# Final Report FDOT Project BD521-03

# REGIONAL STORMWATER IRRIGATION FACILITIES

# A Joint Research Program of





Submitted by

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### 16. Abstract

The Florida Department of Transportation manages the runoff water from highways and other transportation related facilities, and frequently regional detention ponds are used. One potential use of detained runoff water in regional ponds is for irrigation. The pond water used for irrigation will reduce dependency on costly potable water for irrigation. The use of regional detention ponds is also attractive because irrigation of the detained water helps FDOT meet Total Maximum Daily Load restrictions for water bodies as well as to lower maintenance cost.

The use of regional ponds for irrigation can become more common if the occurrence of harmful algae can be minimized. Cyanobacteria counts and toxins are used as the measure of harmful algae. The counts and toxic concentrations are documented in regional detention ponds and after the detained water passes through soils. The algal count in regional ponds is three orders magnitude less than that found in central Florida lakes. The count and toxic levels after filtration through soils are less than that found in the regional ponds.

To remove the detained water through soils may be done using horizontal wells. To demonstrate the operation of a horizontal well, one is constructed adjacent to the shore line of a 15 acre regional pond. The well consistently produced a flow rate needed for the irrigation demand (500 gpm), and of a quality that meets public access irrigation quality standards.

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# **Executive Summary**

The conclusion of this research is that regional ponds with horizontal wells can be used as a source of water for irrigation. This research is significant because the use of stormwater from regional ponds will reduce the amount of surface discharge pollutants from the ponds, and provide for an alternative water supply, that can be used for irrigation. Decreasing the quantity of water pollutants discharging into receiving waters will help meet total maximum daily load (TMDL) limits as well as lower the cost of maintenance of highway vegetation.

Regional ponds collect stormwater from watershed areas and these watershed areas are typically a combination of land uses. Examples of common land use classifications are highways, residential, commercial, industrial, agricultural, and natural undisturbed areas. These land uses contain pervious and impervious surfaces. Some of the pervious areas within the contributing land uses need irrigation water. The regional pond then serves as a source of irrigation water.

The use of regional ponds for irrigation can become more common if the occurrence of harmful algae can be minimized. Cyanobacteria counts and the Cyanotoxin Microcystin are used as the measure of harmful algae.

Fourteen regional ponds were sampled, which all had discharges from a roadway surface. The counts and toxic concentrations were documented in these regional detention ponds. Also, the fate of Cyanobacteria and the Cyanotoxin Microcystin is measured after regional pond water passes through soils. The algae count in regional ponds is at least three orders magnitude less than that found in central Florida lakes. The count and toxic level after filtration through soils is less than that found in the regional ponds.

Removal of detained regional pond water through soils may be done using horizontal wells. To demonstrate the operation of a horizontal well, one is constructed adjacent to the shore line of an existing regional pond on the campus of the University of Central Florida. The watershed has a four lane divided highway running through it with an average daily traffic count of about 80,000 vehicles. The 155.86 acre watershed is a mixed use area consisting of commercial, condominium, and recreational sport stadiums. The pond is 15 acres in area with a normal depth of eight feet. The well consistently produces a flow rate needed for the irrigation demand (500 gpm) and of a quality that meet public access irrigation quality.

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### CHAPTER 1 – INTRODUCTION

Regional ponds collect stormwater from more than one classification of watershed or land use. The ponds can also serve as a source of irrigation water. A roadway is usually associated with each and every developed watershed, but there are many other land uses producing runoff. Examples of other land uses are: residential, commercial, industrial, agriculture, and natural or undisturbed. Irrigation for the pervious areas of these land uses is needed. Regional detention ponds can serve as the source of irrigation water; however, the water quality of the regional ponds used as a source of irrigation has not been documented. In particular, Cyanobacteria counts and toxic concentrations have not been measured. Furthermore, the currently used alternative water supply for irrigation is treated sewage (reclaimed water) which must be disinfected primarily using chlorine. Water in a stormwater pond may not need to be chlorinated, but could simply be filtered. Filtering the water through select soil materials or even the natural soils and then extracting it, using horizontal wells under and near a pond would not only be operationally easy, but may also produce a better water quality. Before installing and using the filters, it must first be shown that detained water can be extracted from a pond using a horizontal well.

In February of 2004, The Florida Department Transportation (FDOT) and the Florida Department of Environmental Protection (FDEP) funded research contracts to collect water quality data to support the concept of regional stormwater irrigation facilities. The sites selected for this research will receive stormwater from highways, but are regional in nature, and thus have input waters from other land uses. In addition, a regional facility will be constructed and initial operation will be demonstrated using a horizontal well. Runoff waters to the detention pond are from a four lane highway, an athletic complex, and a commercial area.

# 1.1 Objectives

The objectives of this research are:

- Develop an algal mass and toxin data base for regional stormwater ponds that have the potential to be used for irrigation.
- 2. Demonstrate the use of a horizontal well for the collection of irrigation quality water from a regional facility.

# 1.2 Limitations

The results are constrained by the location and climate in Florida. The water quality data base is limited to algal masses and toxins.

# 1.3 Approach

This report consists of six chapters. Provided in the first chapter is an introduction to the topic and also a description of the research objectives. In chapter two, a review of the current state of regional ponds and information related to algal counts and toxins is presented. The site selection criteria and description of the sites is covered in chapter three. In chapter four, results and discussion of the data are shown. The demonstration details for a reuse pond are presented in chapter five. In chapter six, a discussion, summary, conclusions, and recommendations are presented.

# **CHAPTER 2 – BACKGROUND**

A regional facility for stormwater management is a detention pond that collects stormwater from more than one land use and usually includes runoff from roadways. The stormwater in the detention pond can be used for irrigation (Wanielista et.al., 1991). Currently, potable water is used in most parts of Florida for irrigating lawns, washing automobiles, and other consumptive uses. A non-potable source could be less costly relative to a potable source; however, some non-potable sources are becoming scarce. In 2003, eleven counties in Florida reported at least 85% of the reclaimed water is now used for non-potable uses (Water Reuse Work Group, 2003), and there is a demand for more than can be supplied. At the demonstration site for this research, a reclaimed line has been available for two years, but no reclaimed water was allocated. Thus, stormwater became a source to satisfy the demand for non-potable water.

Regional and even single watershed ponds are found throughout the State, especially in areas with high water tables. These ponds frequently discharge more water than they collect because of high water table and poorly drained soil conditions; however, some of the detained water can be used for irrigation. Some of the benefits of converting detention ponds to regional irrigation ponds are:

- 1. The regional irrigation pond will continue to assist in meeting Water Management District Environmental Resource Permits in terms of peak discharge and water quality management.
- 2. When using irrigation from the regional ponds, the volume of stormwater discharged to surface waters decreases relative to no-reuse, and thus total maximum daily loads (TMDL) of pollutants are reduced. Regional ponds with irrigation will help FDOT, other government agencies, and private developers meet the new TMDL regulations.
- 3. Drinking water is used for irrigation of lawns. The use of irrigation water from a regional

facility will replace the use of drinking water. This has a direct benefit in areas that rely on groundwater as the sole drinking water source. The drinking water supply is not only sustained, but wetlands dependent on the groundwater are enhanced and maintained as well.

- 4. The cost of providing water for drinking and irrigation purposes decreases because the irrigation water from the regional ponds will cost less than drinking water.
- 5. A regional irrigation pond as part of a FDOT highway project can be purchased with construction money. The operation can then be assumed by a stormwater utility or irrigation utility, thus improving the operational effectiveness of such systems.
- 6. In some groundwater protected areas, such as Springsheds, a yearly hydrologic water budget must be maintained. Thus, the use of detention ponds with irrigation can help in the maintenance of the annual hydrologic budget.

# 2.1 Past Research for the Design and Operation of a Reuse Stormwater Pond

Stormwater ponds are designed for pollution control and flood control. Pollution control can also be achieved in terms of mass removal by reducing the discharged volume of water. Furthermore, if the detained water is of acceptable quality it can be irrigated. Filtration of detained water through natural soils adjacent to ponds may be also possible, and may even improve water quality.

Gravity filtration systems in detention ponds were monitored to document operational and pollution removal effectiveness in the past (Wanielista, 1986, Harper and Miracle, 1993, and Dyer, Riddle, Mills and Precourt, Inc, 1995). These were shallow, wet detention ponds with bottom and bank filtration systems. The filtration depth was only a few inches to a few feet and the discharges from the filtration systems were not used for irrigation. The results of the

monitoring indicated that particulate species in the stormwater were reduced, but the average pollution removal effectiveness for dissolved species, especially nitrogen, was low, and in a few events total nitrogen was exported. In addition, clogging was a problem when peat or fine silt materials were used as the filtration materials (Nnadi, et.al., 1997).

Wet detention pond design criteria were thus modified to include the recovery of the pollution control volume using pumps for irrigation. These ponds are called stormwater reuse ponds, and are normally wet all year. The design criteria are listed in a FDEP report (Wanielista, et. al., 1991). Using these design criteria, a pond was designed and operated in Winter Park, Florida (Wanielista and J. Bradner, 1992). The documentation of the water quantity irrigation efficiencies for which this pond was designed validated the model used for sizing a wet detention pond for irrigation, and are based on the effective impervious area (Wanielista, et.al., 1997). For regional ponds, the design criteria are thus established and an example design curve, called a REV curve used for central Florida, is shown in Figure 1.

Biological organisms are naturally selected in a soil column and on the ground surface. Past studies indicate that hydrocarbon-degrading bacteria were naturally selected along highways and the number of bacteria decreased at a distance from the road edge. The population of bacteria was positively correlated with the amount of hydrocarbon substrate in the environments in ditches adjacent to highways (Wanielista, et.al., 1978). In other studies, (Wanielista, and Charba, et.al., 1991) it was demonstrated that granular activated carbon did decrease Trihalomethane Formation Potential.

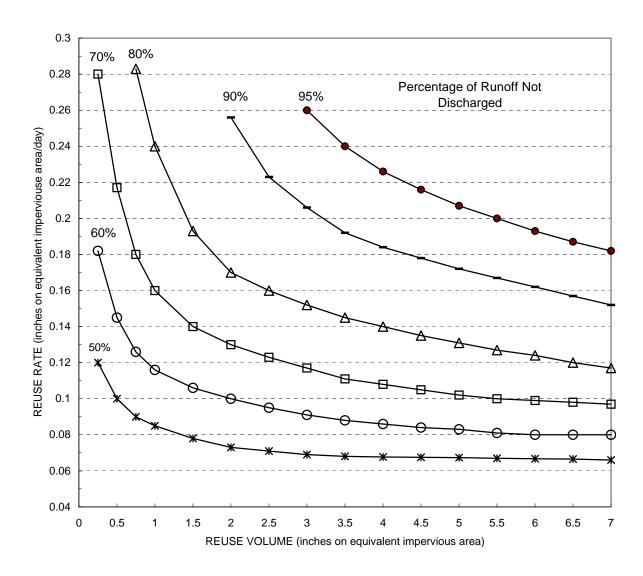


Figure 1: Reuse Curve for Designing a Reuse Volume and Irrigation Rate for Central Florida (From Wanielista, Yousef, et.al, 1991)

Within stormwater there are pollutants, classified as nutrients, organics, solids, metals, oils, bacteria, and others. The average loading rates for these have been documented (Harper, 1994, and Wanielista and Yousef, 1993, pg. 126). These pollutants are not found in high concentrations in irrigation quality waters, and thus some must be removed before irrigation. Some methods are better than others to remove pollutants, and there is excellent documentation of the watershed approach and the best management practices in many publications (Livingston,

et.al., 1988, Ruston, 2001, and Ruston, 2002). This research will concentrate on documenting the removal of public health related pollutants by soils and in regional ponds. In Figure two, there are two pond schematics, one for detention and one for retention. Both pond systems can be used to supply irrigation water.

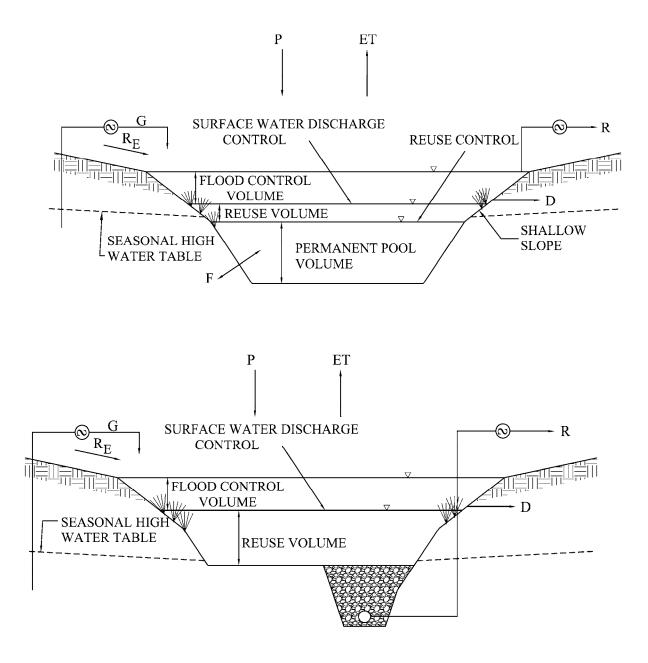


Figure 2: Schematics of Stormwater Ponds with Irrigation System Equipment

# **CHAPTER 3 – FIELD SITE DESCRIPTIONS**

### 3.1 Site Selection

The necessity to evaluate stormwater ponds as a potential source of Cyanobacteria has become evident for several reasons. Cyanobacteria has been identified and documented within larger water bodies throughout the state of Florida, but very little investigation has been conducted on smaller water bodies. Stormwater ponds are an abundant and readily available water source and are a practical, commonly used source for irrigation. A stormwater pond located within residential area is regularly used for irrigation with little or no treatment prior to use. It is not uncommon for residents to pump water directly from the small water bodies for irrigation purposes. The tendency for algae to proliferate within these water bodies is easily observed by casual glances. Due to the extensive growth of Cyanobacteria in Florida waters and the potential for human exposure to airborne toxins associated with Cyanobacteria, the need for evaluation of these sources is evident.

Since small water bodies are just as susceptible to algae growth as large water bodies, stormwater and small residential ponds were selected for this study. The stormwater ponds that were selected are located in central Florida within the Orlando area. The ponds are located within residential developments (Lake Condel, Terrier Pond), on the University of Central Florida campus, near an industrial site (Lake Patrik), alongside a major expressway (SR 417) and by the side of heavily traveled urban roadways (Horatio Avenue, University Boulevard). The ponds for this study were chosen on the basis that they exhibit desirable characteristics as irrigation sources.

The occurrence of rainfall after a long period of no rainfall can influence algal blooms.

According to Orange County Environmental Protection Division (Bortles, 2005), the largest

blooms will occur within three to five days following a rain event provided that another rain event will not occur, but the rain event may hinder the algae growth.

### 3.1.1 Initial Site Selection

A windshield survey was conducted in order to evaluate potential pond sites for this investigation. This consisted of traveling along central Florida roads and residential areas to visually observe potential ponds that exhibited excessive algae growth. This method was used in conjunction with ponds recommended by the Orange County Environmental Protection Division that are currently being studied for Cyanobacteria.

# 3.1.2 Selected Regional Ponds with land use classifications

#### Residential

- 1 Lake Condel
- 2 Terrier Pond

# University of Central Florida Campus

- 3 Irrigation Ponds
- 4 Pegasus Pond

#### **Industrial**

5 Lake Patrik

### S.R. 417 - Greenway

- 6 NB, at Lee Vista Boulevard exit
- 7 SB, 0.5 miles south of Lee Vista Boulevard
- 8 NB, at SR 528 (Beeline) exit
- 9 NB, 2 miles north of Narcoossee Road
- NB, 1 mile north of Narcoossee Road

# Urban Roadways

- 11 University Boulevard and Hall Road
- 12 University Boulevard and S.R. 417, NW corner
- Horatio Avenue and Via Tuscany No. 1
- Horatio Avenue and Via Tuscany No. 2

The USGS Quadrangle and Soil Conservation Service (SCS) Soil Survey maps for each stormwater pond site and photographs are shown in the Appendix.

# 3.2 Pond Sampling

The sample depths utilized for this testing were within several inches of the water surface. This depth was selected because some ponds were shallow or with average depths in the dry season, of less than three feet. The sample locations were also limited to several feet of the water body's shoreline. For this study, samples were collected from an area in the pond where the algal blooms were present. Sampling from the deeper half (or lower) water column presented the potential for introducing pond bottom mud and decaying vegetation. This sampling technique also presented limitations due to the limited length, approximately six feet long, of the sampling pole used to collect the sample. Additionally, wading into the water body was not practiced during the sampling events. Samples that were collected near the water surface may have reduced levels of bacteria due the utilization of the necessary nutrients by competing vegetation, such as duckweed, which is prominent at many of the pond locations.

There were many method and materials utilized to collect the samples. One of these materials included a six-foot long PVC pole with an attachment to hold a 1-liter amber sample bottle. The bottles were rinsed three times with the pond water prior to collecting the sample to be analyzed. The sampling technique itself involved keeping the open end of the sample bottle facing downward as the bottle was immersed into the pond. This was done to minimize the chance of water entering the bottle prior to reaching the desired depth.

Samples were collected for pH and alkalinity during the months of October, December and February, when Cyanobacteria growth is most likely not at its peak growth. Temperatures

above 25 degrees Celsius promote the highest level of Cyanobacteria growth (Chorus and Bartram, 1999), but the algae are able to grow at temperatures ranging from 17 to 22 degrees Celsius (Kurmayer et al., 2002). Although conditions were conducive for bacteria growth based on observations of algae blooms in the ponds and information provided by Orange County, more favorable conditions were experienced during the warmer months of the spring and summer. These conditions supported a more active growing season for the bacteria. Samples were collected during April and August to satisfy the more desirable conditions for algal growth. It was also noted that samples collected during the summer months at Lake Condel in previous years by Orange County were also observed to exhibit readily detectable levels of Cyanobacteria. These samples were obtained as part of a previous study and were collected by Orange County as part of the ongoing study of Cyanobacteria levels within Lake Condel (Bortles, 2005).

# 3.3 Filtrate Sampling

Pond stormwater was added to four chambers with A-3 soils (poorly-graded) since these soils were the most common soils found near or at the stormwater ponds. Samples for analyses were taken four feet below the chamber surfaces. Three of the chambers were covered with grass and one was not covered. Amber bottles were used for sampling.

# CHAPTER 4 – ALGAL RESULTS AND DISCUSSION

Within this Chapter, Cyanobacteria population counts, potentially toxic (PTOX) counts, and toxin concentrations are reported for stormwater ponds and filtrate. The filtrate was obtained after 50 inches of pond waters (from S.R. 417-1, Pegasus and Lake Condel ponds) passed through four feet of a poorly graded sandy soil typical of that on the campus of UCF. The next data reported are comparisons between data sets from this sampling and between one other lake's data set.

The methods and analyses used to determine the population and concentration were performed by the same laboratory, namely GreenWater Laboratories of Palatka, Florida. An initial analyses was conducted at the University of Central Florida and thus indicated the presence of Cyanobacteria, but was not quantified. The use of the GreenWater Laboratory for comparative quantitative analyses minimized the potential variations in analytical results so that the counts and concentrations determined could be compared without variability between labs. The use of one lab minimized the possibility of different techniques from different laboratories, which may have provided additional variance for populations and concentrations. In addition, a previous study for lake populations was performed by GreenWater and thus the comparisons to that lake data also reduce variability possibilities among labs.

# 4.1 Cyanobacteria Populations

Forty-five stormwater ponds in central Florida were visited and past sampling results from Orange County helped identify potential ponds for the research. Of these 45 ponds, 24 had indications of blue green algal activity. Those 24 ponds were again sampled and 14 of them

were identified qualitatively as having blue green algal blooms. These same ponds also had the visual appearance of the algae. Also, there was different land use associated with these 14 ponds, which were a criterion for choice. Terrier Pond was sampled at two locations because it has a history of Cyanobacteria populations and resident respiratory problems.

Total Cyanobacteria and potential toxic (PTOX) counts per milliliter are shown in Table 1 for two sampling periods, April, which is the start of the visible bloom activity, and August, in

**Table 1: Total and PTOX Counts for Two Sampling Periods** 

APRIL 2005 AUGUST 2005

Sample	Total	PTOX	Sample	Total	PTOX
Description	CYANO	CYANO	Description	CYANO	CYANO
-	Units/mL	Units/mL		Units/mL	Units/mL
Filtrate #1	1,167	0	Filtrate #1	2,928	1
Filtrate #2	130	0	Filtrate #2	686	0
Filtrate #3	751	0	Filtrate #3	650	0
			Filtrate #4	1,231	0
			Filtrate #4 replicate	583	0
Residential					
Lake Condel	12,590	227	Lake Condel	36,412	1,844
Terrier Pond East	650	499	Terrier Pond East	1,746	191
Terrier Pond South	2,223	635	Terrier Pond South	1,501	265
University of Central Florida Campus					
Irrigation Ponds	298	0	Irrigation Ponds		
Pegasus	1,387	68	Pegasus	3,450	38
Industrial					
Lake Patrik	557	390	Lake Patrik	5,011	3,759
SR 417 Roadways					
SR 417-1	824	476	SR 417-1	33,640	20,691
SR 417-2	2,620	1,427	SR 417-2	17,578	14,312
SR 417-3	1,005	183	SR 417-3	11,038	5,897
SR 417-4	3,267	2,814	SR 417-4	13,797	9,064
SR 417-5	491,690*	318	SR 417-5	499	4
Urban Roadways					
Hall Road	389	0			
Horatio 1	0	0	Horatio 1	7,825	2,681
Horatio 2	270	0	Horatio 2	613	8
University & SR 417 NW	420	11			

<sup>\*</sup> Not included in statistical analyses

the middle of algal bloom activity. The filtrate PTOX counts were at or near zero, while the detention ponds had identifiable counts. Alkalinity and pH were recorded 34 times and averaged 45 mg CaCO<sub>3</sub> per mL and 7.4 respectively with standard deviations of 10.5 and 0.4. Comparisons for average counts among land uses are shown below in Figure 3.

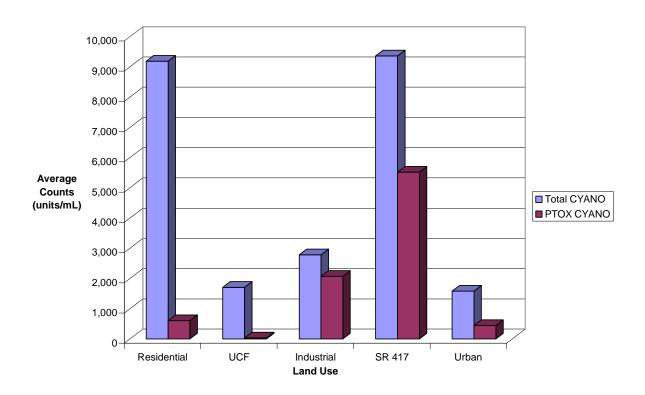


Figure 3: Comparison of Total and PTOX Cyanobacteria Average Counts vs. Land Use

The average Cyanobacteria counts for the stormwater ponds were 34,546 total and 470 PTOX in April with standard deviations of 3,113 and 724 respectively. One result for total count at SR 417-5 was eliminated from the average calculations because it was greater than three standard deviations from the mean, and likely was in error. For the filtrate, the averages were 682 and 0 counts with standard deviations of 426 and zero respectively. For the August 2005 sampling, the averages were 11,093 total and 4,896 PTOX with standard deviations of 11,924 and 6,371 respectively. For the filtrate, the averages were 1,216 total and 0.2 PTOX with

standard deviations of 887 and 0.4 respectively. Thus, on average and for field data, the filtration was removing both total counts and PTOX levels of Cyanobacteria.

# 4.2 Stormwater and Lake Cyanobacteria Population Comparisons

For central Florida lakes, data on total and PTOX counts are available from GreenWater laboratories. These data are shown in Table 2. If we compare the results from the stormwater ponds to those of the central Florida lakes, the stormwater ponds total Cyanobacteria counts and the potentially toxic Cyanobacteria counts (PTOX) averages are much lower.

Table 2: Total and PTOX Populations in Central Florida Lakes

Sample	Sampling	Total CYANO	PTOX
Description	Date	Units/mL	Units/mL
Lake Apopka	Year 1	1,361,860	13,550
	Year 2	1,136,098	1,864
Lake Beauclair	Year 1	650,370	154,190
	Year 2	449,210	69,420
Lake Dora	Year 1	581,110	144,590
	Year 2	500,196	129,510
Lake Eustis	Year 1	<285,000	
	Year 2	<285,000	40,520
Lake Griffin	Year 1	<285,000	
	Year 2	<285,000	
Lake Harris	Year 1	235,570	
	Year 2	116,700	41,990
Lake Yale	Year 1	<285,000	
_	Year 2	<285,000	

from:

Chapman et al, 2004, "Cyanobacteria Populations in Seven Central Florida Lakes" 15th Annual Conference of the Florida Lake Management Society, Tampa Florida

There was not a count on the number of samples associated with the lake data, and thus no statistical comparisons could be done. However, the pond count average data are about two orders of magnitude lower than the lake data. For the April sampling, there was only one stormwater pond total count that was higher than the lake total counts, and the value reported for

Lake Harris (491,690 Units/mL vs. 116,700 Units/mL). In addition, there was one PTOX count exceeding the lake Apopka PTOX count (2,814 Units/mL vs. 1,864 Units/mL). The second sampling event did not have a total counts that exceeded the lake counts, but for six stormwater ponds, PTOX counts were greater than those at Lake Apopka. Thus, the PTOX values in the stormwater ponds indicate that they are approximately equal at least in magnitude to those in lakes and thus if the lakes are used to supply irrigation water, then the ponds can also be used based only on PTOX.

# 4.3 Cyanobacteria Comparisons between Pond and Filtrate

The PTOX counts in stormwater ponds that can be used for irrigation lead to the question, "Can total and PTOX in ponds be removed by filtration using a naturally occurring soil?" For sampling in April 2005, the total pond water Cyanobacteria counts are significantly different from the filtrate total counts at the 75% level of significance. The stormwater pond PTOX counts are significantly different from the filtrate PTOX counts at the 85% level of significance. The data for these statistical analyses are shown in Table 3.

**Table 3: Ponds vs. Filtrate Comparisons with Statistics April 2005** 

Description	Date	Total	PTOX
		Units/mL	Units/mL
Filtrate #1	4/15/2005	1,167	0
Filtrate #2	4/15/2005	130	0
Filtrate #3	4/15/2005	751	0
Residential			
Lake Condel	4/17/2005	12,590	227
Terrier Pond East	4/17/2005	650	499
Terrier Pond South	4/17/2005	2,223	635
University of Central Floric	la Campus		
South Irrigation	4/17/2005	298	0
Pegasus	4/17/2005	1,387	68
Industrial			
Lake Patrick	4/17/2005	557	390
SR 417 Roadways			
SR 417-1	4/17/2005	824	476
SR 417-2	4/17/2005	2,620	1,427
SR 417-3	4/17/2005	1,005	183
SR 417-4	4/17/2005	3,267	2,814
SR 417-5	4/17/2005	*	318
Urban Roadways			
Hall Road	4/17/2005	389	0
Horatio 1	4/17/2005	0	0
Horatio 2	4/17/2005	270	0
University and SR 417 NW	4/17/2005	420	11

<sup>\*</sup> not included in statistical analyses

Table 4: Continued Ponds vs. Filtrate Comparisons with Statistics April 2005

		Total	PTOX
		CYANO	CYANO
X bar 1	Pond AVG	1,893	470
X bar 2	Filtrate Avg	682	0.000
S1	STD DEV Ponds	3113	724
S2	STD DEV Filtrate	426	0.000
n1	# of Pond samp	14	15
n2	# of Filtrate samp	3	3
note: n1+n2=		17	18
thus use t statistic	t Statistic	Total	PTOX
		CYANO	CYANO
	X1bar-X2bar	1,210	470
	(n1-1)*S^2	125970429	7340754
	(n2-1)*S^2	363073	0.000
	n1+n2-2	15	16
	(1/n1+1/n2)	0.40476	0.40000
	SQRT	1846	428
	t	0.656	1.097
	significant difference	>75%	>85%

For sampling on April 15 through 17, 2005

For sampling in August 2005, the pond water total Cyanobacteria population counts were significantly different from the filtrate Cyanobacteria counts at the 95% level of confidence. The stormwater pond PTOX counts are significantly different from the filtrate PTOX counts at the 90% level of significance. The data used for these statistical analyses are shown in Table 5.

<sup>1)</sup> The pond water total cyanobacteria counts are significantly different from the filtrate cyanobacteria counts at the 75% level of significance.

<sup>2)</sup> The potentially toxic cyanobacteria counts are significantly different from the filtrate potentially toxic counts at the 85% level of significance

**Table 5: Ponds vs. Filtrate Comparisons with Statistics August 2005** 

Sample	Sampling	Total	PTOX
Description	Date	CYANO	CYANO
		Units/mL	Units/mL
Filtrate #1	8/7/2005	2,928	1
Filtrate #2	8/7/2005	686	0
Filtrate #3	8/7/2005	650	0
Filtrate #4	8/7/2005	1,231	0
Filtrate #4b	8/7/2005	583	0
Residential			
Lake Condel	8/7/2005	36,412	1,844
Terrier Pond East	8/7/2005	1,746	191
Terrier Pond South	8/7/2005	1,501	265
University of Centra	l Florida		
South Irrigation			
Pegasus	8/7/2005	3,450	38
Industrial			
Lake Patrick	8/6/2005	5,011	3,759
SR 417 Roadways			
SR 417-1	8/7/2005	33,640	20,691
SR 417-2	8/7/2005	17,578	14,312
SR 417-3	8/7/2005	11,038	5,897
SR 417-4	8/7/2005	13,797	9,064
SR 417-5	8/7/2005	499	4
Urban Roadways			
Horatio 1	8/7/2005	7,825	2,681
Horatio 2	8/7/2005	613	8

		Total	PTOX
_		CYANO	CYANO
X bar 1	Pond AVG	11,093	4,896
X bar 2	Filtrate Avg	1,216	0.200
S1	STD DEV Ponds	11924	6371
S2	STD DEV Filtrate	887	0.400
n1	# of Pond samp	12	12
n2	# of Filtrate samp	5	5
· n1_n2_	·	17	17

note: n1+n2=

thus use t statistic

t Statistic	Total	PTOX
	CYANO	CYANO
X1bar-X2bar	9,877	4,896
(n1-1)*S^2	1564125679	446458710
(n2-1)*S^2	3146580	0.640
n1+n2-2	15	15
(1/n1+1/n2)	0.28333	0.28333
SQRT	5441	2904
t	1.815	1.686
significant difference	>95%	>90%

For sampling on August 6 through 7, 2005

- 1) The pond water total cyanobacteria counts are significantly different from the filtrate cyanobacteria counts at the 95% level of confidence.
- 2) The potentially toxic cyanobacteria counts are significantly different from the filtrate potentially toxic counts at the 90% level of significance

For the combined sampling data of April and August 2005, the pond water total Cyanobacteria counts are significantly different from the filtrate Cyanobacteria counts at the 99% level of confidence. The potentially toxic Cyanobacteria counts (PTOX) are significantly different from the filtrate potentially toxic counts (PTOX) at the 99% level of significance. The data used for the statistical analyses are shown in Table 6.

Table 6: Ponds vs. Filtrate Comparisons Combined Data and Statistics

	<b>P</b>		
		Total	PTOX
		CYANO	CYANO
X bar 1	Pond AVG	6,139	2,437
X bar 2	Filtrate Avg	1,016	0.125
S1	STD DEV Ponds	9,585	4,813
S2	STD DEV Filtrate	791	0.331
n1	# of Pond samp	26	27
n2	# of Filtrate samp	8	8
note n1+n2=	thus use Z statistic	34	35
	Z Statistic	Total	PTOX
		CYANO	CYANO
	X1bar-X2bar	5,123	2,437
	S1^2/n1	3,533,814	858,053
	S2^2/n2	78,303	0.014
	SQT RT	1901	926
	Z	2.70	2.63
	level of confidence	>99%	>99%

For the combined sampling of April 17 and August 7, 2005,

- 1) The pond water total cyanobacteria counts are significantly different from the filtrate cyanobacteria counts at the 99% level of confidence.
- 2) The potentially toxic cyanobacteria counts are significantly different from the filtrate potentially toxic counts at the 99% level of significance

Figure 4 on the following page presents a graphical representation for the average total and PTOX Cyanobacteria counts using the combined data from both sampling events.

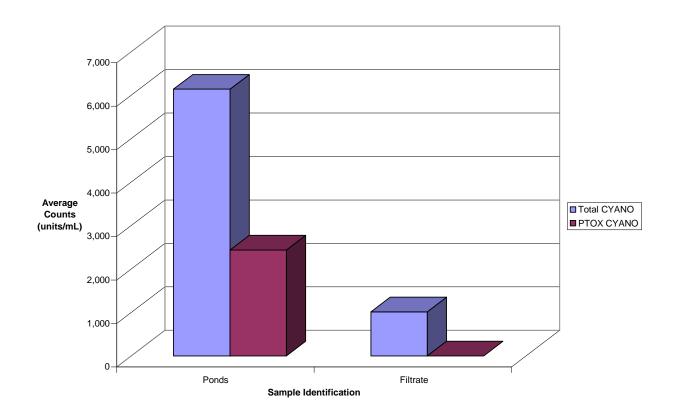


Figure 4: Pond vs. Filtrate Cyanobacteria Comparisons Using Combined Data

# 4.4 Cyanobacteria Toxin Concentrations

Cyanobacteria toxin concentrations were quantified using the ELISA method. These concentrations were provided by GreenWater laboratory. The toxin concentrations and the associated quality control data are shown in Tables 7 and 8. The average pond concentrations for all sites for each sampling period were 0.22 and 0.33 mg/L for the April and August sampling periods respectively. The filtrate averages were 0.23 and less than 0.04 mg/L for the April and August sampling periods respectively. The water applied to the soil columns were from the Pegasus and Lake Condel stormwater ponds. These ponds were thought to have higher concentrations of Toxins but the concentrations were relatively low (<0.04 to 0.17 mg/L). From

a statistical analysis, comparing the mean values of toxin Microcystin in the ponds to the filtrate values, the results from the sampling event in April showed no significant difference existed between the two.

