

TKPOA 2019 Laminar Flow Aeration Report

Prepared Pursuant to
California Water Boards General 401 Water Quality Certification Order
(SB14007IN) Requirements and Basin Plan Prohibition Exemption for the
Tahoe Keys Property Owners Association Laminar Flow Aeration Trial
Project, El Dorado County





2019 Laminar Flow Aeration Report

Prepared by

Gregory J Hoover
TKPOA Water Quality Manager / AIS Management Coordinator

Michael H Bangs
TKPOA AIS Technician

Vesper Rodriguez
TKPOA AIS Technician

Submitted by: Kirk J. Wooldridge, General Manager

Signature:

TABLE OF CONTENTS

1.0 Introduction	1
2.0 Project Description	1
3.0 Objectives for LFA System	4
4.0 Methods	4
4.1 System Layout	4
4.2 Monitoring	5
4.3 Sampling Procedures	8
4.4 Laboratory Analysis	9
5.0 Results	10
5.1 Dissolved Oxygen Levels	10
5.2 Turbidity	12
5.3 Muck Levels	13
5.4 Cyanobacteria Results	14
6.0 Discussion	15
7.0 2020 Recommendations	17
7.1 Sediment Monitoring	17
7.2 Site-Specific Macrophyte Survey	17
7.3 Dye Study	18
7.4 Coontail Blooms	17
7.5 Readjustment of Diffusers	17
8.0 Acknowledgements	18
9.0 List of Preparers	19
10.0 References	19

TABLE OF FIGURES

Figure 1. LFA Circulation.	2
Figure 2. LFA Project site location.	3
Figure 3. Diffuser map with depths.	5
Figure 4. Diffuser.	5
Figure 5. LFA Project timeline.	6
Table 1. Water Quality parameters.	7
Figure 6. D.O. for the 2019 season.	11
Figure 7. Site 6 D.O. at each quadrant.	11
Figure 8. D.O. at Bottom quadrant.	12
Figure 9. Turbidity throughout the 2019 Season.	12
Figure 10. Turbidity range for the 2019 season.	13
Figure 11. Bathymetry map of the LFA site on April 16th, 2019 (day of installation), and November 12th (last scan).	13

Table 2: LFA Muck Depths	14
Figure 12. Cyanobacteria levels per site.	15
Figure 13. Anatoxin-a Levels (Copies/mL) throughout the sesaon.	15
Figure 14. Cyanobacteria near Site LFA J	16
Figure 15. Cyanobacteria near Diffuser 1, 9.10.2019	16
Figure 16: 2019 Macrophyte Survey: Curly Leaf Pondweed by location	17

APPENDIX

- Appendix A LRWQCB Sample Bottle Collection Method
- Appendix B Delta Labs Field Filtration Protocol
- Appendix C Cyanobacteria Caution Level Signage
- Appendix D Bend Genetics, LLC Cyanobacteria Results
- Appendix E LFA Data Workbook

1.0 INTRODUCTION

The Tahoe Keys Property Owners Association (TKPOA) has been working to create an adaptive, integrated plan to significantly reduce the bio volume of the aquatic invasive species (AIS) infestation in the Tahoe Keys lagoons. Since the 1980s, the TKPOA has been combating increasing amounts of invasive and nuisance aquatic vegetation, with Harvesting and Fragment Collection being the main methods available for management. As the vegetation density has increased in the waterways, so has the accumulation of plant and animal detritus at the benthic layer. This accumulation of detritus, referred to herein as the “muck layer”, may help stimulate aquatic vegetation growth and create ideal conditions for harmful algal blooms (HABs).

In 2019, the TKPOA implemented a Laminar Flow Aeration (LFA) project in an attempt to reduce the muck layer and circulate the water column. LFA is a technology originally used for improving water quality in wastewater treatment plants by assisting in the organic breakdown of sludge. LFA has recently been adapted for water body restoration by accelerating a water body’s natural capability to process nutrients, purge harmful gases like ammonia and hydrogen sulfide, precipitate iron and manganese, and keep down algae growth.

LFA has been used successfully with shallow, warmer waters with minimal circulation at low elevation; however, it has not been fully tested in an area such as Lake Tahoe, which has deeper, cold water at a much higher elevation.

2.0 PROJECT DESCRIPTION

Laminar Flow Aeration (LFA) is a technology used for improving water quality where there is consistently low dissolved oxygen and a buildup of fine organic sediment. LFA uses microporous ceramic disks, called diffusers, that are placed throughout the area needing oxygen. These disks are connected by self-sinking hoses connected to an air compressor. Air is pumped through the system, creating an abundance of bubbles that rise and create laminar flow, and provide oxygenation to the bottom of the water column where dissolved oxygen is typically the lowest.

Increasing dissolved oxygen in the sediment layer triggers a reaction that turns ammonia into nitrite and then nitrate. This process is believed to be in part responsible for the reduction in the organic matter seen in other LFA studies. The organic matter, a combination of animal and plant detritus, contains carbon and nitrogen as carbohydrates, lipids, amino acids, and proteins. The increase in dissolved oxygen and the disruption of the organic matter aid in hydrolysis of carbohydrates and lipids, and protolyzation of proteins to amino acids, which can lead to nitrification and denitrification. Figure 1 below shows water circulation with the LFA system.

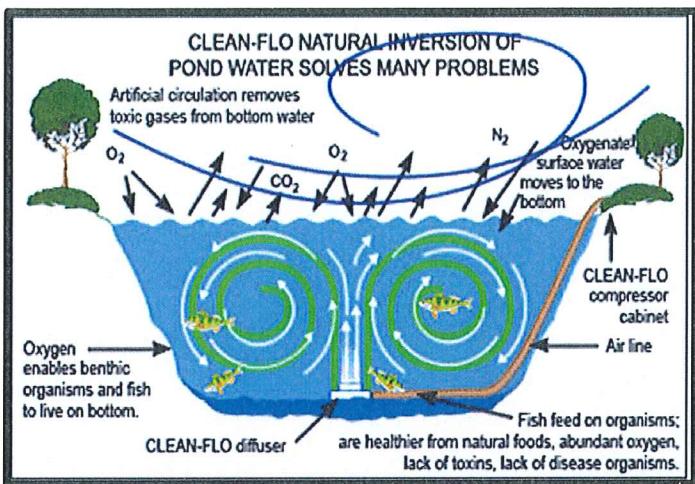


Figure 1. LFA Circulation.

SOLitude Lake Management, a natural resources management company, states “Maintaining a constant high dissolved oxygen level throughout the water column from top-to-bottom (including the sediment and water boundary layer) delivers the following benefits to the water body:

1. Control of the nutrients that lead to excessive aquatic weed and algae growth (P, N, and CO₂)
2. Prevention of the formation of undesirable toxic gases, hydrogen sulfide, methane and ammonia, formed as a result of the persistent anaerobic conditions
3. Prevention of the chemical release of Manganese, Iron, and other metals through redox reactions under anaerobic conditions
4. Increase in biological activity in the benthic layer, accelerating the decomposition of organic “muck” at the bottom
5. Fishery improvement as a result of enabling fish to live and feed all the way to the bottom of the water body”

LFA reduces the organic sediment that accumulates at the bottom of lakes and ponds by increasing dissolved oxygen content. This dissolved oxygen is utilized by organic microbes that breakdown the organic material. Typical installations include the use of additional microbes to stimulate the system. However, due to local permitting restrictions, the TKPOA was not able to use additional microbes, but relied on the native microbial populations.

The test site represents typical conditions within the Tahoe Keys lagoons, including dead-end coves and open water areas, to assess water quality and sediment variation by location (refer to Figure 2). The Control site, Site 6, is representative of these same conditions and will be monitored without diffuser installation for comparison. LFA equipment was installed in April 2019 and will be kept in place for a minimum of three years.

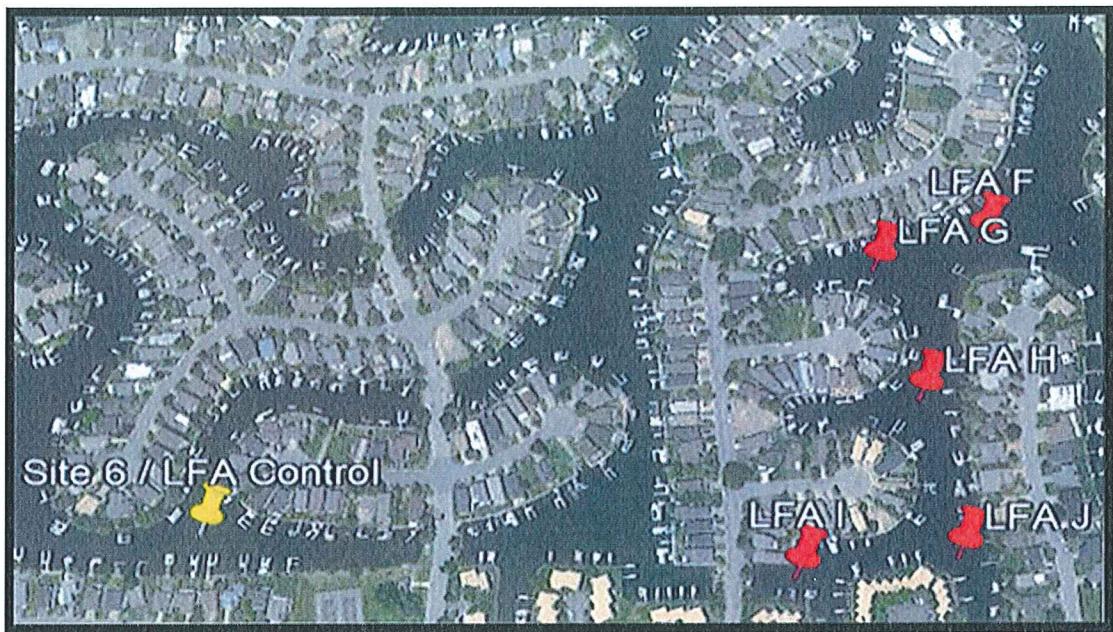


Figure 2. LFA Project site location.

3.0 OBJECTIVES FOR LFA SYSTEM

The system is operating continuously for the three-year test period with sediment, organic matter, dissolved oxygen, and nutrients in the pore (interstitial) water being monitored. The WQ Department will monitor the LFA system to determine its performance. In accordance with the California Water Boards *General 401 water quality certification order (SB14007IN) Requirements and Basin Plan Prohibition Exemption for the Tahoe Keys Property Owners Association Laminar Flow Aeration Trial Project, El Dorado County* of the objectives for the LFA system are:

1. Increase Dissolved Oxygen (DO) levels at the sediment-water interface and throughout the water column to promote a healthy ecosystem, and encourage chemical reduction of sediments
2. Reduce organic matter in sediments around the LFA diffusers
3. Circulate the water column to decrease the opportunity for Harmful Algal Bloom (HAB) occurrences
4. Reduce the habitable environment for aquatic macrophyte growth

4.0 METHODS

Water samples were collected by TKPOA Water Quality staff according to the monitoring schedule created in accordance with the TKPOA and California State SWAMP Protocols. Sampling is further discussed in the following sections. Sediment level reduction is monitored and evaluated by TKPOA Water Quality staff. Evaluations are conducted using Lowrance hydroacoustic scanners in companion with the BioBase analysis software. The scanners use sonar technology to measure underwater topography.

4.1 System Layout

Clean-Flo International was granted the contract to design an LFA system for the Tahoe Keys, strategically placing ten diffusers in the locations shown below in Figure 3. The compressor is located in TKPOA's Well #2, located near the bridge on Venice Drive. The diffuser airlines run from Well #2, under the bridge on Venice Drive, and out to their designated waterway locations.



Figure 3. Diffuser map with depths.

This system was specifically designed for the project area's size and water depth. It consists of a 7.1 horsepower compressor, variable frequency drive, 10 microporous ceramic diffusers (refer to Figure 4), stainless manifold with equal number of ports and control valves, and approximately 9,000 feet of self-sinking airline.

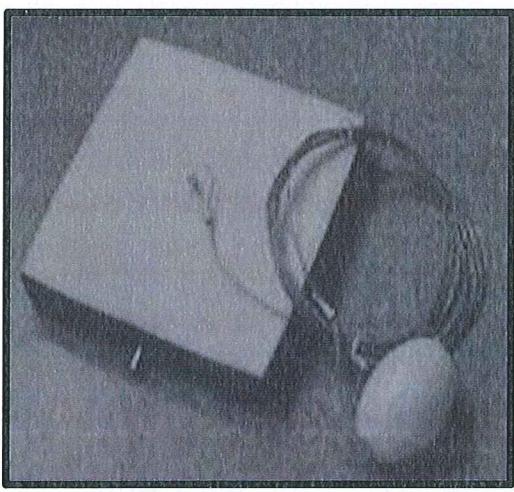


Figure 4. Diffuser.

4.2 Monitoring

Bimonthly monitoring for the project was conducted from April to November 12th, 2019 according to the monitoring schedule (refer to Figure 5).

Water	Pre-Project		Installation		Post Monitoring					
	Week Prior	Day Prior	Day 1	Day 2-7	Week 2-4	Month 2/3	Month 4-12	Year 2-3		
Turbidity / pH / DO / ORP / SPC / Temp	LFA-1 0830 / 1430 LFA-2 0915 / 1515	LFA-1 0830 / 1430 LFA-2 0915 / 1515	LFA-1 0830 / 1430 LFA-2 0915 / 1515	LFA-1 0830 / 1430 LFA-2 0915 / 1515	LFA-1 0830 / 1430 LFA-2 0915 / 1515	Bi-Monthly Tues- LFA-1 0830 / 1430 Bi-Monthly Tues- LFA-2 0915 / 1515	Monthly Monthly	Quarterly Quarterly		
Total Kjeldahl Nitrogen / Nitrate + Nitrite Nitrogen /	One week from Installation date	N/A	N/A	Day 7	Week 3	Once per month	Monthly	Quarterly		
Sediment	Pre-Project		Installation		Post Monitoring					
Core Sample	Two Weeks Prior		Day 1	Day 2	Week 2-4	Month 2-12		Year 2-3		
	Two Weeks from Installation		N/A	N/A	N/A	October		Bi-Annual		
Sediment Surface Total Kjeldahl Nitrogen / Nitrate + Nitrite Nitrogen / Ammonia / Ortho-	Two Weeks from Installation		N/A	N/A	N/A	October		Bi-Annual		
Aquatic Plants	Pre-Project		Installation		Post Monitoring					
Plant Composition	TKPOA Annual Macrophyte Survey		N/A		Year 2-3					
	Weekly Hydro-Acoustic Scanning Until October				Annual Macrophyte Survey					
Plant Density / Bio Mass Hydro-					Weekly Scanning May					

Figure 5. LFA Project timeline.

1. Equipment

Water Quality data was collected using the YSI ProDSS and the YSI Pro1020, both portable multiparameter water quality instruments. The ProDSS and Pro1020 require regular calibration for accurate readings. The TKPOA also uses an HDS 7 Lowrance system with sonar sensor for hydroacoustic scans. Initial muck levels were assessed by using a telescoping pole with a plate mounted to the end. The pole has marks every decimeter to indicate depth.

2. Calibration

The TKPOA Water Quality staff calibrated the ProDSS and Pro1020 monthly and no later than one day prior to each scheduled sampling event. Both meters were calibrated according to the manufacturer's instructions. On the day of sampling, DO was calibrated for more accurate readings, a method suggested by the manufacturer. The Pro1020 and ProDSS calibration information was logged on a calibration worksheet and then archived with the sampling data sheets for that event.

3. Parameters

The monitored parameters for this project consisted of atmospheric and physical attributes such as:

- Time Start / End
- Air Temp Start / End
- Cloud Cover Start / End
- Last Precipitation
- Wind Speed Start / End
- Wind Direction Start / End
- General Comments

4. Water Quality

Parameters measured at each of the designated sites for water quality are shown in the following table:

Parameter	Method of Measurement	Description
Time of Day	Watch	Time of sampling at each site
Depth	YSI ProDSS or Water Sounder	Depth in meters of water at each site. Used to determine the 5 sampling points in the water column.
Temperature	YSI ProDSS and YSI Pro1020	Measure of acidity or alkalinity of water, with pH 7 being neutral. Surface, mid-point, and bottom were collected during the season to monitor effects of plant biomass on overall pH.
Specific Conductance	YSI ProDSS	Measure in micro Siemens per centimeter ($\mu\text{S}/\text{cm}$) of dissolved ionic particles in the water. Acts as a good indicator of Total Dissolved Solids.
Dissolved Oxygen	YSI ProDSS and YSI Pro1020	Amount (in parts per million) of oxygen present in water. An important parameter in water quality assessment due to its influence on aquatic organisms. (Fondriest Environmental Inc. 2016).
pH	YSI ProDSS	Measure of acidity or alkalinity of water, with pH 7 being neutral. Surface, mid-point, and bottom were collected during the season to monitor effects of plant biomass on overall pH.
Phycocyanin (PC)	YSI ProDSS	A measure of Phycocyanin in the water column. Phycocyanin is a blue-copper containing pigment found in harmful algae.
Chlorophyll (Chl-a)	YSI ProDSS	Chlorophyll content in the water column.
Ammonium	YSI ProDSS	Measure of Ammonium in the water column. Ammonium is a key nutrient for plant growth.
Oxidation Reduction Potential	YSI ProDSS and YSI Pro1020	Oxidation Reduction Potential (ORP) recorded in millivolts. This is a key component in water quality to determine the health of an ecosystem.
Turbidity (FNU)	YSI ProDSS	Measurement of water clarity using Formazin Nephelometric Units

Table 1. Water Quality parameters.

5. Hydroacoustic Scans

Muck levels were monitored bi-monthly using Lowrance hydroacoustic scanners in companion with the BioBase analysis software. Once completed, scans were immediately uploaded to the BioBase system and then reviewed by BioBase analysts. TKPOA Water Quality staff analyzed scan results next to lake level data for more accurate measurements. Lake level data was retrieved from the USGS database.

4.3 Sampling Procedures

All water samples were collected at the surface quadrant. For each sample site, six different bottles were needed for sample collection. Samples for pigments, nutrients, and cyanobacteria were collected according to the procedures instructed by Lahontan Regional Water Quality Control Board (LRWQCB) (Appendix A). Samples for orthophosphorus require field filtration and were conducted by TKPOA Water Quality staff using the method instructed by Delta Environmental Laboratories (Appendix B).

1. Sampling Checklist

- a. Check weather forecast for sampling day to determine if conditions are appropriate for sampling to occur.
- b. Verify sampling materials delivery.
- c. Verify, if applicable, that the selected analytical lab is scheduled to pick up samples the day after they are to be collected, as hold times on parameters (such as nutrients) require quick processing.
- d. Calibration of the YSI ProDSS and YSI Pro1020 should occur monthly and take place no later than a day prior to the scheduled sampling event. Sampling should not occur if calibration is not completed. Calibrate according to the manufacturer's instructions.

2. Water Quality / Cyanobacteria Sampling Procedure

- a. Review the Sampling Checklist.
- b. Verify that all required sampling equipment is gathered.
- c. Once on the boat with all necessary materials, the Sample Collector will begin to complete the data sheet, indicating Date, Sample Collector, Boat Driver, Start time, Air Temperature, Cloud Coverage, Last Precipitation, Wind Speed, and Wind Direction.
- d. YSI: Data will be collected at each site with the YSI ProDSS and the YSI Pro1020. Data to be collected:
 - i. Depth (m), Water Temperature (°C), pH, Dissolved Oxygen, Oxidation-Reduction Potential (ORP), Algae Content, Ammonium.
 - ii. Turbidity (FNU) and Electric Conductivity (uS/cm) are collected at each site midpoint.
 - iii. Observations (i.e. the presence of algae, odor, fish, insects, or amphibians in sample site etc.) are recorded at each site, if applicable.
 - iv. Check that the blue calibration cup is not covering the YSI sensors. If so, remove the calibration cup. Do not pour out the water in the calibration cup.
 - v. Lower the instrument to the desired depth in the water column, according to the data sheet (Bottom, Q1, Mid, Q3, Surface).
 - vi. Allow adequate time to ensure the YSI data balances before recording information onto the data sheet.
 - vii. Complete for each column of each category on the data sheet.
 - viii. Verify that all required data has been collected before moving on to the next site
3. Sample Grabs: The following information shall be recorded on each sample bottle at the time of sampling:

- a. Sample ID Number (for contract laboratories)
 - b. Sampling Date and Time
 - c. Site Name/ Station Code
 - d. Preservative (optional depending on sampling)
 - e. Collector's Initials
4. Surface Grabs: The Sample Collector should be wearing arm-length, disposable, powder-free gloves when handling the sample containers to prevent contamination of the sample.
- a. Holding the correct sample bottle, lower into the water column until the water reaches two inches below the top of the Collector's elbow-length glove.
 - b. Triple rinse the collection bottles before collecting the actual sample, filling roughly three-quarters of the bottle.
 - c. Secure sample bottle cap and place in iced cooler for preservation.
5. Cyanobacteria Surface Grabs: Do not rinse the sample container prior to sample collection.
- a. The Collector will remove the PETG plastic bottle cap, invert and slowly lower the bottle into the water.
 - b. Once the bottle has reached the desired depth, between 1 inch and 11.8 inches, the Collector will again invert the bottle in the water to collect the sample.
 - c. Return the container to the surface quickly and, if necessary, pour out a small volume of the sample to allow for homogenization.
 - d. Quickly replace the cap and tighten securely.
 - e. Place in an iced cooler for preservation.

4.4 Laboratory Analysis

Laboratory analysis for the Water Quality samples were collected to assess ambient water quality conditions in the Tahoe Keys lagoons. The following laboratory analysis results include:

1. Nutrients
 - a. Orthophosphorus – Dissolved inorganic phosphorus that is readily available for aquatic plants and algae.
 - b. Total Phosphorus – Amount of all forms, dissolved and particulate, of phosphorus present in the sample.
 - c. Nitrate-Nitrogen – Amount of nitrogen bound to a nitrate ion present in the sample.
 - d. Nitrite-Nitrogen – Amount of nitrogen bound to a nitrite ion present in the sample.
 - e. Total Kjeldahl Nitrogen – Measure of ammonia and organic forms of nitrogen.
 - f. Total Nitrogen – Sum of all forms of nitrogen, including Nitrate-Nitrogen, Nitrite-Nitrogen, and TKN.
 - g. Blue-Green Algae – Identification of abundant classes of cyanobacteria as well as potential toxicity and quantification of chlorophyll-a.
2. Cyanobacteria
 - a. Anatoxin-A – A secondary, bicyclic amine alkaloid and cyanotoxin with acute neurotoxicity, produced by seven different genera of cyanobacteria.
 - b. Cylindrospermopsin – An alkaloid consisting of tricyclic guanidine coupled with hydroxymethyluracil. Zwitterionic, highly water soluble molecule; resistant to high temperatures, sunlight, and pH extremes. Often released from cells into the surrounding water, it bioaccumulates, particularly in organisms low in the food chain such as gastropods, bivalves, and crustaceans.

- c. Microcystin – Cyclic non-ribosomal peptides produced by cyanobacteria, known to cause severe hepatic damage principally by inhibiting protein phosphatases. May be released into the surrounding water when cyanobacteria cells disintegrate. Typical environmental half-life of 10 weeks, the breakdown rate is increased under direct sunlight, at high environmental temperatures ($>40^{\circ}\text{C}$), and extremely low pH (<1) or high pH (>9).
- d. Saxitoxin – Produced in freshwater and marine environments. In freshwaters, saxitoxins are produced by cyanobacteria in the genera *Anabaena* sp., *Aphanizomenon* sp., *Planktothrix* sp., *Cylindrospermopsis* sp., *Lyngbya* sp., and *Scytonema* sp. can accumulate in freshwater fish. Also known as paralytic shellfish poisons (PSPs).
- e. Total Cyano (16S) – 16S rRNA is a genetic characterization of cyanobacterial strains. Quantitative polymerase chain reaction; process used to enumerate pathogens, algae or specific genes responsible for production of undesirable compounds (i.e., 16S gene¹, microcystin, anatoxin-a).

3. Pigments

- a. Chlorophyll-a and Phycocyanin pigment concentrations are used in assessing environmental health, and are analyzed according to the LRWQCB's procedures.

Three separate laboratory shipments were prepared once sampling was completed (Appendix C). Cyanobacteria samples were sent to Bend Genetics, LLC in Sacramento, California. Nutrient samples were sent to Delta Environmental Laboratories in Benicia, California. Pigment samples were analyzed at the Lahontan Regional Water Quality Control Board's South Lake Tahoe, California, location .

5.0 RESULTS

5.1 Dissolved Oxygen Levels

The figures below show dissolved oxygen (DO) data from the 2019 season. Figure 6 shows the spread of recorded DO levels from April through October. Results are presented for data measured in the bottom quarter of the water column (labeled "B" on the x-axis of Figure 6), the middle of the water column (labeled "M" on the x-axis of Figure 6), and the upper, or surface, quarter of the water column (labeled "S" on the x-axis of Figure 6). The lowest DO levels are from before the LFA system was turned on. Figure 6 shows that bottom DO increased at all of the LFA sites except at Site 6, which is the Control site.

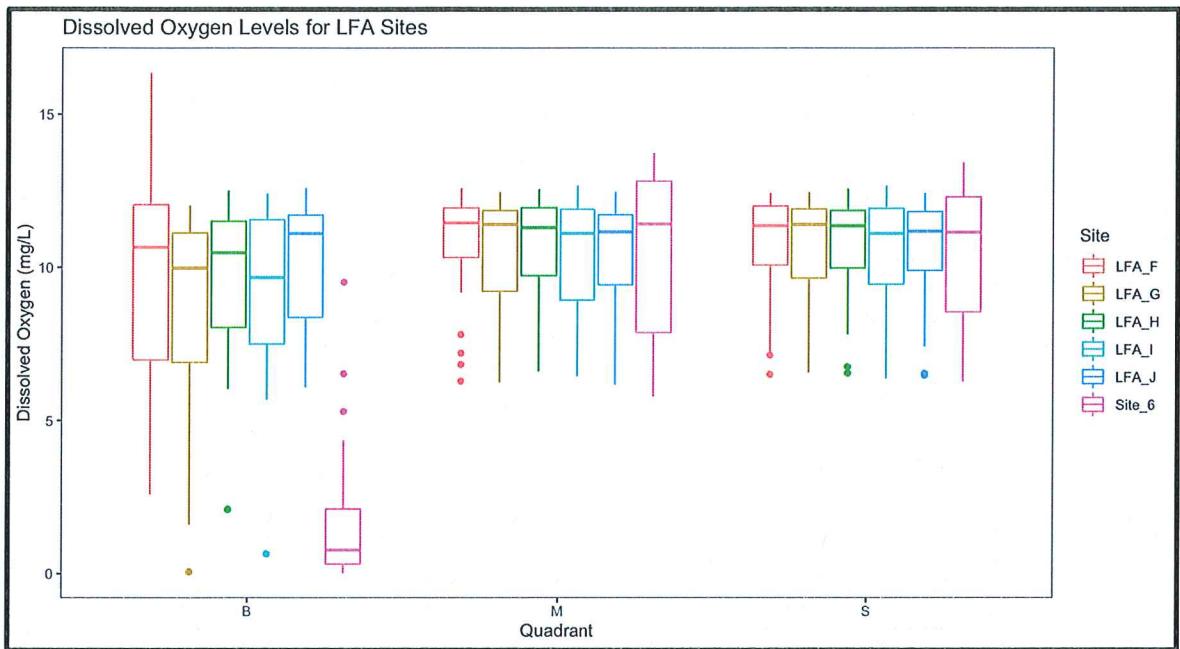


Figure 6. DO for the 2019 season.

Figure 7 shows the consistently low bottom DO levels that were observed at the Control site (Quadrant B is the bottom; Quadrant S is the surface). The conditions found at Site 6 are similar throughout the lagoons. Figure 8 shows the initial spike in DO levels at all sites after the system was turned on. Figure 8 displays data from April 15th to June 25th to highlight the initial spike in DO.

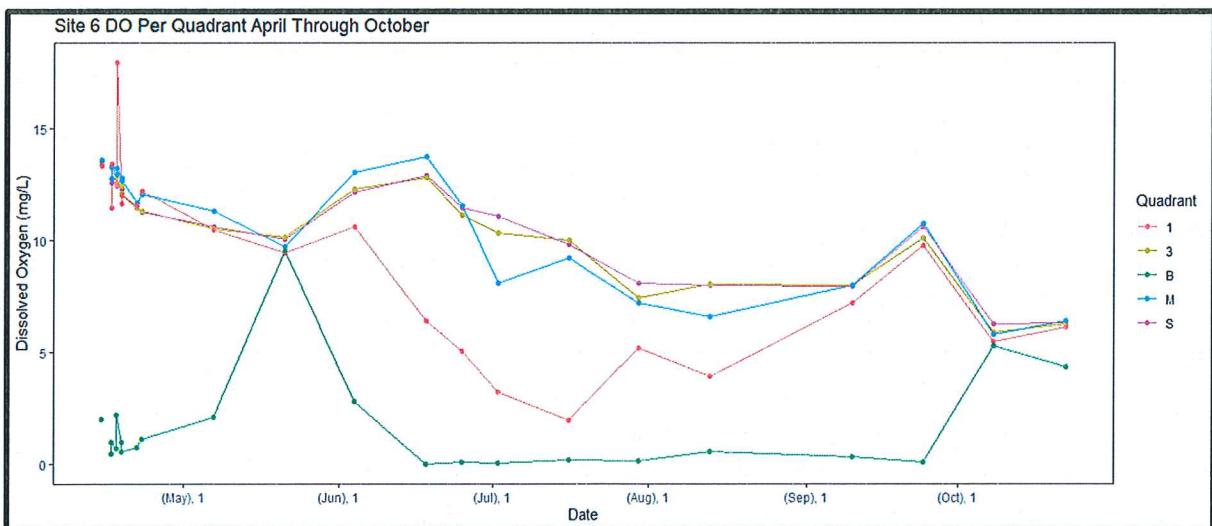


Figure 7. Site 6 DO at each quadrant.

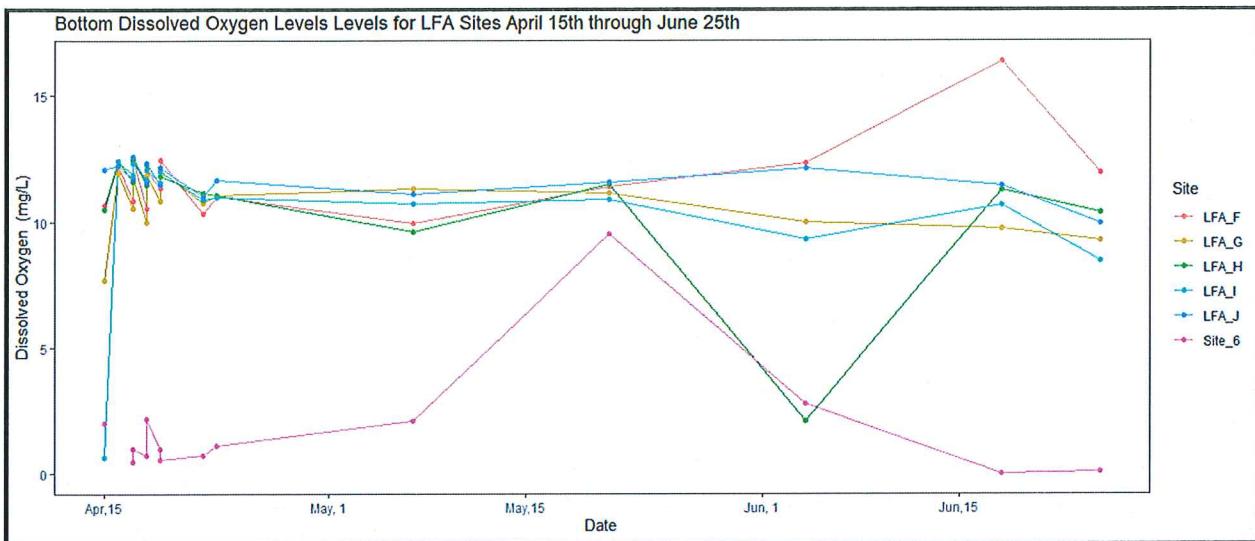


Figure 8. Bottom DO for each site

5.2 Turbidity

The TKPOA is required to monitor turbidity as a part of the permit NO. WDID6A091810005 issued by the LRWQCB. According to this permit, the TKPOA must keep turbidity in the project site below 3 NTU. If the turbidity exceeds 3 NTU, then the TKPOA must notify LRWQCB.

Figures 9 and 10 display the results of turbidity monitoring from the 2019 season. It can be seen that turbidity did rise above 3 NTU. The TKPOA did notify the LRWQCB of the problem. However, it is uncertain if the turbidity increase was related solely to operation of the LFA system since the turbidity at the control site, Site 6, also increased above 3 NTU for a short period.

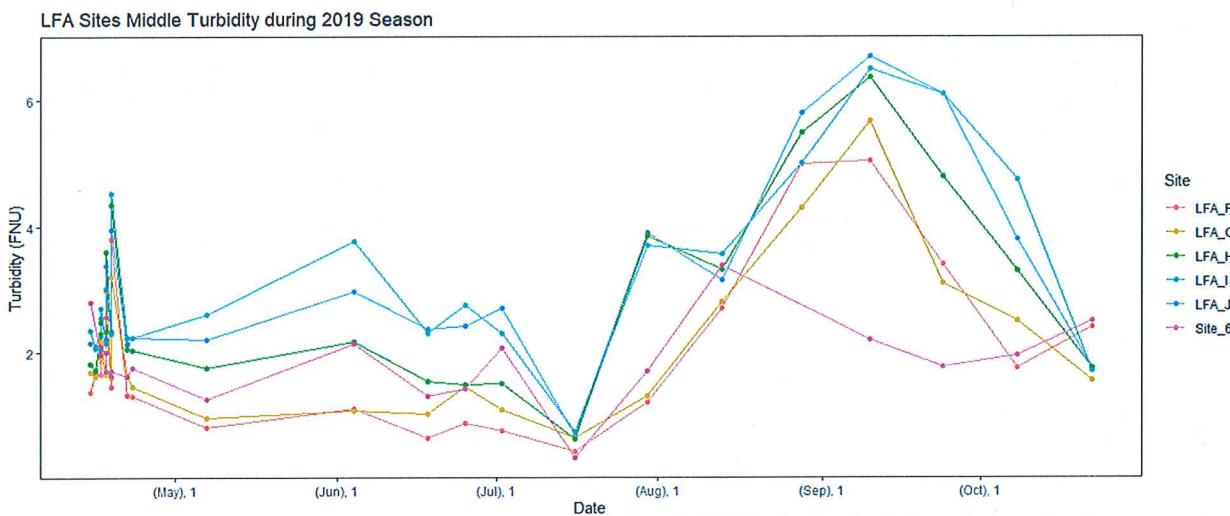


Figure 9. Turbidity throughout the 2019 Season.

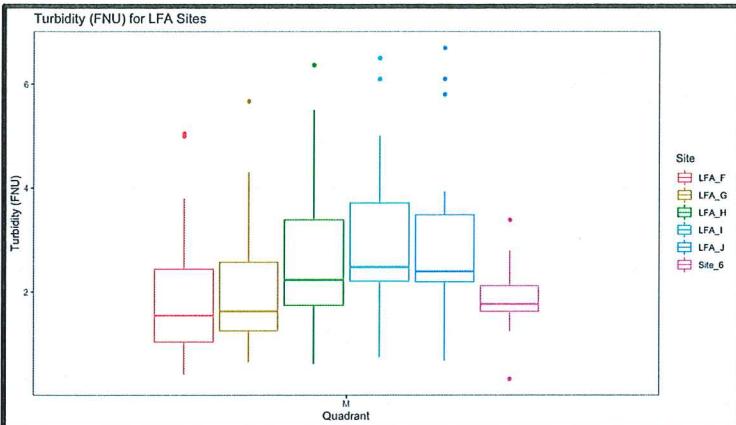


Figure 10. Turbidity range for the 2019 season.

5.3 Muck Levels

An objective of the LFA project is to reduce organic matter around the diffusers, thus reducing the availability of nutrients for aquatic plants and algae. Most of these nutrients are in the organic layer at the bottom of the water column. At the beginning of the project, the organic layer was measured to be 3-5 feet thick. Table 2 below shows the results from measured depths from April installation compared to an October measurement. All diffusers saw an increase in depth to the top of the muck layer, which is equivalent to a reduction in the muck layer thickness. This reduction in thickness is likely due to the oxidation of the organic material in the sediment. The TKPOA attempted to monitor depth throughout the area using hydroacoustic scans (Figures 11 and 12), but due to dense vegetation, the depth readings were not very accurate.



Figure 11. Bathymetry map of the LFA site on April 16th, 2019 (day of installation), and November 12th (last scan).

Diffuser	Depth on 4/17/2019 (feet)	Depth on 10/10/2019 (feet)	Lake Difference (feet)	Net Change in Depth to Muck Layer (feet)
1	7.9	8.53	0.22	0.85
2	10.6	11.48	0.22	1.1
3	9.3	9.51	0.22	0.43
4	10.7	11.65	0.22	0.95
5	7.3	9.51	0.22	2.43
6	9.4	10.3	0.22	1.12
7	9.5	10.01	0.22	0.73
8	9.4	10.50	0.22	1.32
9	13.5	15.81	0.22	2.53
10	12.4	13.29	0.22	1.11

Table 2: LFA Muck Depths

5.4 Cyanobacteria Results

The TKPOA staff monitors PC and Chlorophyll in the LFA sites to determine if there is a presence of cyanobacteria. This helps determine if the system is meeting the objective of reducing cyanobacteria levels by circulating the water column.

Anatoxin-a was first detected on 7/16/2019 at Control Site 6. By the next sampling on 7/30/2019, every site had Anatoxin-a present. After Anatoxin-a was detected, the TKPOA sampled certain water quality sites based off of appearance and levels of scum present. The TKPOA posted caution signs (Appendix D) at all of the entrances to the Tahoe Keys and along the waterways to warn boaters and homeowners of the potential danger. The last sampling event to detect cyanobacteria in the 2019 season was on September 24th. The next sampling event on 10/8/2019 had non-detects at all sites. This is likely due to the cooling conditions creating an unfavorable environment for bacteria growth. In the 2019 season, cyanobacteria were present for approximately 72 days.

The 2019 sampling results show that the cyanobacteria bloom peaked from August to September. The highest amounts of Anatoxin-a were found at Sites LFA I, LFA J, and LFA F. The results of the 9/10/2019 sampling found both Anatoxin-a and Microcystin at every site. Anatoxin-a levels were at the highest amounts during the 8/13/2019 sampling, as shown below in Figure 13. The cyanobacteria lab results from Bend Genetics, LLC are attached in Appendix E.

Figure 12 shows the spread of anatoxin-a at each site in µg/L. The figure shows that concentrations were highest at LFA I, LFA J and LFA G. These are dead-end areas inside of the test site, as shown on Figure 2. Lower concentrations were detected at Site 6 and LFA F, which are open water areas.

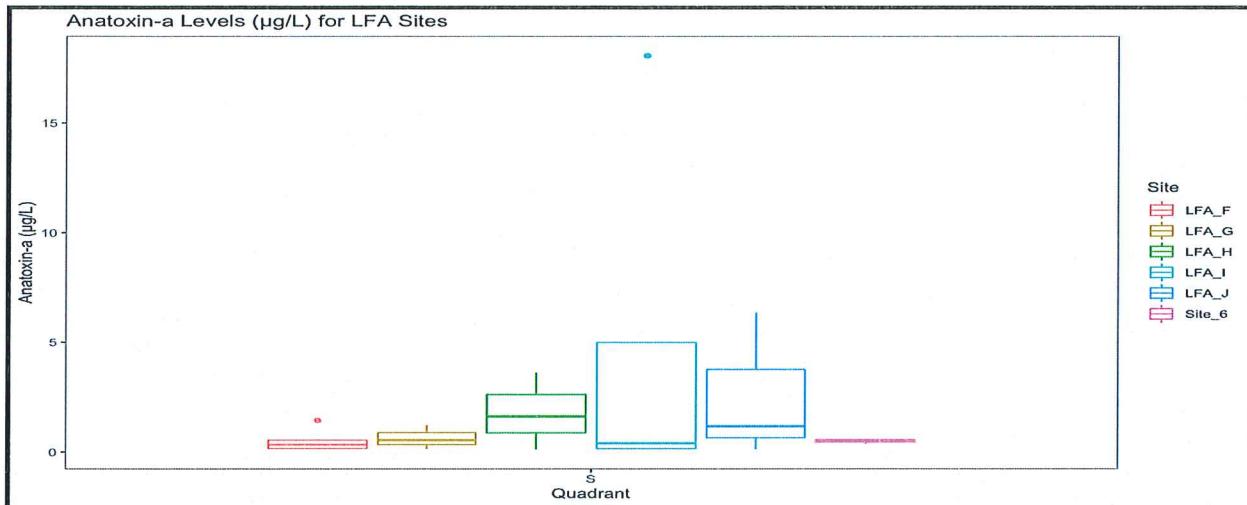


Figure 12. Cyanobacteria levels per site.

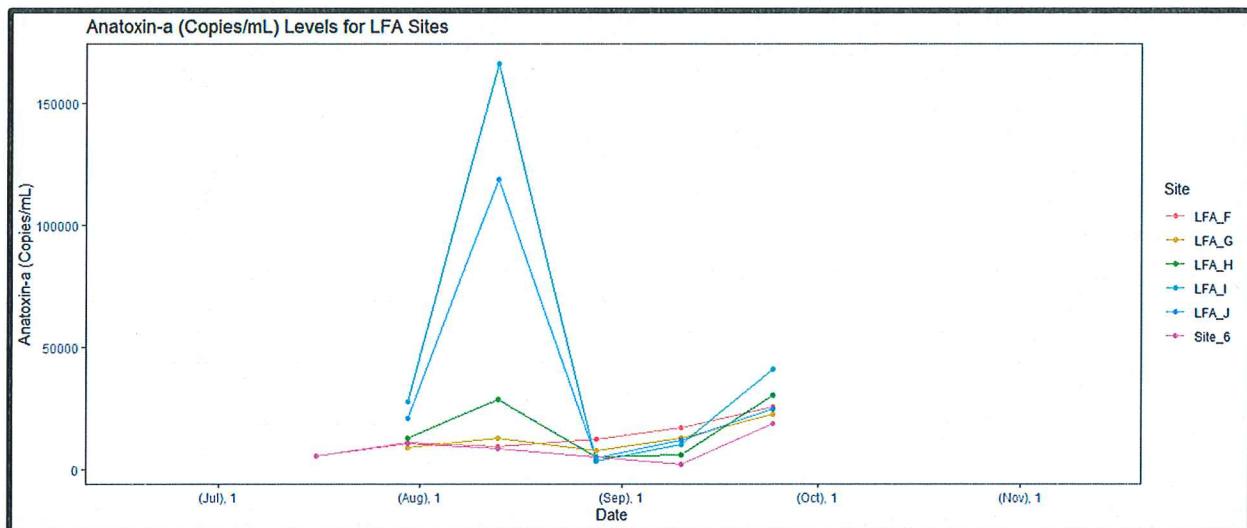


Figure 13. Anatoxin-a Levels (Copies/mL) throughout the season.

