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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:

1. 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.

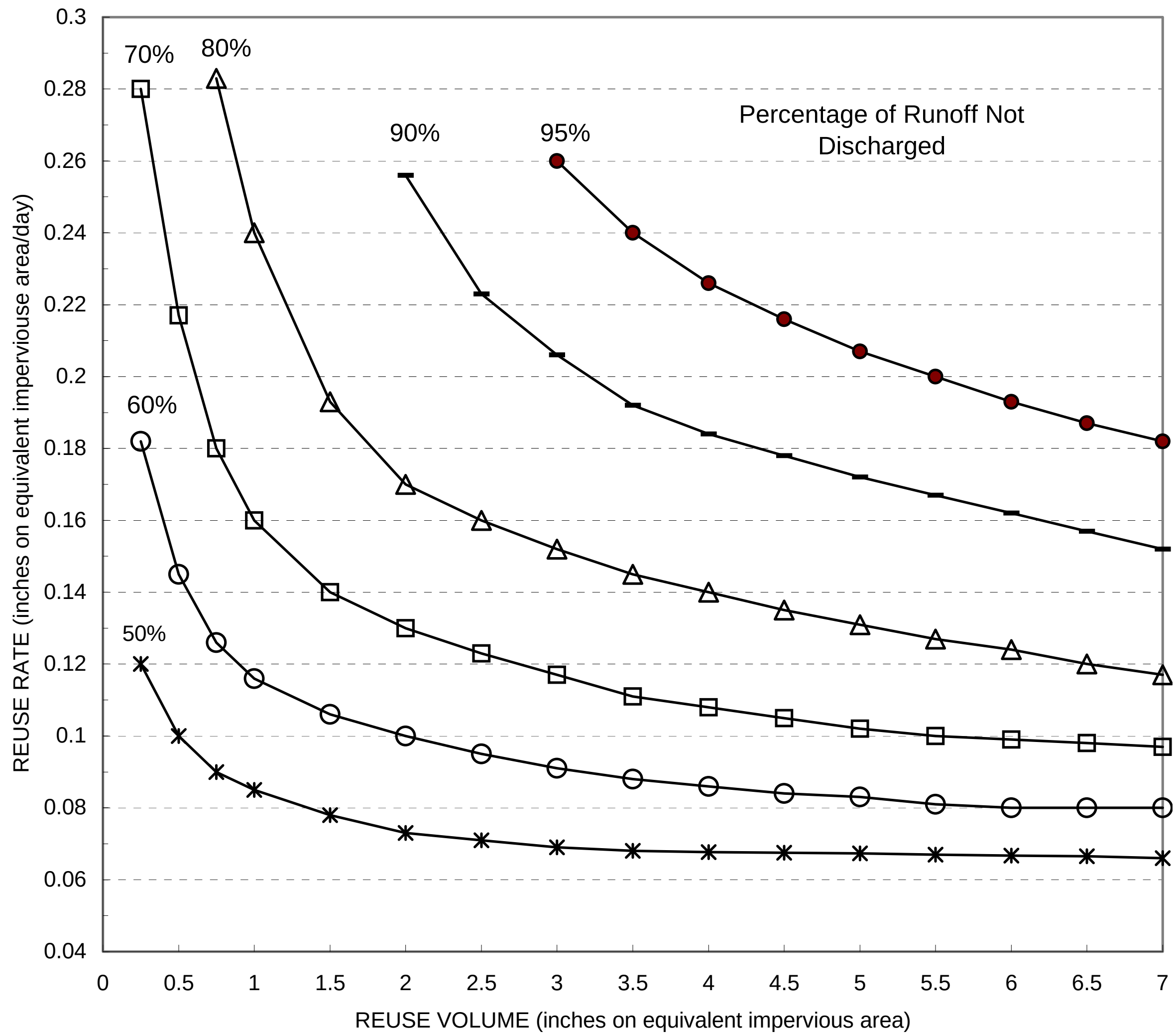


Figure 1: Reuse Curve for Designing a Reuse Volume and Irrigation Rate for Central Florida (From Wanielista, Yousef, et.al, 1991)

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.

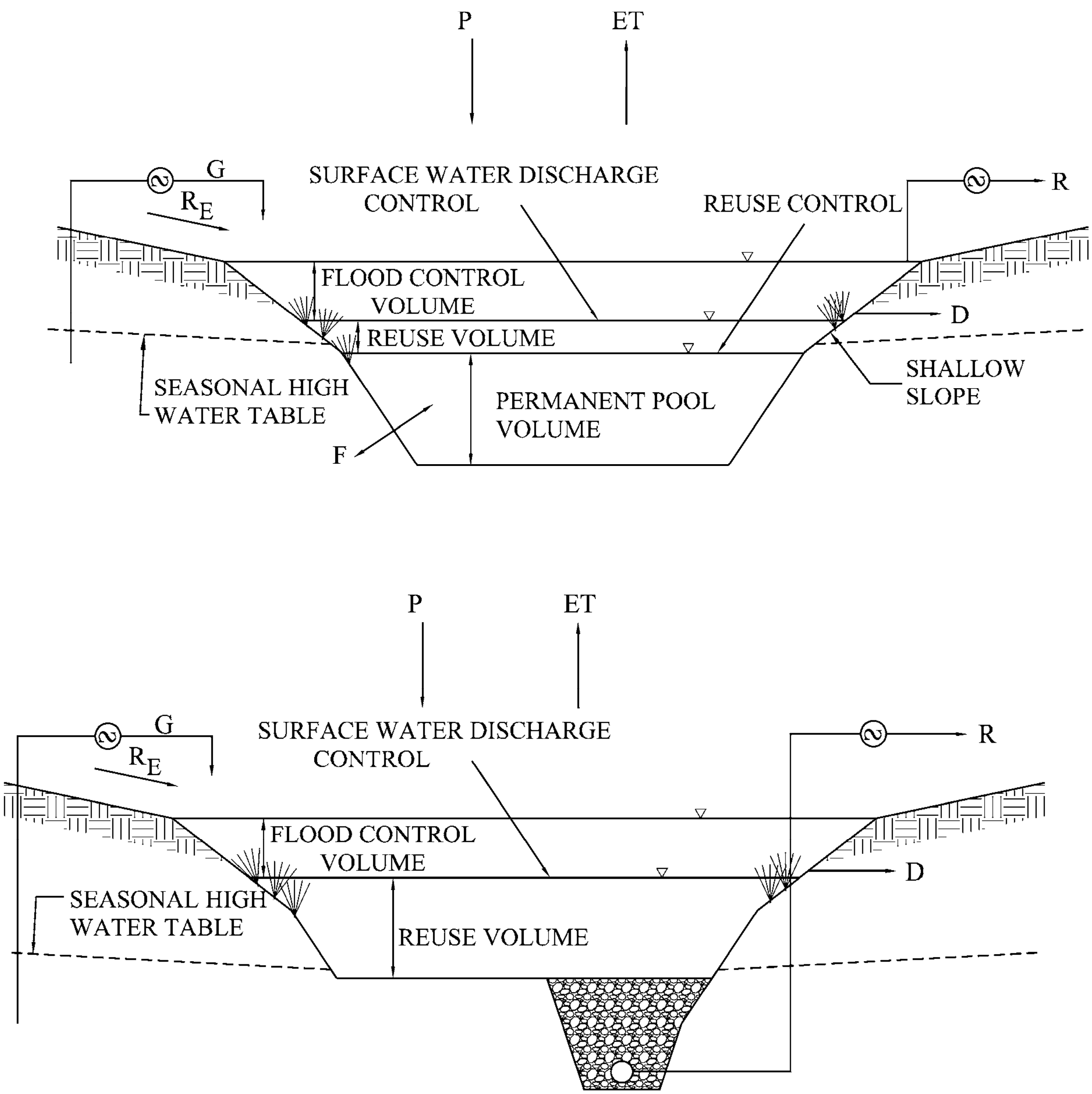


Figure 2: Schematics of Stormwater Ponds with Irrigation System Equipment

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
10 NB, 1 mile north of Narcoossee Road

Urban Roadways

11 University Boulevard and Hall Road
12 University Boulevard and S.R. 417, NW corner
13 Horatio Avenue and Via Tuscany No. 1
14 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 Description	**Total CYANO Units/mL**	**PTOX CYANO Units/mL**	**Sample Description**	**Total CYANO Units/mL**	**PTOX CYANO 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**			

* 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 $CaCO_3$ 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.

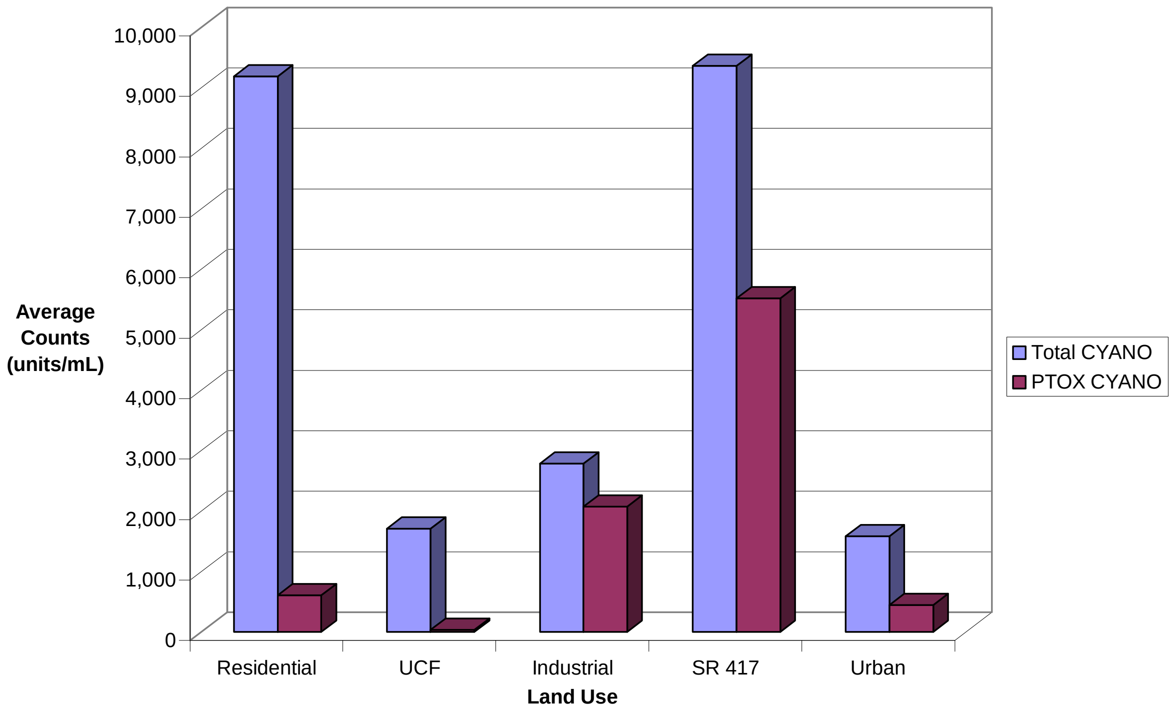


Figure 3: Comparison of Total and PTOX Cyanobacteria Average Counts vs. Land Use

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 Description	Sampling Date	Total CYANO Units/mL	PTOX 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 Florida 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**

* not included in statistical analyses

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

		Total CYANO	PTOX 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 CYANO**	**PTOX 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

1) The pond water total cyanobacteria counts are significantly different from the filtrate cyanobacteria counts at the 75% level of significance.
2) The potentially toxic cyanobacteria counts are significantly different from the filtrate potentially toxic counts at the 85% level of significance

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.

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

Sample Description	Sampling Date	Total CYANO Units/mL	PTOX CYANO 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 Central 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 CYANO	PTOX 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
note: n1+n2=		17	17

thus use t statistic

t Statistic	Total CYANO	PTOX 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

		Total CYANO	**PTOX 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 CYANO**	**PTOX 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.

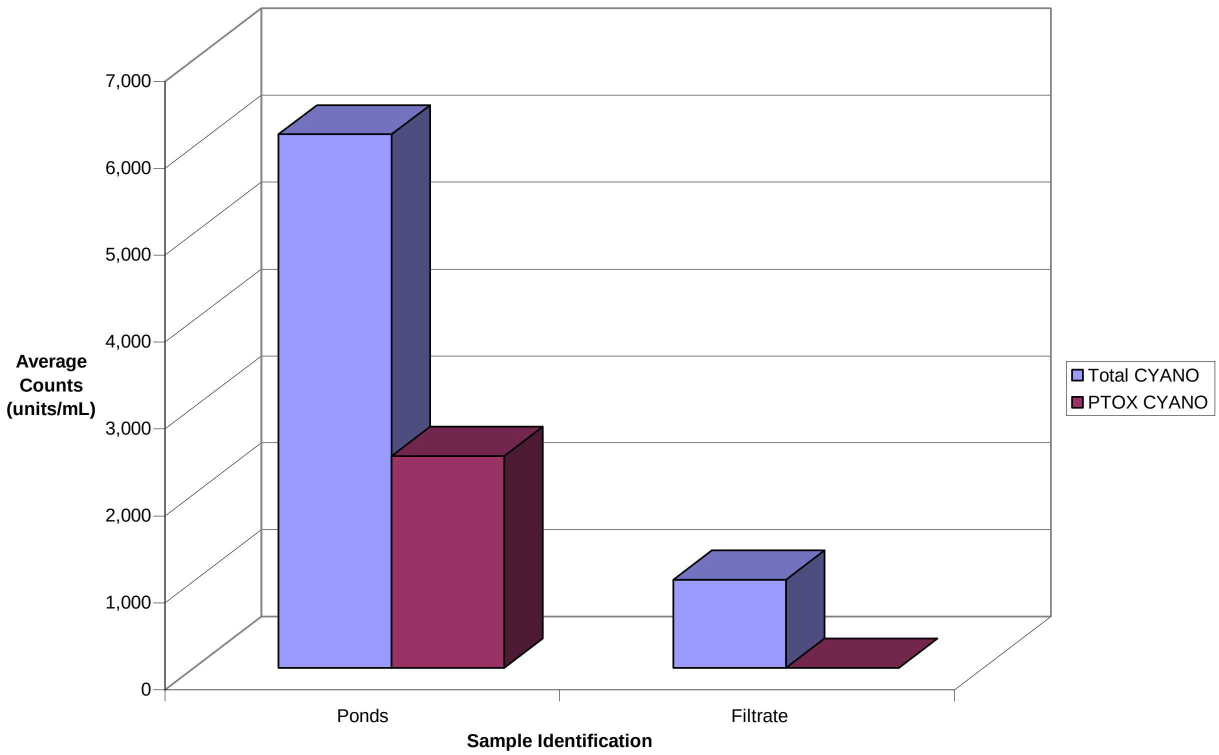


Figure 4: Pond vs. Filtrate Cyanobacteria Comparisons Using Combined Data

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.

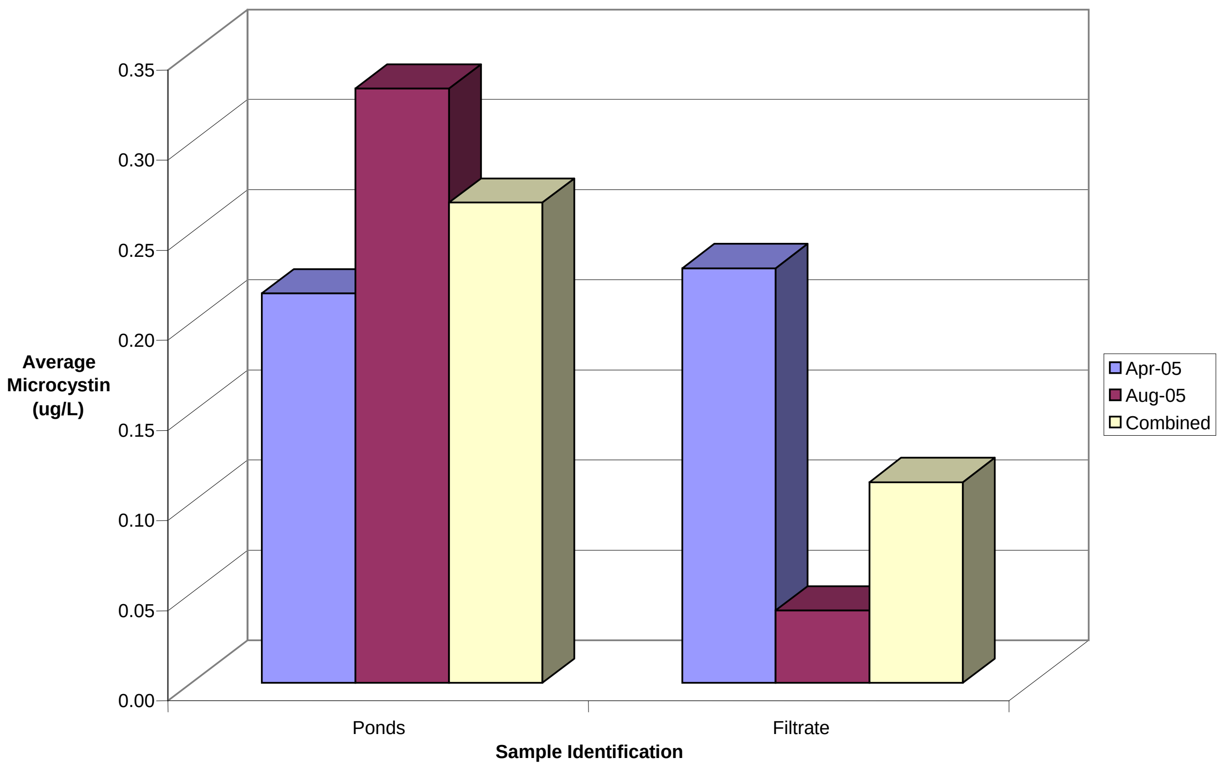


Figure 5: Ponds vs. Filtrate Microcystin Data

Table 7: Microcystin Concentrations for April 2005

ELISA Method Sampled in April 2005

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

Quantification limit = 0.04 µg/L
No dilution ratio necessary

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

Sample ID	Dilution Ratio	Final Conc. Factor	Assay Value (ug/L)	Standard Recovery (%)	Corrected Spike Recovery (%)	Final 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
	0	1x	0.02	102	98	< 0.04		

Quantification limit = 0.04 µg/L

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

Single Sample Run Date of April 2005

Null Hypothesis: Xbar 1 > Xbar2 (0ne 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

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%

not a significant difference

Single Sample Run Date of August 2005

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

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+n2=		17

t Statistic	Toxin
X1bar-X2bar	0.290
(n1-1)*S1^2	2.970
(n2-1)*S2^2	0.000
n1+n2-2	15
(1/n1+1/n2)	0.283
SQRT	0.237
t	1.223
significant difference	~88%

Combined Sampling Data

Null Hypothesis: Xbar 1 > Xbar2 (0ne 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
	S1^2/n1	0.005
	S2^2/n2	0.002
	SQT RT	0.081
	Z	1.91
	level of confidence	>97%

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

* Average Depth
** Surface Area Multiplied by Average Depth
*** Based on 2% of the Watershed used for Pond Area

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.

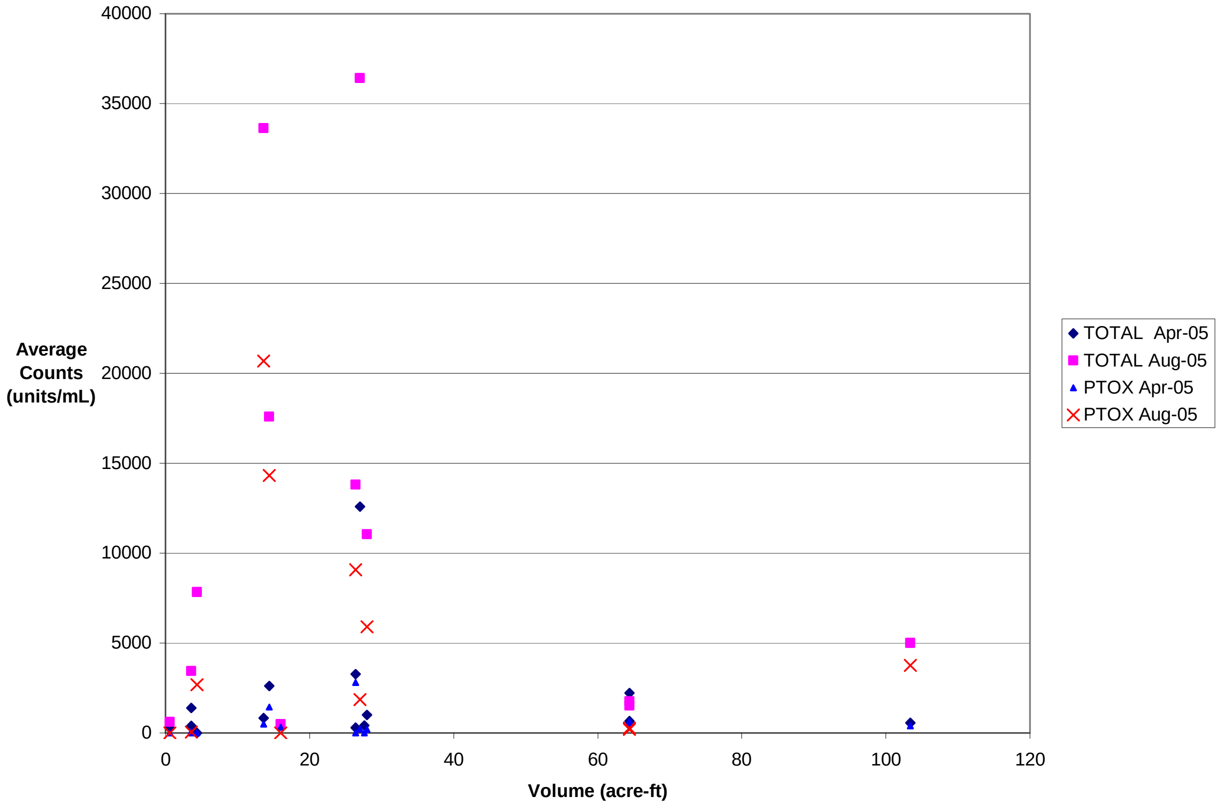


Figure 6: Pond Volume vs. Total and PTOX Counts

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

	Approx Volume (acre-ft)	Total CYANO 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 Volume (acre-ft)	PTOX CYANO 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

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.