However, the second sampling event in August, 2005 indicated that a significant difference did exist at the level of confidence of approximately 88%. Additionally, the level of confidence when the values from both sampling events were combined was on the order of 97% for the Microcystin filtering process. A graphical comparison of the average Microcystin concentration data (ug/L) for the ponds and the filtrate is shown in Figure 5. The graph visually indicates the difference in the average values.

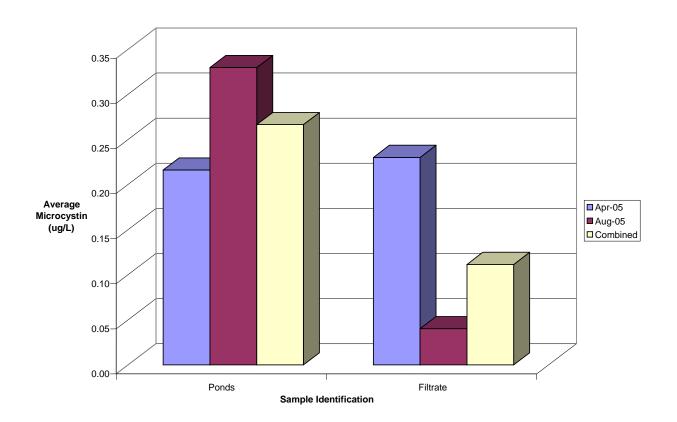


Figure 5: Ponds vs. Filtrate Microcystin Data

**Table 7: Microcystin Concentrations for April 2005** 

**ELISA Method Sampled in April 2005** 

222611 Weemon Sumples in 12	prii 2002		Standard	Corrected	Final		
Sample ID	Assay Value (ug/L)	Final Conc. Factor	Recovery (%)	Spike Recovery (%)	Corrected Concentration (ug/L)	Average Concentration (ug/L)	Standard Deviation
Filtrate #1	0.10	1x	74	78	0.17	0.13	0.06
	0.05	1 x	74	78	0.09		
Filtrate #2	0.12	1x	83	89	0.16	0.18	0.02
	0.14	1 x	83	89	0.19		
Filtrate #3	0.28	1x	83	89	0.38	0.39	0.01
	0.29	1 x	83	89	0.39		
Hall Rd	0.10	1x	98	66	0.15	0.18	0.04
	0.13	1 x	98	66	0.20		
South Irrigation	0.24	1x	74	73	0.44	0.49	0.07
	0.29	1 x	74	73	0.54		
Lake Patrick	0.08	1x	74	77	0.14	0.16	0.03
	0.10	1 x	74	77	0.18		
Lake Condel	0.12	1x	98	81	0.15	0.17	0.02
	0.14	1 x	98	81	0.18		
Terrier Pond East	0.09	1x	90	92	0.11	0.10	0.02
	0.07	1 x	90	92	0.08		
Terrier Pond South	0.05	1x	90	92	0.06	0.10	0.05
	0.11	1 x	90	92	0.13		
Pegasus Pond	0.11	1x	98	80	0.14	0.16	0.02
	0.13	1 x	98	80	0.17		
SR 417-1	0.36	1 x	90	92	0.43	0.38	0.07
	0.27	1 x	90	92	0.33		
SR 417-2	0.49	1 x	98	80	0.62	0.60	0.04
	0.45	1 x	98	80	0.57		
SR 417-3	0.10	1x	98	93	0.11	0.13	0.03
	0.14	1 x	98	93	0.15		
SR 417-4	0.14	1x	98	72	0.20	0.20	0.00
	0.14	1 x	98	72	0.20		
SR 417-5	0.17	1x	98	97	0.18	0.19	0.01
	0.19	1 x	98	97	0.20		
University and SR 417 NW	0.09	1x	98	78	0.12	0.14	0.03
	0.12	1x	98	78	0.16		
Horatio 1	0.06	1x	90	87	0.08	0.09	0.01
	0.07	1x	90	87	0.09		
Horatio 2	0.12	1x	90	93	0.14	0.19	0.06
	0.19	1 x	90	93	0.23		

 $\begin{aligned} &Quantification \ limit = 0.04 \ \mu g/L \\ &No \ dilution \ ratio \ necessary \end{aligned}$ 

To provide additional evidence for the sorption of Microcystin on soil particles, laboratory batch studies were conducted to provide another estimate of the potential for adsorption of Microcystin (MC) onto soil. Microcystin-LR (MC-LR) solutions (50 mL) were prepared from commercially available standard and distilled water and were mixed with 10 g of sand for up to 46 hours. Microcystin concentrations were determined by the ELISA method.

Reductions in Microcystin concentrations ranged from 13 to 32 % (O'Reilly and Wanielista, 2006). Sorption processes likely explain this reduction because microbial degradation of MC-LR has been reported to require a three-day lag before commencing (Miller et al, 2001). In response to degradation problem, adsorption isotherms were developed, resulting in a slightly better fit to a Freundlich rather than linear isotherm. These results are consistent with findings reported by Miller et al (2001) who reported a linear isotherm coefficient of 0.80 L/kg for a sandy soil.

**Table 8: Microcystin Concentrations for August 2005** 

ELISA Method Sampled	in August	2005			Corrected	Final		
Sample ID	Dilution Ratio	Final Conc. Factor	Assay Value (ug/L)	Standard Recovery (%)	Spike Recovery (%)	Corrected Concentration (ug/L)	Average Concentration (ug/L)	Standard Deviation
Filtrate #1	0	1x	0.02	77	98	< 0.04	< 0.04	0.00
	0	1x	0.03	77	98	< 0.04		
Filtrate #2	0	1x	0.02	77	98	< 0.04	< 0.04	0.00
	0	1x	0.02	77	98	< 0.04		
Filtrate #3	0	1x	0.03	77	98	< 0.04	< 0.04	0.00
	0	1x	0.01	77	98	< 0.04		
Filtrate #4	0	1x	0.02	77	98	< 0.04	< 0.04	0.00
	0	1x	0.02	77	98	< 0.04		
Filtrate #4b	0	1x	0.03	77	98	< 0.04	< 0.04	0.00
	0	1x	0.03	77	98	< 0.04		
Lake Patrick	0	1x	0.04	88	89	0.04	0.05	0.01
	0	1x	0.05	88	89	0.06		
Terrier Pond East	0	1x	0.07	88	89	0.08	0.06	0.03
	0	1x	0.04	88	89	0.04		
Terrier Pond South	0	1x	0.06	88	89	0.07	0.08	0.01
	0	1x	0.07	88	89	0.08		
SR 417-5	0	1x	0.08	88	89	0.09	0.12	0.04
	0	1x	0.13	88	89	0.15		
SR 417-4	0	1x	0.11	102	98	0.11	0.15	0.06
	0	1x	0.10	102	98	0.19		
SR 417-3	0	1x	0.09	102	98	0.09	0.09	0.00
	0	1x	0.09	102	98	0.09		
SR 417-1	1/10	10x	1.64	54	94	1.74	1.36	0.54
	1/10	10x	0.92	54	94	0.98		
SR 417-2	0	1x	1.33	54	94	1.41	1.56	0.21
	0	1x	1.61	54	94	1.7		
Lake Condel	0	1x	0.02	102	98	0.02	0.04	0.03
	0	1x	0.06	102	98	0.06		
Horatio 1	0	1x	0.45	54	94	0.48	0.45	0.04
	0	1x	0.40	54	94	0.42		
Horatio 2	0	1x	0.03	102	98	< 0.04	< 0.04	0.00
	0	1x	0.03	102	98	< 0.04		
Pegasus Pond	0	1x	0.01	102	98	< 0.04	< 0.04	0.00
Ç	0	1x	0.02	102	98	< 0.04		

Quantification limit = 0.04  $\mu g/L$ 

Table 9: Statistical Analyses: Pond vs. Filtrate Microcystin Data

# Single Sample Run Date of April 2005

# Single Sample Run Date of August 2005

Null Hypothesis: Xbar 1 > Xbar2 (0ne sided)

Null Hypothesis: Xbar 1 > Xbar 2 (One sided)

X bar 1	Pond AVG	0.22
X bar 2	Filtrate Avg	0.23
S1	STD DEV Ponds	0.15
S2	STD DEV Filtrate	0.11
n1	# of Pond samp	15
n2	# of Filtrate samp	3
note: n1+n2=		18

X bar 1	Pond AVG	0.33
X bar 2	Filtrate Avg	0.04
S1	STD DEV Ponds	0.52
S2	STD DEV Filtrate	0.00
n1	# of Pond samp	12
n2	# of Filtrate samp	5
note: n1+r	12=	17

t Statistic

X1bar-X2bar

(n1-1)\*S1^2

(n2-1)\*S2^2

significant difference

Toxin

0.290

2.970

0.000

t Statistic	Toxin
X1bar-X2bar	-0.014
(n1-1)*S1^2	0.297
(n2-1)*S2^2	0.025
n1+n2-2	16
(1/n1+1/n2)	0.400
SQRT	0.090
t	-0.156
significant difference	>55%

n1+n2-2	1
(1/n1+1/n2)	0.28
SQRT	0.23
4	4 22

not a significant difference

# **Combined Sampling Data**

Null Hypothesis: Xbar 1 > Xbar2 (One sided)

X bar 1	Pond AVG	0.266
X bar 2	Filtrate Avg	0.111
S1	STD DEV Ponds	0.367
S2	STD DEV Filtrate	0.114
n1	# of Pond samp	27
n2	# of Filtrate samp	8
note n1+n2=		35
	Z Statistic	Total
	X1bar-X2bar	0.155
	X1bar-X2bar S1^2/n1	0.155 0.005
		4
	S1^2/n1	0.005
	S1^2/n1 S2^2/n2	0.005 0.002

# 4.5 Pond Volume and Cyanobacteria Populations

Lake data shows population counts and concentrations that are at least two orders of magnitude greater than the stormwater ponds, with the lakes being much larger in volume and area relative to the stormwater ponds. Due to the magnitude difference, comparisons of stormwater pond volumes to the population counts and concentrations were made using the stormwater pond data. The data for pond area, average depth, and volumes along with an estimate of the watershed areas are shown in Table 10. The area data were obtained from recent air reconnaissance. The volumes were calculated from the area and an average depth, which was obtained using sounding equipment. For all of the ponds, side slopes were documented until a relatively constant depth was recorded across a pond. Depth was measured through many sections of the ponds and recorded when the change in depth was over about half foot. An average depth was calculated and the volume obtained as a function of the average depth and area. This volume is estimated as that relatively close to the pond control elevation and representative of the sampling times.

Table 10: Stormwater Pond Area, Depth, and Volume Data

Name	Pond Area (acre)	Estimated Watershed Area*** (acre)	Watershed Type	Approximate Average Depth* (ft)	Number of Measured Points	Approximate Volume** (acre-ft)
1 Lake Condel	2.7	135	Residential	10	80	27
2 Terrier Pond	4.6	230	Residential	14	100	64
3 UCF South Irrigation Pond off Campus Road	4.4	220	Roads & Parking	6	80	26
4 UCF Pegasus Pond off Campus Road	0.6	30	Roads & Parking	6	40	3.6
5 Lake Patrik	9.4	470	Roads & Parking	11	50	103
6 SR 417-1, NB at Lee Vista Boulevard Exit	1.7	85	4 Lane Divided	8	40	14
7 SR 417-2, SB 0.5 miles south of Lee Vista Boulevard	1.8	90	4 Lane Divided	8	40	14
8 SR 417-3, NB at SR 528 (Beeline) exit	3.5	175	4 Lane Divided	8	40	28
9 SR 417-4, NB 2 miles north of Narcoossee Road	3.3	165	4 Lane Divided	8	40	26
10 SR 417-5, NB 1 mile north of Narcoossee Road	2.0	100	4 Lane Divided	8	40	16
11 University Boulevard and Hall Road	0.9	45	6 Lane Curbed	4	20	3.6
12 University Boulevard and SR 417, NW corner	4.6	230	6 Lane Curbed	6	40	28
13 Horatio Avenue and Via Tuscany No. 1	1.1	55	4 Lane Curbed	4	20	4.4
14 Horatio Avenue and Via Tuscany No. 2	0.2	10	4 Lane Curbed	3	10	0.6

<sup>\*</sup> Average Depth

Both the sampling data of April and August showed no correlation between the pond volumes and the population counts, nor any correlation between pond volume and PTOX counts. The lack of correlation is shown by the statistical data and calculations in Table 11 through Table 14 for each sampling period. Thus, larger volume stormwater ponds do not have greater counts of Cyanobacteria relative to smaller ones, presumably because of proportional use of rooted vegetation (littoral zone) in all the ponds that remove nutrients.

Graphical presentations of the pond volume data and average total and PTOX were also made to visually compare the potential relationship. This comparison is shown in Figure 6.

<sup>\*\*</sup> Surface Area Multiplied by Average Depth

<sup>\*\*\*</sup> Based on 2% of the Watershed used for Pond Area

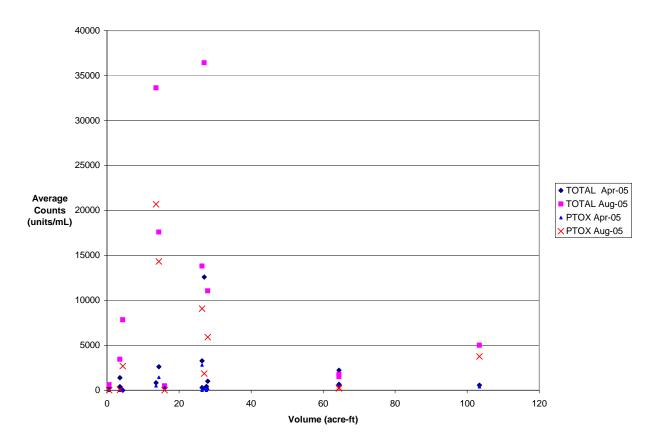


Figure 6: Pond Volume vs. Total and PTOX Counts

**Table 11: Statistical Comparison of Pond Volume to Populations Counts in April 2005** 

	Approx Volume	Total CYANO
	(acre-ft)	Units/mL
Lake Condel	27	12590
Terrier Pond	64	650
Terrier Pond	64	2223
UCF South Pond	26	298
UCF Pegasus Pond	3.6	1387
Lake Patrik	103	557
SR 417-1	14	824
SR 417-2	14	2620
SR 417-3	28	1005
SR 417-4	26	3267
Univ & Hall Road	3.6	389
Horatio Avenue No. 1	4.4	0
Horatio Avenue No. 2	0.6	270
Univ & SR 417, NW	28	420

SR 417-5 Sample Omitted

23092.92	135660462	-5.32746
SSxx	SSyy	SSxy

Xave	29.1	slope	-0.000231	S	3362
yave	1893	SSE	135660462	t	-0.0000104
n	14			t	0.0000104
-		•		table t	13%

**Table 12: Statistical Comparison of Pond Volume to Population Counts in August 2005** 

	Approx Volume (acre-ft)	Total CYANO Units/mL
Lake Condel	27	36412
Terrier Pond	64	1746
Terrier Pond	64	1501
UCF Pegasus Pond	3.6	3450
Lake Patrik	103	5011
SR 417-1	14	33640
SR 417-2	14	17578
SR 417-3	28	11038
SR 417-4	26	13797
SR 417-5	16	499
Horatio Avenue No. 1	4.4	7825
Horatio Avenue No. 2	0.6	613

not sampled

Univ & Hall Road UCF South Pond Univ & SR 417, NW

21877	1728997274	-912584
SSxx	SSyy	SSxy

Xave	30.5	slope	-41.7	S	13004
yave	12467	SSE	1690929877	t	-0.474475
n	12			t	0.47448
		_		table	48%

**Table 13: Statistical Comparison of Pond Volume to PTOX in April 2005** 

	Approx Volume (acre-ft)	PTOX CYANO Units/mL
Lake Condel	27	227
Terrier Pond	64	499
Terrier Pond	64	635
UCF South Pond	26	0
UCF Pegasus Pond	3.6	68
Lake Patrik	103	390
SR 417-1	14	476
SR 417-2	14	1427
SR 417-3	28	183
SR 417-4	26	2814
SR 417-5	16	318
Univ & Hall Road	3.6	0
Horatio Avenue No. 1	4.4	0
Horatio Avenue No. 2	0.6	0
Univ & SR 417, NW	28	11

23349	7865094	32428
SSxx	SSyy	SSxy

Xave	28.3	slope	1.39	S	776
yave	470	SSE	7820058	t	0.27362
n	15			t	0.27362
		_		table	7%

Table 14: Statistical Comparison of Pond Volume to PTOX in August 2005

	Approx	PTOX
	Volume	CYANO
	(acre-ft)	Units/mL
Lake Condel	27	1844
Terrier Pond	64	191
Terrier Pond	64	265
UCF Pegasus Pond	3.6	38
Lake Patrik	103	3759
SR 417-1	14	20691
SR 417-2	14	14312
SR 417-3	28	5897
SR 417-4	26	9064
SR 417-5	16	4
Horatio Avenue No. 1	4.4	2681
Horatio Avenue No. 2	0.6	8

not sampled

Univ & Hall Road UCF South Pond Univ & SR 417, NW
UCF South Pond
Univ & SR 417, NW

20298.68	489280520	-539528			
SSxx	SSyy	SSxy			
Xave	27.0	slope	-26.6	S	6892
yave	4465	SSE	474940170	t	-0.54949
n	12			t	0.54949
	•			table	41%

### CHAPTER 5 HORIZONTAL WELL DEMONSTRATION

A solution to water shortages in Florida is to reuse water. Water used for irrigation and food production accounts for about 80 to 90% of water used worldwide. One of the most abundant sources for irrigation is stormwater. After rainfall occurs, water travels into ditches, ponds, lakes and other receptors before finally making its way to the saline water bodies of the world. This stormwater can be recovered by removing it from these impoundments, filtering the stored water, and introducing it into existing or new water irrigation mains. One example of this stormwater recovery is the UCF Stormwater Reuse System.

A detention pond on the campus of the University of Central Florida was used to demonstrate the construction and operation of a horizontal well. The site was chosen because of its relatively poor soils for infiltration and percolation. Thus, if this detention pond could provide a safe yield of water for irrigation, other similar sites in Florida would also be possible. Water quality data were also reported for this site in chapter four.

#### 5.1 THE UCF STORMWATER REGIONAL IRRIGATION SYSTEM

Researchers demonstrated a wet detention pond on the campus of UCF was used as a regional irrigation system. The watershed for the pond is 155.86 acres. The impervious area is about 74 acres and contains a four lane roadway. The other impervious areas are sidewalks, parking lots, and buildings which are part of a commercial area. The pervious part of the watershed is a combination of sports complex playing fields and highway shoulder areas. The pond area is 15 acres with an average depth of about eight feet at normal pond elevation.

The irrigation water is removed from the pond using a horizontal well. The horizontal well is housed at the university stadium detention pond and is approximately 1000 feet long and about twenty feet deep from land surface. The well is about twelve feet below the normal water level of the pond. Since this was a retrofit, there was no pipe laid under the pond, but instead along the edge of the pond and in a trench about four feet wide. The typical minimum width of trench is eighteen inches. A four feet wide trench was used because the parent soil was very impermeable. A schematic of trench construction details is shown in Figure 7, which illustrates important elevations and distances. The trench was back-filled with sand to provide a more rapid movement of water to the collection pipe. A perforated pipe with a permeable sock cover (usually a two ply filter wrap) was used at the bottom of the trench to collect the water.

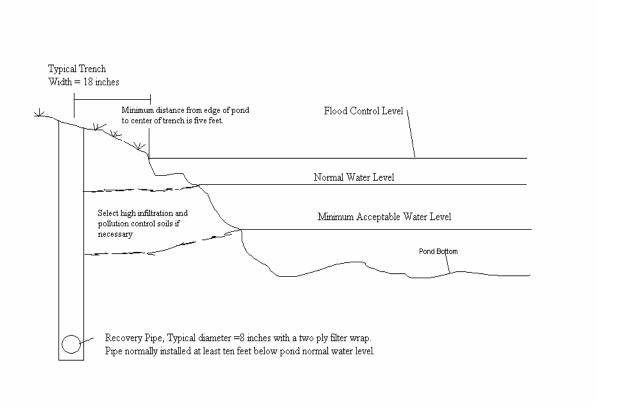


Figure 7: Horizontal Well Construction Details.

To increase the flow of water from the pond into the trenches, highly permeable stringers into the pond were used. These stringers allow preferential flow paths for water in the detention pond to enter the collection system. Perforated pipes were also extended into the detention pond to direct detained water into the trenches, as well as a special filter media for sorption of pollutants. A special filter media is used to enhance the removal of contaminates from the stormwater present in the pond and can be used to enhance stormwater quality with this system in any location. The perforated pipes were then connected to a pump and a subsequent flow rate of over 500 gpm was developed from the horizontal well. This 500 gpm flow rate was the minimum recorded flow rate over a two day period of continuous pumping. The testing lasted over a period of six weeks, pumping continuously for two days each week. The demand for irrigation water is about 77,000 gallons per day for the new UCF stadium and the surrounding grounds. For an eight hour irrigation cycle, the horizontal well can deliver about 240,000 gallons based on a pumping rate of 500 gpm.

At UCF the plan for irrigation is to use the horizontal well in conjunction with reclaimed water. The existing ground water wells would be used only if the stormwater regional detention pond and reclaimed water were discontinued. The detention pond will be the primary source for irrigation water.

Suspended solid samples from the pond water were compared to the Florida DEP reclaimed water standard. The standard for suspended solids is five mg per liter. The detention pond water suspended solids was consistently over that standard (5-9 mg/L). The water did not meet the public access standards for using reclaimed water for irrigation. Since there are no standards for detention pond water used as a source for irrigation, the reclaimed water standards were used.

Water for irrigation was taken from the horizontal well because the water quality was better as measured by turbidity and suspended solids (less that five mg/L in all samples). The stormwater recycling system with the use of the horizontal well consistently produces a water of less than five NTU for turbidity.

This horizontal well filter system can be cleaned and maintained by simply back flushing the perforated pipe; however, from the over 300 locations in operation in Florida to date, there is no need to clean them. It is believed that they can be used on any impounded water body in the State of Florida to provide an alternative water resource for water users, because of past successes and the operational success of the UCF reuse system. Five hundred systems have been installed and there are more than 300 currently in operation in Florida, with the remaining in operation across the USA. This technology was first used in 1987 and introduced within the State of Florida in 1989 (HSSI, 2007). A comparison of a horizontal well to a vertical well is shown in Figure 8 and illustrates a standard section for a horizontal well installation. For the same depth into the surficial aquifer, the horizontal well will remove more water. The length of horizontal well is shown as 500 feet in this case and the depth to the collection pipe is no more than 22 feet. Less deep horizontal wells have also been used provided the depth is below the water table. A four to eight inch diameter pipe is commonly used since larger pipes do not usually provide a proportionally greater flow volume. For most soils, the 500 foot length of a six inch pipe shown can develop between 250-500 gallons of water per minute, depending on soil permeability.

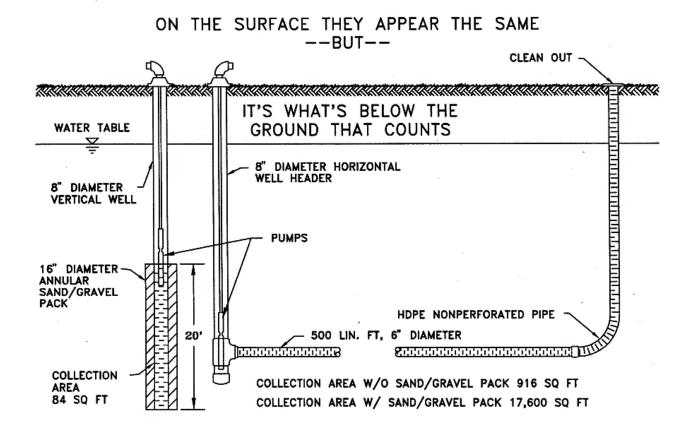


Figure 8: Horizontal Well Section and Comparison to a Vertical Well

### **5.2 INTELLIGENT CONTROLLER (I2 Controller)**

UCF has two horizontal trenches; one each along side of the two stadium ponds. The operating plan is to alternate the selection of the trenches, and if the water level in the detention pond is lower than a preset depth value, to discontinue the use of the horizontal wells for irrigation, instead using the reclaimed source. In addition, the water quality as measured by turbidity will be used to select or to turn off the water from the pond. Pending the approval of the water management district and the state Department of Environmental Protection, the pond can also be refilled using reclaimed water. To carry out the refilling selection, an intelligent controller called I2 will be used. The I2 is a unit that will analyze the water quality properties of

several water sources, as well as the depth of water in the detention pond. This same unit will then enable a water delivery/pumping system to deliver water to a water distribution/irrigation system based on the analysis of the water quality properties. At the UCF site, the particular unit has been configured for the following initial parameters:

#### THE I2 CONTROLLER PARAMETERS

One Water Source – Stormwater Pond

Two Water Quality Parameters – Pond Level and TSS (future), additional future parameters can be added as required

Two Delivery/Pumping Systems – Pressure Control VFD Pump Controller with a pump alternating control strategy

Distribution/Irrigation System – UCF RainBird Irrigation System

Pond Recharge Source – Reclaim Water

The general operations for the controller to receive a "Water Distribution System Request" are a signal from the water distribution/irrigation system. The distribution/irrigation system chosen is the UCF RainBird Irrigation System. Based on the water quality parameters as compared to the water quality parameter set points, the system will enable a water delivery/pumping system to deliver water from a water source (Stormwater Pond) to the water distribution/irrigation system (UCF RainBird).

There are two water delivery/pumping systems. Only one delivery/pump system shall be activated at a time. The delivery/pumping systems shall be on an alternating pumping scheme. The system shall alternate pumping systems at the end of each pumping cycle or upon a pumping system fault.

When the system is not delivering/pumping water to the distribution/irrigation system and the pond is below an operator adjustable low pond level set point, the stormwater pond shall be re-charged. For re-charging the pond, the system shall use a reclaim water system. This re-

charge cycle shall continue until the stormwater pond is above an operator adjustable high set

point or that there is another request for water from the water distribution system.

When a "Water Distribution System Request" signal is received from the water

distribution system, this system is programmed to enable a water delivery/pumping system

provided the water quality parameters for the water source are acceptable. If the water quality

parameters for water source are not acceptable then the system will not enable a water source.

For a water delivery/pumping system to be enabled all of the following conditions must

be true:

1. "Water System Request"

2. "Water Source Water Level" >= "Water Source Low Level Set Point"

3. "Water Source TSS" <= "Water Source TSS Upper Limit Set Point"

**5.2.1** System Specifications

Power Requirements: 120Vac/60Hz

I/O Requirements:

Analog Inputs (4-20mA)

Water Source Level (0-34.6') – Pressure Transducer provided w/Controller

Water Source TSS (0-50 NTU)

Digital Inputs (Relay – Dry Contact)

Water Distribution System Request

Water Delivery System No. 1 Low Level Lockout

Water Delivery System No. 2 Low Level Lockout

Analog Outputs (4-20mA)

N/A

Digital Outputs (Relay – Dry Contact)

Water Source Delivery System No. 1 Enable

Water Source Delivery System No. 2 Enable

Open Pond Re-charge Valve

38

### **5.2.2** Methodology of Installation:

The I2 Controller consist of an Allen-Bradley MicroLogix 1500, 24Vdc power supply, 120Vac surge suppressor, analog surge suppressors, and other miscellaneous electrical components installed in a 24" x 24" x 8" FRP NEMA 3, 3R, 4, 4X, 12, 13 Hoffman enclosure. The I2 Controller has been assembled by a UL 508 panel shop and bears the UL mark of such.

The controller shall be mounted on a rack or stand and installed per NEC and local electrical code requirements. In no way shall any penetration into the controller affect the NEMA rating of the controller. The controller shall be installed in such a way as to limit the temperature inside the enclosure to 110 F. For example, if the controller is to be installed outdoors, sun shields shall be provided by the contractor to protect the controller and to assist with keeping the controller at an acceptable temperature.

The controller has been provided with one pressure transducer to be used for water source level. This pressure transducer is to be installed by the contractor in the water source and wired back to the controller. The contractor shall provide everything necessary (labor, tools, material, and required equipment) to install the pressure transducer and to get the signal from the transducer to the controller.

The controller has an input to be used to indicate to the controller that the water distribution system requires water. The contractor shall provide this signal from the water distribution system to the controller. The contractor shall provide everything necessary (labor, tools, material, and required equipment) to provide this signal and get the signal from the water distribution system to the controller.

The controller will be been provided with two outputs. Each output shall be used to enable a water delivery system to deliver water from the water source to the water distribution

system. The contractor shall provide everything necessary (labor, tools, material, and required equipment) to provide these signals from the controller to the water delivery systems.

The controller will be provided with an output to open a valve to re-charge the pond from a reclaim water source. The contractor shall provide everything necessary (labor, tools, material, and required equipment) to provide this signal from the controller to the pond re-charge valve.

The controller will be provided with additional inputs to monitor the low level cut- off status of the water delivery systems. The contractor shall provide everything necessary (labor, tools, material, and required equipment) to provide these signals from the controller to the water delivery systems.

The I2 Controller will be programmed and configured based on known water quality parameters. Modification to the program and configuration may be made in the field after installation is complete.

A representative from the I2 Controller team will be available to review the installation requirements with the contractor before the installation begins and will also be available to inspect the installation once the installation is complete.

In addition, a representative from the I2 Controller team will be available to assist with start-up and checkout of the system once the system is ready for operation.

## CHAPTER 6 – CONCLUSION AND RECOMMENDATIONS

### 6.1 Summary

Fourteen stormwater ponds located in central Florida were sampled for Cyanobacteria total and potentially toxic (PTOX) counts and toxin concentrations. These ponds had visual appearances of Cyanobacteria, and in some ponds, Orange County Environmental Protection had identified at least the qualitative assessment of the Cyanobacteria. For two stormwater ponds, Lake Terrier and Lake Condel, there were confirmed Cyanobacteria counts. The additional stormwater ponds were chosen to represent different land uses, such as urban roads, state roads, institutional, residential and industrial. The ponds were sampled on two different occasions for the documentation of Cyanobacteria counts and toxin concentrations.

Even though Cyanobacteria were found in all of the ponds evaluated for this study, one particular location, or watershed source, did not show a greater concentration of Cyanobacteria over any other. The average counts for the stormwater ponds were 1,893 total and 470 PTOX in April 2005 with standard deviations of 3,113 and 724 respectively. For the August 2005 sampling, the average counts were 11,093 total and 4,896 PTOX with standard deviations of 11,924 and 6,371 respectively. Lake data shown total count numbers ranging from 116,700 to 1,361,860, and PTOX counts as high as 154,190.

In addition, four soil columns were used to infiltrate and percolate stormwater pond water. Pond water from three ponds along S.R. 417, Lake Condel, and Pegasus pond were

applied to the columns to simulate a year of water. The columns were four feet deep and sampling occurred at this depth to detect the occurrence of Cyanobacteria counts and toxin concentrations. The columns were two foot square and filled with the most common sandy soils on the campus of UCF. The soils were poorly graded and classified as type- A hydrologic in terms of their drainage characteristics and were compacted to 92% density to simulate construction practices.

The fourteen ponds were surveyed for area and depth, which provided an estimate of the as-built and operational conditions. The volume of each pond was then calculated. Geometric data for pond sizes were not available, thus field reconnaissance for pond depths and the use of aerial maps for pond area estimation had to be obtained. This resulted in more accurate pond volume estimates relative to the use of planned construction drawings.

#### 6.2 Conclusions

The results of this research show that total and PTOX Cyanobacteria counts and the toxins associated with them do exist in stormwater ponds across the central Florida area. This was the first documentation of such numbers and as such had no other comparative pond data; however, the total counts are much lower in the stormwater regional ponds by about two orders of magnitude, relative to those counts found in large central Florida lakes.

Assuming that relatively low levels of Cyanobacteria tend to be found in stormwater ponds, the filtration mechanism of natural soil material appears to be an effective means of reducing the total Cyanobacteria counts and the potentially toxic Cyanobacteria counts as well. There were no Microcystin toxins after filtration that exceeded the World Health Organization drinking water standard of one ug/L. The Microcystin toxins are produced from the

Cyanobacteria and were shown to be significantly reduced by the natural soil media; however, the toxin concentrations in the waters of the stormwater ponds did exceed one ug/L in seven percent of the samples.

The area and depth of each stormwater pond was evaluated and the volume of each was estimated. Larger volume and area lakes have higher Cyanobacteria counts and thus larger ponds may have higher counts. The data from this study, however, showed no statistical relationship for counts or toxin concentrations to the volume of stormwater ponds, presumably because of the proportionate amount of rooted vegetation in each pond which help remove nutrients from the water column.

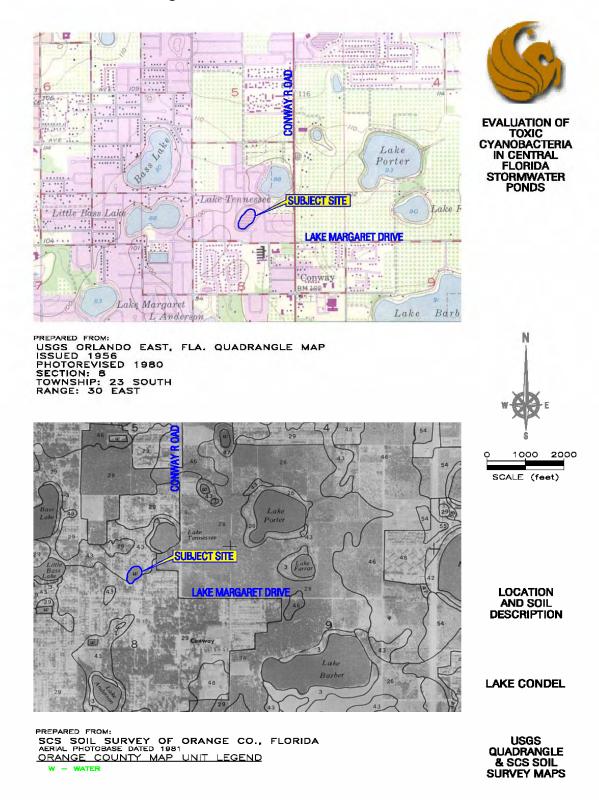
#### **6.3** Recommendations

The results of this study conclude that stormwater ponds should be treated the same as lakes in the area relative to any regulations regarding the beneficial uses of water from lakes and ponds. This conclusion is based on site location and climate condition requirements for this study, and is based on the Cyanobacteria data of this study.