The most prevalent cyanobacteria species found in the lagoons is *Dolichospermum* sp. The 2019 sampling results show that *Dolichospermum* sp. colonies formed in the lagoons by June. *Dolichospermum* sp. is a diverse freshwater genera of cyanobacteria that are able to produce different forms of cyanotoxins, including nonribosomal peptide toxin (microcystin), alkaloid toxins (cylindrospermopsin, saxitoxin, and anatoxin-a), and lipopolysaccharides (LPS) (Li et al. 2016). Other species of cyanobacteria that were found, in smaller quantities, include *Aphanizomenon* sp., *Aphanocapsa* sp., *Microcystis* sp., *Snowella* sp., and *Woronichinia* sp.

6.0 DISCUSSION

The LFA project has four main objectives with the common goal of improving water quality in the Tahoe Keys lagoons. The objectives are to:

- 1) Increase DO levels at the sediment-water interface and throughout the water column to promote a healthy ecosystem, and encourage chemical reduction of sediments,
- 2) Reduce organic matter in sediments around the LFA diffusers,
- 3) Circulate the water column to decrease the opportunity for HAB occurrences, and
- 4) Reduce the habitable environment for aquatic macrophyte growth.

Data collected during the 2019 season supports a few of these objectives but does not support others.

Data collected during the 2019 season indicates that dissolved oxygen increased when the system was activated. This means that the system met the objective of increasing dissolved oxygen at the bottom of the water column. Figure 6 shows that at the Control site, Site 6, there was lower DO at the bottom of the water column than at the rest of the LFA sites. Figure 8 shows how the DO content spiked at the bottom of the water column at LFA I site when the system was activated, but not for the Control site (Figure 7). It is anticipated, this increased dissolved oxygen will facilitate breakdown of the organic sediments in the muck layer.

The goal of using the LFA system to reduce cyanobacteria was not met. Cyanobacteria toxins were detected in higher concentrations during 2019 than the 2018. Figure 14 and Figure 15 below show images of the paint-like cyanobacteria at the LFA sites during the September 10th sampling event.

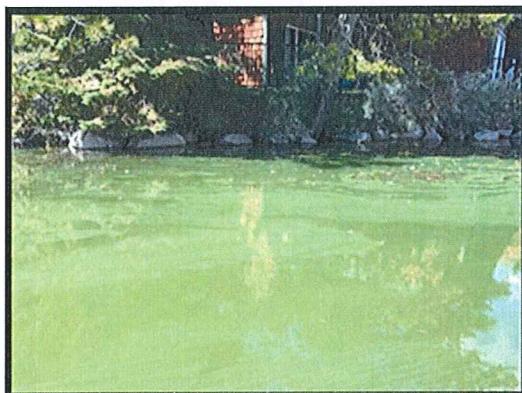


Figure 14. Cyanobacteria near Site LFA J



Figure 15. Cyanobacteria near Diffuser 1, 9.10.2019

The cause of these blooms is not fully understood and further analysis of the available data is needed to reach a conclusion. The TKPOA WQ Department has hypotheses that may explain the cyanobacteria blooms in the lagoons:

1. Another hypothesis, supported by peer reviewed papers, is that curly leaf pondweed die-off in mid-July releases phosphorus into the water column that ends up fueling cyanobacteria growth (Wang, L, et. al., 2018). Refer to Figure 16 below, which is from the 2019 Macrophyte Survey.
 - a. The cyanobacteria bloom that occurred in 2017 occurred at an area of the lagoons where there was a high concentration of curl leaf pondweed.

- b. In 2019, higher concentrations of cyanobacteria were detected where there was an abundance of curlyleaf pondweed (figure 16).

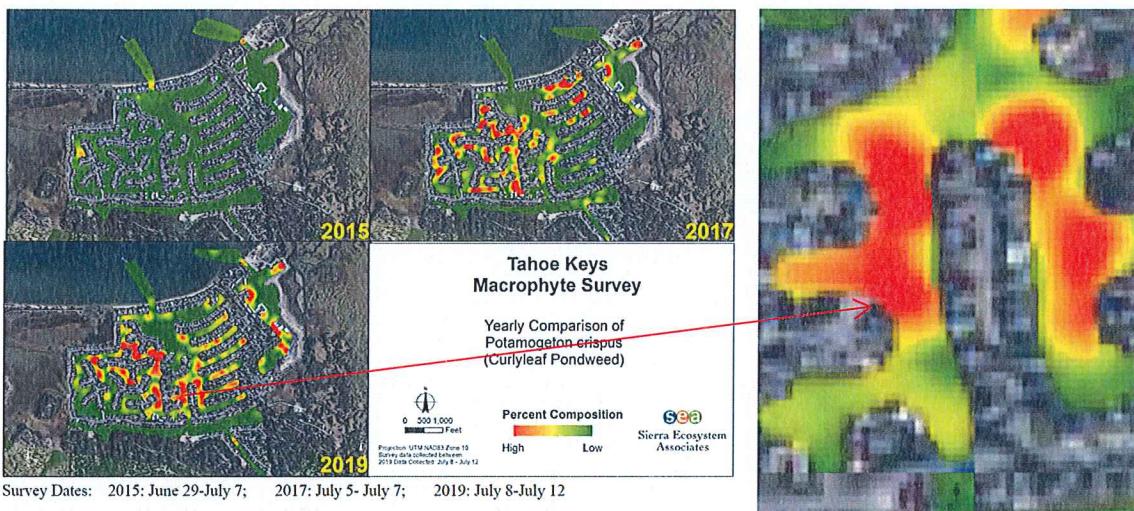


Figure 16: Excerpt from the 2019 Macrophyte Survey: Curly Leaf Pondweed by location

2. The high cyanobacteria concentrations could also have been a symptom of the LFA system being activated and stirring up nutrients from the sediment into the water column.

The highest concentrations of cyanobacteria were detected at sites located in dead end areas. This could indicate that the diffusers created a positive feedback system by pushing nutrients and bacteria towards the end of the lagoons. This system could have fueled further growth and caused higher concentrations by confining the bacteria to the ends of the lagoons.

The TKPOA WQ staff will continue monitoring during the 2020 season to further evaluate possible causes of cyanobacteria blooms and to propose a solution that will reduce cyanobacteria concentrations, if not occurrences.

The final objective of the LFA system is to reduce the habitable environment for aquatic macrophyte growth. A decrease in the muck levels by oxidizing organic material in the sediment is intended to achieve this objective. Table 2 shows the change of depth observed at each site from the project's implementation to the last depth measurement in October. This change of depth is likely due to the breakdown of organic material around the diffusers. Continued monitoring will provide additional data for WQ staff to evaluate changes in the thickness of the muck layer. Of particular interest is the potential for the level to decrease over the winter season due to lack of vegetation.

7.0 2020 RECOMMENDATIONS

7.1 Sediment Monitoring

The TKPOA WQ Department monitored sediment levels at the diffusers during the 2019 season. This monitoring was to determine the change of sediment levels caused by the diffusers. For the 2020 season, the WQ Department plans to conduct sediment depth monitoring from different

locations throughout the LFA area. This sampling would help determine the reduction of organic matter that has occurred since the start of the project.

7.2 Transect-Specific Macrophyte Survey

The permit issued by the LRWQCB to the TKPOA states that the project must not increase the abundance of AIS in the project area. The WQ staff assisted in the monitoring and observations of AIS during SEA's 2019 Macrophyte Survey. For the 2020 season, the TKPOA WQ Department plans to conduct underwater transects that follow a set line. This transect would determine what species are growing along the line and could be repeated twice a year to determine changes in vegetation over the years.

7.3 Coontail Blooms

It was observed throughout the season that Coontail, a native nuisance aquatic plant, began blooming around the diffusers. The bloom densities were high enough that Harvester assistance was required to remove the blooms from the area. Coontail has not been previously observed to grow in high densities in the area where the LFA project takes place. TKPOA WQ staff recommends continued observation of Coontail growth around the diffusers for any further possible information.

7.4 Readjustment of Diffusers

During the 2019 season, cyanobacteria was observed to be concentrated in the dead-end areas of the lagoons. The TKPOA WQ Department plans to consult with Clean-Flo on the possibility of readjusting the position of the diffusers. This will hopefully disrupt cyanobacteria growth and possibly reduce the severity of blooms.

8.0 ACKNOWLEDGEMENTS

The League to Save Lake Tahoe authorized a \$100,000 grant to the TKPOA over a four-year period (2017, 2019-2021) to support this project and the AIS Program. This grant disperses \$25,000 per year with installments given each December.

9.0 LIST OF PREPARERS

The following individuals prepared the text presented in this report.

<u>Name</u>	<u>Education</u>	<u>Role</u>
Gregory J Hoover TKPOA	B.S. Biology and Environmental Sciences A.A. Natural Science A.A. Environmental Technology and Sustainability: Biological Resources	Principle in Charge Contributing Author Data Collection
Vesper Rodriguez TKPOA	A.A. Environmental Technology and Sustainability: Physical Resources- In Progress A.A. Visual & Performing Arts: Digital Music Technology	Primary Author Data Collection
Michael Bangs TKPOA	B.S. Environmental Sciences with Applied Geology Emphasis	Contributing Author Data Collection Data Analysis
Katherine Walton TKPOA	B.S. Human Nutrition, Foods and Exercise with Minor in Psychology	Contributing Author Data Collection
Haley Lazar TKPOA	B.S. Environmental Science-Ecology A.A Natural Science	Contributing Author
Ben Hopper TKPOA	A.S. Fire Science - In Progress	Data Collection
Stephanie Ferjo TKPOA	B.S. Environmental Science- Natural Resource Management- In Progress	Data Collection
Dona Olsen TKPOA	A.A. Environmental Technology and Sustainability: Physical Resources	Data Collection

10.0 REFERENCES

1. Buckley, M., Sokulsky, J. 2007. Lake Tahoe Basin Characterization & Assessment of Exemplary Programs for Water Quality Crediting and Trading Feasibility Analysis. Prepared by Environmental Incentives, LLC for the Lahontan Regional Water Quality Control Board. South Lake Tahoe, CA.
2. Forney, W., Richards, L., Adams, K. D., Minor, T. B., Rowe, T. G., LaRue Smith, J., Raumann, C. G. (2001). *Land Use Change and Effects on Water Quality and Ecosystem Health in the Lake Tahoe Basin, Nevada and California*. Retrieved from <https://pubs.er.usgs.gov/publication/ofr0214>
3. Li, Bo & Cantino, Philip & Olmstead, Richard & Bramley, Gemma & Xiang, Chun-Lei & Ma, Zhong-Hui & Tan, Yunhong & Zhang, Dianxiang. (2016). Li et al. 2016 Supplementary materials.
4. Sahoo, G. B., Schladow, S.G., Reuter J.E. (2010, October 6). *Effect of Sediment and Nutrient Loading on Lake Tahoe Optical Conditions and Restoration Opportunities Using a Newly Developed Lake Clarity Model*. Retrieved from <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2009WR008447>
5. Wang, L., Liu, Q., Hu, C., Liang, R., Qiu, J., & Wang, Y. (2018). Phosphorus release during decomposition of the submerged macrophyte *Potamogeton crispus*. *Limnology*, 19(3), 355–366. doi: 10.1007/s10201-018-0538-2

Appendix A
LRWQCB Sample Bottle Collection Protocol

Bottle Count Spreadsheet

Analysis	Container Size/Type	Collection Method	# bottles
Pigments			
Chl-A	500 ml or 1 L HDPE	Gloved hands, collect surface grab at least 3 cm below the water surface	
Phycocyanin	1L HDPE or glass amber	without touching or disturbing bottom sediments. Triple-rinse sample bottle with sample water and then fill to top	
Nutrients			
NO ₃ - as N, NO ₂ - as N, TN	1L HDPE	Gloved hands, Triple-rinse bottle by filling it 1/3 full, shake & rinse all internal surfaces. Pour out rinse water without disturbing lake bottom, shake water droplets out of bottle. For rinsing & sampling, fill the bottle by submerging top of bottle with cap on 3 cm below water surface, unscrewing cap with bottle opening tilted slightly up, and screwing cap back on while still underwater.	
TKN, TP, Ammonia as N	500 mL HDPE - H ₂ SO ₄ pre-preserved	Gloved hands, Triple-rinse bottle by filling it 1/3 full, shake & rinse all internal surfaces. Pour out rinse water without disturbing lake bottom, shake water droplets out of bottle. For rinsing & sampling, fill the bottle by submerging top of bottle with cap on 3 cm below water surface, unscrewing cap with bottle opening tilted slightly up, and screwing cap back on while still underwater. Use this sample to fill 500 ml pre-preserved bottle.	
Ortho-P	60 mL HDPE (Sample must be field filtered within 15 minutes of collection. Syringes and filters will be provided.)	Sample collection and field filtration method coming soon.	
Cyanobacteria			
Toxin - microcystin/nodularin (MC/NOD); cylindrospermopsin (CYL); anatoxin-a (ANTX); Total MC producing bacteria; Total CYL producing bacteria; Total ANTX - producing cyanobacteria; Identify & photograph potentially toxic algae (PTOX)	250L or 500 mL glass amber	Put on new elbow-length (recommended) gloves and obtain a clean bottle. New sampling bottles should not be rinsed with surface water prior to sample collection. Remove cap from bottle and hold in opposite hand from bottle. Grasp bottle from the bottom and submerge bottle (mouth first) into surface of water, sink bottle downwards 2-4 inches below the surface in a U-shaped motion, then pull the bottle out of water with the mouth facing up. Try to avoid overfilling the bottle; pouring out the sample is discouraged because it is not homogenous. If the sample container is overfilled, shake gently at the elbow 5 times, and then pour out a small volume of water. Immediately cap the bottle. Wipe off exterior of sample bottle and attach label. Place bottle into a cool ice chest. The sample containers should remain in the dark and be cooled to 4-6° C (do not freeze) during the remainder of the field sampling day. To maintain cool ice chests, store in the shade.)	

Note: A total of six (6) sample bottles will be used at each sample location/sample event.

One field dup/sampling event will be collected.

Appendix B

Delta Labs Field Filtration Protocol

DIRECTIONS FOR USING SYRINGE FILTERS

1. PURPOSE

Syringe filters are generally used to remove particles from a liquid sample prior to analysis which may damage equipment (ion chromatography, ICP) or interfere with results (spectrophotometer). They are typically used for small volumes. For most analysis, a disposable polypropylene syringe is used with a 0.45 um pore size filter.

2. DIRECTIONS

1. Open syringe package and remove the syringe. Most filters provided range from 30-60 ml with a luer-lok tip.
2. Filling the syringe and attaching the syringe filter.
 - A) Draw a small amount of air into the syringe by pulling the plunger back and release to loosen it. Load the sample into the syringe. Assure that no air bubbles are locked in the syringe.
 - i. If air bubbles appear, hold the filter upside down to allow the air to float to the tip of the syringe. Slowly push air out without losing any sample.
 - B) Remove the syringe filter from its packaging. To reduce contamination, hold the filter with its original packaging when attaching the filter to the syringe. For a luer lock syringe, fix it firmly by rotating the filter in a clockwise motion, but do not overtighten.
 - C) Hold the assembled syringe and filter vertically. Filter the solution into the receiving vessel by gently pressing down on the syringe plunger to push the sample through the filter. If the back pressure ever increases significantly, change the filter as it may have plugged. Avoid pressing excessively as this could cause the filter housing to burst.
 - D) If additional sample solution needs to be filtered, remove the syringe filter from the syringe tip. Collect the sample and reattach the syringe filter as described previously.
 - E) Use a new syringe and syringe filter for each new sample.

Revision #	Reason/Changes	Written by:	Approved by:	Date
1.0	Revision			



Appendix C

Cyanobacteria Caution Level Signage

CAUTION

**Harmful algae may be present in this water.
For your family's safety:**



You can swim in this water,
but **stay away from algae**
and scum in the water.



Do not let pets and other
animals go into or drink the
water, or eat scum on the
shore.



Keep children away
from algae in the water or
on the shore.



Do not drink this water or use
it for cooking.



For fish caught here, **throw**
away guts and clean fillets
with tap water or bottled
water before cooking.



Do not eat shellfish from
this water.

Call your doctor or veterinarian if you or your pet get sick after going in the water.
For information on harmful algae, go to mywaterquality.ca.gov/monitoring_council/cyanohab_network
For local information, contact: **Gregory J Hoover**
Ghoover@tahoekespoa.org
(530) 542-6444

TKPOA Water Quality Manager / AIS Management Coordinator
Tkpoa@tahoekespoa.org
(530) 542-6444

PRECAUCIÓN

Puede haber algas dañinas en estas aguas.
Para protección de su familia:



Puede nadar en estas aguas pero
aléjese de las algas o espuma
lamosa en el agua.



No deje que sus mascotas o
animales se metan o beban
el agua, o coman la espuma
lamosa en la orilla del agua.



Mantenga a los niños alejados de
algas en el agua u orilla del agua.



No beba de esta agua o use
para cocinar.



Al pescado que pesque aquí, quítelle
los intestinos y tírelos a la basura.
Limpie el filete con agua de la llave
o embotellada antes de cocinarlo.



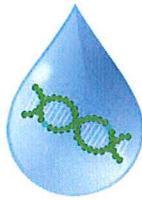
No coma mariscos de estas
aguas.

Llame a su médico o veterinario si usted o su mascota se enferman después de meterse al agua.
Para información sobre algas dañinas, vaya a: mywaterquality.ca.gov/monitoring_council/cyanohab_network

Para información local comuníquese con: Gregory J Hoover
TKPOA Gerente de Qualität/ El Coordinador de AIS
Ghoover@tahoekySpoa.org
(530) 542-6444

Appendix D

Bend Genetics, LLC Cyanobacteria Results



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date:

4/22/2019

Subject:

Cyanobacteria testing results

From:

Tim Otten, Laboratory Director

To:

Greg Hoover
Tahoe Keys Property Owners Association

ELISA testing results are attached for seven samples collected from the Tahoe Keys on 4/15/2019. These data have been reviewed and are considered final.

Analyses included in this report:

- Quantification of specific cyanobacterial toxins (anatoxin-a and microcystin/nodularin) using enzyme linked immunosorbent assay (ELISA).

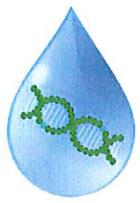


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP_FHAB_2018
Analysis for Toxigenic Cyanobacteria
Project #: Tahoe Keys POA
Reported: 4/22/2019 12:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	BG_ID	Date Collected	Date Received	Matrix	Preserved
Cy-02-LFAF1	TK59	4/15/2019 11:18	4/16/2019 10:00	Water	N
Cy-02-LFAF2	TK60	4/15/2019 11:19	4/16/2019 10:00	Water	N
Cy-02-LFAG	TK61	4/15/2019 11:41	4/16/2019 10:00	Water	N
Cy-02-LFAH	TK62	4/15/2019 11:53	4/16/2019 10:00	Water	N
Cy-02-LFAI	TK63	4/15/2019 12:08	4/16/2019 10:00	Water	N
Cy-02-LFAJ	TK64	4/15/2019 12:26	4/16/2019 10:00	Water	N
Cy-02-Site6	TK65	4/15/2019 13:09	4/16/2019 10:00	Water	N

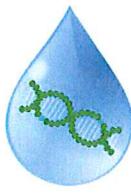


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP_FHAB_2018
Analysis for Toxigenic Cyanobacteria
Project #: Tahoe Keys POA
Reported: 4/22/2019 12:10

SAMPLE RESULTS

Sample ID	Method	Target	Result	Units	Quantitation	
					Limit	Notes
Cy-02-LFAF1	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-LFAF1	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U
Cy-02-LFAF2	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-LFAF2	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U
Cy-02-LFAG	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-LFAG	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U
Cy-02-LFAH	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-LFAH	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U
Cy-02-LFAI	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-LFAI	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U
Cy-02-LFAJ	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-LFAJ	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U
Cy-02-Site6	ELISA	Anatoxin-a	ND	µg/L	0.15	U
Cy-02-Site6	ELISA	Microcystin/Nod.	ND	µg/L	0.15	U



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

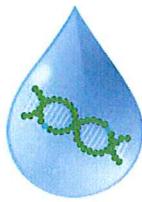
Project: SWAMP_FHAB_2018
Analysis for Toxigenic Cyanobacteria
Project #: Tahoe Keys POA
Reported: 4/22/2019 12:10

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.76		µg/L	0.75	101.0	70-130
ELISA	ATX - Matrix Sp	1.13		µg/L	1.25	90.3	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.77		µg/L	0.75	102.5	70-130
ELISA	MC - Matrix Sp	0.88		µg/L	1.00	88.1	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date:

4/26/2019

Subject:

Cyanobacterial testing results – Agreement# 18-028-270

From:

Tim Otten, Laboratory Director

To:

Marisa Van Dyke, Co-Lead of Freshwater HABS Program
State Water Resources Control Board - Information Management & Quality Assurance

Microscopy results are enclosed for seven water samples collected from the Tahoe Keys (Region 6; c/o Vesper Rodriguez - TKPOA) on 4/23/19. These results have been reviewed and are considered final.

Analyses included in this report:

- Microscope photos and identification of potentially toxigenic (PTOX) cyanobacteria.

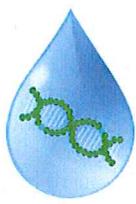


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for: Toxicigenic Cyanobacteria
Project #: 18-028-270
Reported: 4/26/2019 17:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
CY-03-LFAF	634TKLFAF	4/23/2019 11:09	4/24/2019 8:50	Water	N	TK66
CY-03-LFAG	634TKLFLAG	4/23/2019 11:19	4/24/2019 8:50	Water	N	TK67
CY-03-LFAH	634TKLFAH	4/23/2019 11:32	4/24/2019 8:50	Water	N	TK68
CY-03-LFAI	634TKLFAI	4/23/2019 11:45	4/24/2019 8:50	Water	N	TK69
CY-03-LFAJ	634TKFLAJ	4/23/2019 11:59	4/24/2019 8:50	Water	N	TK70
CY-03-Site6	634TKLST6	4/23/2019 12:36	4/24/2019 8:50	Water	N	TK71
CY-03-Site6.2 (DUP)	634TKLST6 DUP	4/23/2019 12:41	4/24/2019 8:50	Water	N	TK72

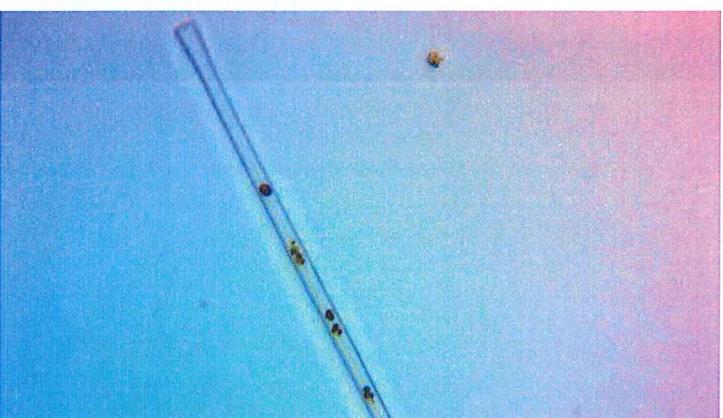
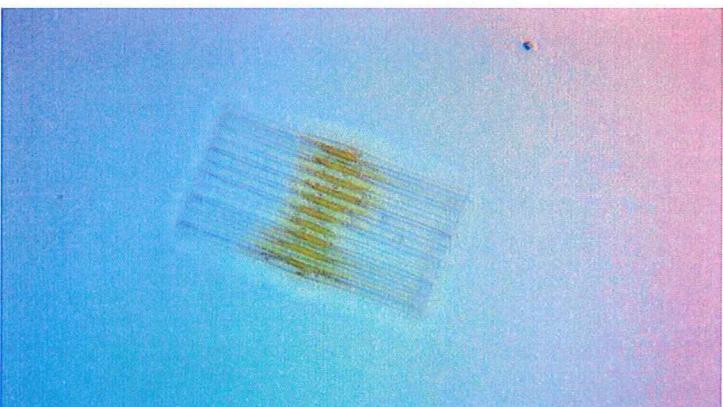


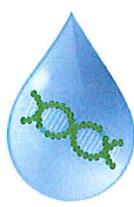
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 4/26/2019 17:25

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-03-LFAF	NA			No cyanobacteria were observed in this sample. There were a low number of diatoms, including <i>Asterionella</i> . The photomicrograph was taken under 400X magnification.
CY-03-LFAG	NA			No cyanobacteria were observed in this sample. There were a low number of diatoms, including <i>Fragilaria</i> . The photomicrograph was taken under 400X magnification.
CY-03-LFAH	NA			There were a low number of diatoms present in this sample; however no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

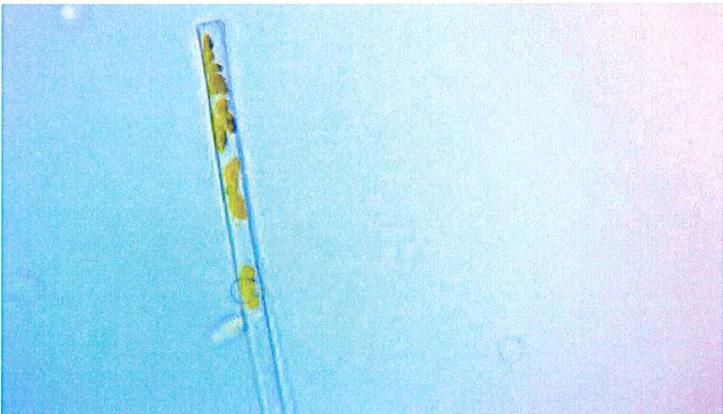




Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 4/26/2019 17:25

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-03-LFAI	NA			<p>There were a low number of diatoms present in this sample; however no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
CY-03-LFAJ	NA			<p>No cyanobacteria were observed in this sample. The photomicrograph was taken under 400X magnification.</p> 
CY-03-Site6	NA			<p>No cyanobacteria were observed in this sample, only some unrecognizable detritus. The photomicrograph was taken under 400X magnification.</p> 



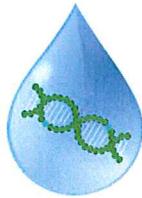
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 4/26/2019 17:25

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-03-Site6.2 (DUP)	NA			No cyanobacteria were observed in this sample. There were a low number of diatoms, including <i>Asterionella</i> and <i>Nitzschia</i> . The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 5/9/2019

Subject: Cyanobacterial testing results – Agreement# 18-028-270

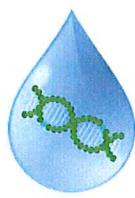
From: Tim Otten, Laboratory Director

To: Marisa Van Dyke, Co-Lead of Freshwater HABS Program
State Water Resources Control Board - Information Management & Quality Assurance

Microscopy results are enclosed for six water samples collected from the Tahoe Keys (Region 6; c/o Vesper Rodriguez - TKPOA) on 5/7/19. These results have been reviewed and are considered final.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for: Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 5/9/2019 16:10

ANALYTICAL REPORT FOR SAMPLES

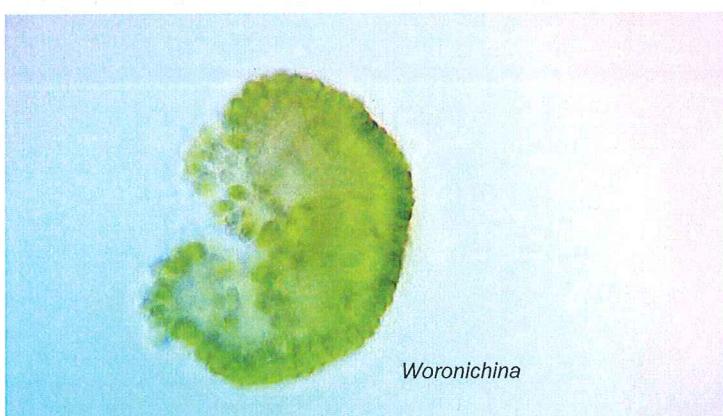
Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
CY-04-LFAF	634TKLFAF	5/7/2019 10:30	5/8/2019 8:45	Water	N	TK73
CY-04-LFAG	634TKLFLAG	5/7/2019 10:45	5/8/2019 8:45	Water	N	TK74
CY-04-LFAH	634TKLFAH	5/7/2019 11:05	5/8/2019 8:45	Water	N	TK75
CY-04-LFAI	634TKLFAI	5/7/2019 11:22	5/8/2019 8:45	Water	N	TK76
CY-04-LFAJ	634TKFLAJ	5/7/2019 11:43	5/8/2019 8:45	Water	N	TK77
CY-04-LFA-6	634TKLST6	5/7/2019 12:35	5/8/2019 8:45	Water	N	TK78

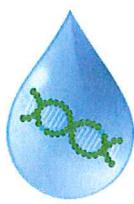


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 5/9/2019 16:10

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-04-LFAF	NA			<p>This sample contained a low amount of uncharacterized detritus; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
CY-04-LFAG	NA			<p>This sample contained a low amount of diatoms and dinoflagellates; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
CY-04-LFAH	<i>Woronichina</i>			<p>There were a low number of diatoms present in this sample, as well as a single colony of <i>Woronichina</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>  <p><i>Woronichina</i></p>

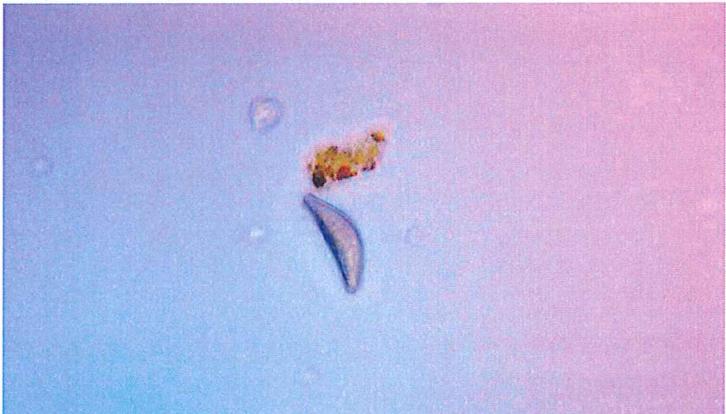


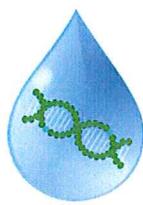
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 5/9/2019 16:10

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-04-LFAI	NA			This sample contained a low amount of uncharacterized detritus; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
CY-04-LFAJ	NA			This sample contained a low amount of diatoms and dinoflagellates; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
CY-04-LFA-6	NA			This sample contained a low amount of uncharacterized detritus; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 5/30/2019

Subject: Cyanobacterial testing results – Agreement# 18-028-270

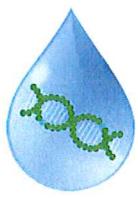
From: Tim Otten, Laboratory Director

To: Keith Bouma-Gregson, Freshwater HABS Program Manager
State Water Resources Control Board - Information Management & Quality Assurance

Microscopy results are enclosed for six water samples collected from the Tahoe Keys (Region 6; c/o Vesper Rodriguez - TKPOA) on 5/21/19. These results have been reviewed and are considered final.

Analyses included in this report:

- Microscope photos and identification of potentially toxigenic (PTOX) cyanobacteria.

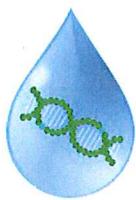


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for: Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 5/30/2019 11:55

ANALYTICAL REPORT FOR SAMPLES

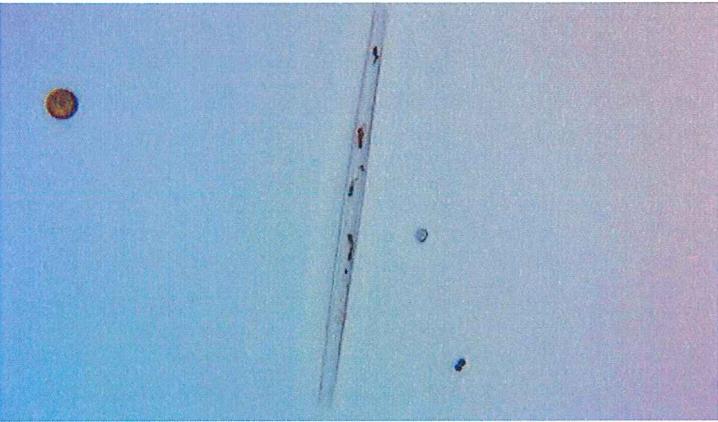
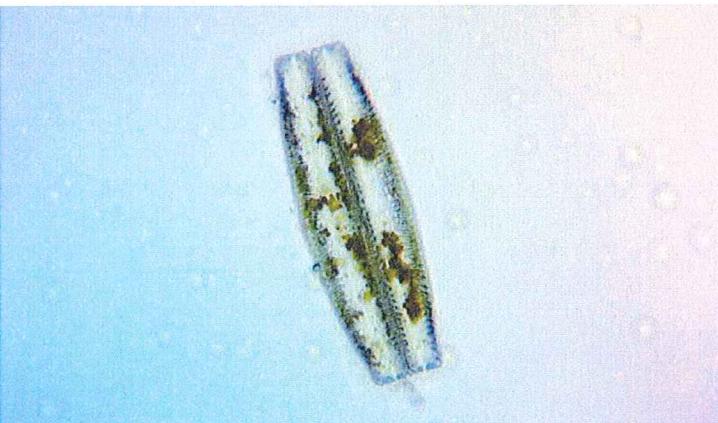
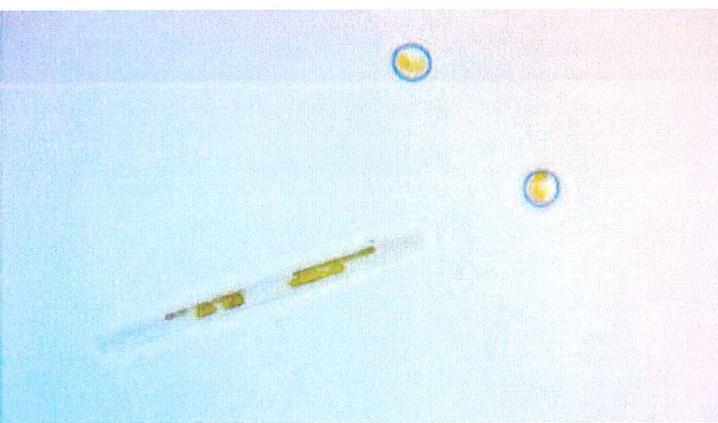
Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
CY-05-LFAF	634TKLFAF	5/21/2019 11:02	5/23/2019 8:35	Water	N	TK79
CY-05-LFAG	634TKLFLAG	5/21/2019 11:19	5/23/2019 8:35	Water	N	TK80
CY-05-LFAH	634TKLFAH	5/21/2019 11:40	5/23/2019 8:35	Water	N	TK81
CY-05-LFAI	634TKLFAI	5/21/2019 12:00	5/23/2019 8:35	Water	N	TK82
CY-05-LFAJ	634TKFLAJ	5/21/2019 12:15	5/23/2019 8:35	Water	N	TK83
CY-05-Site-6	634TKLST6	5/21/2019 13:05	5/23/2019 8:35	Water	N	TK84

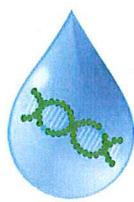


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 5/30/2019 11:55

MICROSCOPY RESULTS - Identification of CyanoHABs

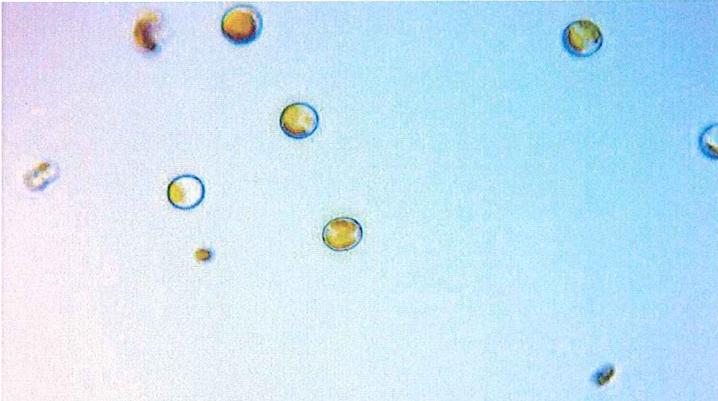
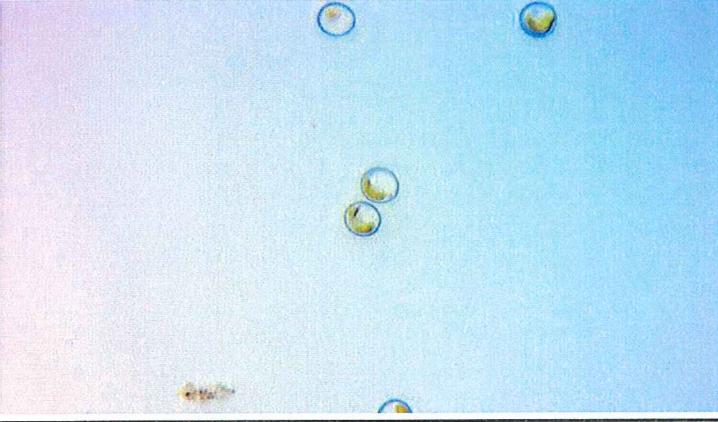
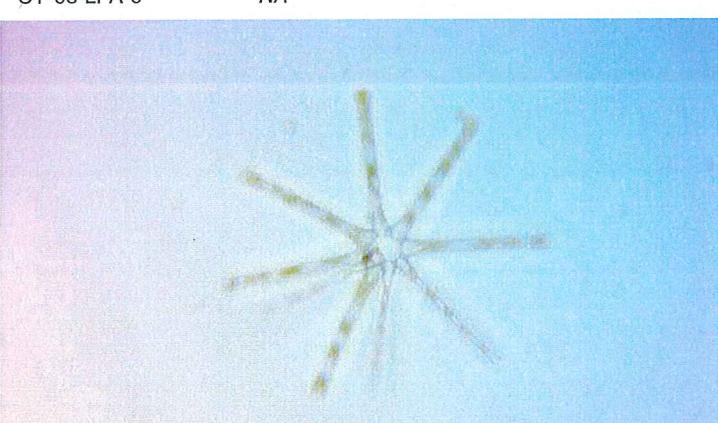
Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-05-LFAF	NA			 <p>This sample contained a low amount of diatoms and chlorophytes; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>
CY-05-LFAG	NA			 <p>This sample contained a low amount of diatoms and chlorophytes; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>
CY-05-LFAH	NA			 <p>This sample contained a low amount of diatoms and chlorophytes; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>

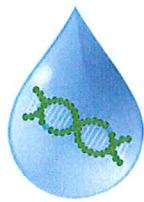


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 5/30/2019 11:55

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-05-LFAI	NA			 <p>This sample contained a moderate amount of chlorophytes and a low amount of diatoms; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>
CY-05-LFAJ	NA			 <p>This sample contained a moderate amount of chlorophytes; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>
CY-05-LFA-6	NA			 <p>This sample contained a low amount of diatoms and chlorophytes; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 6/11/2019

Subject: Cyanobacterial testing results – Agreement# 18-028-270

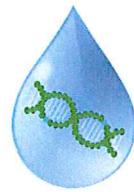
From: Tim Otten, Laboratory Director

To: Keith Bouma-Gregson, Freshwater HABS Program Manager
State Water Resources Control Board - Information Management & Quality Assurance

Attached are the results of microscopy, QPCR and ELISA analyses conducted on 7 water samples collected from the Tahoe Keys (RB6; c/o Vesper Rodriguez) on 6/4/19. Any samples containing cyanobacteria were analyzed by QPCR, and if cyanotoxin genes were present, the indicated toxins were assay by ELISA. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total microcystin/nodularin using enzyme linked immunosorbent assay (ELISA) method.

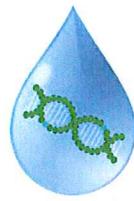


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for: Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 6/11/2019 19:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-06-LFAF	634TKLFAF	6/4/2019 10:30	6/5/2019 8:40	Water	N	TK85
Cy-06-LFAG	634TKLFAG	6/4/2019 10:50	6/5/2019 8:40	Water	N	TK86
Cy-06-LFAH	634TKLFAH	6/4/2019 11:15	6/5/2019 8:40	Water	N	TK87
Cy-06-LFAI	634TKLFAI	6/4/2019 11:45	6/5/2019 8:40	Water	N	TK88
Cy-06-LFAJ	634TKFLAJ	6/4/2019 12:05	6/5/2019 8:40	Water	N	TK89
Cy-06-Site6	634TKLST6	6/4/2019 12:52	6/5/2019 8:40	Water	N	TK90
Cy-06-LFAG2	634TKLFAG	6/4/2019 10:50	6/5/2019 8:40	Water	N	TK91

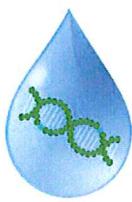


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 6/11/2019 19:10

SAMPLE RESULTS

Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-06-Site6	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-06-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-06-Site6	QPCR	Microcystin	7,092	100	copies/mL	
Cy-06-Site6	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-06-Site6	ELISA	Microcystin	ND	0.15	µg/L	U

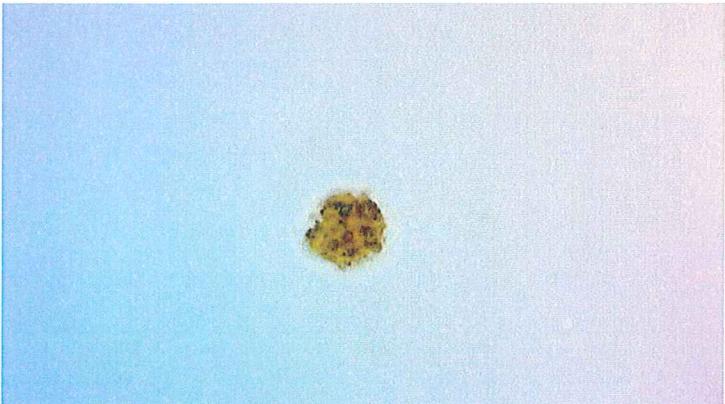


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

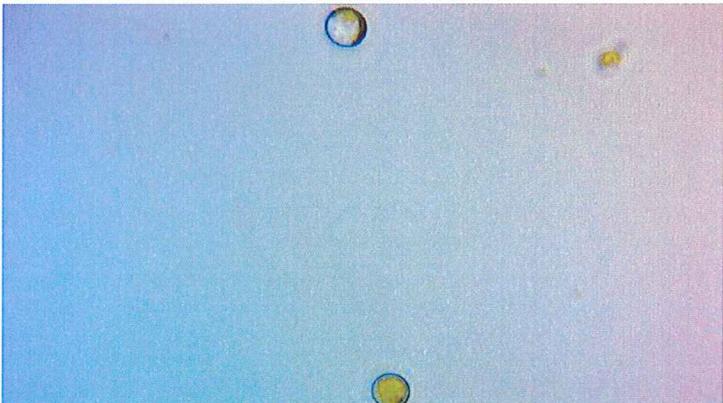
Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 6/11/2019 19:10

MICROSCOPY RESULTS - Identification of CyanoHABs

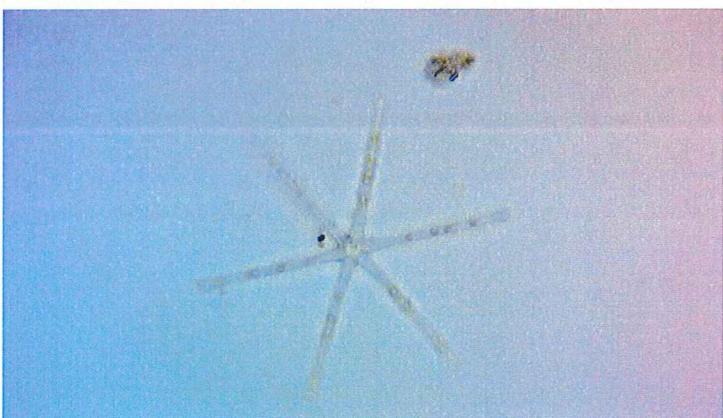
Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-06-LFAF	NA			There was only a low amount of detritus present, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

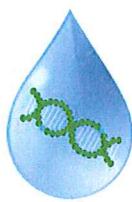


Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-06-LFAG	NA			There was a low amount of green algae present; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-06-LFAH	NA			There was a moderate amount of diatoms present, including <i>Asterionella</i> and <i>Fragilaria</i> ; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

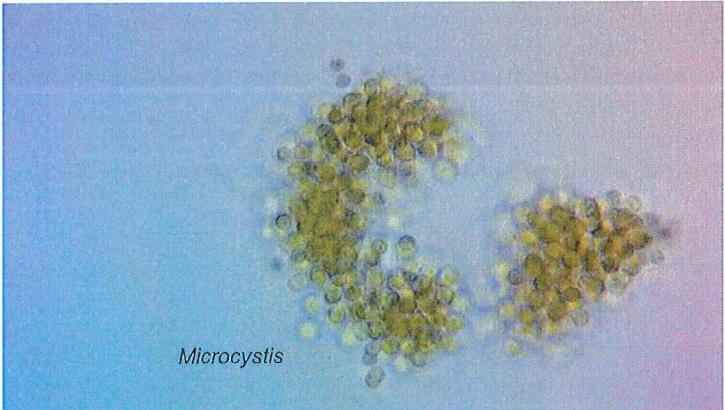


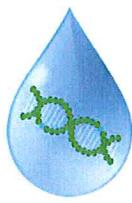


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 6/11/2019 19:10

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-06-LFAI	NA			<p>There was a moderate amount of green algae present; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
Cy-06-LFAJ	NA			<p>This sample contained a low number of diatoms and green algae, with a few <i>Ceratium</i> sp. (dinoflagellate) also observed. However, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
Cy-06-Site6	<i>Microcystis</i>			<p>This sample contained a low amount of <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p>  <p><i>Microcystis</i></p>



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 6/11/2019 19:10

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-06-LFAG2	NA			There was a low amount of green algae present; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

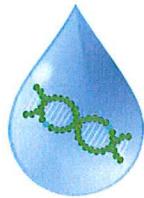
Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 6/11/2019 19:10

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Spike	50,597		copies/mL	50,000	101.2	70-130
QPCR	sxtA - Blank	ND	U	copies/mL	0		
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.69		µg/L	0.75	99.3	70-130
ELISA	MC - Matrix Sp	0.87		µg/L	1.00	97.9	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 7/1/2019

Subject: Cyanobacterial testing results – Agreement# 18-028-270

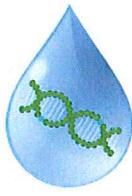
From: Tim Otten, Laboratory Director

To: Keith Bouma-Gregson, Freshwater HABS Program Manager
State Water Resources Control Board - Information Management & Quality Assurance

Testing results are attached for microscopy and QPCR analyses conducted on seven water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 6/25/19. All samples containing cyanobacteria were analyzed by QPCR; however, no toxin genes were detected. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.

