

Chemical Analysis Report

WQAP-2019-09-24-04

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response - as needed**
Request ID: **RQ-2019-07-22-66**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
MS #3560
Tallahassee, FL 32399-2400
Attn: Julie Espy

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 09-OCT-2019 10:56

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the "T" and a long horizontal stroke at the end.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Nutrients and Pesticides.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: LAKE BUFFUM BLOOM RESPONSE-FOLLOW UP **Collection Date/Time: 09/23/2019 13:00**

Field ID: LAKE BUFFUM BLOOM RESPONSE-FOL

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2121828	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P371189	
		Cylindrospermopsin**	0.25	U	ug/L	P371189	
		Microcystin LA**	0.25	U	ug/L	P371189	
		Microcystin LF**	0.25	U	ug/L	P371189	
		Microcystin LR**	0.25	U	ug/L	P371189	
		Microcystin LY**	0.25	U	ug/L	P371189	RPD
		Microcystin RR**	0.25	U	ug/L	P371189	
		Microcystin YR**	0.25	U	ug/L	P371189	
2121829	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P371743	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.83		mg N/L	P371385	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.058		mg N/L	P371468	
	EPA 365.1 Rev. 2.0	Total-P	0.083		mg P/L	P371493	
2121830	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.032		mg P/L	P371240	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P371743

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371385

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P371468

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371240

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: EPA 8321B
Batch ID: P371189

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin YR	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P371743

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371385

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P371468

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.1		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371240

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.3		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P371189

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	127		P	40 - 140
Cylindrospermopsin	107		P	40 - 140
Microcystin LA	97.6		P	40 - 140
Microcystin LF	134		P	40 - 140
Microcystin LR	112		P	40 - 140
Microcystin LY	99.0		P	40 - 140
Microcystin RR	110		P	40 - 140
Microcystin YR	103		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P371743

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121913	Ammonia-N	97.1	98.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P371385

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121742	Kjeldahl Nitrogen	99.4	94.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P371468

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121804	NO2NO3-N	99.4	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P371493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121796	Total-P	95.9	95.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P371240

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121916	O-Phosphate-P	94.7	95.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P371189

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2121741	Anatoxin-a	116	140	P/P	40 - 140
2121741	Cylindrospermopsin	99.9	113	P/P	40 - 140
2121741	Microcystin LA	83.1	98.6	P/P	40 - 140
2121741	Microcystin LF	109	129	P/P	40 - 140
2121741	Microcystin LR	137	109	P/P	40 - 140
2121741	Microcystin LY	73.4	103	P/P	40 - 140
2121741	Microcystin RR	120	117	P/P	40 - 140
2121741	Microcystin YR	119	94.6	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P371743

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121913	Ammonia-N	1.14	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P371385

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121742	Kjeldahl Nitrogen	3.17	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P371468

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121804	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P371493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121796	Total-P	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P371240

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121916	O-Phosphate-P	0.527	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P371189

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2121741	Anatoxin-a	18.4	Spike	P	0 - 30
2121741	Cylindrospermopsin	12.7	Spike	P	0 - 30
2121741	Microcystin LA	17.1	Spike	P	0 - 30
2121741	Microcystin LF	17.3	Spike	P	0 - 30
2121741	Microcystin LR	22.8	Spike	P	0 - 30
2121741	Microcystin LY	33.3	Spike	F	0 - 30
2121741	Microcystin RR	2.12	Spike	P	0 - 30
2121741	Microcystin YR	22.8	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Surrogates

Lab Sample ID: 2121828

Field Sample ID: LAKE BUFFUM BLOOM RESPONSE-FOL

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	116	P	30 - 165

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
 Run ID: A94461
 Included Lab Sample IDs: 2121828

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	97.1	104	P/P	50 - 160
Cylindrospermopsin	101	101	P/P	60 - 160
Microcystin LA	95.3	91.3	P/P	50 - 160
Microcystin LF	111	106	P/P	60 - 160
Microcystin LR	102	97.0	P/P	60 - 160
Microcystin LY	94.7	90.8	P/P	60 - 160
Microcystin RR	106	96.5	P/P	60 - 160
Microcystin YR	89.7	90.6	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Run ID: A94463
 Included Lab Sample IDs: 2121830

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	98.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Run ID: A94525
 Included Lab Sample IDs: 2121829

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Run ID: A94578
 Included Lab Sample IDs: 2121829

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Run ID: A94616
 Included Lab Sample IDs: 2121829

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.7	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
 Run ID: A94667
 Included Lab Sample IDs: 2121829

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	95.7	95.1	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
 Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
 Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	97.4	97.1	98.3			1.14
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.0	99.4	94.9			3.17
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	103	99.4	99.4			0.0
EPA 365.1 Rev. 2.0	Total-P	99.1	95.9	95.9			0.0
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	94.7	95.2			0.527
EPA 8321B	Anatoxin-a	127	116	140			18.4
	Cylindrospermopsin	107	99.9	113			12.7
	Microcystin LA	97.6	83.1	98.6			17.1
	Microcystin LF	134	109	129			17.3
	Microcystin LR	112	137	109			22.8
	Microcystin LY	99.0	73.4	103			33.3
	Microcystin RR	110	120	117			2.12
	Microcystin YR	103	119	94.6			22.8

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2121829
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2121829
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2121829
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2121829
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2121830
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2121828

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 350.1 Rev. 2.0	09/24/2019			10/02/2019 14:41	Ping Hua	2121829
EPA 351.2 Rev. 2.0	09/24/2019	09/26/2019 11:50	Sima Feizi	09/27/2019 18:45	Julia Storbeck	2121829
EPA 353.2 Rev. 2.0	09/24/2019			09/26/2019 10:50	Beverly Y. Sanders	2121829
EPA 365.1 Rev. 2.0	09/24/2019	09/27/2019 15:05	Lipi Saha	09/30/2019 08:51	Lipi Saha	2121829
EPA 365.1 Rev. 2.0 dissolved	09/24/2019			09/24/2019 16:40	Jhamieka S. Greenwood	2121830
EPA 8321B	09/24/2019	09/24/2019 13:00	Juyoung Kim	09/24/2019 15:05	Juyoung Kim	2121828