disk measurements were greater than 8 ft (Figure 4).

The most promising predictor variable for microcystin from the present study was phycocyanin as quantified by the hand-held flourometer in the field. Statistical analysis of the data using Partial Least Squares Regression showed that phycocyanin has a predictive nature to microcystin but that more data was needed to confirm this relationship. This relationship seems to be lake specific, and results are particularly promising for certain lakes like Beaver Dam Lake with an R^2 of 84.8% (Figure 5). These results are as expected since blue-green algae uniquely contain this phycocyanin pigment which would lead to a good relationship between these two variables. Researchers in Ohio have found phycocyanin as a good indicator of microcystin threats as well (Marion et al., 2012).

Algae counts

Compared to the blue-green algae toxin results for these Kosciusko County lakes, the algae count results are potentially more concerning for human health considerations. Of the 92 algae count samples taken over 2012 and 2013, 90 (98%) of the samples contained blue-green algae. For reference, the Indiana Department of Environmental Management and the World Health Organization both consider 20,000-100,000 cells/ml of blue-green algae in the moderate human health risk zone and over 100,000 cells/ml as high risk for human health. Using these guidelines, the number of samples in the present study falling into the moderate or high risk categories together was 38 (41%) and the national reference from the 2007 EPA study was only 27% (EPA, 2009). Clearly, blue-green algae are more common at higher health risk levels in Kosciusko County lakes compared to national statistics.

Like microcystin results, algae counts are sporadic over time. The average blue-green algae count across the five lakes where measurements were taken was 51,014 cells/ml for 2012 and increased to 241,066 cells/ml for 2013. Algae counts were more than over four times higher in 2013 compared to the previous drought year of 2012. Monthly averages also show wide variation of strongly increasing blue-green algae counts over May thru September (Table 5).

There was also wide variation even among the subset of five lakes where algae counting was done (Figure 6). Winona Lake had the most high risk blue-green algae counts of the five lakes, and Wawasee and Dewart lakes only had moderate risk counts over 2012 and 2013. In fact, Winona Lake samples were in moderate or high health risk category 56% of the time. Both Winona and Yellow Creek lakes had blue-green algae cell counts of over 1,000,000 cells/ml in September 2012. These results show that microcystin concentrations and blue-green algae counts are not necessarily related. For example, Lake Wawasee has a much higher average microcystin concentration than Winona Lake even though Winona Lake has a much higher incidence of high blue-green algae counts. The reason for this is seen in the specific types of algae that are found in each of these lakes. Even though Lake Wawasee has a relatively low blue-green algae count, the dominant algae during the higher microcystin concentration that we found was *Microsystis aeruginosa* which is a known microsystin producer. However, Winona Lake has high blue-green algae counts with low microcystin concentrations because three of the four dominant algae species do not even produce microcystin – they produce other toxins that were not measured in this present study (Figure 7).

Algae count results were also tested against several other variables with varying success. Algae counts were somewhat surprisingly not a good predictor for microcystin. This is reasonable upon further analysis since blue-green algae make several other toxins in addition to microcystin, and certain species of blue-green algae cannot make microcystin at all. To predict blue-green algae counts, water clarity as measured by Secchi disk was helpful in some cases. Overall, there seems to be a threshold relationship where Secchi disk measurements over 10 ft leave little likelihood for moderate risk based on blue-green algae counts and World Health Organization guidelines, and Secchi disk measurements over 5 ft leave little likelihood for high risk based on blue-green algae counts (Figure 8). For Winona Lake specifically, Secchi disk measurements do not seem to be a good predictor of blue-green algae counts (Figure 9). Nutrient ratios based on nitrogen to phosphorus (N:P) showed a range from 30-60 where blue-green algae counts had the potential to achieve high levels (Figure 10). This result does not support previous work done by Smith (1983) who found global blue-green algae populations were controlled by N:P ratios such that blue-green algae were rare when N:P > 29. More recent work by Downing et al. (2001) suggests that N:P ratios are not as important in controlling blue-green algae populations compared to nutrient concentrations and total algal biomass, but our data suggests that N:P ratios are the most important of these variables to blue-green algae counts. These comparisons across studies indicate that these relationships are likely lake- and region-specific.

The most promising predictor variable for blue-green algae counts from the present study was phycocyanin as quantified by the hand-held flourometer in the field (Figure 11). With more data to allow for these relationships to be developed for individual lakes, this has strong possibilities for predicting blue-green algae counts in local lakes.

Implications

These research results have several important implications for Kosciusko County and other Midwestern U.S. counties with lakes. First, observed microcystin concentrations indicate that microcystin does not pose a consistent health threat at the present time in Kosciusko County lakes. However, algae count results may indicate higher human health threats from other blue-green algae toxins which were not tested for in the present study. Furthermore, our research indicates that microcystin detections are more common but currently at lower levels in Kosciusko County lakes compared to national and regional data, which demonstrates a potential for major microcystin problems in the future under the right conditions.

Next, this study confirms that prediction of blue-green algae counts or microcystin concentrations is difficult but potentially possible in the future. Visual cues of blue-green algae (such as water clarity as measured by Secchi disk) are helpful but not reliable. The unique pigment in blue-green algae, phycocyanin, is the most promising predictor for both microcystin and algae counts, although more data will need to be collected to confirm this relationship.

The present study also demonstrates that each lake needs to be studied and managed separately. Data collected to date on Kosciusko County lakes show wide variation in algae counts and microcystin levels that do not correlate well with the predictor variables that were tested across all the lakes together. Solutions to human health problems in one lake may not be valid for another adjacent lake, and it is not enough to just study one lake in the county to get a general synopsis of Kosciusko County lakes overall.

Finally, the present study implies that further work needs to be done with Kosciusko County lakes in order to protect human health. These lakes need to be monitored with an ongoing effort, new prediction techniques need to be tested, and additional toxin threats need to be explored.

Future work

This research has prompted several immediate actions. First, the Center for Lakes & Streams at Grace College is sending a lab technician for training to give Grace College the algae counting capacity on campus for quick response to algae health threats. Second, the Kosciusko Health Department has already acquired laboratory equipment with the capacity to test for several toxins locally, including microcystin and other toxins known to be produced by types of algae identified in the present study in our lakes. Finally, the center will work with the K21 Health Foundation and other stakeholders to notify the general public about these research findings and to further educate the public about blue-green algae.

In addition to these immediate actions, this present study also demonstrates that additional monitoring and research is needed in Kosciusko County lakes into the future. Some level of microcystin monitoring with rapid results is critical going forward to alert county residents of potential health threats. A focused study on 5-10 lakes to further test the predictive ability of the phycocyanin pigment using a hand-held flourometer is warranted based on the promising results in the present study. With the discovery of high algae counts in lakes like Winona and Yellow Creek that are made up of species known to produce additional toxins beyond microcystin, an exploratory survey of a broad cross-section of lakes in Kosciusko County is likely needed to test for additional blue-green algae toxins which may be present.

Conclusion

Observed microcystin concentrations over 2010-2013 indicate that microcystin does not pose a consistent health threat at the present time in Kosciusko County lakes. However, algae count results may indicate higher human health threats from other blue-green algae toxins which were not tested for in the present study. Furthermore, our research indicates that microcystin detections are more common but currently at lower levels in Kosciusko County lakes compared to national and regional data, which demonstrates a potential for major microcystin problems in the future under the right conditions. Visual cues of blue-green algae (such as water clarity as measured by Secchi disk) are helpful but not reliable. The unique pigment in blue-green algae, phycocyanin, as measured by a hand-held flourometer in the field is the most promising predictor for both microcystin and algae counts. The present study warrants further research with Kosciusko County lakes in order to protect human health, including ongoing monitoring, testing of new prediction techniques, and exploration of additional toxin threats.

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Tables

Table 1. Lake sampling sites included in present study.

Lake Name	Site ID	Site Type	Latitude (degrees)	Longitude (degrees)	Lake Size (acres)
Backwater Lake	BAC	Near shore	41.31615	-85.67	189
Beaver Dam Lake	BEA1	Near shore	41.09133	-85.972	146
Beaver Dam Lake	BEA2	Open lake	41.09157	-85.9752	146
Big Barbee Lake	BBA1	Near shore	41.28802	-85.7024	304
Big Barbee Lake	BBA2	Open lake	41.28647	-85.7063	304
Big Chapman Lake	BCH1	Near shore	41.2875	-85.7784	414
Big Chapman Lake	BCH2	Open lake	41.28149	-85.7937	414
Boner Lake	BON	Near shore	41.43108	-85.7209	40
Caldwell Lake	CAL	Near shore	41.12424	-85.9023	45
Camelot Lake	CAM1	Near shore	41.41694	-85.7934	30
Camelot Lake	CAM2	Open lake	41.41126	-85.7934	30
Carr Lake	CAR	Near shore	41.15819	-85.8603	79
Center Lake	CEN	Near shore	41.2431	-85.8555	120
Crystal Lake	CRY	Near shore	41.23516	-85.9884	68
Dewart Lake	DEW1	Near shore	41.37385	-85.7827	551
Dewart Lake	DEW2	Open lake	41.37209	-85.7759	551
Diamond Lake	DIA	Near shore	41.10541	-85.9338	79
Goose Lake	GOO	Near shore	41.18977	-85.883	28
Hill Lake	HIL	Near shore	41.10752	-85.9088	70
Hoffman Lake	HOF	Near shore	41.27538	-85.99	180
Irish Lake	IRI	Near shore	41.29276	-85.7331	182
James Lake	JAM1	Near shore	41.31745	-85.7231	282
James Lake	JAM2	Open lake	41.32078	-85.7259	182
Kuhn Lake	KUH	Near shore	41.28099	-85.6942	137
Lake Tippecanoe	TIP1	Near shore	41.32446	-85.742	768
Lake Tippecanoe	TIP2	Open lake	41.33408	-85.7688	768
Lake Wawasee	WAW1	Near shore	41.38576	-85.6848	3410
Lake Wawasee	WAW2	Open lake	41.24249	-85.4251	3410
Little Barbee Lake	LBA	Near shore	41.28867	-85.7205	74
Little Chapman Lake	LCH	Near shore	41.27188	-85.787	121
Loon Lake	LOO	Near shore	41.08316	-85.9666	40
McClure's Lake	MCL	Near shore	41.08123	-85.9511	34
Muskellunge Lake	MUS	Near shore	41.17076	-85.853	32
Oswego Lake	OSW1	Near shore	41.3299	-85.7837	83
Oswego Lake	OSW2	Open lake	41.32506	-85.7856	83

Lake Name	Site ID	Site Type	Latitude (degrees)	Longitude (degrees)	Lake Size (acres)
Palestine Lake	PAL	Near shore	41.16908	-85.9397	290
Papakeechie Lake	PAP	Near shore	41.3716	-85.6667	189
Pike Lake	PIK	Near shore	41.24788	-85.8421	230
Ridinger Lake	RID	Near shore	41.26077	-85.6644	141
Rock Lake	ROC	Near shore	41.04129	-85.9761	56
Sawmill Lake	SAW	Near shore	41.30028	-85.7294	56
Sechrist Lake	SEC	Near shore	41.29752	-85.7169	105
Sellers Lake	SEL	Near shore	41.15295	-85.7474	32
Shock Lake	SHK	Near shore	41.35548	-85.6928	32
Shoe Lake	SHO	Near shore	41.3065	-85.7495	43
Silver Lake	SIL	Near shore	41.07897	-85.8988	102
Spear Lake	SPE	Near shore	41.35709	-85.6648	40
Stanton Lake	STA	Near shore	41.32293	-85.7699	30
Syracuse Lake	SYR1A	Near shore	41.42664	-85.747	414
Syracuse Lake	SYR1B	Near shore	41.43001	-85.7493	414
Syracuse Lake	SYR2	Open lake	41.42848	-85.7379	414
Waubee Lake	WAU	Near shore	41.39492	-85.8357	187
Webster Lake	WEB1	Near shore	41.32259	-85.6932	585
Webster Lake	WEB2	Open lake	41.32858	-85.6933	585
Winona Lake	WIN1	Near shore	41.22225	-85.8224	562
Winona Lake	WIN2	Open lake	41.22232	-85.8306	562
Yellow Creek Lake	YEL1	Near shore	41.10729	-85.9521	150
Yellow Creek Lake	YEL2	Open lake	41.1037	-85.9573	150

Table 2. Stream sampling sites included in present study.

Stream Name	Site ID	Lake Connection	Latitude (degrees)	Longitude (degrees)
Cherry Creek	CHE	Winona Lake	41.22136	-85.8207
Keefer-Evans	KEE	Winona Lake	41.21385	-85.8231
Peterson Ditch	PET	Winona Lake	41.21259	-85.8289
Diamond Creek	DIA	Yellow Creek	41.10406	-85.9451
Yellow Creek Inflow	YCI	Yellow Creek	41.10812	-85.9559
Cable Run	CAB	Dewart Lake	41.35754	-85.7492
Tippecanoe River	TIP	James Lake	41.31472	-85.7143
Papakeechie Outlet	PAP	Lake Wawasee	41.37658	-85.6706
Turkey Creek Inflow	TUR	Lake Wawasee	41.38268	-85.6670
Dillan Creek	DIL	Lake Wawasee	41.39501	-85.6617
Launer Creek	LAU	Lake Wawasee	41.40445	-85.6638

Table 3. Average microcystin (MC) concentrations (in ppb) for each year of the four-year study across all Kosciusko County lakes.

Year	MC (ppb)
2010	0.37
2011	0.47
2012	0.18
2013	0.33

Table 4. Average microcystin (MC) concentrations (in ppb) by month during the four-year study across all Kosciusko County lakes.

Month	MC (ppb)
May	0.23
June	0.48
July	0.45
August	0.27
September	0.22

Table 5. Average blue-green algae counts (in cells/ml) by month during 2012 and 2013 for Dewart, James, Wawasee, Winona, and Yellow Creek lakes.

Month	Blue-green algae counts (cells/ml)
May	29,263
June	49,221
July	133,653
August	228,030
Sept.	368,918

Figures

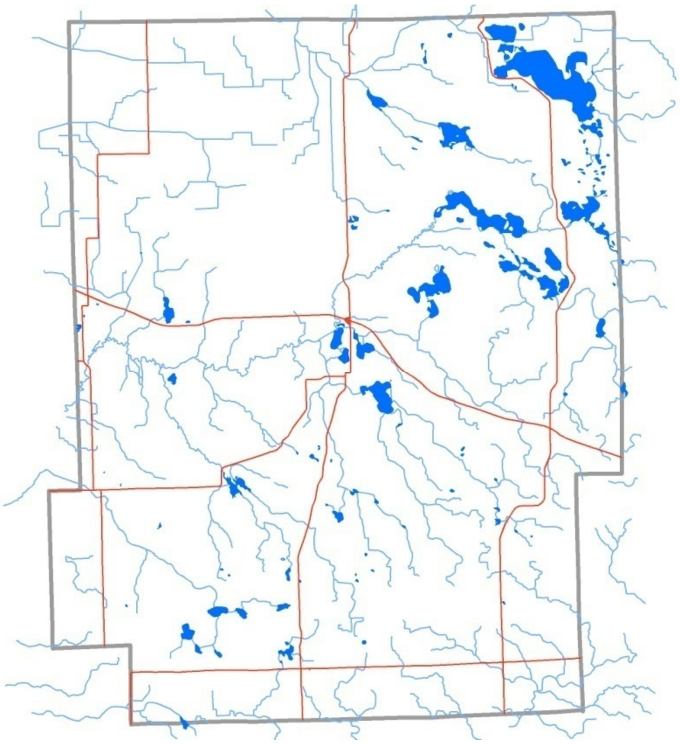

Figure 1. Map of Kosciusko County showing locations of lakes.

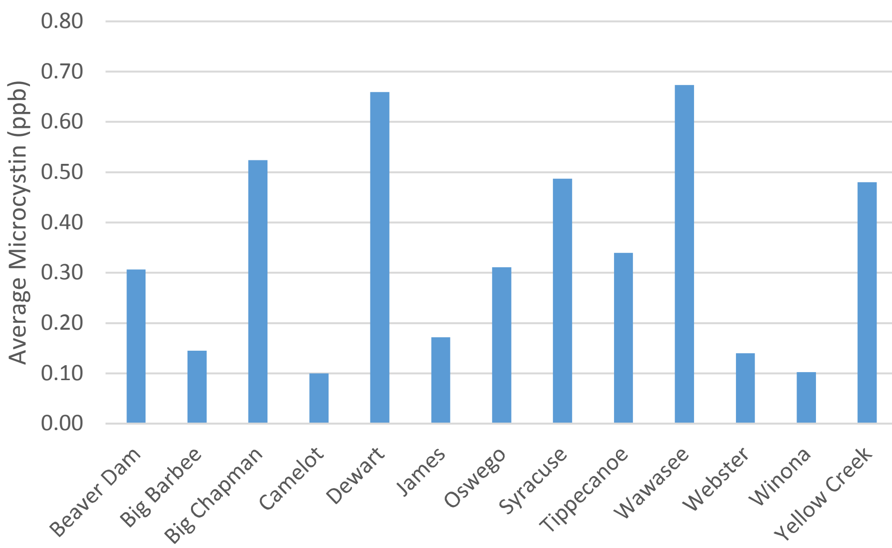

Figure 2. Average microcystin concentrations (in ppb) for 13 all-sports lakes in Kosciusko County over study period of 2010-2013.

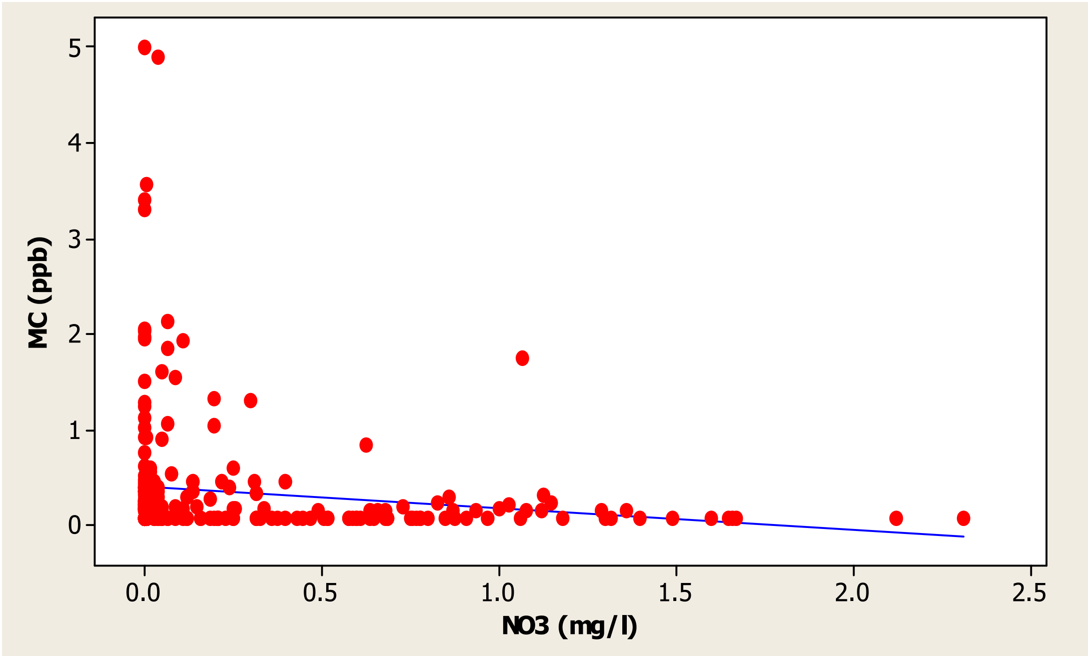

Figure 3. Microcystin (MC) concentrations (in ppb) and nitrate (NO3) concentrations (in mg/l) near surface for 13 all-sports lakes in Kosciusko County over 2010-2013. Blue line shows negative trend of data indicating lower microcystin levels with increasing nitrate levels.