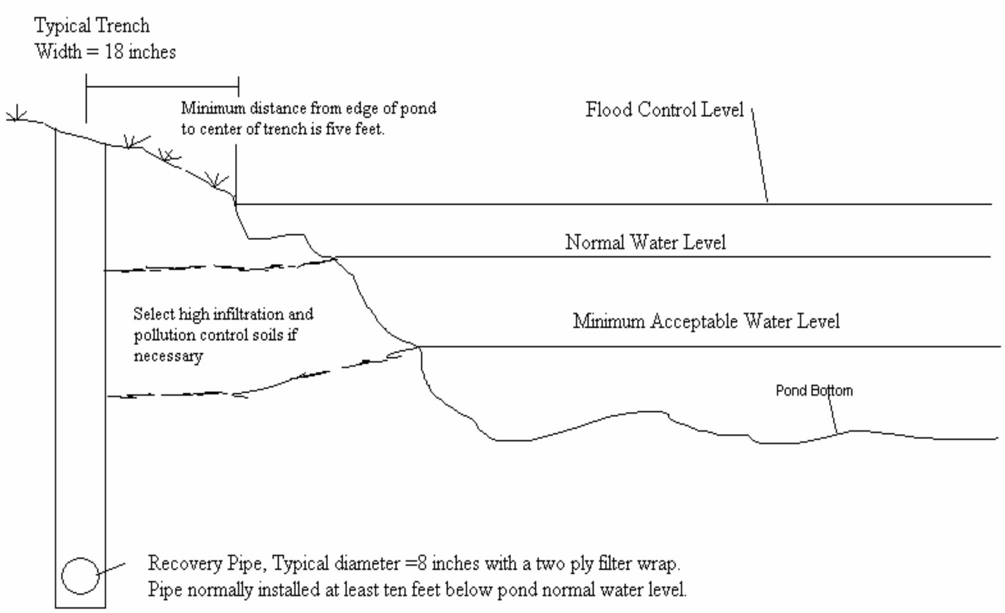


Figure 7: Horizontal Well Construction Details.

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.

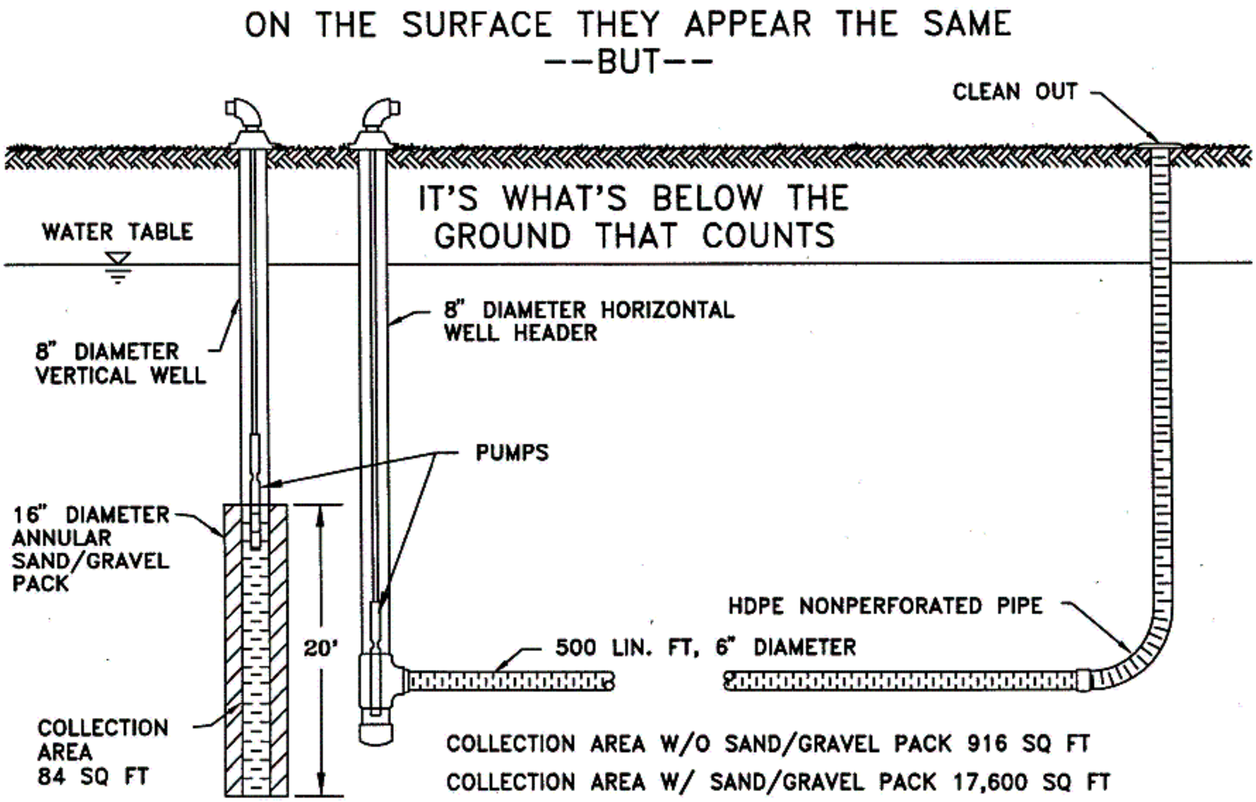


Figure 8: Horizontal Well Section and Comparison to a Vertical Well

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

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.

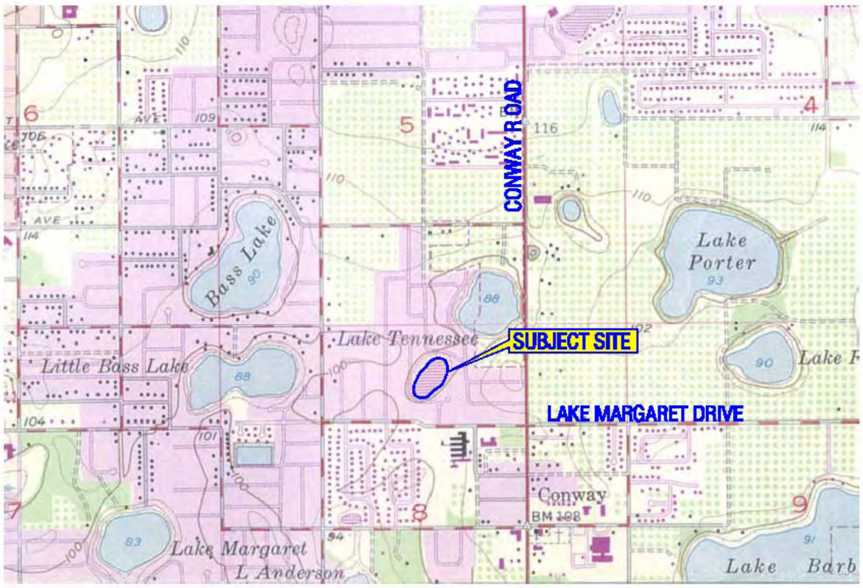
6.3 Recommendations

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.

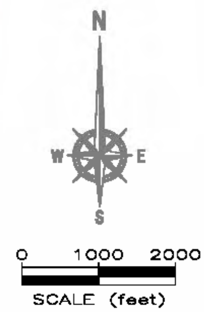
The use of regional stormwater ponds with horizontal wells should be considered to meet stormwater pollution control standards and to help reduce dependency on potable water for irrigation supply. Construction details for horizontal wells are shown in Figure 7 and are recommended for use with established 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.

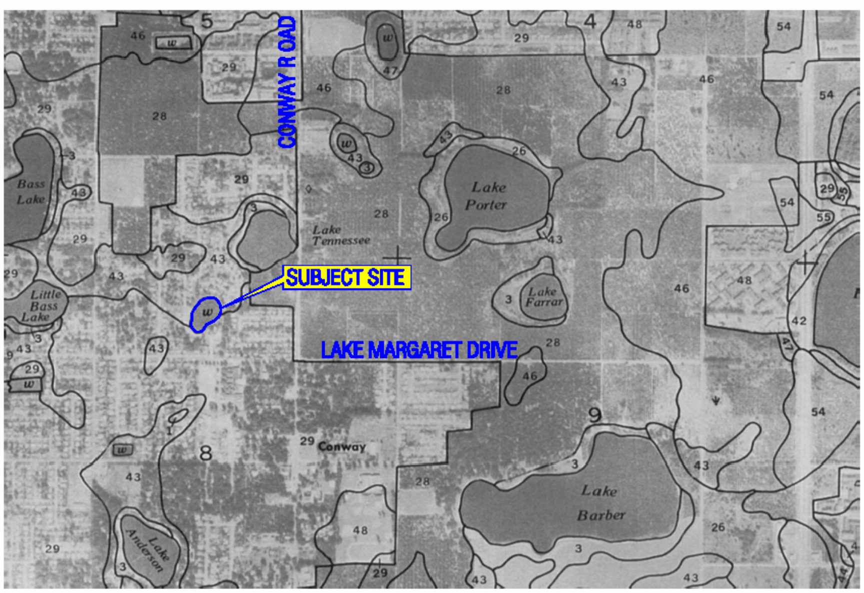
APPENDIX A: USGS QUADRANGLE and SCS SOIL SURVEY MAPS



EVALUATION OF TOXIC CYANOBACTERIA IN CENTRAL FLORIDA STORMWATER PONDS

PREPARED FROM:
USGS ORLANDO EAST, FLA. QUADRANGLE MAP
ISSUED 1956
PHOTOREVISED 1980
SECTION: 8
TOWNSHIP: 23 SOUTH
RANGE: 30 EAST





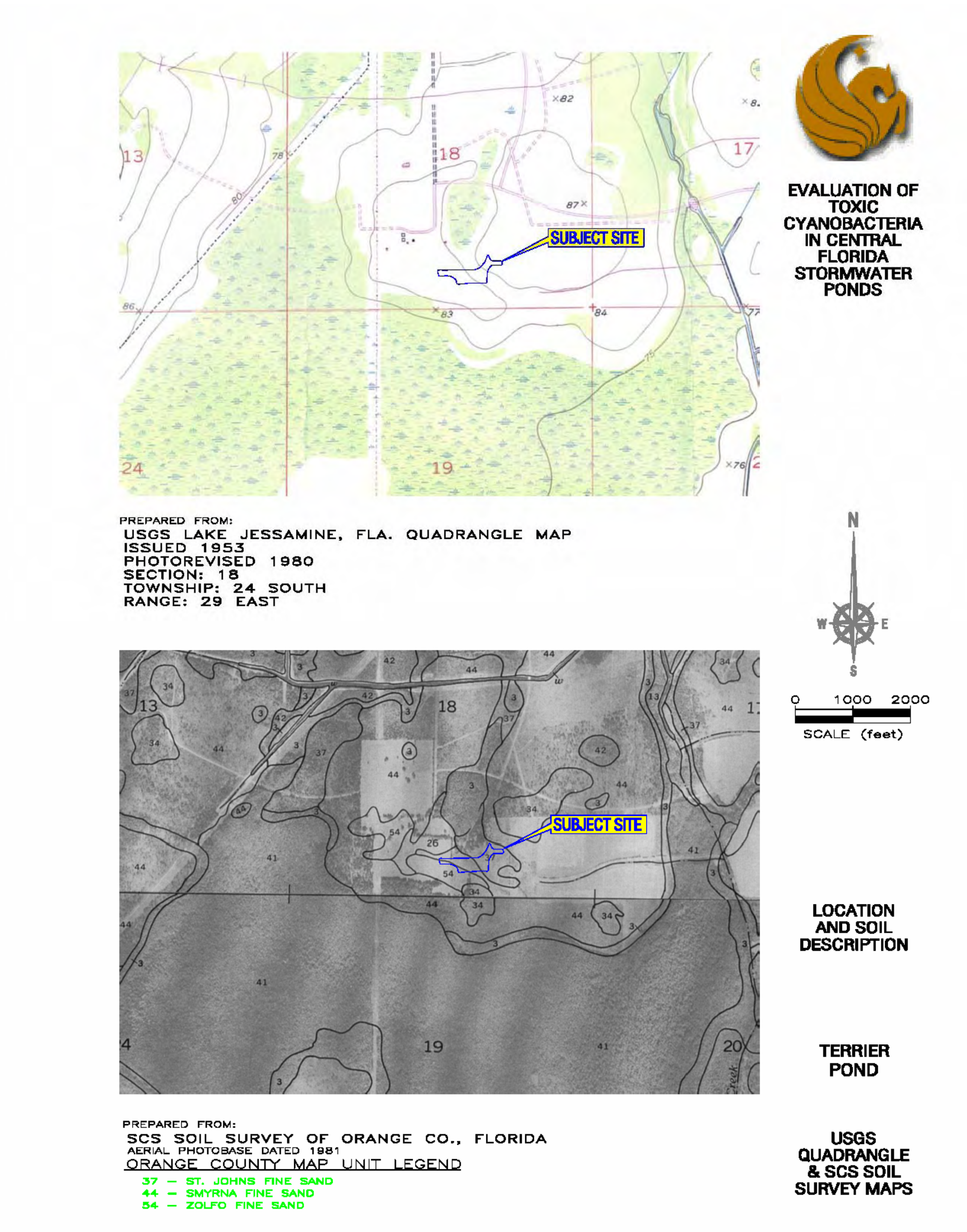
LOCATION AND SOIL DESCRIPTION

LAKE CONDEL

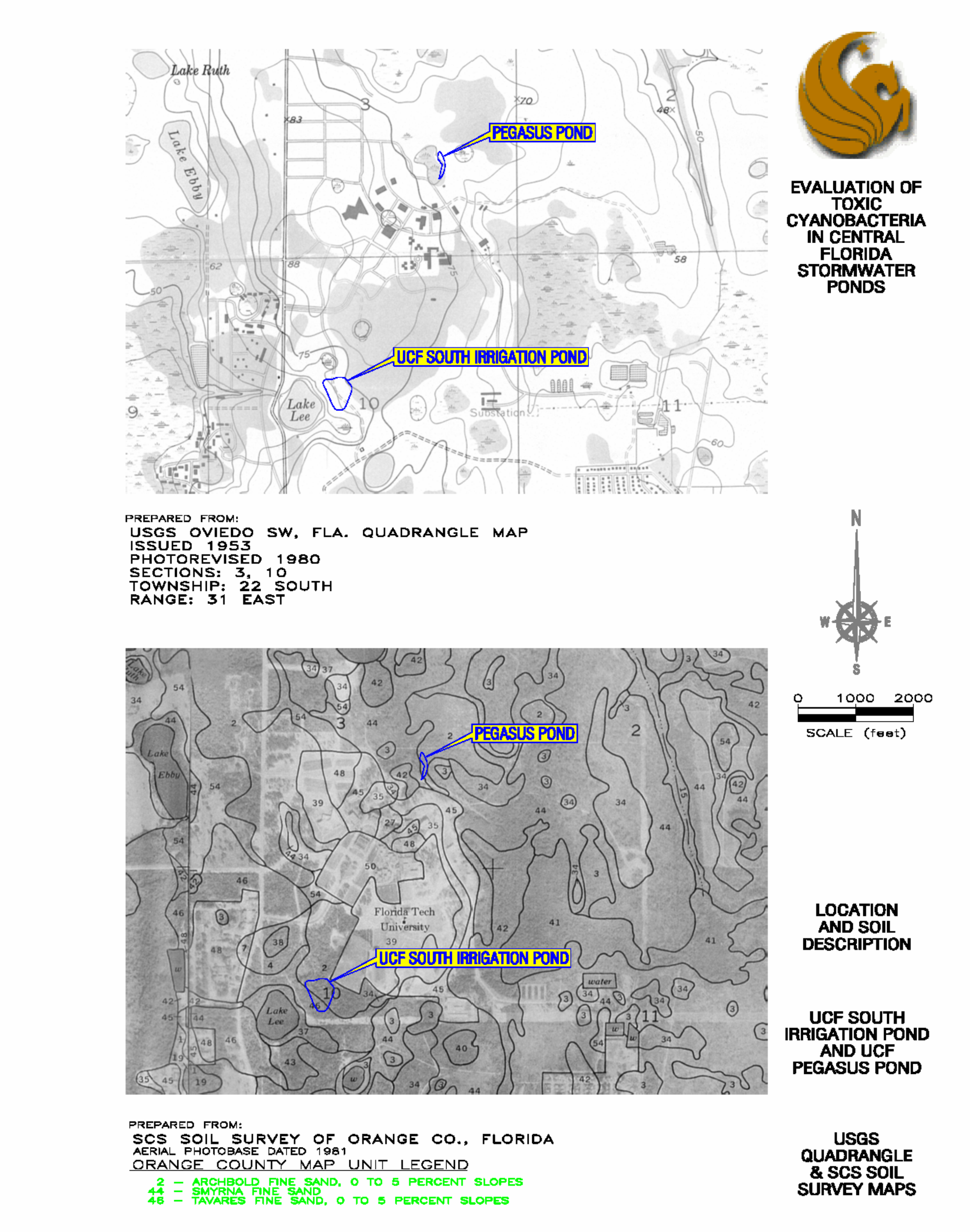
PREPARED FROM:
SCS SOIL SURVEY OF ORANGE CO., FLORIDA
AERIAL PHOTOBASE DATED 1981
ORANGE COUNTY MAP UNIT LEGEND
W – WATER

USGS QUADRANGLE & SCS SOIL SURVEY MAPS

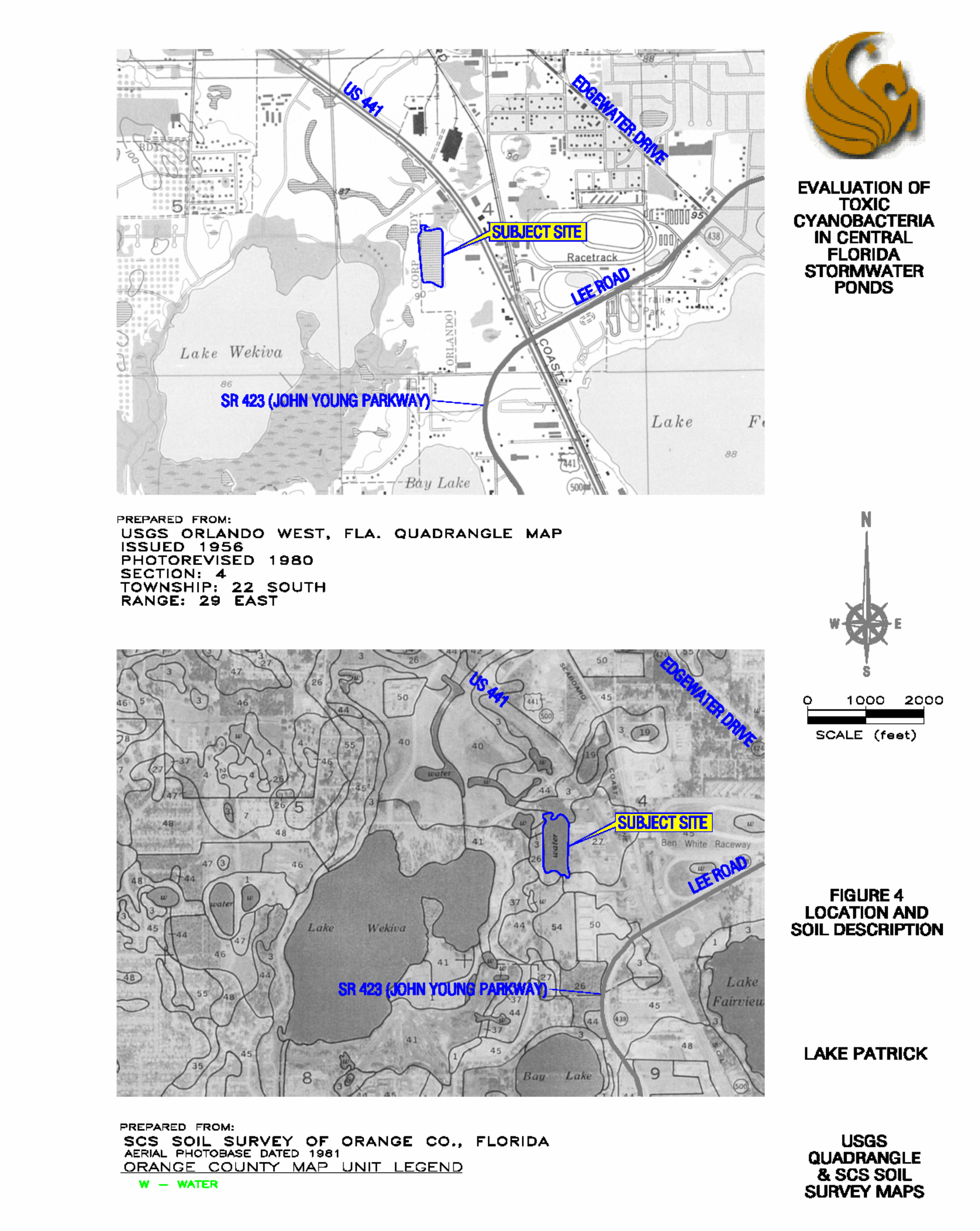
Lake Condel: Location and Soil Description



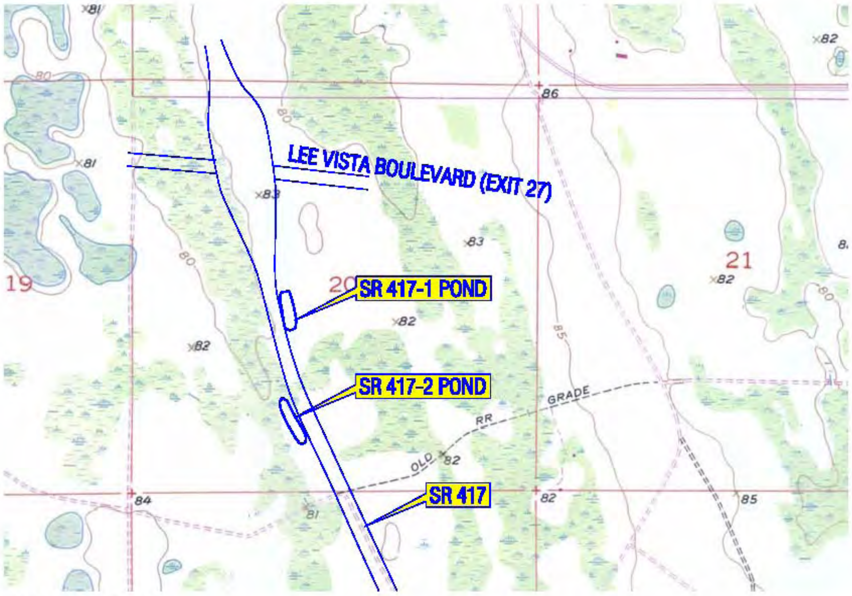
Terrier Pond: Location and Soil Description