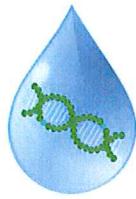


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/1/2019 14:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-08-LFAF	634TKLFAF	6/25/2019 11:03	6/26/2019 10:20	Water	N	WB431
Cy-08-LFAG	634TKLFAG	6/25/2019 11:22	6/26/2019 10:20	Water	N	WB432
Cy-08-LFAH	634TKLFAH	6/25/2019 11:39	6/26/2019 10:20	Water	N	WB433
Cy-08-LFAI	634TKLFAI	6/25/2019 11:52	6/26/2019 10:20	Water	N	WB434
Cy-08-LFAJ	634TKLFAJ	6/25/2019 12:07	6/26/2019 10:20	Water	N	WB435
Cy-08-Site6	634TKLST6	6/25/2019 12:39	6/26/2019 10:20	Water	N	WB436
Cy-08-Site6-2	634TKLST6	6/25/2019 12:39	6/26/2019 10:20	Water	N	WB437

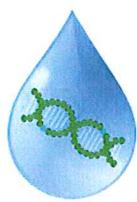


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/1/2019 14:00

SAMPLE RESULTS

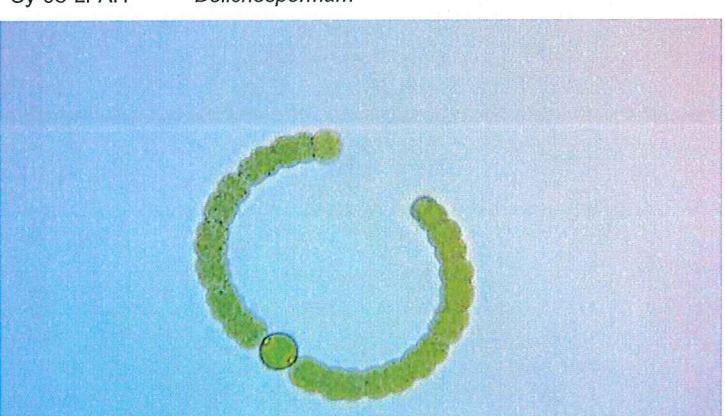
Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-08-LFAG	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-08-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-08-LFAG	QPCR	Microcystin	ND	100	copies/mL	U
Cy-08-LFAG	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-08-LFAH	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-08-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-08-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-08-LFAH	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-08-LFAI	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-08-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-08-LFAI	QPCR	Microcystin	ND	100	copies/mL	U
Cy-08-LFAI	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-08-LFAJ	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-08-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-08-LFAJ	QPCR	Microcystin	ND	100	copies/mL	U
Cy-08-LFAJ	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-08-Site6	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-08-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-08-Site6	QPCR	Microcystin	ND	100	copies/mL	U
Cy-08-Site6	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-08-Site6-2	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-08-Site6-2	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-08-Site6-2	QPCR	Microcystin	ND	100	copies/mL	U
Cy-08-Site6-2	QPCR	Saxitoxin	ND	100	copies/mL	U

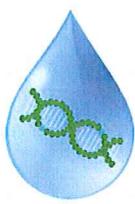


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/1/2019 14:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-08-LFAF	NA			<p>There was a low amount of chlorophytes and diatoms in this sample; however, no cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
Cy-08-LFAG	<i>Dolichospermum</i>			<p>This sample contained a moderately low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
Cy-08-LFAH	<i>Dolichospermum</i>			<p>There was a moderate amount of <i>Dolichospermum</i> sp. present in this sample; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 



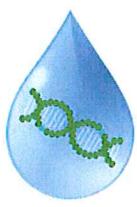
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/1/2019 14:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-08-LFAI	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-08-LFAJ	<i>Dolichospermum</i>			This sample contained a moderate amount of <i>Dolichospermum</i> sp. that presented as two different morphologies (large celled straight filaments and smaller celled coiled filaments); no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-08-Site6	<i>Dolichospermum</i>			This sample contained a moderately low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



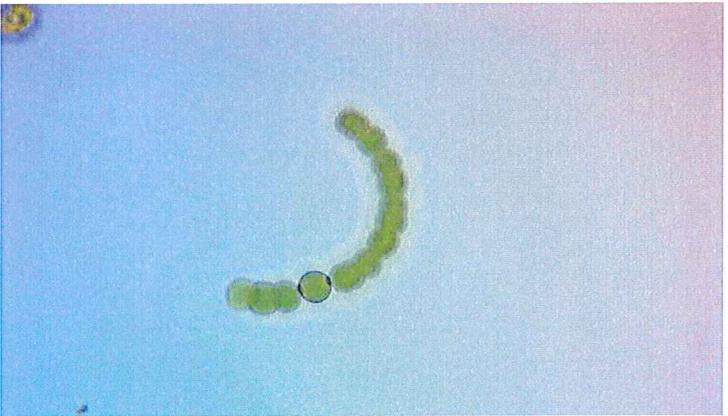


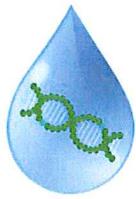
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/1/2019 14:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-08-Site6-2	<i>Dolichospermum</i>			This sample contained a moderately low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/1/2019 14:00

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Spike	50,018		copies/mL	50,000	100.0	70-130
QPCR	sxtA - Blank	ND	U	copies/mL	0		

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 7/10/2019

Subject: Cyanobacterial testing results – Agreement# 18-028-270

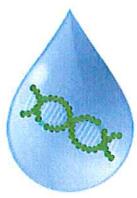
From: Tim Otten, Laboratory Director

To: Keith Bouma-Gregson, Freshwater HABS Program Manager
State Water Resources Control Board - Information Management & Quality Assurance

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on six water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 7/2/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total microcystin/nodularin using enzyme linked immunosorbent assay (ELISA) method.

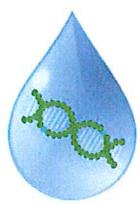


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for: Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/10/2019 17:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-10-LFAF	634TKLFAF	7/2/2019 10:48	7/3/2019 8:40	Water	N	WB483
Cy-10-LFAG	634TKLFAG	7/2/2019 11:08	7/3/2019 8:40	Water	N	WB484
Cy-10-LFAH	634TKLFAH	7/2/2019 11:28	7/3/2019 8:40	Water	N	WB485
Cy-10-LFAI	634TKLFAI	7/2/2019 11:49	7/3/2019 8:40	Water	N	WB486
Cy-10-LFAJ	634TKLFAJ	7/2/2019 12:05	7/3/2019 8:40	Water	N	WB487
Cy-10-Site6	634TKLST6	7/2/2019 12:51	7/3/2019 8:40	Water	N	WB488

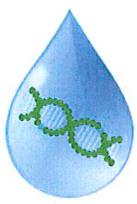


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/10/2019 17:00

SAMPLE RESULTS

Sample ID	Method	Target	Result	Quantitation Limit	Units	Notes
Cy-10-LFAF	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-10-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-10-LFAF	QPCR	Microcystin	ND	100	copies/mL	U
Cy-10-LFAF	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-10-LFAG	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-10-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-10-LFAG	QPCR	Microcystin	ND	100	copies/mL	U
Cy-10-LFAG	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-10-LFAH	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-10-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-10-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-10-LFAH	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-10-LFAI	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-10-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-10-LFAI	QPCR	Microcystin	5,668	100	copies/mL	
Cy-10-LFAI	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-10-LFAI	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-10-LFAJ	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-10-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-10-LFAJ	QPCR	Microcystin	ND	100	copies/mL	U
Cy-10-LFAJ	QPCR	Saxitoxin	ND	100	copies/mL	U
Cy-10-Site6	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-10-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-10-Site6	QPCR	Microcystin	ND	100	copies/mL	U
Cy-10-Site6	QPCR	Saxitoxin	ND	100	copies/mL	U

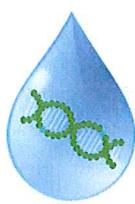


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/10/2019 17:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-10-LFAF	<i>Dolichospermum</i>			There was a low amount of <i>Dolichospermum</i> sp. present in this sample; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-10-LFAG	<i>Dolichospermum</i>	<i>Snowella</i>		This sample contained a low amount of <i>Dolichospermum</i> sp., and a very low amount of <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-10-LFAH	<i>Dolichospermum</i>			There was a low amount of <i>Dolichospermum</i> sp. present in this sample; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

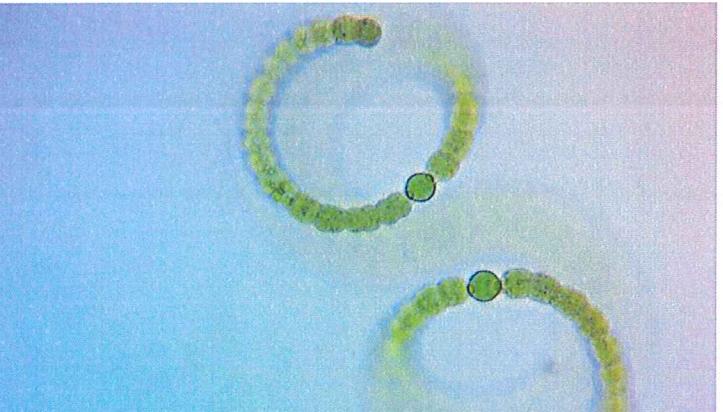
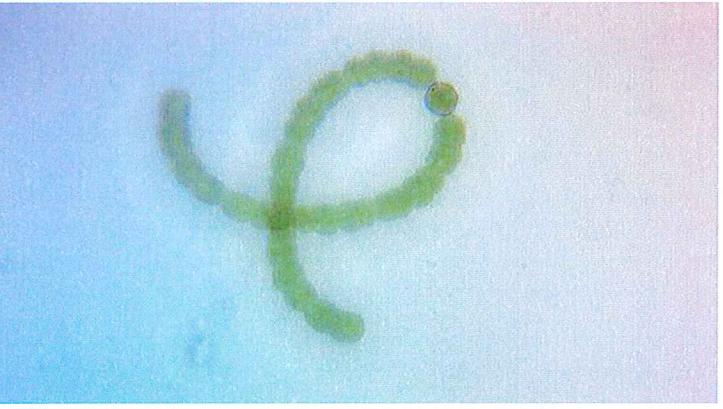
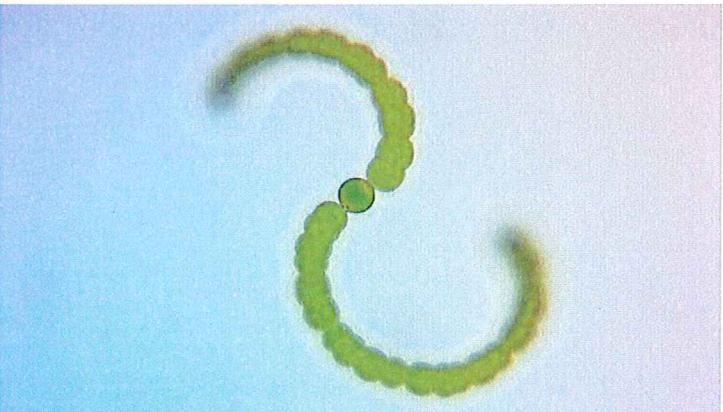


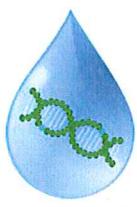
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/10/2019 17:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-10-LFAI	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-10-LFAJ	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-10-Site6	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

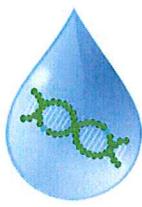
Project: SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/10/2019 17:00

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Spike	47,126		copies/mL	50,000	94.3	70-130
QPCR	sxtA - Blank	ND	U	copies/mL	0		
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.79		µg/L	0.75	105.6	70-130
ELISA	MC - Matrix Sp	1.01		µg/L	1.00	101.1	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 7/23/2019

Subject: Cyanobacterial testing results

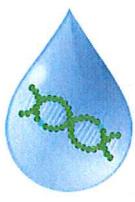
From: Tim Otten, Laboratory Director

To: Keith Bouma-Gregson, Freshwater HABS Program Manager
State Water Resources Control Board - Information Management & Quality Assurance

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on six water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 7/16/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total anatoxin-a using enzyme linked immunosorbent assay (ELISA) method.

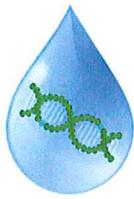


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: TKPOA / SWAMP FHAB 2018 - RB6
Analysis for: Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/23/2019 10:00

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-11-LFAF	634TKLFAF	7/16/2019 10:50	7/17/2019 13:56	Water	N	WB504
Cy-11-LFAG	634TKLFAG	7/16/2019 11:07	7/17/2019 13:56	Water	N	WB505
Cy-11-LFAH	634TKLFAH	7/16/2019 11:21	7/17/2019 13:56	Water	N	WB506
Cy-11-LFAI	634TKLFAI	7/16/2019 11:40	7/17/2019 13:56	Water	N	WB507
Cy-11-LFAJ	634TKLFAJ	7/16/2019 11:55	7/17/2019 13:56	Water	N	WB508
Cy-11-Site6	634TKLST6	7/16/2019 12:30	7/17/2019 13:56	Water	N	WB509

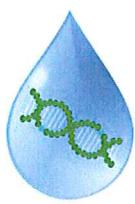


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: TKPOA / SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/23/2019 10:00

SAMPLE RESULTS

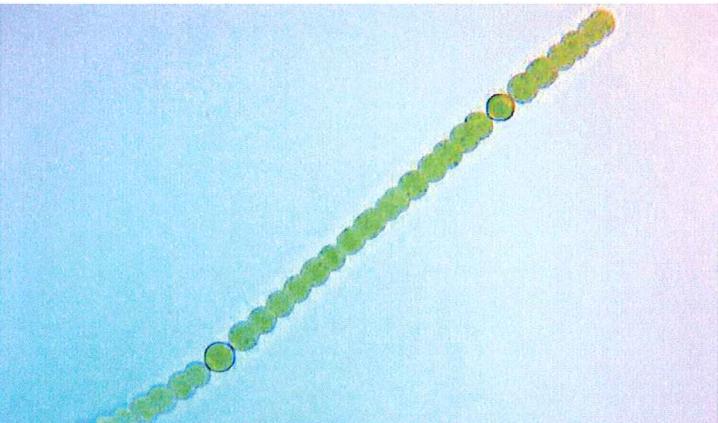
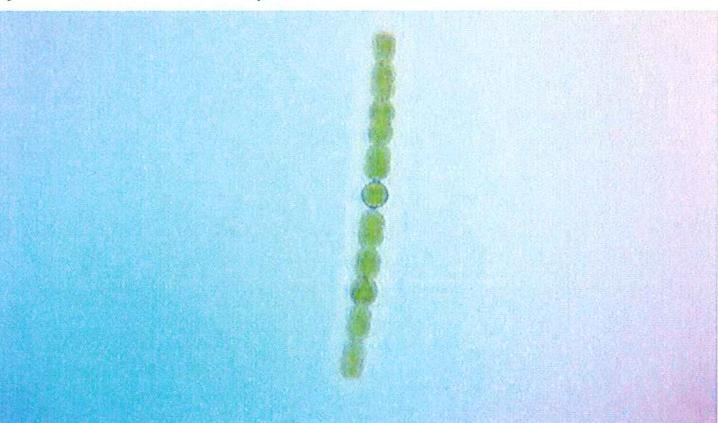
Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-11-LFAF	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-11-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-11-LFAF	QPCR	Microcystin	ND	100	copies/mL	U
Cy-11-LFAG	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-11-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-11-LFAG	QPCR	Microcystin	ND	100	copies/mL	U
Cy-11-LFAH	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-11-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-11-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-11-LFAI	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-11-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-11-LFAI	QPCR	Microcystin	ND	100	copies/mL	U
Cy-11-LFAJ	QPCR	Anatoxin-a	ND	100	copies/mL	U
Cy-11-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-11-LFAJ	QPCR	Microcystin	ND	100	copies/mL	U
Cy-11-Site6	QPCR	Anatoxin-a	5,426	100	copies/mL	
Cy-11-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-11-Site6	QPCR	Microcystin	ND	100	copies/mL	U
Cy-11-Site6	ELISA	Anatoxin-a	0.56	0.15	µg/L	

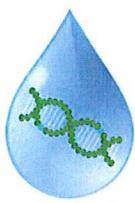


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: TKPOA / SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/23/2019 10:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-11-LFAF	<i>Dolichospermum</i>			<p>There was a low amount of <i>Dolichospermum</i> sp. present in this sample; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
Cy-11-LFAG	<i>Dolichospermum</i>			<p>This sample contained a low amount of <i>Dolichospermum</i> sp. and a very low amount of <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 
Cy-11-LFAH	<i>Dolichospermum</i>			<p>There was a low amount of <i>Dolichospermum</i> sp. present in this sample; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.</p> 

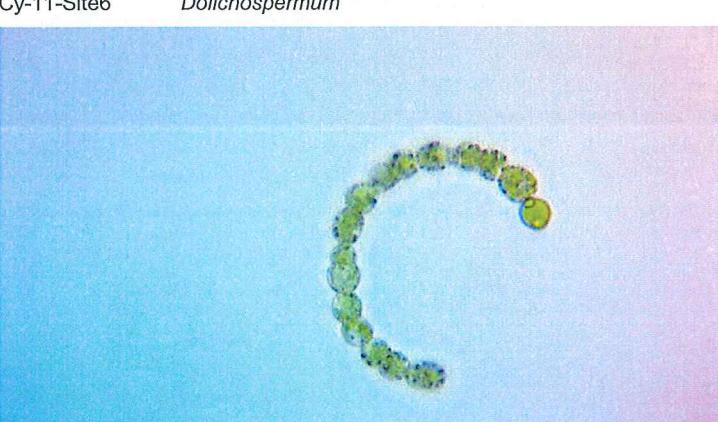
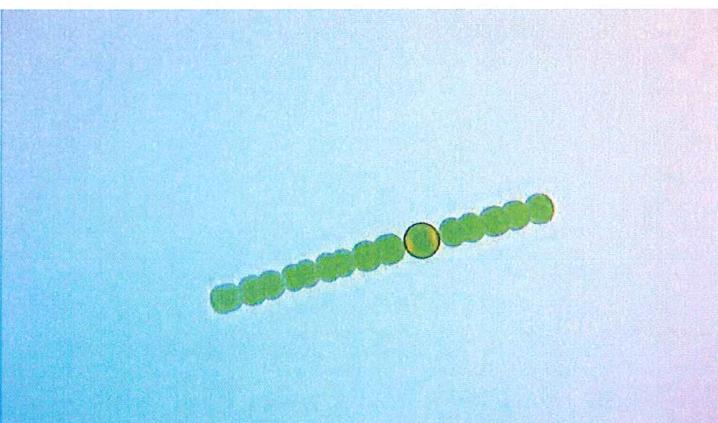


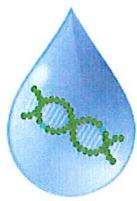
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: TKPOA / SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/23/2019 10:00

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-11-LFAI	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-11-LFAJ	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-11-Site6	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

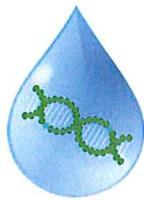
Project: TKPOA / SWAMP FHAB 2018 - RB6
Analysis for Toxigenic Cyanobacteria
Project #: 18-028-270
Reported: 7/23/2019 10:00

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Spike	39,985		copies/mL	50,000	80.0	70-130
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.72		µg/L	0.75	95.8	70-130
ELISA	ATX - Matrix Sp	1.36		µg/L	1.25	108.6	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 8/6/2019

Subject: Cyanobacterial testing results

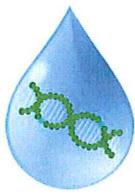
From: Tim Otten, Laboratory Director

To: Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on seven water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 7/30/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

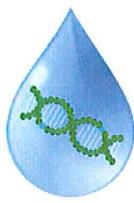


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/6/2019 16:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-12-LFAF	634TKLFAF	7/30/2019 10:53	7/31/2019 14:10	Water	N	WB552
Cy-12-LFAG	634TKLFAG	7/30/2019 11:13	7/31/2019 14:10	Water	N	WB553
Cy-12-LFAH	634TKLFAH	7/30/2019 11:35	7/31/2019 14:10	Water	N	WB554
Cy-12-LFAI	634TKLFAI	7/30/2019 11:57	7/31/2019 14:10	Water	N	WB555
Cy-12-LFAJ	634TKLFAJ	7/30/2019 12:16	7/31/2019 14:10	Water	N	WB556
Cy-12-Site6	634TKLST6	7/30/2019 12:59	7/31/2019 14:10	Water	N	WB557
Cy-12-LFAI2	634TKLFAI	7/30/2019 11:57	7/31/2019 14:10	Water	N	WB558

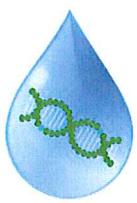


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/6/2019 16:20

SAMPLE RESULTS

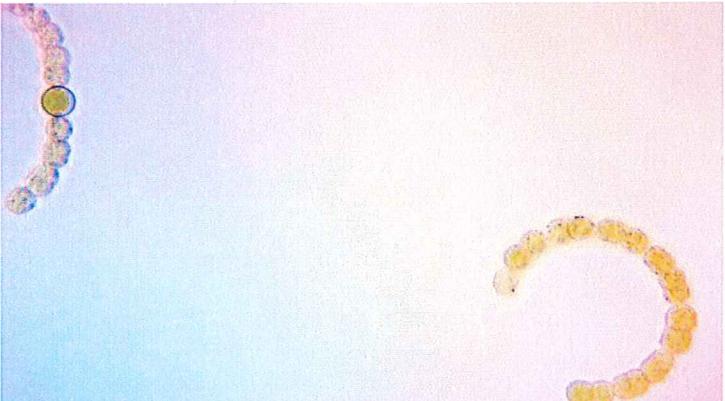
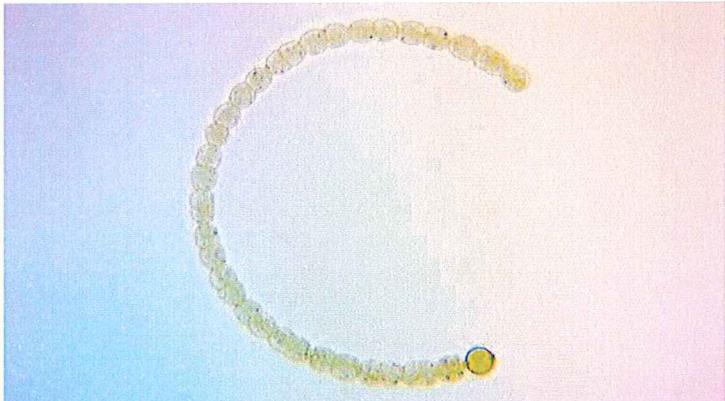
Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-12-LFAF	QPCR	Anatoxin-a	10,959	100	copies/mL	
Cy-12-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-LFAF	QPCR	Microcystin	ND	100	copies/mL	U
Cy-12-LFAF	ELISA	Anatoxin-a	1.44	0.15	µg/L	
Cy-12-LFAG	QPCR	Anatoxin-a	8,700	100	copies/mL	
Cy-12-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-LFAG	QPCR	Microcystin	ND	100	copies/mL	U
Cy-12-LFAG	ELISA	Anatoxin-a	1.22	0.15	µg/L	
Cy-12-LFAH	QPCR	Anatoxin-a	12,467	100	copies/mL	
Cy-12-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-12-LFAH	ELISA	Anatoxin-a	1.62	0.15	µg/L	
Cy-12-LFAI	QPCR	Anatoxin-a	27,480	100	copies/mL	
Cy-12-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-LFAI	QPCR	Microcystin	ND	100	copies/mL	U
Cy-12-LFAI	ELISA	Anatoxin-a	0.63	0.15	µg/L	
Cy-12-LFAJ	QPCR	Anatoxin-a	20,959	100	copies/mL	
Cy-12-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-LFAJ	QPCR	Microcystin	ND	100	copies/mL	U
Cy-12-LFAJ	ELISA	Anatoxin-a	1.17	0.15	µg/L	
Cy-12-Site6	QPCR	Anatoxin-a	10,376	100	copies/mL	
Cy-12-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-Site6	QPCR	Microcystin	9,802	100	copies/mL	
Cy-12-Site6	ELISA	Anatoxin-a	0.54	0.15	µg/L	
Cy-12-Site6	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-12-LFAI2	QPCR	Anatoxin-a	32,300	100	copies/mL	
Cy-12-LFAI2	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-12-LFAI2	QPCR	Microcystin	9,166	100	copies/mL	
Cy-12-LFAI2	ELISA	Anatoxin-a	2.37	0.15	µg/L	
Cy-12-LFAI2	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U

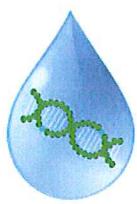


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/6/2019 16:20

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-12-LFAF	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
Cy-12-LFAG	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
Cy-12-LFAH	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				



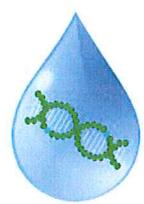
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/6/2019 16:20

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-12-LFA1	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-12-LFAJ	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-12-Site6	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



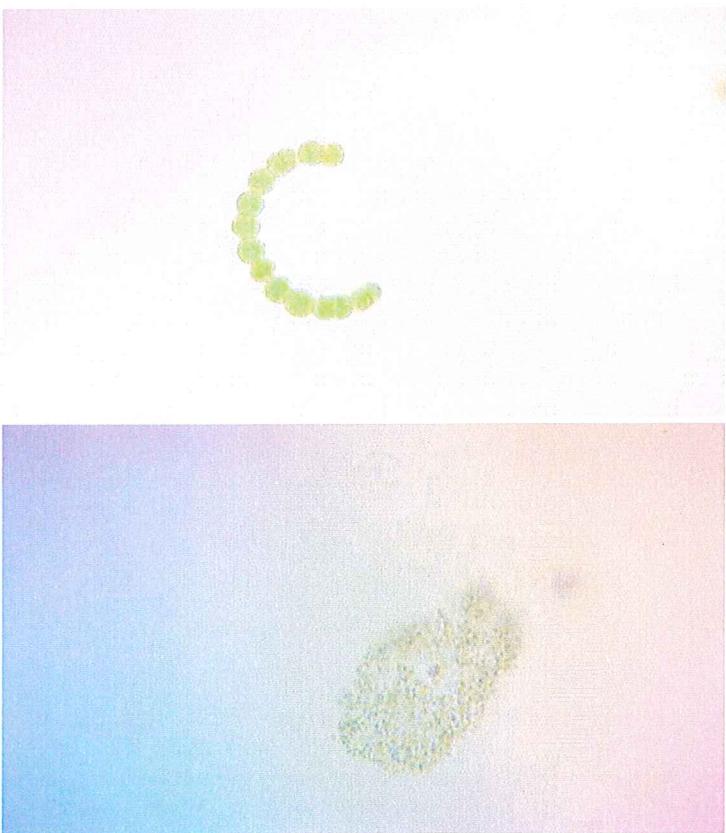


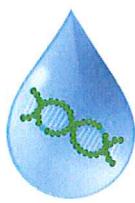
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/6/2019 16:20

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-12-LFAI2	<i>Dolichospermum</i>	<i>Aphanocapsa</i>		This sample contained a low amount of <i>Dolichospermum</i> sp. and <i>Aphanocapsa</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/6/2019 16:20

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Spike	54,289		copies/mL	50,000	108.6	70-130
QPCR	mcyE - Blank	ND	U	copies/mL	0		
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.71		µg/L	0.75	94.0	70-130
ELISA	ATX - Matrix Sp	1.16		µg/L	1.25	93.2	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.73		µg/L	0.75	97.2	70-130
ELISA	MC - Matrix Sp	0.98		µg/L	1.00	98.4	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date:

8/19/2019

Subject:

Cyanobacterial testing results

From:

Tim Otten, Laboratory Director

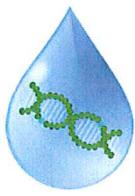
To:

Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on seven water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 8/13/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

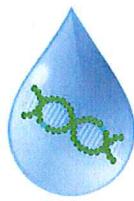


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/19/2019 16:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-13-LFAF	634TKLFAF	8/13/2019	8/14/2019 11:15	Water	N	WB637
Cy-13-LFAG	634TKLFAG	8/13/2019	8/14/2019 11:15	Water	N	WB638
Cy-13-LFAH	634TKLFAH	8/13/2019	8/14/2019 11:15	Water	N	WB639
Cy-13-LFAI	634TKLFAI	8/13/2019	8/14/2019 11:15	Water	N	WB640
Cy-13-LFAJ	634TKLFAJ	8/13/2019	8/14/2019 11:15	Water	N	WB641
Cy-13-Site6	634TKLST6	8/13/2019	8/14/2019 11:15	Water	N	WB642
Cy-13-WQ14	WQ Site 14	8/13/2019	8/14/2019 11:15	Water	N	WB643

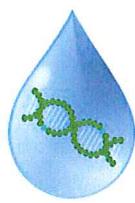


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/19/2019 16:20

SAMPLE RESULTS

Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-13-LFAF	QPCR	Anatoxin-a	9,289	100	copies/mL	
Cy-13-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-LFAF	QPCR	Microcystin	ND	100	copies/mL	U
Cy-13-LFAF	ELISA	Anatoxin-a	0.48	0.15	µg/L	
Cy-13-LFAG	QPCR	Anatoxin-a	12,834	100	copies/mL	
Cy-13-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-LFAG	QPCR	Microcystin	896	100	copies/mL	
Cy-13-LFAG	ELISA	Anatoxin-a	0.54	0.15	µg/L	
Cy-13-LFAG	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-13-LFAH	QPCR	Anatoxin-a	28,664	100	copies/mL	
Cy-13-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-13-LFAH	ELISA	Anatoxin-a	3.62	0.15	µg/L	
Cy-13-LFAI	QPCR	Anatoxin-a	165,994	100	copies/mL	
Cy-13-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-LFAI	QPCR	Microcystin	ND	100	copies/mL	U
Cy-13-LFAI	ELISA	Anatoxin-a	18.07	1.50	µg/L	
Cy-13-LFAJ	QPCR	Anatoxin-a	118,650	100	copies/mL	
Cy-13-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-LFAJ	QPCR	Microcystin	2,949	100	copies/mL	
Cy-13-LFAJ	ELISA	Anatoxin-a	6.35	0.45	µg/L	
Cy-13-LFAJ	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-13-Site6	QPCR	Anatoxin-a	8,378	100	copies/mL	
Cy-13-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-Site6	QPCR	Microcystin	ND	100	copies/mL	U
Cy-13-Site6	ELISA	Anatoxin-a	0.36	0.15	µg/L	
Cy-13-WQ14	QPCR	Anatoxin-a	5,578	100	copies/mL	
Cy-13-WQ14	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-13-WQ14	QPCR	Microcystin	894	100	copies/mL	
Cy-13-WQ14	ELISA	Anatoxin-a	0.21	0.15	µg/L	
Cy-13-WQ14	ELISA	Microcystin/Nod.	0.12	0.15	µg/L	C1,J

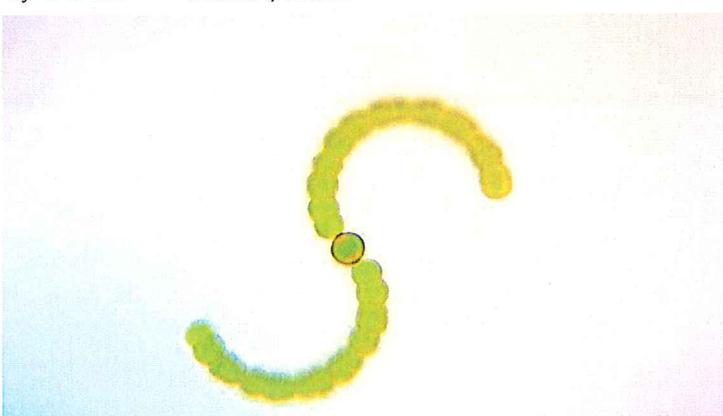
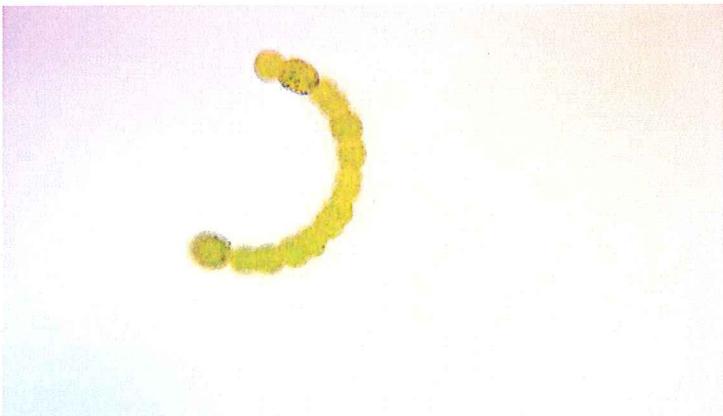


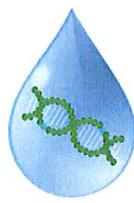
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/19/2019 16:20

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-13-LFAF	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-13-LFAG	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-13-LFAH	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



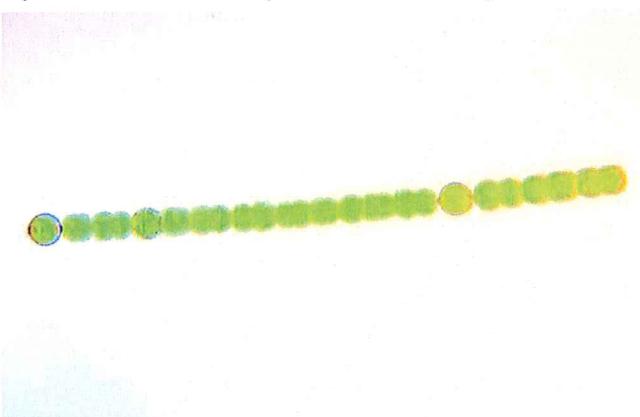
**Bend Genetics, LLC**

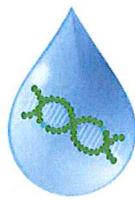
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA

Analysis for Toxigenic Cyanobacteria

Project #:**Reported:** 8/19/2019 16:20**MICROSCOPY RESULTS - Identification of CyanoHABs**

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-13-LFAI	<i>Dolichospermum</i>	<i>Microcystis</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a very low amount of <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
Cy-13-LFAJ	<i>Dolichospermum</i>	<i>Microcystis</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
Cy-13-Site6	<i>Dolichospermum</i>	<i>Microcystis</i>		This sample contained a low amount of <i>Dolichospermum</i> sp. and a very low amount of <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				



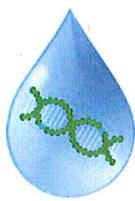
Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #: _____
Reported: 8/19/2019 16:20

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-13-WQ14	<i>Dolichospermum</i>	<i>Microcystis</i>		This sample contained a low amount of <i>Dolichospermum</i> sp. and a very low amount of <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

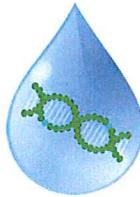
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 8/19/2019 16:20

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	anaC - Spike	40,379		copies/mL	50,000	80.8	70-130
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.74		µg/L	0.75	99.1	70-130
ELISA	ATX - Matrix Sp	1.30		µg/L	1.25	103.8	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.69		µg/L	0.75	91.9	70-130
ELISA	MC - Matrix Sp	0.99		µg/L	1.00	98.7	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 9/4/2019

Subject: Cyanobacterial testing results

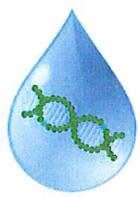
From: Tim Otten, Laboratory Director

To: Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on six water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 8/28/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

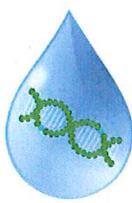


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/4/2019 16:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-14-LFAF	634TKLFAF	8/28/2019 10:30	8/29/2019 9:48	Water	N	WB743
Cy-14-LFAG	634TKLFAG	8/28/2019 10:50	8/29/2019 9:48	Water	N	WB744
Cy-14-LFAH	634TKLFAH	8/28/2019 11:09	8/29/2019 9:48	Water	N	WB745
Cy-14-LFAI	634TKLFAI	8/28/2019 11:28	8/29/2019 9:48	Water	N	WB746
Cy-14-LFAJ	634TKLFAJ	8/28/2019 11:46	8/29/2019 9:48	Water	N	WB747
Cy-14-Site6	634TKLST6	8/28/2019 12:23	8/29/2019 9:48	Water	N	WB748

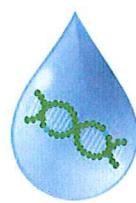


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/4/2019 16:25

SAMPLE RESULTS

Sample ID	Method	Target	Quantitation			
			Result	Limit	Units	Notes
Cy-14-LFAF	QPCR	Anatoxin-a	12,355	100	copies/mL	
Cy-14-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-14-LFAF	QPCR	Microcystin	ND	100	copies/mL	U
Cy-14-LFAF	ELISA	Anatoxin-a	0.19	0.15	µg/L	
Cy-14-LFAG	QPCR	Anatoxin-a	7,469	100	copies/mL	
Cy-14-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-14-LFAG	QPCR	Microcystin	ND	100	copies/mL	U
Cy-14-LFAG	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-14-LFAH	QPCR	Anatoxin-a	4,912	100	copies/mL	
Cy-14-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-14-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-14-LFAH	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-14-LFAI	QPCR	Anatoxin-a	3,105	100	copies/mL	
Cy-14-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-14-LFAI	QPCR	Microcystin	9,626	100	copies/mL	
Cy-14-LFAI	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-14-LFAI	ELISA	Microcystin/Nod.	0.16	0.15	µg/L	
Cy-14-LFAJ	QPCR	Anatoxin-a	4,400	100	copies/mL	
Cy-14-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-14-LFAJ	QPCR	Microcystin	ND	100	copies/mL	U
Cy-14-LFAJ	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-14-Site6	QPCR	Anatoxin-a	4,927	100	copies/mL	
Cy-14-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-14-Site6	QPCR	Microcystin	ND	100	copies/mL	U
Cy-14-Site6	ELISA	Anatoxin-a	ND	0.15	µg/L	U

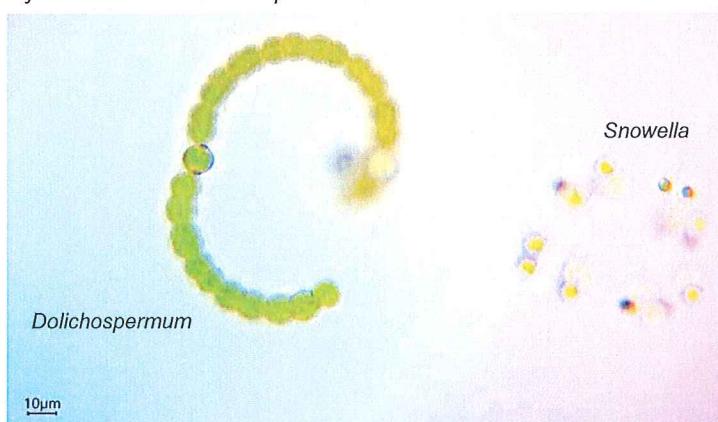


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

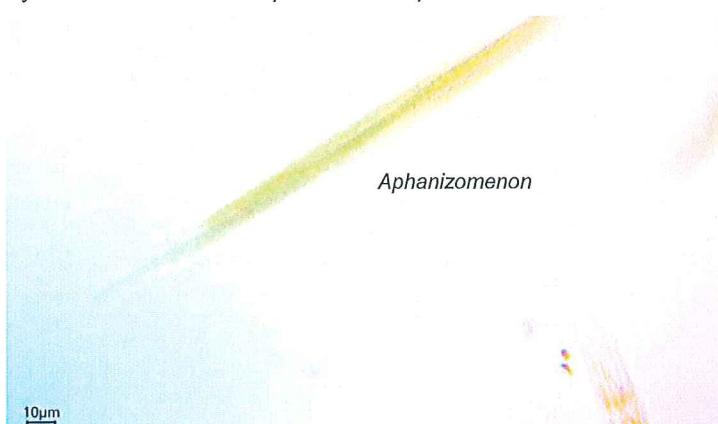
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/4/2019 16:25