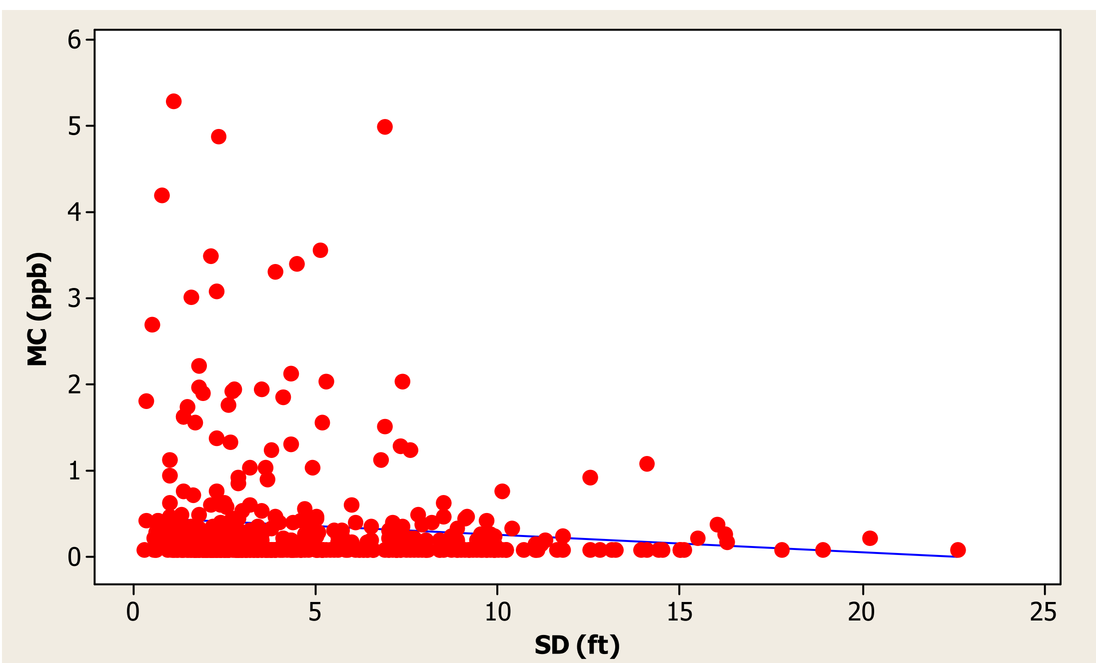

Figure 4. Microcystin (MC) concentrations (in ppb) and Secchi disk (SD) measurements (in ft) for 13 all-sports lakes in Kosciusko County over 2010-2013. Blue line shows negative trend of data indicating lower microcystin levels with increasing water clarity.

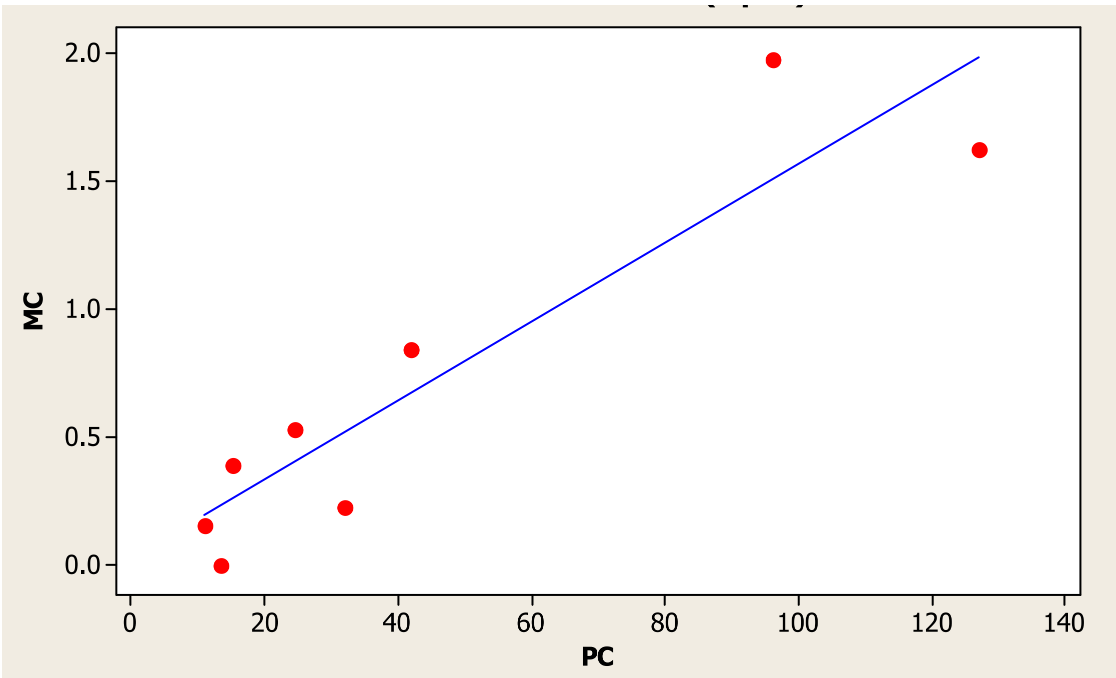

Figure 5. Microcystin (MC) concentrations (in ppb) and phycocyanin (PC) concentrations (in ppb) for Beaver Dam Lake in 2013. Blue line shows positive trend (R^2 = 84.8%) of data indicating prediction of increased microcystin levels with increasing phycocyanin.

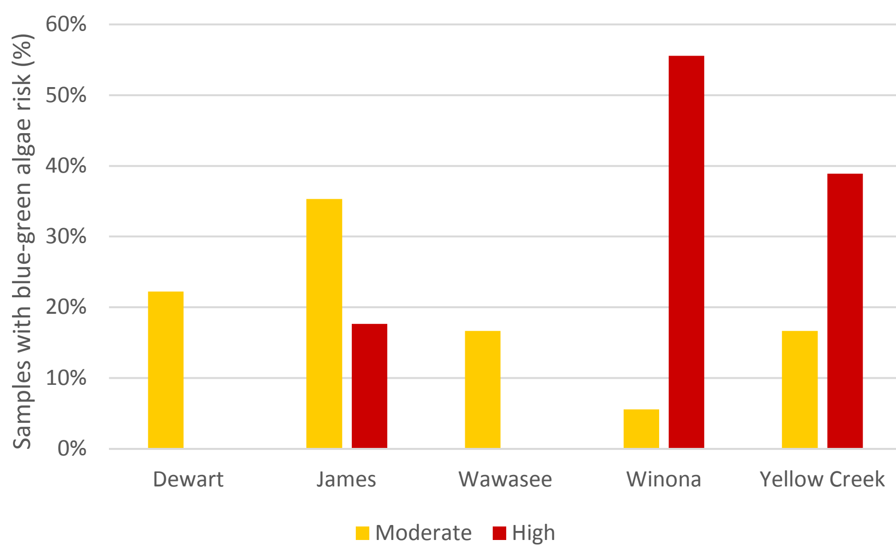

Figure 6. Portion (in %) of samples taken that fell within moderate and high human health risk guidelines for five lakes in Kosciusko County over study period of 2012-2013. Human health risk guidelines set by World Health Organization and the Indiana Department of Environmental Management.

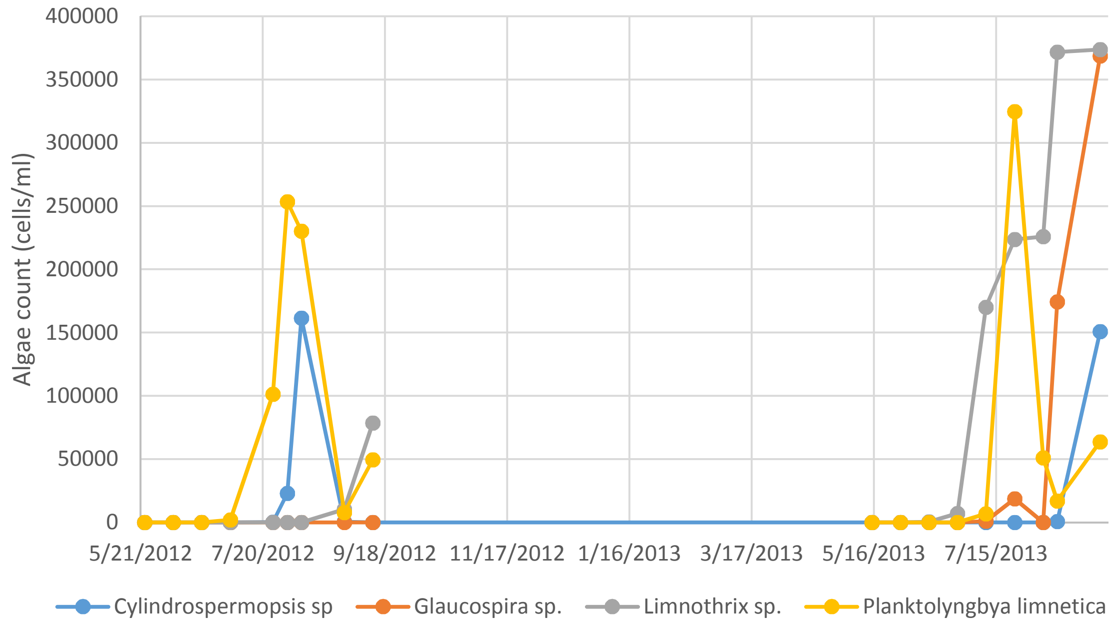

Figure 7. Blue-green algae counts (in cells/ml) for the four most dominant algae types in Winona Lake in Kosciusko County over study period of 2012-2013.

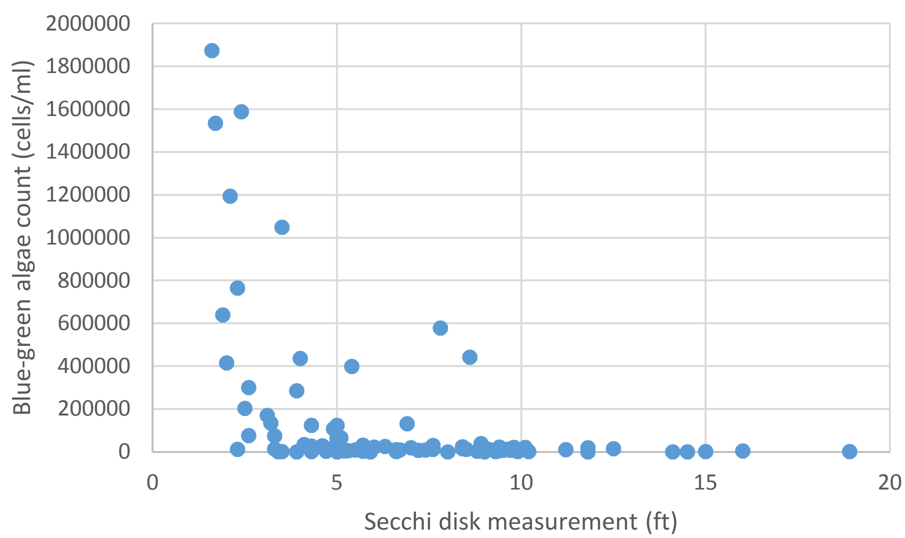

Figure 8. Blue-green algae counts (in cells/ml) and Secchi disk (SD) measurements (in ft) for Dewart, James, Wawasee, Winona, and Yellow Creek lakes in Kosciusko County over study period of 2012-2013.

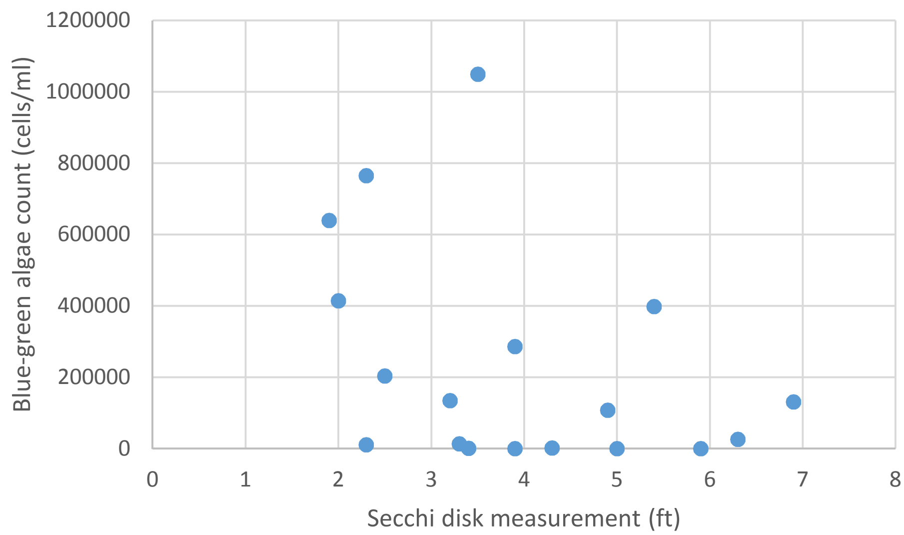

Figure 9. Blue-green algae counts (in cells/ml) and Secchi disk (SD) measurements (in ft) for Winona Lake in Kosciusko County over study period of 2012-2013.

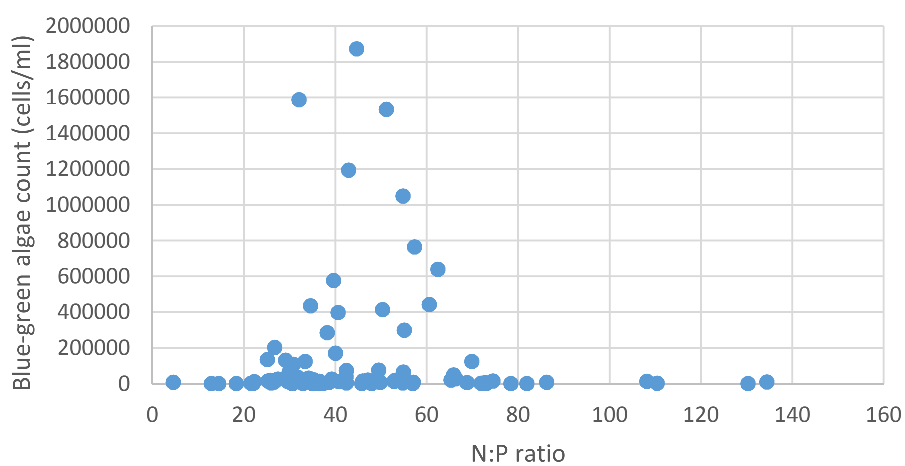

Figure 10. Blue-green algae counts (in cells/ml) and nitrogen to phosphorus ratios (N:P) for Dewart, James, Wawasee, Winona, and Yellow Creek lakes in Kosciusko County over study period of 2012-2013.

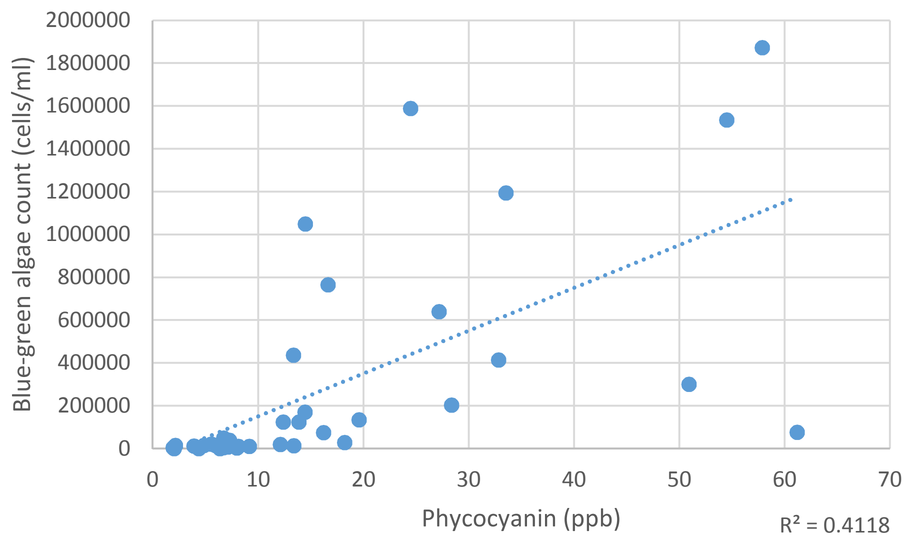

Figure 11. Blue-green algae counts (in cells/ml) and phycocyanin concentrations (in ppb) for Dewart, James, Wawasee, Winona, and Yellow Creek lakes in Kosciusko County over study period of 2012-2013. Linear regression fit to data shown as dotted line with R^2 of 41.2%.

Appendix

Table A1: Raw lake data from 2010-2013 used in data analysis. Column heading abbreviations are described as follows: SD - secchi disc, WT - water temperature, DO - dissolved oxygen, Cond - conductivity, PC - phycocyanin, MC - microcystin, NH_3 - ammonia, NO_2 - nitrite, NO_3 - nitrate, SRP - soluble reactive phosphorus, TP - total phosphorus, TKN - total Kjeldahl nitrogen, TN - total nitrogen, N/P - nitrogen to phosphorus ratio, BG algae - blue-green algae count. *SD is greater than depth at shore sample site.