UCF South Irrigation and Pegasus Ponds: Location and Soil Description

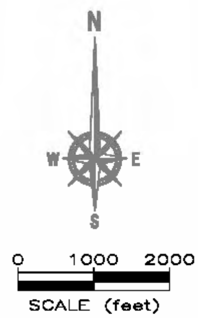


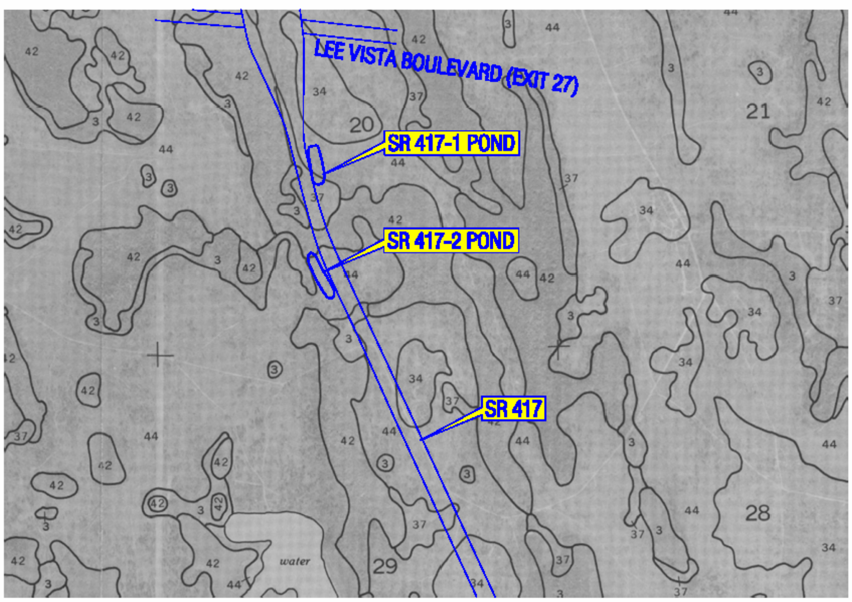
Lake Patrik: Location and Soil Description



EVALUATION OF TOXIC CYANOBACTERIA IN CENTRAL FLORIDA STORMWATER PONDS

PREPARED FROM:
USGS NARCOOSSEE NW, FLA. QUADRANGLE MAP
ISSUED 1953
PHOTOREVISED 1980
SECTION: 20
TOWNSHIP: 23 SOUTH
RANGE: 31 EAST





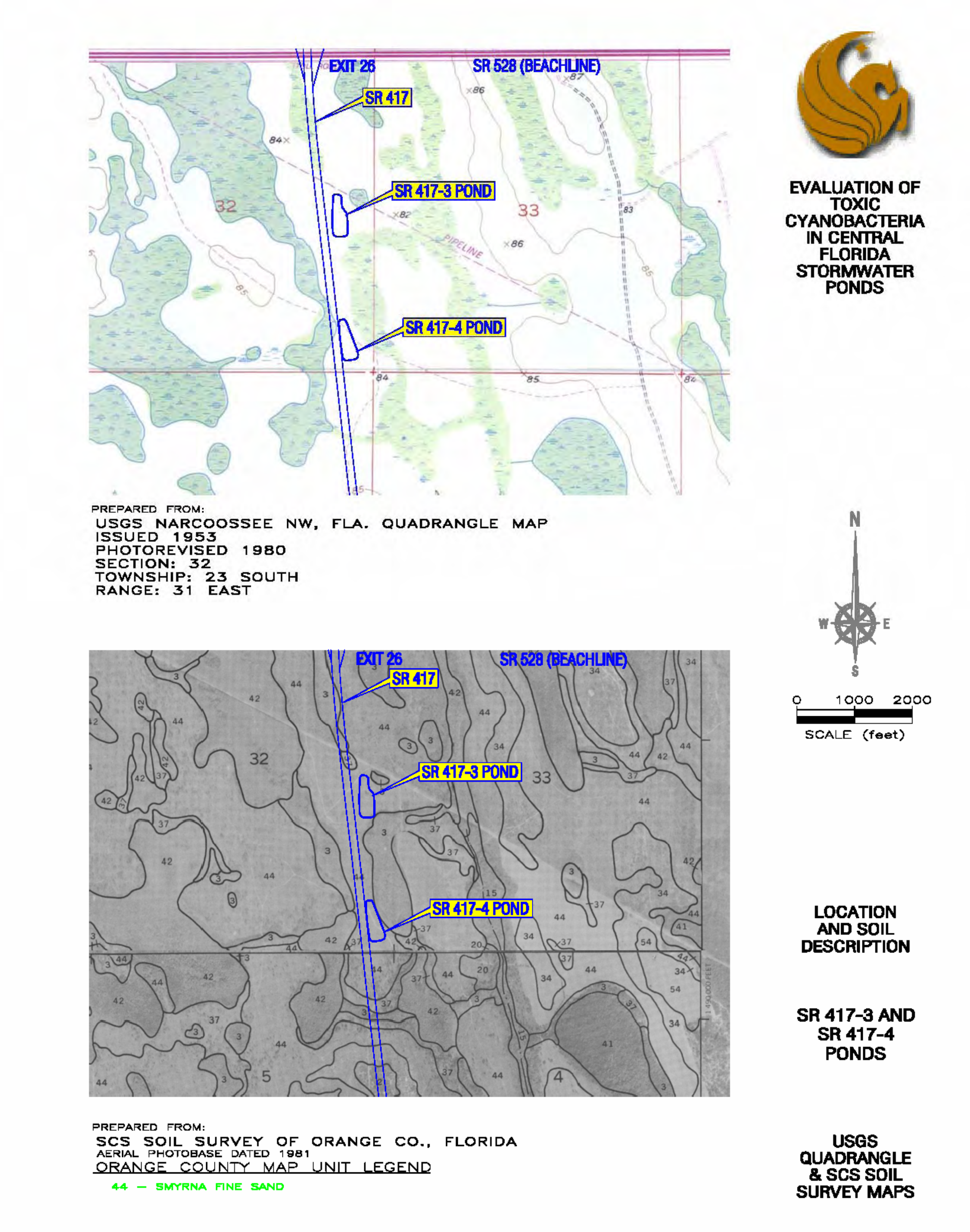
LOCATION AND SOIL DESCRIPTION

SR 417-1 AND SR 417-2 PONDS

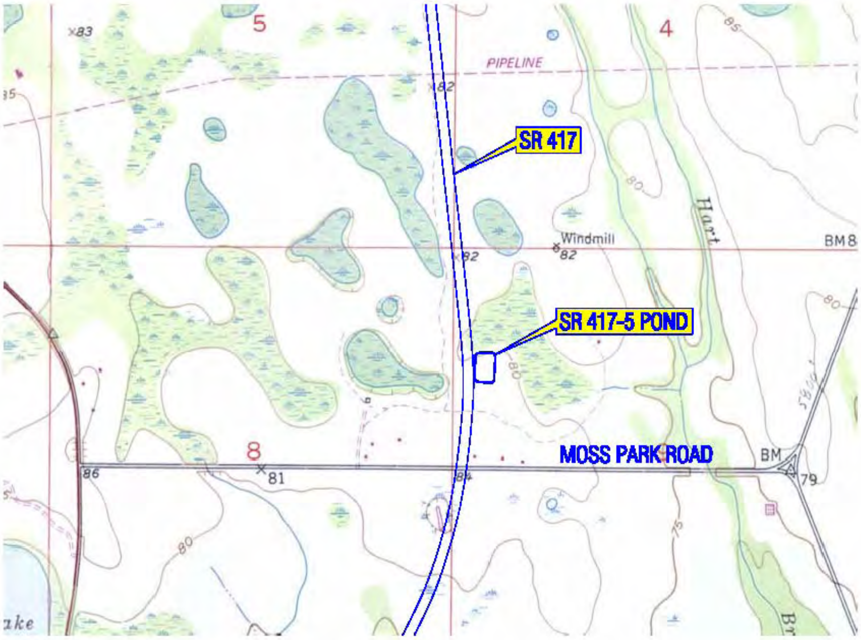
PREPARED FROM:
SCS SOIL SURVEY OF ORANGE CO., FLORIDA
AERIAL PHOTOBASE DATED 1981
ORANGE COUNTY MAP UNIT LEGEND
37 – ST. JOHNS FINE SAND
42 – SANIBEL MUCK
44 – SMYRNA FINE SAND

USGS QUADRANGLE & SCS SOIL SURVEY MAPS

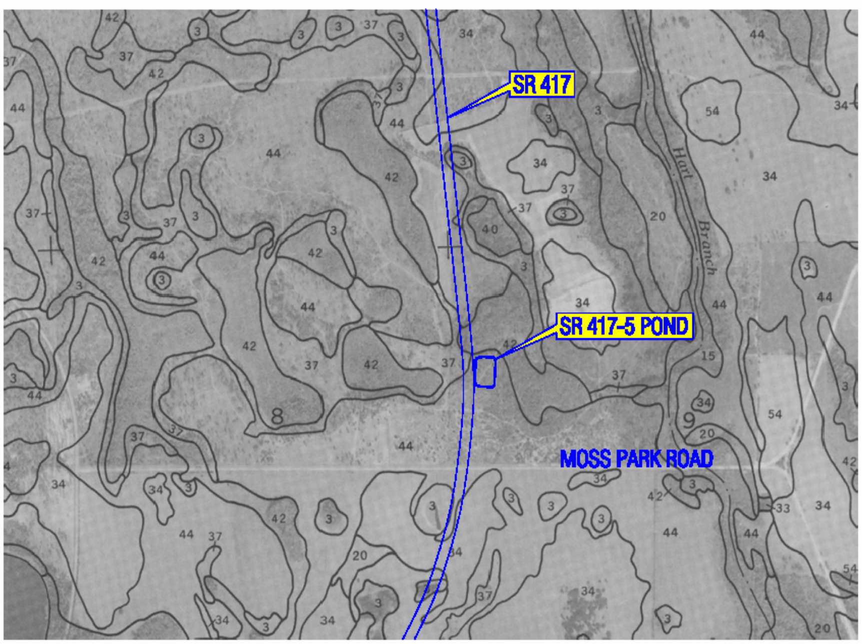
S.R. 417-1 and S.R. 417-2 Ponds: Location and Soil Description



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



PREPARED FROM:
USGS NARCOOSSEE NW, FLA. QUADRANGLE MAP
ISSUED 1953
PHOTOREVISED 1980
SECTION: 9
TOWNSHIP: 24 SOUTH
RANGE: 31 EAST



PREPARED FROM:
SCS SOIL SURVEY OF ORANGE CO., FLORIDA
AERIAL PHOTOBASE DATED 1981
ORANGE COUNTY MAP UNIT LEGEND
44 — SMYRNA FINE SAND

EVALUATION OF TOXIC CYANOBACTERIA IN CENTRAL FLORIDA STORMWATER PONDS

N
W E
S

0 1000 2000
SCALE (feet)

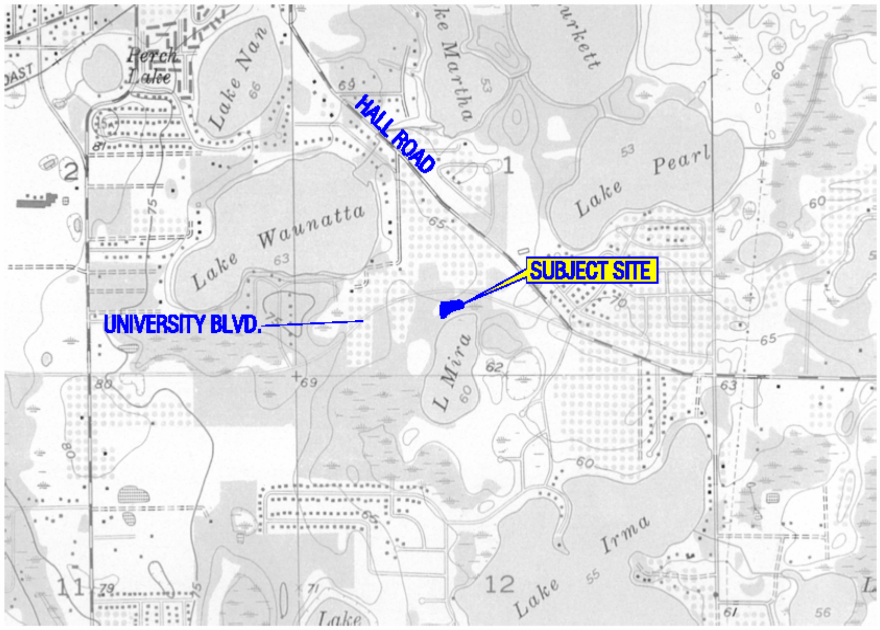
LOCATION AND SOIL DESCRIPTION

SR 417-5 POND

USGS QUADRANGLE & SCS SOIL SURVEY MAPS

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

EVALUATION OF TOXIC CYANOBACTERIA IN CENTRAL FLORIDA STORMWATER PONDS



PREPARED FROM:
USGS ORLANDO EAST, FLA. QUADRANGLE MAP
ISSUED 1956
PHOTOREVISED 1980
SECTION: 1
TOWNSHIP: 22 SOUTH
RANGE: 30 EAST

LOCATION AND SOIL DESCRIPTION

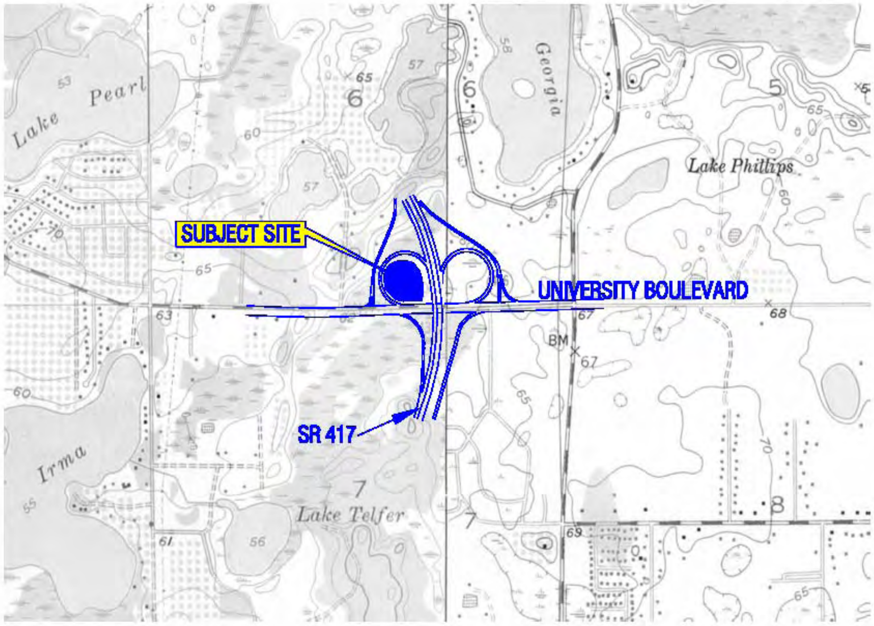
UNIVERSITY BOULEVARD AND HALL ROAD POND

PREPARED FROM:
SCS SOIL SURVEY OF ORANGE CO., FLORIDA
AERIAL PHOTOBASE DATED 1981
ORANGE COUNTY MAP UNIT LEGEND

3 – BASINGER FINE SAND, DEPRESSIONAL
44 – SMYRNA FINE SAND
54 – ZOLFO FINE SAND

USGS QUADRANGLE & SCS SOIL SURVEY MAPS

University Blvd and Hall Road Pond: Location and Soil Description

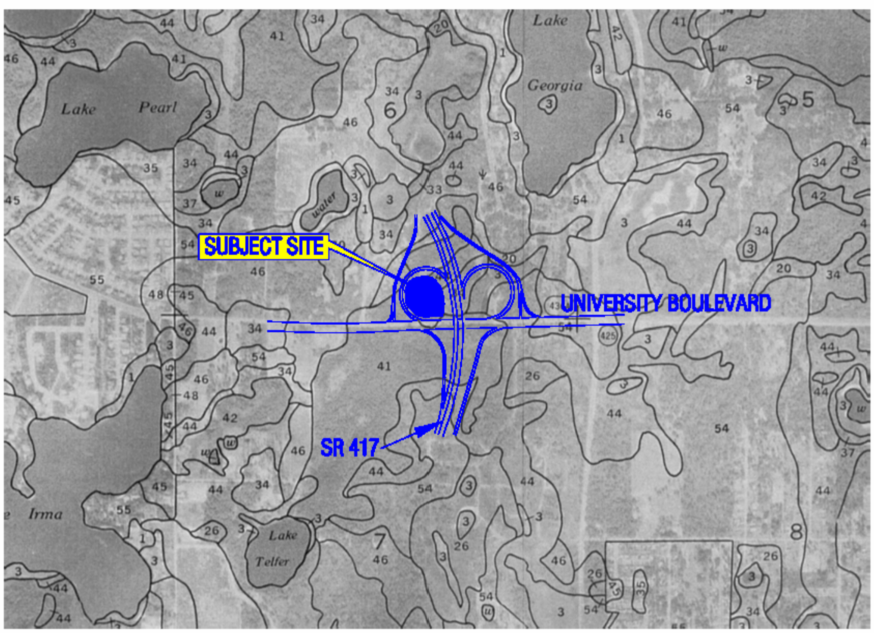


EVALUATION OF TOXIC CYANOBACTERIA IN CENTRAL FLORIDA STORMWATER PONDS

PREPARED FROM:
USGS ORLANDO EAST, FLA. QUADRANGLE MAP
ISSUED 1956
PHOTOREVISED 1980
SECTIONS: 6, 7
TOWNSHIP: 22 SOUTH
RANGE: 31 EAST

N W E S

0 1000 2000
SCALE (feet)



LOCATION AND SOIL DESCRIPTION

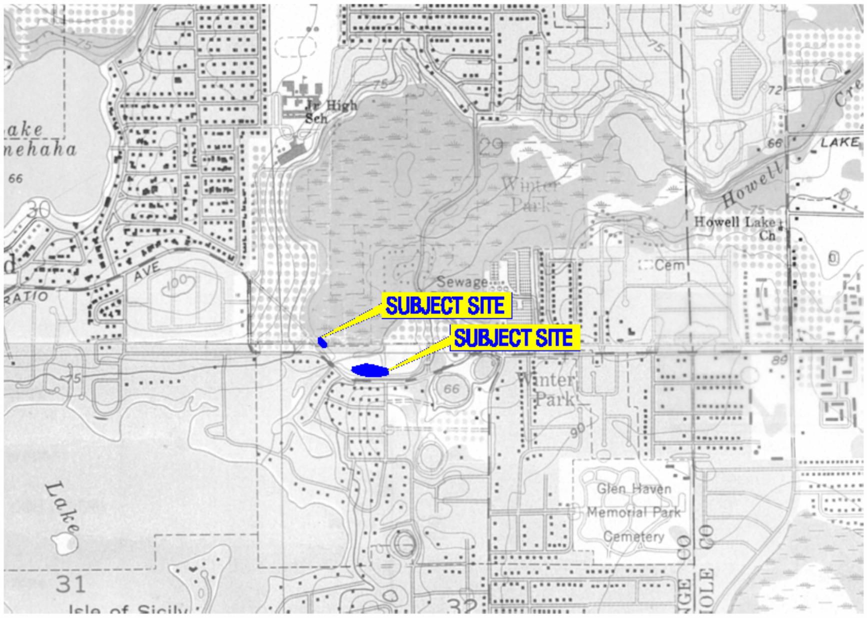
UNIVERSITY BOULEVARD AND SR 417 NW POND

PREPARED FROM:
SCS SOIL SURVEY OF ORANGE CO., FLORIDA
AERIAL PHOTOBASE DATED 1981
ORANGE COUNTY MAP UNIT LEGEND

34 – POMELLO FINE SAND, 0 TO 5 PERCENT SLOPES
41 – SAMSULA–HONTOON–BASINGER ASSOCIATION, DEPRESSIONAL
44 – SMYRNA FINE SAND

USGS QUADRANGLE & SCS SOIL SURVEY MAPS

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

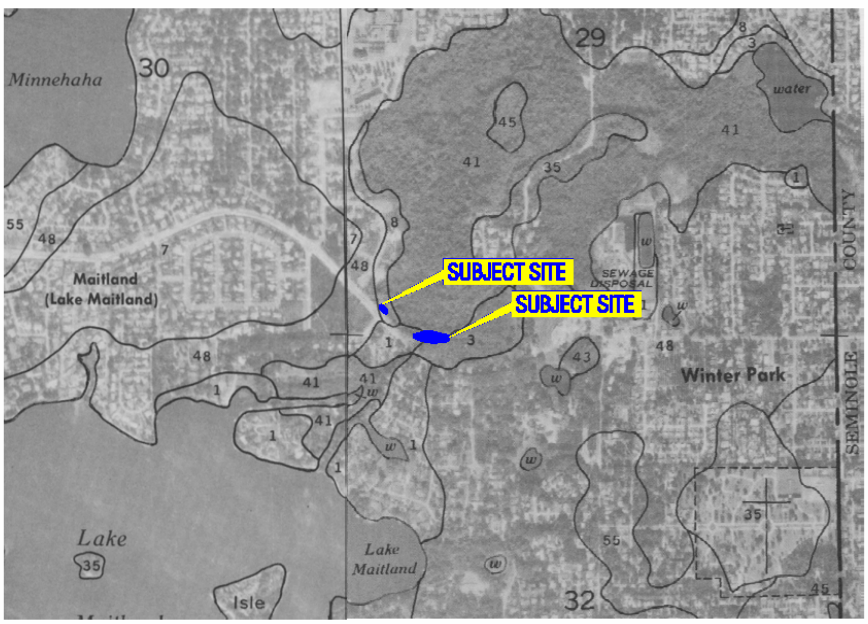


PREPARED FROM:
USGS CASSELBERRY, FLA. QUADRANGLE MAP
ISSUED 1962
PHOTOREVISED 1980
SECTIONS: 29, 32
TOWNSHIP: 21 SOUTH
RANGE: 30 EAST

EVALUATION OF TOXIC CYANOBACTERIA IN CENTRAL FLORIDA STORMWATER PONDS

N
W E
S

0 1000 2000
SCALE (feet)



PREPARED FROM:
SCS SOIL SURVEY OF ORANGE CO., FLORIDA
AERIAL PHOTOBASE DATED 1981
ORANGE COUNTY MAP UNIT LEGEND

1 – ARENTS, NEARLY LEVEL
3 – BASINGER FINE SAND, DEPRESSIONAL
8 – CANDLER–URBAN LAND COMPLEX, 5 TO 12 PERCENT SLOPES
41 – SAMSULA–HONTOON–BASINGER ASSOCIATION, DEPRESSIONAL