MICROSCOPY RESULTS - Identification of CyanoHABs

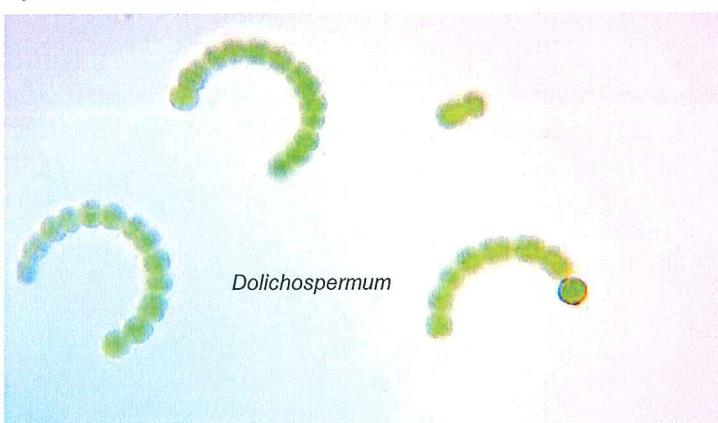
Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-14-LFAF	<i>Dolichospermum</i>	<i>Woronichinia</i>	<i>Snowella</i>	This sample contained a high amount of <i>Dolichospermum</i> sp., and low amounts of both <i>Woronichinia</i> sp. and <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-14-LFAG	<i>Dolichospermum</i>	<i>Aphanizomenon</i>		This sample contained a high amount of <i>Dolichospermum</i> sp. and a low amount of <i>Aphanizomenon</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-14-LFAH	<i>Dolichospermum</i>			This sample contained a high amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

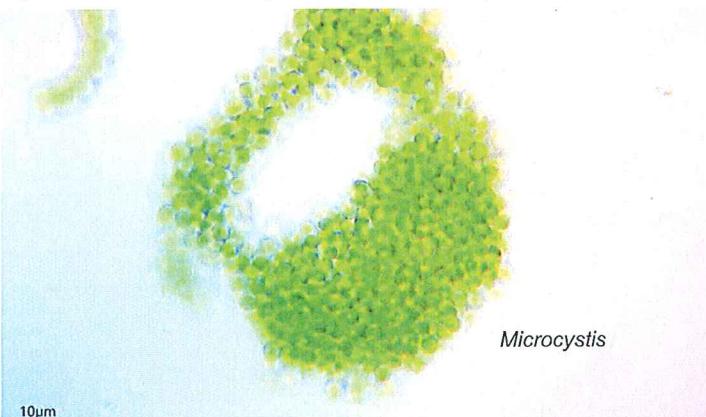
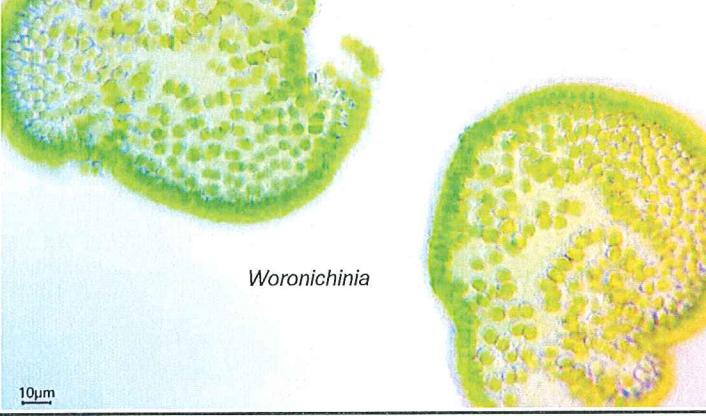
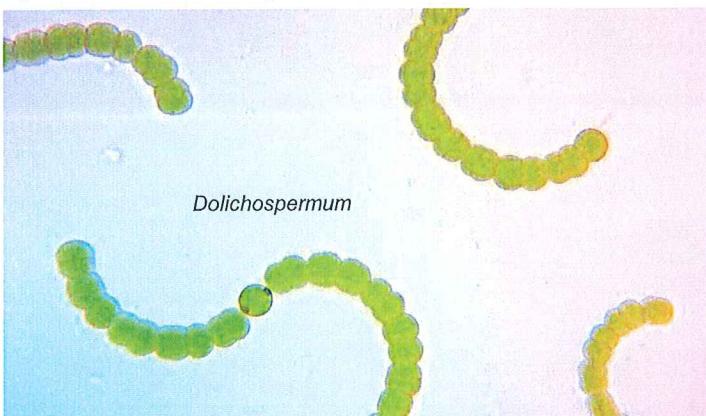


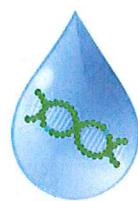


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/4/2019 16:25

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-14-LFAI	<i>Dolichospermum</i>	<i>Microcystis</i>	<i>Woronichinia</i>	This sample contained a high amount of <i>Dolichospermum</i> sp. and low amounts of both <i>Microcystis</i> sp. and <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
				10µm
Cy-14-LFAJ	<i>Dolichospermum</i>	<i>Woronichinia</i>	<i>Aphanizomenon</i>	This sample contained a high amount of <i>Dolichospermum</i> sp. and low amounts of both <i>Woronichinia</i> sp. and <i>Aphanizomenon</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
				10µm
Cy-14-Site6	<i>Dolichospermum</i>	<i>Woronichinia</i>	<i>Aphanizomenon</i>	This sample contained a high amount of <i>Dolichospermum</i> sp. and low amounts of both <i>Woronichinia</i> sp. and <i>Aphanizomenon</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

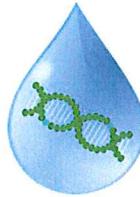
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/4/2019 16:25

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Spike	49,908		copies/mL	50,000	99.8	70-130
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.74		µg/L	0.75	99.1	70-130
ELISA	ATX - Matrix Sp	1.24		µg/L	1.25	99.1	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.73		µg/L	0.75	97.9	70-130
ELISA	MC - Matrix Sp	0.99		µg/L	1.00	98.5	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date:

9/17/2019

Subject:

Cyanobacterial testing results

From:

Tim Otten, Laboratory Director

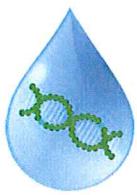
To:

Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on eight water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 9/10/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

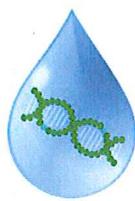


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/17/2019 12:05

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-16-LFAF	634TKLFAF	9/10/2019 10:31	9/11/2019 9:15	Water	N	WB796
Cy-16-LFAG	634TKLFAG	9/10/2019 10:53	9/11/2019 9:15	Water	N	WB797
Cy-16-LFAH	634TKLFAH	9/10/2019 11:12	9/11/2019 9:15	Water	N	WB798
Cy-16-LFAI	634TKLFAI	9/10/2019 11:35	9/11/2019 9:15	Water	N	WB799
Cy-16-LFAJ	634TKLFAJ	9/10/2019 11:55	9/11/2019 9:15	Water	N	WB800
Cy-16-Site6	634TKLST6	9/10/2019 12:31	9/11/2019 9:15	Water	N	WB801
Cy-16-Site 09	TKPOA	9/10/2019 10:08	9/11/2019 9:15	Water	N	WB802
Cy-16-Site 11	TKPOA	9/10/2019 10:15	9/11/2019 9:15	Water	N	WB803

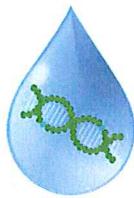


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/17/2019 12:05

SAMPLE RESULTS

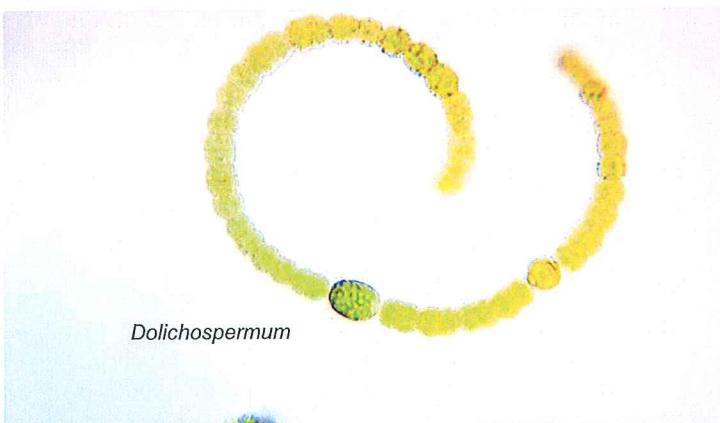
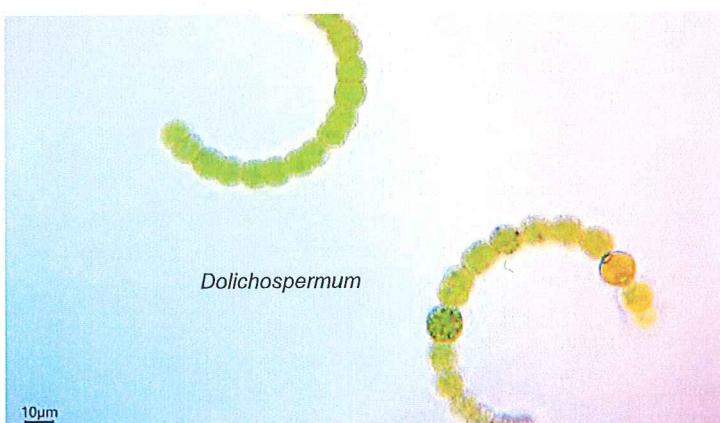
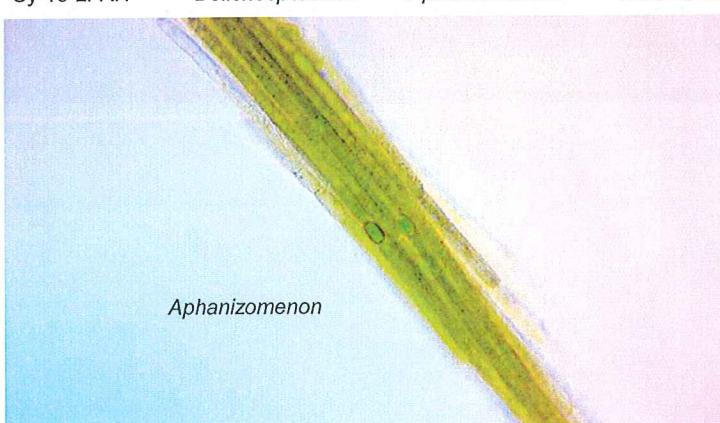
Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-16-LFAF	QPCR	Anatoxin-a	16,991	100	copies/mL	
Cy-16-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-16-LFAF	QPCR	Microcystin	2,402	100	copies/mL	
Cy-16-LFAF	ELISA	Anatoxin-a	0.15	0.15	µg/L	
Cy-16-LFAF	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-16-LFAG	QPCR	Anatoxin-a	12,571	100	copies/mL	
Cy-16-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-16-LFAG	QPCR	Microcystin	1,960	100	copies/mL	
Cy-16-LFAG	ELISA	Anatoxin-a	0.14	0.15	µg/L	C1,J
Cy-16-LFAG	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-16-LFAH	QPCR	Anatoxin-a	5,960	100	copies/mL	
Cy-16-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-16-LFAH	QPCR	Microcystin	3,305	100	copies/mL	
Cy-16-LFAH	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-16-LFAH	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-16-LFAI	QPCR	Anatoxin-a	10,202	100	copies/mL	
Cy-16-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-16-LFAI	QPCR	Microcystin	5,606	100	copies/mL	
Cy-16-LFAI	ELISA	Anatoxin-a	0.11	0.15	µg/L	C1,J
Cy-16-LFAI	ELISA	Microcystin/Nod.	0.18	0.15	µg/L	
Cy-16-LFAJ	QPCR	Anatoxin-a	12,022	100	copies/mL	
Cy-16-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-16-LFAJ	QPCR	Microcystin	12,166	100	copies/mL	
Cy-16-LFAJ	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-16-LFAJ	ELISA	Microcystin/Nod.	0.15	0.15	µg/L	
Cy-16-Site6	QPCR	Anatoxin-a	2,077	100	copies/mL	
Cy-16-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-16-Site6	QPCR	Microcystin	3,326	100	copies/mL	
Cy-16-Site6	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-16-Site6	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-16-Site 09	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-16-Site 09	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-16-Site 11	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-16-Site 11	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/17/2019 12:05

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-16-LFAF	<i>Dolichospermum</i>	<i>Snowella</i>		This sample contained a high amount of <i>Dolichospermum</i> sp. and a low amount of <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				
				 10µm
Cy-16-LFAG	<i>Dolichospermum</i>	<i>Microcystis</i>		This sample contained a high amount of <i>Dolichospermum</i> sp. and a low amount of <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				

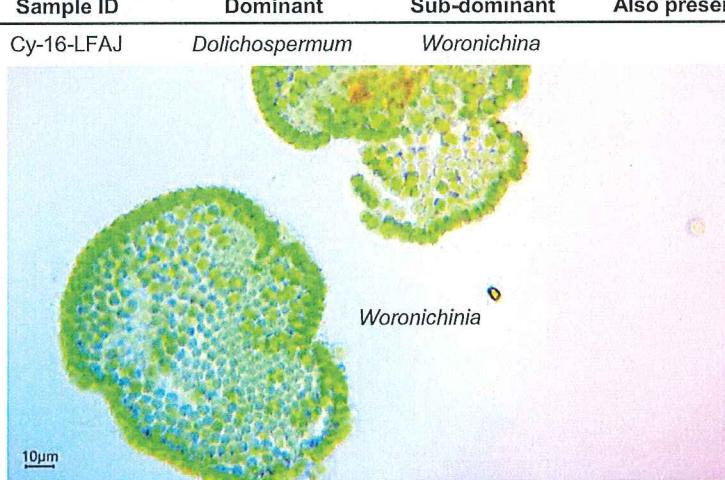
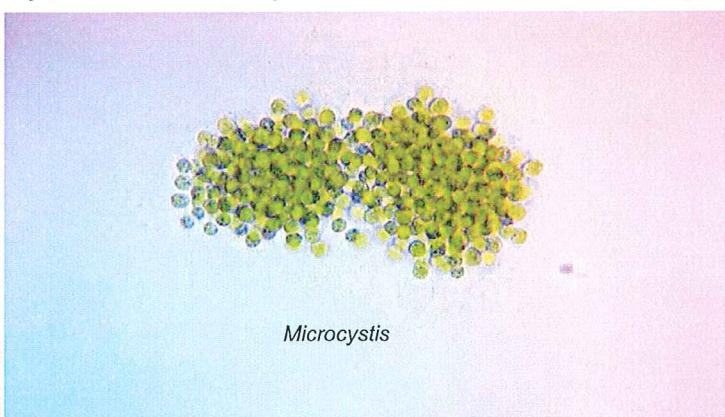


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #: _____
Reported: 9/17/2019 12:05

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-16-LFAI	<i>Dolichospermum</i>	<i>Woronichina</i>	<i>Microcystis</i>	This sample contained a high amount of <i>Dolichospermum</i> sp. and low amounts of both <i>Microcystis</i> sp. and <i>Woronichinia</i> sp.; the photomicrograph was taken under 400X magnification.
Cy-16-LFAJ	<i>Dolichospermum</i>	<i>Woronichina</i>		This sample contained a high amount of <i>Dolichospermum</i> sp. and a low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-16-Site6	<i>Dolichospermum</i>	<i>Woronichina</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.





Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

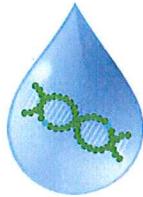
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 9/17/2019 12:05

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	anaC - Spike	43,814		copies/mL	50,000	87.6	70-130
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.71		µg/L	0.75	94.4	70-130
ELISA	ATX - Matrix Sp	1.36		µg/L	1.25	109.1	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.85		µg/L	0.75	113.3	70-130
ELISA	MC - Matrix Sp	1.01		µg/L	1.00	101.2	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date:

10/01/2019

Subject:

Cyanobacterial testing results

From:

Tim Otten, Laboratory Director

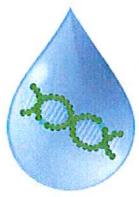
To:

Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy, QPCR and ELISA analyses conducted on six water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 9/24/19. All samples containing cyanobacteria were analyzed by QPCR, any samples testing positive were analyzed by ELISA for the indicated toxin. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total toxin-producing cyanobacteria by toxin class using real-time quantitative polymerase chain reaction (QPCR) methods.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

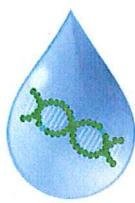


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxicogenic Cyanobacteria
Project #:
Reported: 10/1/2019 12:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-17-LFAF	634TKLFAF	9/24/2019 10:50	9/25/2019 9:05	Water	N	WB843
Cy-17-LFAG	634TKLFAG	9/24/2019 11:10	9/25/2019 9:05	Water	N	WB844
Cy-17-LFAH	634TKLFAH	9/24/2019 11:29	9/25/2019 9:05	Water	N	WB845
Cy-17-LFAI	634TKLFAI	9/24/2019 11:48	9/25/2019 9:05	Water	N	WB846
Cy-17-LFAJ	634TKLFAJ	9/24/2019 12:05	9/25/2019 9:05	Water	N	WB847
Cy-17-Site6	634TKLST6	9/24/2019 12:41	9/25/2019 9:05	Water	N	WB848



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/1/2019 12:30

SAMPLE RESULTS

Sample ID	Method	Target	Quantitation			
			Result	Limit	Units	Notes
Cy-17-LFAF	QPCR	Anatoxin-a	25,315	100	copies/mL	
Cy-17-LFAF	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-17-LFAF	QPCR	Microcystin	ND	100	copies/mL	U
Cy-17-LFAF	ELISA	Anatoxin-a	0.13	0.15	µg/L	C1,J
Cy-17-LFAG	QPCR	Anatoxin-a	22,355	100	copies/mL	
Cy-17-LFAG	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-17-LFAG	QPCR	Microcystin	ND	100	copies/mL	U
Cy-17-LFAG	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-17-LFAH	QPCR	Anatoxin-a	30,316	100	copies/mL	
Cy-17-LFAH	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-17-LFAH	QPCR	Microcystin	ND	100	copies/mL	U
Cy-17-LFAH	ELISA	Anatoxin-a	0.12	0.15	µg/L	C1,J
Cy-17-LFAI	QPCR	Anatoxin-a	40,852	100	copies/mL	
Cy-17-LFAI	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-17-LFAI	QPCR	Microcystin	8,679	100	copies/mL	
Cy-17-LFAI	ELISA	Anatoxin-a	0.16	0.15	µg/L	
Cy-17-LFAI	ELISA	Microcystin/Nod.	0.33	0.15	µg/L	
Cy-17-LFAJ	QPCR	Anatoxin-a	24,786	100	copies/mL	
Cy-17-LFAJ	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-17-LFAJ	QPCR	Microcystin	10,043	100	copies/mL	
Cy-17-LFAJ	ELISA	Anatoxin-a	0.12	0.15	µg/L	C1,J
Cy-17-LFAJ	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-17-Site6	QPCR	Anatoxin-a	18,728	100	copies/mL	
Cy-17-Site6	QPCR	Cylindrospermopsin	ND	100	copies/mL	U
Cy-17-Site6	QPCR	Microcystin	16,850	100	copies/mL	
Cy-17-Site6	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-17-Site6	ELISA	Microcystin/Nod.	0.18	0.15	µg/L	

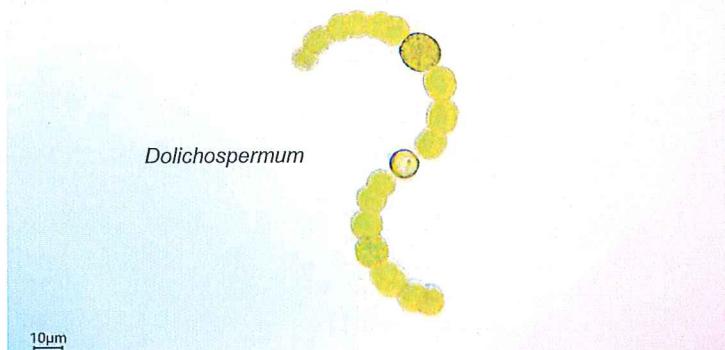


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

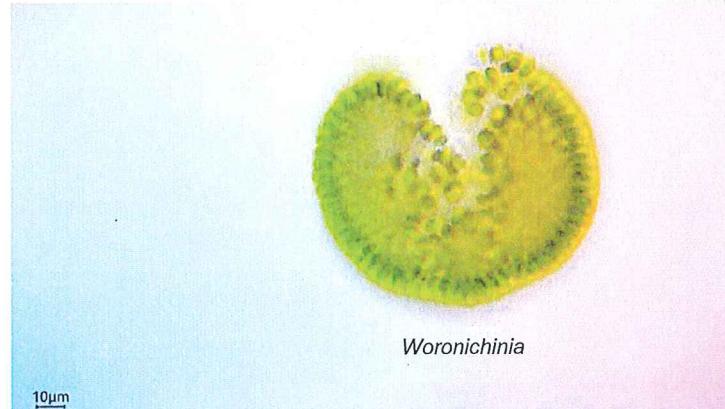
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/1/2019 12:30

MICROSCOPY RESULTS - Identification of CyanoHABs

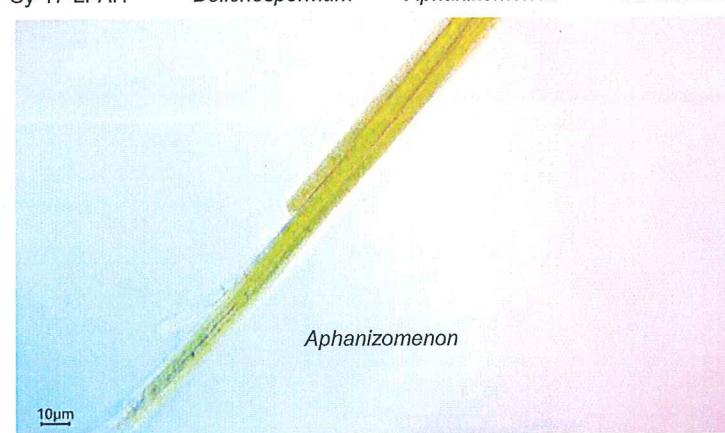
Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-17-LFAF	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-17-LFAG	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-17-LFAH	<i>Dolichospermum</i>	<i>Aphanizomenon</i>	<i>Woronichinia</i>	This sample contained a moderately high amount of <i>Dolichospermum</i> sp. and low amounts of both <i>Aphanizomenon</i> sp. and <i>Woronichinia</i> sp.; the photomicrograph was taken under 400X magnification.



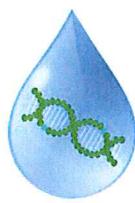


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/1/2019 12:30

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-17-LFAI	<i>Dolichospermum</i>	<i>Microcystis</i>	<i>Woronichinia</i>	This sample contained a high amount of <i>Dolichospermum</i> sp. and low amounts of both <i>Microcystis</i> sp. and <i>Woronichinia</i> sp.; the photomicrograph was taken under 400X magnification.
Cy-17-LFAJ	<i>Dolichospermum</i>	<i>Woronichinia</i>	<i>Microcystis</i>	This sample contained a moderately high amount of <i>Dolichospermum</i> sp. and a low amount of both <i>Woronichinia</i> sp. and <i>Microcystis</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
Cy-17-Site6	<i>Dolichospermum</i>	<i>Woronichinia</i>	<i>Aphanizomenon</i>	This sample contained a low amount of <i>Dolichospermum</i> sp., <i>Woronichinia</i> sp. and <i>Aphanizomenon</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

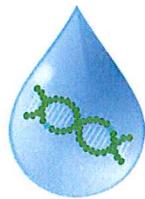
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxicigenic Cyanobacteria
Project #:
Reported: 10/1/2019 12:30

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
QPCR	anaC - Blank	ND	U	copies/mL	0		
QPCR	anaC - Spike	40,786		copies/mL	50,000	81.6	70-130
QPCR	cyrA - Blank	ND	U	copies/mL	0		
QPCR	mcyE - Blank	ND	U	copies/mL	0		
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.74		µg/L	0.75	99.1	70-130
ELISA	ATX - Matrix Sp	1.23		µg/L	1.25	98.1	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.73		µg/L	0.75	97.0	70-130
ELISA	MC - Matrix Sp	0.97		µg/L	1.00	96.8	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 10/11/2019

Subject: Cyanobacterial testing results

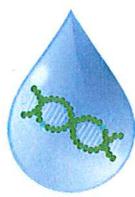
From: Tim Otten, Laboratory Director

To: Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy and ELISA analyses conducted on six water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 10/8/19. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

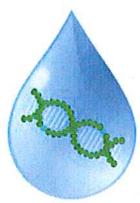


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/11/2019 12:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
Cy-18-LFAF	634TKLFAF	10/8/2019 10:30	10/9/2019 9:45	Water	N	WB876
Cy-18-LFAG	634TKLFAG	10/8/2019 10:49	10/9/2019 9:45	Water	N	WB877
Cy-18-LFAH	634TKLFAH	10/8/2019 11:08	10/9/2019 9:45	Water	N	WB878
Cy-18-LFAI	634TKLFAI	10/8/2019 11:27	10/9/2019 9:45	Water	N	WB879
Cy-18-LFAJ	634TKLFAJ	10/8/2019 11:49	10/9/2019 9:45	Water	N	WB880
Cy-18-Site6	634TKLST6	10/8/2019 12:24	10/9/2019 9:45	Water	N	WB881

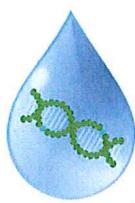


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/11/2019 12:55

SAMPLE RESULTS

Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
Cy-18-LFAF	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-18-LFAF	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-18-LFAG	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-18-LFAG	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-18-LFAH	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-18-LFAH	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-18-LFAI	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-18-LFAI	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-18-LFAJ	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-18-LFAJ	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
Cy-18-Site6	ELISA	Anatoxin-a	ND	0.15	µg/L	U
Cy-18-Site6	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U

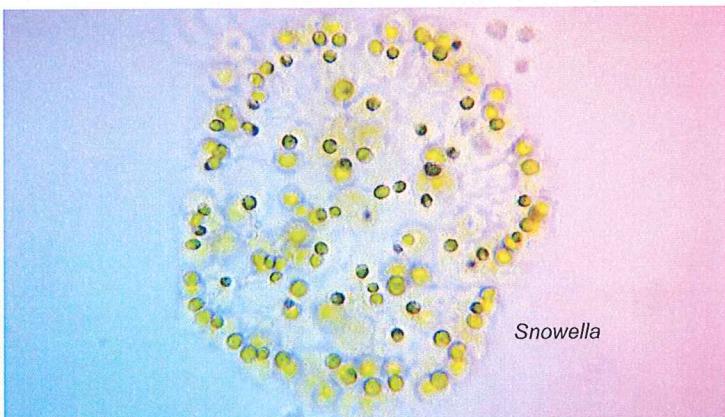


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

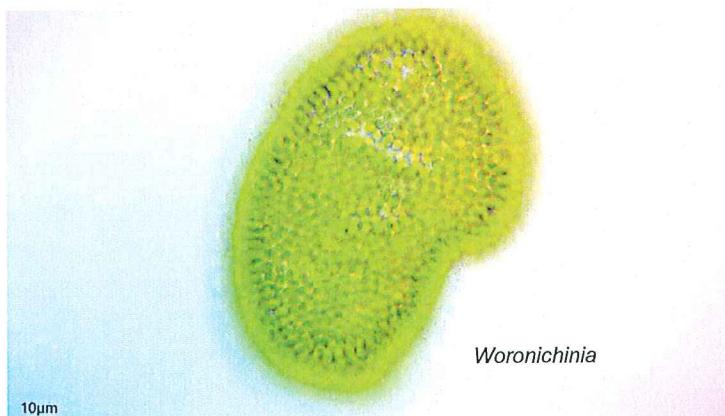
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/11/2019 12:55

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-18-LFAF	<i>Dolichospermum</i>	<i>Snowella</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

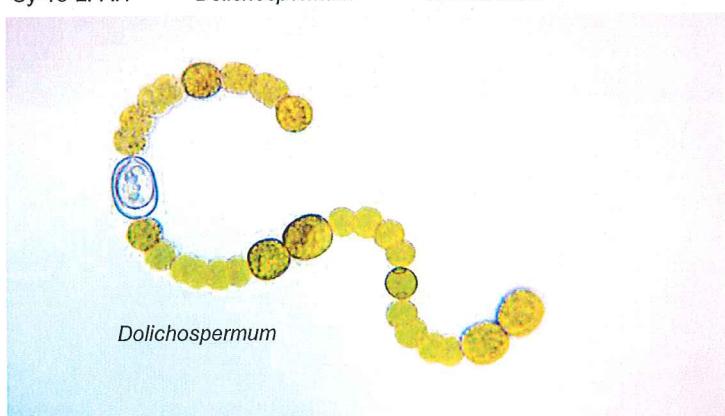


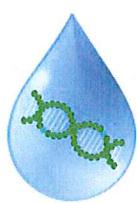
Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-18-LFAG	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



10µm

Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-18-LFAH	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a moderate amount of <i>Dolichospermum</i> sp. and a low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



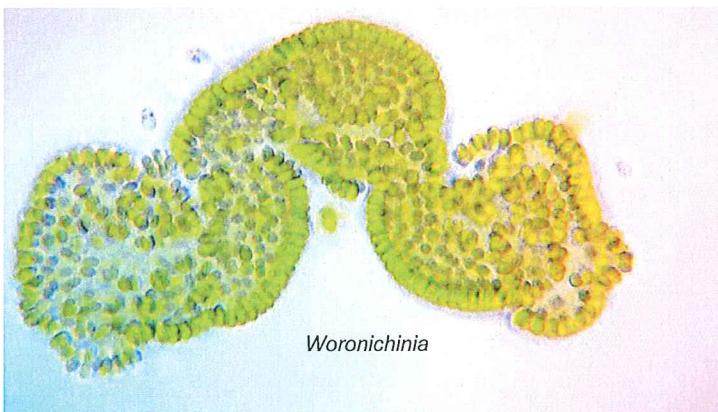


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/11/2019 12:55

MICROSCOPY RESULTS - Identification of CyanoHABs

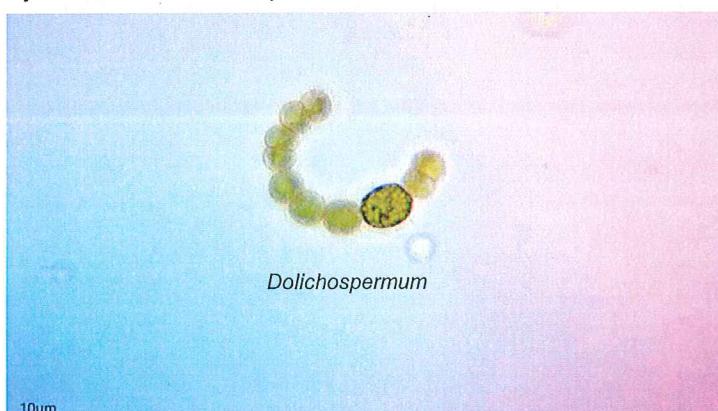
Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-18-LFAI	<i>Woronichinia</i>	<i>Dolichospermum</i>		This sample contained a low amount of both <i>Woronichinia</i> sp. and <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-18-LFAJ	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a low amount of <i>Dolichospermum</i> sp. and <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



Sample ID	Dominant	Sub-dominant	Also present	Notes
Cy-18-Site6	<i>Dolichospermum</i>	<i>Snowella</i>		This sample contained a very low amount of both <i>Dolichospermum</i> sp. and <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



10µm



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

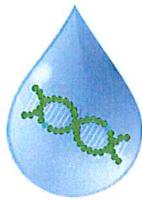
Project: SWAMP FHAB 2019 - TKPOA
Analysis for Toxigenic Cyanobacteria
Project #:
Reported: 10/11/2019 12:55

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.75		µg/L	0.75	100.1	70-130
ELISA	ATX - Matrix Sp	1.33		µg/L	1.25	106.7	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.78		µg/L	0.75	103.9	70-130
ELISA	MC - Matrix Sp	0.91		µg/L	1.00	91.4	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date: 10/28/2019

Subject: Cyanobacterial testing results – Agreement #19-001-270

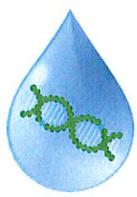
From: Tim Otten, Laboratory Director

To: Keith Bouma-Gregson, Freshwater HABS Program Manager
State Water Resources Control Board - Information Management & Quality Assurance

Testing results are attached for microscopy and ELISA analyses conducted on six water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 10/22/19. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxigenic (PTOX) cyanobacteria.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

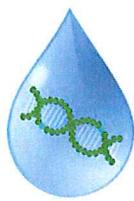


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: RWB6_FHAB_MM_LFA_2019
Analysis for Toxigenic Cyanobacteria
Project #: 19-001-270
Reported: 10/28/2019 17:05

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
CY-19-LFAF	634TKLFAF	10/22/2019 10:36	10/23/2019 9:05	Water	N	WB902
CY-19-LFAG	634TKLFAG	10/22/2019 10:54	10/23/2019 9:05	Water	N	WB903
CY-19-LFAH	634TKLFAH	10/22/2019 11:13	10/23/2019 9:05	Water	N	WB904
CY-19-LFAI	634TKLFAI	10/22/2019 11:30	10/23/2019 9:05	Water	N	WB905
CY-19-LFAJ	634TKLFAJ	10/22/2019 11:47	10/23/2019 9:05	Water	N	WB906
CY-19-Site6	634TKLST6	10/22/2019 12:22	10/23/2019 9:05	Water	N	WB907

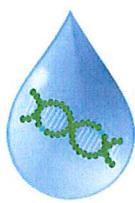


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: RWB6_FHAB_MM_LFA_2019
Analysis for Toxigenic Cyanobacteria
Project #: 19-001-270
Reported: 10/28/2019 17:05

SAMPLE RESULTS

Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
CY-19-LFAF	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-19-LFAF	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-19-LFAG	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-19-LFAG	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-19-LFAH	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-19-LFAH	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-19-LFAI	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-19-LFAI	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-19-LFAJ	ELISA	Anatoxin-a	ND	0.15	µg/L	U
	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-19-Site6	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-19-Site6	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U

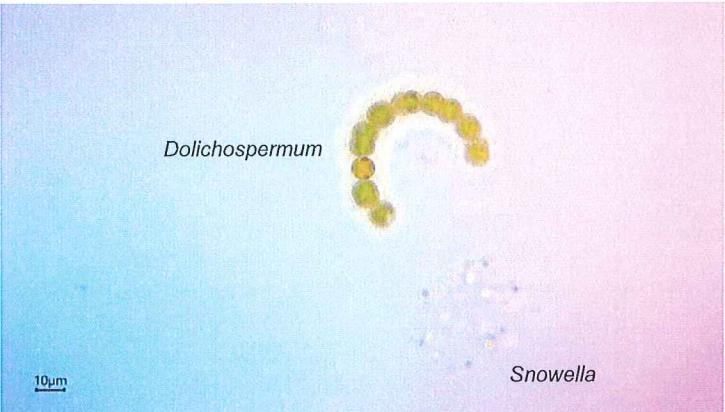


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: RWB6_FHAB_MM_LFA_2019
Analysis for Toxigenic Cyanobacteria
Project #: 19-001-270
Reported: 10/28/2019 17:05

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-19-LFAF	<i>Dolichospermum</i>	<i>Woronichinia</i>	<i>Snowella</i>	This sample contained a low amount of <i>Dolichospermum</i> sp. and very low amounts of <i>Woronichinia</i> sp. and <i>Snowella</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

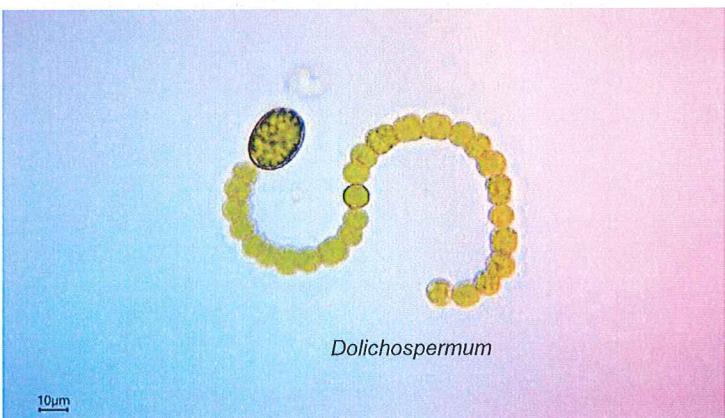


10µm

Dolichospermum

Snowella

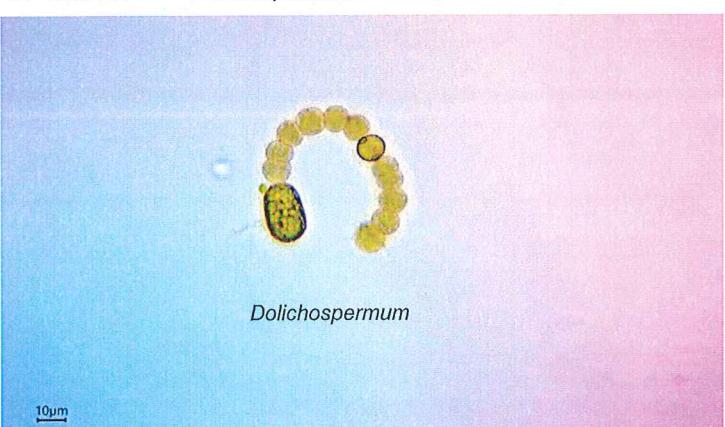
Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-19-LFAG	<i>Dolichospermum</i>			This sample contained a moderately low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



10µm

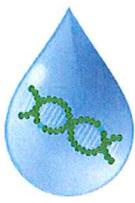
Dolichospermum

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-19-LFAH	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a low amount of <i>Dolichospermum</i> sp. and a very low amount of <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



10µm

Dolichospermum

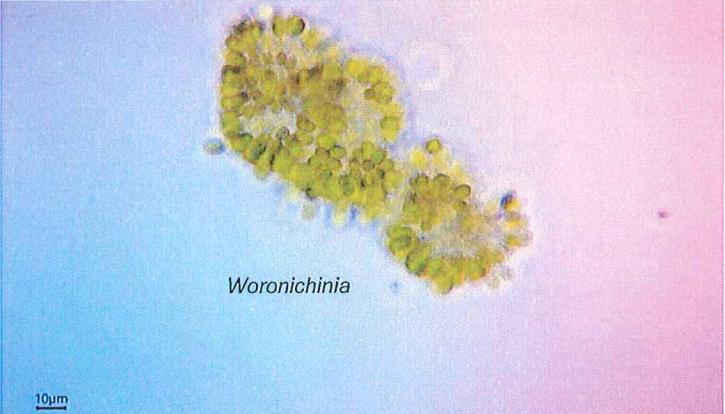


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: RWB6_FHAB_MM_LFA_2019
Analysis for Toxigenic Cyanobacteria
Project #: 19-001-270
Reported: 10/28/2019 17:05

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-19-LFAI	<i>Dolichospermum</i>	<i>Woronichinia</i>		This sample contained a low amount of both <i>Dolichospermum</i> sp. and <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



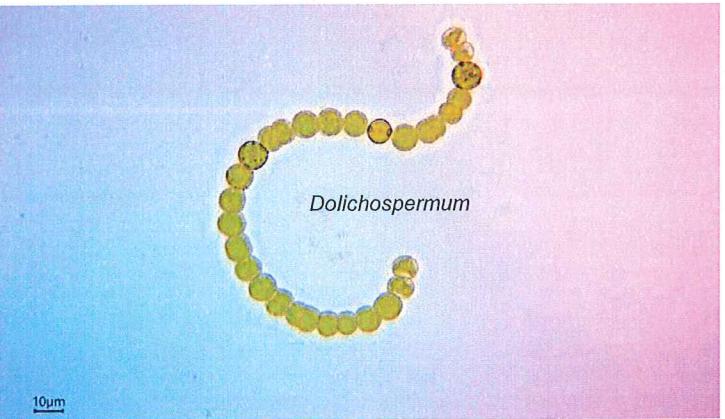
10µm

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-19-LFAJ	<i>Dolichospermum</i>	<i>Aphanizomenon</i>		This sample contained a low amount of <i>Dolichospermum</i> sp. and a very low amount of <i>Aphanizomenon</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.

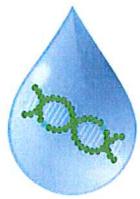


10µm

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-19-Site6	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.



10µm



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

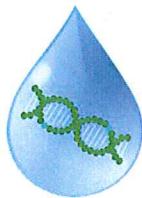
Project: RWB6_FHAB_MM_LFA_2019
Analysis for Toxigenic Cyanobacteria
Project #: 19-001-270
Reported: 10/28/2019 17:05

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.79		µg/L	0.75	105.0	70-130
ELISA	ATX - Matrix Sp	1.30		µg/L	1.25	103.7	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.84		µg/L	0.75	112.6	70-130
ELISA	MC - Matrix Sp	0.93		µg/L	1.00	92.6	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Date:

11/18/2019

Subject:

Cyanobacterial testing results

From:

Tim Otten, Laboratory Director

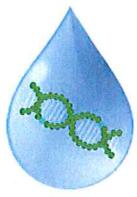
To:

Gregory Hoover, Water Quality Manager
Tahoe Keys Property Owners Association

Testing results are attached for microscopy and ELISA analyses conducted on three water samples collected from the Tahoe Keys Lagoons (RB6; c/o Vesper Rodriguez) on 11/12/2019. All data have been reviewed and are considered final. An EDD report summarizing these data will be submitted to the State Water Board within 40 days of receipt of the data template.

Analyses included in this report:

- Microscope photos and identification of potentially toxicogenic (PTOX) cyanobacteria.
- Quantification of total anatoxin-a and microcystin/nodularin by enzyme linked immunosorbent assay (ELISA) method.