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Backwater	Shore	08/18/10	2.4	26.7	7.4	93	8.1			<0.15									
Beaver Dam	Shore	08/18/10	*	27.3	7.2	90	8.8			<0.15									
Beaver Dam	Open	08/18/10	5.3	27.2	7.2	91	8.8			<0.15									
Big Barbee	Shore	08/18/10	*	28.4	9.8	126	8.6			<0.15									
Big Barbee	Open	08/18/10	4.1	27.4	8.3	105	8.5			<0.15									
Big Chapman	Shore	08/18/10	*	26.5	8.4	105	8.7			0.33									
Big Chapman	Open	08/18/10	7.6	27.0	7.6	95	8.7			0.84									
Boner	Shore	08/18/10	*	28.4	8.3	108	8.4			<0.15									
Caldwell	Shore	08/18/10	3.9	27.6	9.3	119	8.8			<0.15									
Camelot	Shore	08/18/10	*	28.4	9.9	127	8.6			0.28									
Carr	Shore	08/18/10	*	29.2	10.2	133	8.8			<0.15									
Center	Shore	08/18/10	*	27.7	7.5	95	8.9			<0.15									
Crystal	Shore	08/18/10	*	28.6	8.8	114	8.6			0.30									
Dewart	Shore	08/18/10	*	28.0	8.4	107	8.7			0.41									
Dewart	Open	08/18/10	7.7	27.5	7.6	96	8.6			0.55									
Diamond	Shore	08/18/10	2.7	27.4	9.2	116	8.9			0.20									
Goose	Shore	08/18/10	*	28.7	7.6	98	8.7			<0.15									
Hill	Shore	08/18/10	*	27.7	9.2	117	8.7			0.31									
Hoffman	Shore	08/18/10	*	27.4	10.7	135	8.7			1.13									
Irish	Shore	08/18/10	*	26.9	8.4	106	8.6			<0.15									
James	Shore	08/18/10	*	28.1	8.8	113	8.6			<0.15									
James	Open	08/18/10	4.4	27.8	7.7	98	8.4			<0.15									
Kuhn	Shore	08/18/10	*	28.8	10.0	130	8.5			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Little Barbee	Shore	08/18/10	2.9	27.9	9.3	118	8.5			<0.15									
Little Chapman	Shore	08/18/10	*	26.8	9.1	113	8.8			<0.15									
Loon	Shore	08/18/10	2.8	27.3	7.4	93	8.6			<0.15									
McClure's	Shore	08/18/10	1.8	26.9	6.8	85	8.8			<0.15									
Muskellunge	Shore	08/18/10	1.5	26.6	12.3	154	8.4			11.90									
Oswego	Shore	08/18/10	*	27.7	7.7	99	8.4			<0.15									
Oswego	Open	08/18/10	8.4	28.4	8.4	108	8.6			<0.15									
Palestine	Shore	08/18/10	*	26.9	10.5	133	8.5			<0.15									
Papakeechie	Shore	08/18/10	*	29.0	8.6	112	8.9			<0.15									
Pike	Shore	08/18/10	3.0	27.3	8.6	109	8.7			<0.15									
Ridinger	Shore	08/18/10	2.4	29.0	11.0	142	8.7			<0.15									
Rock	Shore	08/18/10	1.8	26.6	5.4	68	8.4			0.18									
Sawmill	Shore	08/18/10	*	28.2	10.9	139	8.7			<0.15									
Sechrist	Shore	08/18/10	*	28.4	9.3	119	8.6			<0.15									
Sellers	Shore	08/18/10	2.0	28.8	6.6	85	8.3			<0.15									
Shock	Shore	08/18/10	*	28.4	6.2	79	8.1			<0.15									
Shoe	Shore	08/18/10	*	28.4	7.4	95	8.6			0.15									
Silver	Shore	08/18/10	3.0	28.3	6.9	88	8.5			<0.15									
Spear	Shore	08/18/10	*	28.9	10.4	138	8.9			<0.15									
Stanton	Shore	08/18/10	*	27.9	6.2	79	8.2			0.15									
Syracuse (Hoy's Beach)	Shore	08/18/10	*	28.0	9.2	118	8.8			0.23									
Syracuse (Lakeview)	Shore	08/18/10	*	27.5	9.4	115	8.7			0.25									
Syracuse	Open	08/18/10	7.3	27.2	8.1	102	8.7			0.16									
Tippecanoe	Shore	08/18/10	*	27.5	7.1	90	8.2			<0.15									
Tippecanoe	Open	08/18/10	7.0	27.7	7.5	95	8.6			<0.15									
Waubee	Shore	08/18/10	*	28.1	11.7	150	8.7			0.22									
Wawasee	Shore	08/18/10	*	27.4	8.2	104	8.7			0.31									
Wawasee	Open	08/18/10	10.0	26.7	7.3	91	8.6			0.24									
Webster	Shore	08/18/10	*	27.8	14.7	186	8.7			<0.15									
Webster	Open	08/18/10	3.3	27.3	8.4	106	8.5			<0.15									
Winona	Shore	08/18/10	*	26.1	7.3	91	8.6			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Winona	Open	08/18/10	3.5	27.0	7.4	93	8.6			<0.15									
Yellow Creek	Shore	08/18/10	*	27.2	8.2	104	8.9			0.16									
Backwater	Shore	09/22/10	3.0	22.0	10.3	117	8.4			<0.15									
Beaver Dam	Shore	09/22/10	*	21.3	9.6	108	8.8			<0.15									
Beaver Dam	Open	09/22/10	6.5	21.4	9.6	109	8.8			<0.15									
Big Barbee	Shore	09/22/10	*	21.7	9.3	106	8.6			<0.15									
Big Barbee	Open	09/22/10	5.1	21.4	9.2	105	8.6			<0.15									
Big Chapman	Shore	09/22/10	*	21.1	7.9	89	8.6			0.35									
Big Chapman	Open	09/22/10	8.3	21.1	8.6	97	8.6			0.61									
Boner	Shore	09/22/10	*	23.0	9.4	109	8.3			<0.15									
Caldwell	Shore	09/22/10	*	21.6	9.2	104	8.5			0.54									
Camelot	Shore	09/22/10	*	20.7	9.7	108	8.6			0.17									
Carr	Shore	09/22/10	*	21.5	9.3	105	8.8			<0.15									
Center	Shore	09/22/10	*	21.5	8.7	99	8.6			0.15									
Crystal	Shore	09/22/10	*	20.4	7.2	80	8.5			2.12									
Dewart	Shore	09/22/10	*	20.9	7.4	83	8.5			1.25									
Dewart	Open	09/22/10	9.0	20.9	8.4	94	8.6			1.25									
Diamond	Shore	09/22/10	2.1	22.2	13.1	150	9.0			<0.15									
Goose	Shore	09/22/10	*	21.5	8.7	97	8.5			2.12									
Hill	Shore	09/22/10	*	21.5	7.9	89	8.3			2.25									
Hoffman	Shore	09/22/10	*	20.6	8.6	96	8.5			0.31									
Irish	Shore	09/22/10	*	21.7	9.3	106	8.6			<0.15									
James	Shore	09/22/10	*	21.5	9.2	104	8.6			0.15									
James	Open	09/22/10	4.7	21.7	9.8	111	8.6			0.18									
Kuhn	Shore	09/22/10	*	22.7	9.7	112	8.5			0.18									
Little Barbee	Shore	09/22/10	*	22.1	9.2	105	8.6			<0.15									
Little Chapman	Shore	09/22/10	*	21.3	7.4	84	8.4			0.24									
Loon	Shore	09/22/10	3.0	21.8	8.9	102	8.6			<0.15									
McClure's	Shore	09/22/10	1.9	21.9	11.7	133	8.8			<0.15									
Muskellunge	Shore	09/22/10	1.9	21.2	9.2	104	8.5			2.10									
Oswego	Shore	09/22/10	*	22.0	9.4	108	8.6			<0.15									
Oswego	Open	09/22/10	6.4	22.5	10.3	119	8.7			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Palestine	Shore	09/22/10	*	21.1	8.5	95	8.3			<0.15									
Papakeechie	Shore	09/22/10	*	22.3	9.4	108	8.7			0.23									
Pike	Shore	09/22/10	2.8	21.2	8.8	99	8.7			<0.15									
Ridinger	Shore	09/22/10	*	22.3	10.5	120	8.5			<0.15									
Rock	Shore	09/22/10	1.9	21.5	10.3	117	8.7			<0.15									
Sawmill	Shore	09/22/10	*	23.4	9.9	116	8.6			<0.15									
Sechrist	Shore	09/22/10	*	23.8	10.2	122	8.6			<0.15									
Sellers	Shore	09/22/10	1.1	22.2	8.7	100	8.3			<0.15									
Shock	Shore	09/22/10	*	22.4	9.6	102	8.4			0.48									
Shoe	Shore	09/22/10	*	23.1	9.2	111	8.4			0.33									
Silver	Shore	09/22/10	3.0	21.5	9.7	113	8.7			<0.15									
Spear	Shore	09/22/10	*	22.2	8.1	91	8.3			0.29									
Stanton	Shore	09/22/10	*	21.7	7.5	86	8.3			0.17									
Syracuse (Hoy's Beach)	Shore	09/22/10	*	21.1	8.8	99	8.6			0.37									
Syracuse (Lakeview)	Shore	09/22/10	*	21.9	9.3	106	8.7			0.45									
Syracuse	Open	09/22/10	9.6	20.6	8.8	98	8.7			0.39									
Tippecanoe	Shore	09/22/10	*	21.5	8.4	94	8.4			<0.15									
Tippecanoe	Open	09/22/10	7.0	21.5	9.3	105	8.6			<0.15									
Waubee	Shore	09/22/10	*	20.3	8.8	97	8.6			0.27									
Wawasee	Shore	09/22/10	*	20.9	8.8	99	8.5			0.44									
Wawasee	Open	09/22/10	9.5	20.4	8.9	98	8.6			0.80									
Webster	Shore	09/22/10	2.3	21.3	9.5	107	8.6			<0.15									
Webster	Open	09/22/10	3.5	21.2	9.1	102	8.7			<0.15									
Winona	Shore	09/22/10	*	23.3	11.2	129	8.7			<0.15									
Winona	Open	09/22/10	5.5	21.8	9.7	111	8.7			<0.15									
Yellow Creek	Shore	09/22/10	*	22.0	10.5	120	8.9			<0.15									
Backwater	Shore	05/18/11	*	16.8	10.0	104	8.5			<0.15									
Beaver Dam	Shore	05/18/11	*	16.5	8.3	85	8.9			<0.15									
Beaver Dam	Open	05/18/11	7.2	16.2	7.6	78	8.8			<0.15	0.049		0.16	0.003	0.024	0.602	0.762	31.5	
Big Barbee	Shore	05/18/11	*	17.3	13.5	140	8.8			<0.15									
Big Barbee	Open	05/18/11	5.1	16.4	10.1	103	8.6			<0.15	0.262	0.01	0.12	0.008	0.054	0.971	1.101	20.6	