LOCATION AND SOIL DESCRIPTION

HORATIO AVENUE AND VIA TUSCANY PONDS

USGS QUADRANGLE & SCS SOIL SURVEY MAPS

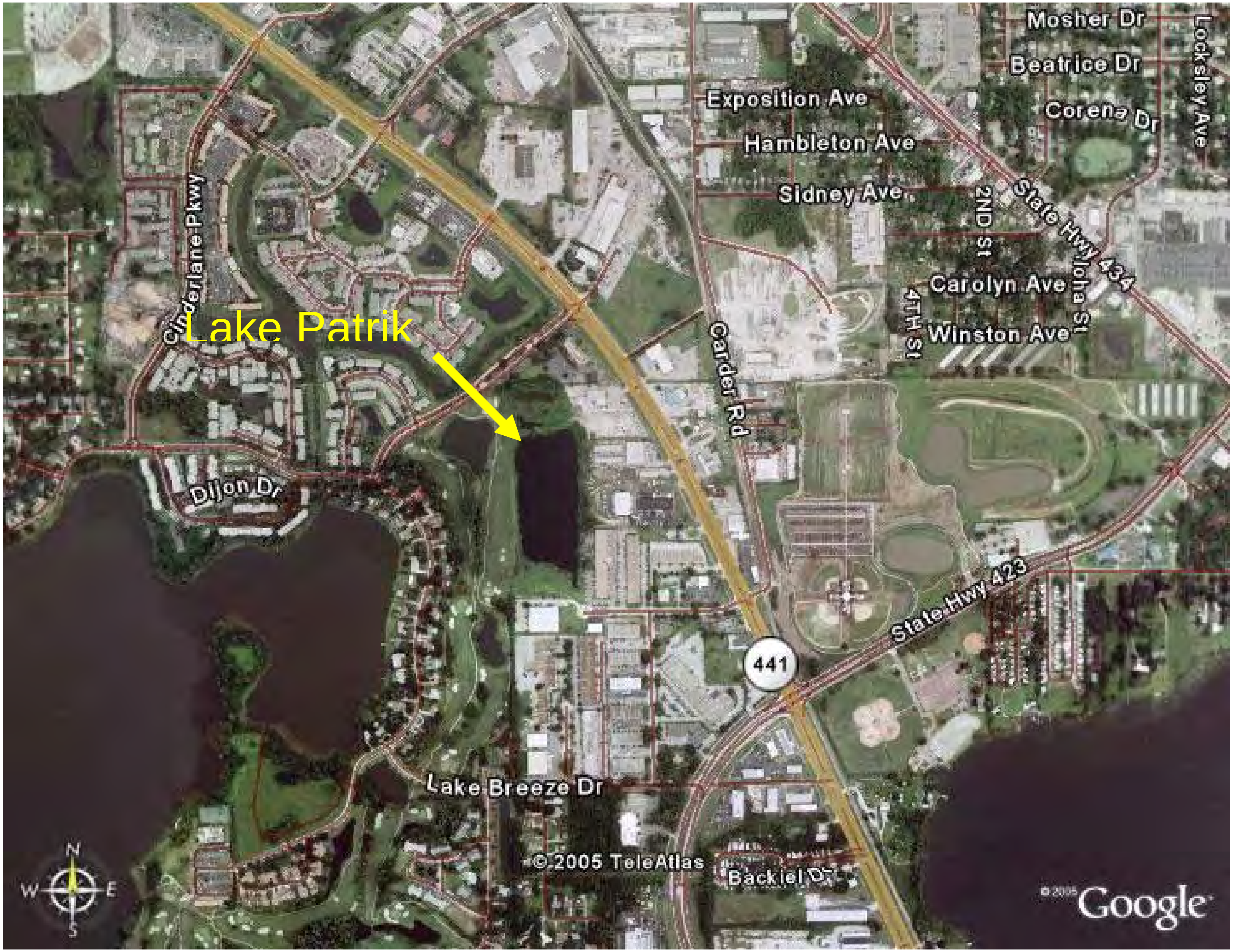
Horatio Avenue and Via Tuscany No. 1 and No. 2 Ponds: Location and Soil Description

APPENDIX B: PHOTOGRAPHS OF STORMWATER PONDS

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

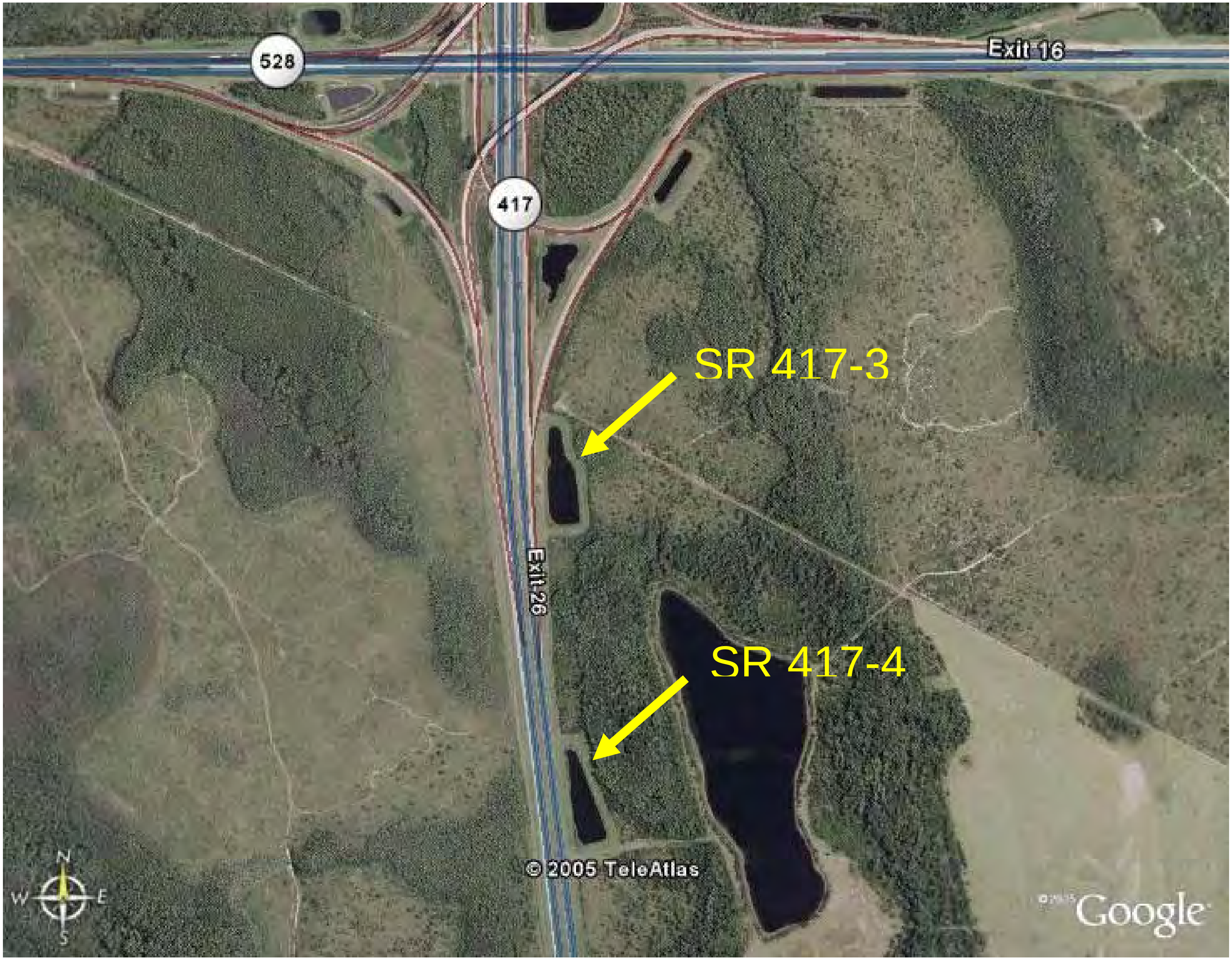
Terrier Pond: Aerial photograph of subject site and surrounding area.

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



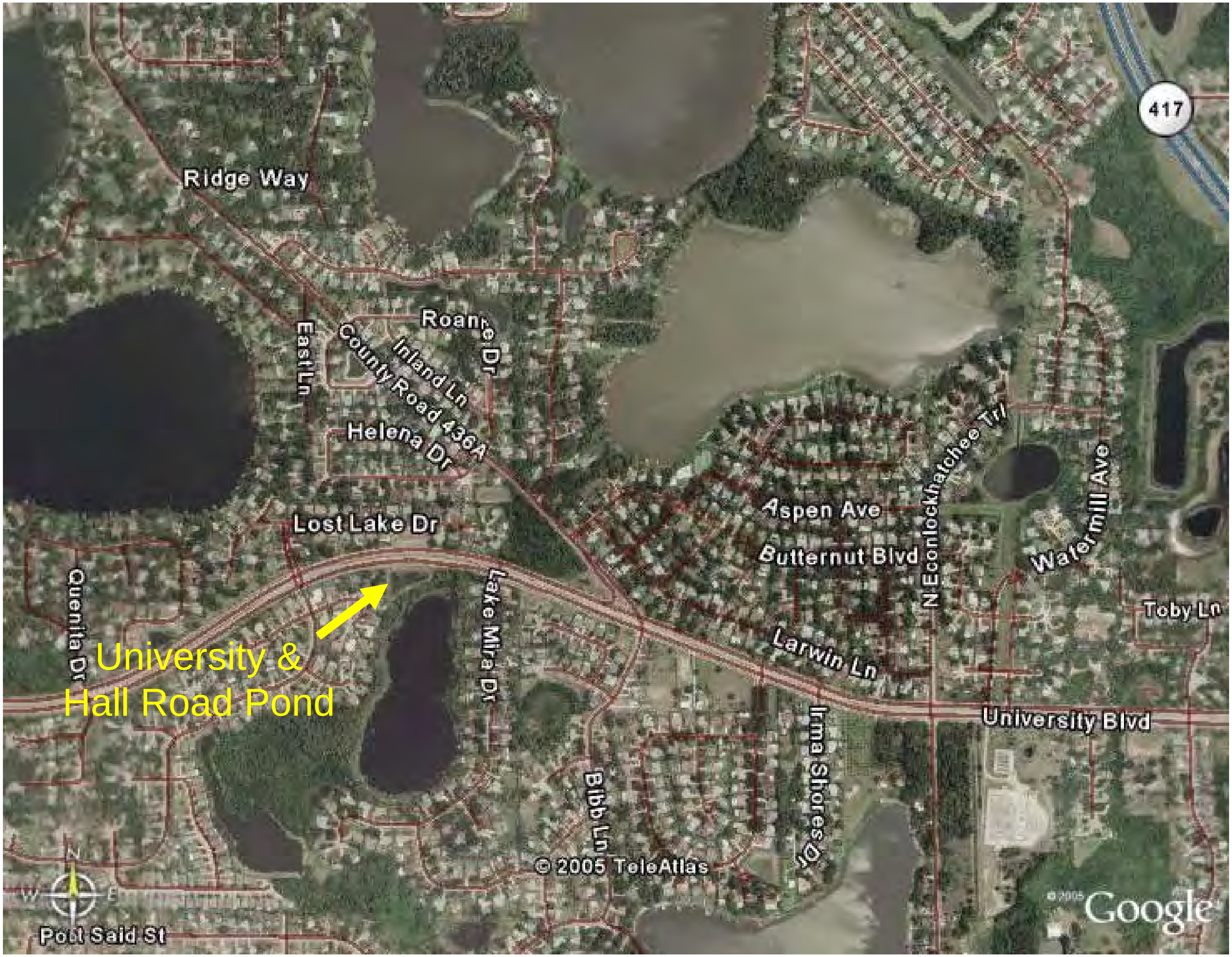
Lake Patrik: Aerial photograph of subject site and surrounding area.

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

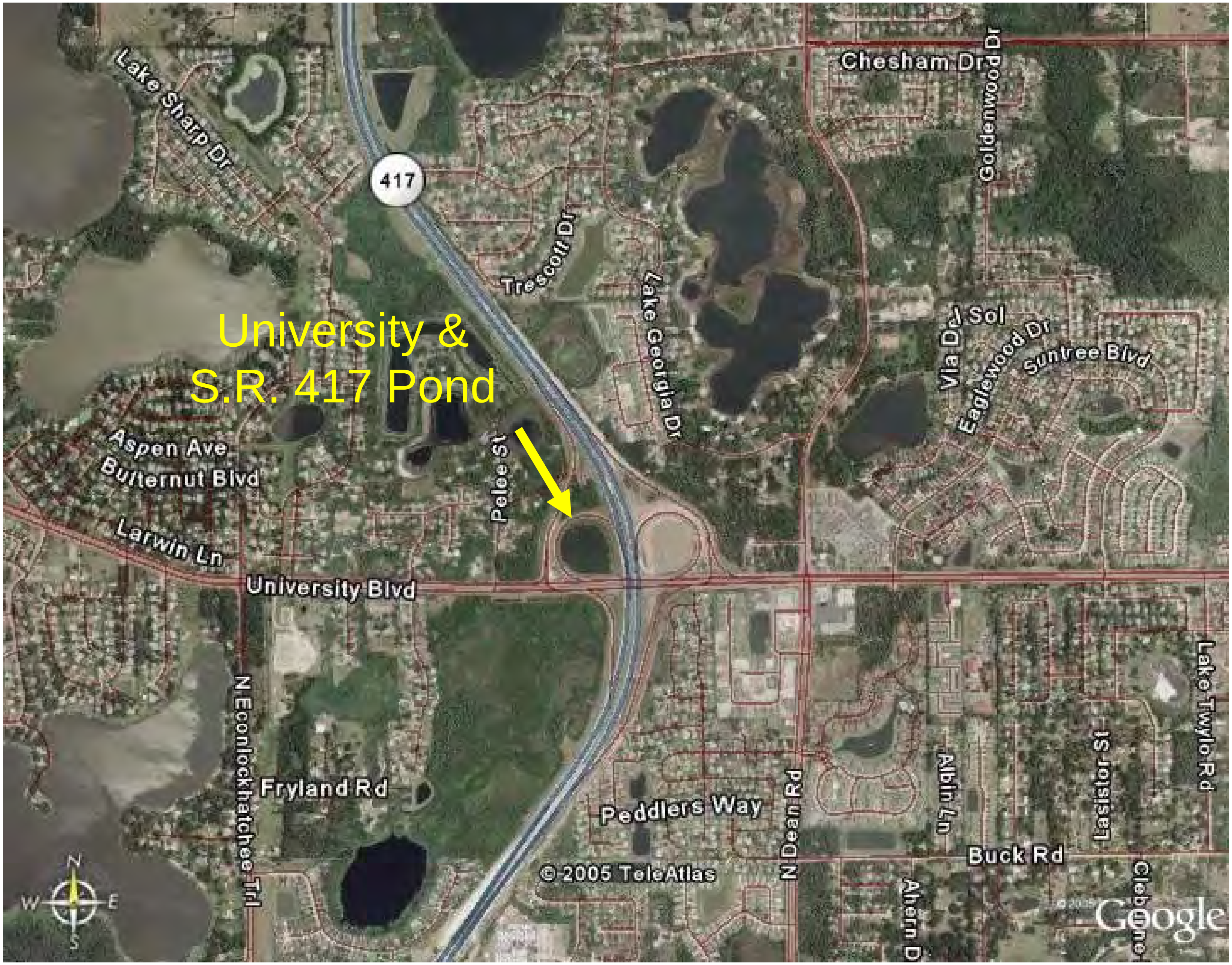


S.R. 417-3 and S.R. 417-4 Ponds: Aerial photograph of subject sites and surrounding areas.

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.

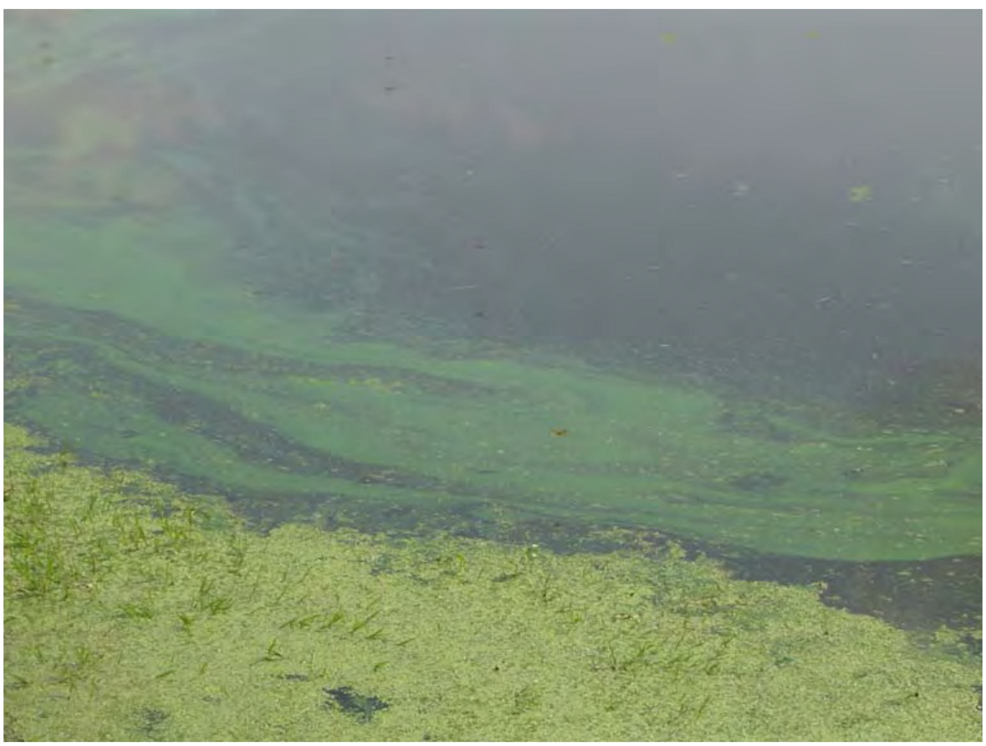
UCF Pegasus Pond: View facing southeast from the northwest corner.

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

GreenWater laboratories — 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

Sample Prep – Samples were ultrasonicated, extracted (C18 SPE), and filtered. Duplicate samples spiked with 1.0 µg/L of microcystin-LR as well as a 1.0 µg/L microcystin-LR standard sample were utilized for additional quantitative purposes (recoveries/correction factors).

Analytical Methodology – 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 LAB

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386.328.0882 voice • 386.328.9646 fax
cyanomail@cyanolab.com • www.cyanolab.com

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	none	1x	74	78	0.17	**0.13**	0.06
	0.05	none	1x	74	78	0.09		
Chamber 2	0.12	none	1x	83	89	0.16	**0.18**	0.02
	0.14	none	1x	83	89	0.19		
Chamber 3	0.28	none	1x	83	89	0.38	**0.39**	0.01
	0.29	none	1x	83	89	0.39		
Hall Rd East	0.10	none	1x	98	66	0.15	**0.18**	0.04
	0.13	none	1x	98	66	0.20		
UCF South Pond	0.24	none	1x	74	73	0.44	**0.49**	0.07
	0.29	none	1x	74	73	0.54		
Lake Patric	0.08	none	1x	74	77	0.14	**0.16**	0.03
	0.10	none	1x	74	77	0.18		
Lake Condel South	0.12	none	1x	98	81	0.15	**0.17**	0.02
	0.14	none	1x	98	81	0.18		
Terrier Pond East	0.09	none	1x	90	92	0.11	**0.10**	0.02
	0.07	none	1x	90	92	0.08		
Terrier Pond South	0.05	none	1x	90	92	0.06	**0.10**	0.05
	0.11	none	1x	90	92	0.13		
Student Union	0.11	none	1x	98	80	0.14	**0.16**	0.02
	0.13	none	1x	98	80	0.17		
417-1 South	0.36	none	1x	90	92	0.43	**0.38**	0.07
	0.27	none	1x	90	92	0.33		
417-2 North	0.49	none	1x	98	80	0.62	**0.60**	0.04
	0.45	none	1x	98	80	0.57		
417-3 South	0.10	none	1x	98	93	0.11	**0.13**	0.03
	0.14	none	1x	98	93	0.15		
417-4 South	0.14	none	1x	98	72	0.20	**0.20**	0.00
	0.14	none	1x	98	72	0.20		
417-5 South	0.17	none	1x	98	97	0.18	**0.19**	0.01
	0.19	none	1x	98	97	0.20		
417 Univ. NW	0.09	none	1x	98	78	0.12	**0.14**	0.03
	0.12	none	1x	98	78	0.16		
Horatio 1 @ Weir	0.06	none	1x	90	87	0.08	**0.09**	0.01
	0.07	none	1x	90	87	0.09		
Horatio 2 @ Weir	0.12	none	1x	90	93	0.14	**0.19**	0.06
	0.19	none	1x	90	93	0.23		