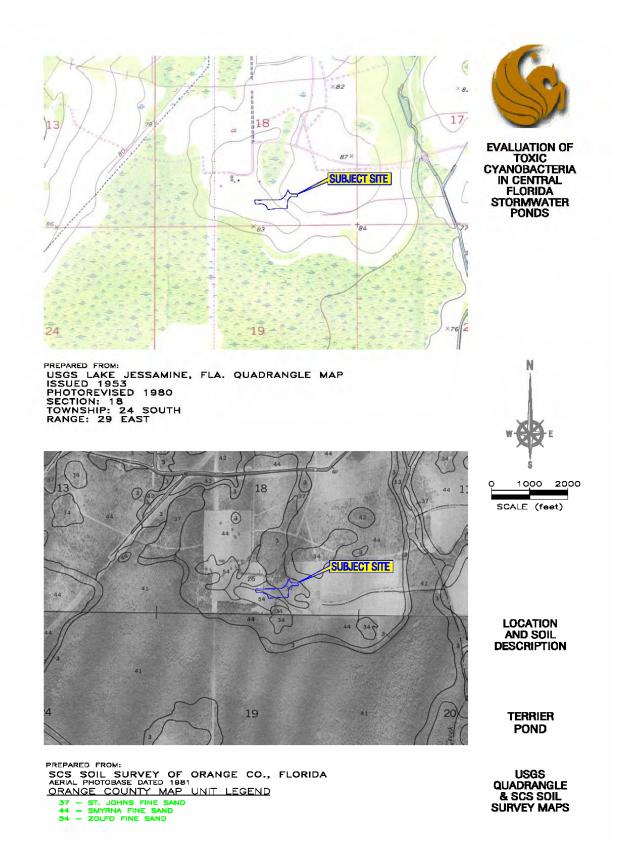
There were significant removal of total and PTOX Cyanobacteria using naturally occurring, poorly graded soils. However, further study is necessary for the removal of toxins in stormwater using these and other naturally occurring soils. Some evidence shows that additional organic content may reduce the toxins and will be examined in a continuing study, adding more definitive data on the forces causing removals. The growth rate as related to residence time may as well be important and worthy of additional research, because of the lower residence time in the stormwater ponds relative to the large lakes.

The use of regional stormwater ponds with horizontal wells should be considered to meet stormwater pollution control standards and to help reduce dependency on potable water for irrigation supply. Construction details for horizontal wells are shown in Figure 7 and are recommended for use with established ponds. Stringers about four feet wide and placed about every fifty feet along the pond edge are recommended to enhance the follow of water from the pond to the trench.

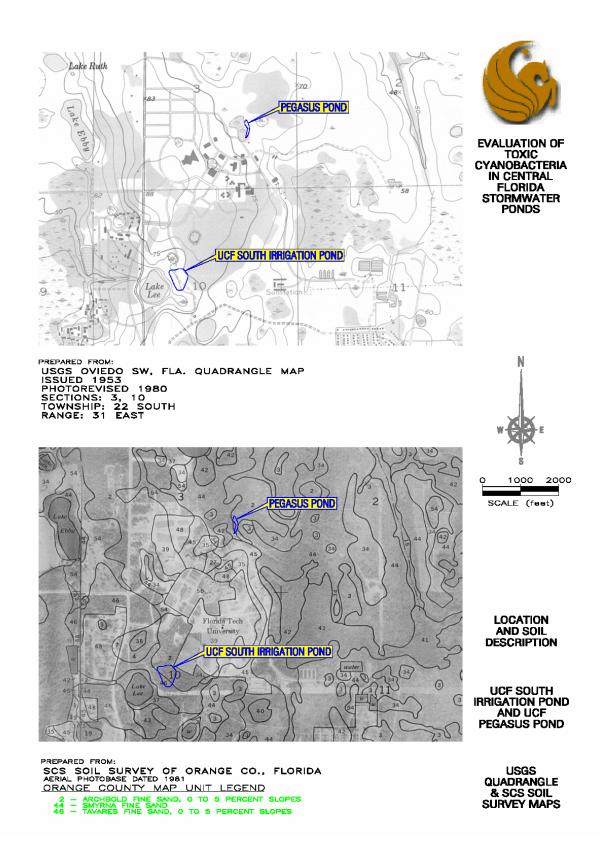
# APPENDIX A: USGS QUADRANGLE and SCS SOIL SURVEY MAPS



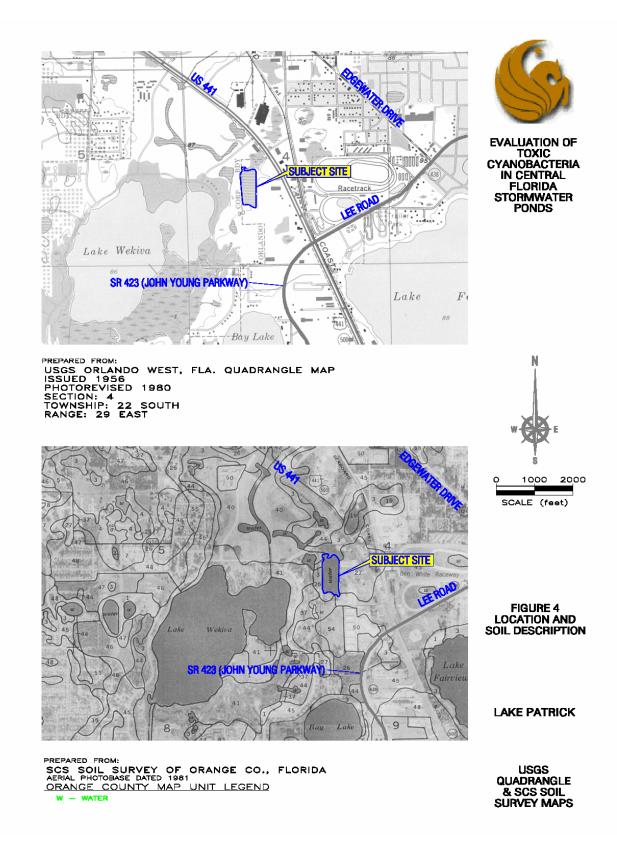
Lake Condel: Location and Soil Description



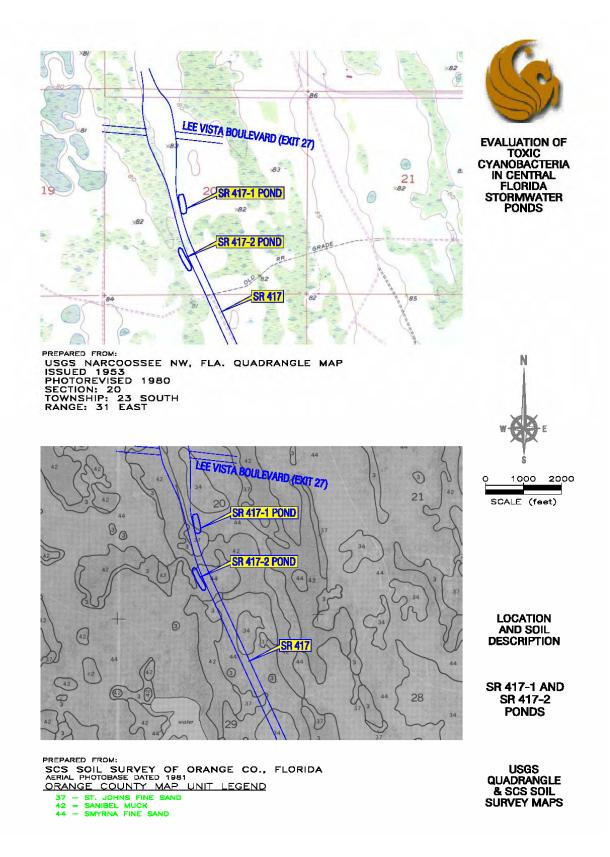
Terrier Pond: Location and Soil Description



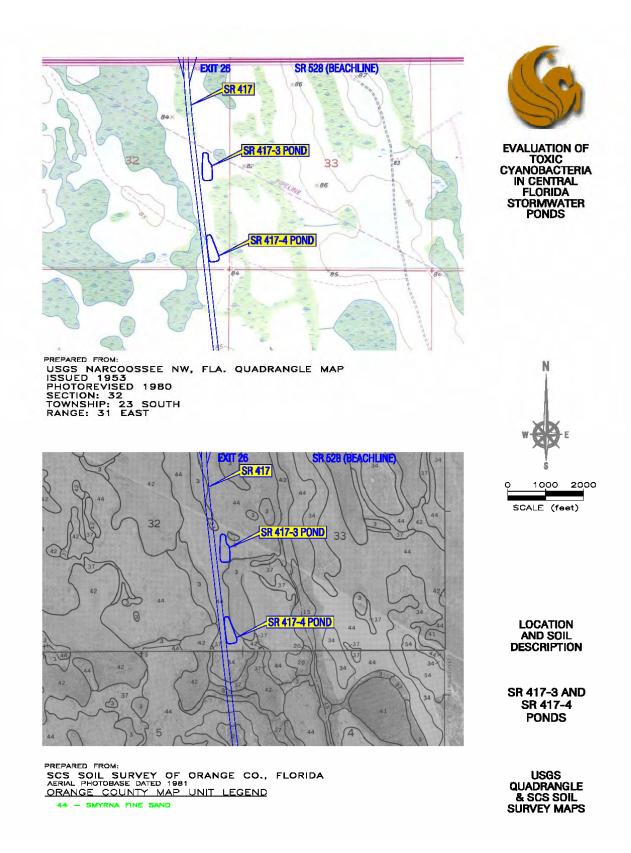
UCF South Irrigation and Pegasus Ponds: Location and Soil Description



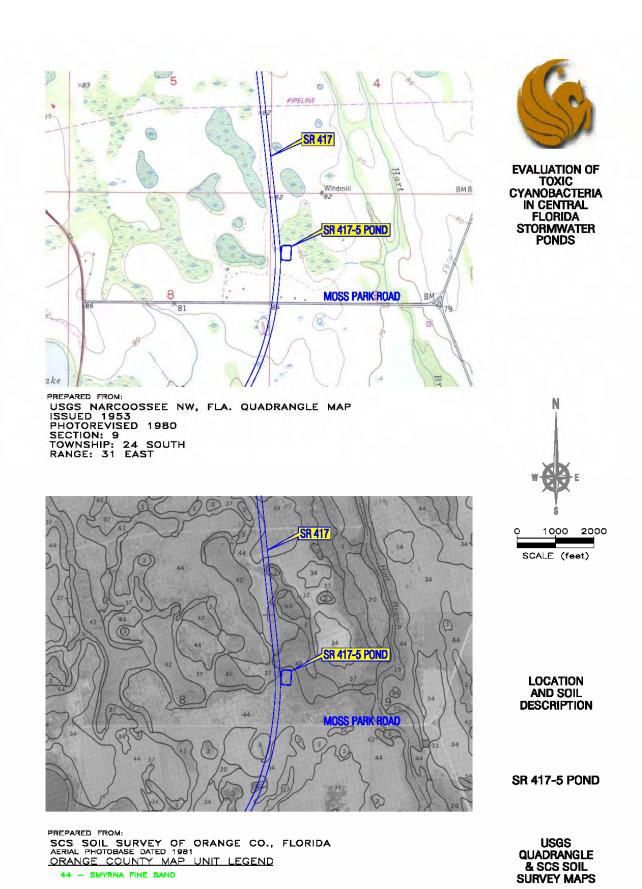
Lake Patrik: Location and Soil Description



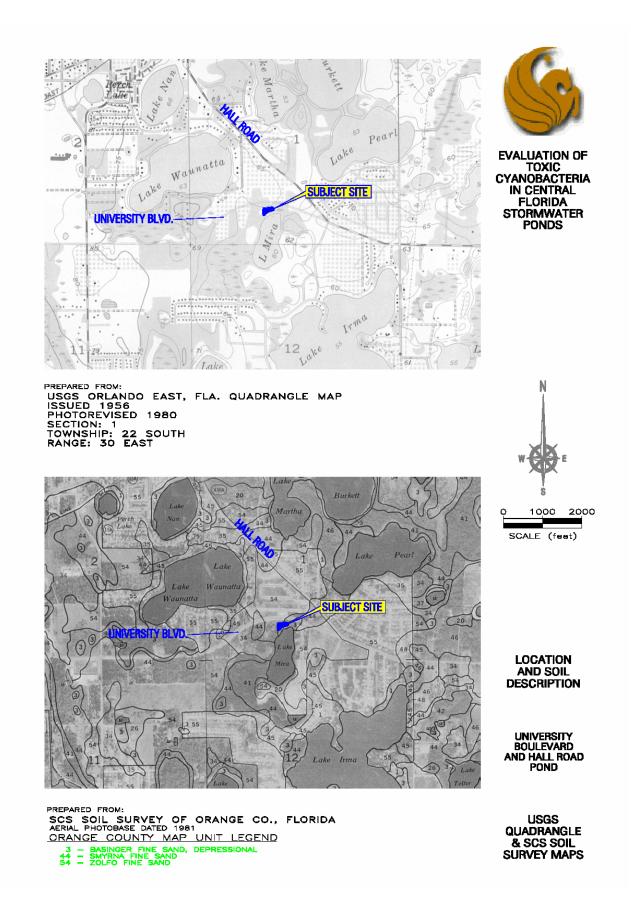
S.R. 417-1 and S.R. 417-2 Ponds: Location and Soil Description



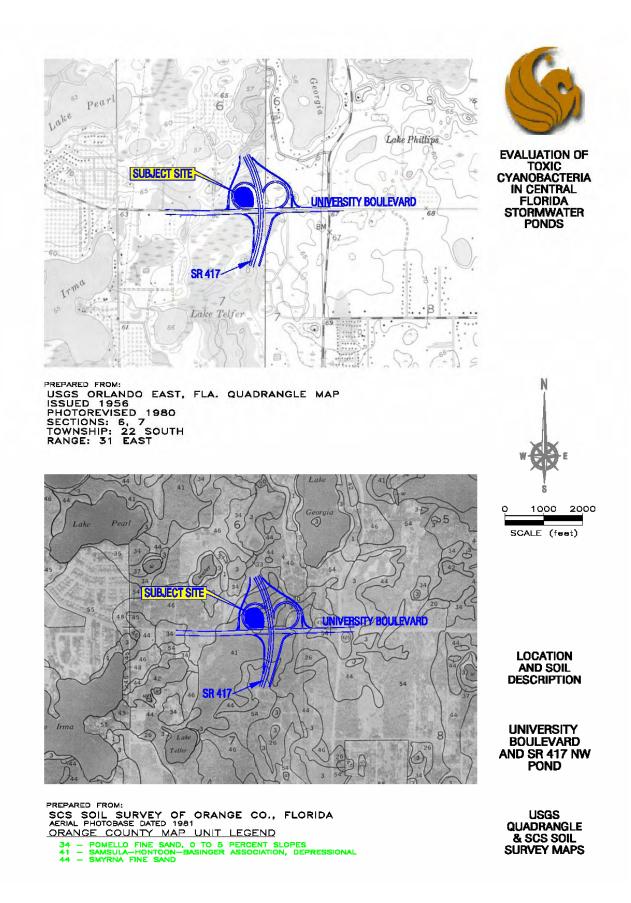
S.R. 417-3 and S.R. 417-4 Ponds: Location and Soil Description



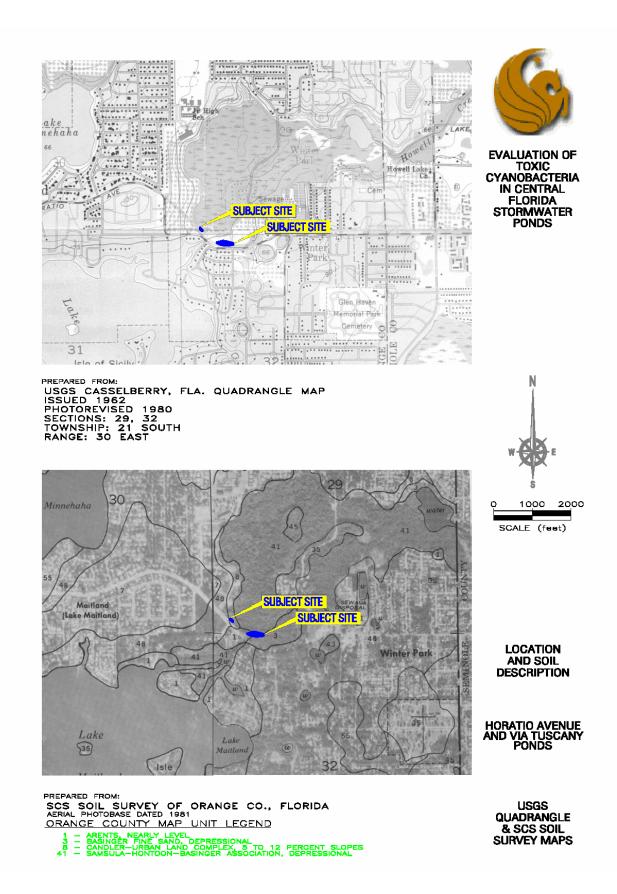
S.R. 417-5 Pond: Location and Soil Description



University Blvd and Hall Road Pond: Location and Soil Description



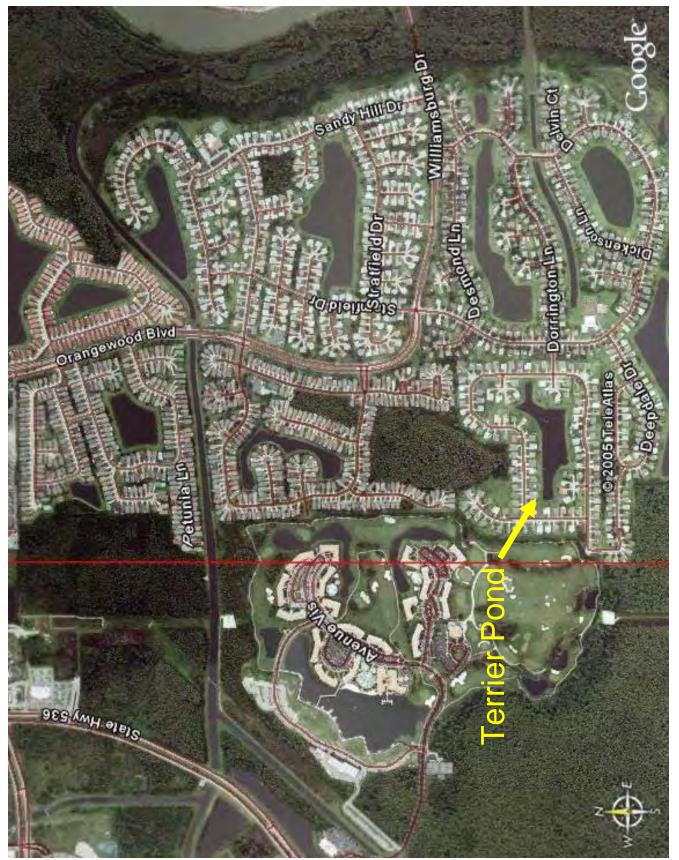
University Blvd and S.R. 417 Pond: Location and Soil Description



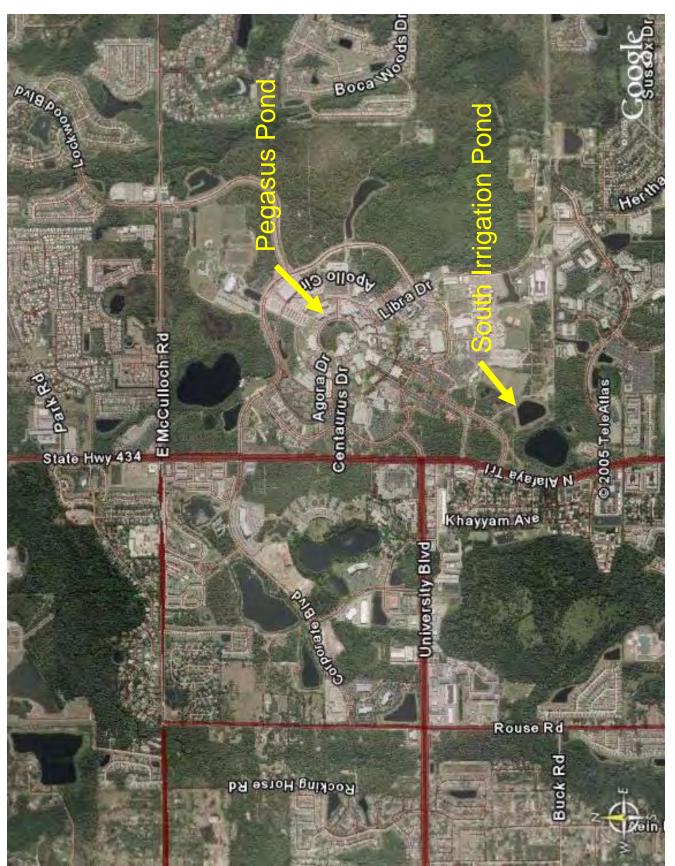
Horatio Avenue and Via Tuscany No. 1 and No. 2 Ponds: Location and Soil Description



Lake Condel: Aerial photograph of subject site and surrounding area.



Terrier Pond: Aerial photograph of subject site and surrounding area.



UCF South Irrigation and Pegasus Ponds: Aerial photograph of subject sites and surrounding areas.



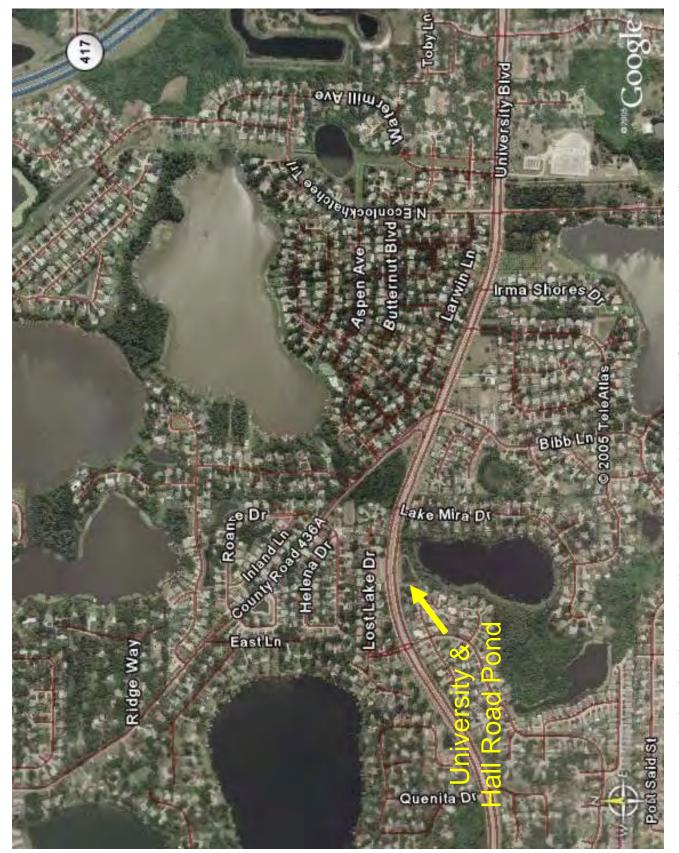


S.R. 417-1 and S.R. 417-2 Ponds: Aerial photograph of subject sites and surrounding areas.

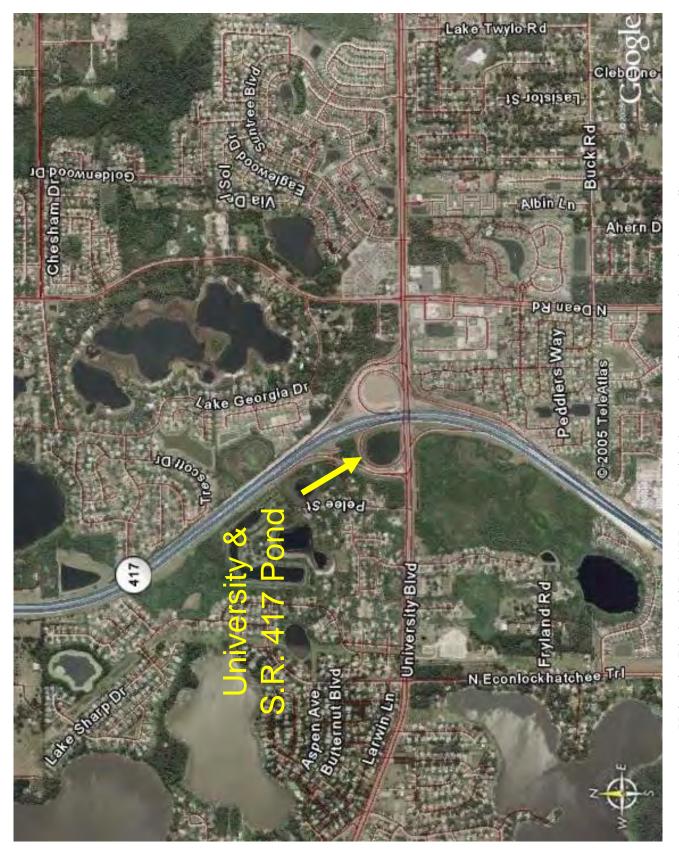


S.R. 417-3 and S.R. 417-4 Ponds: Aerial photograph of subject sites and surrounding areas.

S.R. 417-5 Pond: Aerial photograph of subject site and surrounding area.



University Blvd and Hall Road Pond: Aerial photograph of subject site and surrounding area.



University Blvd and S.R. 417 Pond: Aerial photograph of subject site and surrounding area.



Horatio Avenue and Via Tuscany Ponds: Aerial photograph of subject sites and surrounding areas.



Lake Condel: View of the south shoreline from the west shore.



Lake Condel: View of the east shoreline from the west shore.



Terrier Pond: View facing west from the east shore (standing at the nose of the dog).



Terrier Pond: View from south shoreline facing west.



UCF South Irrigation Pond: View facing south from the north shore.



UCF South Irrigation Pond: View from south shoreline facing northeast.



UCF Pegasus Pond: View facing southeast from the northwest corner.



UCF Pegasus Pond: View from east shoreline facing northwest.



Lake Patrik: View facing northeast from the south shoreline.



Lake Patrik: View from southeast corner facing northwest.



S.R. 417-1 Pond: View of north shoreline.



S.R. 417-1 Pond: Close up view of algae along north shoreline.



S.R. 417-2 Pond: View from south shoreline.



S.R. 417-2 Pond: View of east shoreline.



S.R. 417-3 Pond: View of west shoreline.



S.R. 417-3 Pond: View of northwest corner near Beachline (S.R. 528) exit.



S.R. 417-4 Pond: View from southwest corner.



S.R. 417-4 Pond: View from northwest corner facing southeast.



S.R. 417-5 Pond: View from southwest corner.



S.R. 417-5 Pond: View of algae along north shoreline.



University Blvd and Hall Road Pond: View from northwest corner.



University Blvd and Hall Road Pond: View from southwest corner.



University Blvd and S.R. 417 Pond: View from southeast corner facing west.



University Blvd and S.R. 417 Pond: View from southeast corner facing north.



Horatio Avenue and Via Tuscany No. 1: View from east shoreline.



Horatio Avenue and Via Tuscany No. 1: View from southeast corner.



Horatio Avenue and Via Tuscany No. 2: View from southwest corner.



Horatio Avenue and Via Tuscany No. 2: View from southeast corner.

## APPENDIX C: GREENWATER LABORATORIES SAMPLING DATA



aquatic analysis ... research ... consulting

### Microcystin Data Report Project: UCF Stormwater Management Academy

Sample Identification	Sample Collection Date
1. Chamber 1 filtrate	050415
2. Chamber 2	050415
3. Chamber 3	050415
4. Hall Rd. East	050417
5. UCF South Pond	050417
6. Lake Patric	050417
7. Lake Condel South	050417
8. Terrier Pond East	050417
9. Terrier Pond South	050417
10. Student Union	050417
11. 417-1 South	050417
12. 417-2 North	050417
13. 417-3 South	050417
14. 417-4 South	050417
15. 417-5 South	050417
16. 417 Univ. NW	050417
17. Horatio 1 @ Weir	050417
18. Horatio 2 @ Weir	050417

<u>Analytical Methodology</u> – An Enzyme Linked Immunosorbent Assay (ELISA) kit (expiration 12/05) was utilized for the determination of the concentration of **total** microcystins present. Each sample (including spikes) was run in duplicate.

Limit of Detection/Quantification = 0.04 µg/L (0.04 ppb)

Cyano

UCF Microcystin Results
Sampled on 4/15/2005 and 4/17/2005

Sample ID	Assay Value, ug/L	Dilution Ratio	Final Conc. Factor	Std. Recovery	Corrected Spike Recovery (%)	Final Corrected Concentration (ug/L)	Average (ug/L)	Standard Deviation
Chanmber 1 filtrate	0.10 0.05	none none	1x 1x	74 74	78 78	0.17 0.09	0.13	0.06
Chamber 2	0.12 0.14	none	1x 1x	83 83	89 89	0.16 0.19	0.18	0.02
Chamber 3	0.28 0.29	none	1x 1x	83 83	89 89	0.38 0.39	0.39	0.01
Hall Rd East	0.10 0.13	none	1x 1x	98 98	66 66	0.15 0.20	0.18	0.04
UCF South Pond	0.24 0.29	none none	1x 1x	74 74	73 73	0.44 0.54	0.49	0.07
Lake Patric	0.08 0.10	none none	1x 1x	74 74	77 77	0.14 0.18	0.16	0.03
Lake Condel South	0.12 0.14	none none	1x 1x	98 98	81 81	0.15 0.18	0.17	0.02
Terrier Pond East	0.09 0.07	none none	1x 1x	90 90	92 92	0.11 0.08	0.10	0.02
Terrier Pond South	0.05 0.11	none none	1x 1x	90 90	92 92	0.06 0.13	0.10	0.05
Student Union	0.11 0.13	none none	1x 1x	98 98	80 80	0.14 0.17	0.16	0.02
417-1 South	0.36 0.27	none none	1x 1x	90 90	92 92	0.43 0.33	0.38	0.07
417-2 North	0.49 0.45	none none	1x 1x	98 98	80 80	0.62 0.57	0.60	0.04
417-3 South	0.10 0.14	none none	1x 1x	98 98	93 93	0.11 0.15	0.13	0.03
417-4 South	0.14 0.14	none none	1x 1x	98 98	72 72	0.20 0.20	0.20	0.00
417-5 South	0.17 0.19	none none	1x 1x	98 98	97 97	0.18 0.20	0.19	0.01
417 Univ. NW	0.09 0.12	none none	1x 1x	98 98	78 78	0.12 0.16	0.14	0.03
Horatio 1 @ Weir	0.06 0.07	none	1x 1x	90 90	87 87	0.08 0.09	0.09	0.01
Horatio 2 @ Weir	0.12 0.19	none none	1x 1x	90 90	93 93	0.14 0.23	0.19	0.06