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Big Chapman	Shore	05/18/11	*	16.6	10.6	109	8.5			<0.15									
Big Chapman	Open	05/18/11	8.5	16.5	9.3	96	8.5			0.46	0.947	0.11	0.31	0.029	0.107	2.959	3.379	31.6	
Boner	Shore	05/18/11	*	19.9	11.0	120	8.6			<0.15									
Caldwell	Shore	05/18/11	*	16.4	9.7	99	8.2			<0.15									
Camelot	Shore	05/18/11	*	16.8	9.6	99	8.5			<0.15									
Carr	Shore	05/18/11	*	17.3	7.4	77	8.4			<0.15									
Center	Shore	05/18/11	*	16.1	9.4	95	8.7			0.28									
Crystal	Shore	05/18/11	*	16.3	8.9	91	8.6			0.42									
Dewart	Shore	05/18/11	*	16.4	9.8	100	8.7			0.34									
Dewart	Open	05/18/11	16.2	16.0	9.6	97	8.7			0.25	0.488	0.03	1.15	0.052	0.093	1.246	2.426	26.2	
Diamond	Shore	05/18/11	1.1	15.7	13.9	141	9.0			5.30									
Goose	Shore	05/18/11	*	17.1	10.8	112	8.9			0.34									
Hill	Shore	05/18/11	0.5	16.1	12.3	125	9.0			2.70									
Hoffman	Shore	05/18/11	*	15.3	9.5	95	8.6			0.19									
Irish	Shore	05/18/11	*	17.5	11.2	118	8.7			<0.15									
James	Shore	05/18/11	*	20.3	15.8	171	8.8			<0.15									
James	Open	05/18/11	9.5	18.2	10.3	109	8.6			<0.15	0.094	0.02	0.65	0.004	0.026	0.812	1.482	57.4	
Kuhn	Shore	05/18/11	*	17.0	9.8	101	8.5			<0.15									
Little Barbee	Shore	05/18/11	*	17.4	11.3	119	8.7			<0.15									
Little Chapman	Shore	05/18/11	*	16.5	9.9	102	8.9			0.16									
Loon	Shore	05/18/11	*	16.3	5.6	57	8.7			<0.15									
McClure's	Shore	05/18/11	1.0	16.3	17.4	147	9.1			1.13									
Muskellunge	Shore	05/18/11	1.7	15.2	11.5	114	8.1			<0.15									
Oswego	Shore	05/18/11	*	19.1	15.5	169	8.8			<0.15									
Oswego	Open	05/18/11	15.0	18.0	11.9	124	8.5			<0.15	0.071	0.02	0.68	0.005	0.023	0.832	1.532	66.9	
Palestine	Shore	05/18/11	*	15.3	8.9	89	8.3			<0.15									
Papakeechie	Shore	05/18/11	*	17.6	10.2	107	8.7			<0.15									
Pike	Shore	05/18/11	*	15.8	9.2	93	8.6			<0.15									
Ridinger	Shore	05/18/11	*	17.2	12.3	128	8.7			<0.15									
Rock	Shore	05/18/11	1.3	16.1	7.8	79	8.6			<0.15									
Sawmill	Shore	05/18/11	*	16.8	8.9	92	8.5			<0.15									
Sechrist	Shore	05/18/11	*	17.6	12.0	126	8.8			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Sellers	Shore	05/18/11	1.8	18.5	11.7	124	8.6			<0.15									
Shock	Shore	05/18/11	*	17.1	10.8	110	8.6			<0.15									
Shoe	Shore	05/18/11	*	17.1	9.5	98	8.5			<0.15									
Silver	Shore	05/18/11	*	16.0	8.4	85	8.6			<0.15									
Spear	Shore	05/18/11	*	17.3	7.1	74	8.0			<0.15									
Stanton	Shore	05/18/11	*	16.8	9.1	94	8.4			<0.15									
Syracuse (Hoy's Beach)	Shore	05/18/11	*	18.2	10.4	110	8.4			<0.15									
Syracuse (Lakeview)	Shore	05/18/11	*	17.3	9.6	100	8.5			<0.15									
Syracuse	Open	05/18/11	12.8	16.8	9.2	95	8.5			<0.15	0.106	0.00	0.21	0.003	0.027	0.642	0.853	31.7	
Tippecanoe	Shore	05/18/11	*	21.2	14.8	165	8.7			<0.15									
Tippecanoe	Open	05/18/11	15.1	17.0	10.3	107	8.4			<0.15	0.032	0.00	0.58	0.040	0.067	0.638	1.219	18.1	
Waubee	Shore	05/18/11	*	15.9	9.5	96	8.6			<0.15									
Wawasee	Shore	05/18/11	*	16.5	9.9	101	8.5			<0.15									
Wawasee	Open	05/18/11	22.6	15.6	9.4	94	8.6			<0.15	0.061	0.00	0.25	0.004	0.009	0.485	0.736	79.1	
Webster	Shore	05/18/11	*	18.9	7.4	80	8.6			<0.15									
Winona	Shore	05/18/11	*	15.9	12.7	130	8.8			<0.15									
Winona	Open	05/18/11	7.0	15.6	9.3	94	8.6			<0.15	0.064	0.00	0.09	0.004	0.011	0.653	0.744	70.9	
Yellow Creek	Shore	05/18/11	*	16.1	10.7	108	8.9			3.70									
Backwater	Shore	06/15/11	1.0	23.0	11.7	136	8.6			0.24									
Beaver Dam	Shore	06/15/11	0.6	23.5	10.7	125	9.2			0.29									
Beaver Dam	Open	06/15/11	0.7	23.6	12.0	141	9.4			0.41	0.086	0.04	0.24	0.002	0.046	2.693	2.973	64.6	
Big Barbee	Shore	06/15/11	*	22.1	11.5	132	8.9			0.17									
Big Barbee	Open	06/15/11	1.3	21.9	9.5	109	8.7			0.15	0.096	0.06	1.36	0.002	0.038	1.203	2.623	69.0	
Big Chapman	Shore	06/15/11	*	21.9	8.1	93	8.6			1.87									
Big Chapman	Open	06/15/11	2.8	22.9	8.4	98	8.7			1.94	0.075	0.00	0.11	0.003	0.013	0.663	0.774	60.5	
Boner	Shore	06/15/11	*	22.4	7.1	82	8.2			<0.15									
Caldwell	Shore	06/15/11	0.6	23.4	11.5	135	8.4			<0.15									
Camelot	Shore	06/15/11	*	23.6	9.8	115	8.6			<0.15									
Carr	Shore	06/15/11	0.3	23.1	12.3	143	9.0			<0.15									
Center	Shore	06/15/11	1.1	25.1	10.5	127	8.9			<0.15									
Crystal	Shore	06/15/11	*	23.1	9.3	109	8.8			0.22									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Dewart	Shore	06/15/11	*	21.6	7.9	90	8.7			5.94									
Dewart	Open	06/15/11	2.3	21.7	7.9	90	8.6			4.90	0.049	0.00	0.04	0.003	0.020	0.736	0.777	39.2	
Diamond	Shore	06/15/11	1.4	22.6	10.7	123	9.1			0.77									
Goose	Shore	06/15/11	*	23.5	8.9	105	8.6			<0.15									
Hill	Shore	06/15/11	*	23.7	8.7	103	8.7			0.27									
Hoffman	Shore	06/15/11	0.9	22.1	9.2	106	8.7			0.19									
Irish	Shore	06/15/11	*	22.5	8.9	103	8.6			<0.15									
James	Shore	06/15/11	1.2	23.7	9.7	114	8.7			0.36									
James	Open	06/15/11	1.0	24.2	10.1	120	8.7			0.46	0.049	0.02	0.22	0.005	0.039	1.093	1.333	34.3	
Kuhn	Shore	06/15/11	*	22.5	8.4	96	8.6			0.18									
Little Barbee	Shore	06/15/11	1.1	21.5	9.6	109	8.7			<0.15									
Little Chapman	Shore	06/15/11	*	22.4	8.8	102	8.8			0.97									
Loon	Shore	06/15/11	0.9	24.4	10.5	126	8.9			0.27									
McClure's	Shore	06/15/11	0.4	24.2	14.0	166	9.2			1.81									
Muskellunge	Shore	06/15/11	0.6	21.4	10.1	114	8.1			0.22									
Oswego	Shore	06/15/11	*	24.1	10.2	122	8.7			0.32									
Oswego	Open	06/15/11	1.5	24.3	8.6	104	8.5			0.16	0.054	0.03	0.49	0.003	0.018	1.052	1.572	85.4	
Palestine	Shore	06/15/11	*	21.1	3.2	36	7.8			<0.15									
Papakeechie	Shore	06/15/11	*	23.6	9.2	109	8.7			0.19									
Pike	Shore	06/15/11	0.8	25.4	12.5	152	7.7			0.15									
Ridinger	Shore	06/15/11	0.9	24.3	15.1	177	8.9			0.19									
Rock	Shore	06/15/11	0.4	25.4	9.8	116	8.5			0.42									
Sawmill	Shore	06/15/11	*	22.5	9.8	114	8.8			<0.15									
Sechrist	Shore	06/15/11	*	22.7	7.6	88	8.6			<0.15									
Sellers	Shore	06/15/11	0.6	22.7	12.8	148	8.5			<0.15									
Shock	Shore	06/15/11	0.6	23.1	12.2	142	8.9			<0.15									
Shoe	Shore	06/15/11	*	22.9	9.3	108	8.9			0.20									
Silver	Shore	06/15/11	*	24.9	9.7	117	8.7			<0.15									
Spear	Shore	06/15/11	*	22.7	8.6	100	8.7			<0.15									
Stanton	Shore	06/15/11	*	22.3	9.2	106	8.6			<0.15									
Syracuse (Hoy's Beach)	Shore	06/15/11	*	22.1	8.8	100	8.7			3.24									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Syracuse (Lakeview)	Shore	06/15/11	*	21.5	9.3	106	8.8			3.89									
Syracuse	Open	06/15/11	4.1	21.9	8.5	97				1.85	0.041	0.00	0.07	0.002	0.009	0.583	0.654	76.0	
Tippecanoe	Shore	06/15/11	0.9	23.3	14.4	166	8.7			0.35									
Tippecanoe	Open	06/15/11	2.0	24.1	8.8	105	8.3			<0.15	0.045	0.03	0.52	0.003	0.020	0.844	1.394	69.0	
Waubee	Shore	06/15/11	*	23.0	10.4	122	8.8			0.21									
Wawasee	Shore	06/15/11	*	21.4	9.0	101	8.7			1.50									
Wawasee	Open	06/15/11	2.7	21.5	8.4	95	8.7			1.33	0.052	0.01	0.20	0.003	0.009	0.550	0.760	81.8	
Webster	Shore	06/15/11	0.7	22.2	8.5	97	8.7			0.25									
Webster	Open	06/15/11	0.7	21.5	7.7	88				0.41	0.057	0.01	0.04	0.001	0.043	1.222	1.272	29.5	
Winona	Shore	06/15/11	*	24.8	12.2	146	8.8			<0.15									
Winona	Open	06/15/11	1.0	24.1	10.2	122	8.8			<0.15	0.020	0.03	0.85	0.003	0.030	1.320	2.200	73.1	
Yellow Creek	Shore	06/15/11	*	23.8	8.9	106	8.6			1.35									
Backwater	Shore	07/13/11	2.6	29.4	8.5	111	8.3			<0.15									
Beaver Dam	Shore	07/13/11	2.0	28.9	8.4	110	8.9			0.26									
Beaver Dam	Open	07/13/11	2.6	28.8	9.1	119	9.0			0.36	0.001	0.00	0.00	0.004	0.050	1.472	1.474	29.4	
Big Barbee	Shore	07/13/11	2.1	28.8	12.4	161	8.9			0.61									
Big Barbee	Open	07/13/11	3.2	27.0	9.0	113	8.7			0.61	0.040	0.03	0.25	0.008	0.041	1.165	1.445	35.6	
Big Chapman	Shore	07/13/11	*	29.9	9.6	128	8.7			4.48									
Big Chapman	Open	07/13/11	7.4	29.1	8.9	116	8.7			2.04	0.051	0.00	0.00	0.000	0.020	0.592	0.594	30.3	
Boner	Shore	07/13/11	*	25.7	6.3	77	8.3			<0.15									
Caldwell	Shore	07/13/11	*	27.9	13.4	170	8.9			<0.15									
Camelot	Shore	07/13/11	*	28.0	9.7	125	8.6			<0.15									
Carr	Shore	07/13/11	*	29.3	7.8	101	8.7			3.32									
Center	Shore	07/13/11	2.6	30.3	8.7	116	8.8			0.57									
Crystal	Shore	07/13/11	*	28.1	6.1	79	8.3			<0.15									
Dewart	Shore	07/13/11	*	25.9	8.0	98	8.9			3.04									
Dewart	Open	07/13/11	5.2	27.0	8.3	105	9.0			3.58	0.050	0.00	0.01	0.003	0.030	0.738	0.749	24.9	
Diamond	Shore	07/13/11	*	28.4	11.4	148	9.1			0.16									
Goose	Shore	07/13/11	*	28.7	8.8	114	8.8			0.21									
Hill	Shore	07/13/11	*	28.6	9.3	120	8.8			0.24									
Hoffman	Shore	07/13/11	*	28.0	10.6	136	8.5			0.30									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Irish	Shore	07/13/11	2.3	27.6	10.4	132	8.8			3.09									
James	Shore	07/13/11	*	29.1	9.2	120	8.6			0.37									
James	Open	07/13/11	7.0	27.8	7.9	101	8.7			0.31	0.001	0.01	0.04	0.000	0.030	0.854	0.904	30.0	
Kuhn	Shore	07/13/11	*	28.5	7.3	94	8.5			0.80									
Little Barbee	Shore	07/13/11	2.3	29.6	14.4	190	9.1			1.38									
Little Chapman	Shore	07/13/11	*	29.8	10.8	142	8.9			1.10									
Loon	Shore	07/13/11	2.3	28.5	8.3	107	9.0			<0.15									
McClure's	Shore	07/13/11	1.7	27.9	11.4	146	9.1			0.72									
Muskellunge	Shore	07/13/11	*	28.4	12.0	155	8.6			<0.15									
Oswego	Shore	07/13/11	*	28.0	8.3	107	8.4			1.06									
Oswego	Open	07/13/11	3.7	28.3	9.5	121	8.7			0.90	0.046	0.01	0.05	0.006	0.024	0.807	0.867	36.8	
Palestine	Shore	07/13/11	*	26.6	6.9	86	8.0			<0.15									
Papakeechie	Shore	07/13/11	*	29.0	8.9	115	8.9			<0.15									
Pike	Shore	07/13/11	1.4	29.6	12.6	166	8.8			0.27									
Ridinger	Shore	07/13/11	*	28.3	10.5	135	8.8			0.42									
Rock	Shore	07/13/11	2.3	28.8	7.9	102	8.8			0.27									
Sawmill	Shore	07/13/11	2.7	28.6	12.5	160	8.9			3.35									
Sechrist	Shore	07/13/11	*	28.3	8.1	104	8.6			<0.15									
Sellers	Shore	07/13/11	2.3	27.5	8.2	105	8.6			0.32									
Shock	Shore	07/13/11	*	28.3	8.9	114	8.4			0.37									
Shoe	Shore	07/13/11	*	29.1	8.4	109	8.7			0.21									
Silver	Shore	07/13/11	2.9	28.5	13.2	170	9.0			0.45									
Spear	Shore	07/13/11	*	28.4	9.0	115	8.3			<0.15									
Stanton	Shore	07/13/11	*	29.0	7.2	93	8.3			<0.15									
Syracuse (Hoy's Beach)	Shore	07/13/11	*	26.6	8.9	111	8.9			2.83									
Syracuse (Lakeview)	Shore	07/13/11	*	26.2	8.7	108	8.8			1.65									
Syracuse	Open	07/13/11	5.3	27.8	8.7	110	8.9			2.05	0.001	0.00	0.00	0.008	0.014	0.614	0.616	43.4	
Tippecanoe	Shore	07/13/11	*	29.6	10.9	144	8.6			0.46									
Tippecanoe	Open	07/13/11	5.2	27.6	8.6	109	8.8			1.56	0.001	0.01	0.09	0.000	0.025	0.844	0.944	38.2	
Waubee	Shore	07/13/11	*	27.9	11.8	151	8.8			0.25									
Wawasee	Shore	07/13/11	*	28.5	10.4	133	9.0			5.12									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Wawasee	Open	07/13/11	3.9	27.1	9.0	112	8.9			3.31	0.001	0.00	0.00	0.008	0.022	0.717	0.719	32.8	
Webster	Shore	07/13/11	*	29.2	15.9	206	8.8			0.26									
Webster	Open	07/13/11	2.7	29.2	8.9	116	8.6			0.21	0.089	0.00	0.00	0.005	0.040	0.913	0.915	22.7	
Winona	Shore	07/13/11	*	27.5	7.3	92	8.4			<0.15									
Winona	Open	07/13/11	10.0	27.5	8.6	109	8.8			<0.15	0.089	0.02	0.58	0.003	0.022	0.777	1.377	61.8	
Yellow Creek	Shore	07/13/11	2.6	28.7	12.7	164	9.2			0.23									
Backwater	Shore	08/17/11	1.5	25.1	11.7	142	8.6			<0.15									
Beaver Dam	Shore	08/17/11	2.4	26.6	7.7	96				<0.15									
Beaver Dam	Open	08/17/11	3.5	25.7	7.3	90	8.8			<0.15	0.018	0.00	0.00	0.001	0.030	1.153	1.155	38.5	
Big Barbee	Shore	08/17/11	*	27.9	10.6	131	8.8			<0.15									
Big Barbee	Open	08/17/11	4.5	26.4	9.7	120	8.9			<0.15	0.009	0.00	0.00	0.003	0.038	0.807	0.809	21.6	
Big Chapman	Shore	08/17/11	*	27.9	9.9	130	8.8			0.24									
Big Chapman	Open	08/17/11	7.1	27.2	8.6	108	8.8			0.21	0.012	0.00	0.00	0.002	0.012	0.566	0.568	47.7	
Boner	Shore	08/17/11	*	28.6	10.9	141	8.7			<0.15									
Caldwell	Shore	08/17/11	*	25.6	8.2	100	8.5			3.89									
Camelot	Shore	08/17/11	*	25.5	9.5	116	5.6			<0.15									
Carr	Shore	08/17/11	*	25.5	7.8	95	8.8			0.16									
Center	Shore	08/17/11	*	25.8	8.1	100	8.7			<0.15									
Crystal	Shore	08/17/11	*	24.6	7.3	88	8.4			<0.15									
Dewart	Shore	08/17/11	*	24.9	8.2	99	8.8			0.52									
Dewart	Open	08/17/11	9.2	25.0	8.3	100	8.9			0.46	0.019	0.00	0.00	0.002	0.015	0.677	0.679	44.4	
Diamond	Shore	08/17/11	1.6	25.3	8.5	115	8.9			<0.15									
Goose	Shore	08/17/11	*	26.0	8.0	99	8.5			0.22									
Hill	Shore	08/17/11	*	26.0	8.1	100	8.7			0.55									
Hoffman	Shore	08/17/11	*	24.4	7.0	84	8.3			0.16									
Irish	Shore	08/17/11	*	27.0	9.6	121	8.8			<0.15									
James	Shore	08/17/11	*	26.3	9.2	114	8.8			<0.15									
James	Open	08/17/11	3.7	26.1	9.4	115	8.7			<0.15	0.010	0.00	0.00	0.001	0.020	0.789	0.791	38.9	
Kuhn	Shore	08/17/11	*	25.2	7.2	87	8.6			0.28									
Little Barbee	Shore	08/17/11	*	26.5	9.3	116	8.8			<0.15									
Little Chapman	Shore	08/17/11	*	27.8	12.3	157	9.0			<0.15									
Loon	Shore	08/17/11	3.0	26.3	7.8	96	8.8			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
McClure's	Shore	08/17/11	1.1	26.3	8.5	106	8.9			<0.15									
Muskellunge	Shore	08/17/11	1.9	25.4	5.9	71	8.2			<0.15									
Oswego	Shore	08/17/11	*	27.1	10.7	134	8.8			0.23									
Oswego	Open	08/17/11	4.7	26.9	10.1	126	8.7			0.27	0.020	0.00	0.00	0.003	0.018	0.737	0.739	40.4	
Palestine	Shore	08/17/11	*	22.6	4.0	47	7.9			<0.15									
Papakeechie	Shore	08/17/11	*	25.9	8.6	105	8.5			<0.15									
Pike	Shore	08/17/11	2.5	25.3	10.4	126	8.7			<0.15									
Ridinger	Shore	08/17/11	2.8	25.8	11.7	144	9.0			<0.15									
Rock	Shore	08/17/11	0.9	27.4	9.3	118	8.5			0.28									
Sawmill	Shore	08/17/11	*	26.4	11.2	138	8.7			<0.15									
Sechrist	Shore	08/17/11	3.0	26.3	10.1	124	8.8			<0.15									
Sellers	Shore	08/17/11	1.7	25.4	6.2	75	8.3			0.17									
Shock	Shore	08/17/11	*	26.2	7.2	88	8.2			<0.15									
Shoe	Shore	08/17/11	*	27.5	8.7	108	8.6			<0.15									
Silver	Shore	08/17/11	2.2	26.7	9.3	116	8.9			0.20									
Spear	Shore	08/17/11	*	25.6	7.3	89	8.0			<0.15									
Stanton	Shore	08/17/11	*	26.6	6.3	78	8.1			<0.15									
Syracuse (Hoy's Beach)	Shore	08/17/11	*	26.4	10.7	130	9.0			0.46									
Syracuse (Lakeview)	Shore	08/17/11	*	27.2	12.0	152	9.0			0.45									
Syracuse	Open	08/17/11	7.9	26.4	8.8	110	8.8			0.37	0.022	0.00	0.00	0.001	0.014	0.601	0.603	44.3	
Tippecanoe	Shore	08/17/11		26.2	10.1	125	8.6			<0.15									
Tippecanoe	Open	08/17/11	4.4	26.5	9.4	117	8.8			<0.15	0.019	0.00	0.00	0.003	0.019	0.706	0.708	36.5	
Waubee	Shore	08/17/11	*	25.3	9.1	111	8.7			0.18									
Wawasee	Shore	08/17/11		26.2	10.2	133	9.0			0.63									
Wawasee	Open	08/17/11	7.8	25.9	8.7	106	8.9			0.48	0.020	0.00	0.00	0.002	0.012	0.542	0.544	46.1	
Webster	Shore	08/17/11	2.0	27.3	9.2	116	8.6			<0.15									
Webster	Open	08/17/11	1.7	25.3	9.5	116	8.7			<0.15	0.010	0.03	0.00	0.001	0.034	1.010	1.041	30.3	
Winona	Shore	08/17/11	*	24.9	7.7	93	8.4			<0.15									
Winona	Open	08/17/11	4.1	25.1	9.3	113	8.8			<0.15	0.024	0.03	0.01	0.002	0.027	0.809	0.849	31.4	
Yellow Creek	Shore	08/17/11	1.9	26.0	8.1	100	9.0			<0.15									
Backwater	Shore	09/14/11	2.9	21.6	11.4	130	8.6			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Beaver Dam	Shore	09/14/11	*	22.2	9.7	111	8.9			<0.15									
Beaver Dam	Open	09/14/11	4.4	21.7	10.0	113	9.0			<0.15	0.001	0.00	0.00	0.003	0.022	1.202	1.204	56.0	
Big Barbee	Shore	09/14/11	*	20.9	9.9	110	9.0			<0.15									
Big Barbee	Open	09/14/11	6.2	20.2	7.0	78	9.0			<0.15	0.001	0.00	0.00	0.005	0.028	0.696	0.698	25.1	
Big Chapman	Shore	09/14/11	2.7	25.1	10.7	130	8.7			0.24									
Big Chapman	Open	09/14/11	7.0	22.5	9.6	111	8.9			0.21	0.001	0.00	0.00	0.008	0.018	0.683	0.685	37.9	
Boner	Shore	09/14/11	*	20.3	5.0	55	8.0			<0.15									
Caldwell	Shore	09/14/11	*	22.3	9.0	104	8.6			1.07									
Camelot	Shore	09/14/11	*	21.3	9.8	111	8.4			<0.15									
Carr	Shore	09/14/11	*	22.0	11.0	126	8.8			<0.15									
Center	Shore	09/14/11	*	20.2	8.3	91	8.7			<0.15									
Crystal	Shore	09/14/11	*	21.0	8.0	90	8.4			<0.15									
Dewart	Open	09/14/11	8.2	21.5	9.7	110	8.9			0.40	0.001	0.00	0.00	0.003	0.014	0.584	0.586	41.5	
Dewart	Shore	09/14/11	*	21.5	8.2	93	8.7			0.40									
Diamond	Shore	09/14/11	2.6	21.7	11.2	127	9.0			<0.15									
Goose	Shore	09/14/11	*	22.0	8.2	94	8.4			0.76									
Hill	Shore	09/14/11	*	22.3	8.8	101	8.6			0.31									
Hoffman	Shore	09/14/11	*	21.1	10.3	115	8.6			<0.15									
Irish	Shore	09/14/11	*	19.0	9.1	98	9.0			<0.15									
James	Shore	09/14/11	*	21.4	8.9	101	8.6			<0.15									
James	Open	09/14/11	7.9	22.3	9.7	112	8.5			<0.15	0.001	0.00	0.00	0.005	0.012	0.627	0.629	51.5	
Kuhn	Shore	09/14/11	*	19.6	10.5	115	9.0			<0.15									
Little Barbee	Shore	09/14/11	*	21.2	8.9	101	8.9			<0.15									
Little Chapman	Shore	09/14/11	*	24.7	10.8	130	8.8			<0.15									
Loon	Shore	09/14/11	*	22.1	9.9	114	8.8			<0.15									
McClure's	Shore	09/14/11	1.2	22.7	13.2	154	9.1			<0.15									
Muskellunge	Shore	09/14/11	2.1	21.3	8.5	95	8.4			<0.15									
Oswego	Shore	09/14/11	*	23.8	12.3	145	8.9			<0.15									
Oswego	Open	09/14/11	9.8	23.0	10.3	120	8.6			<0.15	0.001	0.00	0.00	0.006	0.016	0.676	0.678	42.6	
Palestine	Shore	09/14/11	*	18.2	6.2	66	8.3			<0.15									
Papakeechie	Shore	09/14/11	*	21.4	9.0	102	8.7			0.67									
Pike	Shore	09/14/11	2.3	19.7	9.2	101	9.0			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Ridinger	Shore	09/14/11	*	21.7	10.6	121	8.7			<0.15									
Rock	Shore	09/14/11	1.7	22.4	12.0	138	9.0			<0.15									
Sawmill	Shore	09/14/11	*	21.1	9.6	108	9.0			<0.15									
Sechrist	Shore	09/14/11	*	21.7	9.6	110	9.1			<0.15									
Sellers	Shore	09/14/11	2.3	21.1	8.0	90	8.4			<0.15									
Shock	Shore	09/14/11	*	21.4	8.8	102	7.9			<0.15									
Shoe	Shore	09/14/11	*	22.3	8.6	99	8.4			<0.15									
Silver	Shore	09/14/11	2.7	22.3	12.5	144	9.0			0.25									
Spear	Shore	09/14/11	*	23.3	10.1	118	8.4			0.53									
Stanton	Shore	09/14/11	*	21.9	7.1	82	8.1			<0.15									
Syracuse (Hoy's Beach)	Shore	09/14/11	*	22.4	10.7	124	8.8			0.21									
Syracuse (Lakeview)	Shore	09/14/11	*	22.7	12.9	148	8.9			0.24									
Syracuse	Open	09/14/11	7.1	21.8	9.4	108	8.8			0.39									
Tippecanoe	Shore	09/14/11	*	21.5	9.4	106	8.6			<0.15									
Tippecanoe	Open	09/14/11	9.9	22.0	8.7	100	8.6			<0.15	0.001	0.00	0.00	0.005	0.013	0.697	0.699	55.0	
Waubee	Shore	09/14/11	*	21.5	8.8	100	8.6			0.17									
Wawasee	Shore	09/14/11	*	22.3	10.7	122	8.8			0.41									
Wawasee	Open	09/14/11	10.4	21.6	9.4	107	8.7			0.32	0.252	0.00	0.00	0.005	0.034	1.131	1.133	33.4	
Webster	Shore	09/14/11	*	20.7	10.1	113	8.7			<0.15									
Webster	Open	09/14/11	3.0	22.2	11.2	129	8.8			<0.15	1.387	0.00	0.00	0.004	0.026	2.536	2.538	98.0	
Winona	Open	09/14/11	8.0	20.1	8.0	88	9.0			<0.15	0.001	0.00	0.00	0.005	0.024	0.812	0.814	33.6	
Winona	Shore	09/14/11	*	18.2	7.6	80	8.7			<0.15									
Yellow Creek	Shore	09/14/11	*	22.1	9.5	109	8.8			<0.15									
Backwater	Shore	05/23/12	5.6	23.4	13.2	153	7.5			<0.15									
Beaver Dam	Shore	05/23/12	*	23.4	13.4	154	8.7			<0.15									
Beaver Dam	Open	05/23/12	2.2	22.9	13.1	154	8.5			0.17	0.095	0.06	1.29	0.003	0.090	1.908	3.258	36.2	
Big Barbee	Shore	05/23/12	*	23.2	13.2	155	8.4			<0.15									
Big Barbee	Open	05/23/12	7.0	22.2	11.1	126	8.3			<0.15	0.029	0.02	0.60	0.001	0.036	0.744	1.364	38.4	
Big Chapman	Shore	05/23/12	*	23.1	11.0	128	7.8			0.23									
Big Chapman	Open	05/23/12	15.5	22.1	10.1	116	7.7			0.22	0.001	0.00	0.04	0.001	0.022	0.496	0.537	24.4	
Boner	Shore	05/23/12	*	22.9	8.4	96	7.9			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Caldwell	Shore	05/23/12	4.6	23.3	10.7	133	8.1			0.15									
Camelot	Shore	05/23/12	*	21.6	11.8	134	7.4			<0.15									
Camelot	Open	05/23/12	20.2	23.1	11.2	129	7.6			0.22	0.057	0.02	1.03	0.002	0.025	0.294	1.344	53.6	
Carr	Shore	05/23/12	2.1	24.3	12.7	152	8.2			0.18									
Center	Shore	05/23/12	*	22.7	11.2	134	8.2			0.16									
Crystal	Shore	05/23/12	*	23.1	8.6	102	7.5			0.19									
Dewart	Shore	05/23/12	*	20.4	10.1	12	8.0			<0.15									
Dewart	Open	05/23/12	15.0	21.2	10.8	113	8.1			<0.15	0.066	0.00	0.01	0.002	0.048	0.602	0.613	12.9	614
Diamond	Shore	05/23/12	4.7	23.4	13.4	154	8.4			0.16									
Goose	Shore	05/23/12	*	25.2	9.7	113	7.9			0.44									
Hill	Shore	05/23/12	*	22.7	9.4	113	8.2			0.54									
Hoffman	Shore	05/23/12	*	22.1	10.9	118	7.5			1.11									
Irish	Shore	05/23/12	*	24.3	12.9	152	8.4			<0.15									
James	Shore	05/23/12	*	22.2	12.8	146	8.3			<0.15									
James	Open	05/23/12	9.0	21.3	10.0	113	8.0			<0.15	0.075	0.01	0.36	0.002	0.030	0.722	1.092	36.9	10
Kuhn	Shore	05/23/12	*	25.3	12.8	156	8.2			<0.15									
Little Barbee	Shore	05/23/12	*	23.5	16.6	196	8.4			<0.15									
Little Chapman	Shore	05/23/12	*	23.4	10.0	127	8.2			<0.15									
Loon	Shore	05/23/12	6.0	23.3	9.5	118	7.3			0.16									
McClure's	Shore	05/23/12	1.0	23.3	6.6	77	7.5			0.62									
Muskellunge	Shore	05/23/12	1.6	24.2	10.1	125	7.7			0.22									
Oswego	Shore	05/23/12	4.4	21.2	12.2	137	8.1			<0.15									
Oswego	Open	05/23/12	5.2	22.0	11.2	128	8.4			<0.15	0.049	0.01	0.32	0.001	0.024	0.716	1.046	43.9	
Palestine	Shore	05/23/12	*	22.4	1.8	21	7.0			<0.15									
Papakeechie	Shore	05/23/12	*	22.9	9.3	109	7.8			<0.15									
Pike	Shore	05/23/12	2.3	23.2	11.4	130	8.3			0.76									
Ridinger	Shore	05/23/12	2.5	22.5	8.8	103	7.3			0.19									
Rock	Shore	05/23/12	2.0	23.2	6.5	76	7.3			0.18									
Sechrist	Shore	05/23/12	*	23.7	14.9	181	8.4			<0.15									
Sellers	Shore	05/23/12	2.9	23.8	7.0	77	7.6			0.17									
Shock	Shore	05/23/12	*	22.7	6.6	83	7.2			<0.15									
Shoe	Shore	05/23/12	*	23.5	11.9	140	8.3			<0.15									