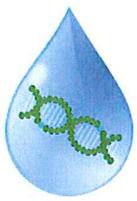


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP_FHAB_2019_RB6
Analysis for Toxigenic Cyanobacteria
Project #: TKPOA
Reported: 11/18/2019 14:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Location	Date Collected	Date Received	Matrix	Preserved	BG_ID
CY-20-LFAF	634TKLFAF	11/12/2019 10:47	11/13/2019 9:40	Water	N	WB931
CY-20-LFAJ	634TKLFAJ	11/12/2019 11:44	11/13/2019 9:40	Water	N	WB932
CY-20-Site6	634TKLST6	11/12/2019 12:30	11/13/2019 9:40	Water	N	WB933

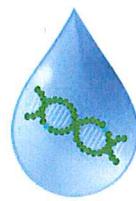


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP_FHAB_2019_RB6
Analysis for Toxigenic Cyanobacteria
Project #: TKPOA
Reported: 11/18/2019 14:25

SAMPLE RESULTS

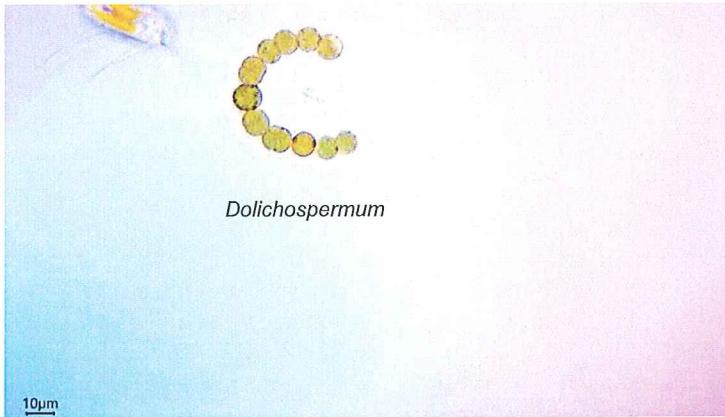
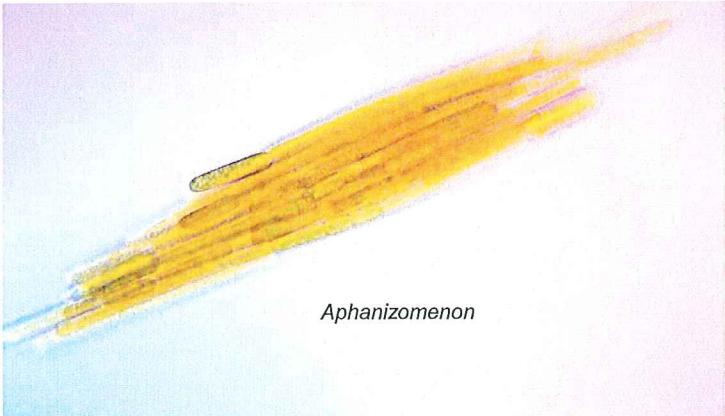
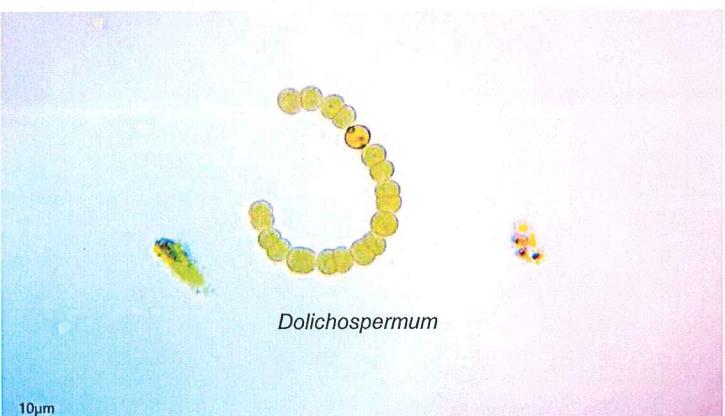
Sample ID	Method	Target	Result	Quantitation		
				Limit	Units	Notes
CY-20-LFAF	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-20-LFAF	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-20-LFAJ	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-20-LFAJ	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U
CY-20-Site6	ELISA	Anatoxin-a	ND	0.15	µg/L	U
CY-20-Site6	ELISA	Microcystin/Nod.	ND	0.15	µg/L	U

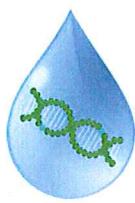


Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP_FHAB_2019_RB6
Analysis for Toxigenic Cyanobacteria
Project #: TKPOA
Reported: 11/18/2019 14:25

MICROSCOPY RESULTS - Identification of CyanoHABs

Sample ID	Dominant	Sub-dominant	Also present	Notes
CY-20-LFAF	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				<p><i>Dolichospermum</i></p> <p>10µm</p>
CY-20-LFAJ	<i>Aphanizomenon</i>	<i>Dolichospermum</i>	<i>Woronichinia</i>	This sample contained a low amount of <i>Aphanizomenon</i> sp., and very low amounts of both <i>Dolichospermum</i> sp. and <i>Woronichinia</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				<p><i>Aphanizomenon</i></p>
CY-20-Site6	<i>Dolichospermum</i>			This sample contained a low amount of <i>Dolichospermum</i> sp.; no other cyanobacteria were observed. The photomicrograph was taken under 400X magnification.
				<p><i>Dolichospermum</i></p> <p>10µm</p>



Bend Genetics, LLC
87 Scripps Drive, Ste. 301
Sacramento, CA 95825
Tel: (916) 550-1048

Project: SWAMP_FHAB_2019_RB6
Analysis for Toxigenic Cyanobacteria
Project #: TKPOA
Reported: 11/18/2019 14:25

QUALITY CONTROL

Method	Analyte	Result	Qualifiers / Comments	Units	Spike Level	%REC	%REC Limits
ELISA	ATX - Blank	ND	U	µg/L	0		
ELISA	ATX - Positive	0.70		µg/L	0.75	92.7	70-130
ELISA	ATX - Matrix Sp	1.14		µg/L	1.25	90.8	70-130
ELISA	MC - Blank	ND	U	µg/L	0		
ELISA	MC - Positive	0.78		µg/L	0.75	104.1	70-130
ELISA	MC - Matrix Sp	1.37		µg/L	1.38	98.9	70-130

QUALIFIERS/COMMENTS/NOTES

- C1 The reported concentration for this analyte is below the quantification limit.
- C2 The reported concentration for this analyte is above the calibration range of the instrument.
- J The reported result for this analyte should be considered an estimated value.
- U Undetected

Appendix E

LFA Data Workbook

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_F	4/15/19	VR,JH	N/A	N/A	75	5	1121	4.50	8.7	6.96	N/A	N/A	0.23
LFA_F	4/15/19	VR,JH	N/A	N/A	75	4	1121	3.50	8.8	7.16	N/A	N/A	0.23
LFA_F	4/15/19	VR,JH	N/A	N/A	75	3	1121	2.50	9.0	7.22	1.38	111.3	0.21
LFA_F	4/15/19	VR,JH	N/A	N/A	75	2	1121	1.50	9.5	7.31	N/A	N/A	0.19
LFA_F	4/15/19	VR,JH	N/A	N/A	75	1	1121	0.00	9.6	7.33	N/A	N/A	0.17
LFA_F	4/16/19	VR,BH	N/A	N/A	20	5	1557	4.50	9.3	7.23	N/A	N/A	0.25
LFA_F	4/16/19	VR,BH	N/A	N/A	20	4	1557	3.50	9.3	7.33	N/A	N/A	0.24
LFA_F	4/16/19	VR,BH	N/A	N/A	20	3	1557	2.50	9.5	7.36	1.68	113.4	0.22
LFA_F	4/16/19	VR,BH	N/A	N/A	20	2	1557	1.50	10.4	7.37	N/A	N/A	0.19
LFA_F	4/16/19	VR,BH	N/A	N/A	20	1	1557	0.00	11.5	7.35	N/A	N/A	0.15
LFA_F	4/17/19	JR,JH	N/A	0	20	5	848	4.00	9.2	7.31	N/A	N/A	0.18
LFA_F	4/17/19	JR,JH	N/A	0	20	4	848	3.00	9.4	7.29	N/A	N/A	0.20
LFA_F	4/17/19	JR,JH	N/A	0	20	3	848	2.00	9.6	7.31	1.66	113.0	0.19
LFA_F	4/17/19	JR,JH	N/A	0	20	2	848	1.00	9.7	7.32	N/A	N/A	0.19
LFA_F	4/17/19	JR,JH	N/A	0	20	1	848	0.00	9.8	7.32	N/A	N/A	0.18
LFA_F	4/17/19	VR,JH	N/A	N/A	20	5	1504	4.00	9.5	7.48	N/A	N/A	0.08
LFA_F	4/17/19	VR,JH	N/A	N/A	20	4	1504	3.00	9.6	7.42	N/A	N/A	0.09
LFA_F	4/17/19	VR,JH	N/A	N/A	20	3	1504	2.00	10.2	7.41	1.96	113.0	0.09
LFA_F	4/17/19	VR,JH	N/A	N/A	20	2	1504	1.00	10.6	7.40	N/A	N/A	0.09
LFA_F	4/17/19	VR,JH	N/A	N/A	20	1	1504	0.00	11.4	7.39	N/A	N/A	0.10
LFA_F	4/18/19	VR,JH	38.6	N/A	1	5	850	4.00	9.5	7.26	N/A	N/A	0.33
LFA_F	4/18/19	VR,JH	38.6	N/A	1	4	850	3.00	9.7	7.33	N/A	N/A	0.33
LFA_F	4/18/19	VR,JH	38.6	N/A	1	3	850	2.00	10.1	7.33	1.65	112.9	0.33
LFA_F	4/18/19	VR,JH	38.6	N/A	1	2	850	1.00	10.4	7.34	N/A	N/A	0.29
LFA_F	4/18/19	VR,JH	38.6	N/A	1	1	850	0.00	10.6	7.34	N/A	N/A	0.26
LFA_F	4/18/19	VR,JH	N/A	N/A	1	5	1502	4.00	9.7	7.29	N/A	N/A	0.09
LFA_F	4/18/19	VR,JH	N/A	N/A	1	4	1502	3.00	10.0	7.33	N/A	N/A	0.08
LFA_F	4/18/19	VR,JH	N/A	N/A	1	3	1502	2.00	10.8	7.35	2.57	113.8	0.08
LFA_F	4/18/19	VR,JH	N/A	N/A	1	2	1502	1.00	11.7	7.36	N/A	N/A	0.08
LFA_F	4/18/19	VR,JH	N/A	N/A	1	1	1502	0.00	11.9	7.39	N/A	N/A	0.08
LFA_F	4/19/19	VR,JH	32	2SSW	N/A	5	842	4.00	9.3	7.44	N/A	N/A	0.24
LFA_F	4/19/19	VR,JH	32	2SSW	N/A	4	842	3.00	9.5	7.37	N/A	N/A	0.27
LFA_F	4/19/19	VR,JH	32	2SSW	N/A	3	842	2.00	10.5	7.37	1.45	110.1	0.26
LFA_F	4/19/19	VR,JH	32	2SSW	N/A	2	842	1.00	11.1	7.38	N/A	N/A	0.24
LFA_F	4/19/19	VR,JH	32	2SSW	N/A	1	842	0.00	11.5	7.36	N/A	N/A	0.21
LFA_F	4/19/19	VR,JH	N/A	N/A	70	5	1507	4.00	9.5	7.54	N/A	N/A	0.08
LFA_F	4/19/19	VR,JH	N/A	N/A	70	4	1507	3.00	10.5	7.48	N/A	N/A	0.08
LFA_F	4/19/19	VR,JH	N/A	N/A	70	3	1507	2.00	11.3	7.47	3.80	112.6	0.08
LFA_F	4/19/19	VR,JH	N/A	N/A	70	2	1507	1.00	12.1	7.43	N/A	N/A	0.08
LFA_F	4/19/19	VR,JH	N/A	N/A	70	1	1507	0.00	12.8	7.43	N/A	N/A	0.07
LFA_F	4/19/19	VR,JH	50	N/A	0	5	1109	4.00	9.8	7.24	N/A	N/A	0.21
LFA_F	4/19/19	VR,JH	50	N/A	0	4	1109	3.00	10.3	7.27	N/A	N/A	0.20
LFA_F	4/19/19	VR,JH	50	N/A	0	3	1109	2.00	11.6	7.30	1.30	110.9	0.20
LFA_F	4/19/19	VR,JH	50	N/A	0	2	1109	1.00	12.2	7.35	N/A	N/A	0.16
LFA_F	4/19/19	VR,JH	50	N/A	0	1	1109	0.00	12.8	7.36	N/A	N/A	0.14
LFA_F	4/19/19	VR,JH	58	3	50	5	1030	4.00	10.9	7.03	N/A	N/A	0.64
LFA_F	5/7/19	VR,JH	58	3	50	4	1030	3.00	12.2	7.33	N/A	N/A	0.46

PC	Chlorophyll	DOD (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
1.59	N/A	10.66	-75.4	N/A	N/A	N/A	N/A	N/A	
0.99	N/A	11.44	7.6	N/A	N/A	N/A	N/A	N/A	
0.37	N/A	12.13	26	N/A	N/A	N/A	N/A	N/A	
0.25	N/A	12.41	36.6	N/A	N/A	N/A	N/A	N/A	
0.18	N/A	12.44	45	ND	ND	ND	ND	ND	
1.77	N/A	12.25	-57.1	N/A	N/A	N/A	N/A	N/A	
0.80	N/A	12.55	-24	N/A	N/A	N/A	N/A	N/A	
0.52	N/A	12.59	-1.6	N/A	N/A	N/A	N/A	N/A	
0.22	N/A	12.41	7.7	N/A	N/A	N/A	N/A	N/A	
0.09	N/A	12.14	17.9	N/A	N/A	N/A	N/A	N/A	
1.11	N/A	10.86	-27.8	N/A	N/A	N/A	N/A	N/A	
0.51	N/A	11.77	-6.2	N/A	N/A	N/A	N/A	N/A	
0.45	N/A	11.95	13.5	N/A	N/A	N/A	N/A	N/A	
0.30	N/A	12.01	23.5	N/A	N/A	N/A	N/A	N/A	
0.22	N/A	12.09	30.7	N/A	N/A	N/A	N/A	N/A	
1.27	N/A	12.48	50	N/A	N/A	N/A	N/A	N/A	
0.61	N/A	12.58	47.5	N/A	N/A	N/A	N/A	N/A	
0.28	N/A	12.48	49.6	N/A	N/A	N/A	N/A	N/A	
0.17	N/A	12.38	53.2	N/A	N/A	N/A	N/A	N/A	
0.08	N/A	12.31	56.9	N/A	N/A	N/A	N/A	N/A	
0.87	N/A	10.53	-46.5	N/A	N/A	N/A	N/A	N/A	
0.40	N/A	11.74	-26.5	N/A	N/A	N/A	N/A	N/A	
0.32	N/A	11.91	-4	N/A	N/A	N/A	N/A	N/A	
0.18	N/A	12.04	8.5	N/A	N/A	N/A	N/A	N/A	
0.13	N/A	12.00	17.5	N/A	N/A	N/A	N/A	N/A	
1.66	N/A	12.05	-66.8	N/A	N/A	N/A	N/A	N/A	
0.59	N/A	12.51	-36.6	N/A	N/A	N/A	N/A	N/A	
0.33	N/A	12.41	-33.5	N/A	N/A	N/A	N/A	N/A	
0.09	N/A	12.26	-16.8	N/A	N/A	N/A	N/A	N/A	
0.10	N/A	12.26	-1.1	N/A	N/A	N/A	N/A	N/A	
1.00	N/A	11.34	86	N/A	N/A	N/A	N/A	N/A	
0.55	N/A	11.63	39.9	N/A	N/A	N/A	N/A	N/A	
0.29	N/A	12.02	43.8	N/A	N/A	N/A	N/A	N/A	
0.21	N/A	12.03	50.8	N/A	N/A	N/A	N/A	N/A	
0.17	N/A	12.01	56.3	N/A	N/A	N/A	N/A	N/A	
1.25	N/A	12.44	31.8	N/A	N/A	N/A	N/A	N/A	
0.31	N/A	12.45	30.9	N/A	N/A	N/A	N/A	N/A	
0.33	N/A	12.42	38.9	N/A	N/A	N/A	N/A	N/A	
0.06	N/A	12.27	44.4	N/A	N/A	N/A	N/A	N/A	
0.05	N/A	12.13	48.5	N/A	N/A	N/A	N/A	N/A	
0.69	N/A	10.33	15.1	N/A	N/A	N/A	N/A	N/A	
0.25	N/A	11.25	16.6	N/A	N/A	N/A	N/A	N/A	
0.15	N/A	11.48	22.8	N/A	N/A	N/A	N/A	N/A	
0.12	N/A	11.53	27.9	N/A	N/A	N/A	N/A	N/A	
0.09	N/A	11.55	32.8	N/A	N/A	N/A	N/A	N/A	
0.92	N/A	11.03	-20.7	N/A	N/A	N/A	N/A	N/A	
0.24	N/A	11.35	-12.5	N/A	N/A	N/A	N/A	N/A	
0.20	N/A	11.46	-1.3	N/A	N/A	N/A	N/A	N/A	
0.07	N/A	11.52	4.5	N/A	N/A	N/A	N/A	N/A	
0.04	N/A	11.53	9.6	ND	ND	ND	ND	ND	
0.41	5.02	9.95	-96.1	N/A	N/A	N/A	N/A	N/A	
0.07	0.96	10.97	-74.3	N/A	N/A	N/A	N/A	N/A	

Comprehensive Environmental Monitoring Data Log																	
Site	Date	Collection Team		Air Temp at Start		Wind Speed at Start		Cloud Cover		Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
		Air	Ground	Temp (°C)	Humidity (%)	Wind (km/h)	Wind Dir.	Cloud (0-8)	Cloud Cover Description								
LFA_F	5/7/19	VR_JH	VR_JH	58	3	50	3	1030	2.00	13.6	7.43	0.80	100.5	0.36	N/A	N/A	
LFA_F	5/7/19	VR_JH	VR_JH	58	3	50	2	1030	1.00	14.3	7.48	N/A	N/A	0.24	N/A	N/A	
LFA_F	5/7/19	VR_JH	VR_JH	58	3	50	1	1030	0.00	14.8	7.51	N/A	N/A	0.20	N/A	N/A	
LFA_F	5/21/19	VR_KW	VR_KW	38	15SSW	50	5	1102	4.00	11.3	7.89	N/A	N/A	0.10	N/A	N/A	
LFA_F	5/21/19	VR_KW	VR_KW	38	15SSW	50	4	1102	3.00	11.3	7.88	N/A	N/A	0.11	N/A	N/A	
LFA_F	5/21/19	VR_KW	VR_KW	38	15SSW	50	3	1102	2.00	11.3	7.86	-6.09	95.4	0.10	N/A	N/A	
LFA_F	5/21/19	VR_KW	VR_KW	38	15SSW	50	2	1102	1.00	11.4	7.85	N/A	N/A	0.10	N/A	N/A	
LFA_F	5/21/19	VR_KW	VR_KW	38	15SSW	50	1	1102	0.00	11.4	7.85	N/A	N/A	0.10	N/A	N/A	
LFA_F	6/4/19	VR_JW	VR_JW	64	7NNE	5	5	1030	4.00	12.8	7.44	N/A	N/A	0.19	N/A	N/A	
LFA_F	6/4/19	VR_JW	VR_JW	64	7NNE	5	4	1030	3.00	13.3	7.75	N/A	N/A	0.18	N/A	N/A	
LFA_F	6/4/19	VR_JW	VR_JW	64	7NNE	5	3	1030	2.00	15.5	7.74	1.10	100.0	0.15	N/A	N/A	
LFA_F	6/4/19	VR_JW	VR_JW	64	7NNE	5	2	1030	1.00	16.2	7.68	N/A	N/A	0.10	N/A	N/A	
LFA_F	6/4/19	VR_JW	VR_JW	64	7NNE	5	1	1030	0.00	17.1	7.64	N/A	N/A	0.08	N/A	N/A	
LFA_F	6/18/19	VR_MB	VR_MB	67	2NE	1	5	1030	4.00	16.1	8.46	N/A	N/A	0.15	N/A	N/A	
LFA_F	6/18/19	VR_MB	VR_MB	67	2NE	1	4	1030	3.00	18.1	7.58	N/A	N/A	0.14	N/A	N/A	
LFA_F	6/18/19	VR_MB	VR_MB	67	2NE	1	3	1030	2.00	19.0	7.89	0.65	93.7	0.12	N/A	N/A	
LFA_F	6/18/19	VR_MB	VR_MB	67	2NE	1	2	1030	1.00	19.5	7.88	N/A	N/A	0.10	N/A	N/A	
LFA_F	6/18/19	VR_MB	VR_MB	67	2NE	1	1	1030	0.00	19.9	7.84	N/A	N/A	0.09	N/A	N/A	
LFA_F	6/25/19	VR_MB	VR_MB	68	7SSW	1	5	1103	4.00	17.1	8.89	N/A	N/A	0.08	N/A	N/A	
LFA_F	6/25/19	VR_MB	VR_MB	68	7SSW	1	4	1103	3.00	17.3	8.56	N/A	N/A	0.08	N/A	N/A	
LFA_F	6/25/19	VR_MB	VR_MB	68	7SSW	1	3	1103	2.00	18.5	8.98	0.87	91.5	0.08	N/A	N/A	
LFA_F	6/25/19	VR_MB	VR_MB	68	7SSW	1	2	1103	1.00	18.9	9.03	N/A	N/A	0.08	N/A	N/A	
LFA_F	6/25/19	VR_MB	VR_MB	68	7SSW	1	1	1103	0.00	19.2	9.02	N/A	N/A	0.08	N/A	N/A	
LFA_F	7/2/19	VR_MB	VR_MB	N/A	24SW	0	5	1048	4.00	15.4	9.14	N/A	N/A	0.12	N/A	N/A	
LFA_F	7/2/19	VR_MB	VR_MB	N/A	24SW	0	4	1048	3.00	16.1	8.73	N/A	N/A	0.12	N/A	N/A	
LFA_F	7/2/19	VR_MB	VR_MB	N/A	24SW	0	3	1048	2.00	17.3	8.89	0.76	92.8	0.11	N/A	N/A	
LFA_F	7/2/19	VR_MB	VR_MB	N/A	24SW	0	2	1048	1.00	17.9	8.79	N/A	N/A	0.10	N/A	N/A	
LFA_F	7/2/19	VR_MB	VR_MB	N/A	24SW	0	1	1048	0.00	18.2	8.81	N/A	N/A	0.10	N/A	N/A	
LFA_F	7/16/19	VR_MB	VR_MB	N/A	3NE	80	5	1050	3.50	19.2	8.97	N/A	N/A	0.16	N/A	N/A	
LFA_F	7/16/19	VR_MB	VR_MB	N/A	3NE	80	4	1050	2.75	20.4	9.25	N/A	N/A	0.16	N/A	N/A	
LFA_F	7/16/19	VR_MB	VR_MB	N/A	3NE	80	3	1050	2.00	20.5	9.26	0.42	95.2	0.15	N/A	N/A	
LFA_F	7/16/19	VR_MB	VR_MB	N/A	3NE	80	2	1050	0.75	20.8	9.27	N/A	N/A	0.15	N/A	N/A	
LFA_F	7/16/19	VR_MB	VR_MB	N/A	3NE	80	1	1050	0.00	20.9	9.24	N/A	N/A	0.14	N/A	N/A	
LFA_F	7/30/19	VR_MB	VR_MB	80	24SW	0	5	1053	4.00	20.8	7.08	N/A	N/A	0.25	N/A	N/A	
LFA_F	7/30/19	VR_MB	VR_MB	80	24SW	0	4	1053	3.00	22.4	9.36	N/A	N/A	0.16	N/A	N/A	
LFA_F	7/30/19	VR_MB	VR_MB	80	24SW	0	3	1053	2.00	22.5	9.42	1.20	95.5	0.13	N/A	N/A	
LFA_F	7/30/19	VR_MB	VR_MB	80	24SW	0	2	1053	1.00	22.8	9.40	N/A	N/A	0.13	N/A	N/A	
LFA_F	7/30/19	VR_MB	VR_MB	80	24SW	0	1	1053	0.00	22.9	9.40	N/A	N/A	0.12	N/A	N/A	
LFA_F	8/13/19	VR_MB	VR_MB	68	1NNE	0	5	1030	3.25	20.7	8.75	N/A	N/A	0.25	N/A	N/A	
LFA_F	8/13/19	VR_MB	VR_MB	68	1NNE	0	4	1030	2.50	20.8	9.27	N/A	N/A	0.23	N/A	N/A	
LFA_F	8/13/19	VR_MB	VR_MB	68	1NNE	0	3	1030	1.75	20.9	9.32	2.70	96.4	0.23	N/A	N/A	
LFA_F	8/13/19	VR_MB	VR_MB	68	1NNE	0	2	1030	1.00	21.1	9.28	N/A	N/A	0.23	N/A	N/A	
LFA_F	8/13/19	VR_MB	VR_MB	68	1NNE	0	1	1030	0.00	21.2	9.26	N/A	N/A	0.22	N/A	N/A	
LFA_F	8/28/19	VR_MB	VR_MB	73	5NE	0	5	1030	3.50	22.0	9.29	N/A	N/A	0.07	N/A	N/A	
LFA_F	8/28/19	VR_MB	VR_MB	73	5NE	0	4	1030	2.75	22.2	9.37	N/A	N/A	0.04	N/A	N/A	
LFA_F	8/28/19	VR_MB	VR_MB	73	5NE	0	3	1030	1.75	22.3	9.46	5.00	100.9	0.03	N/A	N/A	
LFA_F	8/28/19	VR_MB	VR_MB	73	5NE	0	2	1030	1.00	22.4	9.49	N/A	N/A	0.03	N/A	N/A	
LFA_F	8/28/19	VR_MB	VR_MB	73	5NE	0	1	1031	0.00	23.1	9.49	N/A	N/A	0.12	N/A	N/A	
LFA_F	9/10/19	VR_MB	VR_MB	56	4WSW	5	5	1031	4.00	18.7	7.96	N/A	N/A	0.08	N/A	N/A	
LFA_F	9/10/19	VR_MB	VR_MB	56	4WSW	5	4	1031	3.00	18.8	8.86	N/A	N/A	0.09	N/A	N/A	
LFA_F	9/10/19	VR_MB	VR_MB	56	4WSW	5	3	1031	2.00	18.8	8.93	5.05	103.2	0.08	N/A	N/A	
LFA_F	9/10/19	VR_MB	VR_MB	56	4WSW	5	2	1031	1.00	19.0	8.87	N/A	N/A	0.08	N/A	N/A	

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	ug/L	Copies/mL	ug/L	Cylindrospermopsin	Notes:
0.05	0.83	10.95	-58.3	N/A	N/A	N/A	N/A	N/A	N/A
0.05	0.50	10.90	-49.2	N/A	N/A	N/A	N/A	N/A	N/A
0.04	0.31	10.83	-42.5	ND	ND	ND	ND	ND	ND
0.10	1.90	11.41	114.9	N/A	N/A	N/A	N/A	N/A	N/A
0.09	1.58	11.37	118	N/A	N/A	N/A	N/A	N/A	N/A
0.12	1.52	11.38	121.4	N/A	N/A	N/A	N/A	N/A	N/A
0.13	1.24	11.38	125	N/A	N/A	N/A	N/A	N/A	N/A
0.09	1.05	11.37	126.7	ND	ND	ND	ND	ND	ND
0.18	1.74	12.34	136	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.47	12.43	165	N/A	N/A	N/A	N/A	N/A	N/A
0.05	0.50	11.90	196	N/A	N/A	N/A	N/A	N/A	N/A
0.07	0.36	11.65	212.5	N/A	N/A	N/A	N/A	N/A	N/A
0.04	0.19	11.49	227	ND	ND	ND	ND	ND	ND
0.10	0.66	16.37	121.2	N/A	N/A	N/A	N/A	N/A	N/A
0.04	0.38	11.39	177.3	N/A	N/A	N/A	N/A	N/A	N/A
0.04	0.32	11.83	193.3	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.25	11.59	204.6	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.17	11.42	217.5	N/A	N/A	N/A	N/A	N/A	N/A
0.15	1.12	11.96	-103	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.32	10.14	-44	N/A	N/A	N/A	N/A	N/A	N/A
0.07	0.62	11.04	-26	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.52	10.89	-12	N/A	N/A	N/A	N/A	N/A	N/A
0.05	0.28	11.15	1	ND	ND	ND	ND	ND	ND
0.10	1.41	13.82	-136	N/A	N/A	N/A	N/A	N/A	N/A
0.07	0.52	11.43	-90	N/A	N/A	N/A	N/A	N/A	N/A
0.09	0.62	11.48	-81	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.50	11.08	-67	N/A	N/A	N/A	N/A	N/A	N/A
0.07	0.30	10.72	-58	ND	ND	ND	ND	ND	ND
0.67	1.49	6.70	-81	N/A	N/A	N/A	N/A	N/A	No site odor
0.28	0.80	11.21	-135	N/A	N/A	N/A	N/A	N/A	No water odor
0.26	0.64	11.21	-108	N/A	N/A	N/A	N/A	N/A	Water color: green
0.20	0.60	11.28	-89	N/A	N/A	N/A	N/A	N/A	
0.24	0.55	11.26	-67	5426	0.56	ND	ND	ND	
0.06	0.40	2.59	-38	N/A	N/A	N/A	N/A	N/A	Containment area from the 24st-24th fuel spill potentially
0.14	0.39	11.30	-84	N/A	N/A	N/A	N/A	N/A	LFA diffuser off
0.11	0.41	10.91	-35	N/A	N/A	N/A	N/A	N/A	Post spill that occurred on July 20th
0.11	0.28	10.63	-28	N/A	N/A	N/A	N/A	N/A	
0.06	0.20	11.07	-16	10959	1.44	ND	ND	ND	
0.37	1.65	8.15	-32	N/A	N/A	N/A	N/A	N/A	
0.40	1.08	9.10	-28	N/A	N/A	N/A	N/A	N/A	
0.33	1.05	9.18	-22	N/A	N/A	N/A	N/A	N/A	
0.17	0.53	9.19	-19	N/A	N/A	N/A	N/A	N/A	
0.20	0.38	9.49	-15	9289	0.48	ND	ND	ND	
1.40	1.83	4.30	-55	N/A	N/A	N/A	N/A	N/A	
1.80	1.70	9.31	-75	N/A	N/A	N/A	N/A	N/A	
1.92	1.88	10.33	-49	N/A	N/A	N/A	N/A	N/A	
1.67	1.56	10.50	-36	N/A	N/A	N/A	N/A	N/A	
1.82	1.00	20.08	-29	12355	0.19	ND	ND	ND	
0.77	0.62	5.05	-132	N/A	N/A	N/A	N/A	N/A	
1.16	0.74	7.01	-123	N/A	N/A	N/A	N/A	N/A	
1.15	0.84	7.81	-100	N/A	N/A	N/A	N/A	N/A	
1.03	0.80	7.72	-86	N/A	N/A	N/A	N/A	N/A	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_F	9/10/19	VR,MB	56	4WSW	5	1	1031	0.00	19.1	8.93	N/A	N/A	0.08
LFA_F	9/24/19	VR,MB	60	2	0	5	1050	3.50	15.0	7.45	N/A	N/A	0.07
LFA_F	9/24/19	VR,MB	60	2	0	4	1050	2.75	15.1	7.56	N/A	N/A	0.06
LFA_F	9/24/19	VR,MB	60	2	0	3	1050	1.75	15.1	7.87	3.40	106.5	0.06
LFA_F	9/24/19	VR,MB	60	2	0	2	1050	1.00	15.3	8.23	N/A	N/A	0.05
LFA_F	9/24/19	VR,MB	60	2	0	1	1050	0.00	16.1	8.14	N/A	N/A	0.05
LFA_F	10/8/19	VR,MB	59	SMOKE	6ENE	5	1030	3.75	12.4	8.12	N/A	N/A	0.01
LFA_F	10/8/19	VR,MB	59	SMOKE	6ENE	4	1030	3.00	12.5	8.24	N/A	N/A	0.01
LFA_F	10/8/19	VR,MB	59	SMOKE	6ENE	3	1030	1.75	12.6	8.25	1.75	108.6	0.01
LFA_F	10/8/19	VR,MB	59	SMOKE	6ENE	2	1030	1.00	12.7	8.27	N/A	N/A	0.01
LFA_F	10/8/19	VR,MB	59	SMOKE	6ENE	1	1030	0.00	12.9	8.27	N/A	N/A	0.01
LFA_F	10/22/19	VR,MB	54	SSE @ 4	9%	5	1036	3.25	9.9	7.60	N/A	N/A	0.19
LFA_F	10/22/19	VR,MB	54	SSE @ 4	9%	4	1036	2.50	10.0	7.80	N/A	N/A	0.19
LFA_F	10/22/19	VR,MB	54	SSE @ 4	9%	3	1036	1.75	10.1	7.94	2.40	111.0	0.19
LFA_F	10/22/19	VR,MB	54	SSE @ 4	9%	2	1036	1.00	10.2	7.99	N/A	N/A	0.20
LFA_F	10/22/19	VR,MB	54	SSE @ 4	9%	1	1036	0.00	10.3	7.96	N/A	N/A	0.21
LFA_F	11/12/19	VR, MB	50	Calm	11%	5	1047	3.50	7.5	7.62	N/A	N/A	0.36
LFA_F	11/12/19	VR, MB	50	Calm	11%	4	1047	2.75	7.5	7.87	N/A	N/A	0.34
LFA_F	11/12/19	VR, MB	50	Calm	11%	3	1047	1.75	7.6	7.96	0.83	111.7	0.34
LFA_F	11/12/19	VR, MB	50	Calm	11%	2	1047	1.00	7.8	7.96	N/A	N/A	0.33
LFA_F	11/12/19	VR, MB	50	Calm	11%	1	1047	0.00	8.0	8.00	N/A	N/A	0.31
LFA_G	4/15/19	VR,JH	N/A		N/A	75	5	1141	4.50	8.0	6.89	N/A	0.26
LFA_G	4/15/19	VR,JH	N/A		N/A	75	4	1141	3.38	8.6	7.03	N/A	0.25
LFA_G	4/15/19	VR,JH	N/A		N/A	75	3	1141	2.25	9.1	7.12	1.69	112.2
LFA_G	4/15/19	VR,JH	N/A		N/A	75	2	1141	1.13	9.5	7.29	N/A	N/A
LFA_G	4/15/19	VR,JH	N/A		N/A	75	1	1141	0.00	9.6	7.31	N/A	N/A
LFA_G	4/16/19	VR,BH	N/A		N/A	20	5	1615	4.00	8.9	7.14	N/A	0.13
LFA_G	4/16/19	VR,BH	N/A		N/A	20	4	1615	3.00	9.4	7.22	N/A	0.17
LFA_G	4/16/19	VR,BH	N/A		N/A	20	3	1615	2.00	10.3	7.28	1.62	113.4
LFA_G	4/16/19	VR,BH	N/A		N/A	20	2	1615	1.00	10.9	7.31	N/A	0.14
LFA_G	4/16/19	VR,BH	N/A		N/A	20	1	1615	0.00	11.3	7.32	N/A	0.12
LFA_G	4/17/19	JR,JH	N/A	0	N/A	20	5	902	4.50	9.5	7.13	N/A	0.28
LFA_G	4/17/19	JR,JH	N/A	0	N/A	20	4	902	3.38	9.6	7.22	N/A	0.20
LFA_G	4/17/19	JR,JH	N/A	0	N/A	20	3	902	2.25	9.7	7.26	1.92	113.2
LFA_G	4/17/19	JR,JH	N/A	0	N/A	20	2	902	1.13	9.7	7.27	N/A	0.18
LFA_G	4/17/19	JR,JH	N/A	0	N/A	20	1	902	0.00	9.7	7.25	N/A	0.17
LFA_G	4/17/19	VR,JH	N/A		N/A	20	5	1514	4.50	9.7	7.25	N/A	0.13
LFA_G	4/17/19	VR,JH	N/A		N/A	20	4	1514	3.38	9.8	7.30	N/A	0.14
LFA_G	4/17/19	VR,JH	N/A		N/A	20	3	1514	2.25	10.0	7.33	N/A	0.14
LFA_G	4/17/19	VR,JH	N/A		N/A	20	2	1514	1.13	10.7	7.34	N/A	0.14
LFA_G	4/17/19	VR,JH	N/A		N/A	20	1	1514	0.00	10.7	7.35	N/A	0.13
LFA_G	4/18/19	VR,JH	N/A		N/A	1	5	903	4.50	10.1	7.00	N/A	0.45
LFA_G	4/18/19	VR,JH	N/A		N/A	1	4	903	3.38	10.1	7.08	N/A	0.32
LFA_G	4/18/19	VR,JH	38.6		N/A	1	3	903	2.25	10.1	7.22	1.67	113.2
LFA_G	4/18/19	VR,JH	38.6		N/A	1	2	903	1.13	10.1	7.25	N/A	0.25
LFA_G	4/18/19	VR,JH	38.6		N/A	1	1	903	0.00	10.2	7.27	N/A	0.23
LFA_G	4/18/19	VR,JH	N/A		N/A	1	5	1514	4.50	9.8	7.23	N/A	0.11
LFA_G	4/18/19	VR,JH	N/A		N/A	1	4	1514	3.38	9.9	7.27	N/A	0.11
LFA_G	4/18/19	VR,JH	N/A		N/A	1	3	1514	2.25	10.7	7.29	113.3	0.12
LFA_G	4/18/19	VR,JH	N/A		N/A	1	2	1514	1.13	11.3	7.34	N/A	0.11
LFA_G	4/18/19	VR,JH	N/A		N/A	1	1	1514	0.00	11.8	7.35	N/A	0.11

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.94	0.79	7.57	-76	16991	0.15	2402	ND	ND	
0.40	1.10	7.39	-56	N/A	N/A	N/A	N/A	N/A	Green, paint-like algae at site
0.64	1.50	8.97	-69	N/A	N/A	N/A	N/A	N/A	
0.80	1.30	9.90	-72	N/A	N/A	N/A	N/A	N/A	
0.40	0.93	10.47	-67	N/A	N/A	N/A	N/A	N/A	
0.31	0.27	9.85	-58	25315	0.13	ND	ND	ND	
0.28	0.93	5.82	-1	N/A	N/A	N/A	N/A	N/A	Smokey odor
0.35	1.14	6.50	-61	N/A	N/A	N/A	N/A	N/A	Omnivore circling
0.28	1.05	6.29	-56	N/A	N/A	N/A	N/A	N/A	Greenish-brown water
0.25	0.58	6.45	-53	N/A	N/A	N/A	N/A	N/A	
0.23	0.50	6.51	-50	ND	ND	ND	ND	ND	
0.40	1.65	6.11	-105	N/A	N/A	N/A	N/A	N/A	Lots of plants
0.26	1.40	6.80	-112	N/A	N/A	N/A	N/A	N/A	pH not fully stable
0.40	1.66	6.83	-108	N/A	N/A	N/A	N/A	N/A	
0.12	0.57	6.66	-102	N/A	N/A	N/A	N/A	N/A	
0.10	0.41	7.14	-96	ND	ND	ND	ND	ND	
0.52	1.58	6.98	-37						
0.15	1.22	7.38	-38						
0.12	0.97	7.20	-35						
0.13	0.57	7.22	-30						
0.12	0.56	7.26	-28						
4.33	N/A	7.70	0	N/A	N/A	N/A	N/A	N/A	N/A
2.22	N/A	10.85	13.2	N/A	N/A	N/A	N/A	N/A	N/A
0.59	N/A	12.21	27.5	N/A	N/A	N/A	N/A	N/A	N/A
0.30	N/A	12.42	37.5	N/A	N/A	N/A	N/A	N/A	N/A
0.09	N/A	12.46	45.2	ND	ND	ND	ND	ND	N/A
2.45	N/A	11.93	-36	N/A	N/A	N/A	N/A	N/A	N/A
0.87	N/A	12.38	-31.6	N/A	N/A	N/A	N/A	N/A	N/A
0.40	N/A	12.17	-14	N/A	N/A	N/A	N/A	N/A	N/A
0.12	N/A	12.20	2.1	N/A	N/A	N/A	N/A	N/A	N/A
0.07	N/A	12.20	13.2	N/A	N/A	N/A	N/A	N/A	N/A
0.97	N/A	10.56	-53.2	N/A	N/A	N/A	N/A	N/A	N/A
0.67	N/A	11.67	-29.8	N/A	N/A	N/A	N/A	N/A	N/A
0.63	N/A	11.85	-8.6	N/A	N/A	N/A	N/A	N/A	N/A
0.58	N/A	11.87	0.9	N/A	N/A	N/A	N/A	N/A	N/A
0.42	N/A	11.86	13.1	N/A	N/A	N/A	N/A	N/A	N/A
1.26	N/A	11.79	-28	N/A	N/A	N/A	N/A	N/A	N/A
0.77	N/A	12.30	-14.3	N/A	N/A	N/A	N/A	N/A	N/A
0.51	N/A	12.46	-4.1	N/A	N/A	N/A	N/A	N/A	N/A
0.42	N/A	12.46	6	N/A	N/A	N/A	N/A	N/A	N/A
0.14	N/A	12.42	13.1	N/A	N/A	N/A	N/A	N/A	N/A
1.00	N/A	10.00	-70	N/A	N/A	N/A	N/A	N/A	N/A
0.51	N/A	11.66	-55.5	N/A	N/A	N/A	N/A	N/A	N/A
0.44	N/A	11.80	-42	N/A	N/A	N/A	N/A	N/A	N/A
0.49	N/A	11.86	-31.9	N/A	N/A	N/A	N/A	N/A	N/A
0.34	N/A	11.91	-25.5	N/A	N/A	N/A	N/A	N/A	N/A
0.83	N/A	11.88	-66.7	N/A	N/A	N/A	N/A	N/A	N/A
0.62	N/A	12.26	-52.9	N/A	N/A	N/A	N/A	N/A	N/A
0.35	N/A	12.43	-24.3	N/A	N/A	N/A	N/A	N/A	N/A
0.18	N/A	12.36	-12.9	N/A	N/A	N/A	N/A	N/A	N/A
0.08	N/A	12.30	-4.4	N/A	N/A	N/A	N/A	N/A	N/A