Sample Description	Sampling Date Genus	Genus	Species	Algal Group	# Counter (units)	Algal Group # Counted Counting Unit Magn (units)		Field Area # of Fields (mm2)		Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	tox CYANO Units/mL
1 Chamber 1 Filtrate	050415	cyanophyte filament	sp. (1)	CYANO	14	filament	400	0.0625	20	-	<u>_</u>	206	1,167	0
1 Chamber 1 Filtrate	050415	cyanophyte filament	sp. (2)	CYANO	4	filament	400	0.0625	70	<b>—</b>	-	259		
1 Chamber 1 Filtrate	050415	cnyptophyte	sp. (D=15um)	CRYPT	×	[B0	400	0.0625	70	-	<b>—</b>			
1 Chamber 1 Filtrate	050415	unicell, oval/rod 2.5-5um	dds		×	1100	400	0.0625	20	<b>←</b>	<b>~</b>			
1 Chamber 1 Filtrate	050415	unicell, sphere 2.5-5um	.dds		×	lleo	400	0.0625	20	<b>←</b>	<b>~</b>			
1 Chamber 1 Filtrate	050415	unicell, sphere 5-7.5um	.dds		×	lleo	200	0.25	30	-	<b>—</b>			
2 Chamber 2	050415	cyanophyte filament	sp. (1)	CYANO	2	filament	400	0.0625	70	<b>—</b>	<b>~</b>	130	130	0
2 Chamber 2	050415	Nitzschia	sp. (L=15um)	BACIL	×	e	400	0.0625	70	<b>—</b>	<b>—</b>			
2 Chamber 2	050415	pennate diatom	sp. (L=17um)	BACIL	×	eo	400	0.0625	20	<b>←</b>	<b>~</b>			
2 Chamber 2	050415	cryptophyte	sp. (D=10um)	CRYPT	×	180	400	0.0625	20	-	<b>~</b>			
2 Chamber 2	050415	cryptophyte	sp. (D=15um)	CRYPT	×	<del>  </del> 90	200	0.25	30	<b>—</b>	<b>—</b>			
2 Chamber 2	050415	unicell, oval/rod 2.5-5um	Spp		×	e0	400	0.0625	20	-	<b>←</b>			
2 Chamber 2	050415	unicell, sphere 2.5-5um	. spp.		×	lleo	400	0.0625	70	<b>—</b>	<b>~</b>			
2 Chamber 2	050415	unicell, sphere 5-7.5um	.spp.		×	lleo	400	0.0625	70	1	1			
3 Chamber 3		cyanophyte chain	sp. (1)	CYANO	-	filament	200	0.25	30	1	1	38	751	0
3 Chamber 3		cyanophyte filament	sp. (1)	CYANO	6	filament	400	0.0625	70	<b>~</b>	<b>~</b>	583		
3 Chamber 3	050415	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	20	~	<b>—</b>	130		
		unicell, oval/rod 2.5-5um	spp.		×	lle0	400	0.0625	70	-	<b>—</b>			
4 Hall Rd. East		Aphanocapsa	spp. <2um	CYANO	-	colony	400	0.0625	20	1	1	91	389	0
4 Hall Rd. East		cyanophyte filament	sp. (2)	CYANO	<b>—</b>	filament	200	0.25	20	-	<b>~</b>	23		
4 Hall Rd. East		cyanophyte filament	sp. (3)	CYANO	-	filament	400	0.0625	20	-	~	91		
4 Hall Rd. East		Lyngbya	sp. (1)	CYANO	<b>—</b>	filament	100	283.53	<u>_</u>	-	<b>—</b>	-		
4 Hall Rd. East		Oscillatoria	sp. (1)	CYANO	2	filament	100	283.53	Ç	<b>←</b>	<b>~</b>	2		
4 Hall Rd. East		oscillatorian filament	sp. (1)	CYANO	2	filament	400	0.0625	20	-	<b>—</b>	181		
4 Hall Rd. East	050417	pennate diatom	sp. (L=10um)	BACIL	×	lleo	400	0.0625	20	<b>←</b>	<b>~</b>			
4 Hall Rd. East	050417	pennate diatom	sp. (L=20um)	BACIL	×	lle0	200	0.25	20	<b>—</b>	<b>~</b>			
4 Hall Rd. East	050417	chlorophyte filament	sp. (B)	CHLOR	×	filament	200	0.25	20	-	<b>—</b>			
4 Hall Rd. East	050417	Cosmarium	sp. (large)	OHLOR.	×	lleo	200	0.25	20	<b>—</b>	<b>—</b>			
4 Hall Rd. East	050417	Cosmarium	sp. (med)	CHLOR	×	II8	400	0.0625	20	-	-			
4 Hall Rd. East	050417	Eutetramorus	sp. (1)	CHLOR	×	colony	400	0.0625	20	<b>-</b>	<del>-</del>			
4 Hall Rd. East	050417	Mougeotia	sb.	GLOR S	×	filament	100	283.53	77	<b>—</b>	_			
4 Hall Rd. East	050417	Oocystis	sb. (3)	CHLOR	×	colony	400	0.0625	20	-	<b>—</b>			
4 Hall Rd. East	050417	Oocystis	sp. (4)	CHLOR	×	colony	200	0.25	20	-	_			
4 Hall Rd. East	050417	Scenedesmus	optnens	SEC	×	colony	400	0.0625	20	<b>-</b>	<del>-</del>			
4 Hall Rd. East	050417	Scenedesmus	.ds	CHLOR	×	colony	400	0.0625	20	-	<b>—</b>			
4 Hall Rd. East	050417	Spirogyra	Sp.	CHLOR	×	filament	100	283.53	<u></u>	-	<del>-</del>			
4 Hall Rd. East	050417	Staurastrum	sp. (large)	SELOR SELOR	×	e0	100	283.53	<u>,                                     </u>	<b>←</b>	<b>—</b>			
4 Hall Rd. East	050417	Staurastrum	sb. (med)	GE/OR	×	<del>  </del>	200	0.05	20	<del>-</del>	<del>-</del>			
4 Hall Rd. East	050417	cryptophyte	sp. (D=10um)	CRYPT	×	[e]	200	0.25	20	<b>←</b>	<b>—</b>			
4 Hall Rd. East	050417	cryptophyte	sp. (L=10um)	CRYPT	×	1100	400	0.0625	20	-	←:			
4 Hall Rd. East	050417	cryptophyte	sp. (L=10um)	CRYPT	×	<del>  </del>	400	0.0625	20	<b>—</b>	<b>—</b>			
4 Hall Rd. East	050417	unicell, oval/rod 2.5-5um	.dds		×	lle ell	400	0.0625	20	-	<b>~</b>			
4 Hall Rd. East	050417	unicell, sphere 2.5-5um	.dds		×	<del>  </del> 8	400	0.0625	20	<b>—</b>	<del>-</del>			
4 Hall Rd. East	050417	unicell, sphere 5-7.5um	spp.		×	lleo	400	0.0625	20	1	<b>—</b>			

GreenWater Laboratories Sampling Data April 2005

Sample Description	Sampling Date Genus	Genus	Species	Algal Group	# Counte (units)	Algal Group #Counted Counting Unit Magn (units)	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	Ptox CYANO Units/mL
5 UCF South Pond		Aphanocapsa		CYANO	Ω.	colony	400	0.0625	20	2	1	162	298	0
5 UCF South Pond		cyanophyte filament	sp. (3)	CYANO	-	filament	400	0.0625	02	2	<b>~</b>	32		
5 UCF South Pond		Limnothrix/Pseudanabaena		CYANO	<del>-</del>	filament	100	283.53	-	2	<b>—</b>	-		
5 UCF South Pond		Merismopedia	punctata	CYANO	-	colony	90	0.25	30	2	_	19		
5 UCF South Pond		Oscillatoria	sp. (2)	CYANO	-	filament	200	0.25	30	2	<b>—</b>	19		
5 UCF South Pond		oscillatorian filament	sp. (1)	CYANO	5	filament	400	0.0625	20	2	<u></u>	92		
5 UCF South Pond		Navicula	g	BACIL	ж	lle0	400	0.0625	70	2	<b>—</b>			
5 UCF South Pond	050417	pennate diatom	sp. (L=30um)	BACIL	×	lle0	400	0.0625	02	2	-			
5 UCF South Pond		Synedra	g	BACIL	×	lle0	200	0.25	30	2	_			
5 UCF South Pond		chlorophyte colony	sp. (B)	SHLOR	×	colony	400	0.0625	22	2	<b>—</b>			
		chlorophyte single cell	sp. (1)	SHLOR	×	II:80	400	0.0625	22	2	<b>~</b>			
5 UCF South Pond		chlorophyte tetrad	sp. (1)	SHLOR	×	colony	90	0.25	30	2	<b>—</b>			
5 UCF South Pond		Closterium	acutum var. variabile	CHLOR	×	e0	400	0.0625	02	2	<b>—</b>			
5 UCF South Pond		Coelastrum	sp. (1)	CHLOR	×	colony	100	283.53	-	2	_			
		Didymocystis	fina	CHLOR	×	colony	400	0.0625	02	2	_			
		Elakatothrix	viridis	CHLOR	×	colony	400	0.0625	20	2	_			
5 UCF South Pond		Eudorina	sp. (1)	SHLOR	×	colony	400	0.0625	02	2	-			
5 UCF South Pond		Eutetramorus	sp. (1)	CHLOR	×	colony	400	0.0625	70	2	<b>—</b>			
5 UCF South Pond		Oocystis	sp. (2)	FLOR	×	colony	400	0.0625	02	2	<b>—</b>			
		Oocystis	sp. (2)	SHLOR	×	colony	400	0.0625	20	2	<b>~</b>			
		Scenedesmus	quadricauda	SHLOR	×	colony	100	283.53	<del>-</del>	2	<b>—</b>			
5 UCF South Pond		Staurastrum		CHLOR	×	lle0	200	0.25	30	2	<b>—</b>			
5 UCF South Pond		Staurastrum	sp. (med)	CHLOR	×	lleo	400	0.0625	2	2	-			
		Dinobnyon		CHRYS	×	colony	100	283.53	-	2	-			
		cryptophyte	sp. (D=5um)	CRYPT	×	e0	400	0.0625	20	2	-			
5 UCF South Pond		cryptophyte		CRYPT	×	lle0	400	0.0625	02	2	~			
		unicell, oval/rod 2.5-5um	.dds		×	e0	400	0.0625	02	2	_			
5 UCF South Pond		unicell, sphere 2.5-5um	sbb.		×	lle0	400	0.0625	02	2	~			
5 UCF South Pond		unicell sphere 5-7.5um	008		×	100	400	0.0625	02	2				

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Sample Description	Sampling Date Genu	Genus	Species	Algal Group	# Counter (units)	Algal Group # Counted Counting Unit Magn (units)	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	tox CYANO Units/mL
6 Lake Patrick		Anabaena	circinalis/flos-aquae (1)	CYANO	-	filament	100	283.53	-	2	<b>V</b>	1	299	380
		Anabaena		CYANO	12	filament	400	0.0625	2	7	_	88		
6 Lake Patrick		Aphanocapsa/Chroococcus		CYANO	-	colony	400	0.0625	02	2	<b>—</b>	32		
		cyanophyte chain	sp. (1)	CYANO	<b>—</b>	filament	400	0.0625	2	2	_	32		
		cyanophyte filament		CYANO	-	filament	900	0.25	30	2	<b>—</b>	19		
6 Lake Patrick	050417	Limnothrix/Pseudanabaena		CYANO	<u>-</u>	filament	400	0.0625	02	2	-	32		
		oscillatorian filament	sp. (1)	CYANO	-	filament	200	0.25	30	2	<b>—</b>	19		
		Planktolyngbya	cf. limnetica	CYANO	~	filament	400	0.0625	2	2	<b>—</b>	32		
		Aulacoseira	italica	BACIL	×	chain	100	283.53	~	2	<b>—</b>			
		Navicula	sp. (L=20um)	BACIL	×	lleo	200	0.25	30	2	<b>~</b>			
		Nitzschia	sp. (L=20um)	BACIL	×	lleo	400	0.0625	2	2	<b>—</b>			
		pennate diatom		BACIL	×	lle0	400	0.0625	2	2	-			
		pennate diatom	sp. (L=20um)	BACIL	×	e0	400	0.0625	20	2	<b>—</b>			
		Botryococcus	braunii (sm)	SHLOR	×	colony	100	283.53	T	2	_			
		chlorophyte colony	sp. (B)	CHLOR	×	colony	400	0.0625	02	2	-			
		chlorophyte colony	sp. (G)	CHLOR	×	colony	400	0.0625	70	2	_			
		chlorophyte single cell	sp. (1)	SHLOR	×	e0	400	0.0625	02	2	-			
		Closterium	acutum var. variabile	CHLOR	×	lle0	100	283.53	-	2	<b>—</b>			
		Closterium	sp. (1)	SH.OR	×	lleo	100	283.53	<u></u>	2	<b>—</b>			
		Dictyosphaerium	Sp.	CHLOR	×	colony	400	0.0625	2	2	<b>.</b>			
		Eutetramorus	sp. (1)	SELOR	×	colony	400	0.0625	2	2	<b>—</b>			
		Franceia	sp. (2)	SHOR	×	lle0	100	283.53	-	2	<b>—</b>			
		Monoraphidium	arcuatum	CHLOR	×	e0	90	0.25	8	2	-			
		Monoraphidium	sp. (1)	CHLOR	×	e0	400	0.0625	20	2	<b>—</b>			
		Monoraphidium/Koliella	Sp.	CHLOR	×	e0	400	0.0625	70	2	-			
		Oocystis	sp. (2)	SHLOR	×	colony	400	0.0625	20	2	<b>—</b>			
		Pandorina	morum	SHLOR	×	colony	400	0.0625	02	2	<b>—</b>			
		Staurastrum	sp. (large)	SHOR	×	lleo	90	0.25	30	2	<del>-</del>			
		cryptophyte	sp. (D=10um)	CRYPT	×	lleo	400	0.0625	2	2	<b>—</b>			
		cryptophyte	sp. (L=15um)	CRYPT	×	1180	200	0.25	30	2	<del></del>			
		cryptophyte	sp. (L=7um)	CRYPT	×	e0	400	0.0625	20	2	-			
		Ceratium	hirundinella	DINOP	×	e	90	0.25	8	2	<b>.</b>			
		Centritractus	.ds	XANTH	×	lleo	400	0.0625	20	2	<b>.</b>			
		unicell, sphere 2.5-5um	Spp.		×	100	400	0.0625	02	2	-			
	050/17	unicell sohere 5.7 5um	cuo		>	ll a	400	0.0825	70	C	-			

GreenWater Laboratories Sampling Data April 2005

ത്മ്	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counte (units)	Algal Group # Counted Counting Unit Magn (units)		Field Area (mm2)	Field Area # of Fields (mm2)	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	tox CYANO Units/mL
7 L2	Lake Condel South	050417	Anabaena	eucompacta	CYANO	2	filament	200	0.25	20	1		45	12,590	727
7 7	Lake Condel South	050417	Anabaena	sp. (4)	CYANO	8	filament	90	0.0625	9	-	-	<u>≅</u>		
7 Le	ake Condel South	050417	Aphanocapsa	spp. <2um	CYANO	106	colony	400	0.0625	20	_	<u></u>	9,617		
7 1/8	ake Condel South	050417	Aphanocapsa/Chroococcus	GS GS	CYANO	_	colony	200	0.35	20	_	<b>~</b>	23		
7 18	ake Condel South	050417	cyanophyte filament	Sp. (4)	CYANO	9	filament	400	0.0625	20	<b>—</b>	<b>—</b>	1,633		
7 L	-ake Condel South	050417	Microcystis	sp. (1)	CYANO	-	colony	6	283.53	_	-	~	-		
7 Le	ake Condel South	050417	oscillatorian filament	sp. (2)	CYANO	10	filament	400	0.0625	50	-	<b>—</b>	206		
7 Le	ake Condel South	050417	Planktolyngbya	limnetica	CYANO	2	filament	400	0.0625	50	<del>-</del>	<b>~</b>	181		
7 Le	ake Condel South	050417	pennate diatom	sp. (L=12um)	BACIL	×	lle0	400	0.0625	50	-	·			
7 Le	ake Condel South	050417	Synedra	sp. (L=25um)	BACIL	×	lleo	400	0.0625	20	<b>—</b>	~			
7 Le	ake Condel South	050417	Synedra	sb. (L=50um)	BACIL	×	lleo	400	0.0625	20	-	<b>—</b>			
7 Le	ake Condel South	050417	Ankistrodesmus	gracilis	CHLOR	×	lleo	200	0.25	20	<b>←</b>	-			
7 L	ake Condel South	050417	chlorophyte	sp. (cross)	CHLOR	×	lleo	200	0.25	20	<b>—</b>	-			
7 L6	ake Condel South	050417	Coelastrum	sp. (1)	CHLOR	×	colony	100	283.53	~	-	_			
7 L8	ake Condel South	050417	Cosmarium	sp. (med)	CHLOR	×	e	400	0.0625	20	_	<b>—</b>			
7 L6	ake Condel South	050417	Crudgeniella	divergens	CHLOR	×	colony	400	0.0625	20	_	_			
7 L6	ake Condel South	050417	Didymocystis	fina	OH_CR	×	colony	400	0.0625	20	<b>—</b>	<b>—</b>			
7 Lê	ake Condel South	050417	Euastrum	sp. (1)	SE SE	×	lle0	200	0.25	20	-	<u>_</u>			
7 LE	ake Condel South	050417	Kirchneriella	sp. (1)	SH.CR.	×	e	400	0.0625	20	<b>—</b>	<del>-</del>			
7 Le	ake Condel South	050417	Lagerheimia	ds	ST/S	×	e	400	0.0625	20	_	<b>—</b>			
7 L6	ake Condel South	050417	Monoraphidium	contorta	GL/CR	×	e	400	0.0625	20	<del>-</del>	<b>—</b>			
7 Le	_ake Condel South	050417	Monoraphidium	sp. (1)	GH_OR	×	<del> </del> 8	400	0.0625	20	<b>—</b>	<del>-</del>			
7    -	ake Condel South	050417	Monoraphidium/Koliella	.ds	OHLOR.	×	e	400	0.0625	20	<del>-</del>	←			
7 L	ake Condel South	050417	Pediastrum	ponyanum	CHLOR	×	colony	400	0.0625	20	<b>—</b>	_			
7 Le	ake Condel South	050417	Pediastrum	qnblex	OHLOR.	×	colony	400	0.0625	20	-	←:			
7 L	ake Condel South	050417	Pediastrum	tetras	SELOR.	×	colony	400	0.0625	20	<b>—</b>	<del>-</del>			
7 L	ake Condel South	050417	Scenedesmus	acuminatus	유명	×	colony	400	0.0625	20	<b>—</b>	<b>—</b>			
. Le	ake Condel South	050417	Scenedesmus	bernardii	SH.CR.	×	colony	90	0.25	20	<b>.</b>	<del>-</del>			
7	ake Condel South	050417	Scenedesmus	bicaudatus	SEC.	×	colony	400	0.0625	20	_	<u> </u>			
7 LE	ake Condel South	050417	Scenedesmus	quadricauda	SH_CR	×	colony	400	0.0625	20	<del>-</del>	<b>—</b>			
7 - 1	ake Condel South	050417	Scenedesmus	sp. (10)		×	colonly	400	0.0625	20		<del></del>			
- 1-	ake Conder South	000417	Scelledesilius	Sp. (21)	555	<b>(</b> )	colony	400	0.0625	200	- +	- 14			
- 1-	ake Condel South	050417	Schrooderia	sp. (siligle cell)	\$ E	< >	Colony	900	0.0023	8 6	- +				
- L	ake Condel South	050417	Staurastrum	tetracerum	S E S	<::×	3 8	400	0.0625	20	_	- 🔾			
7 [8	ake Condel South	050417	Staurastrum	sp. (med)	CHLOR	×	198	400	0.0625	20		-			
7 Le	ake Condel South	050417	Tetraedron	candatum	CHLOR	×	lleo	400	0.0625	50	_	_			
7 Le	ake Condel South	050417	Tetraedron	sp. (1)	SHLOR	×	lleo	200	0.25	20	_	<b>~</b>			
7 LE	ake Condel South	050417	Tetrastrum	heteracanthum	CHLOR	×	lleo	400	0.0625	20	<b>—</b>	<b>~</b>			
7 Le	ake Condel South	050417	cryptophyte	sp. (D=5um)	CRYPT	×	lleo	400	0.0625	20	_	<b>—</b>			
7 Lé	ake Condel South	050417	cryptophyte	sb. (D=8um)	CRYPT	×	e	400	0.0625	20	<b>—</b>	<del></del>			
7 12	ake Condel South	050417	cryptophyte	sp. (L=20um)	CRYPT	×	<del>  </del> 8	400	0.0625	20	<b>—</b>	<b>—</b>			
7	ake Condel South	050417	Trachelomonas	ds	EUGLE	×	e	400	0.0625	20	-	<del>-</del>			
7 L	ake Condel South	050417	Goniochloris	sb. (2)	XANTH	×	lleo	200	0.25	20	<del>-</del>	<b>—</b>			
7 L	ake Condel South	050417	Goniochloris	sb. (3)	XANTH	×	lleo.	200	0.25	20	<b>—</b>	<b>—</b>			
. Ľ	ake Condel South	050417	Pseudostaurastrum	SD.	XANTH	×	8	500	0.25	20	-	← •			
. تــــ ا ~	ake Condel South	050417	unicell, oval/rod 2.5-5um	dds		×	[e]	400	0.0625	20					
4	ake Condel South	U5U417	unicell, sphere 2:5-5um	.dds		×	lleo	400	0.0625	9n	J				

GreenWater Laboratories Sampling Data April 2005

	Sample	Sampling Date Genus	Genus	Species	Algal Group	# Counted	Algal Group # Counted Counting Unit Magn	Magn	Field Area	# of Fields	Settling Vol.	Field Area # of Fields Settling Vol. Dilution Factor	Species	CYANO Total Ptox CYANO	Ptox CYANO
ω		050417	Anabaena	beraii/minderi (2)	CYANO	2	filament	300	0.25	92	3	•	15	650	499
œ		050417	Aphanizomenon	issatschenkoi	CYANO	-	filament	90	0.0625	8	ဗ	-	212		
00	Terrier Pond East	050417	cyanophyte filament	sb. (3)	CYANO	7	filament	400	0.0625	20	n	_	09		
$\infty$	Terrier Pond East	050417	cyanophyte single cell	sp. (long)	CYANO	ന		400	0.0625	20	8	_	91		
œ	<b>Terrier Pond East</b>	050417	Microcystis	sp. (1)	CYANO	က	colony	400	0.0625	20	က	-	91		
œ	Terrier Pond East	050417	Microcystis unicell	. ds	CYANO	9	les	400	0.0625	20	က	-	18		
00	Terrier Pond East	050417	diatom	sp. (L=12um)	BACIL	ж	lleo	400	0.0625	20	60	<b>—</b>			
00	Terrier Pond East	050417	pennate diatom	sp. (D=25um)	BACIL	×	lle0	400	0.0625	20	65	~			
00	Terrier Pond East	050417	chlorophyte colony	sp. (B)	CHLOR	×	colony	400	0.0625	20	65	<u></u>			
00	Terrier Pond East	050417	Closterium	acutum var. variabile	CHLOR	×	lle0	900	0.25	20	65	<b>~</b>			
00	Terrier Pond East		Coelastrum	sp. (2)	SHLOR	×	colony	200	0.25	20	ന	<b>—</b>			
00	Terrier Pond East		Eutetramorus	sp. (1)	SHLOR	×	colony	200	0.25	20	n	-			
∞	Terrier Pond East		Scenedesmus	sp. (23)	CHLOR	×	colony	400	0.0625	20	n	-			
$\infty$	Terrier Pond East		Spirogyra	Sp.	CHLOR	×	filament	90	283.53	-	m	_			
$\infty$	Terrier Pond East		Staurastrum	sp. (large)	CHLOR	×	lle0	400	0.0625	20	9	_			
00	Terrier Pond East		cryptophyte	sp. (D=4um)	CRYPT	×	lle0	400	0.0625	20	n	_			
00	Terrier Pond East	050417	cryptophyte	sp. (D=8um)	CRYPT	×	[e]	400	0.0625	20	3	_			
00	Terrier Pond East	050417	Ceratium	hirundinella	DINOP	×	lleo	200	0.25	20	60	· —			
00	Terrier Pond East	050417	Trachelomonas	.ds	EUGLE	×	<b>■</b> 80	200	0.25	20	65	_			
00	Terrier Pond East	050417	Isthmochloron	gracile	XANTH	×	eo	400	0.0625	20	n	<b>—</b>			
00	Terrier Pond East	050417	unicell, oval/rod 2.5-5um	spp.		×	e	400	0.0625	20	က	<b>—</b>			
00	Terrier Pond East	050417	unicell, sphere 2.5-5um	Spp.		×	- - - - -	400	0.0625	20	n	<b>—</b>			
C	T.L.	010447	The section of the se					000	20000	CL	c				

CYANO Total Ptox CYANO Units/mL Units/mL Settling Vol. Dilution Factor Field Area # of Fields # Counted Counting Unit Magn Algal Group hanzschii gradis sp. (2) braunii (sm) sp. (8) aoutum var. variabile crucifera boryanum duplex quadricauda (4 cells) sp. (17) sp. (large) triangulare Orgiseta f. variabilis contortum flexuosum griffithii Species Apraizomenton
Aphanizomenton
Aphanizomenton
cf. Romenta
Limothrix/Seudanabaena
Microcyats
oscillation an filament
Plankolyingbya
Androthira Botryococcus
chlorophyte colony
Clostenium
Cuclogeniella
Didymocystis
Elakarothm
FranceialGolenkinia
Koliella Monoraphidium Monoraphidium Monoraphidium Sampling Date Genus Student Union
Student Union
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Student Union

GreenWater Laboratories Sampling Data April 2005

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Sample	Sampling Date Genus	Genus	Species	Algal Group	# Count	Algal Group # Counted Counting Unit Magn		Field Area # of Fields		Settling Vol. Dilution Factor	tion Factor	Species	CYANO Total Ptox CYANO	tox CYANO
Description	2000		* (*)	DOM: 24	(nuits)	IVOI	1879	(mm2)		(mL)		Units/mL	Units/mL	Units/mL
10 Terrier Pond South	050417	Aphanizomenon	issatschenkoi	CYANO	6	filament	400	0.0625	90	က	۲	272	2,223	635
10 Terrier Pond South	050417	Aphanocapsa	sp. (D=2.5)	CYANO	-	colony	100	283.53	<b>-</b>	n	_	0		
10 Terrier Pond South	050417	cf. Aphanocapsa	sp. (D=.3um)	CYANO	5	colony	400	0.0625	20	m	_	1,542		
10 Terrier Pond South	2	cyanophyte filament	sp. (2)	CYANO	-	filament	500	0.25	20	es	_	∞		
10 Terrier Pond South	050417	cyanophyte single cell	sp. (long)	CYANO	-	lleo	400	0.0625	20	8	<b>—</b>	30		
10 Terrier Pond South	050417	Gomphosphaeria	sp. (1)	CYANO	_	colony	500	0.25	20	8	<b>—</b>	00		
10 Terrier Pond South		Microcystis	sp. (1)	CYANO	ß	colony	9	0.0625	20	က	-	151		
10 Terrier Pond South	050417	Microcystis unicell	.ds	CYANO	7	le e	400	0.0625	20	က	~	212		
10 Terrier Pond South		Navicula	sp. (L=20um)	BACIL	×	lleo	400	0.0625	20	65	<b>~</b>			
		Botryococcus	braunii (sm)	CHLOR	×	colony	100	283.53	<u>_</u>	63	<b>~</b>			
10 Terrier Pond South		Closterium	acutum var. variabile	SECR	×	lleo	400	0.0625	20	9	<b>—</b>			
10 Terrier Pond South	050417	Eutetramorus	sp. (1)	CHLOR	×	colony	400	0.0625	22	n	<b>—</b>			
10 Terrier Pond South		Oocystis	sp. (3)	CHLOR	×	colony	200	0.25	20	n	-			
10 Terrier Pond South	050417	Spirogyra	Sp.	CHLOR	×	filament	90	283.53	-	3	_			
10 Terrier Pond South		Staurastrum	sp. (large)	CHLOR	×	lleo	200	0.25	20	8	_			
10 Terrier Pond South	050417	Staurastrum	sp. (med)	CHLOR	×	lleo	400	0.0625	20	3	_			
10 Terrier Pond South		cnyptophyte	sp. (D=5um)	CRYPT	×	lleo	400	0.0625	20	3	_			
10 Terrier Pond South	20	cryptophyte	sp. (L=10um)	CRYPT	×	lleo	400	0.0625	20	65	-			
10 Terrier Pond South		cnyptophyte	sp. (L=20um)	CRYPT	×	lleo	90	0.25	20	n	_			
10 Terrier Pond South	050417	Ceratium	hirundinella	DINOP	×	lleo	400	0.0625	20	60	<del>-</del>			
10 Terrier Pond South	2	Trachelomonas	.ds	EUGLE	×	lleo	200	0.25	20	ന	<b>—</b>			
10 Terrier Pond South	7	Isthmochloron	gracile	XANTH	×	es	400	0.0625	20	60	<del>-</del>			
10 Terrier Pond South	050417	unicell, oval/rod 2:5-5um	.dds		×	e	400	0.0625	20	3	-			
10 Terrier Pond South	050417	unicell, sphere 2.5-5um	spp.		×	cell	400	0.0625	20	3	1			

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080417 050417 050417 050417 050417 050417 050417	Anabaena Aphanocapsa Limothin/Pseudanabaena Microcystis Aulacoseira Aulacoseira Narious	sp. (5)	CHANNO	, ,		I	· · · · · ·		Î	,	2,813	3,267	2 814
050417 050417 050417 050417 050417 050417	Aphanocapsa LimnothrixPseudanabaena Microcystis Aulacoseira Aulacoseira Nariousa	sm <2 m	CYANO	2	filament	400	0.0625	20	•				4.0.7
050417 050417 050417 050417 050417 050417	LinnothrixPseudanabaena Microcystis Aulacoseira Aulacoseira Navicula	100	CYANO	4	colony	400	0.0625	200	· <del>-</del>	· <del>-</del>	363		1000
050417 050417 050417 050417 050417	Microcystis Autacoseira Autacoseira Navicula	ds	CYANO	-	filament	400	0.0625	20	-	<b>—</b>	91		
050417 050417 050417 050417	Aulacoseira Aulacoseira Navicula	sp. (1)	CYANO	-	colony	6	283.53	-	ς-	-	-		
050417 050417 050417 050417	Aulacoseira Navicula	granulata v. angustissima	BACIL	×	chain	200	0.25	20	<b>—</b>	<b>—</b>			
050417 050417 050417	Navicula	italica	BACIL	×	chain	400	0.0625	20	<del>-</del>	<b>—</b>			
050417		sp. (L=20um)	BACIL	×	lleo	400	0.0625	20	<b>—</b>	<b>—</b>			
050417	Nitzschia	sp. (L=12um)	BACIL	×	lleo	400	0.0625	20	<b>~</b>	<b>—</b>			
050447	pennate diatom	sp. (L=10um)	BACIL	×	lleo	200	0.25	20	<b>~</b>	<b>~</b>			
/1.t/ncn	pennate diatom	sp. (L=75um)	BACIL	×	lleo	100	283.53	↽	<b>~</b>	<b>—</b>			
	Synedra	sp. (L=125um)	BACIL	×	lleo	500	0.25	20	<del>-</del>	<b>—</b>			
050417	Synedra	sp. (L=50um)	BACIL	×	lleo	400	0.0625	20	<b>←</b>	-			
050417	Coelastrum	sp. (2)	CHLOR	×	colony	400	0.0625	20	<b>—</b>	<b>—</b>			
050417	Cosmarium	sp. (large)	CHLOR	×	lleo	901	283.53	÷	<b>—</b>	_			
050417	Cosmarium	sp. (med)	CHLOR	×	lleo	200	0.25	20	<del>-</del>	_			
	Didymocystis	fina	CHLOR	×	colony	400	0.0625	20	<b>—</b>	_			
050417	Oocystis	sp. (4)	SHOR	×	colony	400	0.0625	20	<del>-</del>	<b>~</b>			
050417	Pediastrum	duplex	SH_CR	×	colony	400	0.0625	20	<b>—</b>	<b>—</b>			
050417	Pediastrum	tetras	SH.CR	×	colony	400	0.0625	20	<b>←</b>	<u></u>			
050417	Scenedesmus	quadricauda (4 cells)	GH_CR	×	colony	400	0.0625	20	_	<del>-</del>			
050417	Scenedesmus	sp. (10)	CHLOR	×	colony	8	0.25	20	<b>—</b>	<del></del>			
1 050417	Scenedesmus	sp. (17)	CHLOR	×	colony	400	0.0625	20	<b>—</b>	<del>-</del>			
050417	Spirogyra	.ds	CHLOR	×	filament	100	283.53	-	<b>—</b>	-			
050417	Staurastrum	sp. (med)	CHLOR	×	lleo	90	0.25	20	<b>—</b>	<b>—</b>			
050417	Tetrastrum	triangulare	CHLOR	×	lleo	400	0.0625	20	<b>—</b>	-			
1 050417	cryptophyte	sb. (D=8nm)	CRYPT	×	lleo	400	0.0625	20	~	~			
11 417-4-South 050417	Trachelomonas	.ds	EUGLE	×	lleo	6	283.53	-	<b>—</b>	_			
050417	unicell, oval/rod 2.5-5um	spp.		×	lleo	400	0.0625	20	<del>-</del>	<b>~</b>			
11 417-4-South 050417	unicell, sphere 2.5-5um	.dds		×	lleo	400	0.0625	20	<b>—</b>	<b>—</b>			
11 417-4-South 050417	unicell, sphere 5-7.5um	spp.		×	lleo	400	0.0625	20	+	1			9

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Sample Description	Sampling Date	Genus	Species	Algal Group	# Counte (units)	#Counted Counting Unit Magn (units)	Magn	Field Area # of Fields (mm2)	# of Fields	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	tox CYANO Units/mL
12 417-5-South	050417	Anabaena	bergii/minderi (3)	CYANO	-	filament	200	0.25	20	,	1	23	491,690	318
12 417-5-South	050417	Aphanocapsa	sp. (D=1.5um)	CYANO	-	colony	400	0.0625	20	-	~	9		
	050417	cyanophyte chain	(L) ds	CYANO	7	filament	400	0.0625	20	<b>—</b>	_	181		
	050417	cyanophyte filament	<del>Q</del>	CYANO	Þ	filament	400	0.0625	20	-	~	363		
12 417-5-South	050417	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	20	~	-	181		
	050417	cyanophyte filament	sp. (3)	CYANO	က	filament	400	0.0625	20	<del>-</del>	<b>—</b>	272		
	050417	cyanophyte single cell	sp. (long)	CYANO	88	lle0	400	0.0625	20	-	-	3,448		
	050417	Glaucospira	Sp	CYANO	<del>-</del>	filament	400	0.0625	20	<del>-</del>	<b>-</b>	9		
	050417	Limnothrix/Pseudanabaena	.ds	CYANO	-	filament	900	0.25	20	<b>—</b>	<b>~</b>	23		
	050417	Merismopedia	punctata	CYANO	5	colony	400	0.0625	20	<del>-</del>	<b>-</b>	1,361		
	050417	Microcystis	sp. (1)	CYANO	-	colony	8	0.25	20	-	-	83		
	050417	Microcystis unicell	.ds	CYANO	ო	lles	400	0.0625	20	τ	~	272		
12 417-5-South	050417	Oscillatoria	sp. (1)	CYANO	5	filament	90	283.53	-	-	-	5		
	050417	Oscillatoria	sp. (2)	CYANO	Ξ	filament	400	0.0625	20	<b>—</b>	_	866		
	050417	oscillatorian filament	sp. (1)	CYANO	2	filament	400	0.0625	20	~	_	454		
12 417-5-South	050417	Planktolyngbya	limnetica	CYANO	-	filament	400	0.0625	20	~	_	91		
	050417	Aulacoseira	italica	BACIL	×	chain	90	283.53	-	~	<b>~</b>			
	050417	Nitzschia	sp. (L=30um)	BACIL	×	lleo	400	0.0625	20	<b>—</b>	<b>—</b>			
	050417	Nitzschia	sp. (L=50um)	BACIL	×	lle0	400	0.0625	20	<u></u>	_			
	050417	pennate diatom	sp. (L=55um)	BACIL	×	lleo	200	0.25	20	<b>—</b>	<b>~</b>			
	050417	Synedra	sp. (L=12um)	BACIL	×	lleo	400	0.0625	20	<del>-</del>	<b>—</b>			
	050417	chlorophyte colony	sb. (D)	SHOR	×	colony	200	0.25	20	<b>—</b>	<b>—</b>			
	050417	Closterium	acutum var. variabile	CHLOR	×	lleo	400	0.0625	20	-	-			
12 417-5-South	050417	Cosmarium	sp. (large)	CHLOR	×	e	400	0.0625	20	-	-			
	050417	Cosmarium	sb. (med)	CHLOR	×	lleo	400	0.0625	20	-	<b>—</b>			
	050417	Didymocystis	fina	CHLOR	×	colony	400	0.0625	20	-	<b>~</b>			
	050417	Eutetramorus	sp. (1)	CHLOR	×	colony	400	0.0625	20	<b>—</b>	_			
	050417	filamentous chlorophyte	sp. (1)	SH_CR	×	filament	9	283.53	-	~	<b>~</b>			
	050417	Kirchneriella	sp. (1)	CHLOR	×	lleo	400	0.0625	20	<b>—</b>	<b>—</b>			
	050417	Koliella	longiseta f. variabilis	CHLOR	×	lleo	400	0.0625	20	<del>-</del>	<del>-</del>			
	050417	Monoraphidium	circinale	CHLOR	×	lleo	400	0.0625	20	<b>-</b>	-			
12 417-5-South	050417	Oocystis	sp. (4)	CHLOR	×	colony	90	0.25	20	₩.	<b>~</b>			
	050417	Pandorina	mounu	CHLOR	×	colony	90	0.25	20	<b>—</b>	-			
	050417	Scenedesmus	acuminatus	SH.OR	×	colony	400	0.0625	20	<b>—</b>	-			
	050417	Scenedesmus	obtusus	SH_CR	×	colony	400	0.0625	20	_	-			
	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	×	colony	400	0.0625	20	-	<b>—</b>			
	050417	Scenedesmus	sp. (23)	CHLOR	×	colony	400	0.0625	20	-	<b>—</b>			
	050417	Schroederia	setigera	CHLOR	×	lleo	400	0.0625	20	<b>—</b>	<u>_</u>			
	050417	Staurastrum	sp. (large)	CHLOR	×	e	400	0.0625	20	<b>—</b>	<b>—</b>			
12 417-5-South	050417	cryptophyte	sp. (L=15um)	CRYPT	×	lleo	400	0.0625	20	<del>-</del>	_			
	050417	Ceratium	hirundinella	DINOP	×	lleo	400	0.0625	20	₩.	-			
12 417-5-South	050417	unicell, oval/rod 2:5-5um	.dds		×	lleo	400	0.0625	20	<del>-</del>	_			
	050417	unicell, sphere 2.5-5um	.dds		×	lleo	400	0.0625	20	₩.	<b>-</b>			
12 417-5-South	050417	unicell, sphere 5-7.5um	spp.		×	e	400	0.0625	20	_	<b>—</b>			