	Site		SD	WT	DO	DO		Cond	PC	MC	NH3	NO2	NO3	SRP	TP	TKN	TN	N/P	BG algae
Lake Name	**Type**	**Week**	ft	°C	mg/L	%sat	pH	mS/cm	ppb	ppb	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		cells/ml
Silver	Shore	05/23/12	3.2	23.2	9.6	118	8.2			0.17									
Spear	Shore	05/23/12	*	22.8	5.2	69	7.0			<0.15									
Stanton	Shore	05/23/12	*	22.7	10.2	120	8.1			<0.15									
Syracuse (Hoy's Beach)	Shore	05/23/12	*	23.3	11.0	126	8.0			<0.15									
Syracuse (Lakeview)	Shore	05/23/12	*	24.2	10.2	125	8.0			0.15									
Syracuse	Open	05/23/12	11.1	21.7	9.8	112	8.4			<0.15	0.040	0.00	0.00	0.001	0.008	0.492	0.494	65.0	
Tippecanoe	Shore	05/23/12	*	22.3	12.3	141	8.3			<0.15									
Tippecanoe	Open	05/23/12	9.9	21.2	9.7	109	8.3			<0.15	0.019	0.01	0.51	0.003	0.022	0.655	1.175	54.4	
Waubee	Shore	05/23/12	*	22.8	9.6	115	7.8			<0.15									
Wawasee	Shore	05/23/12	*	21.1	10.1	114	7.7			0.16									
Wawasee	Open	05/23/12	18.9	20.7	9.6	107	8.0			<0.15	0.043	0.00	0.12	0.001	0.013	0.460	0.581	45.7	502
Webster	Open	05/23/12	3.8	22.1	9.4	109	8.2			<0.15	0.053	0.00	0.00	0.000	0.021	0.700	0.702	33.9	
Webster	Shore	05/23/12	2.0	22.7	9.3	107	7.3			<0.15									
Winona	Shore	05/23/12	*	24.5	14.6	176	8.2			0.18									
Winona	Open	05/23/12	5.0	22.1	12.2	121	7.4			<0.15	0.052	0.01	0.43	0.003	0.019	0.699	1.139	60.6	156
Yellow Creek	Shore	05/23/12	*	23.6	10.0	125	8.3			0.26									
Yellow Creek	Open	05/23/12	8.6	23.2	10.2	122	8.0			0.18	0.046	0.04	1.00	0.003	0.037	1.070	2.110	56.9	442713
Big Barbee	Open	06/06/12	3.5	21.0	12.5	138	7.6			0.18	0.049	0.02	0.11	0.003	0.045	0.940	1.070	23.7	
Big Chapman	Open	06/06/12	6.8	20.7	9.7	109	7.3			1.13	0.017	0.00	0.00	0.003	0.020	0.575	0.577	28.9	
Camelot	Open	06/06/12	17.8	23.8	11.6	134	7.0			<0.15	0.011	0.02	0.76	0.003	0.017	0.364	1.144	66.9	
Dewart	Open	06/06/12	9.9	20.1	9.1	103	7.3			0.23	0.021	0.00	0.00	0.002	0.018	0.634	0.636	36.1	576
James	Open	06/06/12	8.0	20.6	9.7	108	7.3			0.18	0.052	0.01	0.25	0.007	0.018	0.618	0.878	48.0	111
Oswego	Open	06/06/12	9.7	20.7	9.8	108	7.6			0.29	0.057	0.01	0.19	0.005	0.022	0.748	0.948	44.1	
Syracuse	Open	06/06/12	9.7	20.4	9.1	101	7.2			0.21	0.038	0.00	0.00	0.003	0.019	0.566	0.568	30.7	
Tippecanoe	Open	06/06/12	16.3	20.3	8.5	94	7.1			0.18	0.019	0.02	0.34	0.004	0.022	0.614	0.974	45.1	
Wawasee	Open	06/06/12	14.1	19.5	9.7	106	7.3			1.08	0.035	0.00	0.07	0.003	0.032	0.517	0.588	18.3	390
Webster	Open	06/06/12	3.8	20.7	9.3	103	7.3			<0.15	0.036	0.00	0.03	0.002	0.028	0.765	0.796	28.5	
Winona	Open	06/06/12	3.4	20.9	10.2	113	7.4			<0.15	0.047	0.01	0.32	0.004	0.027	0.728	1.058	39.6	616
Yellow Creek	Open	06/06/12	7.8	22.0	10.1	115	7.5			<0.15	0.031	0.04	0.78	0.003	0.026	0.968	1.788	68.8	577606
Backwater	Shore	06/20/12	2.6	25.4	3.9	46	7.2			<0.15									
Beaver Dam	Shore	06/20/12	*	25.7	6.5	79				<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Beaver Dam	Open	06/20/12	4.6	25.8	7.3	90				<0.15	0.074	0.00	0.05	0.002	0.042	1.417	1.468	35.4	
Big Barbee	Shore	06/20/12	*	26.2	7.9	100	7.8			0.18									
Big Barbee	Open	06/20/12	3.5	25.2	8.5	105	7.9			<0.15	0.047	0.00	0.00	0.006	0.047	0.772	0.774	16.3	
Big Chapman	Shore	06/20/12	*	24.4	8.6	107	8.0			0.18									
Big Chapman	Open	06/20/12	7.7	24.5	9.2	112	8.4			0.21	0.039	0.00	0.05	0.007	0.018	0.623	0.674	37.0	
Boner	Shore	06/20/12	*	27.0	9.8	118	7.4			<0.15									
Caldwell	Shore	06/20/12	*	26.9	9.0	110				<0.15									
Camelot	Shore	06/20/12	3.4	25.8	11.8	148	7.5			<0.15									
Camelot	Open	06/20/12	14.1	26.8	9.3	113				<0.15	0.075	0.01	0.78	0.008	0.020	0.386	1.176	60.0	
Carr	Shore	06/20/12	*	26.9	9.7	116				<0.15									
Center	Shore	06/20/12	*	24.8	9.4	109	8.1			<0.15									
Crystal	Shore	06/20/12	*	25.4	6.4	85				<0.15									
Dewart	Shore	06/20/12	*	25.1	7.1	103				0.20									
Dewart	Open	06/20/12	9.7	25.4	8.7	106				<0.15	0.037	0.00	0.01	0.003	0.019	0.731	0.742	38.6	6574
Diamond	Shore	06/20/12	1.7	26.6	10.3	121				0.18									
Goose	Shore	06/20/12	*	27.4	8.4	103				0.36									
Hill	Shore	06/20/12	*	26.2	7.6	97				0.18									
Hoffman	Shore	06/20/12	*	25.4	8.4	100				0.17									
Irish	Shore	06/20/12	*	24.7	7.1	85	7.9			<0.15									
James	Shore	06/20/12	*	25.6	8.7	111	7.4			<0.15									
James	Open	06/20/12	5.0	25.6	9.0	109				0.47	0.052	0.01	0.14	0.004	0.020	0.660	0.810	40.7	7179
Kuhn	Shore	06/20/12	*	24.7	7.3	90	8.1			<0.15									
Little Barbee	Shore	06/20/12	*	26.1	9.9	100	7.7			<0.15									
Little Chapman	Shore	06/20/12	*	24.7	9.4	107	8.2			<0.15									
Loon	Shore	06/20/12	2.9	26.3	7.3	87				<0.15									
McClure's	Shore	06/20/12	1.1	26.9	8.1	106				0.45									
Muskellunge	Shore	06/20/12	2.2	27.7	8.2	106				0.35									
Oswego	Shore	06/20/12	3.8	26.1	9.1	108				1.24									
Oswego	Open	06/20/12	4.8	26.7	8.8	111				0.36	0.092	0.00	0.01	0.004	0.031	0.733	0.744	24.1	
Palestine	Shore	06/20/12	2.2	25.2	7.3	8				<0.15									
Papakeechie	Shore	06/20/12	*	27.7	7.8	94				<0.15									
Pike	Shore	06/20/12	2.1	24.9	10.2	121	8.0			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Ridinger	Shore	06/20/12	2.2	27.0	12.3	148				0.20									
Rock	Shore	06/20/12	1.7	26.6	6.4	75				0.35									
Sawmill	Shore	06/20/12	*	25.9	7.2	83	8.0			<0.15									
Sechrist	Shore	06/20/12	*	24.9	7.1	82	7.9			<0.15									
Sellers	Shore	06/20/12	2.0	27.1	6.5	76				0.22									
Shock	Shore	06/20/12	*	27.9	8.2	97				0.30									
Shoe	Shore	06/20/12	*	26.1	9.3	101	8.3			<0.15									
Silver	Shore	06/20/12	2.5	26.4	7.5	88				0.62									
Spear	Shore	06/20/12	*	27.6	7.5	87				<0.15									
Stanton	Shore	06/20/12	*	26.5	8.5	97	8.1			<0.15									
Syracuse (Hoy's Beach)	Shore	06/20/12	*	26.6	10.5	131	7.6			<0.15									
Syracuse (Lakeview)	Shore	06/20/12	*	25.8	10.2	132	7.7			<0.15									
Syracuse	Open	06/20/12	9.6	25.6	8.6	106				<0.15	0.037	0.00	0.01	0.002	0.014	0.477	0.488	34.4	
Tippecanoe	Shore	06/20/12	*	25.9	8.6	107	7.3			0.17									
Tippecanoe	Open	06/20/12	5.2	25.5	9.6	118				<0.15	0.030	0.01	0.16	0.006	0.030	0.744	0.914	30.9	
Waubee	Shore	06/20/12	*	26.0	8.6	104				<0.15									
Wawasee	Shore	06/20/12	*	24.7	7.7	94				0.96									
Wawasee	Open	06/20/12	7.6	25.3	9.0	110				1.25	0.033	0.00	0.00	0.002	0.019	0.580	0.582	30.7	11352
Webster	Shore	06/20/12	*	25.4	7.8	101	7.9			<0.15									
Webster	Open	06/20/12	3.8	25.9	7.9	97	7.3			<0.15	0.051	0.00	0.01	0.006	0.039	0.873	0.884	22.7	
Winona	Shore	06/20/12	2.8	25.0	11.6	132	7.7			<0.15									
Winona	Open	06/20/12	4.3	24.7	11.4	137	8.0			<0.15	0.077	0.01	0.04	0.002	0.025	0.807	0.857	34.1	1496
Yellow Creek	Shore	06/20/12	*	25.8	8.6	107				0.25									
Yellow Creek	Open	06/20/12	5.7	26.1	8.7	109				0.17	0.076	0.03	0.68	0.003	0.030	3.336	4.046	134.4	30461
Beaver Dam	Open	07/04/12	2.6	30.7	9.0	123				0.15	0.019	0.00	0.00	0.005	0.028	1.241	1.243	44.4	
Big Barbee	Open	07/04/12	3.2	28.1	8.2	105				0.17	0.021	0.00	0.00	0.002	0.042	0.716	0.718	17.1	
Big Chapman	Open	07/04/12	9.1	28.6	8.8	112				0.45	0.045	0.00	0.00	0.004	0.021	0.575	0.577	27.0	
Camelot	Open	07/04/12	8.5	29.7	8.2	108				<0.15	0.021	0.01	0.64	0.001	0.009	0.300	0.950	109.2	
Dewart	Open	07/04/12	7.4	30.2	7.8	104				0.25	0.018	0.00	0.00	0.002	0.005	0.594	0.596	110.4	8999
James	Open	07/04/12	4.7	28.4	8.4	109				0.56	0.038	0.00	0.02	0.003	0.020	0.712	0.733	37.4	3309
Oswego	Open	07/04/12	3.4	28.6	8.5	112				0.36	0.023	0.00	0.00	0.002	0.024	0.740	0.742	30.5	1887

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Syracuse	Open	07/04/12	13.1	29.5	7.9	103				<0.15	0.019	0.00	0.00	0.002	0.009	0.522	0.524	60.2	
Tippecanoe	Open	07/04/12	3.5	28.1	8.9	114				1.96	0.029	0.00	0.00	0.003	0.023	0.696	0.698	30.4	1608
Wawasee	Open	07/04/12	9.7	28.9	8.8	112				0.43	0.011	0.00	0.00	0.001	0.011	0.546	0.548	49.4	8557
Webster	Open	07/04/12	2.9	28.0	8.9	113				<0.15	0.020	0.00	0.00	0.008	0.035	0.855	0.857	24.6	
Winona	Open	07/04/12	2.3	29.0	8.6	112				<0.15	0.020	0.51	0.00	0.004	0.025	0.820	1.331	52.8	11137
Yellow Creek	Open	07/04/12	5.0	30.5	9.0	122				0.45	0.024	0.02	0.40	0.004	0.017	1.002	1.422	86.2	13759
Backwater	Shore	07/25/12	1.4	27.8	5.4	72	8.1			0.32									
Beaver Dam	Shore	07/25/12	*	27.5	6.1	81	8.5			0.21									
Beaver Dam	Open	07/25/12	4.9	27.8	6.2	80	8.4			1.03	0.021	0.00	0.00	0.003	0.023	1.204	1.206	52.2	
Big Barbee	Shore	07/25/12	*	29.1	8.7	113	8.9			<0.15									
Big Barbee	Open	07/25/12	3.2	29.1	8.6	112	9.3			0.17	0.117	0.00	0.00	0.005	0.037	0.840	0.842	23.0	
Big Chapman	Shore	07/25/12	*	26.9	6.1	87				<0.15									
Big Chapman	Open	07/25/12	8.9	27.4	7.4	98	8.3			0.34	0.024	0.00	0.00	0.003	0.006	0.478	0.480	80.0	
Boner	Shore	07/25/12	*	27.3	2.1	28	7.7			<0.15									
Caldwell	Shore	07/25/12	3.1	28.0	6.5	94	7.9			<0.15									
Camelot	Shore	07/25/12	*	29.2	7.8	102	8.1			0.20									
Camelot	Open	07/25/12	11.0	27.7	7.6	96	8.1			<0.15	0.047	0.01	0.52	0.003	0.021	0.607	1.137	54.4	
Carr	Shore	07/25/12	*	27.8	7.1	90	8.4			<0.15									
Dewart	Shore	07/25/12	*	28.0	5.7	73	8.2			0.37									
Dewart	Open	07/25/12	9.5	28.7	7.9	102	8.5			0.26	0.037	0.00	0.00	0.005	0.024	0.756	0.758	31.8	7729
Diamond	Shore	07/25/12	2.6	28.0	7.5	99	8.6			0.17									
Goose	Shore	07/25/12	*	27.9	6.9	93	8.3			0.94									
Hill	Shore	07/25/12	*	27.8	6.5	93	8.4			<0.15									
Hoffman	Shore	07/25/12	4.2	27.3	7.0	91	7.9			<0.15									
Irish	Shore	07/25/12	*	28.4	5.7	78	8.9			0.16									
James	Shore	07/25/12	*	29.0	7.5	103	9.2			0.16									
James	Open	07/25/12	4.1	28.8	8.4	109	7.8			<0.15	0.052	0.00	0.00	0.003	0.035	0.774	0.776	22.0	34194
Kuhn	Shore	07/25/12	*	29.1	7.5	98	8.1			<0.15									
Little Barbee	Shore	07/25/12	*	29.8	8.8	111	8.3			<0.15									
Little Chapman	Shore	07/25/12	*	27.4	6.8	94	8.4			<0.15									
Loon	Shore	07/25/12	*	28.0	5.7	84	8.3			<0.15									
McClure's	Shore	07/25/12	1.6	27.7	5.4	76	8.5			<0.15									

	Site		SD	WT	DO	DO		Cond	PC	MC	NH3	NO2	NO3	SRP	TP	TKN	TN	N/P	BG algae
Lake Name	**Type**	**Week**	ft	°C	mg/L	%sat	pH	mS/cm	ppb	ppb	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		cells/ml
Muskellunge	Shore	07/25/12	1.6	27.6	4.7	70	8.0			0.18									
Oswego	Shore	07/25/12	4.1	28.8	6.3	85	9.3			0.21									
Oswego	Open	07/25/12	5.2	29.1	8.5	12	8.1			<0.15	0.022	0.00	0.00	0.002	0.025	0.688	0.690	27.5	
Palestine	Shore	07/25/12	2.1	26.2	0.2	2	7.4			0.18									
Papakeechie	Shore	07/25/12	*	29.4	8.0	102	8.5			<0.15									
Pike	Shore	07/25/12	*	27.7	8.2	100	8.1			<0.15									
Ridinger	Shore	07/25/12	2.6	29.2	10.4	135	8.6			0.18									
Rock	Shore	07/25/12	1.9	27.7	4.1	54	8.1			0.16									
Sawmill	Shore	07/25/12	*	29.1	7.5	98	8.2			0.18									
Sechrist	Shore	07/25/12	*	29.5	7.7	101	8.2			<0.15									
Sellers	Shore	07/25/12	1.6	27.7	4.9	64	7.9			0.34									
Shock	Shore	07/25/12	*	29.2	7.0	91	8.1			<0.15									
Shoe	Shore	07/25/12	1.8	30.3	7.8	106	8.4			0.17									
Silver	Shore	07/25/12	2.5		5.1	64	8.1			<0.15									
Spear	Shore	07/25/12	*	29.5	7.5	94	8.0			<0.15									
Stanton	Shore	07/25/12	*	27.7	7.6	90	8.2			<0.15									
Syracuse (Hoy's Beach)	Shore	07/25/12	*	27.8	7.7	93	8.2			<0.15									
Syracuse (Lakeview)	Shore	07/25/12	*	28.3	8.2	103	8.5			<0.15									
Syracuse	Open	07/25/12	11.6	28.6	8.2	106	8.5			<0.15	0.026	0.00	0.00	0.003	0.013	0.551	0.553	43.9	
Tippecanoe	Shore	07/25/12	*	28.2	4.2	60	8.6			0.24									
Tippecanoe	Open	07/25/12	5.7	28.5	7.9	101	9.6			0.30	0.003	0.00	0.02	0.003	0.027	0.765	0.786	29.1	
Waubee	Shore	07/25/12	*	28.7	9.2	119	8.2			<0.15									
Wawasee	Shore	07/25/12	*	28.6	8.5	113	8.5			0.24									
Wawasee	Open	07/25/12	8.4	28.4	9.5	115	8.6			0.18	0.024	0.00	0.00	0.004	0.018	0.552	0.554	30.8	23105
Webster	Shore	07/25/12	1.7	27.6	6.0	80	8.0			0.28									
Webster	Open	07/25/12	2.6	27.7	7.7	101	7.9			0.18	0.018	0.00	0.00	0.005	0.023	0.849	0.851	37.8	
Winona	Shore	07/25/12	*	28.6	8.3	102	8.3			0.17									
Winona	Open	07/25/12	4.9	27.8	8.1	103	8.2			0.24	0.014	0.00	0.00	0.003	0.014	0.685	0.687	49.8	107790
Yellow Creek	Shore	07/25/12	*	28.0	6.7	102	8.5			0.20									
Yellow Creek	Open	07/25/12	5.5	27.6	7.8	98	8.5			<0.15	0.031	0.02	0.21	0.003	0.020	0.731	0.961	47.6	8436
Beaver Dam	Open	08/01/12	3.6	27.8	7.7	98	8.5			<0.15	0.067	0.00	0.00	0.002	0.037	1.277	1.279	34.7	