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_G	4/19/19	VRJ,H	32	2SSW	N/A	5	856	4.00	9.16	7.25	N/A	N/A	0.20
LFA_G	4/19/19	VRJ,H	32	2SSW	N/A	4	856	3.00	10.1	7.31	N/A	N/A	0.21
LFA_G	4/19/19	VRJ,H	32	2SSW	N/A	3	856	2.00	10.6	7.32	1.61	111.8	0.20
LFA_G	4/19/19	VRJ,H	32	2SSW	N/A	2	856	1.00	10.7	7.33	N/A	N/A	0.18
LFA_G	4/19/19	VRJ,H	32	2SSW	N/A	1	856	0.00	10.7	7.33	N/A	N/A	0.17
LFA_G	4/19/19	VRJ,H	N/A	N/A	70	5	1518	4.00	9.7	7.50	N/A	N/A	0.09
LFA_G	4/19/19	VRJ,H	N/A	N/A	70	4	1518	3.00	10.2	7.43	N/A	N/A	0.09
LFA_G	4/19/19	VRJ,H	N/A	N/A	70	3	1518	2.00	10.6	7.41	3.20	112.7	0.09
LFA_G	4/19/19	VRJ,H	N/A	N/A	70	2	1518	1.00	12.0	7.40	N/A	N/A	0.09
LFA_G	4/19/19	VRJ,H	N/A	N/A	70	1	1518	0.00	11.8	7.41	N/A	N/A	0.09
LFA_G	4/22/19	VRJ,H	35	2N	1	5	913	4.00	10.7	7.46	N/A	N/A	0.15
LFA_G	4/22/19	VRJ,H	35	2N	1	4	913	3.00	11.2	7.37	N/A	N/A	0.19
LFA_G	4/22/19	VRJ,H	35	2N	1	3	913	2.00	11.2	7.37	1.64	111.4	0.20
LFA_G	4/22/19	VRJ,H	35	2N	1	3	913	1.00	11.2	7.36	N/A	N/A	0.20
LFA_G	4/22/19	VRJ,H	35	2N	1	1	913	0.00	11.3	7.36	N/A	N/A	0.20
LFA_G	4/23/19	VRJ,H	50	N/A	0	5	1119	4.00	10.1	7.18	N/A	N/A	0.14
LFA_G	4/23/19	VRJ,H	50	N/A	0	4	1119	3.00	10.9	7.25	N/A	N/A	0.14
LFA_G	4/23/19	VRJ,H	50	N/A	0	3	1119	2.00	11.7	7.29	1.46	110.9	0.14
LFA_G	4/23/19	VRJ,H	50	N/A	0	2	1119	1.00	12.2	7.32	N/A	N/A	0.12
LFA_G	4/23/19	VRJ,H	50	N/A	0	1	1119	0.00	12.7	7.34	N/A	N/A	0.11
LFA_G	5/7/19	VRJ,H	58	3	50	5	1045	4.00	11.1	7.45	N/A	N/A	0.23
LFA_G	5/7/19	VRJ,H	58	3	50	4	1045	3.00	11.7	7.48	N/A	N/A	0.24
LFA_G	5/7/19	VRJ,H	58	3	50	3	1045	2.00	13.6	7.51	0.96	99.6	0.24
LFA_G	5/7/19	VRJ,H	58	3	50	2	1045	1.00	13.8	7.54	N/A	N/A	0.19
LFA_G	5/7/19	VRJ,H	58	3	50	1	1045	0.00	14.2	7.56	N/A	N/A	0.18
LFA_G	5/21/19	VRJ,KW	38	15SSW	50	5	1119	5.00	11.2	7.72	N/A	N/A	0.12
LFA_G	5/21/19	VRJ,KW	38	15SSW	50	4	1119	3.75	11.3	7.80	N/A	N/A	0.11
LFA_G	5/21/19	VRJ,KW	38	15SSW	50	3	1119	2.50	11.3	7.81	-5.96	95.4	0.11
LFA_G	5/21/19	VRJ,KW	38	15SSW	50	2	1119	1.25	11.4	7.83	N/A	N/A	0.10
LFA_G	5/21/19	VRJ,KW	38	15SSW	50	1	1119	0.00	11.4	7.81	N/A	N/A	0.11
LFA_G	6/4/19	VRJ,JW	64	7NN	5	5	1050	5.00	13.0	7.15	N/A	N/A	0.26
LFA_G	6/4/19	VRJ,JW	64	7NN	5	4	1050	3.75	13.1	7.66	N/A	N/A	0.14
LFA_G	6/4/19	VRJ,JW	64	7NN	5	3	1050	2.50	15.1	7.67	1.07	99.6	0.10
LFA_G	6/4/19	VRJ,JW	64	7NN	5	2	1050	1.25	16.0	7.65	N/A	N/A	0.09
LFA_G	6/4/19	VRJ,JW	64	7NN	5	1	1050	0.00	16.6	7.64	N/A	N/A	0.09
LFA_G	6/18/19	VRJ,MB	67	2NE	5	5	1050	5.00	7.05	7.06	N/A	N/A	0.15
LFA_G	6/18/19	VRJ,MB	67	2NE	1	4	1050	3.75	17.4	7.94	N/A	N/A	0.13
LFA_G	6/18/19	VRJ,MB	67	2NE	1	3	1050	2.50	19.0	7.92	1.02	93.8	0.11
LFA_G	6/18/19	VRJ,MB	67	2NE	1	2	1050	1.25	19.1	7.92	N/A	N/A	0.10
LFA_G	6/18/19	VRJ,MB	67	2NE	1	1	1050	0.00	20.1	7.93	N/A	N/A	0.09
LFA_G	6/25/19	VRJ,MB	68	7SSW	1	5	1122	5.00	17.3	7.77	N/A	N/A	0.11
LFA_G	6/25/19	VRJ,MB	68	7SSW	1	4	1122	3.75	18.2	8.86	N/A	N/A	0.10
LFA_G	6/25/19	VRJ,MB	68	7SSW	1	3	1122	2.50	18.5	8.96	1.45	91.4	0.10
LFA_G	6/25/19	VRJ,MB	68	7SSW	1	2	1122	1.25	18.6	8.95	N/A	N/A	0.10
LFA_G	6/25/19	VRJ,MB	68	7SSW	1	1	1122	0.00	18.6	8.97	N/A	N/A	0.10
LFA_G	7/12/19	VRJ,MB	N/A	2-4SW	0	5	1108	5.00	15.8	8.65	N/A	N/A	0.17
LFA_G	7/12/19	VRJ,MB	N/A	2-4SW	0	4	1108	3.75	17.2	9.02	N/A	N/A	0.14
LFA_G	7/12/19	VRJ,MB	N/A	2-4SW	0	3	1108	2.50	17.4	8.99	1.09	92.8	0.12
LFA_G	7/12/19	VRJ,MB	N/A	2-4SW	0	2	1108	1.25	17.5	8.99	N/A	N/A	0.11
LFA_G	7/12/19	VRJ,MB	N/A	2-4SW	0	1	1108	0.00	18.4	8.97	N/A	N/A	0.11
LFA_G	7/16/19	VRJ,MB	N/A	3NE	80	5	1107	5.00	20.1	8.65	N/A	N/A	0.24
LFA_G	7/16/19	VRJ,MB	N/A	3NE	80	4	1107	3.75	20.5	9.23	N/A	N/A	0.18

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.90	N/A	10.84	-25.2	N/A	N/A	N/A	N/A	N/A	
0.48	N/A	11.75	-6.6	N/A	N/A	N/A	N/A	N/A	
0.34	N/A	11.91	8.7	N/A	N/A	N/A	N/A	N/A	
0.23	N/A	11.95	16.5	N/A	N/A	N/A	N/A	N/A	
0.31	N/A	11.95	24.5	N/A	N/A	N/A	N/A	N/A	
1.00	N/A	12.03	45.1	N/A	N/A	N/A	N/A	N/A	
0.55	N/A	12.23	34.9	N/A	N/A	N/A	N/A	N/A	
0.27	N/A	12.23	36.6	N/A	N/A	N/A	N/A	N/A	
0.22	N/A	12.25	40.4	N/A	N/A	N/A	N/A	N/A	
0.18	N/A	12.31	44.7	N/A	N/A	N/A	N/A	N/A	
0.80	N/A	10.74	6.6	N/A	N/A	N/A	N/A	N/A	
0.40	N/A	11.15	10.3	N/A	N/A	N/A	N/A	N/A	
0.40	N/A	11.32	16.7	N/A	N/A	N/A	N/A	N/A	
0.26	N/A	11.36	22.3	N/A	N/A	N/A	N/A	N/A	
0.25	N/A	11.41	27.3	N/A	N/A	N/A	N/A	N/A	
0.58	N/A	11.06	-40.5	N/A	N/A	N/A	N/A	N/A	
0.38	N/A	11.34	-32.4	N/A	N/A	N/A	N/A	N/A	
0.28	N/A	11.41	-22.3	N/A	N/A	N/A	N/A	N/A	
0.16	N/A	11.43	-11.7	N/A	N/A	N/A	N/A	N/A	
0.07	N/A	11.48	-4.4	ND	ND	ND	ND	ND	
0.16	3.28	11.31	-17.4	N/A	N/A	N/A	N/A	N/A	
0.14	1.92	11.53	-12.5	N/A	N/A	N/A	N/A	N/A	
0.08	1.45	11.09	-6.9	N/A	N/A	N/A	N/A	N/A	
0.06	0.96	11.08	-1.8	N/A	N/A	N/A	N/A	N/A	
0.05	0.96	11.07	1.1	ND	ND	ND	ND	ND	
0.15	3.01	11.13	-14	N/A	N/A	N/A	N/A	N/A	
0.15	2.58	11.25	19.5	N/A	N/A	N/A	N/A	N/A	
0.12	2.11	11.31	31.7	N/A	N/A	N/A	N/A	N/A	
0.14	1.99	11.34	45.2	N/A	N/A	N/A	N/A	N/A	
0.10	1.50	11.38	52.9	ND	ND	ND	ND	ND	
0.43	3.50	9.98	7	N/A	N/A	N/A	N/A	N/A	
0.05	0.62	12.20	22	N/A	N/A	N/A	N/A	N/A	
0.08	0.50	11.77	87	N/A	N/A	N/A	N/A	N/A	
0.06	0.44	11.76	105	N/A	N/A	N/A	N/A	N/A	
0.07	0.32	11.66	120	ND	ND	ND	ND	ND	
0.15	1.42	9.72	35.9	N/A	N/A	N/A	N/A	N/A	
0.02	0.53	12.72	69.4	N/A	N/A	N/A	N/A	N/A	
0.05	0.39	11.86	120.6	N/A	N/A	N/A	N/A	N/A	
0.05	0.34	11.89	158.1	N/A	N/A	N/A	N/A	N/A	
0.04	0.29	11.65	174.9	N/A	N/A	N/A	N/A	N/A	
0.18	1.25	9.26	-80	N/A	N/A	N/A	N/A	N/A	Chlorophyll meter moving a lot
0.07	0.70	11.01	-59	N/A	N/A	N/A	N/A	N/A	Chlorophyll meter moving a lot
0.10	0.78	11.57	-34	N/A	N/A	N/A	N/A	N/A	Chlorophyll meter moving a lot
0.08	0.60	11.37	-66	N/A	N/A	N/A	N/A	N/A	Chlorophyll meter moving a lot
0.01	0.23	11.41	-55	ND	ND	ND	ND	ND	No site odor
0.36	1.24	6.96	-156	N/A	N/A	N/A	N/A	N/A	No water odor
0.22	0.92	10.58	-145	N/A	N/A	N/A	N/A	N/A	No water odor

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_G	7/16/19	VR,MB	N/A	3NE	80	3	1107	2.50	20.7	9.25	0.65	95.3	0.17
LFA_G	7/16/19	VR,MB	N/A	3NE	80	2	1107	1.25	20.7	9.26	N/A	N/A	0.16
LFA_G	7/16/19	VR,MB	N/A	3NE	80	1	1107	0.00	20.7	9.26	N/A	N/A	0.16
LFA_G	7/30/19	VR,MB	80	2-4SW	0	5	1113	5.00	20.2	7.56	N/A	N/A	0.41
LFA_G	7/30/19	VR,MB	80	2-4SW	0	4	1113	3.75	21.3	7.74	N/A	N/A	0.28
LFA_G	7/30/19	VR,MB	80	2-4SW	0	3	1113	2.50	22.5	9.36	1.31	102.1	0.17
LFA_G	7/30/19	VR,MB	80	2-4SW	0	2	1113	1.25	22.7	9.45	N/A	N/A	0.14
LFA_G	7/30/19	VR,MB	80	2-4SW	0	1	1113	0.00	23.4	9.43	N/A	N/A	0.13
LFA_G	8/13/19	VR,MB	68	1NNE	0	5	1038	5.00	20.6	8.09	N/A	N/A	0.48
LFA_G	8/13/19	VR,MB	68	1NNE	0	4	1038	3.75	20.8	8.84	N/A	N/A	0.37
LFA_G	8/13/19	VR,MB	68	1NNE	0	3	1038	2.50	20.9	9.17	2.80	97.0	0.30
LFA_G	8/13/19	VR,MB	68	1NNE	0	2	1038	1.25	20.9	9.20	N/A	N/A	0.28
LFA_G	8/13/19	VR,MB	68	1NNE	0	1	1038	0.00	21.2	9.20	N/A	N/A	0.27
LFA_G	8/28/19	VR,MB	73	5NE	0	5	1050	5.00	21.8	8.10	N/A	N/A	0.08
LFA_G	8/28/19	VR,MB	73	5NE	0	4	1050	3.75	22.3	9.02	N/A	N/A	0.04
LFA_G	8/28/19	VR,MB	73	5NE	0	3	1050	2.50	22.3	9.21	4.30	101.8	0.04
LFA_G	8/28/19	VR,MB	73	5NE	0	2	1050	1.25	22.4	9.24	N/A	N/A	0.04
LFA_G	8/28/19	VR,MB	73	5NE	0	1	1050	0.00	23.2	9.26	N/A	N/A	0.04
LFA_G	9/10/19	VR,MB	56	4WSW	5	5	1053	4.75	18.6	8.72	N/A	N/A	0.16
LFA_G	9/10/19	VR,MB	56	4WSW	5	4	1053	3.50	18.7	8.73	N/A	N/A	0.12
LFA_G	9/10/19	VR,MB	56	4WSW	5	3	1053	2.25	18.9	8.83	5.67	103.5	0.11
LFA_G	9/10/19	VR,MB	56	4WSW	5	2	1053	1.00	19.0	8.85	N/A	N/A	0.10
LFA_G	9/10/19	VR,MB	56	4WSW	5	1	1053	0.00	19.2	8.85	N/A	N/A	0.10
LFA_G	9/24/19	VR,MB	60	2	0	5	1110	4.75	15.0	7.22	N/A	N/A	0.13
LFA_G	9/24/19	VR,MB	60	2	0	4	1110	3.50	15.1	7.46	N/A	N/A	0.13
LFA_G	9/24/19	VR,MB	60	2	0	3	1110	2.25	15.2	7.59	3.10	107.1	0.13
LFA_G	9/24/19	VR,MB	60	2	0	2	1110	1.00	15.2	7.65	N/A	N/A	0.12
LFA_G	9/24/19	VR,MB	60	2	0	1	1110	0.00	15.2	7.69	N/A	N/A	0.12
LFA_G	10/8/19	VR,MB	59	SMOKE	6ENE	5	1049	4.75	12.5	7.89	N/A	N/A	0.02
LFA_G	10/8/19	VR,MB	59	SMOKE	6ENE	4	1049	3.50	12.5	7.99	N/A	N/A	0.02
LFA_G	10/8/19	VR,MB	59	SMOKE	6ENE	3	1049	2.25	12.6	8.06	2.50	109.3	0.02
LFA_G	10/8/19	VR,MB	59	SMOKE	6ENE	2	1049	1.00	12.6	8.11	N/A	N/A	0.02
LFA_G	10/8/19	VR,MB	59	SMOKE	6ENE	1	1049	0.00	12.6	8.12	N/A	N/A	0.02
LFA_G	10/22/19	VR,MB	54	SSE @ 4	9%	5	1054	4.75	9.9	7.44	N/A	N/A	1.48
LFA_G	10/22/19	VR,MB	54	SSE @ 4	9%	4	1054	3.75	10.0	7.52	N/A	N/A	1.43
LFA_G	10/22/19	VR,MB	54	SSE @ 4	9%	3	1054	2.50	10.1	7.66	1.55	112.0	1.30
LFA_G	10/22/19	VR,MB	54	SSE @ 4	9%	2	1054	1.25	10.1	7.71	N/A	N/A	1.23
LFA_G	10/22/19	VR,MB	54	SSE @ 4	9%	1	1054	0.00	10.1	7.74	N/A	N/A	1.23
LFA_G	11/12/19	VR, MB	50	Calm	11%	5	1110	4.60	7.4	7.65	N/A	N/A	0.29
LFA_G	11/12/19	VR, MB	50	Calm	11%	4	1110	3.25	7.5	7.86	N/A	N/A	0.28
LFA_G	11/12/19	VR, MB	50	Calm	11%	3	1110	2.25	7.5	7.94	0.92	112.5	0.28
LFA_G	11/12/19	VR, MB	50	Calm	11%	2	1110	1.00	7.5	7.99	N/A	N/A	0.28
LFA_G	11/12/19	VR, MB	50	Calm	11%	1	1110	0.00	7.5	8.01	N/A	N/A	0.28
LFA_H	4/15/19	VR,JH	N/A	N/A	75	5	1154	3.50	8.8	6.92	N/A	N/A	0.19
LFA_H	4/15/19	VR,JH	N/A	N/A	75	4	1154	2.63	9.0	7.14	N/A	N/A	0.17
LFA_H	4/15/19	VR,JH	N/A	N/A	75	3	1154	1.75	9.3	7.24	1.82	113.8	0.15
LFA_H	4/15/19	VR,JH	N/A	N/A	75	2	1154	0.88	9.3	7.28	N/A	N/A	0.13
LFA_H	4/15/19	VR,JH	N/A	N/A	75	1	1154	0.00	9.3	7.29	N/A	N/A	0.12
LFA_H	4/16/19	VR,BH	N/A	N/A	20	5	1629	3.50	9.2	7.42	N/A	N/A	0.11
LFA_H	4/16/19	VR,BH	N/A	N/A	20	4	1629	2.63	9.2	7.39	N/A	N/A	0.14
LFA_H	4/16/19	VR,BH	N/A	N/A	20	3	1629	1.75	10.2	7.37	1.73	113.6	0.15

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	ug/L	Copies/mL	ug/L	Cylindrospermopsin	Notes:
0.33	0.80	11.47	-99	N/A	N/A	N/A	N/A	N/A	Water color: green Skimmer boat had just cleaned area
0.30	0.78	11.42	-82	N/A	N/A	N/A	N/A	N/A	
0.23	0.64	11.42	-67	ND	ND	ND	ND	ND	
0.10	0.40	0.06	-197	N/A	N/A	N/A	N/A	N/A	
0.10	0.30	6.48	-92	N/A	N/A	N/A	N/A	N/A	
0.20	0.50	10.19	-40	N/A	N/A	N/A	N/A	N/A	
0.13	0.41	11.40	-24	N/A	N/A	N/A	N/A	N/A	
0.08	0.17	10.94	-13	8700	1.22	ND	ND	ND	
0.25	0.70	4.44	-132	N/A	N/A	N/A	N/A	N/A	
0.37	0.95	7.84	-130	N/A	N/A	N/A	N/A	N/A	
0.28	0.86	8.09	-94	N/A	N/A	N/A	N/A	N/A	
0.36	0.60	8.69	-77	N/A	N/A	N/A	N/A	N/A	
0.25	0.50	8.56	-67	12834	0.54	896	ND	ND	Paint looking algae in area Paint algae on surface
0.65	1.16	1.60	-124	N/A	N/A	N/A	N/A	N/A	
1.65	1.07	9.21	-113	N/A	N/A	N/A	N/A	N/A	
1.70	1.22	9.22	-90	N/A	N/A	N/A	N/A	N/A	
1.66	1.18	8.97	-73	N/A	N/A	N/A	N/A	N/A	
1.77	1.01	9.65	-60	7469	ND	ND	ND	ND	
1.25	0.75	6.89	-142	N/A	N/A	N/A	N/A	N/A	
1.30	0.84	6.85	-119	N/A	N/A	N/A	N/A	N/A	
1.53	0.81	6.91	-105	N/A	N/A	N/A	N/A	N/A	
1.43	0.75	6.99	-92	N/A	N/A	N/A	N/A	N/A	
1.15	0.60	7.44	-83	12571	0.14	1950	ND	ND	
0.40	0.80	8.52	-68	N/A	N/A	N/A	N/A	N/A	Green, paint-like algae at site
0.56	0.94	8.77	-58	N/A	N/A	N/A	N/A	N/A	
0.40	0.80	8.67	-50	N/A	N/A	N/A	N/A	N/A	
0.37	0.76	9.58	-44	N/A	N/A	N/A	N/A	N/A	
0.35	0.73	9.32	-28	22355	ND	ND	ND	ND	
0.31	1.15	6.48	-72	N/A	N/A	N/A	N/A	N/A	
0.37	1.30	6.17	-67	N/A	N/A	N/A	N/A	N/A	
0.40	1.25	6.25	-63	N/A	N/A	N/A	N/A	N/A	
0.33	1.15	6.53	-58	N/A	N/A	N/A	N/A	N/A	
0.28	1.00	6.57	-50	ND	ND	ND	ND	ND	
0.18	0.90	5.48	-97	N/A	N/A	N/A	N/A	N/A	Ammonium sensor broken
0.21	1.14	6.69	-93	N/A	N/A	N/A	N/A	N/A	
0.18	1.01	6.85	-87	N/A	N/A	N/A	N/A	N/A	Algae seen on surface
0.13	0.86	6.72	-83	N/A	N/A	N/A	N/A	N/A	
0.12	0.90	6.81	-80	ND	ND	ND	ND	ND	
0.20	1.38	6.90	-73						
0.12	1.45	7.17	-71						
0.15	1.29	7.14	-61						
0.11	0.92	7.34	-52						
0.08	0.52	7.67	-49						
1.65	N/A	10.48	-18.8	N/A	N/A	N/A	N/A	N/A	
0.75	N/A	11.92	-5.7	N/A	N/A	N/A	N/A	N/A	
0.39	N/A	12.33	13.4	N/A	N/A	N/A	N/A	N/A	
0.32	N/A	12.38	22.5	N/A	N/A	N/A	N/A	N/A	
0.26	N/A	12.40	32.3	ND	ND	ND	ND	ND	
1.22	N/A	12.42	-1	N/A	N/A	N/A	N/A	N/A	
1.06	N/A	12.57	10.9	N/A	N/A	N/A	N/A	N/A	
0.44	N/A	12.48	15.2	N/A	N/A	N/A	N/A	N/A	

Comprehensive Environmental Monitoring Data Log																		
Site	Date	Collection Team		Air Temp at Start		Wind Speed at Start		Cloud Cover		Quadrant		Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)
		Team A	Team B	Team C	Team D	Team E	Team F	Team G	Team H	Team I	Team J							
LFA_H	4/16/19	VR,BH	N/A	N/A	20	2	1629	0.88	10.3	7.37	N/A	N/A	N/A	0.13	N/A	N/A	N/A	
LFA_H	4/16/19	VR,BH	N/A	N/A	20	1	1629	0.00	10.3	7.36	N/A	N/A	N/A	0.12	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	0	20	5	916	3.00	9.6	7.40	N/A	N/A	N/A	0.15	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	0	20	4	916	2.63	9.6	7.34	N/A	N/A	N/A	0.16	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	0	20	3	916	1.75	9.7	7.31	2.30	114.2	0.17	N/A	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	0	20	2	916	0.88	9.7	7.28	N/A	N/A	N/A	0.16	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	N/A	20	5	1524	3.00	10.3	7.39	N/A	N/A	N/A	0.10	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	N/A	20	4	1524	2.63	10.7	7.39	N/A	N/A	N/A	0.11	N/A	N/A	N/A	
LFA_H	4/17/19	JR,JH	N/A	N/A	20	3	1524	1.75	10.7	7.39	2.48	114.8	0.11	N/A	N/A	N/A	N/A	
LFA_H	4/17/19	VR,JH	N/A	N/A	20	2	1524	0.88	10.8	7.38	N/A	N/A	N/A	0.11	N/A	N/A	N/A	
LFA_H	4/17/19	VR,JH	N/A	N/A	20	1	1524	0.00	10.8	7.37	N/A	N/A	N/A	0.11	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	38.6	N/A	1	5	914	3.50	10.3	7.25	N/A	N/A	N/A	0.18	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	38.6	N/A	1	4	914	2.63	10.3	7.26	N/A	N/A	N/A	0.18	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	38.6	N/A	1	3	914	1.75	10.3	7.28	2.33	115.0	0.17	N/A	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	38.6	N/A	1	2	914	0.88	10.4	7.28	N/A	N/A	N/A	0.16	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	38.6	N/A	1	1	914	0.00	10.4	7.29	N/A	N/A	N/A	0.16	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	N/A	N/A	5	5	1525	3.50	10.9	7.45	N/A	N/A	N/A	0.08	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	N/A	N/A	1	4	1525	2.63	11.4	7.41	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	N/A	N/A	1	3	1525	1.75	11.6	7.40	3.60	114.9	0.09	N/A	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	N/A	N/A	1	2	1525	0.88	11.8	7.38	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/18/19	VR,JH	N/A	N/A	1	1	1525	0.00	11.9	7.38	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	32	2SSW	N/A	5	908	3.50	11.1	7.32	N/A	N/A	N/A	0.14	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	32	2SSW	N/A	4	908	2.63	11.2	7.31	N/A	N/A	N/A	0.14	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	32	2SSW	N/A	3	908	1.75	11.2	7.32	2.33	114.9	0.14	N/A	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	32	2SSW	N/A	2	908	0.88	11.2	7.31	N/A	N/A	N/A	0.13	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	32	2SSW	N/A	1	908	0.00	11.2	7.31	N/A	N/A	N/A	0.13	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	N/A	N/A	70	5	1527	3.50	11.7	7.33	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	N/A	N/A	70	4	1527	2.63	12.1	7.36	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	N/A	N/A	70	3	1527	1.75	12.2	7.38	4.35	115.0	0.09	N/A	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	N/A	N/A	70	2	1527	0.88	12.3	7.39	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/19/19	VR,JH	N/A	N/A	70	1	1527	0.00	12.3	7.39	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/22/19	VR,JH	35	2N	1	4	925	3.50	11.6	7.35	N/A	N/A	N/A	0.15	N/A	N/A	N/A	
LFA_H	4/22/19	VR,JH	35	2N	1	3	925	1.75	11.6	7.35	2.05	114.0	0.16	N/A	N/A	N/A	N/A	
LFA_H	4/22/19	VR,JH	35	2N	1	2	925	0.88	11.6	7.35	N/A	N/A	N/A	0.16	N/A	N/A	N/A	
LFA_H	4/22/19	VR,JH	35	2N	1	1	925	0.00	11.6	7.34	2.27	N/A	N/A	0.08	N/A	N/A	N/A	N/A
LFA_H	4/23/19	VR,JH	50	N/A	0	5	1132	3.50	12.1	7.33	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/23/19	VR,JH	50	N/A	0	4	1132	2.63	12.2	7.33	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	4/23/19	VR,JH	50	N/A	0	3	1132	1.75	12.4	7.36	2.04	114.3	0.08	N/A	N/A	N/A	N/A	
LFA_H	4/23/19	VR,JH	50	N/A	0	2	1132	0.88	12.4	7.37	N/A	N/A	N/A	0.08	N/A	N/A	N/A	
LFA_H	4/23/19	VR,JH	50	N/A	0	1	1132	0.00	12.4	7.37	N/A	N/A	N/A	0.08	N/A	N/A	N/A	
LFA_H	5/7/19	VR,JH	58	3	50	5	1105	3.50	13.6	7.33	N/A	N/A	N/A	0.19	N/A	N/A	N/A	
LFA_H	5/7/19	VR,JH	58	3	50	4	1105	2.63	14.8	7.40	N/A	N/A	N/A	0.19	N/A	N/A	N/A	
LFA_H	5/7/19	VR,JH	58	3	50	3	1105	1.75	14.4	7.50	1.76	103.9	0.18	N/A	N/A	N/A	N/A	
LFA_H	5/7/19	VR,JH	58	3	50	2	1105	0.88	14.5	7.53	N/A	N/A	N/A	0.17	N/A	N/A	N/A	
LFA_H	5/7/19	VR,JH	58	3	50	1	1105	0.00	14.8	7.54	N/A	N/A	N/A	0.17	N/A	N/A	N/A	
LFA_H	5/21/19	VR,KW	38	15SSW	50	5	1140	3.50	11.6	7.70	N/A	N/A	N/A	0.11	N/A	N/A	N/A	
LFA_H	5/21/19	VR,KW	38	15SSW	50	4	1140	2.63	11.6	7.78	N/A	N/A	N/A	0.10	96.4	N/A	N/A	
LFA_H	5/21/19	VR,KW	38	15SSW	50	3	1140	1.75	11.7	7.93	-5.65	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	5/21/19	VR,KW	38	15SSW	50	2	1140	0.88	12.0	7.94	N/A	N/A	N/A	0.09	N/A	N/A	N/A	
LFA_H	5/21/19	VR,KW	38	15SSW	50	1	1140	0.00	12.1	7.88	N/A	N/A	N/A	0.10	N/A	N/A	N/A	

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.30	N/A	12.49	32.6	N/A	N/A	N/A	N/A	N/A	N/A
0.31	N/A	12.52	39	N/A	N/A	N/A	N/A	N/A	N/A
0.78	N/A	11.60	12.9	N/A	N/A	N/A	N/A	N/A	N/A
0.60	N/A	11.81	25	N/A	N/A	N/A	N/A	N/A	N/A
0.52	N/A	11.95	36.6	N/A	N/A	N/A	N/A	N/A	N/A
0.45	N/A	11.96	41.8	N/A	N/A	N/A	N/A	N/A	N/A
0.41	N/A	11.97	46.5	N/A	N/A	N/A	N/A	N/A	N/A
0.87	N/A	12.51	-24.9	N/A	N/A	N/A	N/A	N/A	N/A
0.54	N/A	12.53	-17.4	N/A	N/A	N/A	N/A	N/A	N/A
0.40	N/A	12.55	1	N/A	N/A	N/A	N/A	N/A	N/A
0.32	N/A	12.57	10.8	N/A	N/A	N/A	N/A	N/A	N/A
0.20	N/A	12.58	18	N/A	N/A	N/A	N/A	N/A	N/A
0.77	N/A	11.48	-14.5	N/A	N/A	N/A	N/A	N/A	N/A
0.61	N/A	11.65	-8.6	N/A	N/A	N/A	N/A	N/A	N/A
0.56	N/A	11.79	2.9	N/A	N/A	N/A	N/A	N/A	N/A
0.36	N/A	11.84	8.8	N/A	N/A	N/A	N/A	N/A	N/A
0.34	N/A	11.86	14	N/A	N/A	N/A	N/A	N/A	N/A
0.72	N/A	12.30	-4	N/A	N/A	N/A	N/A	N/A	N/A
0.47	N/A	12.37	6.2	N/A	N/A	N/A	N/A	N/A	N/A
0.33	N/A	12.38	16.9	N/A	N/A	N/A	N/A	N/A	N/A
0.19	N/A	12.38	23.4	N/A	N/A	N/A	N/A	N/A	N/A
0.17	N/A	12.39	30.7	N/A	N/A	N/A	N/A	N/A	N/A
0.53	N/A	11.51	14.1	N/A	N/A	N/A	N/A	N/A	N/A
0.51	N/A	11.70	16.8	N/A	N/A	N/A	N/A	N/A	N/A
0.46	N/A	11.75	26.3	N/A	N/A	N/A	N/A	N/A	N/A
0.41	N/A	11.77	32.8	N/A	N/A	N/A	N/A	N/A	N/A
0.33	N/A	11.78	39.9	N/A	N/A	N/A	N/A	N/A	N/A
0.65	N/A	11.83	-50.1	N/A	N/A	N/A	N/A	N/A	N/A
0.41	N/A	12.14	-42.1	N/A	N/A	N/A	N/A	N/A	N/A
0.33	N/A	12.23	-22.4	N/A	N/A	N/A	N/A	N/A	N/A
0.38	N/A	12.26	-10.3	N/A	N/A	N/A	N/A	N/A	N/A
0.33	N/A	12.28	-1.7	N/A	N/A	N/A	N/A	N/A	N/A
0.44	N/A	11.15	29.1	N/A	N/A	N/A	N/A	N/A	N/A
0.30	N/A	11.26	25	N/A	N/A	N/A	N/A	N/A	N/A
0.29	N/A	11.29	28.7	N/A	N/A	N/A	N/A	N/A	N/A
0.22	N/A	11.30	32.9	N/A	N/A	N/A	N/A	N/A	N/A
0.15	N/A	11.31	36.3	N/A	N/A	N/A	N/A	N/A	N/A
0.52	N/A	11.05	-40	N/A	N/A	N/A	N/A	N/A	N/A
0.28	N/A	11.34	-29.1	N/A	N/A	N/A	N/A	N/A	N/A
0.22	N/A	11.41	-15.4	N/A	N/A	N/A	N/A	N/A	N/A
0.17	N/A	11.39	-7.2	N/A	N/A	N/A	N/A	N/A	N/A
0.16	N/A	11.40	-0.3	ND	ND	ND	ND	ND	ND
0.20	3.88	9.60	37.3	N/A	N/A	N/A	N/A	N/A	N/A
0.14	2.60	10.76	39.1	N/A	N/A	N/A	N/A	N/A	N/A
0.14	2.45	10.87	40.7	N/A	N/A	N/A	N/A	N/A	N/A
0.12	1.24	10.89	42.8	N/A	N/A	N/A	N/A	N/A	N/A
0.09	1.15	10.91	43.8	ND	ND	ND	ND	ND	ND
0.25	3.00	11.46	-60.6	N/A	N/A	N/A	N/A	N/A	N/A
0.17	2.66	11.55	-34.1	N/A	N/A	N/A	N/A	N/A	N/A
0.15	2.15	11.54	7.4	N/A	N/A	N/A	N/A	N/A	N/A
0.12	1.84	11.52	28.2	N/A	N/A	N/A	N/A	N/A	N/A
0.09	1.28	11.49	39.8	ND	ND	ND	ND	ND	ND

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_H	6/14/19	VR_JW	64	7NNE	5	5	1115	3.50	14.5	6.68	N/A	N/A	0.10
LFA_H	6/14/19	VR_JW	64	7NNE	5	4	1115	2.63	16.1	7.60	N/A	N/A	0.10
LFA_H	6/14/19	VR_JW	64	7NNE	5	3	1115	1.75	16.5	7.67	2.17	102.6	0.09
LFA_H	6/14/19	VR_JW	64	7NNE	5	2	1115	0.88	16.7	7.68	N/A	N/A	0.09
LFA_H	6/14/19	VR_JW	64	7NNE	5	1	1115	0.00	16.9	7.68	N/A	N/A	0.09
LFA_H	6/18/19	VR_MB	67	2NE	1	5	1115	3.50	18.7	7.48	N/A	N/A	0.08
LFA_H	6/18/19	VR_MB	67	2NE	1	4	1115	2.63	19.5	8.09	N/A	N/A	0.08
LFA_H	6/18/19	VR_MB	67	2NE	1	3	1115	1.75	19.7	8.08	1.54	95.1	0.08
LFA_H	6/18/19	VR_MB	67	2NE	1	2	1115	0.88	19.7	8.08	N/A	N/A	0.08
LFA_H	6/18/19	VR_MB	67	2NE	1	1	1115	0.00	19.9	8.06	N/A	N/A	0.08
LFA_H	6/25/19	VR_MB	68	7SSW	1	5	1139	3.50	18.8	9.10	N/A	N/A	0.10
LFA_H	6/25/19	VR_MB	68	7SSW	1	4	1139	2.63	19.0	9.09	N/A	N/A	0.11
LFA_H	6/25/19	VR_MB	68	7SSW	1	3	1139	1.75	19.1	9.07	1.49	93.1	0.12
LFA_H	6/25/19	VR_MB	68	7SSW	1	2	1139	0.88	19.4	9.09	N/A	N/A	0.11
LFA_H	6/25/19	VR_MB	68	7SSW	1	1	1139	0.00	19.4	9.10	N/A	N/A	0.10
LFA_H	7/2/19	VR_MB	N/A	2-4SW	0	5	1128	3.50	17.5	9.16	N/A	N/A	0.12
LFA_H	7/2/19	VR_MB	N/A	2-4SW	0	4	1128	2.75	17.7	9.17	N/A	N/A	0.12
LFA_H	7/2/19	VR_MB	N/A	2-4SW	0	3	1128	1.75	18.0	9.14	1.50	93.5	0.12
LFA_H	7/2/19	VR_MB	N/A	2-4SW	0	2	1128	0.75	18.5	9.17	N/A	N/A	0.11
LFA_H	7/2/19	VR_MB	N/A	2-4SW	0	1	1128	0.00	19.4	9.18	N/A	N/A	0.10
LFA_H	7/16/19	VR_MB	N/A	3NE	80	5	1121	3.50	20.7	7.81	N/A	N/A	0.24
LFA_H	7/16/19	VR_MB	N/A	3NE	80	4	1121	2.75	20.9	9.17	N/A	N/A	0.17
LFA_H	7/16/19	VR_MB	N/A	3NE	80	3	1121	2.00	21.0	9.28	0.62	96.8	0.16
LFA_H	7/16/19	VR_MB	N/A	3NE	80	2	1121	0.75	21.2	9.29	N/A	N/A	0.15
LFA_H	7/16/19	VR_MB	N/A	3NE	80	1	1121	0.00	21.1	9.29	N/A	N/A	0.15
LFA_H	7/30/19	VR_MB	80	2-4SW	0	5	1135	3.50	22.4	9.23	N/A	N/A	0.18
LFA_H	7/30/19	VR_MB	80	2-4SW	0	4	1135	2.75	22.7	9.30	N/A	N/A	0.16
LFA_H	7/30/19	VR_MB	80	2-4SW	0	3	1135	1.75	22.9	9.32	3.85	106.4	0.16
LFA_H	7/30/19	VR_MB	80	2-4SW	0	2	1135	1.00	23.0	9.32	N/A	N/A	0.15
LFA_H	7/30/19	VR_MB	80	2-4SW	0	1	1135	0.00	23.4	9.33	N/A	N/A	0.15
LFA_H	8/13/19	VR_MB	68	1NNE	0	5	1053	3.25	20.7	9.27	N/A	N/A	0.40
LFA_H	8/13/19	VR_MB	68	1NNE	0	4	1053	2.50	20.8	9.35	N/A	N/A	0.36
LFA_H	8/13/19	VR_MB	68	1NNE	0	3	1053	1.75	20.9	9.38	3.32	99.2	0.36
LFA_H	8/13/19	VR_MB	68	1NNE	0	2	1053	1.00	21.0	9.39	N/A	N/A	0.34
LFA_H	8/13/19	VR_MB	68	1NNE	0	1	1053	0.00	21.5	9.37	N/A	N/A	0.32
LFA_H	8/28/19	VR_MB	73	5NE	0	5	1109	3.50	22.1	9.04	N/A	N/A	0.07
LFA_H	8/28/19	VR_MB	73	5NE	0	4	1109	2.75	22.3	9.37	N/A	N/A	0.05
LFA_H	8/28/19	VR_MB	73	5NE	0	3	1109	1.75	22.4	9.42	5.50	103.0	0.05
LFA_H	8/28/19	VR_MB	73	5NE	0	2	1109	1.00	22.4	9.43	N/A	N/A	0.04
LFA_H	8/28/19	VR_MB	73	5NE	0	1	1109	0.00	22.9	9.44	N/A	N/A	0.04
LFA_H	9/10/19	VR_MB	56	4WSW	5	5	1112	3.25	18.5	8.77	N/A	N/A	0.11
LFA_H	9/10/19	VR_MB	56	4WSW	5	4	1112	2.75	18.6	8.92	N/A	N/A	0.11
LFA_H	9/10/19	VR_MB	56	4WSW	5	3	1112	1.75	18.6	8.94	6.37	105.3	0.11
LFA_H	9/10/19	VR_MB	56	4WSW	5	2	1112	1.00	18.7	8.94	N/A	N/A	0.11
LFA_H	9/10/19	VR_MB	56	4WSW	5	1	1112	0.00	18.8	8.95	N/A	N/A	0.10
LFA_H	9/24/19	VR_MB	60	2	0	5	1129	3.25	14.7	7.76	N/A	N/A	0.13
LFA_H	9/24/19	VR_MB	60	2	0	4	1129	2.50	14.9	7.89	N/A	N/A	0.13
LFA_H	9/24/19	VR_MB	60	2	0	3	1129	1.75	14.9	7.95	4.80	109.4	0.13
LFA_H	9/24/19	VR_MB	60	2	0	2	1129	1.00	14.9	7.98	N/A	N/A	0.12
LFA_H	9/24/19	VR_MB	60	2	0	1	1129	0.00	15.1	7.98	N/A	N/A	0.12
LFA_H	10/8/19	VR_MB	59	SMOKE	6ENE	5	1108	3.25	12.1	7.98	N/A	N/A	0.01
LFA_H	10/8/19	VR_MB	59	SMOKE	6ENE	4	1108	2.50	12.2	8.12	N/A	N/A	0.01