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Sample	Sampling Date Genus	Genus	Species	Algal Group	# Counter	Algal Group # Counted Counting Unit Magn (Linits)		ield Area	Field Area # of Fields	Settling Vol. [	Settling Vol. Dilution Factor	Species	Species CYANO Total Ptox CYANO	otox CYANO
13 417-2-North		Anabaena	circinalis/flos-aquae (1)	CYANO	4	filament	L	0.0625		2	•	181	2 620	1.427
13 417-2-North		Aphanizomenon	issatschenkoi	CYANO	_	filament	80	0.25	200	2	· <del>-</del>	11	e la	
13 417-2-North		Aphanocapsa	spp. <2um	CYANO	. 7	colony	400	0.0625	20	5	-	91		
13 417-2-North		cyanophyte chain	sp. (1)	CYANO	_	filament	400	0.0625	20	2	_	45		
13 417-2-North		cyanophyte filament	sp. (3)	CYANO	2	filament	400	0.0625	20	2	-	91		
13 417-2-North		cyanophyte filament	sp. (4)	CYANO	2	filament	400	0.0625	20	2	-	91		
13 417-2-North		cyanophyte pseudofilament	.ds	CYANO	_	filament	900	0.25	20	2	<b>—</b>	=======================================		
13 417-2-North		cyanophyte single cell	sp. (long)	CYANO	8	lle0	400	0.0625	20	2	<b>~</b>	817		
13 417-2-North		Limnothrix/Pseudanabaena	. ds	CYANO	-	filament	400	0.0625	20	2	<b>—</b>	45		
13 417-2-North	050417	Microcystis	sp. (1)	CYANO	-	colony	200	0.25	29	7	-	7		
13 417-2-North		Microcystis	sp. (small colony)	CYANO	-	colony	400	0.0625	20	7	-	45		
13 417-2-North		Microcystis unicell	S. G.	CYANO	8	lleo	9	0.0625	20	7	-	1,179		
13 417-2-North		Aulacoseira	italica	BACIL	×	chain	90	0.25	20	2	<b>—</b>			
13 417-2-North		Nitzschia	sp. (L=15um)	BACIL	×	lleo	900	0.25	20	2	-			
13 417-2-North		Botryococcus	braunii (sm)	CHLOR	×	colony	90	0.25	20	2	_			
13 417-2-North		Closterium	acutum var. variabile	CHLOR	×	e0	400	0.0625	20	7	_			
13 417-2-North		Closterium	sp. (1)	CHLOR	×	e	100	283.53	<b>-</b>	2	-			
13 417-2-North		Cosmanium	sp. (large)	CHLOR	×	lle0	100	283.53	<del>-</del>	2	<b>—</b>			
13 417-2-North		Euastrum	sp. (1)	SI_CR	×	lleo	400	0.0625	20	2	<u>_</u>			
13 417-2-North		Monoraphidium	griffithii	CHLOR	×	lleo	400	0.0625	20	2	<b>—</b>			
13 417-2-North		Monoraphidium/Koliella	o ds	CHLOR	×	1180	400	0.0625	20	2	<b>~</b>			
13 417-2-North		Oocystis	sp. (2)	CHLOR	×	colony	900	0.25	20	2	<b>—</b>			
13 417-2-North		Pediastrum	duplex	CHLOR	×	colony	400	0.0625	22	2	-			
13 417-2-North		Scenedesmus	quadricauda (2 cells)	CHLOR	×	colony	90	0.25	20	2	-			
13 417-2-North		Scenedesmus	quadricauda (4 cells)	CHLOR	×	colony	400	0.0625	20	2	-			
13 417-2-North		Scenedesmus	sp. (23)	CHLOR	×	colony	200	0.25	20	2	<b>—</b>			
13 417-2-North		Staurastrum	sp. (large)	CHLOR	×	lleo	400	0.0625	20	2	<b>—</b>			
13 417-2-North		Staurastrum	sp. (med)	SHLOR	×	lle0	400	0.0625	20	2	<b>—</b>			
13 417-2-North		cryptophyte	sp. (D=12um)	CRYPT	×	lleo	400	0.0625	20	2	<b>.</b>			
13 417-2-North		cryptophyte	sp. (L=20um)	CRYPT	×	e0	400	0.0625	20	2	<del></del>			
13 417-2-North		cryptophyte	sb. (L=6um)	CRYPT	×	lleo	400	0.0625	20	2	-			
13 417-2-North		Ceratium	hirundinella	DINOP	×	lle0	400	0.0625	20	2	<b>.</b>			
43 447 7 North		unicall cohora 16 Film	900		>	100	400	30300	C	~	*			

GreenWater Laboratories Sampling Data April 2005

Sample Description	Sampling Date Genus	Genus	Species	Algal Group	# Counte (units)	# Counted Counting Unit Magn (units)		Field Area (mm2)	Field Area # of Fields (mm2)	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	ox CYANO Units/mL
14 417-3-South	050417	Anabaena	Sp. (5)	CYANO	-	filament	9	283.53	-	7	7	-	1,005	183
14 417-3-South	050417	Anabaena	(g)	CYANO	_	filament	400	0.0625	20	-	ς-	9		
	050417	cyanophyte colony	(B) ds	CYANO	7	colony	400	0.0625	20	<u></u>	-	181		
14 417-3-South	050417	Limnothrix/Pseudanabaena	d <del>s</del>	CYANO	4	filament	400	0.0625	20	<b>—</b>	_	363		
14 417-3-South	050417	Microcystis	sp. (small colony)	CYANO	_	colony	9	0.0625	20	-	-	91		
	050417	Oscillatoria	sp. (1)	CYANO	9	filament	90	283.53	<u></u>	<del>-</del>	<del>-</del>	9		
	050417	oscillatorian filament	sp. (1)	CYANO	_	filament	400	0.0625	20	_	_	91		
14 417-3-South	050417	Planktolyngbya	limnetica	CYANO	7	filament	400	0.0625	20	<del>-</del>	<b>—</b>	181		
	050417	Navicula	sp. (L=20um)	BACIL	×	lleo	400	0.0625	20	<del>-</del>	-			
	050417	Nitzschia	sp. (L=10um)	BACIL	×	lleo	400	0.0625	20	<del>-</del>	<b>—</b>			
	050417	pennate diatom	sp. (L=20um)	BACIL	×	lleo	400	0.0625	20	-	<b>~</b>			
14 417-3-South	050417	pennate diatom	sp. (L=40um)	BACIL	×	lleo	400	0.0625	20	-	<b>—</b>			
14 417-3-South	050417	Botryococcus	braunii (sm)	CHLOR	×	colony	90	283.53	-	<b>—</b>	-			
14 417-3-South	050417	chlorophyte colony	sb. (B)	CHLOR	×	colony	400	0.0625	20	-	-			
14 417-3-South		Closterium	sp. (L=100um)	CHLOR	×	lleo	900	0.25	20	_	_			
14 417-3-South		Closterium	sp. (L=500um)	CHLOR	×	lleo	90	283.53	-	-	_			
14 417-3-South		Coelastrum	sp. (2)	SHOR	×	colony	400	0.0625	20	_	_			
14 417-3-South	050417	Coelastrum	Sp. (4)	CHLOR	×	colony	400	0.0625	20	<del></del>	_			
14 417-3-South	050417	Cosmarium	sp. (med)	CHLOR	×	lleo	400	0.0625	20	<u></u>	_			
	050417	Cosmanum	sp. (med)	CHLOR	×	lleo	400	0.0625	20	<b>~</b>	-			
	050417	Didymocystis	fina	CHLOR	×	colony	400	0.0625	20	~	~			
	050417	Eutetramorus	sp. (1)	CHLOR	×	colony	400	0.0625	20	<b>—</b>	-			
	050417	Hydrodictyon	. ds	CHLOR	×	filament	9	283.53	-	<del>-</del>	-			
	050417	Kirchneriella	Sp. (1)	CHLOR	×	<b>■</b>	400	0.0625	20	<b>—</b>	-			
14 417-3-South	050417	Monoraphidium	griffithii	CHLOR	×	1180	200	0.25	20	-	-			
14 417-3-South	050417	Mougeotia	o ds	CHLOR	×	filament	9	283.53	-	<b>—</b>	~			
14 417-3-South	050417	Pandorina	morum	CHLOR	×	colony	400	0.0625	20	_	_			
14 417-3-South	050417	Pediastrum	duplex	SHOR	×	colony	90	0.25	20	_	~			
14 417-3-South	050417	Pediastrum	tetras	CHLOR	×	colony	400	0.0625	20	<b>—</b>	~			
	050417	Rhizoclonium	ds	CHLOR	×	filament	100	283.53	<u></u>	<del>-</del>	<del>-</del>			
14 417-3-South	050417	Rhizoclonium/Cladophora	ds	CHLOR	×	filament	100	283.53	-	-	-			
	050417	Scenedesmus	magnus	CHLOR	×	colony	8	0.25	20	<del>-</del>	<b>—</b>			
	050417	Scenedesmus	optnens	SHLOR	×	colony	400	0.0625	20	<del>-</del>	<b>—</b>			
14 417-3-South	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	×	colony	400	0.0625	20	~	-			
	050417	Scenedesmus	sp. (23)	SH_CR	×	colony	400	0.0625	20	<del>-</del>	-			
		Scenedesmus	(8)	SH_CR	×	colony	400	0.0625	20	<del>-</del>	-			
14 417-3-South	050417	Spirogyra	ds	SE SE	×	filament	6	283.53	-	<del>-</del>	<b>—</b>			
	050417	Staurastrum	sp. (large)	SH CH	×	lleo	400	0.0625	20	<del>( -</del> -	<b>—</b>			
	050417	Staurastrum	sp. (med)	SE SE	×	lleo	400	0.0625	20	<b>—</b>	<b>—</b>			
	050417	Staurastrum	sb. (sm)	SES	×	lleo	400	0.0625	20	←:	<u></u>			
14 417-3-South	050417	Telingia	.ds	CH_CR	×	80	400	0.0625	20	<del>-</del>				
	050417	cryptophyte	sb. (D=em)	CRYPT	×	lleo	400	0.0625	20	<del>-</del>	<b>—</b>			
14 417-3-South	050417	cryptophyte	sp. (L=8um)	CRYPT	×	<u></u>	400	0.0625	200	ς				
	050417	Ceratium	hirundinella	d l	×	lleo:	2	S :	2 1	<b>-</b> .	<u> </u>			
	050417	Trachelomonas	ds.	ENGLE	×	eo	8	0.25	20	<del>(-</del> )	-			
	050417	Pseudostaurastrum	.ds	XANTH	×		900	0.0625	3 20	← •				
	050417	unicell, oval/rod 2.5-5um	dds		×	eo	904	0.0625	20	<del>,</del>				
14 417-3-South	050417	unicell, sphere 2.5-5um unicell, sphere 5-7.5um	<u>0</u>		× ×	B 8	38	0.0625	2 2					

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Sample Description	Sampling Date Genus	Genus	Species	Algal Group	# Counter (units)	# Counted Counting Unit Magn (units)	5000	Field Area (mm2)	Field Area # of Fields (mm2)	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO . Units/mL Units/mL	tox CYANO Units/mL
15 417-1-South	050417	Anabaena	circinalis/flos-aquae (1)	CYANO	æ	filament	400	0.0625	20	က	۲	151	824	476
15 417-1-South	050417	Aphanocapsa	spp. <2um	CYANO	-	colony	400	0.0625	20	က	~	30		
15 417-1-South	050417	Limnothrix/Pseudanabaena	ds	CYANO	∞	filament	400	0.0625	20	က	<b>—</b>	242		
	050417	Microcystis	sp. (1)	CYANO	က	colony	80	0.25	9	က	ς-	23		
15 417-1-South	050417	Microcystis unicell	Sp.	CYANO	9		400	0.0625	20	က	-	305		
15 417-1-South	050417	oscillatorian filament	sp. (1)	CYANO	2	filament	400	0.0625	20	က	<b>←</b>	09		
15 417-1-South	050417	Woronichina/Coelomoron	ds	CYANO	2	colony	200	0.25	20	က	<b>—</b>	15		
	050417	Aulacoseira	italica	BACIL	×	chain	200	0.25	20	es	<b>~</b>			
15 417-1-South	050417	centric diatom	sp. (D=10um)	BACIL	×	III eo	400	0.0625	20	6	~			
15 417-1-South	050417	Navicula	sp. (L=25um)	BACIL	×	III eo	400	0.0625	20	63	<b>~</b>			
15 417-1-South	050417	Nitzschia	sp. (L=10um)	BACIL	×	e	400	0.0625	20	က	<b>—</b>			
15 417-1-South	050417	Nitzschia	sp. (L=25um)	BACIL	×	<b>=</b>	400	0.0625	20	က	-			
15 417-1-South	050417	Botryococcus	braunii (sm)	CHLOR	×	colony	200	0.25	20	ന	<b>~</b>			
15 417-1-South	050417	cf. Didymocystis	.ds	CHLOR	×	colony	400	0.0625	20	n	_			
15 417-1-South	050417	Closterium	acutum var. variabile	CHLOR	×	III	200	0.25	20	က	_			
15 417-1-South	050417	Closterium	sp. (1)	CHLOR	×	lleo	400	0.0625	20	က	_			
15 417-1-South	050417	Coelastrum	sp. (2)	SHLOR	×	colony	400	0.0625	20	က	<b>—</b>			
15 417-1-South	050417	Didymocystis	fina	CHLOR	×	colony	400	0.0625	20	6	<b>—</b>			
15 417-1-South	050417	Kirchneriella	sp. (1)	FICE	×	lle0	400	0.0625	20	ന	<b>~</b>			
15 417-1-South	050417	Oocystis	sp. (1)	CHLOR	×	colony	900	0.25	20	က	-			
15 417-1-South	050417	Oocystis	sp. (3)	SHLOR	×	colony	400	0.0625	20	m	<b>—</b>			
15 417-1-South	050417	Pandorina	morum	CHLOR	×	colony	200	0.25	20	m	-			
15 417-1-South	050417	Pediastrum	boryanum	CHLOR	×	colony	100	283.53	T	က	-			
15 417-1-South	050417	Pediastrum	tetras	CHLOR	×	colony	400	0.0625	20	ო	-			
15 417-1-South	050417	Rhizoclonium	ds	CHLOR	×	filament	001	283.53	-	6	-			
15 417-1-South	050417	Scenedesmus	bicaudatus	CHLOR	×	colony	400	0.0625	20	n	~			
15 417-1-South	050417	Scenedesmus	obtusus	CHLOR	×	colony	400	0.0625	20	က	_			
15 417-1-South	050417	Scenedesmus	quadricauda (4 cells)	SHOR	×	colony	400	0.0625	20	n	~			
	050417	Scenedesmus	sb. (5)	CHLOR	×	colony	400	0.0625	20	က	-			
15 417-1-South	050417	Spirogyra	ds	CHLOR	×	filament	100	283.53	<del>-</del>	က	<del></del>			
15 417-1-South	050417	Staurastrum	sp. (large)	CHLOR	×	e0	200	0.25	20	n	-			
	050417	Tetrastrum	heteracanthum	CHLOR	×	lleo	90	0.25	20	ო	<b>—</b>			
15 417-1-South	050417	cryptophyte	sp. (D=5um)	CRYPT	×	lle0	400	0.0625	20	n	<b>~</b>			
15 417-1-South	050417	cryptophyte	sp. (D=8um)	CRYPT	×	lle0	400	0.0625	20	က	<b>~</b>			
15 417-1-South	050417	cryptophyte	sp. (L=10um)	CRYPT	×	e0	400	0.0625	20	က	<b>—</b>			
15 417-1-South	050417	Ceratium	hirundinella	DINOP	×	lleo	400	0.0625	20	ಣ	-			
15 417-1-South	050417	Isthmochloron	gradile	XANTH	×	lleo	100	283.53	-	n	<b>—</b>			
15 417-1-South	050417	unicell, oval/rod 2:5-5um	.dds		×	lleo	400	0.0625	20	က	<b>—</b>			
15 417-1-South	050417	unicell, sphere 2.5-5um	dds		×	lle0	400	0.0625	20	en	<b>—</b>			
15 417-1-South	050417	unicell sphere 5-7.5um	cos		×	8	400	0.0625	20	က	<b>—</b>			

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Sample Description	Sampling Date Gen	Genus	Species	Algal Group	# Counted (units)	# Counted Counting Unit Magn (units)		Field Area (mm2)	# of Fields	Settling Vol. (mL)	Settling Vol. Dilution Factor (mL)	Species Units/mL	CYANO Total Ptox CYANO Units/mL Units/mL	tox CYANO Units/mL
16 417 Univ. NW		Anabaena	circinalis/flos-aquae (1)	CYANO	-	filament	200	0.25	20	2	1	11	420	11
16 417 Univ. NW		cyanophyte single cell		CYANO	4	180	400	0.0625	20	2	<b>—</b>	181		
16 417 Univ. NW	050417	Limnothrix/Pseudanabaena		CYANO	-	filament	400	0.0625	20	2	-	45		
16 417 Univ. NW		oscillatorian filament	sp. (1)	CYANO	-	filament	400	0.0625	20	2	_	45		
16 417 Univ. NW		Planktolyngbya	undulata	CYANO	က	filament	400	0.0625	20	2	<b>—</b>	136		
16 417 Univ. NW		pennate diatom	sp. (L=10um)	BACIL	×	lleo	400	0.0625	20	2	-			
16 417 Univ. NW		pennate diatom	g	BACIL	×	lleo	200	0.25	20	2	-			
16 417 Univ. NW		Synedra		BACIL	×	lleo	400	0.0625	20	2	<del>-</del>			
16 417 Univ. NW		cf. Didymocystis	g	CHLOR	×	colony	400	0.0625	20	2	_			
16 417 Univ. NW		cf. Radiofilum	Sp.	CHLOR	×	filament	100	283.53	Ψ.	2	<b>~</b>			
16 417 Univ. NW		chlorophyte filament	sp. (1)	SHLOR	×	filament	100	283.53	-	2	<b>—</b>			
16 417 Univ. NW		chlorophyte filament	sp. (A)	CHLOR	×	filament	100	283.53	-	2	<b>—</b>			
16 417 Univ. NW		Closterium	acutum var. variabile	CHLOR	×	lleo	200	0.25	20	2	<b>—</b>			
16 417 Univ. NW		Coelastrum	sp. (2)	CHLOR	×	colony	90	0.25	20	7	_			
16 417 Univ. NW		Cosmanium	sp. (large)	CHLOR	×	lleo	400	0.0625	20	2	_			
16 417 Univ. NW		Cosmanum	sp. (med)	CHLOR	×	lleo	400	0.0625	20	2	_			
16 417 Univ. NW		Cosmanium	sp. (sm)	SHLOR	×	lleo	200	0.25	20	2	_			
16 417 Univ. NW		Monoraphidium	sp. (1)	CHLOR	×	lleo	400	0.0625	20	2	<b>—</b>			
16 417 Univ. NW		Mougeotia	Sp.	SH.CR	×	filament	200	0.25	20	2	<u></u>			
16 417 Univ. NW		Onychonema/Sphaerozosma	Sp.	SHLOR	×	chain	100	283.53	ς-	2	<del>-</del>			
16 417 Univ. NW		Pandorina	moun	SHOR	×	colony	200	0.25	20	2	<del>-</del>			
16 417 Univ. NW		Scenedesmus	sp. (23)	CHLOR	×	colony	400	0.0625	20	2	<b>—</b>			
16 417 Univ. NW		Spirogyra	Sp.	CHLOR	×	filament	100	283.53	-	2	-			
16 417 Univ. NW		Staurastrum	sp. (large)	CHLOR	×	lleo	400	0.0625	20	2	<b>—</b>			
16 417 Univ. NW		Staurastrum		CHLOR	×	lleo	200	0.25	20	2	-			
16 417 Univ. NW		Staurodesmus	sp. (short arm)	CHLOR	×	lleo	400	0.0625	20	2	<b>—</b>			
16 417 Univ. NW		Zygnema	sp. (1)	SHLOR	×	filament	200	0.25	20	2	_			
16 417 Univ. NW		cryptophyte	sp. (D=10um)	CRYPT	×	lleo	400	0.0625	20	2	<b>~</b>			
16 417 Univ. NW		cryptophyte		CRYPT	×	lleo	400	0.0625	20	2	<b>—</b>			
16 417 Univ. NW		Ceratium	hirundinella	DINOP	×	lleo	200	0.25	20	2	<b>—</b>			
16 417 Univ. NW		unicell, oval/rod 2.5-5um	spp.		×	lleo	400	0.0625	20	2	<b>—</b>			
16 417 Univ. NW		unicell, sphere 2.5-5um	spp.		×	lleo	400	0.0625	20	2	-			
16 417 Univ. NW		unicell sphere 5-7 5um	ods		134	100	400	0.0625	200	2	-			