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
1	Chamber 1 Filtrate	050415	cyanophyte filament	sp. (1)	CYANO	14	filament	400	0.0625	70	1	1	907	1,167	0
1	Chamber 1 Filtrate	050415	cyanophyte filament	sp. (2)	CYANO	4	filament	400	0.0625	70	1	1	259		
1	Chamber 1 Filtrate	050415	cryptophyte	sp. (D=15um)	CRYPT	x	cell	400	0.0625	70	1	1			
1	Chamber 1 Filtrate	050415	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
1	Chamber 1 Filtrate	050415	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
1	Chamber 1 Filtrate	050415	unicell, sphere 5-7.5um	spp.		x	cell	200	0.25	30	1	1			
2	Chamber 2	050415	cyanophyte filament	sp. (1)	CYANO	2	filament	400	0.0625	70	1	1	130	130	0
2	Chamber 2	050415	Nitzschia	sp. (L=15um)	BACIL	x	cell	400	0.0625	70	1	1			
2	Chamber 2	050415	pennate diatom	sp. (L=17um)	BACIL	x	cell	400	0.0625	70	1	1			
2	Chamber 2	050415	cryptophyte	sp. (D=10um)	CRYPT	x	cell	400	0.0625	70	1	1			
2	Chamber 2	050415	cryptophyte	sp. (D=15um)	CRYPT	x	cell	200	0.25	30	1	1			
2	Chamber 2	050415	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
2	Chamber 2	050415	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
2	Chamber 2	050415	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	70	1	1			
3	Chamber 3	050415	cyanophyte chain	sp. (1)	CYANO	1	filament	200	0.25	30	1	1	38	751	0
3	Chamber 3	050415	cyanophyte filament	sp. (1)	CYANO	9	filament	400	0.0625	70	1	1	583		
3	Chamber 3	050415	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	70	1	1	130		
3	Chamber 3	050415	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
4	Hall Rd. East	050417	Aphanocapsa	spp. <2um	CYANO	1	colony	400	0.0625	50	1	1	91	389	0
4	Hall Rd. East	050417	cyanophyte filament	sp. (2)	CYANO	1	filament	200	0.25	50	1	1	23		
4	Hall Rd. East	050417	cyanophyte filament	sp. (3)	CYANO	1	filament	400	0.0625	50	1	1	91		
4	Hall Rd. East	050417	Lyngbya	sp. (1)	CYANO	1	filament	100	283.53	1	1	1	1		
4	Hall Rd. East	050417	Oscillatoria	sp. (1)	CYANO	2	filament	100	283.53	1	1	1	2		
4	Hall Rd. East	050417	oscillatorian filament	sp. (1)	CYANO	2	filament	400	0.0625	50	1	1	181		
4	Hall Rd. East	050417	pennate diatom	sp. (L=10um)	BACIL	x	cell	400	0.0625	50	1	1			
4	Hall Rd. East	050417	pennate diatom	sp. (L=20um)	BACIL	x	cell	200	0.25	50	1	1			
4	Hall Rd. East	050417	chlorophyte filament	sp. (B)	CHLOR	x	filament	200	0.25	50	1	1			
4	Hall Rd. East	050417	Cosmarium	sp. (large)	CHLOR	x	cell	200	0.25	50	1	1			
4	Hall Rd. East	050417	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
4	Hall Rd. East	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	50	1	1			
4	Hall Rd. East	050417	Mougeotia	sp.	CHLOR	x	filament	100	283.53	1	1	1			
4	Hall Rd. East	050417	Oocystis	sp. (3)	CHLOR	x	colony	400	0.0625	50	1	1			
4	Hall Rd. East	050417	Oocystis	sp. (4)	CHLOR	x	colony	200	0.25	50	1	1			
4	Hall Rd. East	050417	Scenedesmus	obtusus	CHLOR	x	colony	400	0.0625	50	1	1			
4	Hall Rd. East	050417	Scenedesmus	sp.	CHLOR	x	colony	400	0.0625	50	1	1			
4	Hall Rd. East	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	1	1			
4	Hall Rd. East	050417	Staurastrum	sp. (large)	CHLOR	x	cell	100	283.53	1	1	1			
4	Hall Rd. East	050417	Staurastrum	sp. (med)	CHLOR	x	cell	200	0.25	50	1	1			
4	Hall Rd. East	050417	cryptophyte	sp. (D=10um)	CRYPT	x	cell	200	0.25	50	1	1			
4	Hall Rd. East	050417	cryptophyte	sp. (L=10um)	CRYPT	x	cell	400	0.0625	50	1	1			
4	Hall Rd. East	050417	cryptophyte	sp. (L=10um)	CRYPT	x	cell	400	0.0625	50	1	1			
4	Hall Rd. East	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
4	Hall Rd. East	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
4	Hall Rd. East	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
5	UCF South Pond	050417	Aphanocapsa	spp. <2um	CYANO	5	colony	400	0.0625	70	2	1	162	298	0
5	UCF South Pond	050417	cyanophyte filament	sp. (3)	CYANO	1	filament	400	0.0625	70	2	1	32		
5	UCF South Pond	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	100	283.53	1	2	1	1		
5	UCF South Pond	050417	Merismopedia	punctata	CYANO	1	colony	200	0.25	30	2	1	19		
5	UCF South Pond	050417	Oscillatoria	sp. (2)	CYANO	1	filament	200	0.25	30	2	1	19		
5	UCF South Pond	050417	oscillatorian filament	sp. (1)	CYANO	2	filament	400	0.0625	70	2	1	65		
5	UCF South Pond	050417	Navicula	sp. (L=25um)	BACIL	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	pennate diatom	sp. (L=30um)	BACIL	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	Synedra	sp. (L=50um)	BACIL	x	cell	200	0.25	30	2	1			
5	UCF South Pond	050417	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	chlorophyte single cell	sp. (1)	CHLOR	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	chlorophyte tetrad	sp. (1)	CHLOR	x	colony	200	0.25	30	2	1			
5	UCF South Pond	050417	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	Coelastrum	sp. (1)	CHLOR	x	colony	100	283.53	1	2	1			
5	UCF South Pond	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	Elakatothrix	viridis	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	Eudorina	sp. (1)	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	Oocystis	sp. (2)	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	Oocystis	sp. (2)	CHLOR	x	colony	400	0.0625	70	2	1			
5	UCF South Pond	050417	Scenedesmus	quadricauda	CHLOR	x	colony	100	283.53	1	2	1			
5	UCF South Pond	050417	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	30	2	1			
5	UCF South Pond	050417	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	Dinobryon	sp.	CHRYS	x	colony	100	283.53	1	2	1			
5	UCF South Pond	050417	cryptophyte	sp. (D=5um)	CRYPT	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	cryptophyte	sp. (L=10um)	CRYPT	x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	2	1			
5	UCF South Pond	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	70	2	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
6	**Lake Patrick**	**050417**	**Anabaena**	**circinalis/flos-aquae (1)**	**CYANO**	**1**	**filament**	**100**	**283.53**	**1**	**2**	**1**	**1**	557	**390**
6	**Lake Patrick**	**050417**	**Anabaena**	**sp. (3)**	**CYANO**	**12**	**filament**	**400**	**0.0625**	**70**	**2**	**1**	**389**		
6	Lake Patrick	050417	Aphanocapsa/Chroococcus	sp.	CYANO	1	colony	400	0.0625	70	2	1	32		
6	Lake Patrick	050417	cyanophyte chain	sp. (1)	CYANO	1	filament	400	0.0625	70	2	1	32		
6	Lake Patrick	050417	cyanophyte filament	sp. (3)	CYANO	1	filament	200	0.25	30	2	1	19		
6	Lake Patrick	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	400	0.0625	70	2	1	32		
6	Lake Patrick	050417	oscillatorian filament	sp. (1)	CYANO	1	filament	200	0.25	30	2	1	19		
6	Lake Patrick	050417	Planktolyngbya	cf. limnetica	CYANO	1	filament	400	0.0625	70	2	1	32		
6	Lake Patrick	050417	Aulacoseira	italica	BACIL	x	chain	100	283.53	1	2	1			
6	Lake Patrick	050417	Navicula	sp. (L=20um)	BACIL	x	cell	200	0.25	30	2	1			
6	Lake Patrick	050417	Nitzschia	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	pennate diatom	sp. (L=12um)	BACIL	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	Botryococcus	braunii (sm)	CHLOR	x	colony	100	283.53	1	2	1			
6	Lake Patrick	050417	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	70	2	1			
6	Lake Patrick	050417	chlorophyte colony	sp. (G)	CHLOR	x	colony	400	0.0625	70	2	1			
6	Lake Patrick	050417	chlorophyte single cell	sp. (1)	CHLOR	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	Closterium	acutum var. variabile	CHLOR	x	cell	100	283.53	1	2	1			
6	Lake Patrick	050417	Closterium	sp. (1)	CHLOR	x	cell	100	283.53	1	2	1			
6	Lake Patrick	050417	Dictyosphaerium	sp.	CHLOR	x	colony	400	0.0625	70	2	1			
6	Lake Patrick	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	70	2	1			
6	Lake Patrick	050417	Franceia	sp. (2)	CHLOR	x	cell	100	283.53	1	2	1			
6	Lake Patrick	050417	Monoraphidium	arcuatum	CHLOR	x	cell	200	0.25	30	2	1			
6	Lake Patrick	050417	Monoraphidium	sp. (1)	CHLOR	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	Monoraphidium/Koliella	sp.	CHLOR	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	Oocystis	sp. (2)	CHLOR	x	colony	400	0.0625	70	2	1			
6	Lake Patrick	050417	Pandorina	morum	CHLOR	x	colony	400	0.0625	70	2	1			
6	Lake Patrick	050417	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	30	2	1			
6	Lake Patrick	050417	cryptophyte	sp. (D=10um)	CRYPT	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	cryptophyte	sp. (L=15um)	CRYPT	x	cell	200	0.25	30	2	1			
6	Lake Patrick	050417	cryptophyte	sp. (L=7um)	CRYPT	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	Ceratium	hirundinella	DINOP	x	cell	200	0.25	30	2	1			
6	Lake Patrick	050417	Centritractus	sp.	XANTH	x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	2	1			
6	Lake Patrick	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	70	2	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
7	**Lake Condel South**	**050417**	**Anabaena**	**eucompacta**	**CYANO**	**2**	**filament**	**200**	**0.25**	**50**	**1**	**1**	**45**	12,590	**227**
7	**Lake Condel South**	**050417**	**Anabaena**	**sp. (4)**	**CYANO**	**2**	**filament**	**400**	**0.0625**	**50**	**1**	**1**	**181**		
7	Lake Condel South	050417	Aphanocapsa	spp. <2um	CYANO	106	colony	400	0.0625	50	1	1	9,617		
7	Lake Condel South	050417	Aphanocapsa/Chroococcus	sp.	CYANO	1	colony	200	0.25	50	1	1	23		
7	Lake Condel South	050417	cyanophyte filament	sp. (4)	CYANO	18	filament	400	0.0625	50	1	1	1,633		
7	**Lake Condel South**	**050417**	**Microcystis**	**sp. (1)**	**CYANO**	**1**	**colony**	**100**	**283.53**	**1**	**1**	**1**	**1**		
7	Lake Condel South	050417	oscillatorian filament	sp. (2)	CYANO	10	filament	400	0.0625	50	1	1	907		
7	Lake Condel South	050417	Planktolyngbya	limnetica	CYANO	2	filament	400	0.0625	50	1	1	181		
7	Lake Condel South	050417	pennate diatom	sp. (L=12um)	BACIL	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Synedra	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Synedra	sp. (L=50um)	BACIL	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Ankistrodesmus	gracilis	CHLOR	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	chlorophyte	sp. (cross)	CHLOR	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	Coelastrum	sp. (1)	CHLOR	x	colony	100	283.53	1	1	1			
7	Lake Condel South	050417	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Crucigeniella	divergens	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Euastrum	sp. (1)	CHLOR	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	Kirchneriella	sp. (1)	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Lagerheimia	sp.	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Monoraphidium	contorta	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Monoraphidium	sp. (1)	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Monoraphidium/Koliella	sp.	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Pediastrum	boryanum	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Pediastrum	duplex	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Pediastrum	tetras	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Scenedesmus	acuminatus	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Scenedesmus	bernardii	CHLOR	x	colony	200	0.25	50	1	1			
7	Lake Condel South	050417	Scenedesmus	bicaudatus	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Scenedesmus	sp. (27)	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Scenedesmus	sp. (single cell)	CHLOR	x	colony	400	0.0625	50	1	1			
7	Lake Condel South	050417	Schroederia	setigera	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Staurastrum	tetracerum	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Tetraedron	caudatum	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Tetraedron	sp. (1)	CHLOR	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	Tetrastrum	heteracanthum	CHLOR	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	cryptophyte	sp. (D=5um)	CRYPT	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	cryptophyte	sp. (D=8um)	CRYPT	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	cryptophyte	sp. (L=20um)	CRYPT	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Trachelomonas	sp.	EUGLE	x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	Goniochloris	sp. (2)	XANTH	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	Goniochloris	sp. (3)	XANTH	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	Pseudostaurastrum	sp.	XANTH	x	cell	200	0.25	50	1	1			
7	Lake Condel South	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
7	Lake Condel South	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
8	**Terrier Pond East**	**050417**	**Anabaena**	**bergii/minderi (2)**	**CYANO**	**2**	**filament**	**200**	**0.25**	**50**	**3**	**1**	**15**	650	**499**
8	**Terrier Pond East**	**050417**	**Aphanizomenon**	**issatschenkoi**	**CYANO**	**7**	**filament**	**400**	**0.0625**	**50**	**3**	**1**	**212**		
8	Terrier Pond East	050417	cyanophyte filament	sp. (3)	CYANO	2	filament	400	0.0625	50	3	1	60		
8	Terrier Pond East	050417	cyanophyte single cell	sp. (long)	CYANO	3	cell	400	0.0625	50	3	1	91		
8	**Terrier Pond East**	**050417**	**Microcystis**	**sp. (1)**	**CYANO**	**3**	**colony**	**400**	**0.0625**	**50**	**3**	**1**	**91**		
8	**Terrier Pond East**	**050417**	**Microcystis unicell**	**sp.**	**CYANO**	**6**	**cell**	**400**	**0.0625**	**50**	**3**	**1**	**181**		
8	Terrier Pond East	050417	diatom	sp. (L=12um)	BACIL	x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	pennate diatom	sp. (D=25um)	BACIL	x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	3	1			
8	Terrier Pond East	050417	Closterium	acutum var. variabile	CHLOR	x	cell	200	0.25	50	3	1			
8	Terrier Pond East	050417	Coelastrum	sp. (2)	CHLOR	x	colony	200	0.25	50	3	1			
8	Terrier Pond East	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	200	0.25	50	3	1			
8	Terrier Pond East	050417	Scenedesmus	sp. (23)	CHLOR	x	colony	400	0.0625	50	3	1			
8	Terrier Pond East	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	3	1			
8	Terrier Pond East	050417	Staurastrum	sp. (large)	CHLOR	x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	cryptophyte	sp. (D=4um)	CRYPT	x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	cryptophyte	sp. (D=8um)	CRYPT	x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	Ceratium	hirundinella	DINOP	x	cell	200	0.25	50	3	1			
8	Terrier Pond East	050417	Trachelomonas	sp.	EUGLE	x	cell	200	0.25	50	3	1			
8	Terrier Pond East	050417	Isthmochloron	gracile	XANTH	x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
8	Terrier Pond East	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	3	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
9	**Student Union**	**050417**	**Anabaena**	**bergii/minderi (2)**	**CYANO**	**1**	**filament**	**200**	**0.25**	**50**	**2**	**1**	**11**	1,387	**68**
9	**Student Union**	**050417**	**Aphanizomenon**	**sp. (2)**	**CYANO**	**1**	**filament**	**100**	**283.53**	**1**	**2**	**1**	**1**		
9	**Student Union**	**050417**	**Aphanizomenon**	**sp. (5)**	**CYANO**	**1**	**filament**	**200**	**0.25**	**50**	**2**	**1**	**11**		
9	Student Union	050417	cf. Romeria	sp.	CYANO	7	filament	400	0.0625	50	2	1	318		
9	Student Union	050417	Limnothrix/Pseudanabaena	sp.	CYANO	5	filament	400	0.0625	50	2	1	227		
9	**Student Union**	**050417**	**Microcystis**	**sp. (small colony)**	**CYANO**	**1**	**colony**	**400**	**0.0625**	**50**	**2**	**1**	**45**		
9	Student Union	050417	oscillatorian filament	sp. (1)	CYANO	16	filament	400	0.0625	50	2	1	726		
9	Student Union	050417	Planktolyngbya	undulata	CYANO	1	filament	400	0.0625	50	2	1	45		
9	Student Union	050417	Planktothrix	sp. (1)	CYANO	5	filament	100	283.53	1	2	1	3		
9	Student Union	050417	Nitzschia	sp. (L=70um)	BACIL	x	cell	200	0.25	50	2	1			
9	Student Union	050417	pennate diatom	sp. (L=15um)	BACIL	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	pennate diatom	sp. (L=15um)	BACIL	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	pennate diatom	sp. (L=100um)	BACIL	x	cell	200	0.25	50	2	1			
9	Student Union	050417	Synedra	sp. (L=75um)	BACIL	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Urosolenia	sp.	BACIL	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Actinastrum	hantzschii	CHLOR	x	colony	200	0.25	50	2	1			
9	Student Union	050417	Ankistrodesmus	gracilis	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Ankistrodesmus	sp. (2)	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Botryococcus	braunii (sm)	CHLOR	x	colony	100	283.53	1	2	1			
9	Student Union	050417	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	2	1			
9	Student Union	050417	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Crucigeniella	crucifera	CHLOR	x	colony	200	0.25	50	2	1			
9	Student Union	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	50	2	1			
9	Student Union	050417	Elakatothrix	viridis	CHLOR	x	colony	400	0.0625	50	2	1			
9	Student Union	050417	Franceia/Golenkinia	sp.	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Monoraphidium	flexuosum	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Mougeotia	sp.	CHLOR	x	filament	100	283.53	1	2	1			
9	Student Union	050417	Pediastrum	boryanum	CHLOR	x	colony	400	0.0625	50	2	1			
9	Student Union	050417	Pediastrum	duplex	CHLOR	x	colony	200	0.25	50	2	1			
9	Student Union	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	x	colony	400	0.0625	50	2	1			
9	Student Union	050417	Scenedesmus	sp. (17)	CHLOR	x	colony	200	0.25	50	2	1			
9	Student Union	050417	Staurastrum	sp. (large)	CHLOR	x	cell	100	283.53	1	2	1			
9	Student Union	050417	Tetrastrum	triangulare	CHLOR	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Dinobryon	sp.	CHRYS	x	colony	400	0.0625	50	2	1			
9	Student Union	050417	cryptophyte	sp. (D=5um)	CRYPT	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	cryptophyte	sp. (D=8um)	CRYPT	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	cryptophyte	sp. (L=9um)	CRYPT	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	Ceratium	hirundinella	DINOP	x	cell	400	0.0625	50	2	1			
9	Student Union	050417	dinoflagellate	sp. (D=15um)	DINOP	x	cell	200	0.25	50	2	1			
9	Student Union	050417	Trachelomonas	sp.	EUGLE	x	cell	100	283.53	1	2	1			
9	Student Union	050417	Isthmochloron	gracile	XANTH	x	cell	100	283.53	1	2	1			
9	Student Union	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	2	1			
9	Student Union	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	2	1			
9	Student Union	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	2	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
10	**Terrier Pond South**	**050417**	**Aphanizomenon**	**issatschenkoi**	**CYANO**	**9**	**filament**	**400**	**0.0625**	**50**	**3**	**1**	**272**	2,223	**635**
10	Terrier Pond South	050417	Aphanocapsa	sp. (D=2.5)	CYANO	1	colony	100	283.53	1	3	1	0		
10	Terrier Pond South	050417	cf. Aphanocapsa	sp. (D=.3um)	CYANO	51	colony	400	0.0625	50	3	1	1,542		
10	Terrier Pond South	050417	cyanophyte filament	sp. (2)	CYANO	1	filament	200	0.25	50	3	1	8		
10	Terrier Pond South	050417	cyanophyte single cell	sp. (long)	CYANO	1	cell	400	0.0625	50	3	1	30		
10	Terrier Pond South	050417	Gomphosphaeria	sp. (1)	CYANO	1	colony	200	0.25	50	3	1	8		
10	**Terrier Pond South**	**050417**	**Microcystis**	**sp. (1)**	**CYANO**	**5**	**colony**	**400**	**0.0625**	**50**	**3**	**1**	**151**		
10	**Terrier Pond South**	**050417**	**Microcystis unicell**	**sp.**	**CYANO**	**7**	**cell**	**400**	**0.0625**	**50**	**3**	**1**	**212**		
10	Terrier Pond South	050417	Navicula	sp. (L=20um)	BACIL	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	Botryococcus	braunii (sm)	CHLOR	x	colony	100	283.53	1	3	1			
10	Terrier Pond South	050417	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	50	3	1			
10	Terrier Pond South	050417	Oocystis	sp. (3)	CHLOR	x	colony	200	0.25	50	3	1			
10	Terrier Pond South	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	3	1			
10	Terrier Pond South	050417	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	50	3	1			
10	Terrier Pond South	050417	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	cryptophyte	sp. (D=5um)	CRYPT	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	cryptophyte	sp. (L=10um)	CRYPT	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	cryptophyte	sp. (L=20um)	CRYPT	x	cell	200	0.25	50	3	1			
10	Terrier Pond South	050417	Ceratium	hirundinella	DINOP	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	Trachelomonas	sp.	EUGLE	x	cell	200	0.25	50	3	1			
10	Terrier Pond South	050417	Isthmochloron	gracile	XANTH	x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
10	Terrier Pond South	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
11	**417-4-South**	**050417**	**Anabaena**	**sp. (5)**	**CYANO**	**31**	**filament**	**400**	**0.0625**	**50**	**1**	**1**	**2,813**	3,267	**2,814**
11	417-4-South	050417	Aphanocapsa	spp. <2um	CYANO	4	colony	400	0.0625	50	1	1	363		
11	417-4-South	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	400	0.0625	50	1	1	91		
11	**417-4-South**	**050417**	**Microcystis**	**sp. (1)**	**CYANO**	**1**	**colony**	**100**	**283.53**	**1**	**1**	**1**	**1**		
11	417-4-South	050417	Aulacoseira	granulata v. angustissima	BACIL	x	chain	200	0.25	50	1	1			
11	417-4-South	050417	Aulacoseira	italica	BACIL	x	chain	400	0.0625	50	1	1			
11	417-4-South	050417	Navicula	sp. (L=20um)	BACIL	x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	Nitzschia	sp. (L=12um)	BACIL	x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	pennate diatom	sp. (L=10um)	BACIL	x	cell	200	0.25	50	1	1			
11	417-4-South	050417	pennate diatom	sp. (L=75um)	BACIL	x	cell	100	283.53	1	1	1			
11	417-4-South	050417	Synedra	sp. (L=125um)	BACIL	x	cell	200	0.25	50	1	1			
11	417-4-South	050417	Synedra	sp. (L=50um)	BACIL	x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	Coelastrum	sp. (2)	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Cosmarium	sp. (large)	CHLOR	x	cell	100	283.53	1	1	1			
11	417-4-South	050417	Cosmarium	sp. (med)	CHLOR	x	cell	200	0.25	50	1	1			
11	417-4-South	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Oocystis	sp. (4)	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Pediastrum	duplex	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Pediastrum	tetras	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Scenedesmus	sp. (10)	CHLOR	x	colony	200	0.25	50	1	1			
11	417-4-South	050417	Scenedesmus	sp. (17)	CHLOR	x	colony	400	0.0625	50	1	1			
11	417-4-South	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	1	1			
11	417-4-South	050417	Staurastrum	sp. (med)	CHLOR	x	cell	200	0.25	50	1	1			
11	417-4-South	050417	Tetrastrum	triangulare	CHLOR	x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	cryptophyte	sp. (D=8um)	CRYPT	x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	Trachelomonas	sp.	EUGLE	x	cell	100	283.53	1	1	1			
11	417-4-South	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
11	417-4-South	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
12	**417-5-South**	**050417**	**Anabaena**	**bergii/minderi (3)**	**CYANO**	**1**	**filament**	**200**	**0.25**	**50**	**1**	**1**	**23**	491,690	**318**
12	417-5-South	050417	Aphanocapsa	sp. (D=1.5um)	CYANO	1	colony	400	0.0625	50	1	1	91		
12	417-5-South	050417	cyanophyte chain	sp. (1)	CYANO	2	filament	400	0.0625	50	1	1	181		
12	417-5-South	050417	cyanophyte filament	sp.	CYANO	4	filament	400	0.0625	50	1	1	363		
12	417-5-South	050417	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	50	1	1	181		
12	417-5-South	050417	cyanophyte filament	sp. (3)	CYANO	3	filament	400	0.0625	50	1	1	272		
12	417-5-South	050417	cyanophyte single cell	sp. (long)	CYANO	38	cell	400	0.0625	50	1	1	3,448		
12	417-5-South	050417	Glaucospira	sp.	CYANO	1	filament	400	0.0625	50	1	1	91		
12	417-5-South	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	200	0.25	50	1	1	23		
12	417-5-South	050417	Merismopedia	punctata	CYANO	15	colony	400	0.0625	50	1	1	1,361		
12	**417-5-South**	**050417**	**Microcystis**	**sp. (1)**	**CYANO**	**1**	**colony**	**200**	**0.25**	**50**	**1**	**1**	**23**		
12	**417-5-South**	**050417**	**Microcystis unicell**	**sp.**	**CYANO**	**3**	**cell**	**400**	**0.0625**	**50**	**1**	**1**	**272**		
12	417-5-South	050417	Oscillatoria	sp. (1)	CYANO	13	filament	100	283.53	1	1	1	13		
12	417-5-South	050417	Oscillatoria	sp. (2)	CYANO	11	filament	400	0.0625	50	1	1	998		
12	417-5-South	050417	oscillatorian filament	sp. (1)	CYANO	5	filament	400	0.0625	50	1	1	454		
12	417-5-South	050417	Planktolyngbya	limnetica	CYANO	1	filament	400	0.0625	50	1	1	91		
12	417-5-South	050417	Aulacoseira	italica	BACIL	x	chain	100	283.53	1	1	1			
12	417-5-South	050417	Nitzschia	sp. (L=30um)	BACIL	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Nitzschia	sp. (L=50um)	BACIL	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	pennate diatom	sp. (L=55um)	BACIL	x	cell	200	0.25	50	1	1			
12	417-5-South	050417	Synedra	sp. (L=12um)	BACIL	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	chlorophyte colony	sp. (D)	CHLOR	x	colony	200	0.25	50	1	1			
12	417-5-South	050417	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Cosmarium	sp. (large)	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	50	1	1			
12	417-5-South	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	50	1	1			
12	417-5-South	050417	filamentous chlorophyte	sp. (1)	CHLOR	x	filament	100	283.53	1	1	1			
12	417-5-South	050417	Kirchneriella	sp. (1)	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Monoraphidium	circinale	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Oocystis	sp. (4)	CHLOR	x	colony	200	0.25	50	1	1			
12	417-5-South	050417	Pandorina	morum	CHLOR	x	colony	200	0.25	50	1	1			
12	417-5-South	050417	Scenedesmus	acuminatus	CHLOR	x	colony	400	0.0625	50	1	1			
12	417-5-South	050417	Scenedesmus	obtusus	CHLOR	x	colony	400	0.0625	50	1	1			
12	417-5-South	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	x	colony	400	0.0625	50	1	1			
12	417-5-South	050417	Scenedesmus	sp. (23)	CHLOR	x	colony	400	0.0625	50	1	1			
12	417-5-South	050417	Schroederia	setigera	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Staurastrum	sp. (large)	CHLOR	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	cryptophyte	sp. (L=15um)	CRYPT	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	Ceratium	hirundinella	DINOP	x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
12	417-5-South	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
13	417-2-North	050417	Anabaena	circinalis/flos-aquae (1)	CYANO	4	filament	400	0.0625	50	2	1	181	2,620	1,427
13	417-2-North	050417	Aphanizomenon	issatschenkoi	CYANO	1	filament	200	0.25	50	2	1	11		
13	417-2-North	050417	Aphanocapsa	spp. <2um	CYANO	2	colony	400	0.0625	50	2	1	91		
13	417-2-North	050417	cyanophyte chain	sp. (1)	CYANO	1	filament	400	0.0625	50	2	1	45		
13	417-2-North	050417	cyanophyte filament	sp. (3)	CYANO	2	filament	400	0.0625	50	2	1	91		
13	417-2-North	050417	cyanophyte filament	sp. (4)	CYANO	2	filament	400	0.0625	50	2	1	91		
13	417-2-North	050417	cyanophyte pseudofilament	sp.	CYANO	1	filament	200	0.25	50	2	1	11		
13	417-2-North	050417	cyanophyte single cell	sp. (long)	CYANO	18	cell	400	0.0625	50	2	1	817		
13	417-2-North	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	400	0.0625	50	2	1	45		
13	417-2-North	050417	Microcystis	sp. (1)	CYANO	1	colony	200	0.25	50	2	1	11		
13	417-2-North	050417	Microcystis	sp. (small colony)	CYANO	1	colony	400	0.0625	50	2	1	45		
13	417-2-North	050417	Microcystis unicell	sp.	CYANO	26	cell	400	0.0625	50	2	1	1,179		
13	417-2-North	050417	Aulacoseira	italica	BACIL	x	chain	200	0.25	50	2	1			
13	417-2-North	050417	Nitzschia	sp. (L=15um)	BACIL	x	cell	200	0.25	50	2	1			
13	417-2-North	050417	Botryococcus	braunii (sm)	CHLOR	x	colony	200	0.25	50	2	1			
13	417-2-North	050417	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	Closterium	sp. (1)	CHLOR	x	cell	100	283.53	1	2	1			
13	417-2-North	050417	Cosmarium	sp. (large)	CHLOR	x	cell	100	283.53	1	2	1			
13	417-2-North	050417	Euastrum	sp. (1)	CHLOR	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	Monoraphidium/Koliella	sp.	CHLOR	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	Oocystis	sp. (2)	CHLOR	x	colony	200	0.25	50	2	1			
13	417-2-North	050417	Pediastrum	duplex	CHLOR	x	colony	400	0.0625	50	2	1			
13	417-2-North	050417	Scenedesmus	quadricauda (2 cells)	CHLOR	x	colony	200	0.25	50	2	1			
13	417-2-North	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	x	colony	400	0.0625	50	2	1			
13	417-2-North	050417	Scenedesmus	sp. (23)	CHLOR	x	colony	200	0.25	50	2	1			
13	417-2-North	050417	Staurastrum	sp. (large)	CHLOR	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	cryptophyte	sp. (D=12um)	CRYPT	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	cryptophyte	sp. (L=20um)	CRYPT	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	cryptophyte	sp. (L=6um)	CRYPT	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	Ceratium	hirundinella	DINOP	x	cell	400	0.0625	50	2	1			
13	417-2-North	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	2	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
14	**417-3-South**	**050417**	**Anabaena**	**sp. (5)**	**CYANO**	**1**	**filament**	**100**	**283.53**	**1**	**1**	**1**	**1**	1,005	**183**
14	**417-3-South**	**050417**	**Anabaena**	**sp. (6)**	**CYANO**	**1**	**filament**	**400**	**0.0625**	**50**	**1**	**1**	**91**		
14	417-3-South	050417	cyanophyte colony	sp. (B)	CYANO	2	colony	400	0.0625	50	1	1	181		
14	417-3-South	050417	Limnothrix/Pseudanabaena	sp.	CYANO	4	filament	400	0.0625	50	1	1	363		
14	**417-3-South**	**050417**	**Microcystis**	**sp. (small colony)**	**CYANO**	**1**	**colony**	**400**	**0.0625**	**50**	**1**	**1**	**91**		
14	417-3-South	050417	Oscillatoria	sp. (1)	CYANO	6	filament	100	283.53	1	1	1	6		
14	417-3-South	050417	oscillatorian filament	sp. (1)	CYANO	1	filament	400	0.0625	50	1	1	91		
14	417-3-South	050417	Planktolyngbya	limnetica	CYANO	2	filament	400	0.0625	50	1	1	181		
14	417-3-South	050417	Navicula	sp. (L=20um)	BACIL	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Nitzschia	sp. (L=10um)	BACIL	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	pennate diatom	sp. (L=40um)	BACIL	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Botryococcus	braunii (sm)	CHLOR	x	colony	100	283.53	1	1	1			
14	417-3-South	050417	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Closterium	sp. (L=100um)	CHLOR	x	cell	200	0.25	50	1	1			
14	417-3-South	050417	Closterium	sp. (L=500um)	CHLOR	x	cell	100	283.53	1	1	1			
14	417-3-South	050417	Coelastrum	sp. (2)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Coelastrum	sp. (4)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Hydrodictyon	sp.	CHLOR	x	filament	100	283.53	1	1	1			
14	417-3-South	050417	Kirchneriella	sp. (1)	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Monoraphidium	griffithii	CHLOR	x	cell	200	0.25	50	1	1			
14	417-3-South	050417	Mougeotia	sp.	CHLOR	x	filament	100	283.53	1	1	1			
14	417-3-South	050417	Pandorina	morum	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Pediastrum	duplex	CHLOR	x	colony	200	0.25	50	1	1			
14	417-3-South	050417	Pediastrum	tetras	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Rhizoclonium	sp.	CHLOR	x	filament	100	283.53	1	1	1			
14	417-3-South	050417	Rhizoclonium/Cladophora	sp.	CHLOR	x	filament	100	283.53	1	1	1			
14	417-3-South	050417	Scenedesmus	magnus	CHLOR	x	colony	200	0.25	50	1	1			
14	417-3-South	050417	Scenedesmus	obtusus	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Scenedesmus	sp. (23)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Scenedesmus	sp. (8)	CHLOR	x	colony	400	0.0625	50	1	1			
14	417-3-South	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	1	1			
14	417-3-South	050417	Staurastrum	sp. (large)	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Staurastrum	sp. (sm)	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Teilingia	sp.	CHLOR	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	cryptophyte	sp. (D=6um)	CRYPT	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	cryptophyte	sp. (L=8um)	CRYPT	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	Ceratium	hirundinella	DINOP	x	cell	200	0.25	50	1	1			
14	417-3-South	050417	Trachelomonas	sp.	EUGLE	x	cell	200	0.25	50	1	1			
14	417-3-South	050417	Pseudostaurastrum	sp.	XANTH	x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
14	417-3-South	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
15	417-1-South	050417	Anabaena	circinalis/flos-aquae (1)	CYANO	5	filament	400	0.0625	50	3	1	151	824	476
15	417-1-South	050417	Aphanocapsa	spp. <2um	CYANO	1	colony	400	0.0625	50	3	1	30		
15	417-1-South	050417	Limnothrix/Pseudanabaena	sp.	CYANO	8	filament	400	0.0625	50	3	1	242		
15	417-1-South	050417	Microcystis	sp. (1)	CYANO	3	colony	200	0.25	50	3	1	23		
15	417-1-South	050417	Microcystis unicell	sp.	CYANO	10	cell	400	0.0625	50	3	1	302		
15	417-1-South	050417	oscillatorian filament	sp. (1)	CYANO	2	filament	400	0.0625	50	3	1	60		
15	417-1-South	050417	Woronichina/Coelomoron	sp.	CYANO	2	colony	200	0.25	50	3	1	15		
15	417-1-South	050417	Aulacoseira	italica	BACIL	x	chain	200	0.25	50	3	1			
15	417-1-South	050417	centric diatom	sp. (D=10um)	BACIL	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Navicula	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Nitzschia	sp. (L=10um)	BACIL	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Nitzschia	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Botryococcus	braunii (sm)	CHLOR	x	colony	200	0.25	50	3	1			
15	417-1-South	050417	cf. Didymocystis	sp.	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Closterium	acutum var. variabile	CHLOR	x	cell	200	0.25	50	3	1			
15	417-1-South	050417	Closterium	sp. (1)	CHLOR	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Coelastrum	sp. (2)	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Didymocystis	fina	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Kirchneriella	sp. (1)	CHLOR	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Oocystis	sp. (1)	CHLOR	x	colony	200	0.25	50	3	1			
15	417-1-South	050417	Oocystis	sp. (3)	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Pandorina	morum	CHLOR	x	colony	200	0.25	50	3	1			
15	417-1-South	050417	Pediastrum	boryanum	CHLOR	x	colony	100	283.53	1	3	1			
15	417-1-South	050417	Pediastrum	tetras	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Rhizoclonium	sp.	CHLOR	x	filament	100	283.53	1	3	1			
15	417-1-South	050417	Scenedesmus	bicaudatus	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Scenedesmus	obtusus	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Scenedesmus	quadricauda (4 cells)	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Scenedesmus	sp. (5)	CHLOR	x	colony	400	0.0625	50	3	1			
15	417-1-South	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	3	1			
15	417-1-South	050417	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	50	3	1			
15	417-1-South	050417	Tetrastrum	heteracanthum	CHLOR	x	cell	200	0.25	50	3	1			
15	417-1-South	050417	cryptophyte	sp. (D=5um)	CRYPT	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	cryptophyte	sp. (D=8um)	CRYPT	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	cryptophyte	sp. (L=10um)	CRYPT	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Ceratium	hirundinella	DINOP	x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	Isthmochloron	gracile	XANTH	x	cell	100	283.53	1	3	1			
15	417-1-South	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
15	417-1-South	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	3	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
16	**417 Univ. NW**	**050417**	**Anabaena**	**circinalis/flos-aquae (1)**	**CYANO**	**1**	**filament**	**200**	**0.25**	**50**	**2**	**1**	**11**	420	**11**
16	417 Univ. NW	050417	cyanophyte single cell	sp. (long)	CYANO	4	cell	400	0.0625	50	2	1	181		
16	417 Univ. NW	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	400	0.0625	50	2	1	45		
16	417 Univ. NW	050417	oscillatorian filament	sp. (1)	CYANO	1	filament	400	0.0625	50	2	1	45		
16	417 Univ. NW	050417	Planktolyngbya	undulata	CYANO	3	filament	400	0.0625	50	2	1	136		
16	417 Univ. NW	050417	pennate diatom	sp. (L=10um)	BACIL	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	pennate diatom	sp. (L=25um)	BACIL	x	cell	200	0.25	50	2	1			
16	417 Univ. NW	050417	Synedra	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	cf. Didymocystis	sp.	CHLOR	x	colony	400	0.0625	50	2	1			
16	417 Univ. NW	050417	cf. Radiofilum	sp.	CHLOR	x	filament	100	283.53	1	2	1			
16	417 Univ. NW	050417	chlorophyte filament	sp. (1)	CHLOR	x	filament	100	283.53	1	2	1			
16	417 Univ. NW	050417	chlorophyte filament	sp. (A)	CHLOR	x	filament	100	283.53	1	2	1			
16	417 Univ. NW	050417	Closterium	acutum var. variabile	CHLOR	x	cell	200	0.25	50	2	1			
16	417 Univ. NW	050417	Coelastrum	sp. (2)	CHLOR	x	colony	200	0.25	50	2	1			
16	417 Univ. NW	050417	Cosmarium	sp. (large)	CHLOR	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Cosmarium	sp. (sm)	CHLOR	x	cell	200	0.25	50	2	1			
16	417 Univ. NW	050417	Monoraphidium	sp. (1)	CHLOR	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Mougeotia	sp.	CHLOR	x	filament	200	0.25	50	2	1			
16	417 Univ. NW	050417	Onychonema/Sphaerozosma	sp.	CHLOR	x	chain	100	283.53	1	2	1			
16	417 Univ. NW	050417	Pandorina	morum	CHLOR	x	colony	200	0.25	50	2	1			
16	417 Univ. NW	050417	Scenedesmus	sp. (23)	CHLOR	x	colony	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Spirogyra	sp.	CHLOR	x	filament	100	283.53	1	2	1			
16	417 Univ. NW	050417	Staurastrum	sp. (large)	CHLOR	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Staurastrum	sp. (med)	CHLOR	x	cell	200	0.25	50	2	1			
16	417 Univ. NW	050417	Staurodesmus	sp. (short arm)	CHLOR	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Zygnema	sp. (1)	CHLOR	x	filament	200	0.25	50	2	1			
16	417 Univ. NW	050417	cryptophyte	sp. (D=10um)	CRYPT	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	cryptophyte	sp. (L=5um)	CRYPT	x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	Ceratium	hirundinella	DINOP	x	cell	200	0.25	50	2	1			
16	417 Univ. NW	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	2	1			
16	417 Univ. NW	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	50	2	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magn	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
17	Horatio 1 @ Weir	050417	Nitzschia	sp. (L=30um)	BACIL	x	cell	400	0.0625	70	1	1		0	0
17	Horatio 1 @ Weir	050417	Actinastrum	gracillimum	CHLOR	x	colony	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Chlorogonium	sp.	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Eudorina	sp. (1)	CHLOR	x	colony	100	283.53	1	1	1			
17	Horatio 1 @ Weir	050417	Golenkiniopsis	sp. (1)	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Monoraphidium	arcuatum	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Monoraphidium	minutum	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Monoraphidium	sp. (1)	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Scenedesmus	magnus	CHLOR	x	colony	200	0.25	30	1	1			
17	Horatio 1 @ Weir	050417	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Scenedesmus	sp. (13)	CHLOR	x	colony	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	Schroederia	sp. (1)	CHLOR	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	cryptophyte	sp. (D=12um)	CRYPT	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	cryptophyte	sp. (D=8um)	CRYPT	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	cryptophyte	sp. (L=12um)	CRYPT	x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
17	Horatio 1 @ Weir	050417	unicell, sphere 5-7.5um	spp.		x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Aphanocapsa	sp. (D=1.5um)	CYANO	1	colony	400	0.0625	70	1	1	65	270	0
18	Horatio 2 @ Weir	050417	cyanophyte colony	sp. (B)	CYANO	1	colony	400	0.0625	70	1	1	65		
18	Horatio 2 @ Weir	050417	Limnothrix/Pseudanabaena	sp.	CYANO	1	filament	400	0.0625	70	1	1	65		
18	Horatio 2 @ Weir	050417	Merismopedia	tenuissima	CYANO	2	colony	200	0.25	30	1	1	76		
18	Horatio 2 @ Weir	050417	Navicula	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Nitzschia	sp. (L=50um)	BACIL	x	cell	200	0.25	30	1	1			
18	Horatio 2 @ Weir	050417	Synedra	sp. (L=40um)	BACIL	x	cell	200	0.25	30	1	1			
18	Horatio 2 @ Weir	050417	Ankistrodesmus	gracilis	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	cf. Quadrigula	sp.	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	chlorophyte colony	sp. (B)	CHLOR	x	colony	200	0.25	30	1	1			
18	Horatio 2 @ Weir	050417	Coelastrum	sp. (1)	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Cosmarium	sp. (sm)	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Crucigeniella	crucifera	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Dictyosphaerium	sp.	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Eudorina	sp. (1)	CHLOR	x	colony	200	0.25	30	1	1			
18	Horatio 2 @ Weir	050417	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Monoraphidium	arcuatum	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Monoraphidium	circinale	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Monoraphidium	minutum	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Monoraphidium	sp. (1)	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	acuminatus	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	bernardii	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	magnus	CHLOR	x	colony	200	0.25	30	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	obtusus	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	sp. (11)	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	sp. (5)	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Scenedesmus	sp. (8)	CHLOR	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Teilingia	sp.	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Tetrastrum	triangulare	CHLOR	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Stylobryon/Bicosoeca	sp.	CHRYS	x	colony	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	cryptophyte	sp. (D=25um)	CRYPT	x	cell	200	0.25	30	1	1			
18	Horatio 2 @ Weir	050417	Euglena	sp.	EUGLE	x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	Euglena	sp.	EUGLE	x	cell	100	283.53	1	1	1			
18	Horatio 2 @ Weir	050417	Trachelomonas	sp.	EUGLE	x	cell	100	283.53	1	1	1			
18	Horatio 2 @ Weir	050417	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
18	Horatio 2 @ Weir	050417	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			