Lake Name	**Site Type**	**Week**	**SD** ft	**WT** °C	**DO** mg/L	**DO** %sat	pH	**Cond** mS/cm	**PC** ppb	**MC** ppb	**NH3** mg/l	**NO2** mg/l	**NO3** mg/l	**SRP** mg/l	**TP** mg/l	**TKN** mg/l	**TN** mg/l	**N/P**	**BG algae** cells/ml
Big Barbee	Open	08/01/12	4.6	27.7	8.9	114	8.3			<0.15	0.013	0.00	0.01	0.002	0.028	0.708	0.719	25.4	
Big Chapman	Open	08/01/12	8.9	29.1	8.4	107	8.4			<0.15	0.001	0.00	0.01	0.005	0.019	0.598	0.609	32.9	
Dewart	Open	08/01/12	9.1	28.8	8.0	107	8.3			<0.15	0.013	0.00	0.01	0.005	0.015	0.577	0.588	39.2	11189
James	Open	08/01/12	4.3	28.9	9.2	120	8.4			0.20	0.005	0.00	0.01	0.002	0.023	0.764	0.775	33.2	26670
Oswego	Open	08/01/12	3.9	29.0	9.4	123	8.5			<0.15	0.015	0.00	0.00	0.006	0.025	0.566	0.568	22.7	
Syracuse	Open	08/01/12	13.9	28.2	8.2	106	8.4			<0.15	2.049	0.00	0.01	0.013	0.114	5.183	5.194	45.6	
Tippecanoe	Open	08/01/12	4.9	28.8	8.4	109	8.3			0.19	0.001	0.00	0.01	0.003	0.022	0.476	0.487	22.1	
Wawasee	Open	08/01/12	9.4	27.7	8.5	108	8.5			<0.15	0.018	0.00	0.01	0.002	0.014	0.539	0.550	38.2	21810
Webster	Open	08/01/12	2.2	27.8	9.0	116	8.2			<0.15	0.001	0.00	0.00	0.003	0.039	0.898	0.900	23.2	
Winona	Open	08/01/12	3.9	27.2	8.1	101	8.4			<0.15	0.001	0.00	0.00	0.005	0.024	0.647	0.649	26.6	285637
Yellow Creek	Open	08/01/12	6.6	27.8	8.3	107	8.4			<0.15	0.005	0.01	0.21	0.002	0.022	0.985	1.205	54.8	10282
Backwater	Shore	08/08/12	1.3	27.4	8.5	105	8.2			<0.15									
Beaver Dam	Shore	08/08/12	*	27.1	7.3	92	8.2			<0.15									
Beaver Dam	Open	08/08/12	3.1	27.3	7.4	93	8.6			<0.15	0.005		0.11	0.004	0.038	1.193	1.303	34.3	
Big Barbee	Shore	08/08/12	2.8	29.2	8.4	102	8.3			<0.15	0.020		0.01	0.003	0.026	0.670	0.680	26.3	
Big Chapman	Shore	08/08/12	*	24.3	8.1	106	8.2			<0.15									
Big Chapman	Open	08/08/12	*	27.8	8.6	107	8.3			0.21	0.011	0.00	0.01	0.002	0.010	0.535	0.546	56.3	
Boner	Shore	08/08/12	*	24.9	2.0	24	7.7			<0.15									
Caldwell	Shore	08/08/12	2.2	28.2	7.8	97	8.4			<0.15									
Camelot	Shore	08/08/12	*	27.8	6.6	124	8.3			<0.15									
Carr	Shore	08/08/12	*	28.2	7.2	95	8.5			<0.15									
Center	Shore	08/08/12	3.2	25.9	7.6	95	8.4			0.29									
Crystal	Shore	08/08/12	*	26.5	7.4	16	8.3			<0.15									
Dewart	Shore	08/08/12	*	27.0	7.4	92	8.6			<0.15									
Dewart	Open	08/08/12	9.4	27.4	7.6	97	8.5			0.19	0.026	0.00	0.00	0.003	0.011	0.613	0.615	54.9	5313
Diamond	Shore	08/08/12	2.5	27.4	5.1	66	8.4			<0.15									
Goose	Shore	08/08/12	*	28.0	7.6	100	8.4			0.21									
Hill	Shore	08/08/12	*	27.7	7.7	102	8.3			<0.15									
Hoffman	Shore	08/08/12	3.4	27.1	6.5	87	8.0			<0.15									
Irish	Shore	08/08/12	*	28.4	7.8	112	8.4			<0.15									
James	Shore	08/08/12	*	27.5	9.3	117	8.5			<0.15									
James	Open	08/08/12	5.1	27.2	8.6	107	8.3			0.28	0.001	0.00	0.00	0.002	0.030	0.785	0.787	26.5	65729

	Site		SD	WT	DO	DO		Cond	PC	MC	NH3	NO2	NO3	SRP	TP	TKN	TN	N/P	BG algae
Lake Name	**Type**	**Week**	ft	°C	mg/L	%sat	pH	mS/cm	ppb	ppb	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		cells/ml
Kuhn	Shore	08/08/12	*	29.6	8.2	108	8.2			<0.15									
Little Barbee	Shore	08/08/12	*	29.7	8.2	108	8.2			<0.15									
Little Chapman	Shore	08/08/12	*	25.1	8.2	100	9.2			<0.15									
Loon	Shore	08/08/12	2.1	26.9	5.7	81	8.4			<0.15									
McClure's	Shore	08/08/12	1.4	27.3	6.1	76	8.5			<0.15									
Muskellunge	Shore	08/08/12	1.2	28.2	7.0	86	8.2			<0.15									
Oswego	Shore	08/08/12	*	27.6	9.8	124	8.6			<0.15									
Oswego	Open	08/08/12	5.6	27.6	8.5	109	8.3			0.17	0.004	0.00	0.00	0.004	0.021	0.617	0.619	29.8	
Palestine	Shore	08/08/12	1.7	25.4	1.5	16	7.7			<0.15									
Papakeechie	Shore	08/08/12	*	27.5	8.7	110	8.8			<0.15									
Pike	Shore	08/08/12	3.1	25.9	7.6	95	8.6			0.15									
Ridinger	Shore	08/08/12	*	27.6	9.7	122	8.5			<0.15									
Rock	Shore	08/08/12	1.2	27.1	6.0	67	8.3			0.29									
Sawmill	Shore	08/08/12	*	28.6	8.8	114	8.3			<0.15									
Sechrist	Shore	08/08/12	*	28.4	7.8	106	8.3			<0.15									
Sellers	Shore	08/08/12	1.1	28.1	8.5	108	8.1			0.18									
Shock	Shore	08/08/12	*	27.6	8.5	107	8.2			<0.15									
Shoe	Shore	08/08/12	*	28.0	8.5	109	8.5			0.16									
Silver	Shore	08/08/12	*	17.5	6.2	73	8.3			0.30									
Spear	Shore	08/08/12	*	27.1	7.1	89	8.1			<0.15									
Stanton	Shore	08/08/12	*	27.7	8.2	105	8.3			0.29									
Syracuse (Hoy's Beach)	Shore	08/08/12	*	27.2	8.3	105	8.5			<0.15									
Syracuse (Lakeview)	Shore	08/08/12	*	26.4	7.6	93	8.5			<0.15									
Syracuse	Open	08/08/12	12.5	27.5	8.2	104	8.5			<0.15	0.006	0.00	0.00	0.002	0.012	0.587	0.589	51.2	
Tippecanoe	Shore	08/08/12	*	27.2	8.7	110	8.4			<0.15									
Tippecanoe	Open	08/08/12	6.1	27.3	8.0	98	8.4			0.40	0.003	0.00	0.00	0.003	0.020	0.648	0.650	31.9	
Waubee	Shore	08/08/12	*	27.5	10.1	126	8.3			<0.15									
Wawasee	Shore	08/08/12	*	27.2	8.8	110	8.6			0.17									
Wawasee	Open	08/08/12	11.2	26.7	8.2	102	8.6			0.15	0.014	0.00	0.02	0.005	0.016	0.617	0.638	40.6	9932
Webster	Shore	08/08/12	2.2	27.5	9.2	116	8.5			<0.15									
Webster	Open	08/08/12	2.0	27.6	8.8	112	8.3			0.16	0.009	0.00	0.00	0.003	0.025	0.872	0.874	34.7	

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Winona	Shore	08/08/12	2.9	24.2	8.4	100	8.5			<0.15									
Winona	Open	08/08/12	5.4	27.2	8.4	109	8.3			<0.15	0.706	0.00	0.01	0.001	0.013	0.724	0.735	57.0	398399
Yellow Creek	Shore	08/08/12	*	27.3	8.3	108	8.4			0.17									
Yellow Creek	Open	08/08/12	5.5	27.6	8.8	110	8.6			0.30	0.034	0.01	0.12	0.005	0.021	0.995	1.125	53.1	8095
Beaver Dam	Open	08/29/12	6.5	26.2	8.6	106	8.1			<0.15	0.044	0.00	0.00	0.004	0.022	0.941	0.943	42.7	
Big Barbee	Open	08/29/12	7.1	26.6	9.8	122	8.0			<0.15	0.050	0.00	0.00	0.001	0.017	0.498	0.500	30.3	
Big Chapman	Open	08/29/12	9.1	26.4	9.6	118	7.7			<0.15	0.039	0.00	0.00	0.003	0.024	0.446	0.448	19.0	
Dewart	Open	08/29/12	7.0	26.3	9.0	110	7.8			<0.15	0.051	0.00	0.00	0.004	0.008	0.842	0.844	108.2	18367
James	Open	08/29/12	6.1	25.5	9.5	117	7.9			<0.15	0.055	0.00	0.00	0.004	0.022	0.539	0.541	24.7	
Oswego	Open	08/29/12	8.1	25.9	9.6	123	8.1			<0.15	0.060	0.00	0.00	0.004	0.007	0.535	0.537	73.6	
Syracuse	Open	08/29/12	11.2	25.4	9.2	114	8.0			<0.15	0.044	0.00	0.00	0.003	0.010	0.488	0.490	48.1	
Tippecanoe	Open	08/29/12	5.6	25.7	9.4	115	7.9			<0.15	0.090	0.01	1.12	0.094	0.102	0.750	1.880	18.4	
Wawasee	Open	08/29/12	9.5	25.0	9.8	117	8.2			<0.15	0.026	0.00	0.00	0.008	0.018	0.491	0.493	27.4	12578
Webster	Open	08/29/12	3.2	26.9	10.2	129	7.9			0.16	0.048	0.00	0.00	0.003	0.020	0.657	0.659	33.3	
Winona	Open	08/29/12	6.3	26.1	9.5	116	7.9			<0.15	0.712	0.02	0.08	0.204	0.300	1.249	1.349	4.5	25579
Yellow Creek	Open	08/29/12	6.7	26.2	10.0	124	8.3			0.24	0.036	0.00	0.00	0.002	0.011	0.748	0.750	66.4	8020
Backwater	Shore	09/12/12		21.7	8.2	98	7.6			0.15									
Beaver Dam	Shore	09/12/12	*	23.3	6.7	79	7.9			<0.15									
Beaver Dam	Open	09/12/12	8.0	23.3	6.7	79	7.9			<0.15	0.001	0.00	0.00	0.001	0.022	0.941	0.943	42.5	
Big Barbee	Shore	09/12/12	*	25.5	12.8	168	7.9			<0.15									
Big Barbee	Open	09/12/12	6.3	24.3	6.8	82	7.7			<0.15	0.001	0.00	0.00	0.002	0.015	0.525	0.527	34.4	
Big Chapman	Shore	09/12/12	*	24.9	8.4	99	8.0			0.16									
Big Chapman	Open	09/12/12	8.7	23.9	7.0	82	7.8			0.23	0.067	0.00	0.00	0.003	0.014	0.623	0.625	46.3	
Boner	Shore	09/12/12	*	17.7	2.4	24	7.1			<0.15									
Caldwell	Shore	09/12/12	*	24.0	7.9	94	7.9			0.17									
Camelot	Shore	09/12/12	*	22.7	6.4	62	7.4			<0.15									
Carr	Shore	09/12/12	*	23.0	7.3	83	8.2			<0.15									
Center	Shore	09/12/12	*	24.2	7.8	92	7.9			<0.15									
Crystal	Shore	09/12/12	*	22.5	6.0	66	7.4			0.17									
Dewart	Shore	09/12/12		22.1	6.4	75	7.7			<0.15									
Dewart	Open	09/12/12		23.5	6.4	76	7.8			<0.15	0.046	0.00	0.01	0.002	0.020	0.593	0.604	30.0	27886
Diamond	Shore	09/12/12	*	23.5	7.4	86	8.0			<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Goose	Shore	09/12/12	*	23.9	6.6	78	7.3			0.19									
Hill	Shore	09/12/12	*	24.2	7.3	88	7.6			0.26									
Hoffman	Shore	09/12/12	*	23.3	7.0	83	7.6			<0.15									
Irish	Shore	09/12/12	*	25.4	6.8	81	7.8			<0.15									
James	Shore	09/12/12	*	23.4	8.0	94	7.8			0.15									
James	Open	09/12/12	7.6	23.2	7.1	83	7.9			0.20	0.030	0.00	0.00	0.001	0.007	0.475	0.477	65.3	29424
Kuhn	Shore	09/12/12	*	26.3	9.6	120	7.7			0.16									
Little Barbee	Shore	09/12/12	*	25.9	7.7	91	7.6			<0.15									
Little Chapman	Shore	09/12/12	*	25.0	8.6	105	7.8			<0.15									
Loon	Shore	09/12/12	*	23.8	7.3	86	8.0			<0.15									
McClure's	Shore	09/12/12	2.0	23.6	7.6	89	7.8			0.16									
Muskellunge	Shore	09/12/12	2.5	23.2	6.8	79	7.7			0.25									
Oswego	Shore	09/12/12	*	21.7	8.0	89	8.0			<0.15									
Oswego	Open	09/12/12	7.1	23.3	6.9	80	7.9			<0.15	0.032	0.00	0.01	0.005	0.010	0.535	0.546	53.5	
Palestine	Shore	09/12/12	2.1	21.7	1.4	16	6.8			<0.15									
Papakeechie	Shore	09/12/12	*	21.7	6.9	77	8.7			0.25									
Pike	Shore	09/12/12	2.4	23.9	7.9	92	7.8			<0.15									
Ridinger	Shore	09/12/12		24.0	6.9	79	7.9			<0.15									
Rock	Shore	09/12/12	1.2	23.5	9.4	111	8.1			0.32									
Sawmill	Shore	09/12/12	*	25.6	7.4	93	7.6			<0.15									
Sechrist	Shore	09/12/12	*	26.2	10.2	120	7.9			<0.15									
Sellers	Shore	09/12/12	1.5	23.8	10.1	118	7.7			<0.15									
Shock	Shore	09/12/12		23.3	7.8	92	7.5			<0.15									
Silver	Shore	09/12/12	2.4	24.4	8.6	103	7.5			0.24									
Silver	Shore	09/12/12	2.4	24.3	8.6	102	8.0			0.59									
Stanton	Shore	09/12/12	*				7.2			0.28									
Syracuse (Hoy's Beach)	Shore	09/12/12	*	20.2	6.8	75	7.7			0.28									
Syracuse (Lakeview)	Shore	09/12/12	*	21.0	6.2	70	7.9			0.52									
Syracuse	Open	09/12/12	11.3				7.9			0.18	0.039	0.00	0.01	0.001	0.010	0.466	0.477	46.3	
Tippecanoe	Shore	09/12/12	*	21.9	8.0	92	7.7			<0.15									
Tippecanoe	Open	09/12/12	6.5	23.4	6.9	82	7.8			0.18	0.001	0.00	0.00	0.002	0.009	0.500	0.502	55.8	

	Site		SD	WT	DO	DO		Cond	PC	MC	NH3	NO2	NO3	SRP	TP	TKN	TN	N/P	BG algae
Lake Name	**Type**	**Week**	ft	°C	mg/L	%sat	pH	mS/cm	ppb	ppb	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		cells/ml
Waubee	Shore	09/12/12	*	22.9	7.6	91	7.8			<0.15									
Wawasee	Shore	09/12/12	*	20.8	7.4	82	8.4			0.25									
Wawasee	Open	09/12/12	11.8				7.3			0.23	0.034	0.00	0.00	0.003	0.005	0.421	0.423	79.9	
Webster	Shore	09/12/12		22.8	6.8	83	7.6			<0.15									
Webster	Open	09/12/12	3.4	23.3	7.0	82	7.7			<0.15	0.005	0.00	0.00	0.004	0.023	0.738	0.740	32.2	
Winona	Shore	09/12/12	*	25.7	12.2	149	8.1			<0.15									
Winona	Open	09/12/12	6.9	24.4	7.6	91	7.8			<0.15	0.033	0.00	0.00	0.002	0.016	0.554	0.556	35.2	130980
Yellow Creek	Shore	09/12/12	*	23.3	7.6	89	8.2			1.53									
Yellow Creek	Open	09/12/12	6.0	23.6	7.6	89	8.2			0.61	0.031	0.00	0.02	0.004	0.007	0.839	0.860	130.3	22209
Beaver Dam	Open	05/15/13	9.9	19.2	9.7	109	10.2	0.391	10.9	0.15	0.093	0.03	1.08	0.016	0.049	1.485	2.595	53.1	
Big Barbee	Open	05/15/13	7.3	17.9	9.6	103	10.0	0.486	14.7	<0.15	0.102	0.04	2.31	0.001	0.034	1.199	3.549	105.9	
Big Chapman	Open	05/15/13	6.4	17.7	8.5	91	9.6	0.47	-0.9	0.17	0.115	0.00	0.04	0.001	0.014	0.601	0.642	45.2	
Camelot	Open	05/15/13	7.2	19.4	10.1	114	9.5	0.501	0.1	<0.15	0.050	0.01	1.18	0.002	0.010	0.320	1.510	159.0	
Dewart	Open	05/15/13	10.2	16.7	8.3	88	9.3	0.358	6.4	<0.15	0.084	0.00	0.07	0.003	0.024	0.770	0.841	35.2	544
James	Open	05/15/13	5.7	15.5	8.9	93	8.6	0.491	2.0	0.24	0.101	0.02	0.83	0.001	0.022	0.898	1.748	78.4	3031
Oswego	Open	05/15/13	7.2	16.0	9.4	100	9.0	0.486	1.2	0.20	0.093	0.01	0.73	0.002	0.022	0.867	1.607	73.0	
Syracuse	Open	05/15/13	8.7	17.2	9.1	96	9.6	0.37	-3.0	<0.15	0.075	0.00	0.07	0.000	0.016	0.607	0.678	42.1	
Tippecanoe	Open	05/15/13	10.7	15.5	8.6	89	8.7	0.487	1.7	<0.15	0.113	0.02	0.77	0.004	0.029	0.893	1.683	58.2	
Wawasee	Open	05/15/13	11.8	15.8	9.8	103	9.4	0.377	4.4	<0.15	0.057	0.00	0.21	0.000	0.009	0.559	0.770	81.9	0
Webster	Open	05/15/13	5.7	16.8	10.1	104	9.3	0.477	1.7	0.15	0.073	0.02	0.87	0.002	0.027	1.027	1.917	72.3	
Winona	Open	05/15/13	3.9	15.9	10.3	107	9.4	0.548	2.0	<0.15	0.062	0.01	1.65	0.001	0.038	1.186	2.846	74.5	329
Yellow Creek	Open	05/15/13	8.4	19.4	9.1	103	9.7	0.437	2.2	<0.15	0.195	0.03	1.60	0.016	0.044	1.560	3.190	73.0	14836
Backwater	Shore	05/29/13	*	18.8	8.4	94	8.1	0.492		<0.15									
Beaver Dam	Shore	05/29/13	*	19.6	8.1	91	8.3	0.389		0.19									
Beaver Dam	Open	05/29/13	11.0	19.5	7.9	89	8.3	0.391		0.16	0.072	0.03	0.94	0.006	0.056	1.606	2.576	46.3	
Big Barbee	Shore	05/29/13	*	22.1	6.9	82	8.0	0.474		0.23									
Big Barbee	Open	05/29/13	6.6	21.9	8.7	102	8.4	0.489		<0.15	0.055	0.04	1.67	0.000	0.031	1.020	2.730	88.9	
Big Chapman	Shore	05/29/13	*	22.3	9.6	114	8.3	0.464		<0.15									
Big Chapman	Open	05/29/13	7.7	21.3	9.3	108	8.3	0.47		<0.15	0.028	0.00	0.03	0.003	0.030	0.650	0.681	22.8	
Boner	Shore	05/29/13	*	24.4	8.5	105	8.2	0.359		<0.15									
Caldwell	Shore	05/29/13	3.2	20.5	11.5	131	8.4	0.46		<0.15									
Camelot	Shore	05/29/13	*	22.6	9.9	118	8.3	0.449		<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Camelot	Open	05/29/13	9.2	21.5	9.5	110	8.2	0.471		<0.15	0.044	0.01	1.06	0.000	0.016	0.348	1.418	91.5	
Carr	Shore	05/29/13	*	22.9	12.5	150	8.8	0.402		<0.15									
Center	Shore	05/29/13	*	21.7	8.9	104	8.5	0.608		1.06									
Crystal	Shore	05/29/13	*	20.0	7.8	89	8.3	0.468		<0.15									
Dewart	Shore	05/29/13	*	21.0	10.1	116	8.6	0.334		0.17									
Dewart	Open	05/29/13	6.6	20.2	9.5	108	8.6	0.34		<0.15									949
Diamond	Shore	05/29/13	*	21.1	9.6	112	8.5	0.459		<0.15									
Goose	Shore	05/29/13	2.3	22.1	8.5	101	8.4	0.508		<0.15									
Hill	Shore	05/29/13	*	19.7	9.3	104	8.5	0.404		0.15									
Hoffman	Shore	05/29/13	*	19.0	9.0	99	8.2	0.645		<0.15									
Irish	Shore	05/29/13	*	22.2	9.7	115	8.4	0.466		<0.15									
James	Shore	05/29/13	*	18.8	10.0	111	8.3	0.491		0.23									
James	Open	05/29/13	8.8	18.2	8.8	96	8.3	0.481		0.16	0.082	0.02	0.66	0.002	0.051	1.003	1.683	32.9	2735
Kuhn	Shore	05/29/13	*	21.4	7.1	82	8.1	0.47		<0.15									
Little Barbee	Shore	05/29/13	*	22.4	10.2	121	8.4	0.487		<0.15									
Little Chapman	Shore	05/29/13	*	22.3	10.6	125	8.7	0.434		<0.15									
Loon	Shore	05/29/13	*	20.6	9.2	105	8.3	0.406		<0.15									
McClure's	Shore	05/29/13	0.8	20.7	12.9	148	9.3	0.36		4.22									
Muskellunge	Shore	05/29/13	1.7	21.9	10.1	119	8.2	0.621		0.26									
Oswego	Shore	05/29/13	*	19.5	10.0	112	8.4	0.476		0.17									
Oswego	Open	05/29/13	6.3	18.7	9.2	102	8.4	0.47		<0.15									
Palestine	Shore	05/29/13	*	19.6	2.3	26	7.5	0.506		<0.15									
Papakeechie	Shore	05/29/13	*	21.6	6.6	77	7.9	0.305		<0.15									
Pike	Shore	05/29/13	*	21.7	9.2	108	8.3	0.602		0.26									
Ridinger	Shore	05/29/13	3.6	19.9	8.7	98	8.4	0.512		<0.15									
Rock	Shore	05/29/13	2.0	21.1	6.7	78	7.8	0.436		0.24									
Sawmill	Shore	05/29/13	*	22.2	8.5	101	8.3	0.468		<0.15									
Sechrist	Shore	05/29/13	*	21.9	7.6	90	8.2	0.441		<0.15									
Sellers	Shore	05/29/13	1.4	19.6	10.4	117	8.4	0.413		<0.15									
Shock	Shore	05/29/13	*	21.7	8.8	103	8.3	0.379		<0.15									
Shoe	Shore	05/29/13	*	19.4	9.3	104	8.4	0.301		0.20									
Silver	Shore	05/29/13	3.0	21.0	10.7	124	8.6	0.478		<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Spear	Shore	05/29/13	*	22.0	7.6	89	7.9	0.326		<0.15									
Stanton	Shore	05/29/13	*	19.2	9.4	105	8.4	0.405		0.16									
Syracuse (Hoy's Beach)	Shore	05/29/13	*	21.2	8.9	103	8.3	0.368		0.17									
Syracuse (Lakeview)	Shore	05/29/13	*	22.5	9.4	112	8.4	0.367		0.56									
Syracuse	Open	05/29/13	8.9	21.0	8.3	96	8.2	0.372		0.19	0.062	0.00	0.05	0.002	0.018	0.568	0.619	34.8	
Tippecanoe	Shore	05/29/13	*	18.6	10.1	111	8.3	0.474		0.28									
Tippecanoe	Open	05/29/13	8.9	18.7	8.4	93	8.3	0.473		0.16	0.041	0.02	0.64	0.007	0.047	0.898	1.558	33.2	
Waubee	Shore	05/29/13	*	21.8	9.0	105	8.2	0.551		<0.15									
Wawasee	Shore	05/29/13	*	21.3	9.2	107	8.3	0.379		<0.15									
Wawasee	Open	05/29/13	14.5	19.8	8.6	97	8.2	0.372		<0.15	0.027	0.00	0.19	0.004	0.021	0.538	0.729	34.9	48
Webster	Shore	05/29/13	*	19.7	11.3	126	8.5	0.445		<0.15									
Webster	Open	05/29/13	6.4	19.3	8.6	96	8.3	0.459		<0.15	0.018	0.02	0.47	0.002	0.045	0.911	1.401	30.9	
Winona	Shore	05/29/13	*	21.1	9.0	104	8.3	0.546		<0.15									
Winona	Open	05/29/13	5.9	21.0	8.9	103	8.4	0.55		<0.15	0.020	0.02	1.30	0.002	0.032	0.952	2.272	71.9	0
Yellow Creek	Shore	05/29/13	*	20.9	8.8	101	8.3	0.432		<0.15									
Yellow Creek	Open	05/29/13	9.3	20.1	8.1	92	8.1	0.434		<0.15	0.142	0.04	1.49	0.004	0.041	1.447	2.977	72.8	1743
Beaver Dam	Open	06/12/13	2.9	24.5	13.4	167	9.3	0.346	41.7	0.84	0.078	0.04	0.63	0.004	0.062	1.998	2.668	43.0	
Big Chapman	Open	06/12/13	5.8	24.6	10.2	127	8.6	0.437	5.2	0.18	0.032	0.00	0.01	0.003	0.025	0.635	0.646	25.4	
Camelot	Open	06/12/13	14.4	23.6	9.0	110	8.3	0.446	17.7	<0.15	0.056	0.02	0.97	0.003	0.017	0.298	1.288	77.1	
Dewart	Open	06/12/13	7.2	23.8	8.9	109	8.7	0.313	7.1	<0.15	0.026	0.00	0.00	0.009	0.031	0.667	0.669	21.5	6896
James	Open	06/12/13	5.2	22.9	9.0	108	8.4	0.452	8.0	<0.15	0.092	0.02	0.33	0.003	0.051	0.976	1.326	25.9	3485
Oswego	Open	06/12/13	3.3	22.9	10.0	121	8.5	0.448	7.7	<0.15	0.060	0.02	0.40	0.003	0.030	0.867	1.287	43.5	
Syracuse	Open	06/12/13	13.2	23.8	8.8	108	8.5	0.367	6.6	<0.15	0.040	0.00	0.05	0.002	0.013	0.620	0.671	51.6	
Tippecanoe	Open	06/12/13	3.7	22.5	9.8	117	8.6	0.444	13.8	<0.15	0.037	0.03	0.45	0.004	0.046	0.964	1.444	31.7	
Wawasee	Open	06/12/13	16.0	22.7	9.3	111	8.5	0.364	6.7	0.36	0.033	0.00	0.14	0.003	0.019	0.546	0.687	36.5	4456
Webster	Open	06/12/13	3.7	25.1	10.4	131	8.5	0.427	6.2	<0.15	0.051	0.02	0.25	0.004	0.022	0.865	1.135	51.3	
Winona	Open	06/12/13	3.3	24.4	13.0	162	8.9	0.479	13.4	<0.15	0.054	0.04	1.32	0.003	0.059	1.158	2.518	42.4	13137
Yellow Creek	Open	06/12/13	5.3	24.1	9.9	122	8.5	0.4	1.9	<0.15	0.110	0.06	1.66	0.004	0.049	1.521	3.241	65.9	5111
Big Barbee	Open	06/19/13	2.5	24.2	12.1	148	8.8	0.445	12.3	<0.15	0.060	0.10	2.12	0.004	0.053	1.475	3.695	69.6	
Irish	Open	06/19/13	3.3	25.7	10.9	139	8.8	0.422	13.0	0.30	0.036	0.05	0.86	0.002	0.046	1.326	2.236	49.0	
Backwater	Shore	06/26/13	2.5	26.4	6.4	81	8.0	0.491	40.0	0.27									