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The control of the	4.13		. 00 0	ō		100	900	10000	0		*		<	<
Coloraning State		Nizschia	sp. (L=30um)	BACIL	×	e	90	0.0625	21	←:	<b>—</b>		0	0
Europolythmin         \$1         CHCNR         X         Color and the color and th	saer.	Actinastrum	gracilimum	E E	×	colony	400	0.0625	0 6	— · ·				
Conditional Continues	~ 1	Cnlorogonium	.ds	2FC	×	II -	908	0.0625	⊋,					
Microagnician		Golonian	Sp. (3)	35	×>	colony	3 6	203.53	- 2					
Monocaphicum         original         OFFICE         X         original         DIGGS         Th           Monocaphicum         mindum         CPLGR         X         orig         400         0.0055         Th           Monocaphicum         mindum         CPLGR         X         orig         400         0.0055         Th           Scenedermis         mindum         CPLGR         X         orig         400         0.0055         Th           Scenedermis         pp (1)         CPLCR         X         orig         400         0.0055         Th           Scenedermis         pp (1)         CPLCR         X         orig         400         0.0055         Th           Origonophie         SCENTRA         X         orig         400         0.0055         Th         Th           Origonophie         SCEN		Koliella	longiseta fi variabilis	10 E	< >	₹ 2	400	0.0625	202	- +-				
Montagnidum         minimal         CHCRR         x         oil         400         CHCRR         x         oil         ADD         CHCRR         x         oil         ADD         CHCRR         x         oil         ADD         CHCRR         x         Oil         CHCRR         x         Oil         CHCRR         x         Oil         CHCRR         x         Oil         X	7	Monoraphidium	arcliatim		( )×	=	400	0.0625	<u>2</u> 02					
Monoaghidum         girillum         OHOR         x         oil         400         COSS         77         The control of the control o		Monoraphidium	ariffithii	SELSK.	· ×	- Teo	400	0.0625	2	· <del>· ·</del>	-			
School-Sering         Spinoral Strate Sering         CHLOR         X cold year         200         0.055         70         1           School-Sering         applications         pp. (13)         CHLOR         X cold year         200         0.055         70         1           Schroedsrans         applications         pp. (13)         CHLOR         X cold year         400         0.055         70         1           Orgodowyle         pp. (12)         CHLOR         X cold year         400         0.055         70         1           Orgodowyle         pp. (12)         CHLOR         X cold year         400         0.055         70         1           Orgodowyle         pp. (12)         CHLOR         X cold year         400         0.055         70         1           Orgodowyle         pp. (12)         CHLOR         X cold year         400         0.055         70         1         65           Orgodowyle         pp. (12)         CHLOR         X cold year         400         0.055         70         1         65           Orgodowyle         pp. (12)         CHLOR         X cold year         400         0.055         70         1         65           Orgodowyl	7	Monoraphidium	minutum	CHLOR	×	180	400	0.0625	02	<b>—</b>	<b>—</b>			
Scenedamus         Imagensis         CHLRR         X colory	7	Monoraphidium	sp. (1)	CHLOR	×	1100	400	0.0625	2	<del>-</del>	_			
Screed-Seriors guardicatals G-LQR x colony 400 00255 770 1  Screed-Seriors guardicatals G-LQR x colony 400 00255 770 1  Orgotophic 15-5cm gp (15)	7	Scenedesmus	magnus	CHLOR	×	colony	200	0.25	30	_	<b>—</b>			
Schredstrans         sp (13)         CHCR         X         Color         400         0.0255         70           Schredstrans         sp (13)         CHCR         X         cell         400         0.0255         70         1           Orgotolyte         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70         1           Orgotolyte         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70         1           unical ordinal printed \$75mm         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70         1           unical sprinted \$75mm         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70         1           unical sprinted \$75mm         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70         1           unical sprinted \$75mm         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70         1           unical sprinted \$75mm         sp (12-12mm)         CRYPT         X         cell         400         0.0255         70	7	Scenedesmus	quadricauda	CHLOR	×	colony	400	0.0625	20	<b>←</b>	<u></u>			
Optionships         Sp (1-24m)         CRVPT         X         cell         400         0.0255         70         71           Orgotophie         Sp (1-24m)         CRVPT         X         cell         400         0.0255         70         1           Orgotophie         Sp (1-24m)         CRVPT         X         cell         400         0.0255         70         1           unical, sprine 57.5m         Sp (1-24m)         CRVPT         X         cell         400         0.0255         70         1           unical, sprine 57.5m         Sp (1-24m)         CRVPT         X         cell         400         0.0255         70         1           Aprilia cyprophysic colory         Sp (1-24m)         CRVPT         X         cell         400         0.0255         70         1           Liminothin chancilla children in the ch	7	Scenedesmus	sp. (13)	CHLOR	×	colony	400	0.0625	20	_	-			
Optionshipe         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70           Orgotophie         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Unical cyclopyie         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Unical cyclopyie         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Unical cyclopyie         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Unical cyclopyie         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Analyzine         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Analyzine         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1           Analyzine         St. (=12,40m)         GKYPT         X         cell         400         0.0255         70         1 <tr< td=""><td>~</td><td>Schroederia</td><td>sp. (1)</td><td>OH_OR</td><td>×</td><td>  eo</td><td>400</td><td>0.0625</td><td>20</td><td>_</td><td>_</td><td></td><td></td><td></td></tr<>	~	Schroederia	sp. (1)	OH_OR	×	eo	400	0.0625	20	_	_			
organization production of the control of t	7	cryptophyte	sp. (D=12um)	CRYPT	×	<del>=</del> 8	400	0.0625	20	_	_			
unitedic system 2.55cm         spot (Lifzham)         GRYPT         x cell         400         00055         70           unitedic system 2.55cm         spot (Lifzham)         CRYPT         x cell         400         00055         70           unitedic system 2.55cm         spot         x cell         400         00055         70         1         65           Aphanochysic corpus         spot         x cell         400         00055         70         1         65           Instruction a spot         spot         x cell         400         00055         70         1         65           Melstrockerus         spot         x cell         400         00055         70         1         65           Netzschie         spot         x cell         400         00055         70         1         65           Netzschie         spot         x cell         x cell         400         00055         70         1         70           Symptometric corpus         spot         x cell         x cell         400         00055         70         1         70           Constraint         x cell         x cell         x cell         x cell         x cell         x cell	7	cryptophyte	sb. (D=8nm)	CRYPT	×	lleo	400	0.0625	70	←	_			
unitedic sprides 5.55um         spp.         x         cell         400         0.0655         70           unitedic sprides 5.55um         spp.         x         cell         400         0.0655         70         1           quanticytighee 5.55um         spp.         1.000         x <td>7</td> <td>cryptophyte</td> <td>sp. (L=12um)</td> <td>CRYPT</td> <td>×</td> <td>8</td> <td>400</td> <td>0.0625</td> <td>02</td> <td><del>-</del></td> <td><b>—</b></td> <td></td> <td></td> <td></td>	7	cryptophyte	sp. (L=12um)	CRYPT	×	8	400	0.0625	02	<del>-</del>	<b>—</b>			
univedis, sprine 2.5 Juny         sp.         X         real         400         000225         70         1           univedis, sprine 2.5 Juny         sp.         CP-1 Sum)         CYANO         1         655         70         1         655           Anti-processors of processors of processor	7	unicell, oval/rod 2.5-5um	.dds		×	e	400	0.0625	0/	<u></u>	_			
Advision-general spin (2-1-5)-um spin (2-15)-um (2-14-40) (100-25)		unicell, sphere 2.5-5um			×	e   :	400	0.0625	21	←:	<b>~</b> =-			
Addition of the colors         Sp (D=15,m)         C/ANO         1         Colory         400         0.025         70         1         655           Medianceages         Sp (D=15,m)         C/ANO         1         Colory         400         0.0655         70         1         655           Medianceages         Sp (L=20um)         BACIL         x cell         400         0.0655         70         1         655           Mesiancead         Sp (L=20um)         BACIL         x cell         400         0.055         70         1         756           Mesiancead         Sp (L=20um)         BACIL         x cell         400         0.055         70         1         766           Mescapean         Sp (L=20um)         BACIL         x cell         400         0.055         70         1         766           Advanceadelina         Sp (L)         CHLOR         x colory         400         0.055         70         1         766           Cockestrum         Sp (L)         CHLOR         x colory         400         0.055         70         1         766           Cockestrum         Sp (L)         CHLOR         x colory         400         0.055         70	١	unicell, sphere 5-7.5um	- 1		×	lleo	400	0.0625	Ω	_	1			
Language	17	Aphanocapsa		CYANO	_	colony	400	0.0625	20	<del>-</del>	<b>—</b>	92	270	0
Manufacture	17	cyanophyte colony		CYANO	<b>.</b>	colony	900	0.0625	21	<del>,</del> ,	<u> </u>	99		
Mediantopoda (a)         Invalcation         FPAID         2 colony         200         0.25         30         1 months           National and strated (a)         50 (L=20um)         BAGL         x cell         200         0.25         30         1 months           Symedia         50 (L=20um)         BAGL         x cell         200         0.25         30         1 months           Charachigue         50 (L=20um)         BAGL         x cell         200         0.25         30         1 months           ch Louschigue         50 (L)         CHCR         x colony         400         0.055         70         1 months           Costnatum         50 (Sm)         CHCR         x colony         400         0.055         70         1 months           Costnatum         50 (Sm)         CHCR         x colony         400         0.055         70         1 months           Costnatum         ch CR         x colony         400         0.055         70         1 months           Costnatum         ch CR         x colony         400         0.055         70         1 months           Costnation         ch CR         x colony         400         0.055         70         1 months	-	Limnothnx/Pseudanabaena	700	CYANO	-	illament	400	0.0625	2 :			8		
Navidla         Sp (L=50um)         BACIL         x         cell         400         0.025           Synedra         Synedra         Sp (L=50um)         BACIL         x         cell         200         0.25           Ankistrodesmus         sp (L=50um)         BACIL         x         cell         200         0.25           chlorophyte colony         sp (Sm)         CHLOR         x         colony         200         0.055           chlorophyte colony         sp (Sm)         CHLOR         x         colony         400         0.0625           Cocelestrum         sp (Sm)         CHLOR         x         colony         400         0.0625           Cocelestrum         sp (Sm)         CHLOR         x         colony         400         0.0625           Cocelestrum         sp (Sm)         CHLOR         x         colony         400         0.0625           Euclerandra         sp (Sm)         CHLOR         x         colony         400         0.0625           Euclerandra         sp (Sm)         CHLOR         x         colony         400         0.0625           Kolialla         acutatum         CHLOR         x         colony         400         0.0625 <td>17</td> <td>Merismopedia</td> <td></td> <td>CYANO</td> <td>2</td> <td>colony</td> <td>8</td> <td>0.25</td> <td>30</td> <td>_</td> <td>_</td> <td>92</td> <td></td> <td></td>	17	Merismopedia		CYANO	2	colony	8	0.25	30	_	_	92		
Nitischia         Sp. (L=50um)         BACIL         x         cell         200         0.25           Ankistrodesmus         spo (L=40um)         BACIL         x         cell         200         0.25           Chlorophyte colony         sp. (B)         CHLOR         x         colony         400         0.025           Chlorophyte colony         sp. (B)         CHLOR         x         colony         400         0.025           Coelastrum         sp. (B)         CHLOR         x         colony         400         0.025           Concipativitie         sp. (B)         CHLOR         x         colony         400         0.025           Dictyospheerium         sp. (1)         CHLOR         x         colony         400         0.025           Eudermanus         sp. (1)         CHLOR         x         colony         400         0.025           Koleila         Monoraphidum         crinciale         X         colony         400         0.025           Monoraphidum         crinciale         X         CHLOR         x         colony         400         0.025           Monoraphidum         crinciale         X         X         x         colony         400<	17	Navicula	sp. (L=20um)	BACIL	×	lleo	400	0.0625	70	_	<del>-</del>			
Synedga         Sp. (L=40um)         BACIL         x         cell         200         0.25           cf. Quadrigules         gracilis         CHLOR         x         colony         400         0.0625           cf. Quadrigules         cf. Duadrigules         ch. CLOR         x         colony         200         0.055           Coshastrum         sp. (1)         CHLOR         x         colony         400         0.0625           Monoraphidum         acruatum         CHLOR         x         colony         400         0.0625           Monoraphidum         acruatum         CHLOR         x         coll         400         0.0625           Monoraphidum         muntutum         CHLOR         x         coll         400         0.0625 <tr< td=""><td>7</td><td>Nitzschia</td><td>sb. (L=50um)</td><td>BACIL</td><td>×</td><td>  e</td><td>90</td><td>0.25</td><td>30</td><td><b>—</b></td><td>_</td><td></td><td></td><td></td></tr<>	7	Nitzschia	sb. (L=50um)	BACIL	×	e	90	0.25	30	<b>—</b>	_			
Ankstrodesmus         gradiis         CHOR         x         cell         400         0.0625           cf. duadrigula         sp.         CHUR         x         colony         400         0.0625           cf. duadrigula         sp.         (1)         CHUR         x         colony         400         0.0625           Costastrum         sp. (1)         CHUR         x         colony         400         0.0625           Cuuganella         cructera         CHUR         x         colony         400         0.0625           Euteramun         sp. (1)         CHUR         x         colony         400         0.0625           Euteramun         sp. (1)         CHUR         x         colony         400         0.0625           Koliella         longisetaf variabilis         CHUR         x         colony         400         0.0625           Monoraphidum         criculatum         CHUR         x         colony         400         0.0625           Monoraphidum         criculatum         CHUR         x         colony         400         0.0625           Monoraphidum         criculatum         CHUR         x         coll         400         0.0625 </td <td>7</td> <td>Synedra</td> <td>sp. (L=40um)</td> <td>BACIL</td> <td>×</td> <td>lle0</td> <td>900</td> <td>0.25</td> <td>30</td> <td>-</td> <td>_</td> <td></td> <td></td> <td></td>	7	Synedra	sp. (L=40um)	BACIL	×	lle0	900	0.25	30	-	_			
cf. Quadriguila         Sp.         CHLOR         x         colony         400         0.0625           Collostrum         Sp. (1)         CHLOR         x         colony         400         0.025           Collostrum         Sp. (1)         CHLOR         x         colony         400         0.0625           Constrainm         Sp. (1)         CHLOR         x         colony         400         0.0625           Dictyosphearilla         curdena         CHLOR         x         colony         400         0.0625           Dictyosphearilla         curdena         Sp. (1)         CHLOR         x         colony         400         0.0625           Lockosphearilla         sp. (1)         CHLOR         x         colony         400         0.0625           Lockosphearilla         sp. (1)         CHLOR         x         colony         400         0.0625           Mondraghidum         contractum         CHLOR         x         colony         400         0.0625           Mondraghidum         contractum         CHLOR         x         coll         400         0.0625           Mondraghidum         contractum         contractum         CHLOR         x         coll	11	Ankistrodesmus	gracilis	CHLOR	×	e	400	0.0625	02	_	_			
Chlorophyte colony         sp (B)         CHOR         x         colony         200         0.25           Coensarum         sp (1)         CHLOR         x         colony         400         0.0625           Condestrum         sp (1)         CHLOR         x         colony         400         0.0625           Cuctogeniella         crucifera         CHLOR         x         colony         400         0.0625           Eudorina         sp (1)         CHLOR         x         colony         400         0.0625           Eudorina         sp (1)         CHLOR         x         colony         400         0.0625           Monoraphidum         arcuatum         CHLOR         x         colony         400         0.0625           Monoraphidum         controttum         CHLOR         x         col         400         0.0625 <td< td=""><td>7</td><td>of Quadrigula</td><td>S CS</td><td>CHLOR</td><td>×</td><td>colony</td><td>400</td><td>0.0625</td><td>02</td><td>_</td><td>1</td><td></td><td></td><td></td></td<>	7	of Quadrigula	S CS	CHLOR	×	colony	400	0.0625	02	_	1			
Coelestrum         Sp. (1)         CHOR         x         colony         400         0.0625           Cunganella         cy (sm)         CHLOR         x         colny         400         0.0625           Cunganella         sp. (1)         CHLOR         x         colny         400         0.0625           Eutertamenta         sp. (1)         CHLOR         x         colny         400         0.0625           Koliella         longselaf variabilis         CHLOR         x         colny         400         0.025           Koliella         longselaf variabilis         CHLOR         x         colny         400         0.0625           Monoraphidum         circinale         CHLOR         x         coll         400         0.0625	7	chlorophyte colony	Sp. (B)	CHLOR	×	colony	900	0.25	30	_	_			
Cognature         Sp. (sm)         CHOR         X         cell         400         0.0625           Cudorina         curofera         curofera         curofera         curofera         400         0.0625           Eudorina         sp. (1)         CHLOR         X         colony         400         0.0625           Eudorina         sp. (1)         CHLOR         X         colony         400         0.0625           Koilella         Monoraphidum         arcuatum         CHLOR         X         colony         400         0.0625           Monoraphidum         arcuatum         CHLOR         X         cell         400         0.0625           Monoraphidum         controtam         CHLOR         X         cell         400         0.0625           Monoraphidum         controtam         CHLOR         X         cell         400         0.0625           Monoraphidum         controtam         CHLOR         X         cell         400         0.0625           Scenedesmus         accenedesmus         accenedesmus         accenedesmus         cell         400         0.0625           Scenedesmus         accenedesmus         accenedesmus         colony         400         <	7	Coelastrum	Sp. (1)	SHOR	×	colony	400	0.0625	02	_	_			
Crucipeniella         cruciera         CHLOR         x         colony         400         0.0625           Eudorima         sp. (1)         CHLOR         x         colony         400         0.0625           Eudorima         sp. (1)         CHLOR         x         colony         400         0.0625           Kolialia         longeata f variabilis         CHLOR         x         colony         400         0.0625           Monoraphidum         circinale         CHLOR         x         cell         400         0.0625           Monoraphidum         circinale         CHLOR         x         cell         400         0.0625           Monoraphidum         circinale         CHLOR         x         cell         400         0.0625           Monoraphidum         minutum         CHLOR         x         cell         400         0.0625           Monoraphidum         minutum         CHLOR         x         cell         400         0.0625           Scenedesmus         bernardii         CHLOR         x         cell         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         cell         400         0.0625	17	Cosmanium	sp. (sm)	CHLOR	×	. 18	400	0.0625	02	-	_			
Dicty osphaerium         sp         CHLOR         x         colony         400         0.0625           Eutertramours         sp. (1)         CHLOR         x         colony         200         0.28           Eutertramours         sp. (1)         CHLOR         x         colony         200         0.0825           Monor aphidum         carcutum         CHLOR         x         cell         400         0.0625           Monor aphidum         controttum         CHLOR         x         cell         400         0.0625           Monor aphidum         controttum         CHLOR         x         cell         400         0.0625           Monor aphidum         minimum         CHLOR         x         cell         400         0.0625           Monor aphidum         minimum         CHLOR         x         cell         400         0.0625           Monor aphidum         minimum         CHLOR         x         cell         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         cell         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         cell         400         0.0625	17	Crudgeniella	crucifera	CHLOR	×	colony	400	0.0625	70	<b>—</b>	<u></u>			
Eudonina         sp (1)         CHOR         x         colony         20         0.25           Koliella         Sp (1)         CHOR         x         colony         400         0.0625           Monoraphidum         arcuatum         CHOR         x         cell         400         0.0625           Monoraphidum         controttum         CHOR         x         cell         400         0.0625           Scenedesmus         controttum         CHOR         x         cell         400         0.0625           Scenedesmus         controttum         CHOR         x         colony         400         0.0625           Scenedesmus         controttum         CHOR         x         colony         400         0.0625           Scen	17	Dictyosphaerium	ds	CHLOR	×	colony	400	0.0625	20	<b>-</b>	<del>-</del>			
Euteramorus         sp. (1)         CHLOR         x         colony         400         0.0625           Nonraghidum         Iongeeaf variabilis         CHLOR         x         cell         400         0.0625           Monraghidum         circinale         CHLOR         x         cell         400         0.0625           Monraghidum         circinale         CHLOR         x         cell         400         0.0625           Monraghidum         printint         CHLOR         x         cell         400         0.0625           Monraghidum         printutum         CHLOR         x         cell         400         0.0625           Nonraghidum         printutum         CHLOR         x         cell         400         0.0625           Scenedesmus         bernardii         CHLOR         x         colony         400         0.0625           Scenedesmus         pernardii         CHLOR         x         colony         400         0.0625           Scenedesmus         pp. (1)         CHLOR         x         colony         400         0.0625           Scenedesmus         pp. (1)         CHLOR         x         colony         400         0.0625 <tr< td=""><td>17</td><td>Eudonina</td><td>Sp. (1)</td><td>CHLOR</td><td>×</td><td>colony</td><td>200</td><td>0.25</td><td>30</td><td>-</td><td>-</td><td></td><td></td><td></td></tr<>	17	Eudonina	Sp. (1)	CHLOR	×	colony	200	0.25	30	-	-			
Kotelella         Iongisetat variabilis         CHLOR         x         cell         400         0.0625           Mondraphidum         arcutatum         CHLOR         x         cell         400         0.0625           Mondraphidum         contoctum         CHLOR         x         cell         400         0.0625           Mondraphidum         sp. (1)         CHLOR         x         cell         400         0.0625           Mondraphidum         sp. (1)         CHLOR         x         cell         400         0.0625           Scenedesmus         amminatus         CHLOR         x         cell         400         0.0625           Scenedesmus         bernardit         CHLOR         x         colny         400         0.0625           Scenedesmus         bernardit         CHLOR         x         colny         400         0.0625           Scenedesmus         pernardit         CHLOR         x         colny         400         0.0625           Scenedesmus         pernardit         CHLOR         x         colny         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         colny         400         0.0625 <tr< td=""><td>17</td><td>Eutetramorus</td><td>Sp. (1)</td><td>CHLOR</td><td>×</td><td>colony</td><td>400</td><td>0.0625</td><td>20</td><td>_</td><td>_</td><td></td><td></td><td></td></tr<>	17	Eutetramorus	Sp. (1)	CHLOR	×	colony	400	0.0625	20	_	_			
Monoraphidum         arculatum         CHLOR         x         cell         400         0.0625           Monoraphidum         cricirale         CHLOR         x         cell         400         0.0625           Monoraphidum         griffini         CHLOR         x         cell         400         0.0625           Monoraphidum         minutum         CHLOR         x         cell         400         0.0625           Monoraphidum         minutum         CHLOR         x         cell         400         0.0625           Scenedesmus         aouminatus         CHLOR         x         colony         400         0.0625           Scenedesmus         bernardii         CHLOR         x         colony         400         0.0625           Scenedesmus         pominatus         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (11)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (11)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (11)         CHLOR         x         colony         400         0.0625	17	Koliella	longiseta f. variabilis	CHLOR	×	. 8	400	0.0625	202	-	_			
Moor aphidum         circinale         OHLOR         x         cell         400         0.0625           Moor aphidum         contrutum         OHLOR         x         cell         400         0.0625           Moor aphidum         minutum         OHLOR         x         cell         400         0.0625           Moor aphidum         minutum         OHLOR         x         cell         400         0.0625           Moor aphidum         pointum         OHLOR         x         cell         400         0.0625           Scenedesmus         bernardii         OHLOR         x         colony         400         0.0625           Scenedesmus         bernardii         OHLOR         x         colony         400         0.0625           Scenedesmus         sp. (3)         OHLOR         x         colony         400         0.0625	17	Monoraphidium	arcuatum	SHOR.	×		400	0.0625	2	·· ←	_			
Monoraphidum         contortum         CHLOR         x         cell         400         0.0625           Monoraphidum         griffnii         CHLOR         x         cell         400         0.0625           Monoraphidum         sp (1)         CHLOR         x         cell         400         0.0625           Scenedesmus         barninatus         CHLOR         x         cell         400         0.0625           Scenedesmus         barninatus         CHLOR         x         celny         400         0.0625           Scenedesmus         particular         CHLOR         x         celny         400         0.0625           Scenedesmus         particular         CHLOR         x         celny         400         0.0625           Scenedesmus         sp (1)         CHLOR         x         celny         400         0.0625           S	17	Monoraphidium	circinale	CHLOR	×	100	400	0.0625	02	-	_			
Monrasphidum         griffthii         CHOR         x         cell         400         0.0625           Monrasphidum         minutum         CHOR         x         cell         400         0.0625           Scenedesmus         bourninstus         CHOR         x         colny         400         0.0625           Scenedesmus         bourninstus         CHOR         x         colny         400         0.0625           Scenedesmus         bourninstus         CHOR         x         colny         400         0.0625           Scenedesmus         potatricauda         CHOR         x         colny         400         0.0625           Scenedesmus         sp (11)         CHOR         x         colny         400         0.0625           Sc	17	Monoraphidium	contortum	CHLOR	×	lleo	400	0.0625	02	<b>—</b>	<b>—</b>			
Monoraphidum         minutum         CHLOR         x         cell         400         0.0625           Noncaepidum         sp. (1)         CHLOR         x         cell         400         0.0625           Scenedesmus         souminatus         CHLOR         x         colony         400         0.0625           Scenedesmus         bernardia         CHLOR         x         colony         400         0.0625           Scenedesmus         publication         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (3)         CHLOR         x         colony         400         0.0625	17	Monoraphidium	ariffithii	CHLOR	×	lle0	400	0.0625	02	<b>—</b>	<b>.</b>			
Monoraphidum         sp (1)         CHLOR         x         cell         400         0.0625           Scenedesmus         andminatus         CHLOR         x         colony         400         0.0625           Scenedesmus         magnus         CHLOR         x         colony         400         0.0625           Scenedesmus         magnus         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (13)         CHLOR         x         colony         400         0.0625	17	Monoraphidium	minutum	CHLOR	×	lleo	400	0.0625	20	-	_			
Scenedesmus         aduminatus         CHLOR         x         colony         400         0.0625           Scenedesmus         bernardii         CHLOR         x         colony         400         0.0625           Scenedesmus         bernardii         CHLOR         x         colony         400         0.0625           Scenedesmus         quadricauda         CHLOR         x         colony         400         0.0625           Scenedesmus         quadricauda         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (3)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (8)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (8)         CHLOR         x         colony         400         0.0625           Taling         sp. (8)         CHLOR         x         colony         400         0.0625           Sylobytophile         sp. (8)         CHLOR         x         colony         400         0.0625           Tappidana         sp. (9)         CHLOR         x         col         400         0.0625	17	Monoraphidium	Sp. (1)	CHLOR	×	1180	400	0.0625	02	_	_			
Scenedesmus         bernardii         CHLOR         x         colony         400         0.0625           Scenedesmus         maguus         CHLOR         x         colony         200         0.25           Scenedesmus         quadricauda         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (3)         CHLOR         x         colony         400         0.0625           Terratum         sp. (3)         CHLOR         x         colony         400         0.0625           Terratum         sp. (3)         CHLOR         x         colony         400         0.0625           Terratum         sp. (4)         CHLOR         x         colony         400         0.0625           Terratum         sp. (5)         CHLOR         x         colony         400         0.0625           Terratum         sp. (5)         CHLOR         x         colony         400         0.0625           Tradingal </td <td>17</td> <td>Scenedesmus</td> <td>acuminatus</td> <td>CHLOR</td> <td>×</td> <td>Auoloo</td> <td>400</td> <td>0.0625</td> <td>70</td> <td>_</td> <td>_</td> <td></td> <td></td> <td></td>	17	Scenedesmus	acuminatus	CHLOR	×	Auoloo	400	0.0625	70	_	_			
Scenedesmus         magnus         CHLOR         x         colony         200         0.25           Scenedesmus         quadricuda         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (11)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (5)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (5)         CHLOR         x         colony         400         0.0625           Terrastum         sp (8)         CHLOR         x         colony         400         0.0625           Tetrastum         sp (8)         CHLOR         x         colony         400         0.0625           Syloboyvalfosoeca         sp (8)         CHLOR         x         col         400         0.0625           Syloboyvalfosoeca         sp (7)         x         col         400         0.0625           Chlore         sp (25)         CHLOR         x         col         400         0.0625           Syloboyvalfosoeca         sp (7)         x         col         400         0.0625           Euglar         sp (7)         col <td>17</td> <td>Scenedesmus</td> <td>bernardii</td> <td>CHLOR</td> <td>×</td> <td>colony</td> <td>400</td> <td>0.0625</td> <td>70</td> <td><del>-</del></td> <td><del>-</del></td> <td></td> <td></td> <td></td>	17	Scenedesmus	bernardii	CHLOR	×	colony	400	0.0625	70	<del>-</del>	<del>-</del>			
Scenedesmus         obtusus         OHLOR         x         colony         400         0.0625           Scenedesmus         quadricauda         OHLOR         x         colony         400         0.0625           Scenedesmus         sp. (11)         OHLOR         x         colony         400         0.0625           Scenedesmus         sp. (8)         OHLOR         x         colony         400         0.0625           Scenedesmus         sp. (8)         OHLOR         x         colony         400         0.0625           Taling         sp. (9)         OHLOR         x         colony         400         0.0625           SylobytonBiososca         sp. (9)         OHLOR         x         col         400         0.0625           SylobytonBiososca         sp. (D-25m)         CRPYT         x         col         400         0.0625           Euglana         sp. (25m)         CRPYT         x         col         400         0.0625           Euglana         sp. (25m)         CRPYT         x         cell         400         0.0625           Euglana         sp. (25m)         CRPYT         x         cell         400         0.0625           Eu	17	Scenedesmus	madurs	CHOR	×	colony	200	0.25	30					
Scenedesmus         quadricauda         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (1)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp. (5)         CHLOR         x         colony         400         0.0625           Teimiga         sp. (8)         CHLOR         x         colony         400         0.0625           Teimiga         sp. (8)         CHLOR         x         colony         400         0.0625           Teimiga         sp. (9)         CHLOR         x         colony         400         0.0625           Sylobryon/Biosoeca         sp. (D-25un)         CRPYS         x         colony         400         0.0625           Cyprophyte         sp. (D-25un)         CRPYS         x         colony         400         0.0625           Euglena         sp. (D-25un)         EUGLE         x         cell         400         0.0525           Trachledomonas         sp. (D-25un)         EUGLE         x         cell         400         0.0525           Trachledomonas         sp. (B-25un)         EUGLE         x         cell         400         0.0525	17	Scenedesmis	obtusus	동등	><	colony	400	0.0625	02	-	_			
Scenedesmus         sp (11)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (5)         CHLOR         x         colony         400         0.0625           Telinga         sp (8)         CHLOR         x         colny         400         0.0625           Telinga         sp (8)         CHLOR         x         colny         400         0.0625           SyloboynorBosoeca         sp (P=25m)         CHRYS         x         coln         400         0.0625           Cyptophyre         sp (D=25m)         CRYPT         x         cell         400         0.0625           Euglera         sp (D=25m)         EUGLE         x         cell         400         0.0625           Trachleromas         sp (D=25m)         EUGLE         x         cell         400         0.0625           Trachleromas         sp (D=25m)         EUGLE         x         cell         400         0.0625           Trachleromas         sp (D=25m)         EUGLE         x         cell         400         0.0625	17	Scenedesmus	auadricauda	CHLOR	×	colony	400	0.0625	02	-	_			
Scenedesmus         sp (5)         CHLOR         x         colony         400         0.0625           Scenedesmus         sp (8)         CHLOR         x         colony         400         0.0625           Telinga         sp (2)         CHLOR         x         cell         400         0.0625           Sylobyor/Bicosoca         sp         CHLOR         x         cell         400         0.0625           cyptoplyte         sp (D-25m)         CHYPT         x         cell         400         0.0625           cyptoplyte         sp (D-25m)         CHYPT         x         cell         400         0.0625           Euglana         sp (2)         EUGLE         x         cell         400         0.0825           Trachledromona         sp (2)         EUGLE         x         cell         100         285.53           Trachledromona         sp (2)         EUGLE         x         cell         100         285.53           Trachledromona         sp (2)         EUGLE         x         cell         100         285.53	~	Scenedesmus	sp. (11)	CHLOR	×	colony	400	0.0625	02	~	<u></u>			
Scenedesmus         sp (8)         CHLOR         x         colony         400         0.0625           Telingra         sp         CHLOR         x         cell         400         0.0625           Terrastrum         Trangulare         CHLOR         x         cell         400         0.0625           Sylobyon/Biosoeca         sp         CHLOR         x         cell         400         0.0625           Cuppopyrie         sp         CRYPT         x         cell         400         0.0625           Euglena         sp         EUGLE         x         cell         400         0.052           Translomonas         sp         EUGLE         x         cell         400         0.285           uninell ovalroid 25-5um         sp         cell         400         0.0825	7	Scenedesmus	sp. (5)	CHLOR	×	colony	400	0.0625	02	_	_			
Telinga   Sp.   CHLOR   X   Cell   400   0.0625     Teltrastrum   SpilothyvalPlooseea   SpilothyvalPlooseea   SpilothyvalPlooseea   Sp. (D=25um)   CHRYS   X   Cell   400   0.0625     SpilothyvalPlooseea   Sp. (D=25um)   CHRYS   X   Cell   400   0.0625     Euglana   Sp.   EUGLE   X   Cell   400   0.0625     Teltrastrum   Sp.   EUGLE   X   Cell   400   0.0625     Teltrastrum   Sp.   EUGLE   X   Cell   400   0.0625     United Lydron 2.5-5um   Sp.   EUGLE   X   Cell   400   0.0625     Teltrastrum   Sp.   EUGLE   X   Cell   400   0	7	Scenedesmus	sb. (8)	CHLOR	×	colony	400	0.0625	70	<b>(</b> -1	<u></u>			
Tefrastrum	17	Tellingia	ds	GELOR	×	e	400	0.0625	20	_	-			
Sylobyor/Biosoeca         sp.         D=25um)         CHRYS         x         colony         400         00825           Cryptopyte         sp. (D=25um)         CRYPT         x         cell         200         0.25           Euglana         sp.         EUGIE         x         cell         400         0.0625           Trachlermonas         sp.         EUGIE         x         cell         100         288.53           Unineal royalformora         sp.         EUGIE         x         cell         400         0.0825	~	Tetrastrum	triangulare	CHLOR	×	- Gel	400	0.0625	70	<b>—</b>	_			
cyptophyte         sp. (D=55um)         CRYPT         x         cell         200         0.25           Euglana         sp.         BUGLE         x         cell         400         0.0825           Euglana         sp.         BUGLE         x         cell         400         0.0825           Trachiledromas         sp.         BUGLE         x         cell         100         288.53           unineal ovalnoto 25-5um         sco         x         cell         400         0.0625	7	Stylobryon/Bicosoeca	ds	CHRYS	×	colony	400	0.0625	70	<b>—</b>	_			
Euglana         sp         EUGLE         x         cell         400           Euglana         sp         EUGLE         x         cell         100           Trachelomonas         sp         EUGLE         x         cell         400           unitical covarion         2.5-5um         sso         cell         400	7	cryptophyte	sp. (D=25um)	CRYPT	×	lleo	8	0.25	30	←	_			
Euglana   Sp	7	Euglena	.ds	ENGLE	×	<del>  </del>	400	0.0625	20	<b>—</b>	_			
Trachelomonas sp. EUGLE x cell 100 unicell.cval/rod 25-5um sco. x cell 400		Euglena	Sp.	EUGLE	×	- Sel	8	283.53	<del>.</del>	<del>-</del>	<u> </u>			
unicell oval/rod 2:5-5um spp. × cell 400	r- 1	Trachelomonas	.ds	EUGLE	×	<u></u>	9	283.53	<u></u>	_	<u></u>			
	_	unicell, oval/rod 2:5-5um	SDD							5				



### Microcystin Analysis Report

#### Project: University of Central Florida Dr. Martin Wanielista

# Sample Identification

Sample Collection Date

- 1) UCF 1 : Filtrate 1
- 2) UCF 2: Filtrate 2
- 3) UCF 3: Filtrate 3
- 4) UCF 4: Filtrate 4
- 5) UCF 5: Filtrate 4b
- 6) UCF 6: Lake Patrick
- 7) UCF 7: Terrier Pond East
- 8) UCF 8: Terrier Pond South
- 9) UCF 9: 417-5-South
- 10) UCF 10: 417-4-South
- 11) UCF 11: 417-3-South
- 12) UCF 12: 417-1-South
- 13) UCF 13: 417-2-North
- 14) UCF 14: Lake Condel South
- 15) UCF 15: Horatio 1 @ Weir
- 16) Horatio 2 @ Weir
- 17) Student Union

Sample Prep – The samples were sonicated and filtered. At least one duplicate per batch of samples was spiked with 1.0 µg/L MCLR and recovery rate calculated.

Analytical Methodology – A microcystins enzyme linked immunosorbent assay (ELISA) was utilized for the quantitative and sensitive congener-independent detection of MCs. The current ELISA kit is sensitive to all MCs (LR, LA, RR, YR, etc.) down to a detection/quantification limit of  $0.15~\mu g/L$ . MCLR standard and spike recoveries averaged 63-74%.

Cyano



# **Summary of Results**

Samp	<u>le</u>	MC levels (μg/L)
1)	UCF 1 : Filtrate 1	< 0.04
2)	UCF 2: Filtrate 2	< 0.04
3)	UCF 3: Filtrate 3	< 0.04
4)	UCF 4: Filtrate 4	< 0.04
5)	UCF 5: Filtrate 4b	< 0.04
6)	UCF 6: Lake Patrick	0.05
7)	UCF 7: Terrier Pond East	0.06
8)	UCF 8: Terrier Pond South	0.08
9)	UCF 9: 417-5-South	0.12
10)	UCF 10: 417-4-South	0.15
11)	UCF 11: 417-3-South	0.09
12)	UCF 12: 417-1-South	1.36
13)	UCF 13: 417-2-North	1.56
14)	UCF 14: Lake Condel South	0.04
15)	UCF 15: Horatio 1 @ Weir	0.45
16)	UCF 16: Horatio 2 @ Weir	< 0.04
17)	UCF 17: Student Union	< 0.04

Limit of Quantification =  $0.15 \mu g/L$ 



University of Central Florida: Microcystin Results

Analysis via ELISA

Sample ID	Initial Conc. Factor	Dilution Ratio	Final Conc. Factor	Assay Value, ug/L	A CALL TO THE REAL PROPERTY OF THE PARTY OF	Corrected Spike Recovery (%)	Final Corrected Concentration (ug/L)	Average (ug/L)
UCF-1	lx	0	1x	0.02	77	98	< 0.04	< 0.04
Filtrate1		0	1x	0.03	77	98	< 0.04	
UCF-2	1x	0	1x	0.02	77	98	< 0.04	< 0.04
Filtrate2		0	1x	0.02	77	98	< 0.04	
UCF-3	1x	0	1x	0.03	77	98	< 0.04	< 0.04
Filtrate3		0	1x	0.01	77	98	< 0.04	
UCF-4	1x	0	1x	0.02	77	98	< 0.04	< 0.04
Filtrate4		0	1x	0.02	77	98	< 0.04	
UCF-5	1x	0	1x	0.03	77	98	< 0.04	< 0.04
Filtrate4b	10000	0	1x	0.03	77	98	< 0.04	
UCF-6	lx	0	1x	0.04	88	89	0.04	0.05
Lake Patrick	1.0	0	1x	0.05	88	89	0.06	0.05
UCF-7	lx	0	1x	0.07	88	89	0.08	0.06
Terrier Pond East	1X	0	1x	0.04	88	89	0.04	0.00
1100 0	W			0.00	00			0.00
UCF-8 Terrier Pond South	1x	0	1x 1x	0.06 0.07	88	89 89	0.07 0.08	0.08
						1000		
UCF-9 417-5-South	1x	0	1x 1x	0.08	88 88	89 89	0.09 0.15	0.12
417-3-30uui			1A	0.13	00	0,7	0.15	
UCF-10	1x	0	1x	0.11	102	98	0.11	0.15
417-4-South		U.	1x	0.10	102	98	0.19	
UCF-11	1x	0	1x	0.09	102	98	0.09	0.09
417-3-South		0	1x	0.09	102	98	0.09	
UCF-12	1x	1/10	10x	1.64	54	94	1.74	1.36
417-1-South		1/10	10x	0.92	54	94	0.98	
UCF-13	1x	0	1x	1.33	54	94	1.41	1.56
417-2-North		0	1x	1.61	54	94	1.7	
UCF-14	1x	0	1x	0.02	102	98	0.02	0.04
Lake Condel South		0	1x	0.06	102	98	0.06	
UCF-15	1x	0	1x	0.45	54	94	0.48	0.45
Horatio 1 @ Weir		0	1x	0.40	54	94	0.42	
UCF-16	1x	0	1x	0.03	102	98	< 0.04	< 0.04
Horatio 2 @ Weir		0	1x	0.03	102	98	< 0.04	
UCF-17	lx	0	1x	0.01	102	98	< 0.04	< 0.04
Student Union		0	1x	0.02	102	98	< 0.04	

Quantification limit = 0.04  $\mu$ g/L na = not applicable

Analyst: C. Williams

Date: 9/2/2005

Sample	Sampling Date Genus	Genus	Species	Algal Group	# Counted Co	ounting Unit	Algal Group # Counted Counting Unit Magnification	Field Area	Field Area # of Fields	Settling Vol.	Settling Vol. Dilution Factor	Species	CYANO Total	Ptox CYANO
Description			•	S.	(units)	Î	ů.	(mm2)		(mL)		Units/mL	Units/mL	Units/mL
1 Filtrate #1	90	cyanophyte filament	sp. (1)	CYANO	38	filament	400	0.0625	70	-	-	2,463	2,928	-
1 Filtrate #1	90	cf. Planktolyngbya	SD	CYANO	2	filament	400	0.0625	70	-	<b>-</b>	130		
1 Filtrate #1	90	cvanophyte single cell	sp. (long)	CYANO	2	cell	400	0.0625	70	-		130		
1 Filtrate #1	90	cyanophyte filament	sp. (3)	CYANO	2	filament	200	0.25	30	+	<b>—</b>	76		
1 Filtrate #1	90	Aphanocapsa	Sp. (1)	CYANO		colony	400	0.0625	70	-	-	65		
1 Filtrate #1	09	cyanophyte filament	sp. (2)	CYANO	-	filament	400	0.0625	70	-	-	65		
1 Filtrate #1	92	Anabaena	sp. (3)	CYANO	_	filament	901	283.53	ς-	ς-	-	-		
1 Filtrate #1	90	unicell, sphere 2:5-5um	. dds		×	cell	400	0.0625	70	-	_			
1 Filtrate #1	90	unicell, oval/rod 2.5-5um	.dds		×	cell	400	0.0625	70	÷	-			
2 Filtrate #2	90	cyanophyte filament	sp.(1)	CYANO	œ	filament	400	0.0625	20	-	1	518	989	0
2 Filtrate #2	90	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	70	-	-	130		
2 Filtrate #2	99	Planktothrix	sp. (2)	CYANO	-	filament	200	0.25	30	-	-	88		
2 Filtrate #2	0.50	pennate diatom	sp. (L=20nm)	BACIL	×	lleo	400	0.0625	70	-	-			
2 Filtrate #2	0.5	unicell, sphere 2.5-5um	Sp. (long)		×	cell	400	0.0625	70	-	-			
2 Filtrate #2	90	unicell, oval/rod 2.5-5um	sbb		×	lleo	400	0.0625	70	-	-			
3 Filtrate #3	90	cyanophyte filament	sp. (1)	CYANO	9	filament	400	0.0625	70	+	1	388	099	0
3 Filtrate #3	90	cvanophyte filament	Sp. (2)	CYANO	2	filament	400	0.0625	70		-	130		
3 Filtrate #3	90	cyanophyte single cell	sp. (long)	CYANO	2	lleo	400	0.0625	70	-	-	130		
3 Filtrate #3	09	Planktothrix	sp. (2)	CYANO	_	filament	100	283.53	-	-	<u>.</u>	-		
	05	oscillatorian filament	(1) es	CYANO		filament	100	283.53	-	-	-			
	90	unicell, oval/rod 2.5-5um	SDD.		· ×	lleo	400	0.0625	20	-				
S Fift ate #3	1 50	unicell sohere 25-5um	uls		. >	la C	400	0.0825	70					
3 Filtrate #3	90	unknown flagellate	sp. (D=5um)		: ×	cell	400	0.0625	2	-	· .			
4 Filtrate #4	90	cyanophyte filament	sp. (2)	CYANO	6	filament	400	0.0625	70	+	+	583	1,231	0
4 Filtrate #4	05	cvanophyte single cell	Sp. (lona)	CYANO	'n	les	400	0.0625	70	•	<u></u>	324		
4 Filtrate #4	90	cyanophyte filament	sp (1)	CYANO	. m	filament	400	0.0625	202	-	-	194		
4 Filtrate #4	90	oscillatorian filament	sp. (2)	CYANO	2	filament	400	0.0625	70	-	-	130		
4 Filtrate #4	99	unicell, oval/rod 2.5-5um	Spp.		×	leo	400	0.0625	70	-	-			
4 Filtrate #4	08	unicell, sphere 2.5-5um	spp.		×	cell	400	0.0625	70	÷	-			
4 Filtrate #4	90	unknown flagellate	sp. (D=7.5um)		×	cell	400	0.0625	70	-	<u></u>			
4 Filtrate #4	90	pennate diatom	sp. (L=20um)	BACIL	×	cell	400	0.0625	70	-	<b>.</b>			
4 Filtrate #4	09	chlorophyte single cell	sp. (1)	CHLOR	×	cell	400	0.0625	70	-	-			
	98	Chlorophyte unicell	sp. (D=7um)	동등	×	le l	00 5	283.53	← ,	-,	<b>-</b> ,			
4 Filtrate #4	GN F		sp. (L=20um)	BACIL	×	cell	DD(	283.53	- (	_	-			
5 Filtrate #4b	9 %	cyanophyte single cell	sp. (long)	CYANO	2 ∘	lleo l	400	0.0625	2 8	4 -	- •	162	583	-
5 Fillrate #40	0 4	cyanophyte marnent	(Z) ds	CANO	no ra	flowent	004	0.0020	2.0	1 -	- •	130		
5 Filhate #4h	3 8	Aphanothece	Sp. (1)	CANO	י כ	colorn	700	0.0025	2 5	J 7		- 42 - 42 - 42		
	3 8	Aprilanous con	(1)	CONSTR	- 0	filomont	000	0.0020	2 02	1 5	- •	3 \$		
	2 8	cyano-pseudo marriem	E @	CYAND	0 01	filament	400	0.0020	2.2	1 4		40		
5 Filtrate #4h	8 8	Garconira	(c) de	CVANO	0 0	llan llan	400	0.0625	202	4	-	33		
5 Filtrate #Ab	8 8	oscillatorian filament	(2)	CVANO		filament	007	0.0825	2 2	- 5		4 6		
5 Filtrate #4h	80	unicell sphere 2 5-5um	Sp. (2)		- ×	Cell	400	0.0625	2 12	1 4	-	2		
5 Filtrate #4h	9 5	Inknown flanellate	sn (D=811m)		: >+	la c	400	0.0825	70	4	-			
5 Filtrate #4h	8 8	unknown flagellate	Sp. (D=10µm)		: ×	la C	400	0.0625	70	- 4	· <del>·</del>			
5 Filtrate #4b	90	unknown flagellate	sp. (L=7.5um)		×	cell	400	0.0625	2	4	-			
5 Filtrate #4b	02	chlorophyte colony	sb (G)	CHLOR	×	colony	400	0.0625	22	4	-			
5 Filtrate #4b	90	chlorophyte single cell	sb	CHLOR	×	cell	400	0.0625	70	4	-			
5 Filtrate #4t	90	cryptophyte	sb. (L=30nm)	CRYPT	×	lleo	200	0.25	90	4	<u>,                                    </u>			
5 Filtrate #4b	02	Nitzschia	sp. (L=35um)	RACI	×	e C	200	0.25	30	4	10			