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 µg/L. MCLR standard and spike recoveries averaged 63-74%.

Summary of Results

Sample		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 µg/L

University of Central Florida: Microcystin Results

Analysis via ELISA

Sample ID	Initial Conc. Factor	Dilution Ratio	Final Conc. Factor	Assay Value, ug/L	Std. Recovery %	Corrected Spike Recovery (%)	Final Corrected Concentration (ug/L)	Average (ug/L)
UCF-1	1x	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		0	1x	0.03	77	98	< 0.04	
UCF-6	1x	0	1x	0.04	88	89	0.04	**0.05**
Lake Patrick		0	1x	0.05	88	89	0.06	
UCF-7	1x	0	1x	0.07	88	89	0.08	**0.06**
Terrier Pond East		0	1x	0.04	88	89	0.04	
UCF-8	1x	0	1x	0.06	88	89	0.07	**0.08**
Terrier Pond South		0	1x	0.07	88	89	0.08	
UCF-9	1x	0	1x	0.08	88	89	0.09	**0.12**
417-5-South		0	1x	0.13	88	89	0.15	
UCF-10	1x	0	1x	0.11	102	98	0.11	**0.15**
417-4-South		0	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	1x	0	1x	0.01	102	98	< 0.04	**< 0.04**
Student Union		0	1x	0.02	102	98	< 0.04	