	Site		SD	WT	DO	DO		Cond	PC	MC	NH3	NO2	NO3	SRP	TP	TKN	TN	N/P	BG algae
Lake Name	**Type**	**Week**	ft	°C	mg/L	%sat	pH	mS/cm	ppb	ppb	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		cells/ml
Beaver Dam	Shore	06/26/13	1.0	27.7	11.1	146	9.4	0.309	45.2	0.94									
Beaver Dam	Open	06/26/13	1.4	27.3	11.4	149	9.4	0.307	126.9	1.62	0.079	0.02	0.05	0.003	0.075	2.186	2.256	30.2	
Big Barbee	Shore	06/26/13	*	25.9	3.4	42	8.0	0.457	12.4	0.34									
Big Barbee	Open	06/26/13	2.8	25.8	8.9	113	8.6	0.455	17.7	0.32	0.796	0.08	1.13	0.097	0.168	1.588	2.798	16.7	
Big Chapman	Shore	06/26/13	*	27.7	8.4	110	8.4	0.441	2.1	0.55									
Big Chapman	Open	06/26/13	7.4	26.7	7.3	94	8.4	0.436	-0.4	0.36	0.056	0.00	0.04	0.005	0.043	0.654	0.695	16.3	
Boner	Shore	06/26/13	*	27.1	5.7	73	8.1	0.361		<0.15									
Caldwell	Shore	06/26/13	3.1	25.8	5.9	74	7.9	0.381	22.5	<0.15									
Camelot	Shore	06/26/13	*	27.1	9.0	116	8.6	0.445		<0.15									
Camelot	Open	06/26/13	7.5	26.7	8.7	113	8.5	0.464	-0.4	<0.15	0.001	0.02	0.88	0.001	0.023	0.370	1.270	54.3	
Carr	Shore	06/26/13	2.1	26.1	1.4	18	8.1	0.356	35.4	3.51									
Center	Shore	06/26/13	3.8	27.5	9.1	119	8.7	0.552	7.6	<0.15									
Crystal	Shore	06/26/13	*	26.5	6.3	81	8.2	0.454		<0.15									
Dewart	Shore	06/26/13	*	26.3	9.7	125	9.0	0.303		<0.15									
Dewart	Open	06/26/13	5.0	26.3	8.4	107	8.9	0.309	6.7	<0.15	0.026	0.00	0.00	0.004	0.024	0.727	0.729	29.9	48784
Diamond	Shore	06/26/13	2.7	27.0	10.8	140	9.1	0.347	63.2	0.34									
Goose	Shore	06/26/13	*	26.4	6.9	89	8.3	0.471		<0.15									
Hill	Shore	06/26/13	3.2	26.5	8.3	107	8.7	0.367	12.1	<0.15									
Hoffman	Shore	06/26/13	3.1	26.5	11.0	141	8.7	0.57	8.3	<0.15									
Irish	Shore	06/26/13	2.7	26.7	8.7	112	8.6	0.433	17.0	0.32									
James	Shore	06/26/13	*	26.1	7.0	89	8.4	0.456	9.1	0.22									
James	Open	06/26/13	4.6	26.0	8.3	106	8.5	0.454	18.2	<0.15	0.038	0.02	0.20	0.004	0.049	1.019	1.239	25.2	27653
Kuhn	Shore	06/26/13	*	26.1	6.2	79	8.3	0.452	7.4	1.25									
Little Barbee	Shore	06/26/13	3.0	26.2	6.8	84	8.3	0.453	12.0	<0.15									
Little Chapman	Shore	06/26/13	*	28.0	10.3	137	9.0	0.373	20.7	0.41									
Loon	Shore	06/26/13	1.5	28.9	10.1	135	9.2	0.338	97.7	1.73									
McClure's	Shore	06/26/13	1.8	26.8	8.1	105	8.3	0.38	61.1	0.48									
Muskellunge	Shore	06/26/13	1.9	23.6	6.3	74	7.7	0.504	21.6	<0.15									
Oswego	Shore	06/26/13	2.9	25.6	8.0	101	8.6	0.442	21.1	0.30									
Oswego	Open	06/26/13	2.7	25.7	8.1	103	8.5	0.438	18.3	0.33	0.058	0.03	0.32	0.006	0.044	0.953	1.303	29.6	
Palestine	Shore	06/26/13	1.7	25.0	3.9	49	7.9	0.453	37.3	<0.15									
Papakeechie	Shore	06/26/13	*	26.7	5.4	69	8.3	0.31		0.41									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Pike	Shore	06/26/13	1.6	26.4	9.9	127	8.7	0.498	34.2	<0.15									
Ridinger	Shore	06/26/13	*	27.0	9.3	121	8.7	0.46	12.7	0.23									
Rock	Shore	06/26/13	1.3	27.0	7.2	94	8.2	0.397	39.1	0.48									
Sawmill	Shore	06/26/13	*	26.1	5.7	73	8.2	0.451	15.0	0.56									
Sechrist	Shore	06/26/13	*	26.1	7.5	95	8.5	0.432	5.9	0.23									
Sellers	Shore	06/26/13	1.5	24.9	3.9	45	7.6	0.384	19.2	<0.15									
Shock	Shore	06/26/13	3.3	26.1	7.2	92	7.9	0.456	9.1	0.20									
Shoe	Shore	06/26/13	*	27.0	8.2	106	8.8	0.282	4.2	<0.15									
Silver	Shore	06/26/13	1.2	26.0	11.5	148	9.2	0.37	111.0	0.45									
Spear	Shore	06/26/13	3.2	26.6	2.3	30	7.5	0.318	4.9	<0.15									
Stanton	Shore	06/26/13	*	26.2	8.1	103	8.5	0.383	4.3	<0.15									
Syracuse (Hoy's Beach)	Shore	06/26/13	*	26.1	8.0	102	8.8	0.357		3.79									
Syracuse (Lakeview)	Shore	06/26/13	*	26.1	7.7	98	8.7	0.39		2.71									
Syracuse	Open	06/26/13	6.9	26.2	7.8	99	8.7	0.354	6.3	5.00	0.026	0.00	0.00	0.003	0.026	0.560	0.562	22.1	
Tippecanoe	Shore	06/26/13	3.0	26.2	6.4	81	8.2	0.46	10.8	0.29									
Tippecanoe	Open	06/26/13	2.5	26.3	9.1	117	8.6	0.438	20.4	0.33	0.023	0.03	0.32	0.002	0.054	1.032	1.382	25.7	
Waubee	Shore	06/26/13	*	26.8	7.3	94	8.6	0.546		<0.15									
Wawasee	Shore	06/26/13	*	26.5	7.5	97	8.7	0.369		1.23									
Wawasee	Open	06/26/13	4.3	25.9	7.8	99	8.7	0.351	5.9	2.13	0.037	0.00	0.07	0.004	0.028	0.627	0.698	25.1	15165
Webster	Shore	06/26/13	*	27.4	6.6	87	8.2	0.469	14.0	<0.15									
Webster	Open	06/26/13	3.5	27.2	8.8	114	8.6	0.436	15.9	0.54	0.001	0.01	0.08	0.005	0.047	0.989	1.079	22.8	
Winona	Shore	06/26/13	1.8	27.2	9.6	124	8.8	0.495	19.9	0.33									
Winona	Open	06/26/13	3.2	27.1	10.4	136	8.9	0.476	19.6	0.16	0.027	0.05	1.12	0.004	0.049	1.261	2.431	49.5	134217
Yellow Creek	Shore	06/26/13	1.8	26.5	9.9	127	9.0	0.375	38.7	2.22									
Yellow Creek	Open	06/26/13	2.6	26.9	11.4	149	9.1	0.361	61.2	1.76	0.052	0.07	1.07	0.003	0.055	1.863	3.003	54.9	75499
Beaver Dam	Open	07/10/13	1.8	26.1	9.2	114	9.0	0.327	96.0	1.98	0.072	0.00	0.00	0.003	0.069	2.552	2.554	37.2	
Big Barbee	Open	07/10/13	2.7	25.4	8.9	111	8.2	0.477	19.2	<0.15	0.047	0.09	1.40	0.002	0.040	1.202	2.692	67.0	
Big Chapman	Open	07/10/13		26.4	8.1	103	8.4	0.444	4.0	0.24	0.067	0.00	0.03	0.004	0.019	0.595	0.626	33.6	
Camelot	Open	07/10/13	10.2	25.5	8.0	100	8.2	0.474	0.0	<0.15	0.064	0.02	0.80	0.003	0.013	0.340	1.160	88.5	
Dewart	Open	07/10/13		25.1	7.6	95	8.5	0.309	8.1	0.94	0.011	0.00	0.01	0.001	0.029	0.747	0.758	25.8	10158
James	Open	07/10/13	4.9	25.4	7.9	98	8.2	0.46	12.1	0.19	0.057	0.02	0.15	0.004	0.046	0.844	1.014	22.2	19381