GreenWater Laboratories Sampling Data August 2005

Date	Genus	Species	Algal Group	# Counted	# Counted Counting Unit	Magnification	Field Area	# of Fields	Settling Vol.	Dilution Factor	Spe
				(units)			(mm2)		(mL)		5
8	Planktothrix	agardhii/mougeotii	CYANO	26	filament	400	0.0625	2	τ-	-	8
	cyanophyte filament	sp. (1)	CYANO	9	filament	400	0.0625	70	-	_	m
	Aphanocapsa	Sp. (4)	CYANO	9	colony	400	0.0625	70	-	-	8
1 4	Anabaena	sp. (B)	CYANO	7	filament	400	0.0625	2	ς-	~	¥
	cyanophyte single cell	sb. (long)	CYANO	2	lleo	400	0.0625	70	-	<b>-</b>	=
	Aphanocapsa	sp. (1)	CYANO	-	colony	400	0.0625	70	-	-	0
	cf. Gleocapsa	Sp	CYANO	-	colony	400	0.0625	70	-	-	9
	Snowella	ds	CYANO	-	colony	400	0.0625	70	-	<b>-</b>	9
2 1	oscillatorian filament	sp. (2)	CYANO	-	filament	400	0.0625	70	-	-	9
	Planktolyngbya	limnetica	CYANO	-	filament	200	0.25	30	-	-	n
1	cf. Romeria	ds	CYANO	-	filament	200	0.25	30	-	<b>,</b>	ന
	Calothrix	atricha	CYANO	9	filament	100	283.53	÷	-	-	
1	cyanophyte filament	sp. (3)	CYANO	4	filament	100	283.53	<b>-</b>	-	-	
i	Lyngbya	sp. (1)	CYANO	-	filament	100	283.53	-	-	<b>,</b> —	

GreenWater Laboratories Sampling Data August 2005

Salliple	Sampling Date Genus	Gerius	Shecies	Aigal Group	# conuined	Counting Office	nagrillic auori	ela Area	* OI LIGIDS	Jetillig vol.	Dilation Factor	Species	CIMINO IOLA	LIGA CI MINO
Description					(nuits)			(mm2)		(mL)		Units/mL	Units/mL	Units/mL
3 Lake Patrick	8	Planktothrix		CYANO	26	filament	400	0.0625		-	-	3,629	5,011	3,759
3 Lake Patrick	90	cyanophyte filament		CYANO	9	filament	400	0.0625		-	_	388		
3 Lake Patrick	90	Aphanocapsa		CYANO	9	colony	400	0.0625		-	-	388		
3 Lake Patrick	90	Anabaena		CYANO	2	CYANO 2 filament 400	400	0.0625	02	~	~	130		
3 Lake Patrick	90	cyanophyte single cell		CYANO	2	lleo	400	0.0625	20	-	-	130		
3 Lake Patrick	06	Aphanocapsa		CYANO	-	colony	400	0.0625	70	-	-	92		
3 Lake Patrick	09	of. Gleocapsa	Sp	CYANO	-	colony	400	0.0625	70	-	-	99		
3 Lake Patrick	90	Snowella	Sp	CYANO	-	colony	400	0.0625	70	-	<b>-</b>	99		
3 Lake Patrick	90	oscillatorian filament	sp. (2)	CYANO	-	filament	400	0.0625	70	-	-	99		
3 Lake Patrick	90	Planktolyngbya	limnetica	CYANO	-	filament	200	0.25	90	-	-	38		
3 Lake Patrick	90	cf. Romeria	Sp	CYANO	-	filament	200	0.25	99	-	-	38		
3 Lake Patrick	00	Calothrix	atricha	CYANO	2	filament	100	283.53	-	-	-	9		
3 Lake Patrick	90	cyanophyte filament	sp. (3)	CYANO	4	filament	100	283.53	-	-		4		
3 Lake Patrick	90	Lyngbya	sp. (1)	CYANO	-	filament	100	283.53	-	-	<b>-</b>	-		
3 Lake Patrick	90	chlorophyte colony	sb. (G)	CHLOR	×	colony	400	0.0625	20	-	-			
3 Lake Patrick	06	unicell, sphere 2.5-5um	spp.		×	lleo	400	0.0625	20	-	-			
3 Lake Patrick	90	Eutetramorus	Sp	CHLOR	×	colony	400	0.0625	70	-	-			
3 Lake Patrick	90	centric diatom	sp. (D=5um)	BACIL	×	lleo	400	0.0625	70	-	-			
3 Lake Patrick	09	Nitzschia	sp. (L=75um)	BACIL	×	cell	400	0.0625	70	+	+			
3 Lake Patrick	90	pennate diatom	sb: (L=35um)	BACIL	×	lleo	400	0.0625	20	-	-			
3 Lake Patrick	06	Elakatothrix	viridis	CHLOR	×	colony	400	0.0625	70	-	-			
3 Lake Patrick	90	Opcystis	sp. (3)	CHLOR	×	colony	400	0.0625	70	-	-			
3 Lake Patrick	90	pennate diatom	sp. (L=20um)	BACIL	×	lleo	400	0.0625	70	-	-			
3 Lake Patrick	90	Staurastrum	sp. (large)	SHLOR	×	lleo	200	0.25	30	-	-			
3 Lake Patrick	90	Closterium	sp.(1)	CHLOR	×	lleo	200	0.25	99	-	-			
3 Lake Patrick	90	centric diatom	sp. (D=12um)	BACIL	×	lleo	200	0.25	30	-	-			
3 Lake Patrick	90	Synedra	sb. (L=85um)	BACIL	×	lleo	200	0.25	30	-	-			
3 Lake Patrick	90	pennate diatom	sp. (L=150um)	BACIL	×	lleo	100	283.53	-	-	-			
3 Lake Patrick	90	Centritractus	.ds	XANTH	×	lleo	100	283.53	-	-	<b>.</b>			
3 Lake Patrick	0.5	Rhizodonium	US.	프	×	filament	100	283.53	•					

Sample	Sampling Date	Genus	Species	Algal Group		# Counted Counting Unit Magnification	Magnification	Field Area	# of Fields	Settling Vol.	Dilution Factor		CYANO Total	Ptox CYANO
Description	î.		c.					(mm2)		(mL)		Units/mL	Units/mL	Units/mL
Terrier Pond East	90	cvanophyte filament	Sp. (1)	CYANO	41	flament		0.0625	20	m	1		1 746	191
Terrier Pond East	1 89	oscillatorian filament	Sp. (2)	CYANO	16	flament		0.0625	20	m	-			
Terrier Pond East	09	Aphanocapsa	SD (4)	CYANO	Ξ	colony		0.0625	70	ı m	-			
<b>Terrier Pond East</b>	8	Anabaena	circinalis/flos-aquae (1)	CYANO	00	filament		0.25	8	ю	ς-			
<b>Terrier Pond East</b>	ક	Anabaena	sp. (6)	CYANO	က	filament		0.0625	2	က	0.0625 70 3 1			
Terrier Pond East	00	cyanophyte filament	(N) ds	CYANO	4	filament		0.25	30	ന	-	20		
Terrier Pond East	92	Anabaena	sp. (B)	CYANO	7	filament	200	0.25	8	က	_	22		
Terrier Pond East	90	Pseudanabaena	sp. (1)	CYANO	-	filament	400	0.0625	70	ന	-	22		
Terrier Pond East	90	Pseudanabaena	galeata	CYANO	-	filament	200	0.25	30	ന	-	13		
Terrier Pond East	90	Lyngbya	sp. (4)	CYANO	4	filament	100	283.53	-	က	-	-		
Terrier Pond East	99	Monoraphidium	contortum	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	90	Monoraphidium	minutum	CHLOR	×	lea	400	0.0625	70	m	-			
Terrier Pond East	90	centric diatom	sp. (D=5um)	BACIL	×	lleo	400	0.0625	70	ന	-			
Terrier Pond East	90	unicell, sphere 2.5-5um	spp.		×	cell	400	0.0625	70	ന	-			
Terrier Pond East	90	Monoraphidium	circinale	CHLOR	×	cell	400	0.0625	7.0	ന	-			
Terrier Pond East	90	Pandorina	morum	CHLOR	×	colony	400	0.0625	70	m	-			
Terrier Pond East		unicell, oval/rod 2:5-5um	spp.		×	lleo	400	0.0625	70	ന				
Terrier Pond East	I	Closterium	acutum var. variabile	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	90	Koliella	longiseta f. variabilis	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	99	Urosolenia	ds	BACIL	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	99	Staurastrum	sb. (med)	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	90	chlorophyte colony	sb.(G)	CHLOR	×	colony	400	0.0625	70	က	-			
Terrier Pond East	90	Eutetramorus	Sp	SHLOR	×	colony	400	0.0625	70	ന	-			
Terrier Pond East	90	pennate diatom	sp. (L=25um)	BACIL	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	90	Ankistrodesmus	cf. gradiis	CHLOR	×	Cell	400	0.0625	70	က	-			
Terrier Pond East	99	Nitzschia	sp. (L=20um)	BACIL	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	1	Monoraphidium	griffithii	CHLOR	×	cell	400	0.0625	70	က	-			
Terrier Pond East		Closterium	sp. (1)	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond East	į	Oocystis	sb. (3)	CHLOR	×	colony	400	0.0625	70	က	-			
Terrier Pond East	90	chlorophyte single cell	ds	CHLOR	×	cell	400	0.0625	70	ო	-			
Terrier Pond East		Scenedesmus	sp. (12)	CHLOR	×	colony	400	0.0625	70	ന	-			
Terrier Pond East	Ī	Synedra	sp. (L=40um)	BACIL	×	lleo	400	0.0625	70	က	-			
Terrier Pond East	Ī	Scenedesmus	sp. (10)	SEL SE	×	colony	400	0.0625	70	ന				
Terrier Pond East	S	Closteriopsis	sp.	SEL CH	×	cell	200	0.25	99	ന	-			
Terrier Pond East	Ĩ	centric diatom	sp. (D=20um)	BACIL	×	cell	200	0.25	90	m				
Terrier Pond East	I	chlorophyte colony	sb. (B)	CHLOR	×	colony	200	0.25	8	က	-			
Terrier Pond East	99	Blakatothrix	viridis	CHLOR	×	colony	200	0.25	30	m	-			
Terrier Pond East	ĺ	Cosmarium	sb. (med)	CHLOR	×	lleo	200	0.25	30	ന	<b>.</b>			
Terrier Pond East	Ì	Goniachloris	fallax	XANTH	×	cell	200	0.25	30	ന	-			
Terrier Pond East		Botryococcus	.ds	CHLOR	×	colony	200	0.25	30	ന	-			
Terrier Pond East		Lagerheimia	.ds	CHLOR	×	lleo	200	0.25	30	ന	<del>,</del>			
Terrier Pond East	1	Pseudostaurastrum	sp.	XANTH	×	cell	200	0.25	30	e	-			
Terrier Pond East	90	Treubaria	schmidlei	CHLOR	×	cell	200	0.25	8	ന	-			
Terrier Pond East	Į	Staurastrum	sp. (large)	CHLOR	×	cell	100	283.53	<b>.</b>	က	~			
Terrier Pond East	90	Ankistrodesmus	falcatus	CHLOR	×	lleo	9	283.53	-	ന	-			
Terrier Pond East	28 32	Crucigeniella	apiculata	SHICK	×	colony	9	283.53	_	က	_			

Sample	Sampling Date Genus	Genus	Species	Algal Group	# Counted	Counting Unit	Algal Group # Counted Counting Unit Magnification		# of Fields	Settling Vol.	Field Area # of Fields Settling Vol. Dilution Factor	Species	CYANO Total	Ptox CYANO
Description					(nuits)			(mm2)		(mL)		Units/mT	Units/mL	Units/mL
Terrier Pond South	99	cyanophyte filament	sp. (1)	CYANO	26	filament	400	0.0625	20	ന	-	562	1,501	265
Terrier Pond South	90	Aphanocapsa	sp. (4)	CYANO	6	colony	400	0.0625	70	ന	-	194		
Terrier Pond South	09	Aphanocapsa	Sp. (1)	CYANO	o	colony	400	0.0625	70	ന	-	194		
Terrier Pand South	1 50	oscillatorian filament	Sn (1)	CYANO	0.	flament	400	0.0825	70	er.		194		
Terrier Pond South	8	Anabaena	Sp. (B)	CYANO	12	filament	200	0.25	8	m	-	151		
Terrier Pond South	8	Anabaena	circinalis/flos-aguae (1)	CYANO	ത	filament	200	0.25	30	ო	Ţ	113		
Terrier Pond South	   	evanophyte filament	Sn (2)	CYANO	േ	filament	400	0.0625	20	e cr	-	65		
Terrier Pand South	   	Anhangcansa/Chrogogous	Sh (8)	CYANO	u <del>s</del>	colony	200	0.25	8	ı cr.	-	13		
Terrier Pond South	1 50	Anhanothece	(A)	CYANO	vi <del>s</del>	colony	200	0.25	30	ı cr.	-	É		
Tarriar Band South	1 8	Cononhyte filament	(N) co	CVANO	্ব	filament	101	283.53		ı cr		٠.		
Terrier Pond South	8 8	of Phormidium	Sp. (14)	CVANO	T. 1	filament	8.0	283.53		o cr				
Tarriar Dond South		Dendorine	200	0000	->	colony	700	0.0826	- 02	o (**		,		
Terrier Bond South		Tetraphialla	3	VANTE	<b>(</b> )	leg	80	0.0626	2 5	o (*)				
Terrier Pond South	3 8	Scanadasmis	opi		< >	Colony	84	0.0025	2 5	o cr	-			
Torrior Dond South	8 8	Sunda	daganeagan	500	< >	loo	007	0.0626	2.2	o 0				
I C I L I I I I I I I I I I I I I I I I	3 8	Sylleula	sp. (L-730iii)	7 .	<	ב ב	400	0.0020	2 6	0 0	- ,			
lerrier Pond South	9 8	MICSCHIA	sp. (L=15um)	BACL P. O. L	×	le l	400	0.0000	2 8	י פי	- •			
Terrier Fond South	9 :	centric diatom	sp. (U=7.5um)	BACIL	×	lleo	400	0.0025	2 ;	יכי				
lerrier Pond South	8	Staurastrum	sb. (med)	35	×	cell	400	0.0625	0/	77)	_			
Terrier Pond South	90	Closterium	sp. (1)	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond South	90	Koliella	longiseta f. variabilis	CHLOR	×	lleo	400	0.0625	20	ന	<b>,</b>			
Terrier Pond South	90	Lagerheimia	Sp.	CHLOR	×	cell	400	0.0625	20	m	-			
Terrier Pond South	09	pennate diatom	sp. (L=15um)	BACIL	×	cell	400	0.0625	70	m	-			
Terrier Pond South	90	Monoraphidium	circinale	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond South	90	unicell, sphere 2.5-5um	spp.		×	lleo	400	0.0625	70	ന	-			
Terrier Pond South	90	Ankistrodesmus	gracilis	CHLOR	×	cell	400	0.0625	20	က	-			
Terrier Pond South	99	Nitzschia	sb: (L=37um)	BACIL	×	cell	400	0.0625	20	ന	-			
Terrier Pond South	99	Closteriopsis	.ds	CHLOR	×	cell	400	0.0625	70	m	-			
Terrier Pond South	09	Kirchneriella	sp. (1)	CHLOR	×	colony	400	0.0625	70	ന	-			
Terrier Pond South	90	chlorophyte single cell	ds	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond South	90	centric diatom	sp. (D=7.5)	BACIL	×	cell	400	0.0625	70	m	-			
Terrier Pond South	99	Kirchneriella	sp. (2)	CHLOR	×	colony	400	0.0625	70	က	-			
Terrier Pond South	99	Treubaria	schmidlei	CHLOR	×	cell	400	0.0625	70	ന				
Terrier Pond South	09	Monoraphidium	flexuosum	CHLOR	×	cell	400	0.0625	70	ന	-			
Terrier Pond South	90	centric diatom	sb. (D=5um)	BACIL	×	cell	400	0.0625	70	ന	+			
Terrier Pond South	98	Eutetramorus	sp.(1)	CHLOR	×	colony	400	0.0625	20	က	_			
Terrier Pond South	99	Scenedesmus	sp. (10)	CHLOR	×	colony	400	0.0625	20	ന				
Terrier Pond South	92	chlorophyte colony	sp. (B)	CHLOR	×	colony	400	0.0625	70	m	-			
Terrier Pond South	09	cryptophyte	sb: (L=7um)	CRYPT	×	cell	400	0.0625	70	ന				
Terrier Pond South	05	Tetrastrum	elegans	CHLOR	×	colony	200	0.25	30	ന	-			
Terrier Pond South	90	Staurastrum	sp. (large)	CHLOR	×	cell	200	0.25	30	က	-			
Terrier Pond South	09	Ankistrodesmus	falcatus	CHLOR	×	cell	200	0.25	30	ന	-			
Terrier Pond South	99	Isthmochloran	gracile	XANTH	×	cell	100	283.53	T	m	-			
Terrier Pond South	00	Cosmanium	sb. (med)	CHLOR	×	cell	100	283.53	-	ന	-			
Terrier Pond South	98	Oocystis	sp. (2)	SHLOR	×	colony	100	283.53	-	ന				
Terrier Pond South	89	chlorophyte filament	.ds	SHLGR	×	filament	100	283.53	-	ന	_			
lerrier Pond South	05	Pseudostaurastrum	Sp.	XANIH	×	cell	100	283.53		က				

Intal Prox CIRINO																												
Units/ml Units/ml			4		_																							
						-	-	<b>—</b>	-	_	-	-	_	<b>-</b>	-	_	<b>.</b>	-	<b>-</b>	<b>.</b>	-	-	<b>—</b>	-	<b>-</b>	<b>-</b>	-	•
(mL)	[-		-	•	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	
(mm2)	70	2 8	-	-	-	7.0	70	70	70	70	70	70	70	70	70	70	70	70	70	70	7.0	70	70	70	70	70	30	
(mm2)	0.0825	0.25	283.53	283.53	283.53	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.25	
magnilleadon	400	200	100	100	100	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	200	
Cunits)	colony	filament	colony	filament	filament	colony	cell	colony	cell	lleo	colony	colony	cell	cell	colony	colony	colony	colony	cell	colony	lleo	cell	leo	cell	colony	colony	colony	
(units)	( -		য	ю	<del>-</del>	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	
diago la radio	CYANO	CYANO	CYANO	CYANO	CYANO	CHLOR	CHLOR	CHLOR		CHLOR	CHLOR	CHLOR	BACIL	CHLOR	CHLOR	CHLOR	CHLOR	CHLOR	SHLOR	CHLOR	XANTH	CHLOR	CHLOR	CHLOR	CHLOR	CHLOR	CHLOR	
		Sp. (1)																										
Salus	Anhanncansa	oscillatorian filament	Aphanocapsa	Planktothrix	Anabaena	chlorophyte colony	Staurastrum	Oocystis	unicell, sphere 2.5-5um	Ankistrodesmus	Elakatothrix	chlorophyte colony	centric diatom	Closterium	Scenedesmus	Oocystis	Oocystis	Eutetramorus	Monoraphidium	Oncystis	Centritractus	Koliella	Cosmanium	Euastrum	Quadrigula	Scenedesmus	Scenedesmus	
Samping Date Cents		8.89				5 3			8 8			8 9			2 3	8 89		3 13	8 88			90		8 3	8 84		8 3	
Description	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	17-5-South	
	. 4	- 4	4	9	4	9	9	4	9	9	9	4	4	9	9	9	9	4	9	9	9	9	9	9	9	9	9	

Units/mL																														
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sp. wesenbergii circinalis/flos-aquae (1) sp. (1) sp. (2)	CYANO 5		4 colony	1 colony	1 filament	Tilament	10 filament	10 filament 4 colony	10 filament 4 colony 4 filament		10 filament 4 colony 4 filament 2 filament × cell	10 filament 4 colony 4 filament 2 filament	10 filament 4 colony 4 filament 2 filament × colony × colony × colony + think	10 filament 4 colony 4 filament 2 filament × cell × colony × colony × colony × colony	10 filament 4 colony 4 filament 5 filament	10 filament 4 colony A filament 2 filament	10 filament 4 colony A filament 2 filament X cell X colony	10 filament 4 colony 4 filament 5 filament 5 cell 6 cell 7 x x colony 7 x colony 8 x x colony 8 x x colony 8 x x colony 9 x colony 9 x x colony 9 x colony	10   Flament	10   Flament     10   Flament     1   1   1   1   1   1   1   1   1	10	10	10	10	10	10	10	10   Flament	10   10   11   11   11   11   11   11	10
_		S.	4 colony	CYANO 1 calony	1 filament	CYANO 1 filament	CYANO 10 filament	ougeodii CYANO 10 filament CYANO 4 colony	ougeotii CYANO 10 filament CYANO 4 colony CYANO 4 filament	CYANO 10 filament   CYANO 4 colony   CYANO 4 filament   CYANO 2 filament   CYANO 3 fila	Ougedi CYANO 10 filament CYANO 4 colony CYANO 4 filament CYANO 2 filament CYANO 2 cell	ougedi         CYANO         10         filament           CYANO         4         filament           CYANO         4         filament           CYANO         2         filament           CYANO         2         filament           CHOR         X         cell           CHLOR         X         colony           CHOR         X         colony	CYANO 10	CYANO 10	CYANO 10	CYANO 10	CYANO	CYANO 10   Flament	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO
<b>Vicrocystis unicell</b> Microcystis	circinalis/flos-aguae (1)	sp. (1) CYANO 5 sp. (2) CYANO 5	sp. (4) CYANO 4 colony sp. (med) CYANO 1 colony	sp.(2) CYANO 1 colomy	sp. (1) CYANO 1 filament	sp. (B) CTANO 1 filament	x agardhii/mougeotii CYANO 10 filament	agardhilmougeotii CYANO 10 filament sp. (large) CYANO 4 colony	x agarchilimougeotii CYANO 10 filament roolony sp. (lage) CYANO 4 colony sp. (s) CYANO 4 filament	x agardhlimougeoti CYANO 10 filament colony sp. (large) CYANO 4 colony sp. (3) CYANO 4 filament sp. (1) CYANO 2 filament	X	CYANO 10 filament   CYANO 10 filament	CYANO 10   Flament	CYANO 10	CYANO	CYANO 10	CYANO 10	CYANO	CYANO	CYANO	CYANO	CYANO   10   Filament	CYANO	CYANO	CYANO	CYANO   10   Mament	CYANO	CYANO   10   Mament   10   M	CYANO   10   Mament	CYANO
Microcysti	wesenbergii CYANO circinalis/flos-aquae (1) CYANO	Adhancepsa sp. (2) CYANO 5  oscillatorian filament sp. (2) CYANO 5	sp. (4) CYANO 4 colony sp. (med) CYANO 1 colony	Aphanocapsa sp. (2) CYANO 1 colomy	Anabaena sp. (1) CYANO 1 filament	Anabaena sp. (B) CYANO 1 nlament	Planktothrix agardhii/mougeotii CYANO 10 filament	Planktothrix agardhli/mougeotii CYANO 10 filament     Microcystis colony sp. (large) CYANO 4 colony	Planktothrix agarbilimougeoti CYANO 10 filament Microcystis colony sp. (large) CYANO 4 colony Anabaena sp. (g) CYANO 4 filament filament	Planktothrix agarchilimougeotii CYANO 10 filament	Planktothrix agardhillimougeotii CYANO 10 filament Anabeana sp. (3) CYANO 4 colony Anabeana sp. (3) CYANO 4 filament Flanktothrix sp. (1) CYANO 2 filament uncell sphere 2.5-5um sp. (1) CYANO 2 filament sp. (1) CYANO 2 filament uncell sphere 2.5-5um sp. (1) CYANO 2 filament sp. (1) CYANO 2 filament sp. (1) CYANO 2 filament uncell sphere 2.5-5um sp. (1) CYANO 2 filament sp. 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(7) CYANO 2 colony firefineriells spiere 2.6.5um sp. (7) CHLOR × colony firefineriells sp. (7) CHLOR × colony firefinerial sp. (8) CHLOR × col	Plankotrkix agarbilimougeoti CYANO 10 filament Microcystis colony Anabaena sp. (a) CYANO 4 colony Anabaena sp. (b) CYANO 4 filament Plankotrkotr 5p. (c) CYANO 4 filament Plankotrkotr 5p. (c) CYANO 2 filament Coelestrum 5p. (c) CYANO 2 filament Anicharity Shere 2.6-5um 5p. (c) CYANO 2 filament Coelestrum 5p. (c) CYANO 2 filament Anicharity Shere 2.6-5um 5p. (c) CYANO 4 filament cell coelestrum 5p. (c) CYANO 4 filament cell colony Authorities 5p. (d) CYANO 2 filament cell colony filament 5p. (d) CYANO 4 filament cell colony filament 5p. (d) CYANO 4 filament colony colony colony cell cell cell cell cell cell cell cel	Planktotrikt agarbilimougeoti CYANO 10 filament Microcystis colony sp. 0.3 pp. 0.3 c. CYANO 4 colony Anabaena sp. 0.3 c. CYANO 4 filament Planktotrikt spie 2.5 c. CYANO 4 filament Coelestrum sp. (2) CYANO 2 filament call Coelestrum sp. (2) CYANO 2 colony Auritorierial spie 2.5 c. CYANO 2 colony Auritorierial sp. (2) CYANO 4 filament call coelestrum sp. (2) CYANO 4 filament call coelestrum sp. (2) CYANO 4 filament call call call call call call call cal	Planktothrix agarbilimougeotii CYNNO 10 filament Microcystis colony sp. drage) CYNNO 4 colony Anabaena sp. (d) CYNNO 4 filament Planktothrix sp. (d) CYNNO 4 filament Planktothrix sp. (d) CYNNO 2 filament colony sp. (d) CYNNO 2 filament sp. (d) CYNNO 4 filament sp. (d) CYNNO 2 filament sp. (d) CYNNO 4 filament colony filament sp. (d) CYNNO 2 filament sp. (d) CHLOR X colony filament sp. (d) CHLOR X colony Scenedesmus sp. (d) CHLOR X colony Scenedesmus sp. (d) CHLOR X colony centric dataon sp. (d) CHLOR X colony filament sp. (d) CHLOR X colony sp. (d) CHLOR X colony CENTIC dataon sp. (d) CHLOR X colony Scenedesmus sp. (d) CHLOR X colony Scenedesmus sp. (d) CHLOR X colony Scenedesmus sp. (d) CHLOR X colony CENTIC dataon sp. (d) CHLOR X colony	Microcontric agarchilimougeotii CYANO 10 Miament Mianctoritix agarchilimougeotii CYANO 10 Mianent Colony Anabaena 9p. (6) CYANO 4 colony CABACO 11 Mianent Parkidotirix 9p. (1) CYANO 2 iliannent CABACO 12 Miannent CABACO 12 Miannent CABACO 12 Miannent CABACO 13 Miannent CABACO 13 Miannent CABACO 13 Miannent CABACO 13 Miannent CABACO 14 Miannent CABACO	Microtropists colony   Anabaena   Anabaena   Panikotropists colony   Anabaena   Panikotropists colony   Anabaena   Panikotropists colony   Anabaena   Panikotropists colony   Panikotropists colony   Panikotropists   Panikotrop	Microcystis colony   Anabaena   Anabaena   Anabaena   Anabaena   Painktotrikt   Anabaena   Painktotrikt   Anabaena   Painktotrikt   Anabaena   Painktotrikt   Painktotrik	Microbritis agarbilimougeoti CYANO 10 Miament Microbrist agarbilimougeoti CYANO 10 Miament Anabaena pp. (6) CYANO 4 colony Anabaena pp. (6) CYANO 4 Miament Plankduthrox pp. (7) CYANO 2 Miament Plankduthrox pp. (7) CYANO 2 Miament Spiral S	Microstrik agarthilimougeoti CYANO 10 Miament Microstsis colony	Paintstorkink         agarbhillinougeoti         CYANO         40         filament           Marabaena         pp. (6)         CYANO         4         filament           Parabaena         pp. (6)         CYANO         4         filament           Parabaena         pp. (7)         CYANO         4         filament           Portugerial         sp. (1)         CYANO         4         filament           Control         colony         CHLOR         x         colony           Control         colony         CHLOR         x         colony           Control         colony         CHLOR         x         colony           Microbinia         sp. (2)         CHLOR         x         colony           Microbinia         sp. (2)         CHLOR         x         colony           Microbinine         sp. (3)         CHLOR         x	Microcystis colony   Anabaena   Painktotrikt   Anabaena   Painktotrikt   Painkt	Plankotrkity         agarbilimougeoti         CYANO         40         filament           Anabaera         sp. (a)         CYANO         4         colony           Anabaera         sp. (a)         CYANO         4         filament           Plankottrick         sp. (b)         CYANO         4         filament           Plankottrick         sp. (c)         CYANO         4         filament           Inical sphere 2.6-5um         sp. (c)         CYANO         2         filament           Coelsstrum         sp. (c)         CHLCR         x         colony           Aulacoseira         sp. (d)         CHLCR         x         colony           Scenede smus         sp. (2)         CHLCR         x         colony           Centric distorm         sp. (12)         CHLCR         x         colony           Centric distorm         sp. (1-25um)         CHLCR         x         colony           Permete sistorm         sp. (1-25um)         CHLCR         x         colony           Michretiella         sp. (2)         CHLCR         x         colony           Michretiella         sp. (2-20um)         CHLCR         x         colony           Michretiella	Patrictority         agarchilimougeoti         CYANO         40         filament           Anabaera         pp. (6)         CYANO         4         filament           Patrictority         pp. (7)         CYANO         4         filament           Patrictoric         pp. (7)         CYANO         4         filament           Patrictoric         pp. (7)         CYANO         4         filament           Inchestiva         pp. (7)         CYANO         4         filament           Control         COND         CALOR         X         colony           Control         COND         CALOR         X         colony           Control         CONTROL         X         colony           Control         CALOR         X         colony           Control	Microcontrict	Microcystis colony   Anabaena   Paintichtrik   Agarbillinougeotii CYNNO   4   Miament	Microcystis colony   Anabaena   Paintichtrik   Agarbillinougeotii CYANO   4   Miament	Microcystis colony   Anabaena   Paintichtrik   Agarbillinougeotii CYNNO   4   Miament	Pathictorinx         agarbilimougeoti         CYANO         40         filament           Marosystis colony         sp. (6)         CYANO         4         filament           Parabaena         sp. (7)         CYANO         4         filament           Parabaena         sp. (1)         CYANO         4         filament           Parabaena         sp. (1)         CYANO         4         filament           Parabaena         sp. (1)         CYANO         4         filament           Control (Spitz)         CHCR         X         colony           Aulacoseira         sp. (1)         CHCR         X         colony           Senedestruns         sp. (1)         CHCR         X         colony           Netzeric altorn         sp. (12)         CHCR         X         colony           Netzeria         sp. (12)         CHCR         X