Quantification limit = 0.04 μg/L
na = not applicable

Analyst: C. Williams

Date: 9/2/2005

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
1	Filtrate #1	05___	cyanophyte filament	sp. (1)	CYANO	38	filament	400	0.0625	70	1	1	2,463	2,928	1
1	Filtrate #1	05___	cf. Planktolyngbya	sp.	CYANO	2	filament	400	0.0625	70	1	1	130		
1	Filtrate #1	05___	cyanophyte single cell	sp. (long)	CYANO	2	cell	400	0.0625	70	1	1	130		
1	Filtrate #1	05___	cyanophyte filament	sp. (3)	CYANO	2	filament	200	0.25	30	1	1	76		
1	Filtrate #1	05___	Aphanocapsa	sp. (1)	CYANO	1	colony	400	0.0625	70	1	1	65		
1	Filtrate #1	05___	cyanophyte filament	sp. (2)	CYANO	1	filament	400	0.0625	70	1	1	65		
1	**Filtrate #1**	**05___**	**Anabaena**	**sp. (3)**	**CYANO**	**1**	**filament**	**100**	**283.53**	**1**	**1**	**1**	**1**		
1	Filtrate #1	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
1	Filtrate #1	05___	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
2	Filtrate #2	05___	cyanophyte filament	sp. (1)	CYANO	8	filament	400	0.0625	70	1	1	518	686	0
2	Filtrate #2	05___	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	70	1	1	130		
2	Filtrate #2	05___	Planktothrix	sp. (2)	CYANO	1	filament	200	0.25	30	1	1	38		
2	Filtrate #2	05___	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	1	1			
2	Filtrate #2	05___	unicell, sphere 2.5-5um	sp. (long)		x	cell	400	0.0625	70	1	1			
2	Filtrate #2	05___	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
3	Filtrate #3	05___	cyanophyte filament	sp. (1)	CYANO	6	filament	400	0.0625	70	1	1	389	650	0
3	Filtrate #3	05___	cyanophyte filament	sp. (2)	CYANO	2	filament	400	0.0625	70	1	1	130		
3	Filtrate #3	05___	cyanophyte single cell	sp. (long)	CYANO	2	cell	400	0.0625	70	1	1	130		
3	Filtrate #3	05___	Planktothrix	sp. (2)	CYANO	1	filament	100	283.53	1	1	1	1		
3	Filtrate #3	05___	oscillatorian filament	sp. (1)	CYANO	1	filament	100	283.53	1	1	1	1		
3	Filtrate #3	05___	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
3	Filtrate #3	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
3	Filtrate #3	05___	unknown flagellate	sp. (D=5um)		x	cell	400	0.0625	70	1	1			
4	Filtrate #4	05___	cyanophyte filament	sp. (2)	CYANO	9	filament	400	0.0625	70	1	1	583	1,231	0
4	Filtrate #4	05___	cyanophyte single cell	sp. (long)	CYANO	5	cell	400	0.0625	70	1	1	324		
4	Filtrate #4	05___	cyanophyte filament	sp. (1)	CYANO	3	filament	400	0.0625	70	1	1	194		
4	Filtrate #4	05___	oscillatorian filament	sp. (2)	CYANO	2	filament	400	0.0625	70	1	1	130		
4	Filtrate #4	05___	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
4	Filtrate #4	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
4	Filtrate #4	05___	unknown flagellate	sp. (D=7.5um)		x	cell	400	0.0625	70	1	1			
4	Filtrate #4	05___	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	1	1			
4	Filtrate #4	05___	chlorophyte single cell	sp. (1)	CHLOR	x	cell	400	0.0625	70	1	1			
4	Filtrate #4	05___	Chlorophyte unicell	sp. (D=7um)	CHLOR	x	cell	100	283.53	1	1	1			
4	Filtrate #4	05___	Nitzschia	sp. (L=20um)	BACIL	x	cell	100	283.53	1	1	1			
5	Filtrate #4b	05___	cyanophyte single cell	sp. (long)	CYANO	10	cell	400	0.0625	70	4	1	162	583	0
5	Filtrate #4b	05___	cyanophyte filament	sp. (2)	CYANO	8	filament	400	0.0625	70	4	1	130		
5	Filtrate #4b	05___	cyanophyte filament	sp. (1)	CYANO	5	filament	400	0.0625	70	4	1	81		
5	Filtrate #4b	05___	Aphanothece	sp. (1)	CYANO	4	colony	400	0.0625	70	4	1	65		
5	Filtrate #4b	05___	cyano-pseudo filament	sp. (1)	CYANO	3	filament	400	0.0625	70	4	1	49		
5	Filtrate #4b	05___	cyanophyte filament	sp. (3)	CYANO	3	filament	400	0.0625	70	4	1	49		
5	Filtrate #4b	05___	Glaucospira	sp.	CYANO	2	cell	400	0.0625	70	4	1	32		
5	Filtrate #4b	05___	oscillatorian filament	sp. (2)	CYANO	1	filament	400	0.0625	70	4	1	16		
5	Filtrate #4b	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	4	1			
5	Filtrate #4b	05___	unknown flagellate	sp. (D=8um)		x	cell	400	0.0625	70	4	1			
5	Filtrate #4b	05___	unknown flagellate	sp. (D=10um)		x	cell	400	0.0625	70	4	1			
5	Filtrate #4b	05___	unknown flagellate	sp. (L=7.5um)		x	cell	400	0.0625	70	4	1			
5	Filtrate #4b	05___	chlorophyte colony	sp. (G)	CHLOR	x	colony	400	0.0625	70	4	1			
5	Filtrate #4b	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	70	4	1			
5	Filtrate #4b	05___	cryptophyte	sp. (L=30um)	CRYPT	x	cell	200	0.25	30	4	1			
5	Filtrate #4b	05___	Nitzschia	sp. (L=35um)	BACIL	x	cell	200	0.25	30	4	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
6	Lake Patrick	05___	Planktothrix	agardhii/mougeotii	CYANO	56	filament	400	0.0625	70	1	1	3,629	5,011	3,759
6	Lake Patrick	05___	cyanophyte filament	sp. (1)	CYANO	6	filament	400	0.0625	70	1	1	389		
6	Lake Patrick	05___	Aphanocapsa	sp. (4)	CYANO	6	colony	400	0.0625	70	1	1	389		
6	Lake Patrick	05___	Anabaena	sp. (B)	CYANO	2	filament	400	0.0625	70	1	1	130		
6	Lake Patrick	05___	cyanophyte single cell	sp. (long)	CYANO	2	cell	400	0.0625	70	1	1	130		
6	Lake Patrick	05___	Aphanocapsa	sp. (1)	CYANO	1	colony	400	0.0625	70	1	1	65		
6	Lake Patrick	05___	cf. Gleocapsa	sp.	CYANO	1	colony	400	0.0625	70	1	1	65		
6	Lake Patrick	05___	Snowella	sp.	CYANO	1	colony	400	0.0625	70	1	1	65		
6	Lake Patrick	05___	oscillatorian filament	sp. (2)	CYANO	1	filament	400	0.0625	70	1	1	65		
6	Lake Patrick	05___	Planktolyngbya	limnetica	CYANO	1	filament	200	0.25	30	1	1	38		
6	Lake Patrick	05___	cf. Romeria	sp.	CYANO	1	filament	200	0.25	30	1	1	38		
6	Lake Patrick	05___	Calothrix	atricha	CYANO	5	filament	100	283.53	1	1	1	5		
6	Lake Patrick	05___	cyanophyte filament	sp. (3)	CYANO	4	filament	100	283.53	1	1	1	4		
6	Lake Patrick	05___	Lyngbya	sp. (1)	CYANO	1	filament	100	283.53	1	1	1	1		
6	Lake Patrick	05___	chlorophyte colony	sp. (G)	CHLOR	x	colony	400	0.0625	70	1	1			
6	Lake Patrick	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
6	Lake Patrick	05___	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	70	1	1			
6	Lake Patrick	05___	centric diatom	sp. (D=5um)	BACIL	x	cell	400	0.0625	70	1	1			
6	Lake Patrick	05___	Nitzschia	sp. (L=75um)	BACIL	x	cell	400	0.0625	70	1	1			
6	Lake Patrick	05___	pennate diatom	sp. (L=35um)	BACIL	x	cell	400	0.0625	70	1	1			
6	Lake Patrick	05___	Elakatothrix	viridis	CHLOR	x	colony	400	0.0625	70	1	1			
6	Lake Patrick	05___	Oocystis	sp. (3)	CHLOR	x	colony	400	0.0625	70	1	1			
6	Lake Patrick	05___	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	1	1			
6	Lake Patrick	05___	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	30	1	1			
6	Lake Patrick	05___	Closterium	sp. (1)	CHLOR	x	cell	200	0.25	30	1	1			
6	Lake Patrick	05___	centric diatom	sp. (D=12um)	BACIL	x	cell	200	0.25	30	1	1			
6	Lake Patrick	05___	Synedra	sp. (L=85um)	BACIL	x	cell	200	0.25	30	1	1			
6	Lake Patrick	05___	pennate diatom	sp. (L=150um)	BACIL	x	cell	100	283.53	1	1	1			
6	Lake Patrick	05___	Centritractus	sp.	XANTH	x	cell	100	283.53	1	1	1			
6	Lake Patrick	05___	Rhizoclonium	sp.	CHLOR	x	filament	100	283.53	1	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
7	Terrier Pond East	05___	cyanophyte filament	sp. (1)	CYANO	41	filament	400	0.0625	70	3	1	886	1,746	191
7	Terrier Pond East	05___	oscillatorian filament	sp. (2)	CYANO	16	filament	400	0.0625	70	3	1	346		
7	Terrier Pond East	05___	Aphanocapsa	sp. (4)	CYANO	11	colony	400	0.0625	70	3	1	238		
7	**Terrier Pond East**	**05___**	**Anabaena**	**circinalis/flos-aquae (1)**	**CYANO**	**8**	**filament**	**200**	**0.25**	**30**	**3**	**1**	**101**		
7	**Terrier Pond East**	**05___**	**Anabaena**	**sp. (6)**	**CYANO**	**3**	**filament**	**400**	**0.0625**	**70**	**3**	**1**	**65**		
7	Terrier Pond East	05___	cyanophyte filament	sp. (N)	CYANO	4	filament	200	0.25	30	3	1	50		
7	**Terrier Pond East**	**05___**	**Anabaena**	**sp. (B)**	**CYANO**	**2**	**filament**	**200**	**0.25**	**30**	**3**	**1**	**25**		
7	Terrier Pond East	05___	Pseudanabaena	sp. (1)	CYANO	1	filament	400	0.0625	70	3	1	22		
7	Terrier Pond East	05___	Pseudanabaena	galeata	CYANO	1	filament	200	0.25	30	3	1	13		
7	Terrier Pond East	05___	Lyngbya	sp. (4)	CYANO	4	filament	100	283.53	1	3	1	1		
7	Terrier Pond East	05___	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Monoraphidium	minutum	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	centric diatom	sp. (D=5um)	BACIL	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Monoraphidium	circinale	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Pandorina	morum	CHLOR	x	colony	400	0.0625	70	3	1			
7	Terrier Pond East	05___	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Urosolenia	sp.	BACIL	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	chlorophyte colony	sp. (G)	CHLOR	x	colony	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	70	3	1			
7	Terrier Pond East	05___	pennate diatom	sp. (L=25um)	BACIL	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Ankistrodesmus	cf. gracilis	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Nitzschia	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Closterium	sp. (1)	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Oocystis	sp. (3)	CHLOR	x	colony	400	0.0625	70	3	1			
7	Terrier Pond East	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Scenedesmus	sp. (12)	CHLOR	x	colony	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Synedra	sp. (L=40um)	BACIL	x	cell	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	70	3	1			
7	Terrier Pond East	05___	Closteriopsis	sp.	CHLOR	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	centric diatom	sp. (D=20um)	BACIL	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	chlorophyte colony	sp. (B)	CHLOR	x	colony	200	0.25	30	3	1			
7	Terrier Pond East	05___	Elakatothrix	viridis	CHLOR	x	colony	200	0.25	30	3	1			
7	Terrier Pond East	05___	Cosmarium	sp. (med)	CHLOR	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	Goniochloris	fallax	XANTH	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	Botryococcus	sp.	CHLOR	x	colony	200	0.25	30	3	1			
7	Terrier Pond East	05___	Lagerheimia	sp.	CHLOR	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	Pseudostaurastrum	sp.	XANTH	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	Treubaria	schmidlei	CHLOR	x	cell	200	0.25	30	3	1			
7	Terrier Pond East	05___	Staurastrum	sp. (large)	CHLOR	x	cell	100	283.53	1	3	1			
7	Terrier Pond East	05___	Ankistrodesmus	falcatus	CHLOR	x	cell	100	283.53	1	3	1			
7	Terrier Pond East	05___	Crucigeniella	apiculata	CHLOR	x	colony	100	283.53	1	3	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
8	Terrier Pond South	05___	cyanophyte filament	sp. (1)	CYANO	26	filament	400	0.0625	70	3	1	562	1,501	265
8	Terrier Pond South	05___	Aphanocapsa	sp. (4)	CYANO	9	colony	400	0.0625	70	3	1	194		
8	Terrier Pond South	05___	Aphanocapsa	sp. (1)	CYANO	9	colony	400	0.0625	70	3	1	194		
8	Terrier Pond South	05___	oscillatorian filament	sp. (1)	CYANO	9	filament	400	0.0625	70	3	1	194		
8	**Terrier Pond South**	**05___**	**Anabaena**	**sp. (B)**	**CYANO**	**12**	**filament**	**200**	**0.25**	**30**	**3**	**1**	**151**		
8	**Terrier Pond South**	**05___**	**Anabaena**	**circinalis/flos-aquae (1)**	**CYANO**	**9**	**filament**	**200**	**0.25**	**30**	**3**	**1**	**113**		
8	Terrier Pond South	05___	cyanophyte filament	sp. (2)	CYANO	3	filament	400	0.0625	70	3	1	65		
8	Terrier Pond South	05___	Aphanocapsa/Chroococcus	sp. (A)	CYANO	1	colony	200	0.25	30	3	1	13		
8	Terrier Pond South	05___	Aphanothece	sp. (A)	CYANO	1	colony	200	0.25	30	3	1	13		
8	Terrier Pond South	05___	cyanophyte filament	sp. (N)	CYANO	4	filament	100	283.53	1	3	1	1		
8	Terrier Pond South	05___	cf. Phormidium	sp.	CYANO	1	filament	100	283.53	1	3	1	0		
8	Terrier Pond South	05___	Pandorina	morum	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Tetraedriella	sp.	XANTH	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Synedra	sp. (L=75um)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Nitzschia	sp. (L=15um)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	centric diatom	sp. (D=7.5um)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Closterium	sp. (1)	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Lagerheimia	sp.	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	pennate diatom	sp. (L=15um)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Monoraphidium	circinale	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Ankistrodesmus	gracilis	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Nitzschia	sp. (L=37um)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Closteriopsis	sp.	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Kirchneriella	sp. (1)	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	centric diatom	sp. (D=7.5)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Kirchneriella	sp. (2)	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Treubaria	schmidlei	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Monoraphidium	flexuosum	CHLOR	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	centric diatom	sp. (D=5um)	BACIL	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Eutetramorus	sp. (1)	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	70	3	1			
8	Terrier Pond South	05___	cryptophyte	sp. (L=7um)	CRYPT	x	cell	400	0.0625	70	3	1			
8	Terrier Pond South	05___	Tetrastrum	elegans	CHLOR	x	colony	200	0.25	30	3	1			
8	Terrier Pond South	05___	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	30	3	1			
8	Terrier Pond South	05___	Ankistrodesmus	falcatus	CHLOR	x	cell	200	0.25	30	3	1			
8	Terrier Pond South	05___	Isthmochloron	gracile	XANTH	x	cell	100	283.53	1	3	1			
8	Terrier Pond South	05___	Cosmarium	sp. (med)	CHLOR	x	cell	100	283.53	1	3	1			
8	Terrier Pond South	05___	Oocystis	sp. (2)	CHLOR	x	colony	100	283.53	1	3	1			
8	Terrier Pond South	05___	chlorophyte filament	sp.	CHLOR	x	filament	100	283.53	1	3	1			
8	Terrier Pond South	05___	Pseudostaurastrum	sp.	XANTH	x	cell	100	283.53	1	3	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
9	417-5-South	05___	Aphanocapsa	sp. (4)	CYANO	7	colony	400	0.0625	70	1	1	454	499	4
9	417-5-South	05___	oscillatorian filament	sp. (1)	CYANO	1	filament	200	0.25	30	1	1	38		
9	417-5-South	05___	Aphanocapsa	sp. (6)	CYANO	4	colony	100	283.53	1	1	1	4		
9	**417-5-South**	**05___**	**Planktothrix**	**agardhii/mougeotii**	**CYANO**	**3**	**filament**	**100**	**283.53**	**1**	**1**	**1**	**3**		
9	**417-5-South**	**05___**	**Anabaena**	**sp. (B)**	**CYANO**	**1**	**filament**	**100**	**283.53**	**1**	**1**	**1**	**1**		
9	417-5-South	05___	chlorophyte colony	sp. (G)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Oocystis	sp. (3)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Ankistrodesmus	cf. gracilis	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Elakatothrix	viridis	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	chlorophyte colony	sp. (A)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	centric diatom	sp. (D=7.5um)	BACIL	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Closterium	acutum var. variabile	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Oocystis	sp. (2)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Oocystis	sp. (1)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Oocystis	sp. (5)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Centritractus	sp.	XANTH	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Euastrum	sp.	CHLOR	x	cell	400	0.0625	70	1	1			
9	417-5-South	05___	Quadrigula	quaternata	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Scenedesmus	sp. (20)	CHLOR	x	colony	400	0.0625	70	1	1			
9	417-5-South	05___	Scenedesmus	sp. (6)	CHLOR	x	colony	200	0.25	30	1	1			
9	417-5-South	05___	Aulacoseira	italica	BACIL	x	chain	100	283.53	1	1	1			
9	417-5-South	05___	pennate diatom	sp. (L=40um)	BACIL	x	cell	100	283.53	1	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
10	417-4-South	05___	Microcystis unicell	sp.	CYANO	123	cell	400	0.0625	70	1	1	7,971	13,797	9,064
10	417-4-South	05___	Microcystis	wesenbergii	CYANO	58	colony	400	0.0625	70	1	1	3,759		
10	417-4-South	05___	Anabaena	circinalis/flos-aquae (1)	CYANO	14	filament	400	0.0625	70	1	1	907		
10	417-4-South	05___	Aphanocapsa	sp. (1)	CYANO	5	colony	400	0.0625	70	1	1	324		
10	417-4-South	05___	oscillatorian filament	sp. (2)	CYANO	5	filament	400	0.0625	70	1	1	324		
10	417-4-South	05___	Aphanocapsa	sp. (4)	CYANO	4	colony	400	0.0625	70	1	1	259		
10	417-4-South	05___	Microcystis colony	sp. (med)	CYANO	1	colony	400	0.0625	70	1	1	65		
10	417-4-South	05___	Aphanocapsa	sp. (2)	CYANO	1	colony	400	0.0625	70	1	1	65		
10	417-4-South	05___	Anabaena	sp. (1)	CYANO	1	filament	400	0.0625	70	1	1	65		
10	417-4-South	05___	Anabaena	sp. (B)	CYANO	1	filament	200	0.25	30	1	1	38		
10	417-4-South	05___	Planktothrix	agardhii/mougeotii	CYANO	10	filament	100	283.53	1	1	1	10		
10	417-4-South	05___	Microcystis colony	sp. (large)	CYANO	4	colony	100	283.53	1	1	1	4		
10	417-4-South	05___	Anabaena	sp. (G)	CYANO	4	filament	100	283.53	1	1	1	4		
10	417-4-South	05___	Planktothrix	sp. (1)	CYANO	2	filament	100	283.53	1	1	1	2		
10	417-4-South	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
10	417-4-South	05___	Coelastrum	sp. (2)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Kirchneriella	sp. (1)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Aulacoseira	granulata	BACIL	x	chain	400	0.0625	70	1	1			
10	417-4-South	05___	Scenedesmus	sp. (20)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Scenedesmus	sp. (12)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	centric diatom	sp. (D=10um)	BACIL	x	cell	400	0.0625	70	1	1			
10	417-4-South	05___	Nitzschia	sp. (L=25um)	BACIL	x	cell	400	0.0625	70	1	1			
10	417-4-South	05___	Oocystis	sp. (5)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	1	1			
10	417-4-South	05___	Treubaria	schmidlei	CHLOR	x	cell	400	0.0625	70	1	1			
10	417-4-South	05___	Kirchneriella	sp. (2)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Oocystis	sp. (3)	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Scenedesmus	bicaudatus	CHLOR	x	colony	400	0.0625	70	1	1			
10	417-4-South	05___	Pandorina	morum	CHLOR	x	colony	200	0.25	30	1	1			
10	417-4-South	05___	Aulacoseira	italica	BACIL	x	chain	200	0.25	30	1	1			
10	417-4-South	05___	diatom chain	sp. (D=12.5)	BACIL	x	chain	200	0.25	30	1	1			
10	417-4-South	05___	Nitzschia	sp. (L=30um)	BACIL	x	cell	200	0.25	30	1	1			
10	417-4-South	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	200	0.25	30	1	1			
10	417-4-South	05___	Scenedesmus	quadricauda	CHLOR	x	colony	100	283.53	1	1	1			
10	417-4-South	05___	Isthmochloron	gracile	XANTH	x	cell	100	283.53	1	1	1			
10	417-4-South	05___	Staurastrum	sp. (med)	CHLOR	x	cell	100	283.53	1	1	1			
10	417-4-South	05___	Closterium	sp. (1)	CHLOR	x	cell	100	283.53	1	1	1			
10	417-4-South	05___	Pediastrum	duplex	CHLOR	x	colony	100	283.53	1	1	1			
10	417-4-South	05___	branched filamentous chloroph	sp. (H)	CHLOR	x	filament	100	283.53	1	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
11	417-3-South	05___	Aphanocapsa	sp. (4)	CYANO	64	colony	400	0.0625	70	1	1	4,148	11,038	5,897
11	**417-3-South**	**05___**	**Anabaena**	**circinalis/flos-aquae (2)**	**CYANO**	**61**	**filament**	**400**	**0.0625**	**70**	**1**	**1**	**3,953**		
11	**417-3-South**	**05___**	**Microcystis unicell**	**sp.**	**CYANO**	**24**	**cell**	**400**	**0.0625**	**70**	**1**	**1**	**1,555**		
11	417-3-South	05___	oscillatorian filament	sp. (2)	CYANO	10	filament	400	0.0625	70	1	1	648		
11	**417-3-South**	**05___**	**Anabaena**	**sp. (B)**	**CYANO**	**3**	**filament**	**400**	**0.0625**	**70**	**1**	**1**	**194**		
11	417-3-South	05___	cyanophyte filament	sp. (3)	CYANO	3	filament	400	0.0625	70	1	1	194		
11	**417-3-South**	**05___**	**Microcystis colony**	**sp. (sm)**	**CYANO**	**3**	**colony**	**400**	**0.0625**	**70**	**1**	**1**	**194**		
11	417-3-South	05___	oscillatorian filament	sp. (1)	CYANO	2	filament	200	0.25	30	1	1	76		
11	417-3-South	05___	Pseudanabaena	limnetica	CYANO	1	filament	400	0.0625	70	1	1	65		
11	417-3-South	05___	Lyngbya	sp. (2)	CYANO	4	filament	100	283.53	1	1	1	4		
11	417-3-South	05___	Planktothrix	sp. (1)	CYANO	3	filament	100	283.53	1	1	1	3		
11	417-3-South	05___	cyanophyte filament	sp. (N)	CYANO	1	filament	100	283.53	1	1	1	1		
11	417-3-South	05___	Planktothrix	sp. (2)	CYANO	1	filament	100	283.53	1	1	1	1		
11	417-3-South	05___	Woronichina	sp.	CYANO	1	colony	100	283.53	1	1	1	1		
11	417-3-South	05___	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Scenedesmus	sp. (12)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	chlorophyte colony	sp. (A)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Elakatothrix	viridis	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Scenedesmus	sp. (11)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Nitzschia	sp. (L=20um)	BACIL	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Koliella	longiseta f. variabilis	CHLOR	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Oocystis	sp. (5)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	pennate diatom	sp. (L=25um)	BACIL	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Scenedesmus	sp. (5)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	chlorophyte colony	sp. (D)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Quadrigula	quaternata	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Pandorina	morum	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Staurastrum	sp. (small)	CHLOR	x	cell	400	0.0625	70	1	1			
11	417-3-South	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	70	1	1			
11	417-3-South	05___	Coelastrum	sp. (2)	CHLOR	x	colony	200	0.25	30	1	1			
11	417-3-South	05___	centric diatom	sp. (D=15um)	BACIL	x	cell	200	0.25	30	1	1			
11	417-3-South	05___	Oocystis	sp. (2)	CHLOR	x	colony	200	0.25	30	1	1			
11	417-3-South	05___	Cosmarium	sp. (sm)	CHLOR	x	cell	200	0.25	30	1	1			
11	417-3-South	05___	branched filamentous chloroph	sp.	CHLOR	x	filament	100	283.53	1	1	1			
11	417-3-South	05___	Vaucheria	sp.	XANTH	x	filament	100	283.53	1	1	1			
11	417-3-South	05___	Pandorina	morum	CHLOR	x	colony	100	283.53	1	1	1			
11	417-3-South	05___	Aulacoseira	sp.	BACIL	x	chain	100	283.53	1	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
12	417-1-South	05___	Microcystis unicell	sp.	CYANO	18	cell	400	0.0625	50	1	10	16,331	33,640	20,691
12	417-1-South	05___	Limnothrix/Pseudanabaena	sp.	CYANO	7	filament	400	0.0625	50	1	10	6,351		
12	417-1-South	05___	cyanophyte filament	sp. (3)	CYANO	3	filament	400	0.0625	50	1	10	2,722		
12	417-1-South	05___	Microcystis colony	sp. (med)	CYANO	12	colony	200	0.25	50	1	10	2,722		
12	417-1-South	05___	Aphanocapsa	sp. (1)	CYANO	2	colony	400	0.0625	50	1	10	1,815		
12	417-1-South	05___	Microcystis colony	sp. (sm)	CYANO	5	colony	200	0.25	50	1	10	1,134		
12	417-1-South	05___	Pseudanabaena	sp. (1)	CYANO	1	filament	400	0.0625	50	1	10	907		
12	417-1-South	05___	cyanophyte filament	sp. (1)	CYANO	1	filament	400	0.0625	50	1	10	907		
12	417-1-South	05___	Anabaena	sp. (C)	CYANO	2	filament	200	0.25	50	1	10	454		
12	417-1-South	05___	Snowella	sp.	CYANO	1	colony	200	0.25	50	1	10	227		
12	417-1-South	05___	Anabaena	circinalis/flos-aquae (1)	CYANO	2	filament	100	283.53	1	1	10	20		
12	417-1-South	05___	Microcystis colony	sp. (large)	CYANO	2	colony	100	283.53	1	1	10	20		
12	417-1-South	05___	Planktothrix	agardhii/mougeotii	CYANO	1	filament	100	283.53	1	1	10	10		
12	417-1-South	05___	Lyngbya	sp. (3)	CYANO	1	filament	100	283.53	1	1	10	10		
12	417-1-South	05___	oscillatorian filament	sp. (1)	CYANO	1	filament	100	283.53	1	1	10	10		
12	417-1-South	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	10			
12	417-1-South	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	1	10			
12	417-1-South	05___	unicell, oval/rod 2.5-5um	spp.		x	cell	400	0.0625	50	1	10			
12	417-1-South	05___	Actinastrum	hantzschii	CHLOR	x	colony	400	0.0625	50	1	10			
12	417-1-South	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	50	1	10			
12	417-1-South	05___	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	1	10			
12	417-1-South	05___	Scenedesmus	sp. (5)	CHLOR	x	colony	400	0.0625	50	1	10			
12	417-1-South	05___	centic diatom	sp. (D=7.5)	BACIL	x	cell	400	0.0625	50	1	10			
12	417-1-South	05___	cf. Ankistrodesmus	sp. (L=27um)	CHLOR	x	cell	200	0.25	50	1	10			
12	417-1-South	05___	Actinastrum	gracillimum	CHLOR	x	colony	200	0.25	50	1	10			
12	417-1-South	05___	Scenedesmus	sp. (12)	CHLOR	x	colony	200	0.25	50	1	10			
12	417-1-South	05___	Isthmochloron	gracile	XANTH	x	cell	100	283.53	1	1	10			
12	417-1-South	05___	Closterium	sp. (1)	CHLOR	x	cell	100	283.53	1	1	10			
13	417-2-North	05___	Planktothrix	agardhii/mougeotii	CYANO	53	filament	400	0.0625	50	1	2	9,617	17,578	14,312
13	417-2-North	05___	Microcystis unicell	sp.	CYANO	15	cell	400	0.0625	50	1	2	2,722		
13	417-2-North	05___	oscillatorian filament	sp. (2)	CYANO	8	filament	400	0.0625	50	1	2	1,452		
13	417-2-North	05___	Microcystis colony	sp. (sm)	CYANO	5	colony	400	0.0625	50	1	2	907		
13	417-2-North	05___	Anabaena	circinalis/flos-aquae (2)	CYANO	4	filament	400	0.0625	50	1	2	726		
13	417-2-North	05___	Aphanocapsa	sp. (1)	CYANO	3	colony	400	0.0625	50	1	2	544		
13	417-2-North	05___	Pseudanabaena	limnetica	CYANO	3	filament	400	0.0625	50	1	2	544		
13	417-2-North	05___	cyanophyte filament	sp. (1)	CYANO	2	filament	400	0.0625	50	1	2	363		
13	417-2-North	05___	Microcystis colony	sp. (med)	CYANO	7	colony	200	0.25	50	1	2	318		
13	417-2-North	05___	Aphanothece	sp. (6)	CYANO	1	colony	400	0.0625	50	1	2	181		
13	417-2-North	05___	cyanophyte filament	sp. (3)	CYANO	1	filament	400	0.0625	50	1	2	181		
13	417-2-North	05___	Microcystis colony	sp. (large)	CYANO	11	colony	100	283.53	1	1	2	22		
13	417-2-North	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Monoraphidium	arcuatum	CHLOR	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Schroederia	spiralis	CHLOR	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Coelastrum	sp. (1)	CHLOR	x	colony	400	0.0625	50	1	2			
13	417-2-North	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	1	2			
13	417-2-North	05___	Tetraedron	caudatum	CHLOR	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Goniochloris	mutica	XANTH	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	cf. Ankistrodesmus	sp.	CHLOR	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	centric diatom	sp. (D=10um)	BACIL	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	50	1	2			
13	417-2-North	05___	Isthmochloron	gracile	XANTH	x	cell	200	0.25	50	1	2			
13	417-2-North	05___	Schroederia	setigera	CHLOR	x	cell	200	0.25	50	1	2			
13	417-2-North	05___	Scenedesmus	acuminatus	CHLOR	x	colony	200	0.25	50	1	2			
13	417-2-North	05___	Pediastrum	duplex	CHLOR	x	colony	100	283.53	1	1	2			
13	417-2-North	05___	Pandorina	morum	CHLOR	x	colony	100	283.53	1	1	2			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
14	Lake Condel South	05____	cyanophyte filament	sp. (6)	CYANO	261	filament	400	0.0625	50	1	1	23,680	36,412	1,844
14	Lake Condel South	05____	Aphanocapsa	sp. (1)	CYANO	52	colony	400	0.0625	50	1	1	4,718		
14	Lake Condel South	05____	Aphanocapsa	sp. (3)	CYANO	24	colony	400	0.0625	50	1	1	2,178		
14	**Lake Condel South**	**05____**	**Microcystis colony**	**sp. (sm)**	**CYANO**	**13**	**colony**	**400**	**0.0625**	**50**	**1**	**1**	**1,179**		
14	Lake Condel South	05____	cyanophyte filament	sp. (3)	CYANO	9	filament	400	0.0625	50	1	1	817		
14	Lake Condel South	05____	Merismopedia	punctata	CYANO	7	colony	400	0.0625	50	1	1	635		
14	**Lake Condel South**	**05____**	**Microcystis unicell**	**sp.**	**CYANO**	**6**	**cell**	**400**	**0.0625**	**50**	**1**	**1**	**544**		
14	Lake Condel South	05____	Aphanocapsa	sp. (2)	CYANO	5	colony	400	0.0625	50	1	1	454		
14	Lake Condel South	05____	Aphanocapsa/Chroococcus	sp. (B)	CYANO	5	colony	400	0.0625	50	1	1	454		
14	Lake Condel South	05____	Microcystis	wesenbergii	CYANO	4	colony	400	0.0625	50	1	1	363		
14	Lake Condel South	05____	Woronichina/Snowella	sp.	CYANO	4	colony	400	0.0625	50	1	1	363		
14	Lake Condel South	05____	Aphanocapsa	sp. (4)	CYANO	3	colony	400	0.0625	50	1	1	272		
14	Lake Condel South	05____	cf. Romeria	sp.	CYANO	3	filament	400	0.0625	50	1	1	272		
14	Lake Condel South	05____	Planktolyngbya	undulata	CYANO	3	filament	400	0.0625	50	1	1	272		
14	**Lake Condel South**	**05____**	**Microcystis colony**	**sp. (med)**	**CYANO**	**5**	**colony**	**200**	**0.25**	**50**	**1**	**1**	**113**		
14	Lake Condel South	05____	Chroococcus	sp.	CYANO	1	colony	400	0.0625	50	1	1	91		
14	**Lake Condel South**	**05____**	**Microcystis colony**	**sp. (sm)**	**CYANO**	**7**	**colony**	**100**	**283.53**	**1**	**1**	**1**	**7**		
14	Lake Condel South	05____	Scenedesmus	sp. (17)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Synedra	sp. (L=50um)	BACIL	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	pennate diatom	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Crucigeniella	crucifera	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Cosmarium	sp. (sm)	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Oocystis	sp. (5)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Goniochloris	mutica	XANTH	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Tetrastrum	heteracanthum	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Goniochloris	cf. fallax	XANTH	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Kirchneriella	sp. (2)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Tetraedron	caudatum	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Pediastrum	boryanum	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	sp. (12)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	sp. (13)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	sp. (29)	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Pediastrum	tetras	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Staurastrum	sp. (med)	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Tetraedron	minimum	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Monoraphidium	circinale	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	bicaudatus	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Ankistrodesmus	cf. gracilis	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Didymocystis	sp.	CHLOR	x	colony	400	0.0625	50	1	1			
14	Lake Condel South	05____	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Ankistrodesmus	sp. (L=60um)	CHLOR	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Nitzschia	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	1	1			
14	Lake Condel South	05____	Scenedesmus	magnus	CHLOR	x	colony	200	0.25	50	1	1			
14	Lake Condel South	05____	Staurastrum	sp. (large)	CHLOR	x	cell	200	0.25	50	1	1			
14	Lake Condel South	05____	Elakatothrix	viridis	CHLOR	x	colony	200	0.25	50	1	1			
14	Lake Condel South	05____	pennate diatom	sp. (L=60um)	BACIL	x	cell	200	0.25	50	1	1			
14	Lake Condel South	05____	Centritractus	sp.	XANTH	x	cell	200	0.25	50	1	1			
14	Lake Condel South	05____	Coelastrum	sp. (1)	CHLOR	x	colony	200	0.25	50	1	1			
14	Lake Condel South	05____	cf. Tetraedriella	sp.	XANTH	x	cell	100	283.53	1	1	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
15	**Horatio 1 @ Weir**	**05___**	**cf. Cylindrospermopsis**	**sp. (coiled)**	**CYANO**	**56**	**filament**	**400**	**0.0625**	**50**	**2**	**1**	**2,540**	**7,825**	2,681
15	Horatio 1 @ Weir	05___	oscillatorian filament	sp. (2)	CYANO	26	filament	400	0.0625	50	2	1	1,179		
15	Horatio 1 @ Weir	05___	Aphanocapsa	sp. (3)	CYANO	20	colony	400	0.0625	50	2	1	907		
15	Horatio 1 @ Weir	05___	Pseudanabaena	galeata	CYANO	17	filament	400	0.0625	50	2	1	771		
15	Horatio 1 @ Weir	05___	oscillatorian filament	sp. (1)	CYANO	16	filament	400	0.0625	50	2	1	726		
15	Horatio 1 @ Weir	05___	Aphanocapsa	sp. (1)	CYANO	15	colony	400	0.0625	50	2	1	680		
15	Horatio 1 @ Weir	05___	Aphanothece	sp.(L=1.2um)	CYANO	4	colony	400	0.0625	50	2	1	181		
15	Horatio 1 @ Weir	05___	Merismopedia	punctata	CYANO	3	colony	400	0.0625	50	2	1	136		
15	Horatio 1 @ Weir	05___	Pseudanabaena	limnetica	CYANO	3	filament	400	0.0625	50	2	1	136		
15	Horatio 1 @ Weir	05___	Merismopedia	tenuissima	CYANO	3	colony	400	0.0625	50	2	1	136		
15	Horatio 1 @ Weir	05___	Pseudanabaena	sp. (1)	CYANO	3	filament	400	0.0625	50	2	1	136		
15	**Horatio 1 @ Weir**	**05___**	**Microcystis colony**	**sp. (sm)**	**CYANO**	**2**	**colony**	**400**	**0.0625**	**50**	**2**	**1**	**91**		
15	Horatio 1 @ Weir	05___	cyanophyte filament	sp. (1)	CYANO	1	filament	400	0.0625	50	2	1	45		
15	Horatio 1 @ Weir	05___	cyano-pseudo filament	sp.	CYANO	1	filament	400	0.0625	50	2	1	45		
15	Horatio 1 @ Weir	05___	Planktolyngbya	undulata	CYANO	1	filament	400	0.0625	50	2	1	45		
15	**Horatio 1 @ Weir**	**05___**	**Anabaena**	**sp. (E)**	**CYANO**	**1**	**filament**	**400**	**0.0625**	**50**	**2**	**1**	**45**		
15	Horatio 1 @ Weir	05___	Planktolyngbya	limnetica	CYANO	1	filament	200	0.25	50	2	1	11		
15	Horatio 1 @ Weir	05___	Lyngbya	sp. (1)	CYANO	7	filament	100	283.53	1	2	1	4		
15	Horatio 1 @ Weir	05___	cyanophyte filament	sp. (4)	CYANO	5	filament	100	283.53	1	2	1	3		
15	**Horatio 1 @ Weir**	**05___**	**Anabaena**	**sp. (B)**	**CYANO**	**4**	**filament**	**100**	**283.53**	**1**	**2**	**1**	**2**		
15	**Horatio 1 @ Weir**	**05___**	**Anabaena**	**sp. (6)**	**CYANO**	**4**	**filament**	**100**	**283.53**	**1**	**2**	**1**	**2**		
15	Horatio 1 @ Weir	05___	Oscillatorian filament	sp. (2)	CYANO	2	filament	100	283.53	1	2	1	1		
15	Horatio 1 @ Weir	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Phacus	sp. (L=30um)	EUGL	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Closterium	sp. (L=150um)	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Elakatothrix	viridis	CHLOR	x	colony	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	pennate diatom	sp. (L=20um)	BACIL	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Nitzschia	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Cosmarium	sp. (med)	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Phacus	sp. (L=20um)	EUGL	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Nitzschia	sp. (=35um)	BACIL	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Kirchneriella	sp. (1)	CHLOR	x	colony	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Ankistrodesmus	cf. gracilis	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	unknowm flagellate	sp. (D=10um)		x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Nitzschia	sp. (L=30um)	BACIL	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Scenedesmus	magnus	CHLOR	x	colony	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Cosmarium	sp. (sm)	CHLOR	x	cell	400	0.0625	50	2	1			
15	Horatio 1 @ Weir	05___	Pandorina	morum	CHLOR	x	colony	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	Coelastrum	sp. (2)	CHLOR	x	colony	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	centric diatom	sp. (D=10um)	BACIL	x	cell	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	Goniochloris	cf. mutica	XANTH	x	cell	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	centric diatom	sp. (D=50um)	BACIL	x	cell	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	Trachelomonas	sp.	EUGL	x	cell	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	pennate diatom	sp. (L=50um)	BACIL	x	cell	200	0.25	50	2	1			
15	Horatio 1 @ Weir	05___	Cosmarium	sp. (large)	CHLOR	x	cell	100	283.53	1	2	1			
15	Horatio 1 @ Weir	05___	Mougoetia	sp.	CHLOR	x	filament	100	283.53	1	2	1			
15	Horatio 1 @ Weir	05___	Aulacoseira	italica	BACIL	x	chain	100	283.53	1	2	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
16	Horatio 2 @ Weir	05___	Aphanocapsa	sp. (1)	CYANO	6	colony	400	0.0625	50	3	1	181	613	8
16	Horatio 2 @ Weir	05___	Aphanocapsa	sp. (4)	CYANO	3	colony	400	0.0625	50	3	1	91		
16	Horatio 2 @ Weir	05___	Cyanofilamnet	sp. (X)	#N/A	11	#N/A	200	0.25	50	3	1	83		
16	Horatio 2 @ Weir	05___	Aphanocapsa	sp. (3)	CYANO	2	colony	400	0.0625	50	3	1	60		
16	Horatio 2 @ Weir	05___	Chroococcus	sp.	CYANO	1	colony	400	0.0625	50	3	1	30		
16	Horatio 2 @ Weir	05___	coiled cyanophyte	sp. (1)	CYANO	1	filament	400	0.0625	50	3	1	30		
16	Horatio 2 @ Weir	05___	cyanophyte single cell	sp. (long)	CYANO	1	cell	400	0.0625	50	3	1	30		
16	Horatio 2 @ Weir	05___	cyanophyte filament	sp. (3)	CYANO	1	filament	400	0.0625	50	3	1	30		
16	Horatio 2 @ Weir	05___	Aphanocapsa	sp. (6)	CYANO	1	colony	400	0.0625	50	3	1	30		
16	Horatio 2 @ Weir	05___	Oscillatorian filament	sp. (1)	CYANO	3	filament	200	0.25	50	3	1	23		
16	Horatio 2 @ Weir	05___	Pseudanabaena	galeata	CYANO	2	filament	200	0.25	50	3	1	15		
16	**Horatio 2 @ Weir**	**05___**	**Planktothrix**	**agardhii/mougeotii**	**CYANO**	**1**	**filament**	**200**	**0.25**	**50**	**3**	**1**	**8**		
16	**Horatio 2 @ Weir**	**05___**	**Microcystis colony**	**sp. (sm)**	**CYANO**	**1**	**colony**	**100**	**283.53**	**1**	**3**	**1**	**0**		
16	Horatio 2 @ Weir	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	chlorophyte colony	sp. (B)	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Pandorina	morum	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Ankistrodesmus	cf. gracilis	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Closteriopsis	sp.	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Dictyosphaerium	sp. (1)	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Scenedesmus	sp. (12)	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	chlorophyte single cell	sp.	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Nitzschia	sp. (L=40um)	BACIL	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Centritractus	sp.	XANTH	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	centric diatom	sp. (D=10um)	BACIL	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Eudorina	sp. (1)	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Micractinium	sp.	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Goniochloris	cf. fallax	XANTH	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	pennate diatom	sp. (L=37um)	BACIL	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Phacus/Leponinclis	sp.	EUGL	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Monoraphidium	arcuatum	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	unknowm flagellate	sp.		x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Monoraphidium	minutum	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Monoraphidium	circinale	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Scenedesmus	sp. (10)	CHLOR	x	colony	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Tetraedron	minimum	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Schroederia	spiralis	CHLOR	x	cell	400	0.0625	50	3	1			
16	Horatio 2 @ Weir	05___	Scenedesmus	sp. (30)	CHLOR	x	colony	200	0.25	50	3	1			
16	Horatio 2 @ Weir	05___	Trachelomonas	sp.	EUGL	x	cell	200	0.25	50	3	1			
16	Horatio 2 @ Weir	05___	Closteriopsis	sp.	CHLOR	x	cell	100	283.53	1	3	1			
16	Horatio 2 @ Weir	05___	Oocystis	sp. (3)	CHLOR	x	colony	100	283.53	1	3	1			