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	ug/L	Copies/mL	ug/L	Cylindrospermopsin	Notes:
1.90	25.55	2.10	227	N/A	N/A	N/A	N/A	N/A	
0.16	2.02	11.52	224	N/A	N/A	N/A	N/A	N/A	
0.14	1.66	11.58	231	N/A	N/A	N/A	N/A	N/A	
0.14	1.26	11.61	240	N/A	N/A	N/A	N/A	N/A	
0.09	0.99	11.57	245.7	ND	ND	ND	ND	ND	
0.11	1.31	11.28	58.6	N/A	N/A	N/A	N/A	N/A	
0.11	1.05	12.07	157.7	N/A	N/A	N/A	N/A	N/A	
0.09	0.81	11.95	186.3	N/A	N/A	N/A	N/A	N/A	
0.09	0.63	11.92	202.3	N/A	N/A	N/A	N/A	N/A	
0.05	0.52	11.81	212.5	ND	ND	ND	ND	ND	
0.24	2.18	10.37	-41	N/A	N/A	N/A	N/A	N/A	Chlorophyll moving lots
0.09	0.92	11.39	-18	N/A	N/A	N/A	N/A	N/A	Chlorophyll moving lots
0.13	0.84	10.93	-5	N/A	N/A	N/A	N/A	N/A	Chlorophyll moving lots
0.04	0.63	11.29	3	N/A	N/A	N/A	N/A	N/A	Chlorophyll moving lots
0.07	0.54	10.69	10	ND	ND	ND	ND	ND	Chlorophyll moving lots
0.25	2.15	11.67	-74	N/A	N/A	N/A	N/A	N/A	Curlyleaf on bottom with turions
0.06	1.22	11.21	-60	N/A	N/A	N/A	N/A	N/A	
0.10	0.73	11.30	-45	N/A	N/A	N/A	N/A	N/A	
0.10	0.46	11.22	-33	N/A	N/A	N/A	N/A	N/A	
0.06	0.38	11.36	-29	ND	ND	ND	ND	ND	
0.35	2.11	8.71	-130	N/A	N/A	N/A	N/A	N/A	No site odor
0.45	1.32	9.95	-105	N/A	N/A	N/A	N/A	N/A	No water odor
0.40	0.72	10.15	-85	N/A	N/A	N/A	N/A	N/A	Water color: green
0.36	0.62	10.37	-66	N/A	N/A	N/A	N/A	N/A	Constant boat traffic
0.17	0.46	10.71	-58	ND	ND	ND	ND	ND	
0.34	0.57	8.04	-54	N/A	N/A	N/A	N/A	N/A	
0.48	0.68	8.69	-18	N/A	N/A	N/A	N/A	N/A	
0.47	0.70	9.73	-4	N/A	N/A	N/A	N/A	N/A	
0.35	0.36	9.64	4	N/A	N/A	N/A	N/A	N/A	
0.35	0.31	9.98	7	12467	1.62	ND	ND	ND	
0.40	0.67	8.60	-14	N/A	N/A	N/A	N/A	N/A	
0.48	0.93	8.96	-5	N/A	N/A	N/A	N/A	N/A	
0.50	0.68	8.80	-3	N/A	N/A	N/A	N/A	N/A	
0.48	0.56	9.26	-1	N/A	N/A	N/A	N/A	N/A	
0.40	0.37	9.56	0	28664	3.62	ND	ND	ND	
1.11	0.80	6.79	-30	N/A	N/A	N/A	N/A	N/A	Algae on surface
2.30	0.89	8.75	-28	N/A	N/A	N/A	N/A	N/A	Some bubble patches
2.13	1.00	8.93	-22	N/A	N/A	N/A	N/A	N/A	2 boats passed during sample collection
2.15	0.97	9.35	-17	N/A	N/A	N/A	N/A	N/A	
2.40	0.87	10.01	-13	4912	ND	ND	ND	ND	
1.78	0.95	7.37	-156	N/A	N/A	N/A	N/A	N/A	
1.65	0.86	9.92	-64	N/A	N/A	N/A	N/A	N/A	
1.64	0.92	8.07	-98	N/A	N/A	N/A	N/A	N/A	
1.37	0.78	7.86	-87	N/A	N/A	N/A	N/A	N/A	
1.21	0.54	8.20	-72	5960	ND	3305	ND	ND	
0.80	0.67	9.29	-71	N/A	N/A	N/A	N/A	N/A	
0.74	0.67	10.14	-71	N/A	N/A	N/A	N/A	N/A	
0.65	0.64	9.92	-64	N/A	N/A	N/A	N/A	N/A	
0.48	0.52	9.93	-60	N/A	N/A	N/A	N/A	N/A	
0.54	0.50	9.95	-56	30516	0.12	ND	ND	ND	
0.75	1.80	6.03	-38	N/A	N/A	N/A	N/A	N/A	Green water, algae present
0.49	1.22	6.41	-37	N/A	N/A	N/A	N/A	N/A	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_H	10/8/19	VR,MB	59	SMOKE	ENE	3	1108	1.75	12.2	8.18	3.30	112.3	0.01
LFA_H	10/8/19	VR,MB	59	SMOKE	ENE	2	1108	1.00	12.2	8.20	N/A	N/A	0.02
LFA_H	10/8/19	VR,MB	59	SMOKE	ENE	1	1108	0.00	12.2	8.20	N/A	N/A	0.02
LFA_H	10/22/19	VR,MB	54	SSE @ 4	9%	5	1113	3.10	9.6	7.71	N/A	N/A	4.53
LFA_H	10/22/19	VR,MB	54	SSE @ 4	9%	4	1113	2.25	9.7	7.72	N/A	N/A	4.45
LFA_H	10/22/19	VR,MB	54	SSE @ 4	9%	3	1113	1.50	9.7	7.74	1.75	116.0	4.38
LFA_H	10/22/19	VR,MB	54	SSE @ 4	9%	2	1113	0.75	9.7	7.76	N/A	N/A	4.63
LFA_H	10/22/19	VR,MB	54	SSE @ 4	9%	1	1113	0.00	9.7	7.76	N/A	N/A	4.74
LFA_H	11/12/19	VR, MB	50	Calm	11%	5	1122	3.00	7.1	7.88	N/A	N/A	0.25
LFA_H	11/12/19	VR, MB	50	Calm	11%	4	1122	2.25	7.2	7.99	N/A	N/A	0.25
LFA_H	11/12/19	VR, MB	50	Calm	11%	3	1122	1.50	7.2	8.02	1.55	118.2	0.24
LFA_H	11/12/19	VR, MB	50	Calm	11%	2	1122	0.75	7.2	8.04	N/A	N/A	0.24
LFA_H	11/12/19	VR, MB	50	Calm	11%	1	1122	0.00	7.2	8.05	N/A	N/A	0.24
LFA_J	4/15/19	VR,JH	N/A	N/A	75	5	1209	4.00	8.8	6.95	N/A	N/A	0.33
LFA_J	4/15/19	VR,JH	N/A	N/A	75	4	1209	3.00	8.8	7.22	N/A	N/A	0.22
LFA_J	4/15/19	VR,JH	N/A	N/A	75	3	1209	2.00	8.9	7.22	2.36	116.9	0.15
LFA_J	4/15/19	VR,JH	N/A	N/A	75	2	1209	1.00	9.1	7.24	N/A	N/A	0.13
LFA_J	4/15/19	VR,JH	N/A	N/A	75	1	1209	0.00	9.3	7.26	N/A	N/A	0.12
LFA_J	4/16/19	VR,BH	N/A	N/A	20	5	1640	3.50	9.0	7.35	N/A	N/A	0.11
LFA_J	4/16/19	VR,BH	N/A	N/A	20	4	1640	2.63	9.5	7.34	N/A	N/A	0.14
LFA_J	4/16/19	VR,BH	N/A	N/A	20	3	1640	1.75	10.3	7.34	2.07	116.2	0.13
LFA_J	4/16/19	VR,BH	N/A	N/A	20	2	1640	0.88	10.2	7.33	N/A	N/A	0.12
LFA_J	4/16/19	VR,BH	N/A	N/A	20	1	1640	0.00	10.2	7.33	N/A	N/A	0.11
LFA_J	4/17/19	JR,JH	N/A	0	20	5	931	3.50	9.6	7.33	N/A	N/A	0.15
LFA_J	4/17/19	JR,JH	N/A	0	20	4	931	2.63	9.6	7.28	N/A	N/A	0.14
LFA_J	4/17/19	JR,JH	N/A	0	20	3	931	1.75	9.6	7.26	2.06	117.0	0.13
LFA_J	4/17/19	JR,JH	N/A	0	20	2	931	0.88	9.6	7.25	N/A	N/A	0.13
LFA_J	4/17/19	JR,JH	N/A	0	20	1	931	0.00	9.6	7.24	N/A	N/A	0.12
LFA_J	4/17/19	JR,JH	N/A	N/A	20	5	1534	3.50	10.6	7.33	N/A	N/A	0.10
LFA_J	4/17/19	JR,JH	N/A	N/A	20	4	1534	2.63	10.8	7.37	N/A	N/A	0.10
LFA_J	4/17/19	JR,JH	N/A	N/A	20	3	1534	1.75	10.9	7.36	2.70	117.0	0.10
LFA_J	4/17/19	JR,JH	N/A	N/A	20	2	1534	0.88	10.9	7.36	N/A	N/A	0.10
LFA_J	4/17/19	JR,JH	N/A	N/A	20	1	1534	0.00	10.9	7.35	N/A	N/A	0.10
LFA_J	4/18/19	VR,JH	38.6	N/A	20	5	926	3.50	10.3	7.38	N/A	N/A	0.14
LFA_J	4/18/19	VR,JH	38.6	N/A	4	4	926	2.63	10.4	7.34	N/A	N/A	0.14
LFA_J	4/18/19	VR,JH	38.6	N/A	3	3	926	1.75	10.4	7.32	2.15	117.8	0.14
LFA_J	4/18/19	VR,JH	38.6	N/A	2	2	926	0.88	10.4	7.30	N/A	N/A	0.13
LFA_J	4/18/19	VR,JH	38.6	N/A	1	1	926	0.00	10.4	7.29	N/A	N/A	0.13
LFA_J	4/18/19	VR,JH	38.6	N/A	1	5	1537	3.50	11.4	7.34	N/A	N/A	0.09
LFA_J	4/18/19	VR,JH	38.6	N/A	4	4	1537	2.63	11.7	7.31	N/A	N/A	0.12
LFA_J	4/18/19	VR,JH	38.6	N/A	3	3	1537	1.75	11.5	7.30	2.30	118.6	0.11
LFA_J	4/18/19	VR,JH	38.6	N/A	2	2	1537	0.88	11.8	7.36	N/A	N/A	0.10
LFA_J	4/18/19	VR,JH	38.6	N/A	1	1	1537	0.00	11.8	7.36	N/A	N/A	0.10
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	5	918	3.50	11.4	7.31	N/A	N/A	0.12
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	4	918	2.63	11.4	7.30	N/A	N/A	0.12
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	3	918	1.75	11.5	7.30	2.30	117.8	0.10
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	2	918	0.88	11.5	7.29	N/A	N/A	0.10
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	1	918	0.00	11.5	7.28	N/A	N/A	0.11
LFA_J	4/19/19	VR,JH	N/A	N/A	5	1538	3.50	12.4	7.38	N/A	N/A	N/A	0.09
LFA_J	4/19/19	VR,JH	N/A	N/A	4	1538	2.63	12.4	7.38	N/A	N/A	N/A	0.09
LFA_J	4/19/19	VR,JH	N/A	N/A	3	1538	1.75	12.5	7.38	4.53	118.6	0.09	

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	CyanoSpermopsin	Notes:
0.52	1.40	6.70	-34	N/A	N/A	N/A	N/A	N/A	
0.40	1.04	6.54	-28	N/A	N/A	N/A	N/A	N/A	
0.37	0.85	6.55	-27	ND	ND	ND	ND	ND	
0.17	1.10	6.43	-54	N/A	N/A	N/A	N/A	N/A	Ammonium sensor broken
0.18	1.22	6.69	-52	N/A	N/A	N/A	N/A	N/A	Algae seen on surface
0.20	1.10	6.61	-49	N/A	N/A	N/A	N/A	N/A	
0.11	0.67	6.77	-45	N/A	N/A	N/A	N/A	N/A	
0.11	0.65	6.76	-42	ND	ND	ND	ND	ND	
0.39	2.02	7.90	-45						
0.18	1.55	7.46	-44						
0.19	1.40	7.63	-40						
0.15	0.70	7.72	-36						
0.07	0.55	7.82	-34						
0.60	N/A	0.65	-59.6	N/A	N/A	N/A	N/A	N/A	
1.24	N/A	11.70	-23	N/A	N/A	N/A	N/A	N/A	
1.00	N/A	12.05	0	N/A	N/A	N/A	N/A	N/A	
0.48	N/A	12.34	17.2	N/A	N/A	N/A	N/A	N/A	
0.23	N/A	12.34	27.3	ND	ND	ND	ND	ND	
1.53	N/A	12.42	-1.7	N/A	N/A	N/A	N/A	N/A	
0.61	N/A	12.88	14.4	N/A	N/A	N/A	N/A	N/A	
0.53	N/A	12.67	22.6	N/A	N/A	N/A	N/A	N/A	
0.49	N/A	12.70	31.5	N/A	N/A	N/A	N/A	N/A	
0.26	N/A	12.66	38.8	N/A	N/A	N/A	N/A	N/A	
0.79	N/A	11.85	48.6	N/A	N/A	N/A	N/A	N/A	
0.65	N/A	11.96	41.5	N/A	N/A	N/A	N/A	N/A	
0.52	N/A	12.01	46.5	N/A	N/A	N/A	N/A	N/A	
0.53	N/A	12.01	51.8	N/A	N/A	N/A	N/A	N/A	
0.39	N/A	12.03	56.1	N/A	N/A	N/A	N/A	N/A	
1.10	N/A	12.35	-29	N/A	N/A	N/A	N/A	N/A	
0.76	N/A	12.57	-18	N/A	N/A	N/A	N/A	N/A	
0.64	N/A	12.63	-1.5	N/A	N/A	N/A	N/A	N/A	
0.45	N/A	12.66	8	N/A	N/A	N/A	N/A	N/A	
0.33	N/A	12.67	15.7	N/A	N/A	N/A	N/A	N/A	
0.75	N/A	11.70	9.1	N/A	N/A	N/A	N/A	N/A	
0.52	N/A	11.86	14.5	N/A	N/A	N/A	N/A	N/A	
0.46	N/A	11.90	21.8	N/A	N/A	N/A	N/A	N/A	
0.46	N/A	11.92	27.5	N/A	N/A	N/A	N/A	N/A	
0.42	N/A	11.93	32.4	N/A	N/A	N/A	N/A	N/A	
0.94	N/A	12.06	-6.3	N/A	N/A	N/A	N/A	N/A	
0.54	N/A	12.48	-7.5	N/A	N/A	N/A	N/A	N/A	
0.50	N/A	12.57	3.4	N/A	N/A	N/A	N/A	N/A	
0.34	N/A	12.59	14.3	N/A	N/A	N/A	N/A	N/A	
0.25	N/A	12.59	20.8	N/A	N/A	N/A	N/A	N/A	
0.65	N/A	11.56	28.9	N/A	N/A	N/A	N/A	N/A	
0.52	N/A	11.66	33.2	N/A	N/A	N/A	N/A	N/A	
0.52	N/A	11.71	41.2	N/A	N/A	N/A	N/A	N/A	
0.41	N/A	11.72	49.7	N/A	N/A	N/A	N/A	N/A	
0.41	N/A	11.73	53.9	N/A	N/A	N/A	N/A	N/A	
0.70	N/A	11.98	-40.6	N/A	N/A	N/A	N/A	N/A	
0.59	N/A	12.27	-32.1	N/A	N/A	N/A	N/A	N/A	
0.44	N/A	12.34	-18.1	N/A	N/A	N/A	N/A	N/A	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_1	4/19/19	VR,JH	N/A	N/A	70	2	15:58	0.88	12.6	7.39	N/A	N/A	0.09
LFA_1	4/19/19	VR,JH	N/A	N/A	70	1	15:58	0.00	12.6	7.38	N/A	N/A	0.09
LFA_1	4/22/19	VR,JH	35	2N	1	5	932	3.50	11.9	7.37	N/A	N/A	0.16
LFA_1	4/22/19	VR,JH	35	2N	1	4	932	2.63	11.9	7.32	N/A	N/A	0.14
LFA_1	4/22/19	VR,JH	35	2N	1	3	932	1.75	12.0	7.33	2.23	118.9	0.13
LFA_1	4/22/19	VR,JH	35	2N	1	3	932	0.88	12.1	7.32	N/A	N/A	0.13
LFA_1	4/22/19	VR,JH	35	2N	1	1	11:45	0.00	12.1	7.31	N/A	N/A	0.12
LFA_1	4/23/19	VR,JH	50	N/A	0	5	11:45	3.50	12.6	7.31	N/A	N/A	0.08
LFA_1	4/23/19	VR,JH	50	N/A	0	4	11:45	2.63	12.7	7.34	N/A	N/A	0.09
LFA_1	4/23/19	VR,JH	50	N/A	0	3	11:45	1.75	12.9	7.36	2.23	119.6	0.09
LFA_1	4/23/19	VR,JH	50	N/A	0	2	11:45	0.88	12.9	7.36	N/A	N/A	0.08
LFA_1	4/23/19	VR,JH	50	N/A	0	1	11:45	0.00	12.9	7.36	N/A	N/A	0.08
LFA_1	5/7/19	VR,JH	58	3	50	5	11:22	3.00	15.1	7.51	N/A	N/A	0.18
LFA_1	5/7/19	VR,JH	58	3	50	4	11:22	2.63	15.2	7.53	N/A	N/A	0.18
LFA_1	5/7/19	VR,JH	58	3	50	3	11:22	1.75	15.4	7.53	2.60	110.3	0.17
LFA_1	5/7/19	VR,JH	58	3	50	2	11:22	0.88	15.5	7.53	N/A	N/A	0.18
LFA_1	5/7/19	VR,JH	58	3	50	1	11:22	0.00	15.5	7.53	N/A	N/A	0.18
LFA_1	5/21/19	VR,KW	38	15SSW	50	5	12:00	3.50	12.4	7.80	N/A	N/A	0.09
LFA_1	5/21/19	VR,KW	38	15SSW	50	4	12:00	2.63	12.5	7.91	N/A	N/A	0.09
LFA_1	5/21/19	VR,KW	38	15SSW	50	3	12:00	1.75	12.5	7.95	-4.62	100.3	0.09
LFA_1	5/21/19	VR,KW	38	15SSW	50	2	12:00	0.88	12.6	7.98	N/A	N/A	0.09
LFA_1	5/21/19	VR,KW	38	15SSW	50	1	12:00	0.00	12.6	7.96	N/A	N/A	0.09
LFA_1	6/4/19	VR,JW	64	7NN	5	5	11:45	3.50	16.9	7.04	N/A	N/A	0.09
LFA_1	6/4/19	VR,JW	64	7NN	5	4	11:45	2.63	17.2	7.47	N/A	N/A	0.09
LFA_1	6/4/19	VR,JW	64	7NN	5	3	11:45	1.75	17.5	7.57	3.76	108.1	0.10
LFA_1	6/4/19	VR,JW	64	7NN	5	2	11:45	0.88	17.7	7.59	N/A	N/A	0.09
LFA_1	6/4/19	VR,JW	64	7NN	5	1	11:45	0.00	17.9	7.61	N/A	N/A	0.09
LFA_1	6/18/19	VR,MB	67	2NE	1	5	11:38	3.50	20.0	7.81	N/A	N/A	0.09
LFA_1	6/18/19	VR,MB	67	2NE	1	4	11:38	2.63	20.5	7.97	N/A	N/A	0.09
LFA_1	6/18/19	VR,MB	67	2NE	1	3	11:38	1.75	20.6	7.97	2.30	99.4	0.09
LFA_1	6/18/19	VR,MB	67	2NE	1	2	11:38	0.88	20.7	7.97	N/A	N/A	0.09
LFA_1	6/18/19	VR,MB	67	2NE	1	1	11:38	0.00	20.9	7.96	N/A	N/A	0.09
LFA_1	6/25/19	VR,MB	68	7SSW	1	5	11:52	3.50	19.8	8.90	N/A	N/A	0.10
LFA_1	6/25/19	VR,MB	68	7SSW	1	4	11:52	2.63	20.0	9.10	N/A	N/A	0.09
LFA_1	6/25/19	VR,MB	68	7SSW	1	3	11:52	1.75	20.2	9.09	2.75	98.6	0.09
LFA_1	6/25/19	VR,MB	68	7SSW	1	2	11:52	0.88	20.2	9.08	N/A	N/A	0.08
LFA_1	6/25/19	VR,MB	68	7SSW	1	1	11:52	0.00	20.2	9.08	N/A	N/A	0.08
LFA_1	7/12/19	VR,MB	N/A	2-4SW	0	5	11:49	3.50	18.6	9.00	N/A	N/A	0.14
LFA_1	7/12/19	VR,MB	N/A	2-4SW	0	4	11:49	2.75	19.0	9.17	N/A	N/A	0.11
LFA_1	7/12/19	VR,MB	N/A	2-4SW	0	3	11:49	1.75	19.0	9.18	2.30	97.1	0.10
LFA_1	7/12/19	VR,MB	N/A	2-4SW	0	2	11:49	0.75	19.0	9.18	N/A	N/A	0.10
LFA_1	7/12/19	VR,MB	N/A	2-4SW	0	1	11:49	0.00	19.4	9.19	N/A	N/A	0.09
LFA_1	7/16/19	VR,MB	N/A	3NE	80	5	11:40	3.00	21.2	9.22	N/A	N/A	0.13
LFA_1	7/16/19	VR,MB	N/A	3NE	80	4	11:40	2.25	21.5	9.27	N/A	N/A	0.15
LFA_1	7/16/19	VR,MB	N/A	3NE	80	3	11:40	1.50	21.5	9.27	0.75	100.0	0.12
LFA_1	7/16/19	VR,MB	N/A	3NE	80	2	11:40	0.75	21.5	9.28	N/A	N/A	0.12
LFA_1	7/16/19	VR,MB	N/A	3NE	80	1	11:40	0.00	21.7	9.28	N/A	N/A	0.12
LFA_1	7/30/19	VR,MB	80	2-4SW	0	5	11:57	3.50	22.9	9.19	N/A	N/A	0.13
LFA_1	7/30/19	VR,MB	80	2-4SW	0	4	11:57	2.75	23.1	9.26	N/A	N/A	0.13
LFA_1	7/30/19	VR,MB	80	2-4SW	0	3	11:57	1.75	23.3	9.27	3.70	110.2	0.13
LFA_1	7/30/19	VR,MB	80	2-4SW	0	2	11:57	1.00	23.2	9.26	N/A	N/A	0.13
LFA_1	7/30/19	VR,MB	80	2-4SW	0	1	11:57	0.00	23.2	9.26	N/A	N/A	0.13

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	ug/L	Copies/mL	ug/L	Cylindrospermopsin	Notes:
0.43	N/A	12.36	-4.5	N/A	N/A	N/A	N/A	N/A	
0.27	N/A	12.36	3.5	N/A	N/A	N/A	N/A	N/A	
0.55	N/A	10.90	2.8	N/A	N/A	N/A	N/A	N/A	
0.04	N/A	11.05	9.3	N/A	N/A	N/A	N/A	N/A	
0.33	N/A	11.11	17.5	N/A	N/A	N/A	N/A	N/A	
0.30	N/A	11.12	23.8	N/A	N/A	N/A	N/A	N/A	
0.33	N/A	11.13	29.1	N/A	N/A	N/A	N/A	N/A	
0.54	N/A	10.98	-16.2	N/A	N/A	N/A	N/A	N/A	
0.38	N/A	11.26	-7.1	N/A	N/A	N/A	N/A	N/A	
0.34	N/A	11.32	2.7	N/A	N/A	N/A	N/A	N/A	
0.28	N/A	11.32	12.9	N/A	N/A	N/A	N/A	N/A	
0.23	N/A	11.32	18.2	ND	ND	ND	ND	ND	
0.38	6.48	10.72	25.3	N/A	N/A	N/A	N/A	N/A	
0.33	5.22	10.72	28.2	N/A	N/A	N/A	N/A	N/A	
0.29	4.57	10.67	34.9	N/A	N/A	N/A	N/A	N/A	
0.26	3.89	10.66	40.9	N/A	N/A	N/A	N/A	N/A	
0.20	3.35	10.72	48	ND	ND	ND	ND	ND	
0.50	6.53	10.90	-27.1	N/A	N/A	N/A	N/A	N/A	
0.35	6.97	11.34	-3.4	N/A	N/A	N/A	N/A	N/A	
0.33	6.19	11.38	10.8	N/A	N/A	N/A	N/A	N/A	
0.34	5.86	11.45	27.6	N/A	N/A	N/A	N/A	N/A	
0.30	5.23	11.45	35.7	ND	ND	ND	ND	ND	
0.84	11.29	9.32	217.2	N/A	N/A	N/A	N/A	N/A	
0.57	8.43	10.96	224	N/A	N/A	N/A	N/A	N/A	
0.55	7.48	11.22	241	N/A	N/A	N/A	N/A	N/A	
0.50	6.95	11.29	250	N/A	N/A	N/A	N/A	N/A	
0.34	3.54	11.35	258.2	ND	ND	ND	ND	ND	
0.29	4.55	10.65	235.8	N/A	N/A	N/A	N/A	N/A	
0.21	3.18	11.10	241.6	N/A	N/A	N/A	N/A	N/A	
0.28	3.25	11.14	248.7	N/A	N/A	N/A	N/A	N/A	
0.23	2.64	11.13	252.3	N/A	N/A	N/A	N/A	N/A	
0.17	1.04	11.11	255.8	ND	ND	ND	ND	ND	
0.32	4.65	8.46	-67	N/A	N/A	N/A	N/A	N/A	
0.28	3.79	9.97	-70	N/A	N/A	N/A	N/A	N/A	
0.30	3.35	9.91	-46	N/A	N/A	N/A	N/A	N/A	
0.22	2.90	9.55	-26	N/A	N/A	N/A	N/A	N/A	
0.22	2.38	10.67	-9	ND	ND	ND	ND	ND	culvert
0.32	2.54	9.67	-92	N/A	N/A	N/A	N/A	N/A	
0.24	1.59	10.31	-81	N/A	N/A	N/A	N/A	N/A	
0.33	1.70	10.89	-61	N/A	N/A	N/A	N/A	N/A	
0.23	1.42	10.96	-51	N/A	N/A	N/A	N/A	N/A	
0.22	0.97	10.48	-43	ND	ND	5668	ND	ND	Non flowing culvert
1.04	1.94	8.31	-55	N/A	N/A	N/A	N/A	N/A	No site odor
1.78	3.24	9.58	-51	N/A	N/A	N/A	N/A	N/A	No water odor
0.97	1.34	9.94	-40	N/A	N/A	N/A	N/A	N/A	Water color: green
0.82	1.16	10.02	-32	N/A	N/A	N/A	N/A	N/A	Inlet/culvert, not flowing
0.82	1.25	9.96	-28	ND	ND	ND	ND	ND	
0.60	0.60	7.50	-27	N/A	N/A	N/A	N/A	N/A	Non flowing culvert
0.68	0.68	8.27	-14	N/A	N/A	N/A	N/A	N/A	
0.70	0.68	8.76	-3	N/A	N/A	N/A	N/A	N/A	
0.60	0.53	8.82	4	N/A	N/A	N/A	N/A	N/A	
0.47	0.42	8.97	10	27480	0.63	ND	ND	ND	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)	
LFA_J	8/13/19	VR,MB	68	1NNE	0	5	1117	3.50	20.6	9.23	N/A	N/A	0.34	
LFA_J	8/13/19	VR,MB	68	1NNE	0	4	1117	2.75	21.0	9.39	N/A	N/A	0.34	
LFA_J	8/13/19	VR,MB	68	1NNE	0	3	1117	1.75	21.1	9.39	3.56	101.9	0.32	
LFA_J	8/13/19	VR,MB	68	1NNE	0	2	1117	1.00	21.1	9.40	N/A	N/A	0.30	
LFA_J	8/13/19	VR,MB	68	1NNE	0	1	1117	0.00	21.3	9.39	N/A	N/A	0.29	
LFA_J	8/28/19	VR,MB	73	5NE	0	5	1128	3.50	22.0	9.02	N/A	N/A	0.05	
LFA_J	8/28/19	VR,MB	73	5NE	0	4	1128	2.75	22.3	9.27	N/A	N/A	0.04	
LFA_J	8/28/19	VR,MB	73	5NE	0	3	1128	1.75	22.5	9.36	5.01	106.1	0.04	
LFA_J	8/28/19	VR,MB	73	5NE	0	2	1128	1.00	22.5	9.36	N/A	N/A	0.04	
LFA_J	8/28/19	VR,MB	73	5NE	0	1	1128	0.00	23.3	9.37	N/A	N/A	0.04	
LFA_J	9/10/19	VR,MB	56	4WSW	5	5	1135	3.50	18.3	7.95	N/A	N/A	0.17	
LFA_J	9/10/19	VR,MB	56	4WSW	5	4	1135	2.75	18.6	8.31	N/A	N/A	0.15	
LFA_J	9/10/19	VR,MB	56	4WSW	5	3	1135	1.75	18.7	8.51	6.50	108.9	0.13	
LFA_J	9/10/19	VR,MB	56	4WSW	5	2	1135	1.00	18.9	8.54	N/A	N/A	0.11	
LFA_J	9/10/19	VR,MB	56	4WSW	5	1	1135	0.00	19.3	8.52	N/A	N/A	0.11	
LFA_J	9/24/19	VR,MB	60	2	0	5	1148	3.50	14.5	7.55	N/A	N/A	0.18	
LFA_J	9/24/19	VR,MB	60	2	0	4	1148	2.75	14.8	7.60	N/A	N/A	0.18	
LFA_J	9/24/19	VR,MB	60	2	0	3	1148	1.75	14.8	7.70	6.10	113.5	0.18	
LFA_J	9/24/19	VR,MB	60	2	0	2	1148	1.00	14.8	7.74	N/A	N/A	0.17	
LFA_J	9/24/19	VR,MB	60	2	0	1	1148	0.00	16.0	7.76	N/A	N/A	0.17	
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	5	1127	3.50	11.8	7.81	N/A	N/A	0.10	
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	4	1127	2.75	12.0	7.89	N/A	N/A	0.11	
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	3	1127	1.75	12.2	7.93	4.75	117.7	0.11	
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	2	1127	1.00	12.2	7.95	N/A	N/A	0.11	
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	1	1127	0.00	12.4	7.97	N/A	N/A	0.10	
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	5	1130	3.25	9.5	7.64	N/A	N/A	14.41	
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	4	1130	2.25	9.6	7.64	N/A	N/A	13.99	
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	3	1130	1.50	9.7	7.64	1.70	121.9	14.07	
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	2	1130	0.75	9.6	7.65	N/A	N/A	14.22	
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	1	1130	0.00	9.7	7.65	N/A	N/A	14.48	
LFA_J	11/12/19	VR, MB	50	Calm	11%	5	1133	3.10	6.8	7.81	N/A	N/A	0.24	
LFA_J	11/12/19	VR, MB	50	Calm	11%	4	1133	2.25	7.0	7.84	N/A	N/A	0.24	
LFA_J	11/12/19	VR, MB	50	Calm	11%	3	1133	1.50	7.0	7.85	1.53	126.2	0.24	
LFA_J	11/12/19	VR, MB	50	Calm	11%	2	1133	0.75	7.0	7.86	N/A	N/A	0.24	
LFA_J	11/12/19	VR, MB	50	Calm	11%	1	1133	0.00	7.0	7.86	N/A	N/A	0.24	
LFA_J	4/15/19	VR,JH	N/A	N/A	75	5	1227	3.00	9.0	7.17	2.16	115.6	0.14	
LFA_J	4/15/19	VR,JH	N/A	N/A	75	4	1227	2.25	9.0	7.22	2.16	115.6	0.13	
LFA_J	4/15/19	VR,JH	N/A	N/A	75	3	1227	1.50	9.2	7.25	2.16	115.6	0.12	
LFA_J	4/15/19	VR,JH	N/A	N/A	75	2	1227	0.75	9.3	7.25	2.16	115.6	0.11	
LFA_J	4/16/19	VR,BH	N/A	N/A	75	1	1227	0.00	9.4	7.26	2.16	115.6	0.11	
LFA_J	4/16/19	VR,BH	N/A	N/A	20	5	1649	2.50	10.0	7.30	2.10	116.2	0.11	
LFA_J	4/16/19	VR,BH	N/A	N/A	20	4	1649	1.75	10.1	7.29	2.10	116.2	0.11	
LFA_J	4/16/19	VR,BH	N/A	N/A	20	3	1649	1.25	10.4	7.29	2.10	116.2	0.11	
LFA_J	4/16/19	VR,BH	N/A	N/A	20	2	1649	0.75	10.4	7.29	2.10	116.2	0.10	
LFA_J	4/16/19	VR,BH	N/A	N/A	20	1	1649	0.00	10.7	7.30	2.10	116.2	0.10	
LFA_J	4/17/19	JR,JH	N/A	N/A	0	20	5	942	2.50	9.5	7.31	2.27	116.6	0.13
LFA_J	4/17/19	JR,JH	N/A	N/A	0	20	4	942	1.75	9.5	7.25	2.27	116.6	0.13
LFA_J	4/17/19	JR,JH	N/A	N/A	0	20	3	942	1.25	9.6	7.26	2.27	116.6	0.12
LFA_J	4/17/19	JR,JH	N/A	N/A	0	20	2	942	0.75	9.6	7.25	2.27	116.6	0.12
LFA_J	4/17/19	JR,JH	N/A	N/A	0	20	1	942	0.00	9.7	7.24	2.27	116.6	0.11
LFA_J	4/17/19	JR,JH	N/A	N/A	20	5	1542	2.50	10.7	7.43	2.55	116.5	0.09	

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
1.06	1.25	7.84	-38	N/A	N/A	N/A	N/A	N/A	non-flowing culvert
1.02	1.18	8.54	-35	N/A	N/A	N/A	N/A	N/A	paint looking algae
0.85	0.86	8.93	-25	N/A	N/A	N/A	N/A	N/A	
0.92	0.80	9.02	-25	N/A	N/A	N/A	N/A	N/A	
0.67	0.63	9.45	-21	165994	18.07	ND	ND	ND	
1.76	1.25	6.84	-40	N/A	N/A	N/A	N/A	N/A	Thick green paint algae
2.40	1.20	8.30	-34	N/A	N/A	N/A	N/A	N/A	
2.40	1.03	8.90	-26	N/A	N/A	N/A	N/A	N/A	
2.22	0.88	8.87	-16	N/A	N/A	N/A	N/A	N/A	
2.06	0.80	9.15	-15	3105	ND	9626	0.16	ND	
1.77	0.80	6.03	-78	N/A	N/A	N/A	N/A	N/A	
2.04	0.95	7.29	-73	N/A	N/A	N/A	N/A	N/A	
2.06	0.85	7.65	-63	N/A	N/A	N/A	N/A	N/A	
1.63	0.82	7.50	-56	N/A	N/A	N/A	N/A	N/A	
1.70	0.73	8.10	-48	10202	0.11	5606	ND	ND	
1.50	0.76	8.33	-124	N/A	N/A	N/A	N/A	N/A	Easier to field filter
1.51	0.92	10.17	-115	N/A	N/A	N/A	N/A	N/A	
1.36	0.78	9.72	-104	N/A	N/A	N/A	N/A	N/A	Green, paint-like algae at site
1.16	0.78	9.73	-95	N/A	N/A	N/A	N/A	N/A	
0.91	0.70	9.79	-90	40852	0.16	8679	0.33	ND	
1.30	1.95	5.96	-48	N/A	N/A	N/A	N/A	N/A	Green water with paint like algae
1.30	2.43	6.27	-45	N/A	N/A	N/A	N/A	N/A	
0.87	1.90	6.45	-42	N/A	N/A	N/A	N/A	N/A	
0.70	1.40	6.44	-36	N/A	N/A	N/A	N/A	N/A	
0.58	1.20	6.27	-30	ND	ND	ND	ND	ND	
0.30	1.87	5.68	-37	N/A	N/A	N/A	N/A	N/A	Ammonium sensor broken
0.30	2.05	6.53	-38	N/A	N/A	N/A	N/A	N/A	Algae seen on surface
0.31	1.65	6.51	-36	N/A	N/A	N/A	N/A	N/A	
0.22	1.42	6.60	-33	N/A	N/A	N/A	N/A	N/A	
0.25	1.50	6.69	-31	ND	ND	ND	ND	ND	
0.15	1.70	7.50	-57						
0.18	1.80	7.54	-47						
0.13	1.02	7.54	-41						
0.16	1.40	7.57	-35						
0.14	1.02	7.68	-31						
1.41	N/A	12.08	-34.4	N/A	N/A	N/A	N/A	N/A	
0.81	N/A	12.36	-17.6	N/A	N/A	N/A	N/A	N/A	
0.75	N/A	12.33	2.5	N/A	N/A	N/A	N/A	N/A	
0.28	N/A	12.33	16.2	N/A	N/A	N/A	N/A	N/A	
0.10	N/A	12.34	26	ND	ND	ND	ND	ND	
0.98	N/A	12.24	5.1	N/A	N/A	N/A	N/A	N/A	
0.65	N/A	12.41	8.4	N/A	N/A	N/A	N/A	N/A	
0.53	N/A	12.35	19.9	N/A	N/A	N/A	N/A	N/A	
0.43	N/A	12.41	27.9	N/A	N/A	N/A	N/A	N/A	
0.18	N/A	12.43	36	N/A	N/A	N/A	N/A	N/A	
0.90	N/A	11.71	-0.5	N/A	N/A	N/A	N/A	N/A	
0.53	N/A	11.82	7	N/A	N/A	N/A	N/A	N/A	
0.46	N/A	11.85	17.1	N/A	N/A	N/A	N/A	N/A	
0.26	N/A	11.86	26.3	N/A	N/A	N/A	N/A	N/A	
0.20	N/A	11.88	32.7	N/A	N/A	N/A	N/A	N/A	
0.72	N/A	12.59	30.5	N/A	N/A	N/A	N/A	N/A	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_J	4/17/19	VR,JH	N/A	N/A	20	4	1542	1.75	10.8	7.39	2.55	116.5	0.09
LFA_J	4/17/19	VR,JH	N/A	N/A	20	3	1542	1.25	10.9	7.39	2.55	116.5	0.10
LFA_J	4/17/19	VR,JH	N/A	N/A	20	2	1542	0.75	11.0	7.34	2.55	116.5	0.10
LFA_J	4/17/19	VR,JH	N/A	N/A	20	1	1542	0.00	11.2	7.33	2.55	116.5	0.10
LFA_J	4/18/19	VR,JH	38.6	N/A	1	5	935	2.50	10.3	7.42	2.22	117.3	0.13
LFA_J	4/18/19	VR,JH	38.6	N/A	1	4	935	1.75	10.3	7.35	2.22	117.3	0.13
LFA_J	4/18/19	VR,JH	38.6	N/A	1	3	935	1.25	10.4	7.32	2.22	117.3	0.13
LFA_J	4/18/19	VR,JH	38.6	N/A	1	2	935	0.75	10.6	7.30	2.22	117.3	0.12
LFA_J	4/18/19	VR,JH	38.6	N/A	1	1	935	0.00	10.6	7.29	2.22	117.3	0.12
LFA_J	4/18/19	VR,JH	N/A	N/A	1	5	1548	4.00	11.7	7.45	3.38	116.9	0.09
LFA_J	4/18/19	VR,JH	N/A	N/A	1	4	1548	3.00	11.7	7.41	3.38	116.9	0.10
LFA_J	4/18/19	VR,JH	N/A	N/A	1	3	1548	2.00	11.8	7.38	3.38	116.9	0.10
LFA_J	4/18/19	VR,JH	N/A	N/A	1	2	1548	1.00	12.0	7.37	3.38	116.9	0.10
LFA_J	4/18/19	VR,JH	N/A	N/A	1	1	1548	0.00	12.2	7.36	3.38	116.9	0.10
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	5	928	2.50	11.3	7.38	2.30	117.6	0.12
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	4	928	1.75	11.4	7.35	2.30	117.6	0.11
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	3	928	1.25	11.4	7.33	2.30	117.6	0.11
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	2	928	0.75	11.5	7.31	2.30	117.6	0.11
LFA_J	4/19/19	VR,JH	32	2SSW	N/A	1	928	0.00	11.5	7.30	2.30	117.6	0.11
LFA_J	4/19/19	VR,JH	N/A	N/A	70	5	1547	2.50	12.4	7.40	3.94	117.5	0.09
LFA_J	4/19/19	VR,JH	N/A	N/A	70	4	1547	1.75	12.4	7.41	3.94	117.5	0.09
LFA_J	4/19/19	VR,JH	N/A	N/A	70	3	1547	1.25	12.6	7.40	3.94	117.5	0.10
LFA_J	4/19/19	VR,JH	N/A	N/A	70	2	1547	0.75	12.6	7.40	3.94	117.5	0.10
LFA_J	4/19/19	VR,JH	N/A	N/A	70	1	1547	0.00	12.7	7.38	3.94	117.5	0.11
LFA_J	4/19/19	VR,JH	35	2N	1	5	941	2.50	11.8	7.40	2.14	117.7	0.14
LFA_J	4/19/19	VR,JH	35	2N	1	4	941	1.75	11.8	7.37	2.14	117.7	0.14
LFA_J	4/19/19	VR,JH	35	2N	1	3	941	1.25	11.9	7.36	2.14	117.7	0.13
LFA_J	4/19/19	VR,JH	35	2N	1	3	941	0.75	12.0	7.34	2.14	117.7	0.12
LFA_J	4/19/19	VR,JH	35	2N	1	1	941	0.00	12.0	7.34	2.14	117.7	0.12
LFA_J	4/22/19	VR,JH	35	N/A	1	5	1159	2.50	12.7	7.73	2.23	118.8	0.08
LFA_J	4/22/19	VR,JH	35	N/A	1	4	1159	1.75	12.8	7.35	2.23	118.8	0.08
LFA_J	4/22/19	VR,JH	35	N/A	1	3	1159	1.25	12.9	7.34	2.23	118.8	0.09
LFA_J	4/22/19	VR,JH	35	N/A	1	2	1159	0.75	13.1	7.34	2.23	118.8	0.09
LFA_J	4/22/19	VR,JH	35	N/A	1	1	1159	0.00	13.4	7.34	2.23	118.8	0.09
LFA_J	4/23/19	VR,JH	50	N/A	0	5	1159	2.50	12.7	7.73	2.23	118.8	0.19
LFA_J	4/23/19	VR,JH	50	N/A	0	4	1159	1.75	12.8	7.35	2.21	108.4	0.20
LFA_J	4/23/19	VR,JH	50	N/A	0	3	1159	1.25	15.1	7.57	2.21	108.4	0.19
LFA_J	4/23/19	VR,JH	50	N/A	0	2	1143	0.75	15.2	7.56	2.21	108.4	0.19
LFA_J	4/23/19	VR,JH	50	N/A	0	1	1143	0.00	15.5	7.54	2.21	108.4	0.19
LFA_J	5/7/19	VR,JH	58	3	50	5	1143	2.50	14.8	7.58	-5.00	100.0	0.09
LFA_J	5/7/19	VR,JH	58	3	50	4	1143	1.75	15.0	7.76	-5.00	100.0	0.09
LFA_J	5/7/19	VR,JH	58	3	50	3	1143	1.25	15.1	7.57	-5.00	100.0	0.09
LFA_J	5/7/19	VR,JH	58	3	50	2	1143	0.75	12.4	8.00	-5.00	100.0	0.09
LFA_J	5/7/19	VR,JH	58	3	50	1	1215	0.00	12.5	7.96	-5.00	100.0	0.09
LFA_J	5/21/19	VR,KW	38	15SSW	50	5	1203	2.50	17.0	7.91	2.97	105.9	0.10
LFA_J	5/21/19	VR,KW	38	15SSW	50	4	1203	1.75	17.2	7.89	2.97	105.9	0.11
LFA_J	5/21/19	VR,KW	38	15SSW	50	3	1203	1.25	17.4	7.75	2.97	105.9	0.10
LFA_J	5/21/19	VR,KW	38	15SSW	50	2	1203	0.75	17.6	7.58	2.97	105.9	0.10
LFA_J	5/21/19	VR,KW	38	15SSW	50	1	1203	0.00	18.0	7.63	2.97	105.9	0.10
LFA_J	6/4/19	VR,JW	64	7NN	5	5	1203	2.50	17.0	7.91	2.97	105.9	0.10
LFA_J	6/4/19	VR,JW	64	7NN	5	4	1203	1.75	17.2	7.89	2.97	105.9	0.11
LFA_J	6/4/19	VR,JW	64	7NN	5	3	1203	1.25	17.4	7.75	2.97	105.9	0.10
LFA_J	6/4/19	VR,JW	64	7NN	5	2	1203	0.75	17.6	7.58	2.97	105.9	0.10
LFA_J	6/4/19	VR,JW	64	7NN	5	1	1203	0.00	18.0	7.63	2.97	105.9	0.10
LFA_J	6/18/19	VR,MB	67	2NE	1	5	1157	2.50	20.1	7.94	2.37	98.2	0.10
LFA_J	6/18/19	VR,MB	67	2NE	1	4	1157	1.75	20.2	8.06	2.37	98.2	0.10
LFA_J	6/18/19	VR,MB	67	2NE	1	3	1157	1.25	20.4	8.09	2.37	98.2	0.10