Sample	Sampling Date Genus	Genus	Species	Algal Group	# Counted C	Algal Group # Counted Counting Unit Magnification	Magnification	Field Area	# of Fields	Settling Vol.	Field Area # of Fields Settling Vol. Dilution Factor	Species	CYANO Total	Ptox CYANO
Description					(units)			(mm2)		(mL)		Units/mL	Units/mL	Units/mL
1 417-3-South	90	Aphanocapsa	sp. (4)	CYANO	容	colony	400	0.0625	70	-	-	4,148	11,038	5,897
1 417-3-South	왕 	Anabaena	circinalis/flos-aquae (2)	CYANO	19	filament	400	0.0625	02	•	-	3,953		
1 417-3-South	8	Microcystis unicell	.ds	CYANO	24	le3	400	0.0625	2	_	-	1,555		
1 417-3-South	90	oscillatorian filament	sp.(2)	CYANO	10	filament	400	0.0625	70	-	-	648		
1 417-3-South	8   	Anabaena	sp. (B)	CYANO	ო	filament	400	0.0625	2	ς-	-	194		
1 417-3-South	90	cyanophyte filament	sb. (3)	CYANO	က	filament	400	0.0625	70	-	-	194		
1 417-3-South	8	Microcystis colony	sp. (sm)	CYANO	က	colony	400	0.0625	2	-	_	194		
1 417-3-South	09	oscillatorian filament	sp.(1)	CYANO	2	filament	200	0.25	30	<del>,</del>	<b>.</b>	9/		
1 417-3-South	90	Pseudanabaena	limnetica	CYANO	-	filament	400	0.0625	70	-	÷	99		
1 417-3-South	90	Lyngbya	sp. (2)	CYANO	4	filament	100	283.53	-	-	-	4		
1 417-3-South	90	Planktothrix	sp.(1)	CYANO	က	filament	100	283.53	<del>,</del>	-	<b>,</b>	m		
1 417-3-South	90	cyanophyte filament	(N) ds	CYANO	-	filament	100	283.53	÷	-	-	-		
1 417-3-South	90	Planktothrix	sp.(2)	CYANO	-	filament	100	283.53	-	-	-	-		
1 417-3-South	90	Woronichina	sp.	CYANO	-	colony	100	283.53	-	-	<b>,</b>	-		
1 417-3-South	90	Cosmarium	sb. (med)	CHLOR	×	cell	400	0.0625	20	-	-			
1 417-3-South	09	Scenedesmus	sp. (12)	CHLOR	×	colony	400	0.0625	70	-	-			
1 417-3-South	99	chlorophyte colony	sp. (A)	CHLOR	×	colony	400	0.0625	70	_	<b>—</b>			
1 417-3-South	99	Elakatothrix	viridis	SHLOR	×	colony	400	0.0625	70	+	-			
1 417-3-South	90	Scenedesmus	sp. (11)	CHLOR	×	colony	400	0.0625	70	-	-			
1 417-3-South	90	unicell, sphere 2.5-5um	spp.		×	lleo	400	0.0625	20	,-	<b>~</b>			
1 417-3-South	99	Staurastrum	sb. (med)	CHLOR	×	lleo	400	0.0625	70	-	-			
1 417-3-South	90	Nitzschia	sp. (L=20um)	BACIL	×	lleo	400	0.0625	70	-	<b>-</b>			
1 417-3-South	09	Koliella	longiseta f. variabilis	CHLOR	×	lleo	400	0.0625	70	<del>,</del>	<b>.</b>			
1 417-3-South	90	Scenedesmus	sp. (10)	CHLOR	×	colony	400	0.0625	70	-	-			
1 417-3-South	90	Eutetramorus	sb.	CHLOR	×	colony	400	0.0625	20	-	-			
1 417-3-South	99	Oocystis	sb: (2)	CHLOR	×	colony	400	0.0625	20	-	<b>-</b>			
1 417-3-South	90	pennate diatom	sp. (L=25um)	BACIL	×	cell	400	0.0625	70	-	-			
1 417-3-South	90	Scenedesmus	sb. (5)	CHLOR	×	colony	400	0.0625	70	-	-			
1 417-3-South	90	chlorophyte colony	sb.(D)	CHLOR	×	colony	400	0.0625	20	<b>.</b>	<b>.</b>			
1 417-3-South	90	Quadrigula	quatemata	CHLOR	×	colony	400	0.0625	20	1	-			
1 417-3-South	09	Pandorina	morum	CHLOR	×	colony	400	0.0625	70	-	-			
1 417-3-South	99	chlorophyte single cell	.ds	CHLOR	×	lleo	400	0.0625	70	,	~			
1 417-3-South	99	Staurastrum	sp. (small)	SH_CR	×	lleo	400	0.0625	70		-			
1 417-3-South	02	Scenedesmus	quadricauda	CH_CR	×	colony	400	0.0625	70	-	-			
1 417-3-South	90	chlorophyte colony	sb. (B)	CHLOR	×	colony	400	0.0625	20	-	<b>-</b>			
1 417-3-South	09	Coelastrum	sp. (2)	CHLOR	×	colony	200	0.25	30		-			
1 417-3-South	99	centric diatom	sp. (D=15um)	BACIL	×	cell	200	0.25	30	-	-			
1 417-3-South	09	Oocystis	sp. (2)	CHLOR	×	colony	200	0.25	30		<b>—</b>			
1 417-3-South	90	Cosmarium	sb. (sm)	CHLOR	×	cell	200	0.25	99	÷	-			
1 417-3-South	90	branched filamentous chlorophr	hrsp.	CHLOR	×	filament	100	283.53	-	-	-			
1 417-3-South	92	Vaucheria	sb.	XANTH	×	filament	100	283.53	<del>-</del>		<del>-</del>			
1 417-3-South	99	Pandorina	morum	CHLOR	×	colony	5	283.53	÷	-	-			
1 417-3-South	90	Aulacoseira	sp.	BACIL	×	chain	100	283.53	<del>-</del>	<del>-</del>	<del>,</del>			24

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Ptox CYANO Units/mL	20 691																													14,312																									
CYANO Total Units/mL	33,640																													17,578																									
Species Units/mL	16.331	6.351	0.779	27,17	1.815	775	7,00	90.7	7.4	404	727	8 8	20	6	10	0														9,617	2,722	1,452	206	726	544	544	363	318	181	181	77														
Settling Vol. Dilution Factor (mL)	9	: =	0 0	2 €	2 ⊊	2 €	2 Ç	2 5	2 6	2 :	0 6	2 ;	9 :	9	10	0	10	10	10	10	9	0	<b>.</b>	2 :	₽	10	9	0 :	10	2	7	2	2	2	2	2	2	2	2	7	N (	7	7 0	7 (	7 0	. 7 0	7 (	4 6	12	2	2	2	7	7 0	2
	-	-		- •	- ,-						- •	= 1	-	-	-		+	<del>,     </del>	-	-	-				-	-	-	-	-	5	~	-	-	5	+	-	-	ς-	-	-,			- •	-		- •		- 1	-	-	-	-	-	- •	
# of Fields																																																	8 8					g -	- <del>-</del>
Field Area		0.0625	0.0825	30.0	0.0625	0.0020	20000	0.0025	30.00	0.20	0.25	283.53	283.53	283.53	283.53	283.53	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.25	0.25	0.25	283.53	283.53	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.25	0.0625	0.0625	283.53	0.0625	0.0625	0.0026	0.0025	0.0625	0.0025	0.0025	0.0625	0.0625	0.0625	0.25	0.25	303.53	283.53
Magnification	400	400	400	000	800	000	000	400	000	200	500	2 3	9	Ş	100	100	400	400	400	400	400	400	400	100	200	200	200	100	100	400	400	400	400	400	400	400	400	200	400	400	3 9	400	96,	004	400	400	100	400	400	400	400	200	200	700	100
# Counted Counting Unit Magnification (units)	les	filament	filament	mainent	Colone	colony	Colonia	filament	Florence	Tilament	colony	filament	colony	filament	filament	filament	cell	colony	cell	colony	lle3	colony	colony	lle3	cell	colony	colony	cell	cell	filament	cell	filament	colony	filament	colony	filament	filament	colony	colony	filament	colony	lle l	le l	lle Cell	colorily	cell	Cololly	3 2	leo	lleo	lleo	ell cell	lleo.	colony	colony
# Counted	9,		· cr	, Ç	<b>!</b> c	V 14	, ,	-11-0	- c	N.	- 0	ν.	7	-	•	-	×	×	×	×	×	×	×	×	×	×	×	×	×	63	15	00	ю	4	ന	ത	7	~	,_	;	-	×	×	××	×	××	< >	< >	×	×	×	×	×	××	××
Algal Group	CYANO	CYANO	CYANO	CIVEN		CNANO	ON ON	CYANO	CNANO	CTANO	CYANO	CTANO	CYANO	CYANO	CYANO	CYANO		CHLOR		CHLOR	CHLOR	CHLOR	SEC	EAC.	CHLOR	CHLOR	CHLOR	XANTH	CHLOR	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CTANO	0	F 15	555	ROJE O	555		XANTH	SELOR	BACIL	CHLOR	XANTH	E E	555	CHLOR
Species	.ds	· 5		on (a)	op. (III out)	obj. (ii)	apr. (am.)	(i) th	( ) i	sp. (c)	sp.	circinalismos-aquae (1)	sp. (large)	agardhii/mougeotii	sb. (3)	sp. (1)	.dds	quadricauda	.dds	hantzschii	sb	sb (B)	sp. (5)	sp. (U=/.5)	sb. (L=2/um)	gracillimum	sp. (12)	gracile	sp. (1)	agardhii/mougeotii	sp.	sp.(2)	sp. (sm)	circinalis/flos-aquae (2)	sp.(1)	limnetica	sp. (1)	sp. (med)	sb. (6)	sp. (3)	sp. (large)	.dds	arcuatum	spiralis	sp. (1)	Sp.	quadicada	mitica	SD.	sp. (D=10um)	contortum	gracile	setigera	acuminatus	morum
Genus	Microcystis unicell	l imnothrix/Pseudanahaena	Cyanonhyte filament	Memoring marrier	Anhangeage	Missesset colons	and organia colonia	example filament	Cyanophyte manient	Anabaena	Snowella	Anabaena	Microcystis colony	Planktothrix	Lyngbya	oscillatorian filament	unicell, sphere 2.5-5um	Scenedesmus	unicell, oval/rod 2.5-5um	Actinastrum			Scenedesmus				Scenedesmus	Isthmochloron	Clostenum	Planktothrix	Microcystis unicell	oscillatorian filament	Microcystis colony	Anabaena	Aphanocapsa							unicell, sphere 2.5-5um	Monoraphidium	Schroederia	Coeldstrum	chlorophyte single cell	Tetrandron	Goninchloris	cf. Ankistradesmus	centric diatom	Monoraphidium	Isthmochloron	Schroederia	Scenedesmus	Pandorina
Sampling Date	18	     15	   	3 8	Ì	ľ	Ĩ	1	Ê	9 3	8 8	     8	 8	8	Ī	I	09	Ĩ	I		Î	Ĭ	8 8	Î	Ĭ			99	0.9	ŀ				 8	1	Î	Ī	1	Ī	ā	8	Ī	Ī	S 8	Ĩ	8 8	1	Ī	99	l	Ì	1	Ĩ	Ĵ	90
Sample Description																																											13 41 /-2-North			13 41 /- 2-North					13 417-2-North				13 417-2-North

Sampling Date Genus Species	Species		Algal Group	# Counted	Algal Group # Counted Counting Unit Magnification	Magnification	Field Area	Field Area # of Fields	Settling Vol.	Settling Vol. Dilution Factor	Species	CYANO Total	Ptox CYANO
	197		0144700	(units)		66.7	(mmz)	ę.	(m)	,	Units/mL	Units/mL	Units/mL
Cyanophyte flament Sp. (6)	(a) ds		CYANO	[Q]	mament	004	0.0625	2 2			77.19	36,412	1,844
	(E) 05		CYANO	24.5	colony	400	0.0625	20	-		2.178		
Microcystis colony sp. (sm)	sp. (sm)		CYANO	5	colony	400	0.0625	20	~	~	1,179		
sb. (3)			CYANO	ග	filament	400	0.0625	90	-	<b>-</b>	817		
punctata			CYANO	<b>!</b> ~ □	colony	400	0.0625	20	- ,	- ,	635		
Microcystis unicell sp.	G		CYANO	ao ur	cell	400	0.0625	8 5			<b>946</b>		
Chronens			CYANO	o uc	colony	400	0.0625	20	-		454		
			CYANO	4	colony	400	0.0625	90	÷	-	363		
nowella	sb		CYANO	4	colony	400	0.0625	20	-	<del>-</del>	363		
ū.	sp. (4)		CYANO	ന	colony	400	0.0625	90	-	-	272		
	sb		CYANO	ന	filament	400	0.0625	95			272		
undulata			CYANO	ro u	filament	400	0.0625	S 6	,- <b>,</b>	<b></b>	272		
Microcystis colony sp. (med)	sp. (med)		CTANO	ი -	colony	200	0.00	<b>8</b> 6	- +		713 51		
			CVANO	- 1	Colony	) <b>(</b>	283 53	S <del>•</del>	- 🔻	- 🕶	, r		
Scenedesmis on (17)	Sp (17)		10 E	· >	colony	400	0.002	- 20		-			
	sb (L=50um)		BACIL	×	Cell	400	0.0625	20		÷			
phere 2.5-5um	das			×	les	400	0.0625	90	-	-			
	sp. (B)		CHLOR	×	colony	400	0.0625	50	-	-			
	sp. (L=25um)		BACIL	×	lleo	400	0.0625	20	-	-			
	cnoifera		CHLOR	×	colony	400	0.0625	90	_	ς-			
	sb. (sm)		CHLOR	×	cell	400	0.0625	20	-	-			
Scenedesmus sp. (10)	sp.(10)		SELS.	×	colony	400	0.0625	20	-	-			
	(2)		CHLOR	×	colony	400	0.0625	8 8	- ,	- ,			
mutica			XANIH	×	lle:	400	0.0625	90					
letrastrum heteracanthum	neteracanthum		SHICK SAME	×	colony	400	0.0626	90		-			
captortus	·			< >	5 8	400	0.0025	2 2	-				
sp.(2)			CHLOR	×	colony	400	0.0625	9	-	-			
caudatum			SHLOR	×	cell	400	0.0625	90	-	<b>.</b>			
Pediastrum boryanum	boryanum		SHLOR	×	colony	400	0.0625	20	-	-			
	Sp.		E E	×	colony	400	0.0625	DS 53	- ,	← •			
Scanadacmus sp. (12)	sp. (12)		ROLL S	<b>«</b> >	colony	907	0.0020	200					
Scenedesmus sn (29)	Sp (79)		S HO	< ×	colony	400	0.0625	20.00		-			
	quadricauda		CHLOR	×	colony	400	0.0625	90	,-	-			
	tetras		CHLOR	×	colony	400	0.0625	20	+	-			
	sb. (med)		CHLOR	×	lleo	400	0.0625	20	-	-			
	minimum		CHLOR	×	lle3	400	0.0625	20		-			
	circinale		F 6	×	lleo"	400	0.0625	20		- ,			
gle cell	Sp		5 5	×	cell	400	0.000	200					
Dicandatus			CHLOR	×	colony	900	0.0025	2 2	- ,				
s cf. gradiis		0.1	H G	×	lle .	400	0.0625	20	-				
Manage Sp. C		) (	HCH.	×	colony	400	0.0625	00	- ,	- •			
gilliniiii Gilliniiii	Contra	) (		K 3		100	0.0020	00 00					
	sp. (L=90um)		FOLIO PAGE	K D	ii ii	904	0.0020	00	- +	- •			
Silwo	sp. (L=20uiii)		E E	< >	Colony	2006	0.0020	20.00	- ,-	- ,-			
	magnus sp (large)			< >	cololly les	300	0.25	2 2					
	viridis		S E	< ×	colony	200	0.25	8 95					
Ε	sb. (L=60um)		BACIL	×	cell	200	0.25	99	-	· 🖵			
	sb		XANTH	×	cell	200	0.25	20	-	-			
Coelastrum sp. (1)	sp.(1)		SEG.	×	colony	200	0.25	20		<b>.</b>			
	Sp.	0.000	XANIH	×	cell	100	283.53	1	1.	1			

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Ptox CYANO Units/mL	2.681																																														
CYANO Total Units/ml																																															
Species Units/mL	2.540	1,179	206	77.1	726	181	136	136	136	136	91	45	45	45		_ 4		. 64	1 64	-																											
Settling Vol. Dilution Factor (mL)	-		-	-	<del>.</del> .	- •		-	-	-	-	← ;	. ,	- •				- 🕶	-	-	<b>-</b>	-	<b>.</b> ,	- ,	- ,		-	-	<b>-</b>	-			-		·	<b>.</b>		- •			-	<del>,</del>	-			-	-
Settling Vol.	5	2	2	2	C1 (	7 0	7 C	2	2	2	2	7	7 0	7 (	<b>V</b> 1 (	40	10	. 2	1 64	2	2	2	64.0	7 0	7 0	7 6	1 64	2	2	2	27	7 6	10	2	2	21	7.0	7 6	7 (	1 64	2	7	2	2 6	4 67	2	2
# of Fields	20	20	90	90	20	2 2	20 60	20	99	20	20	9 :	99	2 20	2 5	3 -	- •	•	-	-	90	20	9 :	2 2	2 2	2 5	99	20	20	20	20	20 20	8 6	200	20	9 :	20	2 2	2 5	9 9	99	90	20	2 2	⊰	-	-
	0.0625	0.0625	0.0625	0.0625	0.0625	0.0025	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.00	283.53	283.53	283.53	283.53	283.53	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0625	0.0025	0.0020	0.25	0.25	0.25	0.25	0.25	283.53	283.53	283.53
Magnification	400	400	400	400	400	400	400	400	400	400	400	400	400	400	9 8	101	3 5	9	ę	001	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	964	30,5	200	200	200	200	300	3 6	100	100
Igal Group # Counted Counting Unit Magnification (units)	filament	filament	colony	filament	filament	colony	colony	filament	colony	filament	colony	filament	filament	filament	filament	filament	filament	filament	filament	filament	cell	cell	ll cell	lle Co	colony		leo cell	leo	cell	colony	colony	a	la C	lleo	cell	colony	colony	colonly	colony	colony	cell	cell	cell	lla d	e e	filament	chain
# Counted (units)	26	26	20	17	<u>e</u> :	<u>o</u> =	t (1)	ന	ന	ന	7			- •		- 1-	- u	্ৰ	্ব	2	×	×	×	×	×	××	×	×	×	×	×	× ×	: ×	×	×	×	×	K )	× >	< ×	×	×	×	××	< ×	×	×
Algal Group	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CYANO	CTANO	CYANO	CYAND	CYANO	CYANO	CYANO		EUGL	CHLOR	SHOR SHORE	5 5	B AC	CHLOR	EUGL	BACIL	CHLOR	SHL9	CHLOX	CHIOR	CHLOR	BACIL	SH_SH	¥ 5	5 5	5 5	CHLOR	BACIL	XANTH	BACIL	ENGL BACI	유명	CHLOR	BACIL
Species	sp. (coiled)	so.(2)	sp. (3)	galeata	sp. (1)	Sp. (1)	Sp.(L=1.2um) punctata	limnetica	tenuissima	sp. (1)	sb. (sm)	sp. (1)	. ds	undulata	Sp. (E)	Sn (1)	sp. (1)	(G) (S)	sp. (6)	sp. (2)	spp.	sb. (L=30nm)	sb. (L=150um)	SD	VIIIIS	sp. (L=20um)	sp. (med)	sp. (L=20um)	sb. (=35um)	sp. (1)	quadricauda	cr. gradilis sn (D=10 im)	anffithii	contortum	sb. (L=30nm)	magnus	Sp. (10)	sp. (0)	sp. (sm) mornim	Sp. (2)	sp. (D=10um)	cf. mutica	sb. (D=20nm)	Sp.	sp. (L-30m.,, sp. (large)	Sps.	italica
Genus	cf. Cylindrospermopsis	oscillatorian filament	Aphanocapsa	Pseudanabaena	oscillatorian filament	Aphanocapsa	Merismopedia	Pseudanabaena	Menismopedia	Pseudanabaena	Microcystis colony	cyanophyte filament	cyano-pseudo filament	Flankfolyngbya	Anabaena	Lynchya	Cyngoyd Cyanonhute filament	Anabaena	Anabaena	Oscillatorian filament	unicell, sphere 2.5-5um	Phacus	Closterium	chlorophyte single cell	Hakatothrix	pennate diatom Nitzschia	Cosmarium	Phacus	Nitzschia	Kirchneriella	Scenedesmus	Ankistrodesmus unknowm flanellate	Monoraphidium	Monoraphidium	Nitzschia	Scenedesmus	Scenedesmus	Champing colony	Custriarium	Coelastrum	centric diatom	Goniochloris	centric diatom	Trachelomonas	Cosmarium	Mougoetia	Aulacoseira
Sampling Date	8	99			Î	8 8	88	90	90	Ī	8   	8 8	ľ	S &		Ĩ	Ī	8		90		Ī	1	Ī	Ī	_ S &	F	İ	09	- 90	90	Î	I		I		9 %	Ĭ	1	ľ			1	1	į,	98	90
Sample	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio I @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1@ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horado 1 @ Well	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1@ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	15 Horatio 1 @ Weir	Horatio 1	Horatio	Horatio	15 Horatio 1 @ Weir 15 Horatio 1 @ Weir	Horatio 1	Horatio 1	Horatio 1	Horatio 1	Horatio 1	15 Horatio I @ Weir 15 Horatio I @ Weir	Horatio 1		Horatio 1	Horatio 1	15 Horatio 1 @ Weir	Horatio 1		Horatio 1	Horatio 1	Horatio 1	Horatio 1	15 Horatio 1@ Weir 15 Horatio 1@ Weir	Horatio 1	Horatio 1	Horatio 1

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Sample	Sampling Date	Genus	Species	Algal Group #	Counted Co	unting Unit Ma	gnification	ea	# of Fields S	ettling Vol. D	ilution Factor	Species	CYANO Total	Ptox CYANO
Description					(nuits)			(mm2)		(mL)		Units/mL	Units/mL	Units/mL
6 Horatio 2 @ Weir		Aphanocapsa	sp. (1)		9	6 colony 400	400	0.0625		ന	-	181	613	00
6 Horatio 2 @ Weir		Aphanocapsa	sp. (4)		60	colony	400	0.0625		m	-	91		
6 Horatio 2 @ Weir	90	Oyanofilamnet	sb (X)		=	#N/A	200	0.25		m	-	83		
6 Horatio 2 @ Weir	90	Aphanocapsa	sp. (3)	CYANO	2	colony	400	0.0625		ന	£	09		
6 Horatio 2 @ Weir	ĺ	Chroococcus	ds	CYANO	-	colony	400	0.0625		ന	<b>,</b>	30		
6 Horatio 2 @ Weir	09	coiled cyanophyte	sp. (1)	CYANO	_	filament	400	0.0625		m	-	30		
6 Horatio 2 @ Weir	1	cyanophyte single cell	sb. (long)	CYANO	-	cell	400	0.0625	20	ന	-	30		
6 Horatio 2@ Weir	ĺ	cyanophyte filament	sb. (3)	CYANO		filament	400	0.0625	90	ന	-	30		
6 Horatio 2@ Weir	90	Aphanocapsa	sb. (6)	CYANO	_	colony	400	0.0625	90	ന	-	30		
6 Horatio 2 @ Weir		Oscillatorian filament	sp. (1)	CYANO	m	filament	200	0.25	20	ന	-	23		
6 Horatio 2 @ Weir		Pseudanabaena	galeata	CYANO	2	filament	200	0.25	20	ന	-	15		
6 Horatio 2 @ Weir		Planktothrix	agardhii/mougeotii	CYANO	_	filament	200	0.25	20	ო	-	<b>6</b> 0		
6 Horatio 2 @ Weir	  8	Microcystis colony	sp. (sm)	CYANO	_	colony	100	283.53	-	က	-	0		
6 Horatio 2 @ Weir	ļ	unicell, sphere 2.5-5um	.dds		×	cell	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	I	chlorophyte colony	sb. (B)	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	1	Pandorina	morum	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	Ī	Ankistradesmus	cf. gracilis	CHLOR	×	cell	400	0.0625	20	ന	-			
6 Horatio 2@ Weir	1	Closteriopsis	.ds	CHLOR	×	cell	400	0.0625	90	m	-			
6 Horatio 2@ Weir		Monoraphidium	contactum	CHLOR	×	cell	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	ĺ	Dictyosphaerium	sp. (1)	CHLOR	×	colony	400	0.0625	20	ന	<b>-</b>			
6 Horatio 2 @ Weir	1	Scenedesmus	sp. (12)	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	99	chlorophyte single cell	.ds	CHLOR	×	cell	400	0.0625	90	ന	-			
6 Horatio 2@ Weir	ĺ	Nitzschia	sp. (L=40um)	BACIL	×	cell	400	0.0625	90	ന				
6 Horatio 2 @ Weir	Ì	Monoraphidium	griffithii	CHLOR	×	cell	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	90	Centritractus	sb.	XANTH	×	cell	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir		Scenedesmus	quadricauda	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2@ Weir	I	centric diatom	sp. (D=10um)	BACIL	×	cell	400	0.0625	90	m	-			
6 Horatio 2@ Weir	1	Eudorina	sp. (1)	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	Ĭ	Micractinium	.ds	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	I	Ganiachlaris	cf. fallax	XANTH	×	cell	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	1	pennate diatom	sb. (L=37um)	BACIL	×	cell	400	0.0625	20	m	-			
6 Horatio 2 @ Weir	Ī	Phacus/Leponinclis	sb	EUGL	×	cell	400	0.0625	20	ന	<b>-</b>			
6 Horatio 2 @ Weir	I	Monoraphidium	arcuatum	SELOR	×	cell	400	0.0625	20	ന	÷			
6 Horatio 2@ Weir		unknowm flagellate	sp.		×	cell	400	0.0625	20	ന	-			
6 Horatio 2 @ Weir	ĺ	Monoraphidium	minutum	CHLOR	×	cell	400	0.0625	20	ന	<b>-</b>			
6 Horatio 2 @ Weir	I	Monoraphidium	circinale	CHLOR	×	cell	400	0.0625	90	m	-			
6 Horatio 2 @ Weir	1	Scenedesmus	sp. (10)	CHLOR	×	colony	400	0.0625	20	ന	-			
6 Horatio 2@ Weir	ĺ	Tetraedron	minimum	CHLOR	×	cell	400	0.0625	20	ന	_			
6 Horatio 2@ Weir		Schroederia	spiralis	CHLOR	×	cell	400	0.0625	20	ന	÷			
6 Horatio 2@ Weir		Scenedesmus	sb. (30)	CHLOR	×	colony	200	0.25	20	ന	-			
6 Horatio 2 @ Weir	Ī	Trachelomonas	ds	EUGL	×	cell	200	0.25	20	m	<del>-</del>			
6 Horatio 2@ Weir	09	Closteriopsis	.ds	CHLOR	×	cell	100	283.53	-	ന	-			
6 Horatio 2 @ Weir	25	Oocystis	sb. (3)	CHLOR	×	colony	100	283.53	_	ന	-			34

Sample	Sampling Date Genus	Genus	Species	Algal Group	# Counted	Igal Group # Counted Counting Unit Magnification	Magnification	-	Field Area # of Fields	Settling Vol.	Settling Vol. Dilution Factor	Species	CYANO Total	Ptox CYANO
Description					(nuits)			(mm2)		(mL)		Units/mL	Units/mL	Units/mL
Student Union	90	Aphanocapsa	sp. (1)	CYANO	19	colony	400	0.0625	90	m	+	1,845	3,450	88
Student Union	09	coiled cyanophyte	Sp. (1)	CYANO	16	filament	400	0.0625	20	ന		484		
Student Union	99	Aphanocapsa	Sp. (3)	CYANO	÷	colony	400	0.0625	50	m		333		
Shident I Inion	1 50	Anhanocansa	Sn (4)	CYANO	~	vuluu	400	0.0825	20	er.	÷	212		
Student Union	88	Aphanothece	Sp. (2)	CYANO	ယ	colony	400	0.0625	99	m		181		
Student Union	89	unknown cyanophyte filament	4 Sp.	CYANO	ന	filament	400	0.0625	20	m		91		
Student Union	1 5	Anhanncansa	(J) us	CYAND	cc	colony	400	0.0825	9	e cr	-	. 6		
Student Union	89	of Nodularia	Sp	CYANO	. 60	filament	200	0.25	1 95	m	-	45		
Student Union	09	Planktothrix	SD.(1)	CYANO	ഹ	filament	200	0.25	20	ന	-	8		
Student Union	18	Planktothrix	agardhii/mougeofii	CYANO	- 140	filament	200	0.25	20	m	5	8		
Student Union	9	Pseudanapaena	limnetica	CYAND		filament	400	0.0625	9	i er	-	: E		
Shident Union	9	Merismonedia	nunctata	CYANO	•	colony	400	0.0625	20	er.	-	1 6		
Student Union	8	Oscillatorian filament	(2)	CYANO		filament	400	0.0825	: 5:	ı cr		: E		
Student Union	   	Calothrix	(z) ds	CYANO	- NE	filament	101	283 53	; -	o cr	-	2		
Shident Union	1 50	Oscillatorian filament	81 (2)	CYANO	6	flament	100	283.53	+	cr.	-			
Shident I Inion	1 50	Fireframulis	î F	E E	· >-	valua	400	0.0825	50	, co				
Shident Union	5	Monoraphidium	arcuatum	등등	. ×	la d	400	0.0625	105	ı cr	-			
Student Union	8 8	unical sphere 7.5 5 mm	das	5	( >	9 9	700	0.0825	2 2	o (**				
omnelli ollini	3 8	dificall, spirate 2.0-0dill	Spip.	0 0 0	<		005	0.0020	3 6	<b>5</b> (				
Student Union	99	Kirchnenella	sp.(2)	35	×	colony	400	0.0625	3		-			
Student Union	89	Urosolenia	ds	BACIL	×	lleo	400	0.0625	20	m	-			
Student Union	90	Monoraphidium	gniffithii	SHLOR	×	cell	400	0.0625	90	m	-			
Student Union	99	Scenedesmus	quadricauda	SHLOR	×	colony	400	0.0625	95	ന				
Student Union	02	centric diatom	sb. (D=5um)	BACIL	×	lleo	400	0.0625	20	ന	-			
Student Union	99	Monoraphidium	minutum	SELOR	×	lleo	400	0.0625	99	m	-			
Student Union	92	Monoraphidium	contortum	CHLOR	×	lleo	400	0.0625	99	ന	-			
Student Union	90	pennate diatom	sp. (L=15um)	BACIL	×	lleo	400	0.0625	90	ന	-			
Student Union	90	chlorophyte colony	Sp (A)	CHLOR	×	colony	400	0.0625	20	ന	-			
Student Union	09	pennate diatom	sp. (L=25um)	BACIL	×	cell	400	0.0625	90	ന	-			
Student Union	0.5	Kirchneriella	sp. (1)	CHLOR	×	colony	400	0.0625	90	ന	-			
Student Union	09	Closterium	acutum var. variabile	CHLOR	×	lleo	200	0.25	90	က	÷			
Student Union	90	Oocystis	sp. (3)	CHLOR	×	colony	200	0.25	99	m	+			
Student Union	90	Planctonema	Sp	CHLOR	×	filament	200	0.25	20	က	-			
Student Union	90	Ankistrodesmus	cf. gradiis	CHLOR	×	lleo	200	0.25	90	m	-			
Student Union	90	pennate diatom	sb. (L=50um)	BACIL	×	lleo	200	0.25	99	က	+			
Student Union	09	Ankistrodesmus	fusiformis	CHLOR	×	lleo	200	0.25	90	m	-			
Student Union	05	Phacus/Leponinclis	Sp.	EUGL	×	lleo	200	0.25	90	ന	-			
Student Union	92	Mougoetia	SD	CHLOR	×	filament	100	283.53	-	ന	-			
Student Union	90	pennate diatom	sp. (L=100um)	BACIL	×	cell	100	283.53	-	ന	-			
Student Union	99	Scenedesmus	sp. (12)	CHLOR	×	colony	100	283.53	-	ന	-			
Student Union	90	Staurastrum	sp. (large)	CHLOR	×	lleo	100	283.53	-	m	-			
Student Union	90	Coelastrum	sp. (1)	CHLOR	×	colony	100	283.53	<b>-</b>	ო	-			
Student Union	90	Ceratium	hirundinella	DINOP	×	cell	100	283.53	÷	m	-			
Student Union	90	Pediastrum	duplex	CHLOR	×	colony	100	283.53	+	ന	-			
Student Union	99	Strombomonas	as	EUGL	×	Cell	100	283.53	•	m	•			

## LIST OF REFERENCES

- Dyer, Riddle, Mills & Precourt, Inc., Packed Bed Filter. Florida Department of Environmental Protection, May, 1995.
- Harper H. H., Stormwater Loading Rate Parameters For Central And South Florida. Environmental Research & Design, Inc. October, 1994.
- Harper H. H., and Miracle, D. Treatment Efficiencies of Detention with Filtration Systems. Proceedings of the 3<sup>rd</sup> Biennial Stormwater Research Conference, Tampa. FL. October, 1993.
- HSSI, Horizontal Subsurface Systems, Inc., personal communication with Don Justice at 239-229-3649, Cape Coral Florida.
- Livingston, E., E. McCarron, J. Cox, and P. Sanzone. Florida Development Florida Development Manual, A guide to Sound Land and Water management. Florida Department of Environmental Regulation, Tallahassee, Fl. 1988.
- Miller, M.J., Critchley, M.M., Hutson, J., and Fallowfield, H.J., The adsorption of cyanobacterial hepatotoxins from water onto soil during batch experiments: Water Research, v. 35, no. 6, p. 1461-1468. 2001.
- Nnadi, F.N., K.W. Ashe, and R.C. Sharek. Design and Performance of Dry Detention Ponds with Underdrain Systems. State Department of Transportation, Nov. 1997.
- O'Reilly, A., and M. Wanielista. Transport of the Cyanotoxin Microcystin in Groundwater Beneath Stormwater Ponds. Poster Paper, FDOH and CDC Symposium on Public Health Cyanotoxin Symposium, Sarasota Florida, September 28-29, 2006.
- Rushton B. T., Hastings R. A Treatment Train Approach to Stormwater Management. Southwest Florida Water Management District. December, 2001.
- Rushton B. Stormwater Research, Summary of Research Projects, 1989-2002. Southwest Florida Water Management District, 2002.
- Wanielista, M. Design and Operation of a Detention Pond with Underdrain Filters At Park Lane, Kissimmee, Florida, Report to the South Florida Water Management District, 1986.
- Wanielista M., Charba J., Dietz J., Lott R.S., and Russell B., Evaluation of the Stormwater Treatment Facilities at the Lake Angel Detention Pond Orange County, Florida. Florida Department of Transportation, FL-ER-49-91, 1991.

- Wanielista M. and Gennaro R. and Bell J.M. and Johnson J.W. with Fagan R. Barker S., Calabrese M., Geddes P., Lovelace V., Breeze B and Allen Mary Shallow-Water Roadside Ditches for Stormwater Purification. Florida Department of Transportation, March, 1978
- Wanielista M., Y. Yousef, G. Harper, T. Lineback, and L. Dansereau, Section 2, Design Curves for the Reuse of Stormwater. State Department of Environmental Protection, 1991.
- Wanielista, M., and J. N. Bradner, Project SMART: Maintaining the Balance, University of Central Florida, December, 1992.
- Wanielista, M., and Y. Yousef. Stormwater Management, John Wiley and Sons. 1993.
- Wanielista, M.; Kersten, R; Eaglin, R., *Hydrology: Water Quantity and Quality Control.* Pages 7, 8, 314-315. John Wiley & Sons, 1997.
- Water Reuse Work Group, Water Reuse for Florida: Strategies for Effective Use of Reclaimed Water, Water Conservation Initiative, Draft 6: FDEP, et.al., pages 135-145, April 15, 2003.