	Site		SD	WT	DO	DO		Cond	PC	MC	NH3	NO2	NO3	SRP	TP	TKN	TN	N/P	BG algae
Lake Name	**Type**	**Week**	ft	°C	mg/L	%sat	pH	mS/cm	ppb	ppb	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l		cells/ml
Oswego	Open	07/10/13	4.3	26.1	8.0	101	8.3	0.45	5.5	1.31	0.058	0.02	0.30	0.005	0.034	0.770	1.090	31.8	
Syracuse	Open	07/10/13	5.6	25.5	7.6	95	8.4	0.368	7.6	0.24	0.026	0.01	0.04	0.003	0.035	0.714	0.764	22.2	
Tippecanoe	Open	07/10/13	3.6	25.9	8.5	107	8.3	0.45	8.3	1.04	0.001	0.03	0.20	0.003	0.048	0.976	1.206	25.0	
Wawasee	Open	07/10/13	5.0	25.0	8.4	104	8.6	0.36	9.2	0.24	0.010	0.00	0.00	0.005	0.023	0.612	0.614	26.7	10727
Webster	Open	07/10/13	2.4	26.7	8.0	103	8.3	0.44	14.2	0.24	0.001	0.00	0.01	0.005	0.047	0.959	0.970	20.5	
Winona	Open	07/10/13	2.5	24.6	7.9	96	8.5	0.502	28.4	<0.15	0.056	0.04	0.75	0.003	0.037	1.237	2.027	55.1	203488
Yellow Creek	Open	07/10/13	2.6	26.0	8.4	106	8.5	0.388	50.9	<0.15	0.035	0.08	0.91	0.002	0.061	1.608	2.598	42.3	300513
Backwater	Shore	07/24/13	3.1	28.7	3.7	49	8.0	0.483	16.3	<0.15									
Beaver Dam	Shore	07/24/13	2.4	26.3	5.3	67	8.9	0.334	34.7	0.18									
Beaver Dam	Open	07/24/13	2.9	26.6	6.0	76	8.8	0.338	31.7	0.23	0.037	0.00	0.04	0.000	0.042	1.532	1.573	37.3	
Big Barbee	Shore	07/24/13	*	27.7	5.8	76	8.4	0.456		0.20									
Big Barbee	Open	07/24/13	3.1	28.3	6.8	90	8.5	0.467	15.0	<0.15	0.069	0.03	0.69	0.002	0.033	1.057	1.777	53.4	
Big Chapman	Shore	07/24/13	*	26.5	9.1	115	8.7	0.444		0.31									
Big Chapman	Open	07/24/13	4.8	26.6	8.4	107	8.7	0.438	7.5	<0.15	0.032	0.00	0.00	0.001	0.007	0.576	0.578	79.2	
Boner	Shore	07/24/13	*	25.2	5.7	70	7.9	0.397		0.18									
Caldwell	Shore	07/24/13	3.1	26.5	8.9	115	8.4	0.452	25.9	0.18									
Camelot	Shore	07/24/13	*	26.6	7.9	100	8.5	0.447		0.17									
Camelot	Open	07/24/13	9.2	26.2	8.3	105	8.4	0.463	1.9	<0.15	0.049	0.01	0.69	0.001	0.012	0.321	1.021	85.8	
Carr	Shore	07/24/13	*	26.1	5.8	72	8.7	0.352		1.10									
Center	Shore	07/24/13	4.1	29.1	7.5	101	8.6	0.556	8.2	0.16									
Crystal	Shore	07/24/13	*	28.5	7.9	104	8.4	0.468		<0.15									
Dewart	Shore	07/24/13	*	25.2	7.9	99	8.9	0.303		0.19									
Dewart	Open	07/24/13	8.9	26.3	7.7	97	8.8	0.301	7.3	<0.15	0.046	0.00	0.00	0.002	0.017	0.727	0.729	42.4	38928
Diamond	Shore	07/24/13	2.7	26.4	8.7	110	8.9	0.401	24.1	0.20									
Goose	Shore	07/24/13	*	28.0	7.0	92	8.4	0.51		<0.15									
Hill	Shore	07/24/13	3.4	27.8	8.4	109	8.8	0.352	5.7	<0.15									
Hoffman	Shore	07/24/13	2.7	26.8	9.4	120	8.6	0.592	14.7	0.45									
Irish	Shore	07/24/13	2.4	28.4	8.4	110	8.6	0.404	23.2	0.62									
James	Shore	07/24/13	2.2	28.7	7.7	102	8.5	0.456	13.5	0.21									
James	Open	07/24/13	3.3	28.3	7.0	92	8.5	0.45	16.2	<0.15	0.084	0.01	0.04	0.004	0.025	0.842	0.892	35.4	75015
Kuhn	Shore	07/24/13	*	27.7	6.6	86	8.5	0.443		1.35									
Little Barbee	Shore	07/24/13	3.4	27.8	6.6	84	8.4	0.453	21.3	0.24									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Little Chapman	Shore	07/24/13	*	26.5	8.0	101	8.8	0.396		0.18									
Loon	Shore	07/24/13	2.3	26.3	6.6	84	8.7	0.369	41.7	0.24									
McClure's	Shore	07/24/13	1.8	26.1	5.7	72	8.4	0.428	54.7	0.26									
Muskellunge	Shore	07/24/13	2.4	26.9	12.2	156	8.6	0.617	42.9	<0.15									
Oswego	Shore	07/24/13	*	28.9	7.3	97	8.6	0.434		0.26									
Oswego	Open	07/24/13	3.9	28.7	7.7	101	8.6	0.431	17.3	0.46	0.038	0.00	0.03	0.001	0.022	0.745	0.776	34.9	
Palestine	Shore	07/24/13	2.1	26.5	8.0	102	8.4	0.55	49.2	<0.15									
Papakeechie	Shore	07/24/13	*	26.3	6.8	86	8.5	0.303		<0.15									
Pike	Shore	07/24/13	1.8	27.6	9.7	125	8.4	0.552	31.2	<0.15									
Ridinger	Shore	07/24/13	*	30.3	10.9	148	8.8	0.473		<0.15									
Rock	Shore	07/24/13	1.9	26.1	4.3	54	8.0	0.443	44.6	0.24									
Sawmill	Shore	07/24/13	2.7	28.3	7.3	98	8.4	0.411	47.6	1.92									
Sechrist	Shore	07/24/13	*	28.3	7.6	99	8.5	0.402		0.18									
Sellers	Shore	07/24/13	2.4	27.5	2.6	34	7.7	0.492	28.8	<0.15									
Shock	Shore	07/24/13	2.6	28.1	7.7	101	8.2	0.387	36.0	0.28									
Shoe	Shore	07/24/13	*	28.9	6.7	89	8.4	0.286		<0.15									
Silver	Shore	07/24/13	1.7	26.1	6.0	76	8.8	0.36	97.7	1.56									
Spear	Shore	07/24/13	*	29.4	8.8	118	8.2	0.325		<0.15									
Syracuse (Hoy's Beach)	Shore	07/24/13	*	26.4	8.0	102	8.8	0.354		0.30									
Syracuse (Lakeview)	Shore	07/24/13	*	26.0	8.1	102	8.8	0.351		0.32									
Syracuse	Open	07/24/13	8.4	26.3	7.6	96	8.7	0.353	4.4	<0.15	0.041	0.00	0.00	0.002	0.008	0.594	0.596	72.7	
Tippecanoe	Shore	07/24/13	*	28.2	5.9	78	8.2	0.435		0.64									
Tippecanoe	Open	07/24/13	3.8	28.5	7.9	104	8.6	0.436	11.9	0.32	0.001	0.00	0.03	0.001	0.017	0.787	0.818	47.9	
Waubee	Shore	07/24/13	*	26.9	8.3	105	8.6	0.511		<0.15									
Wawasee	Shore	07/24/13	*	26.3	7.4	94	8.7	0.368		0.61									
Wawasee	Open	07/24/13	8.5	26.1	7.5	85	8.7	0.354	3.9	0.61	0.016	0.00	0.00	0.001	0.009	0.578	0.580	62.4	11770
Webster	Shore	07/24/13	*	29.4	7.7	103	8.5	0.436		<0.15									
Webster	Open	07/24/13	2.9	29.3	8.0	107	8.6	0.425	8.6	<0.15	0.034	0.00	0.00	0.003	0.021	0.904	0.906	43.3	
Winona	Shore	07/24/13	1.7	25.4	6.1	76	8.6	0.513	30.9	<0.15									
Winona	Open	07/24/13	1.9	25.4	8.7	109	8.7	0.498	27.2	<0.15	0.007	0.02	0.23	0.000	0.029	1.244	1.494	51.2	639333
Yellow Creek	Shore	07/24/13	1.7	27.5	7.9	102	9.1	0.372	47.0	<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Yellow Creek	Open	07/24/13	1.7	27.1	8.6	111	9.1	0.371	54.5	0.17	0.076	0.05	0.26	0.000	0.047	1.880	2.190	47.1	1534207
Beaver Dam	Open	08/07/13	3.0	24.2	9.6	119	8.8	0.343	24.5	0.53	0.018	0.00	0.00	0.001	0.034	1.502	1.504	44.1	
Big Chapman	Open	08/07/13	6.5	26.3	9.3	118	8.5	0.432	2.7	0.36	0.023	0.00	0.00	0.002	0.028	0.740	0.742	26.2	
Camelot	Open	08/07/13	7.6	24.5	8.6	107	8.2	0.475	2.4	<0.15	0.022	0.01	0.59	0.001	0.012	0.367	0.967	79.9	
Dewart	Open	08/07/13	9.8	23.9	8.7	106	8.6	0.308	7.0	0.26	0.001	0.00	0.00	0.002	0.010	0.710	0.712	69.8	19975
James	Open	08/07/13	4.3	23.0	8.8	103	8.4	0.449	13.9	0.19	0.045	0.01	0.02	0.003	0.032	0.987	1.017	32.0	124064
Little Chapman	Open	08/07/13	3.5	25.2	10.6	133	8.7	0.406	8.2	<0.15	0.001	0.00	0.00	0.001	0.039	0.895	0.897	23.2	
Oswego	Open	08/07/13	4.6	23.2	8.8	106	8.4	0.436	9.4	0.41	0.021	0.00	0.00	0.005	0.015	0.803	0.805	53.3	
Syracuse	Open	08/07/13	8.8	24.2	8.2	101	8.5	0.36	3.8	0.17	0.021	0.00	0.00	0.004	0.014	0.686	0.688	47.8	
Tippecanoe	Open	08/07/13	4.5	23.4	8.8	107	8.4	0.434	16.9	3.40	0.030	0.00	0.00	0.001	0.018	0.840	0.842	47.9	
Wawasee	Open	08/07/13	10.1	23.7	8.5	104	8.5	0.364	5.5	0.77	0.001	0.00	0.00	0.003	0.013	0.637	0.639	50.3	21318
Webster	Open	08/07/13	4.3	23.4	9.0	110	8.4	0.421	9.3	<0.15	0.030	0.00	0.01	0.003	0.019	0.936	0.947	50.4	
Winona	Open	08/07/13	2.0	24.0	11.5	142	8.7	0.467	32.8	0.20	0.005	0.01	0.09	0.001	0.031	1.266	1.366	44.6	414495
Yellow Creek	Open	08/07/13	1.6	23.9	9.8	121	9.0	0.361	57.9	0.18	0.006	0.00	0.00	0.002	0.041	1.869	1.871	46.0	1873166
Backwater	Shore	08/14/13	3.6	25.3	6.0	76	7.7	0.462	14.2	<0.15									
Beaver Dam	Shore	08/14/13	2.9	28.1	8.5	112	8.8	0.345	15.2	0.92									
Beaver Dam	Open	08/14/13	2.4	26.8	8.3	108	8.8	0.345	15.1	0.39	0.036	0.00	0.00	0.002	0.034	1.389	1.391	41.5	
Big Barbee	Shore	08/14/13	*	24.1	7.8	96	8.4	0.47		0.30									
Big Barbee	Open	08/14/13	4.7	23.7	7.3	89	8.3	0.473	17.9	<0.15	0.057	0.01	0.38	0.001	0.032	1.074	1.464	45.5	
Big Chapman	Shore	08/14/13	*	22.4	6.7	77	8.5	0.424		0.64									
Big Chapman	Open	08/14/13	7.3	24.3	8.0	99	8.6	0.428	10.0	1.29	0.001	0.00	0.00	0.002	0.015	0.570	0.572	37.9	
Boner	Shore	08/14/13	*	21.9	4.1	48	7.8	0.396		0.20									
Caldwell	Shore	08/14/13	2.4	25.6	9.6	122	8.3	0.454	16.9	<0.15									
Camelot	Shore	08/14/13	*	24.1	7.5	93	8.3	0.459		<0.15									
Camelot	Open	08/14/13	6.2	23.5	8.4	102	8.2	0.476	5.1	<0.15	0.036	0.01	0.60	0.002	0.009	0.337	0.947	108.9	
Carr	Shore	08/14/13	1.9	26.3	2.6	33	7.9	0.386		1.91									
Center	Shore	08/14/13	*	24.4	8.5	103	8.5	0.573		<0.15									
Dewart	Shore	08/14/13	*	22.9	8.1	98	8.7	0.305		<0.15									
Dewart	Open	08/14/13	10.1	23.7	7.8	95	8.6	0.304	6.9	<0.15	0.029	0.00	0.00	0.004	0.022	0.739	0.741	33.4	15479
Diamond	Shore	08/14/13	2.1	27.2	13.4	175	8.9	0.34	26.6	<0.15									
Goose	Shore	08/14/13	*	25.7	8.0	101	8.4	0.514		<0.15									
Hill	Shore	08/14/13	*	26.8	10.9	140	8.8	0.35		<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Hoffman	Shore	08/14/13	2.2	25.1	10.5	128	8.4	0.576	22.2	<0.15									
Irish	Shore	08/14/13	*	23.0	7.7	93	8.5	0.411		<0.15									
James	Shore	08/14/13	*	25.8	8.4	107	8.4	0.443		<0.15									
James	Open	08/14/13	5.0	25.1	7.8	98	8.3	0.442	12.4	<0.15	0.049	0.00	0.00	0.003	0.028	0.828	0.830	29.5	124081
Kuhn	Shore	08/14/13	*	23.5	7.4	89	8.3	0.45		1.38									
Little Barbee	Shore	08/14/13	2.9	23.8	8.5	104	8.5	0.462	18.8	<0.15									
Little Chapman	Shore	08/14/13	*	23.6	7.5	91	8.6	0.406		<0.15									
Loon	Shore	08/14/13	2.6	28.0	10.0	132	8.9	0.371	16.1	<0.15									
McClure's	Shore	08/14/13	2.0	28.7	11.9	159	8.9	0.423	15.8	<0.15									
Muskellunge	Shore	08/14/13	2.5	24.6	12.5	155	8.3	0.587	46.0	<0.15									
Oswego	Shore	08/14/13	*	25.0	7.9	99	8.4	0.428		1.07									
Oswego	Open	08/14/13	6.9	25.1	8.1	101	8.4	0.422	11.7	1.51	0.013	0.00	0.00	0.005	0.019	0.702	0.704	37.5	
Palestine	Shore	08/14/13	2.0	21.0	1.1	11	7.5	0.523	4.9	<0.15									
Papakeechie	Shore	08/14/13	*	24.5	7.0	86	8.3	0.311		<0.15									
Pike	Shore	08/14/13	1.2	23.4	10.5	130	8.6	0.537	38.2	<0.15									
Ridinger	Shore	08/14/13	*	25.2	10.1	127	8.4	0.486		0.16									
Rock	Shore	08/14/13	2.3	28.0	7.4	98	8.4	0.461	10.9	<0.15									
Sawmill	Shore	08/14/13	3.2	24.6	8.4	104	8.4	0.433	21.3	1.04									
Sechrist	Shore	08/14/13	*	24.5	7.7	95	8.5	0.4		0.23									
Sellers	Shore	08/14/13	2.6	24.7	8.8	103	7.9	0.412	24.4	<0.15									
Shock	Shore	08/14/13	2.4	23.9	7.6	92	8.0	0.393	51.2	<0.15									
Shoe	Shore	08/14/13	*	25.1	8.1	102	8.4	0.29		<0.15									
Silver	Shore	08/14/13	1.6	28.1	13.6	179	9.1	0.349	47.6	3.02									
Spear	Shore	08/14/13	*	23.4	5.9	72	7.6	0.33		<0.15									
Stanton	Shore	08/14/13	*	25.8	8.2	105	8.2	0.386		<0.15									
Syracuse (Hoy's Beach)	Shore	08/14/13	*	24.3	8.5	104	8.6	0.355		<0.15									
Syracuse (Lakeview)	Shore	08/14/13	*	24.0	9.1	112	8.6	0.353		0.18									
Syracuse	Open	08/14/13	11.0	24.0	7.7	94	8.5	0.357	5.4	<0.15	0.016	0.00	0.00	0.002	0.045	0.769	0.771	17.2	
Tippecanoe	Shore	08/14/13	*	26.3	7.9	101	8.4	0.444		<0.15									
Tippecanoe	Open	08/14/13	4.5	25.1	8.1	102	8.4	0.431	11.8	0.15	0.027	0.00	0.00	0.003	0.022	0.735	0.737	33.3	
Waubee	Shore	08/14/13	*	24.1	9.6	119	8.5	0.51		0.38									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Wawasee	Shore	08/14/13	*	24.1	7.6	93	8.5	0.363		0.66									
Wawasee	Open	08/14/13	12.5	23.4	7.6	94	8.5	0.36	6.4	0.92	0.009	0.00	0.00	0.004	0.010	0.554	0.556	57.3	13928
Webster	Shore	08/14/13	*	25.9	9.7	124	8.5	0.415		<0.15									
Webster	Open	08/14/13	4.0	25.7	8.2	104	8.4	0.421	6.2	0.39	0.025	0.00	0.01	0.002	0.024	0.808	0.819	34.1	
Winona	Shore	08/14/13	2.3	24.0	11.5	140	8.8	0.468	20.6	0.21									
Winona	Open	08/14/13	2.3	24.5	10.2	132	8.7	0.474	16.7	<0.15	0.014	0.00	0.01	0.005	0.027	1.142	1.153	42.9	764774
Yellow Creek	Shore	08/14/13	1.7	26.2	11.5	147	9.1	0.332	35.6	<0.15									
Yellow Creek	Open	08/14/13	2.1	26.0	11.3	144	9.1	0.334	33.5	<0.15	0.012	0.00	0.00	0.003	0.043	1.706	1.708	40.0	1193782
Backwater	Shore	09/04/13	3.0	22.9	3.9	46	7.6	0.48	14.5	<0.15									
Beaver Dam	Shore	09/04/13	*	24.3	6.8	84	8.6	0.346		<0.15									
Beaver Dam	Open	09/04/13	4.0	24.2	6.7	83	8.6	0.347	13.4	<0.15	0.006	0.00	0.00	0.002	0.037	1.124	1.126	30.9	435783
Big Barbee	Shore	09/04/13	*	26.0	8.5	110	8.4	0.441		0.22									
Big Barbee	Open	09/04/13	3.3	25.5	7.2	90	8.2	0.443	23.5	<0.15	0.011	0.00	0.00	0.003	0.051	0.964	0.966	18.9	
Big Chapman	Shore	09/04/13	*	23.1	7.6	92	8.4	0.415		<0.15									
Big Chapman	Open	09/04/13	5.8	24.9	6.9	86	8.3	0.416	9.0	<0.15	0.013	0.00	0.00	0.001	0.015	0.493	0.495	34.2	
Boner	Shore	09/04/13	*	22.6	0.1	1	7.3	0.438		<0.15									
Caldwell	Shore	09/04/13	2.0	26.3	7.3	94	8.2	0.468	23.9	<0.15									
Camelot	Shore	09/04/13	*	24.7	7.4	92	8.3	0.461		0.18									
Camelot	Open	09/04/13	7.3	24.2	8.5	104	8.2	0.48	6.0	<0.15	0.024	0.01	0.61	0.001	0.012	0.434	1.054	88.6	
Carr	Shore	09/04/13	3.9	26.4	7.3	94	8.6	0.377	51.8	<0.15									
Center	Shore	09/04/13	*	25.5	7.8	95	8.4	0.569		<0.15									
Crystal	Shore	09/04/13	*	27.6	0.7	11	8.2	0.454		<0.15									
Dewart	Shore	09/04/13	*	24.1	8.4	104	8.8	0.298		<0.15									
Dewart	Open	09/04/13	7.2	24.5	7.4	92	8.6	0.303	7.2	<0.15	0.001	0.00	0.00	0.004	0.015	0.583	0.585	39.8	
Diamond	Shore	09/04/13	1.8	26.0	8.0	102	8.6	0.342	40.0	<0.15									
Goose	Shore	09/04/13	*	27.2	6.3	78	8.2	0.514		<0.15									
Hill	Shore	09/04/13	*	26.2	7.8	99	8.5	0.342		<0.15									
Hoffman	Shore	09/04/13	1.7	26.5	10.1	127	8.6	0.483	70.2	<0.15									
Irish	Shore	09/04/13	*	25.8	7.7	95	8.5	0.404		<0.15									
James	Shore	09/04/13	3.3	25.2	7.1	89	8.3	0.451	11.2	0.23									
James	Open	09/04/13	3.1	25.3	6.8	85	8.2	0.446	14.4	<0.15	0.016	0.00	0.00	0.001	0.021	0.636	0.638	31.0	170497
Little Barbee	Shore	09/04/13	*	26.5	8.0	103	8.4	0.423		<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Little Chapman	Shore	09/04/13	*	24.3	6.9	85	8.4	0.406		<0.15									
Loon	Shore	09/04/13	4.8	25.9	6.4	80	8.4	0.386	20.3	0.41									
McClure's	Shore	09/04/13	1.8	25.9	5.9	75	8.5	0.447	31.0	<0.15									
Muskellunge	Shore	09/04/13	1.4	25.9	6.4	76	8.0	0.62	51.8	1.63									
Oswego	Shore	09/04/13	*	25.3	8.0	101	8.3	0.418		<0.15									
Oswego	Open	09/04/13	6.4	25.5	7.1	90	8.3	0.419	10.0	<0.15	0.009	0.00	0.00	0.008	0.016	0.628	0.630	38.4	
Palestine	Shore	09/04/13	*	25.3	1.7	20	7.5	0.5		<0.15									
Papakeechie	Shore	09/04/13	*	24.7	6.6	82	8.2	0.309		<0.15									
Pike	Shore	09/04/13	2.8	25.5	7.8	99	8.3	0.554	26.7	<0.15									
Ridinger	Shore	09/04/13	*	24.4	8.7	108	8.7	0.421		<0.15									
Rock	Shore	09/04/13	2.3	25.7	4.4	56	8.0	0.49	46.3	0.24									
Sawmill	Shore	09/04/13	*	24.9	6.4	80	8.1	0.414		<0.15									
Sechrist	Shore	09/04/13	*	24.3	6.9	86	8.3	0.403		0.30									
Sellers	Shore	09/04/13	1.9	24.2	5.8	72	8.0	0.433	24.0	<0.15									
Shock	Shore	09/04/13	*	24.8	6.4	78	7.9	0.393		<0.15									
Shoe	Shore	09/04/13	*	26.1	7.3	93	8.3	0.292		0.35									
Silver	Shore	09/04/13	2.0	25.8	6.5	82	8.6	0.378	64.4	0.27									
Spear	Shore	09/04/13	*	24.0	5.9	72	7.7	0.329		<0.15									
Syracuse (Hoy's Beach)	Shore	09/04/13	*	26.2	9.0	113	8.6	0.346		0.53									
Syracuse (Lakeview)	Shore	09/04/13	*	26.4	8.9	96	8.7	0.348		<0.15									
Syracuse	Open	09/04/13	8.1	25.6	7.3	90	8.5	0.357	5.8	<0.15	0.001	0.00	0.00	0.001	0.014	0.598	0.600	43.8	
Tippecanoe	Shore	09/04/13	*	24.6	6.5	81	8.4	0.403		<0.15									
Tippecanoe	Open	09/04/13	6.1	25.3	6.6	82	8.2	0.432	9.9	<0.15	0.001	0.00	0.00	0.004	0.015	0.648	0.650	42.7	
Waubee	Shore	09/04/13	*	24.9	7.9	100	8.5	0.504		<0.15									
Wawasee	Shore	09/04/13	*	26.2	8.6	105	8.6	0.362		<0.15									
Wawasee	Open	09/04/13	9.7	24.8	7.2	90	8.5	0.361	4.8	<0.15	0.001	0.00	0.00	0.002	0.010	0.546	0.548	54.8	14391
Webster	Shore	09/04/13	*	26.0	8.4	103	8.4	0.413		<0.15									
Webster	Open	09/04/13	4.4	25.8	7.5	87	7.2	0.418	13.3	0.40	0.001	0.00	0.00	0.005	0.021	0.770	0.772	37.1	
Winona	Shore	09/04/13	*	25.2	7.0	88	8.4	0.488		<0.15									
Winona	Open	09/04/13	3.5	24.5	6.0	76	8.3	0.485	14.5	0.27	0.023	0.00	0.00	0.003	0.027	0.847	0.849	32.0	1049335
Yellow Creek	Shore	09/04/13	*	24.7	7.1	88	8.8	0.35		<0.15									

Lake Name	Site Type	Week	SD ft	WT °C	DO mg/L	DO %sat	pH	Cond mS/cm	PC ppb	MC ppb	NH3 mg/l	NO2 mg/l	NO3 mg/l	SRP mg/l	TP mg/l	TKN mg/l	TN mg/l	N/P	BG algae cells/ml
Yellow Creek	Open	09/04/13	2.4	24.4	6.6	82	8.8	0.351	24.5	<0.15	0.001	0.00	0.00	0.002	0.037	1.270	1.272	34.6	1588955