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.54	N/A	12.52	36.8	N/A	N/A	N/A	N/A	N/A	
0.41	N/A	12.46	42.7	N/A	N/A	N/A	N/A	N/A	
0.22	N/A	12.40	47.3	N/A	N/A	N/A	N/A	N/A	
0.16	N/A	12.38	51.3	N/A	N/A	N/A	N/A	N/A	
0.63	N/A	11.57	29.5	N/A	N/A	N/A	N/A	N/A	
0.52	N/A	11.63	31.3	N/A	N/A	N/A	N/A	N/A	
0.46	N/A	11.72	35.5	N/A	N/A	N/A	N/A	N/A	
0.34	N/A	11.80	40.9	N/A	N/A	N/A	N/A	N/A	
0.27	N/A	11.82	44.6	N/A	N/A	N/A	N/A	N/A	
0.46	N/A	12.34	29.6	N/A	N/A	N/A	N/A	N/A	
0.45	N/A	12.43	34.2	N/A	N/A	N/A	N/A	N/A	
0.34	N/A	12.38	40.1	N/A	N/A	N/A	N/A	N/A	
0.22	N/A	12.33	44.4	N/A	N/A	N/A	N/A	N/A	
0.10	N/A	12.26	47.8	N/A	N/A	N/A	N/A	N/A	
0.62	N/A	11.48	59.8	N/A	N/A	N/A	N/A	N/A	
0.41	N/A	11.62	61.3	N/A	N/A	N/A	N/A	N/A	
0.40	N/A	11.63	64.4	N/A	N/A	N/A	N/A	N/A	
0.36	N/A	11.63	67.2	N/A	N/A	N/A	N/A	N/A	
0.36	N/A	11.64	69.5	N/A	N/A	N/A	N/A	N/A	
0.65	N/A	12.16	-15.8	N/A	N/A	N/A	N/A	N/A	
0.50	N/A	12.21	-14.7	N/A	N/A	N/A	N/A	N/A	
0.40	N/A	12.21	-4.5	N/A	N/A	N/A	N/A	N/A	
0.36	N/A	12.24	3.1	N/A	N/A	N/A	N/A	N/A	
0.25	N/A	12.23	11.3	N/A	N/A	N/A	N/A	N/A	
0.33	N/A	11.02	28.8	N/A	N/A	N/A	N/A	N/A	
0.32	N/A	11.10	30.4	N/A	N/A	N/A	N/A	N/A	
0.26	N/A	11.16	34.9	N/A	N/A	N/A	N/A	N/A	
0.26	N/A	11.17	38.6	N/A	N/A	N/A	N/A	N/A	
0.19	N/A	11.18	42.3	N/A	N/A	N/A	N/A	N/A	
0.54	N/A	11.64	8.5	N/A	N/A	N/A	N/A	N/A	
0.27	N/A	11.25	14.7	N/A	N/A	N/A	N/A	N/A	
0.20	N/A	11.21	21.3	N/A	N/A	N/A	N/A	N/A	
0.12	N/A	11.25	26.9	N/A	N/A	N/A	N/A	N/A	
0.08	N/A	11.27	30.9	ND	ND	ND	ND	ND	
0.40	6.34	11.11	10.5	N/A	N/A	N/A	N/A	N/A	
0.18	3.60	10.98	9.9	N/A	N/A	N/A	N/A	N/A	
0.14	2.70	10.85	19.3	N/A	N/A	N/A	N/A	N/A	
0.14	2.10	10.77	26.4	N/A	N/A	N/A	N/A	N/A	
0.11	1.65	10.68	31.5	ND	ND	ND	ND	ND	
0.27	4.68	11.57	33.8	N/A	N/A	N/A	N/A	N/A	
0.22	3.92	11.53	38.4	N/A	N/A	N/A	N/A	N/A	
0.18	3.59	11.50	44.9	N/A	N/A	N/A	N/A	N/A	
0.16	2.12	11.17	240.3	N/A	N/A	N/A	N/A	N/A	
0.14	1.46	11.27	246.1	ND	ND	ND	ND	ND	
0.36	5.02	12.11	167	N/A	N/A	N/A	N/A	N/A	
0.23	2.89	12.05	197	N/A	N/A	N/A	N/A	N/A	
0.21	2.36	11.44	230	N/A	N/A	N/A	N/A	N/A	
0.18	2.93	11.50	50.9	N/A	N/A	N/A	N/A	N/A	
0.14	2.87	11.50	59.1	ND	ND	ND	ND	ND	
0.27	4.68	12.11	167	N/A	N/A	N/A	N/A	N/A	
0.22	3.92	12.05	197	N/A	N/A	N/A	N/A	N/A	
0.18	3.59	11.50	44.9	N/A	N/A	N/A	N/A	N/A	
0.16	2.12	11.17	240.3	N/A	N/A	N/A	N/A	N/A	
0.14	1.46	11.27	246.1	ND	ND	ND	ND	ND	
0.42	3.13	11.44	95.4	N/A	N/A	N/A	N/A	N/A	
0.15	1.98	11.50	150.8	N/A	N/A	N/A	N/A	N/A	
0.12	1.72	11.50	187.4	N/A	N/A	N/A	N/A	N/A	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFA_J	6/18/19	VR,MB	67	2NE	1	2	11:57	0.75	20.6	7.97	2.37	98.2	0.10
LFA_J	6/18/19	VR,MB	67	2NE	1	1	11:57	0.00	20.8	8.02	2.37	98.2	0.10
LFA_J	6/25/2019	VR,MB	68	TSSW	1	5	12:07	2.50	19.8	8.84	N/A	N/A	0.09
LFA_J	6/25/2019	VR,MB	68	TSSW	1	4	12:07	1.88	20.0	9.06	N/A	N/A	0.10
LFA_J	6/25/2019	VR,MB	68	TSSW	1	3	12:07	1.25	20.0	9.02	2.42	97.7	0.09
LFA_J	6/25/2019	VR,MB	68	TSSW	1	2	12:07	0.63	20.2	9.03	N/A	N/A	0.09
LFA_J	6/25/2019	VR,MB	68	TSSW	1	1	12:07	0.00	20.4	9.06	N/A	N/A	0.09
LFA_J	7/2/19	VR,MB	N/A	24SW	0	5	12:05	2.75	18.6	9.08	N/A	N/A	0.12
LFA_J	7/2/19	VR,MB	N/A	24SW	0	4	12:05	2.25	18.7	9.15	N/A	N/A	0.12
LFA_J	7/2/19	VR,MB	N/A	24SW	0	3	12:05	1.50	18.9	9.11	2.70	96.1	0.10
LFA_J	7/2/19	VR,MB	N/A	24SW	0	2	12:05	1.00	19.1	9.13	N/A	N/A	0.10
LFA_J	7/2/19	VR,MB	N/A	24SW	0	1	12:05	0.00	19.3	9.16	N/A	N/A	0.10
LFA_J	7/16/19	VR,MB	N/A	3NE	80	5	11:55	2.50	21.2	9.20	N/A	N/A	0.13
LFA_J	7/16/19	VR,MB	N/A	3NE	80	4	11:55	2.00	21.4	9.24	N/A	N/A	0.13
LFA_J	7/16/19	VR,MB	N/A	3NE	80	3	11:55	1.25	21.5	9.27	0.68	99.0	0.13
LFA_J	7/16/19	VR,MB	N/A	3NE	80	2	11:55	0.75	21.7	9.29	N/A	N/A	0.14
LFA_J	7/16/19	VR,MB	N/A	3NE	80	1	11:55	0.00	21.9	9.35	N/A	N/A	0.14
LFA_J	7/30/19	VR,MB	80	24SW	0	5	12:16	2.50	22.8	9.06	N/A	N/A	0.31
LFA_J	7/30/19	VR,MB	80	24SW	0	4	12:16	2.00	23.1	9.30	N/A	N/A	0.20
LFA_J	7/30/19	VR,MB	80	24SW	0	3	12:16	1.25	23.2	9.35	3.90	105.1	0.19
LFA_J	7/30/19	VR,MB	80	24SW	0	2	12:16	0.75	23.3	9.34	N/A	N/A	0.18
LFA_J	7/30/19	VR,MB	80	24SW	0	1	12:16	0.00	23.8	9.34	N/A	N/A	0.17
LFA_J	8/13/19	VR,MB	68	1NNE	0	5	11:36	2.50	20.6	9.41	N/A	N/A	0.33
LFA_J	8/13/19	VR,MB	68	1NNE	0	4	11:36	1.75	20.9	9.42	N/A	N/A	0.33
LFA_J	8/13/19	VR,MB	68	1NNE	0	3	11:36	1.25	21.1	9.44	3.15	100.9	0.33
LFA_J	8/13/19	VR,MB	68	1NNE	0	2	11:36	0.75	21.2	9.47	N/A	N/A	0.34
LFA_J	8/13/19	VR,MB	68	1NNE	0	1	11:36	0.00	21.7	9.48	N/A	N/A	0.32
LFA_J	8/28/19	VR,MB	73	5NE	0	5	11:46	2.50	22.1	9.31	N/A	N/A	0.04
LFA_J	8/28/19	VR,MB	73	5NE	0	4	11:46	1.75	22.4	9.39	N/A	N/A	0.04
LFA_J	8/28/19	VR,MB	73	5NE	0	3	11:46	1.25	22.5	9.44	5.80	104.6	0.04
LFA_J	8/28/19	VR,MB	73	5NE	0	2	11:46	0.75	22.8	9.44	N/A	N/A	0.04
LFA_J	8/28/19	VR,MB	73	5NE	0	1	11:46	0.00	23.4	9.44	N/A	N/A	0.04
LFA_J	9/10/19	VR,MB	56	4WSW	5	5	11:55	2.50	18.5	8.50	N/A	N/A	0.12
LFA_J	9/10/19	VR,MB	56	4WSW	5	4	11:55	1.75	18.7	8.66	N/A	N/A	0.11
LFA_J	9/10/19	VR,MB	56	4WSW	5	3	11:55	1.25	18.8	8.67	6.70	107.2	0.11
LFA_J	9/10/19	VR,MB	56	4WSW	5	2	11:55	0.75	18.9	8.68	N/A	N/A	0.10
LFA_J	9/10/19	VR,MB	56	4WSW	5	1	11:55	0.00	19.4	8.71	N/A	N/A	0.10
LFA_J	9/24/19	VR,MB	60	2	0	5	12:05	2.50	14.6	7.87	N/A	N/A	0.27
LFA_J	9/24/19	VR,MB	60	2	0	4	12:05	1.75	14.7	7.90	N/A	N/A	0.26
LFA_J	9/24/19	VR,MB	60	2	0	3	12:05	1.25	14.9	7.90	6.10	112.3	0.25
LFA_J	9/24/19	VR,MB	60	2	0	2	12:05	0.75	15.1	7.92	N/A	N/A	0.22
LFA_J	9/24/19	VR,MB	60	2	0	1	12:05	0.00	15.6	7.96	N/A	N/A	0.19
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	5	11:49	2.20	11.8	7.95	N/A	N/A	0.11
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	4	11:49	1.75	12.1	8.03	N/A	N/A	0.13
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	3	11:49	1.10	12.3	8.03	3.80	116.2	0.13
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	2	11:49	0.75	12.6	8.06	N/A	N/A	0.13
LFA_J	10/8/19	VR,MB	59	SMOKE	6ENE	1	11:49	0.00	12.8	8.10	N/A	N/A	0.13
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	5	11:47	2.40	9.4	7.60	N/A	N/A	35.55
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	4	11:47	1.75	9.6	7.67	N/A	N/A	34.00
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	3	11:47	1.20	9.8	7.66	1.75	121.6	32.85
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	2	11:47	0.75	10.0	7.67	N/A	N/A	31.52
LFA_J	10/22/19	VR,MB	54	SSE @ 4	9%	1	11:47	0.00	10.2	7.69	N/A	N/A	29.90

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.16	1.66	10.98	203.5	N/A	N/A	N/A	N/A	N/A	
0.05	0.99	11.32	21.4	ND	ND	ND	ND	ND	Bridge swallows present,pollen in water
0.46	4.16	9.96	-76	N/A	N/A	N/A	N/A	N/A	Bridge swallows present, pollen in water
0.28	2.87	9.65	-50	N/A	N/A	N/A	N/A	N/A	Bridge swallows present, pollen in water
0.18	2.56	9.48	-35	N/A	N/A	N/A	N/A	N/A	Bridge swallows present, pollen in water
0.16	2.04	9.85	-18	N/A	N/A	N/A	N/A	N/A	Bridge swallows present, pollen in water
0.13	1.34	9.98	-9	ND	ND	ND	ND	ND	Bridge swallows present, pollen in water
0.38	2.60	9.55	-136	N/A	N/A	N/A	N/A	N/A	Bridge swallows present, pollen in water
0.20	2.15	9.84	-112	N/A	N/A	N/A	N/A	N/A	Bridge swallows present, pollen in water
0.26	1.73	10.20	-59	N/A	N/A	N/A	N/A	N/A	Swallows present under bridge
0.17	1.25	10.79	-54	N/A	N/A	N/A	N/A	N/A	Paddleboarder fell into water
0.12	0.82	10.52	-47	ND	ND	ND	ND	ND	No site odor
0.90	1.50	8.55	-72	N/A	N/A	N/A	N/A	N/A	No water odor
0.92	1.50	9.61	-66	N/A	N/A	N/A	N/A	N/A	Water color: green
0.67	1.23	9.84	-42	N/A	N/A	N/A	N/A	N/A	
0.62	1.09	10.11	-33	N/A	N/A	N/A	N/A	N/A	
0.59	0.92	10.38	-26	ND	ND	ND	ND	ND	
1.04	0.85	8.29	-50	N/A	N/A	N/A	N/A	N/A	
0.72	0.64	9.32	-40	N/A	N/A	N/A	N/A	N/A	
0.73	1.02	9.15	-25	N/A	N/A	N/A	N/A	N/A	
0.57	0.82	9.01	-17	N/A	N/A	N/A	N/A	N/A	
0.64	0.65	9.73	-12	20959	1.17	ND	ND	ND	
0.39	0.60	8.37	-91	N/A	N/A	N/A	N/A	N/A	
0.70	1.65	9.30	-82	N/A	N/A	N/A	N/A	N/A	
0.55	0.78	9.59	-67	N/A	N/A	N/A	N/A	N/A	
0.54	0.63	10.54	-57	N/A	N/A	N/A	N/A	N/A	
0.58	0.58	9.75	-50	11850	6.35	2949	ND	ND	
2.75	1.30	7.30	-10	N/A	N/A	N/A	N/A	N/A	Algae on surface
2.60	1.00	8.27	-10	N/A	N/A	N/A	N/A	N/A	
3.04	1.10	9.30	-5	N/A	N/A	N/A	N/A	N/A	
2.60	0.88	9.18	-2	N/A	N/A	N/A	N/A	N/A	
2.54	0.82	9.90	-2	4400	ND	ND	ND	ND	
1.66	0.90	7.20	-122	N/A	N/A	N/A	N/A	N/A	
1.69	1.12	7.50	-84	N/A	N/A	N/A	N/A	N/A	
1.67	0.87	6.90	-114	N/A	N/A	N/A	N/A	N/A	
1.55	0.90	7.66	-99	N/A	N/A	N/A	N/A	N/A	water is neon green with faint algae near site
1.67	0.80	7.71	-89	12022	ND	12166	0.15	ND	Easier to field filter
1.50	0.80	9.46	-39	N/A	N/A	N/A	N/A	N/A	Green paint like algae nearby
1.60	0.85	9.79	-36	N/A	N/A	N/A	N/A	N/A	
1.28	0.73	9.43	-31	N/A	N/A	N/A	N/A	N/A	
0.93	0.50	9.92	-28	N/A	N/A	N/A	N/A	N/A	
0.84	0.46	10.31	-25	24786	0.12	10043	ND	ND	Ammonium Sensor Broken
0.70	1.30	6.08	-38	N/A	N/A	N/A	N/A	N/A	Algae seen on surface
0.70	1.45	5.88	-53	N/A	N/A	N/A	N/A	N/A	Green water
0.60	1.40	6.17	-50	N/A	N/A	N/A	N/A	N/A	Little boat passed by
0.65	1.21	6.45	-46	N/A	N/A	N/A	N/A	N/A	
0.40	0.70	6.48	-44	ND	ND	ND	ND	ND	
0.36	1.75	6.49	-56	N/A	N/A	N/A	N/A	N/A	
0.23	1.37	6.60	-54	N/A	N/A	N/A	N/A	N/A	
0.14	0.83	6.50	-48	N/A	N/A	N/A	N/A	N/A	
0.19	0.79	6.62	-44	N/A	N/A	N/A	N/A	N/A	
0.13	0.71	6.54	-42	ND	ND	ND	ND	ND	

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C)	pH	Turbidity	Conductivity	Ammonium (NH4)
LFa_J	11/12/19	VR_MB	50	Calm	11%	5	1144	2.25	6.9	7.55	N/A	N/A	0.25
LFa_J	11/12/19	VR_MB	50	Calm	11%	4	1144	1.75	7.1	7.74	N/A	N/A	0.24
LFa_J	11/12/19	VR_MB	50	Calm	11%	3	1144	1.25	7.2	7.82	1.24	126.0	0.24
LFa_J	11/12/19	VR_MB	50	Calm	11%	2	1144	0.75	7.4	7.84	N/A	N/A	0.24
Site_6	4/15/19	VR_JH	N/A	N/A	75	5	1311	4.00	6.8	6.81	N/A	N/A	0.16
Site_6	4/15/19	VR_JH	N/A	N/A	75	4	1311	3.00	8.7	7.17	N/A	N/A	0.12
Site_6	4/15/19	VR_JH	N/A	N/A	75	3	1311	2.00	8.9	7.23	2.80	126.3	0.10
Site_6	4/15/19	VR_JH	N/A	N/A	75	2	1311	1.00	9.1	7.28	N/A	N/A	0.09
Site_6	4/16/19	VR_JH	N/A	N/A	75	1	1311	0.00	9.4	7.28	N/A	N/A	0.08
Site_6	4/16/19	VR_JH	N/A	N/A	20	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site_6	4/16/19	VR_JH	N/A	N/A	20	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site_6	4/16/19	VR_JH	N/A	N/A	20	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site_6	4/16/19	VR_JH	N/A	N/A	20	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site_6	4/16/19	VR_JH	N/A	N/A	20	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site_6	4/17/19	JR_JH	N/A	0	20	5	1028	4.00	7.3	6.83	N/A	N/A	0.11
Site_6	4/17/19	JR_JH	N/A	0	20	4	1028	3.00	8.3	6.99	N/A	N/A	0.13
Site_6	4/17/19	JR_JH	N/A	0	20	3	1028	2.00	9.4	7.13	1.97	126.1	0.09
Site_6	4/17/19	JR_JH	N/A	0	20	2	1028	1.00	10.2	7.26	N/A	N/A	0.08
Site_6	4/17/19	JR_JH	N/A	0	20	1	1028	0.00	10.4	7.29	N/A	N/A	0.07
Site_6	4/17/19	VR_JH	N/A	N/A	20	5	1430	4.00	7.4	6.93	N/A	N/A	0.09
Site_6	4/17/19	VR_JH	N/A	N/A	20	4	1430	3.00	9.0	6.96	N/A	N/A	0.10
Site_6	4/17/19	VR_JH	N/A	N/A	20	3	1430	2.00	9.8	7.29	2.10	126.2	0.09
Site_6	4/17/19	VR_JH	N/A	N/A	20	2	1430	1.00	11.1	7.34	N/A	N/A	0.09
Site_6	4/17/19	VR_JH	N/A	N/A	20	1	1430	0.00	12.3	7.35	N/A	N/A	0.08
Site_6	4/18/19	VR_JH	38.6	N/A	1	5	1021	3.50	7.5	6.76	N/A	N/A	0.14
Site_6	4/18/19	VR_JH	38.6	N/A	1	4	1021	3.00	9.6	7.13	N/A	N/A	0.13
Site_6	4/18/19	VR_JH	38.6	N/A	1	3	1021	2.00	10.1	7.30	2.00	126.3	0.09
Site_6	4/18/19	VR_JH	38.6	N/A	1	2	1021	1.00	10.9	7.32	N/A	N/A	0.08
Site_6	4/18/19	VR_JH	38.6	N/A	1	1	1021	0.00	11.2	7.34	N/A	N/A	0.08
Site_6	4/18/19	VR_JH	N/A	N/A	1	5	1431	4.00	7.7	6.86	N/A	N/A	0.13
Site_6	4/18/19	VR_JH	N/A	N/A	1	4	1431	3.00	9.3	7.26	N/A	N/A	0.12
Site_6	4/18/19	VR_JH	N/A	N/A	1	3	1431	2.00	10.3	7.31	1.70	126.3	0.12
Site_6	4/18/19	VR_JH	N/A	N/A	1	2	1431	1.00	12.6	7.34	N/A	N/A	0.11
Site_6	4/18/19	VR_JH	N/A	N/A	1	1	1431	0.00	13.3	7.34	N/A	N/A	0.08
Site_6	4/19/19	VR_JH	32	2SSW	N/A	5	949	4.00	7.9	6.91	N/A	N/A	0.14
Site_6	4/19/19	VR_JH	32	2SSW	N/A	4	949	3.00	9.2	6.97	N/A	N/A	0.20
Site_6	4/19/19	VR_JH	32	2SSW	N/A	3	949	2.00	10.5	7.21	1.64	125.8	0.17
Site_6	4/19/19	VR_JH	32	2SSW	N/A	2	949	1.00	11.5	7.28	N/A	N/A	0.13
Site_6	4/19/19	VR_JH	32	2SSW	N/A	1	949	0.00	12.1	7.31	N/A	N/A	0.10
Site_6	4/19/19	VR_JH	N/A	N/A	70	5	1440	4.00	7.9	6.88	N/A	N/A	0.88
Site_6	4/19/19	VR_JH	N/A	N/A	70	4	1440	3.00	9.0	7.12	N/A	N/A	0.54
Site_6	4/19/19	VR_JH	N/A	N/A	70	3	1440	2.00	10.6	7.23	1.70	126.6	0.21
Site_6	4/19/19	VR_JH	N/A	N/A	70	2	1440	1.00	12.4	7.31	N/A	N/A	0.14
Site_6	4/19/19	VR_JH	N/A	N/A	70	1	1440	0.00	14.3	7.31	N/A	N/A	0.11
Site_6	4/22/19	VR_JH	35	2N	1	5	1003	4.00	8.4	6.95	N/A	N/A	0.13
Site_6	4/22/19	VR_JH	35	2N	1	4	1003	3.00	9.9	6.95	N/A	N/A	0.16
Site_6	4/22/19	VR_JH	35	2N	1	3	1003	2.00	11.4	7.14	1.62	126.8	0.13
Site_6	4/22/19	VR_JH	35	2N	1	3	1003	1.00	12.4	7.27	N/A	N/A	0.09
Site_6	4/22/19	VR_JH	35	2N	1	1	1003	0.00	12.4	7.30	N/A	N/A	0.08
Site_6	4/23/19	VR_JH	50	N/A	0	5	1236	4.00	8.7	6.73	N/A	N/A	0.10

PC	Chlorophyll	DO [ppm]	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.16	1.38	7.53	-7	N/A	N/A	N/A	N/A	N/A	N/A
0.14	1.35	7.42	-8	N/A	N/A	N/A	N/A	N/A	N/A
0.13	1.30	7.27	-5	N/A	N/A	N/A	N/A	N/A	N/A
0.13	1.22	7.36	-4	N/A	N/A	N/A	N/A	N/A	N/A
0.14	0.71	7.41	-3	N/A	N/A	N/A	N/A	N/A	N/A
2.44	N/A	2.00	-7.7	N/A	N/A	N/A	N/A	N/A	N/A
0.82	N/A	13.30	-2.8	N/A	N/A	N/A	N/A	N/A	N/A
0.54	N/A	13.58	17.5	N/A	N/A	N/A	N/A	N/A	N/A
0.26	N/A	13.52	27.3	N/A	N/A	N/A	N/A	N/A	N/A
0.15	N/A	13.44	33.5	ND	ND	ND	ND	ND	ND
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0.54	N/A	0.47	-9.2	N/A	N/A	N/A	N/A	N/A	N/A
0.06	N/A	11.45	15.6	N/A	N/A	N/A	N/A	N/A	N/A
0.30	N/A	12.74	23.8	N/A	N/A	N/A	N/A	N/A	N/A
0.13	N/A	12.76	31	N/A	N/A	N/A	N/A	N/A	N/A
0.10	N/A	12.74	34.5	N/A	N/A	N/A	N/A	N/A	N/A
1.03	N/A	1.00	8	N/A	N/A	N/A	N/A	N/A	N/A
0.82	N/A	13.40	21.3	N/A	N/A	N/A	N/A	N/A	N/A
0.35	N/A	13.28	30.5	N/A	N/A	N/A	N/A	N/A	N/A
0.07	N/A	12.75	37.5	N/A	N/A	N/A	N/A	N/A	N/A
0.03	N/A	12.57	43.9	N/A	N/A	N/A	N/A	N/A	N/A
0.50	N/A	0.72	27.7	N/A	N/A	N/A	N/A	N/A	N/A
0.84	N/A	12.46	33.7	N/A	N/A	N/A	N/A	N/A	N/A
0.29	N/A	12.94	44.3	N/A	N/A	N/A	N/A	N/A	N/A
0.11	N/A	12.86	50.9	N/A	N/A	N/A	N/A	N/A	N/A
0.05	N/A	12.58	55.1	N/A	N/A	N/A	N/A	N/A	N/A
1.38	N/A	2.19	7.1	N/A	N/A	N/A	N/A	N/A	N/A
0.85	N/A	17.91	25.4	N/A	N/A	N/A	N/A	N/A	N/A
0.27	N/A	13.22	31.8	N/A	N/A	N/A	N/A	N/A	N/A
0.06	N/A	12.53	37.7	N/A	N/A	N/A	N/A	N/A	N/A
0.03	N/A	12.42	43.3	N/A	N/A	N/A	N/A	N/A	N/A
0.68	N/A	0.98	38.4	N/A	N/A	N/A	N/A	N/A	N/A
1.90	N/A	11.62	37.8	N/A	N/A	N/A	N/A	N/A	N/A
0.35	N/A	12.78	43.9	N/A	N/A	N/A	N/A	N/A	N/A
0.12	N/A	12.43	47.7	N/A	N/A	N/A	N/A	N/A	N/A
0.05	N/A	12.27	51.7	N/A	N/A	N/A	N/A	N/A	N/A
0.54	N/A	0.55	-130.8	N/A	N/A	N/A	N/A	N/A	N/A
1.25	N/A	12.00	-98.1	N/A	N/A	N/A	N/A	N/A	N/A
0.23	N/A	12.64	-63.6	N/A	N/A	N/A	N/A	N/A	N/A
0.07	N/A	12.10	-48.2	N/A	N/A	N/A	N/A	N/A	N/A
0.03	N/A	12.01	-34.7	N/A	N/A	N/A	N/A	N/A	N/A
1.12	N/A	0.74	-12.6	N/A	N/A	N/A	N/A	N/A	N/A
2.06	N/A	11.53	4.1	N/A	N/A	N/A	N/A	N/A	N/A
0.18	N/A	11.67	10.7	N/A	N/A	N/A	N/A	N/A	N/A
0.04	N/A	11.44	16.6	N/A	N/A	N/A	N/A	N/A	N/A
0.10	N/A	11.45	20.4	N/A	N/A	N/A	N/A	N/A	N/A
0.93	N/A	1.14	29.5	N/A	N/A	N/A	N/A	N/A	N/A

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C°)	pH	Turbidity	Conductivity	Ammonium (NH4)
Site_6	4/23/19	VR,JH	50	N/A	0	4	1236	3.00	10.3	6.94	N/A	N/A	0.11
Site_6	4/23/19	VR,JH	50	N/A	0	3	1236	2.00	11.7	7.18	1.75	126.9	0.09
Site_6	4/23/19	VR,JH	50	N/A	0	2	1236	1.00	13.4	7.25	N/A	N/A	0.08
Site_6	4/23/19	VR,JH	50	N/A	0	1	1236	0.00	14.6	7.29	N/A	N/A	0.08
Site_6	5/7/19	VR,JH	58	3	50	5	1236	4.00	11.1	7.23	N/A	N/A	2.54
Site_6	5/7/19	VR,JH	58	3	50	4	1236	3.00	13.2	7.22	N/A	N/A	0.40
Site_6	5/7/19	VR,JH	58	3	50	3	1236	2.00	14.4	7.35	1.25	122.5	0.27
Site_6	5/7/19	VR,JH	58	3	50	2	1236	1.00	16.1	7.53	N/A	N/A	0.17
Site_6	5/7/19	VR,JH	58	3	50	1	1236	0.00	16.9	7.56	N/A	N/A	0.15
Site_6	5/21/19	VR,KW	38	15SSW	50	5	1305	4.00	12.6	7.48	N/A	N/A	0.09
Site_6	5/21/19	VR,KW	38	15SSW	50	4	1305	3.00	12.6	7.50	N/A	N/A	0.09
Site_6	5/21/19	VR,KW	38	15SSW	50	3	1305	2.00	12.8	7.51	-5.23	118.3	0.09
Site_6	5/21/19	VR,KW	38	15SSW	50	2	1305	1.00	13.1	7.60	N/A	N/A	0.09
Site_6	5/21/19	VR,KW	38	15SSW	50	1	1305	0.00	13.2	7.61	N/A	N/A	0.09
Site_6	6/4/19	VR,JW	64	7NNE	5	5	1252	4.00	14.4	6.62	N/A	N/A	0.17
Site_6	6/4/19	VR,JW	64	7NNE	5	4	1252	3.00	15.2	7.35	N/A	N/A	0.14
Site_6	6/4/19	VR,JW	64	7NNE	5	3	1252	2.00	16.8	8.09	2.14	122.5	0.13
Site_6	6/4/19	VR,JW	64	7NNE	5	2	1252	1.00	18.8	8.06	N/A	N/A	0.10
Site_6	6/4/19	VR,JW	64	7NNE	5	1	1252	0.00	20.3	8.05	N/A	N/A	0.09
Site_6	6/18/19	VR,MB	67	2NE	1	5	1240	4.00	16.1	6.80	N/A	N/A	1.49
Site_6	6/18/19	VR,MB	67	2NE	1	4	1240	3.00	18.0	7.03	N/A	N/A	0.27
Site_6	6/18/19	VR,MB	67	2NE	1	3	1240	2.00	20.2	8.39	1.30	101.3	0.11
Site_6	6/18/19	VR,MB	67	2NE	1	2	1240	1.00	21.7	8.47	N/A	N/A	0.08
Site_6	6/18/19	VR,MB	67	2NE	1	1	1240	0.00	21.9	8.48	N/A	N/A	0.08
Site_6	6/25/2019	VR,MB	68	7SSW	1	5	1239	4.00	17.8	7.57	N/A	N/A	0.23
Site_6	6/25/2019	VR,MB	68	7SSW	1	4	1239	3.00	19.9	8.47	N/A	N/A	0.14
Site_6	6/25/2019	VR,MB	68	7SSW	1	3	1239	2.00	20.4	9.34	1.42	108.9	0.10
Site_6	6/25/2019	VR,MB	68	7SSW	1	2	1239	1.00	21.0	9.26	N/A	N/A	0.09
Site_6	6/25/2019	VR,MB	68	7SSW	1	1	1239	0.00	21.1	9.26	N/A	N/A	0.09
Site_6	7/2/2019	VR,MB	N/A	2-4SW	0	5	1251	4.00	18.0	7.50	N/A	N/A	0.13
Site_6	7/2/2019	VR,MB	N/A	2-4SW	0	4	1251	3.00	18.6	8.33	N/A	N/A	0.12
Site_6	7/2/2019	VR,MB	N/A	2-4SW	0	3	1251	2.00	19.3	9.13	2.07	109.5	0.12
Site_6	7/2/2019	VR,MB	N/A	2-4SW	0	2	1251	1.00	20.0	9.23	N/A	N/A	0.11
Site_6	7/2/2019	VR,MB	N/A	2-4SW	0	1	1251	0.00	20.3	9.23	N/A	N/A	0.11
Site_6	7/16/19	VR,MB	N/A	3NE	80	5	1230	4.00	19.0	7.26	N/A	N/A	0.18
Site_6	7/16/19	VR,MB	N/A	3NE	80	4	1230	3.00	20.6	7.38	N/A	N/A	0.16
Site_6	7/16/19	VR,MB	N/A	3NE	80	3	1230	2.00	21.6	9.05	0.33	114.6	0.14
Site_6	7/16/19	VR,MB	N/A	3NE	80	2	1230	1.00	21.9	9.11	N/A	N/A	0.13
Site_6	7/16/19	VR,MB	N/A	3NE	80	1	1230	0.00	22.4	9.09	N/A	N/A	0.13
Site_6	7/30/19	VR,MB	68	2-4SW	0	5	1259	4.00	21.3	7.66	N/A	N/A	0.56
Site_6	7/30/19	VR,MB	68	2-4SW	0	4	1259	3.00	23.0	8.67	N/A	N/A	0.28
Site_6	7/30/19	VR,MB	68	2-4SW	0	3	1259	2.00	23.2	8.94	1.70	128.8	0.25
Site_6	7/30/19	VR,MB	68	2-4SW	0	2	1259	1.00	23.5	9.00	N/A	N/A	0.21
Site_6	7/30/19	VR,MB	68	2-4SW	0	1	1259	0.00	24.1	9.06	N/A	N/A	0.18
Site_6	8/13/19	VR,MB	68	1NNNE	0	5	1221	4.00	20.7	7.67	N/A	N/A	0.67
Site_6	8/13/19	VR,MB	68	1NNNE	0	4	1221	3.00	20.9	8.05	N/A	N/A	0.63
Site_6	8/13/19	VR,MB	68	1NNNE	0	3	1221	2.00	21.2	8.59	3.39	122.3	0.51
Site_6	8/13/19	VR,MB	68	1NNNE	0	2	1221	1.00	21.6	8.72	N/A	N/A	0.46
Site_6	8/13/19	VR,MB	68	1NNNE	0	1	1221	0.00	22.8	8.73	N/A	N/A	0.43
Site_6	8/28	VR,MB	73	5NE	0	5	1223	4.00	21.8	7.39	N/A	N/A	0.06
Site_6	8/28	VR,MB	73	5NE	0	4	1223	3.00	22.2	7.71	N/A	N/A	0.05
Site_6	8/28	VR,MB	73	5NE	0	3	1223	2.00	22.4	8.75	2.60	127.3	0.04

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.97	N/A	12.20	37.7	N/A	N/A	N/A	N/A	N/A	N/A
0.22	N/A	12.04	41.9	N/A	N/A	N/A	N/A	N/A	N/A
0.07	N/A	11.32	44.1	N/A	N/A	N/A	N/A	N/A	N/A
0.06	N/A	11.24	46.3	ND	ND	ND	ND	ND	ND
1.80	10.30	2.09	-140.1	N/A	N/A	N/A	N/A	N/A	N/A
1.23	18.08	10.45	-86.2	N/A	N/A	N/A	N/A	N/A	N/A
0.05	1.10	11.30	-55.1	N/A	N/A	N/A	N/A	N/A	N/A
0.07	0.54	10.49	-39.3	N/A	N/A	N/A	N/A	N/A	N/A
0.06	0.25	10.59	-29.5	ND	ND	ND	ND	ND	ND
0.20	2.01	9.52	4.6	N/A	N/A	N/A	N/A	N/A	N/A
0.13	2.00	9.43	7.2	N/A	N/A	N/A	N/A	N/A	N/A
0.11	1.46	9.73	16.3	N/A	N/A	N/A	N/A	N/A	N/A
0.12	1.24	10.12	28.4	N/A	N/A	N/A	N/A	N/A	N/A
0.08	0.96	10.06	35.6	ND	ND	ND	ND	ND	ND
0.48	5.69	2.79	177	N/A	N/A	N/A	N/A	N/A	N/A
0.20	3.62	10.62	241.1	N/A	N/A	N/A	N/A	N/A	N/A
0.09	1.30	13.01	242.1	N/A	N/A	N/A	N/A	N/A	N/A
0.03	0.80	12.27	250.7	N/A	N/A	N/A	N/A	N/A	N/A
0.05	0.68	12.12	254.4	ND	ND	7092	ND	ND	ND
1.40	2.21	0.02	-58.5	N/A	N/A	N/A	N/A	N/A	N/A
1.04	19.42	6.38	-46.2	N/A	N/A	N/A	N/A	N/A	N/A
0.15	1.91	13.74	18.4	N/A	N/A	N/A	N/A	N/A	N/A
0.07	1.23	12.81	63.7	N/A	N/A	N/A	N/A	N/A	N/A
0.09	1.08	12.90	93.7	N/A	N/A	N/A	N/A	N/A	N/A
0.98	5.57	0.98	-140	N/A	N/A	N/A	N/A	N/A	N/A
0.78	10.55	5.05	-123	N/A	N/A	N/A	N/A	N/A	N/A
0.15	1.69	11.54	-102	N/A	N/A	N/A	N/A	N/A	N/A
0.10	1.38	11.13	-65	N/A	N/A	N/A	N/A	N/A	N/A
0.07	0.81	11.43	-46	ND	ND	ND	ND	ND	ND
1.70	8.45	0.07	-114	N/A	N/A	N/A	N/A	N/A	N/A
0.40	3.38	3.23	-99	N/A	N/A	N/A	N/A	N/A	N/A
0.41	1.70	8.08	-122	N/A	N/A	N/A	N/A	N/A	N/A
0.28	1.01	10.34	-111	N/A	N/A	N/A	N/A	N/A	N/A
0.38	0.96	11.06	-92	ND	ND	ND	ND	ND	ND
2.96	15.14	0.20	-144	N/A	N/A	N/A	N/A	N/A	N/A
0.70	3.69	1.96	-130	N/A	N/A	N/A	N/A	N/A	N/A
0.18	1.85	9.18	-169	N/A	N/A	N/A	N/A	N/A	N/A
0.11	1.17	9.97	-125	N/A	N/A	N/A	N/A	N/A	N/A
0.13	0.88	9.82	-103	5426	0.56	ND	ND	ND	ND
0.47	1.64	0.13	-121	N/A	N/A	N/A	N/A	N/A	N/A
0.35	1.20	5.20	-81	N/A	N/A	N/A	N/A	N/A	N/A
0.26	1.03	7.20	-55	N/A	N/A	N/A	N/A	N/A	N/A
0.12	0.64	7.41	-37	N/A	N/A	N/A	N/A	N/A	N/A
0.11	0.39	8.09	-24	10376	0.54	9802	ND	ND	Boat
0.26	1.55	0.58	-53	N/A	N/A	N/A	N/A	N/A	N/A
0.32	1.25	3.94	-55	N/A	N/A	N/A	N/A	N/A	N/A
0.63	1.07	6.59	-79	N/A	N/A	N/A	N/A	N/A	N/A
0.50	0.72	8.04	-82	N/A	N/A	N/A	N/A	N/A	N/A
0.44	0.45	7.98	-71	8378	0.36	ND	ND	ND	Ducks swam by sample area
3.20	16.33	0.81	-77	N/A	N/A	N/A	N/A	N/A	No water odor
0.80	3.51	5.23	-85	N/A	N/A	N/A	N/A	N/A	Water color: green
0.60	2.59	7.50	-94	N/A	N/A	N/A	N/A	N/A	Field - easier to filter OP Filter clogged more easily/quicker while field filtering in LFA sites

Site	Date	Collection Team	Air Temp at Start	Wind Speed at Start	Cloud Cover	Quadrant	Time	Depth (m)	Temp (C*)	pH	Turbidity	Conductivity	Ammonium (NH4)
Site_6	8/28	VR,MB	73	5NE	0	2	1223	1.00	22.4	8.88	N/A	N/A	0.03
Site_6	8/28	VR,MB	73	5NE	0	1	1223	0.00	23.4	8.88	N/A	N/A	0.03
Site_6	9/10/19	VR,MB	56	4VSW	5	5	1231	4.00	18.9	8.31	N/A	N/A	0.17
Site_6	9/10/19	VR,MB	56	4VSW	5	4	1231	3.00	18.9	8.48	N/A	N/A	0.14
Site_6	9/10/19	VR,MB	56	4VSW	5	3	1231	2.00	19.1	8.69	2.20	128.7	0.11
Site_6	9/10/19	VR,MB	56	4VSW	5	2	1231	1.00	19.4	8.67	N/A	N/A	0.11
Site_6	9/10/19	VR,MB	56	4VSW	5	1	1231	0.00	19.5	8.67	N/A	N/A	0.10
Site_6	9/24/19	VR,MB	60	2	0	5	1241	4.00	14.9	7.98	N/A	N/A	0.24
Site_6	9/24/19	VR,MB	60	2	0	4	1241	3.00	14.9	8.44	N/A	N/A	0.20
Site_6	9/24/19	VR,MB	60	2	0	3	1241	2.00	15.2	8.54	1.77	133.0	0.19
Site_6	9/24/19	VR,MB	60	2	0	2	1241	1.00	15.6	8.52	N/A	N/A	0.18
Site_6	9/24/19	VR,MB	60	2	0	1	1241	0.00	15.7	8.53	N/A	N/A	0.17
Site_6	10/8/2019	VR,MB	59	6ENE	Smokey	5	1224	3.80	12.2	7.68	N/A	N/A	0.31
Site_6	10/8/2019	VR,MB	59	6ENE	Smokey	4	1224	3.00	12.3	8.08	N/A	N/A	0.26
Site_6	10/8/2019	VR,MB	59	6ENE	Smokey	3	1224	2.00	12.3	8.19	1.95	138.2	0.22
Site_6	10/8/2019	VR,MB	59	6ENE	Smokey	2	1224	1.00	12.7	8.41	N/A	N/A	0.17
Site_6	10/8/2019	VR,MB	59	6ENE	Smokey	1	1224	0.00	13.7	8.43	N/A	N/A	0.09
Site_6	10/22/2019	VR,MB	54	SSE @ 4	9%	5	1222	3.50	9.9	7.85	N/A	N/A	37.15
Site_6	10/22/2019	VR,MB	54	SSE @ 4	9%	4	1222	2.75	10.0	7.94	N/A	N/A	37.49
Site_6	10/22/2019	VR,MB	54	SSE @ 4	9%	3	1222	1.75	10.0	7.99	2.50	142.30	37.74
Site_6	10/22/2019	VR,MB	54	SSE @ 4	9%	2	1222	1.00	10.2	7.99	N/A	N/A	40.85
Site_6	10/22/2019	VR,MB	54	SSE @ 4	9%	1	1222	0.00	10.7	7.98	N/A	N/A	42.68
Site_6	11/12/19	VR, MB	50	Calm	11%	5	1230	3.75	7.2	7.71	N/A	N/A	0.26
Site_6	11/12/19	VR, MB	50	Calm	11%	4	1230	2.75	7.2	7.99	N/A	N/A	0.24
Site_6	11/12/19	VR, MB	50	Calm	11%	3	1230	1.75	7.3	8.02	1.44	147.4	0.24
Site_6	11/12/19	VR, MB	50	Calm	11%	2	1230	1.00	7.6	8.03	N/A	N/A	0.24
Site_6	11/12/19	VR, MB	50	Calm	11%	1	1230	0.00	8.2	8.05	N/A	N/A	0.23

PC	Chlorophyll	DO (ppm)	ORP	Copies/mL	µg/L	Copies/mL	µg/L	Cylindrospermopsin	Notes:
0.49	2.04	8.52	-73	N/A	N/A	N/A	N/A	N/A	
0.41	1.44	8.70	-63	4927	ND	ND	ND	ND	
0.30	0.95	0.36	-160	N/A	N/A	N/A	N/A	N/A	Ducks circling the boat
0.26	1.10	7.19	-173	N/A	N/A	N/A	N/A	N/A	
0.30	1.30	8.00	-150	N/A	N/A	N/A	N/A	N/A	
0.17	0.95	8.01	-130	N/A	N/A	N/A	N/A	N/A	
0.15	0.60	7.95	-115	2077	ND	3326	ND	ND	
0.60	1.60	0.00	-135	N/A	N/A	N/A	N/A	N/A	
0.27	1.36	9.74	-160	N/A	N/A	N/A	N/A	N/A	
0.25	1.30	10.74	-150	N/A	N/A	N/A	N/A	N/A	
0.23	0.74	10.10	-137	N/A	N/A	N/A	N/A	N/A	
0.17	0.59	10.59	-128	18728	ND	16850	0.18	ND	Ducks; boat; harvester passed by
0.27	0.80	5.30	-82	N/A	N/A	N/A	N/A	N/A	Green water with algae present
0.25	0.80	5.46	-78	N/A	N/A	N/A	N/A	N/A	
0.38	1.30	5.78	-74	N/A	N/A	N/A	N/A	N/A	
0.26	0.79	5.90	-66	N/A	N/A	N/A	N/A	N/A	
0.27	0.68	6.27	-56	ND	ND	ND	ND	ND	Ammonium not stabilized
0.25	1.15	4.36	-87	N/A	N/A	N/A	N/A	N/A	Ammonium sensor broken
0.26	1.50	6.11	-98	N/A	N/A	N/A	N/A	N/A	
0.30	1.63	6.39	-95	N/A	N/A	N/A	N/A	N/A	
0.22	1.40	6.26	-88	N/A	N/A	N/A	N/A	N/A	
0.18	0.67	6.33	-84	ND	ND	ND	ND	ND	
0.46	1.84	6.53	-55						
0.30	1.51	6.72	-53						
0.28	1.90	6.68	-47						
0.30	2.01	6.98	-44						
0.11	0.54	6.98	-42						