	Sample Description	Sampling Date	Genus	Species	Algal Group	# Counted (units)	Counting Unit	Magnification	Field Area (mm2)	# of Fields	Settling Vol. (mL)	Dilution Factor	Species Units/mL	CYANO Total Units/mL	Ptox CYANO Units/mL
17	Student Union	05___	Aphanocapsa	sp. (1)	CYANO	61	colony	400	0.0625	50	3	1	1,845	3,450	38
17	Student Union	05___	coiled cyanophyte	sp. (1)	CYANO	16	filament	400	0.0625	50	3	1	484		
17	Student Union	05___	Aphanocapsa	sp. (3)	CYANO	11	colony	400	0.0625	50	3	1	333		
17	Student Union	05___	Aphanocapsa	sp. (4)	CYANO	7	colony	400	0.0625	50	3	1	212		
17	Student Union	05___	Aphanothece	sp. (2)	CYANO	6	colony	400	0.0625	50	3	1	181		
17	Student Union	05___	unknown cyanophyte filament	sp.	CYANO	3	filament	400	0.0625	50	3	1	91		
17	Student Union	05___	Aphanocapsa	sp. (7)	CYANO	3	colony	400	0.0625	50	3	1	91		
17	Student Union	05___	cf. Nodularia	sp.	CYANO	6	filament	200	0.25	50	3	1	45		
17	Student Union	05___	Planktothrix	sp. (1)	CYANO	5	filament	200	0.25	50	3	1	38		
17	**Student Union**	**05___**	**Planktothrix**	**agardhii/mougeotii**	**CYANO**	**5**	**filament**	**200**	**0.25**	**50**	**3**	**1**	**38**		
17	Student Union	05___	Pseudanabaena	limnetica	CYANO	1	filament	400	0.0625	50	3	1	30		
17	Student Union	05___	Merismopedia	punctata	CYANO	1	colony	400	0.0625	50	3	1	30		
17	Student Union	05___	Oscillatorian filament	sp. (2)	CYANO	1	filament	400	0.0625	50	3	1	30		
17	Student Union	05___	Calothrix	sp.	CYANO	5	filament	100	283.53	1	3	1	2		
17	Student Union	05___	Oscillatorian filament	sp. (2)	CYANO	2	filament	100	283.53	1	3	1	1		
17	Student Union	05___	Eutetramorus	sp.	CHLOR	x	colony	400	0.0625	50	3	1			
17	Student Union	05___	Monoraphidium	arcuatum	CHLOR	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	unicell, sphere 2.5-5um	spp.		x	cell	400	0.0625	50	3	1			
17	Student Union	05___	Kirchneriella	sp. (2)	CHLOR	x	colony	400	0.0625	50	3	1			
17	Student Union	05___	Urosolenia	sp.	BACIL	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	Monoraphidium	griffithii	CHLOR	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	Scenedesmus	quadricauda	CHLOR	x	colony	400	0.0625	50	3	1			
17	Student Union	05___	centric diatom	sp. (D=5um)	BACIL	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	Monoraphidium	minutum	CHLOR	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	Monoraphidium	contortum	CHLOR	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	pennate diatom	sp. (L=15um)	BACIL	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	chlorophyte colony	sp. (A)	CHLOR	x	colony	400	0.0625	50	3	1			
17	Student Union	05___	pennate diatom	sp. (L=25um)	BACIL	x	cell	400	0.0625	50	3	1			
17	Student Union	05___	Kirchneriella	sp. (1)	CHLOR	x	colony	400	0.0625	50	3	1			
17	Student Union	05___	Closterium	acutum var. variabile	CHLOR	x	cell	200	0.25	50	3	1			
17	Student Union	05___	Oocystis	sp. (3)	CHLOR	x	colony	200	0.25	50	3	1			
17	Student Union	05___	Planctonema	sp.	CHLOR	x	filament	200	0.25	50	3	1			
17	Student Union	05___	Ankistrodesmus	cf. gracilis	CHLOR	x	cell	200	0.25	50	3	1			
17	Student Union	05___	pennate diatom	sp. (L=50um)	BACIL	x	cell	200	0.25	50	3	1			
17	Student Union	05___	Ankistrodesmus	fusiformis	CHLOR	x	cell	200	0.25	50	3	1			
17	Student Union	05___	Phacus/Leponinclis	sp.	EUGL	x	cell	200	0.25	50	3	1			
17	Student Union	05___	Mougeotia	sp.	CHLOR	x	filament	100	283.53	1	3	1			
17	Student Union	05___	pennate diatom	sp. (L=100um)	BACIL	x	cell	100	283.53	1	3	1			
17	Student Union	05___	Scenedesmus	sp. (12)	CHLOR	x	colony	100	283.53	1	3	1			
17	Student Union	05___	Staurastrum	sp. (large)	CHLOR	x	cell	100	283.53	1	3	1			
17	Student Union	05___	Coelastrum	sp. (1)	CHLOR	x	colony	100	283.53	1	3	1			
17	Student Union	05___	Ceratium	hirundinella	DINOP	x	cell	100	283.53	1	3	1			
17	Student Union	05___	Pediastrum	duplex	CHLOR	x	colony	100	283.53	1	3	1			
17	Student Union	05___	Strombomonas	sp.	EUGL	x	cell	100	283.53	1	3	1			

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