

Chemical Analysis Report

WQAP-2020-03-11-04

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

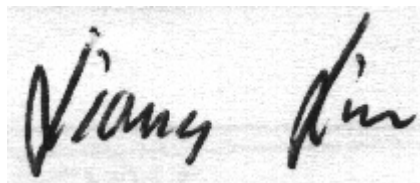
Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2020-02-24-36**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd
Suite 232
Orlando, FL 32806
Attn: Mike Linger

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: Liang Lin, Environmental Administrator

Date Certified: 27-MAR-2020 16:18

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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 Arnold @ 70m from W Shore

Collection Date/Time: 03/10/2020 10:15

Field ID: HABCE0011_LAKE ARNOLD

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2163846	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P380462	RPD
		Cylindrospermopsin**	0.25	U	ug/L	P380462	
		Desmethyl microcystin LR**	0.25	U	ug/L	P380462	
		Microcystin LA**	0.25	U	ug/L	P380462	
		Microcystin LF**	0.25	U	ug/L	P380462	
		Microcystin LR**	0.29	I	ug/L	P380462	
		Microcystin LW**	0.25	U	ug/L	P380462	
		Microcystin LY**	0.25	U	ug/L	P380462	
		Microcystin RR**	0.45	I	ug/L	P380462	
		Microcystin WR**	0.50	U	ug/L	P380462	
		Microcystin YR**	0.25	U	ug/L	P380462	
2163847	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P380968	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.60		mg N/L	P380630	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381095	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P380659	
2163848	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380501	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P380968

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380630

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381095

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380659

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380501

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

Reference Method: EPA 8321B
Batch ID: P380462

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	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 LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	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: P380968

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380630

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	101		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381095

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380659

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380501

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	102		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P380462

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	89.6		P	40 - 140
Cylindrospermopsin	107		P	40 - 140
Desmethyl microcystin LR	99.7		P	40 - 140
Microcystin LA	98.5		P	40 - 140
Microcystin LF	96.3		P	40 - 140
Microcystin LR	103		P	40 - 140
Microcystin LW	87.4		P	40 - 140
Microcystin LY	107		P	40 - 140
Microcystin RR	106		P	40 - 140
Microcystin WR	97.4		P	40 - 140
Microcystin YR	101		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P380968

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163861	Ammonia-N	99.4	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380630

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163847	Kjeldahl Nitrogen	99.2	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381095

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163817	NO2NO3-N	97.0	96.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380659

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163273	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380501

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163673	O-Phosphate-P	95.2	97.0	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P380462

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163225	Anatoxin-a	98.0	90.3	P/P	40 - 140
2163225	Cylindrospermopsin	103	89.8	P/P	40 - 140
2163225	Desmethyl microcystin LR	107	92.7	P/P	40 - 140
2163225	Microcystin LA	118	85.9	P/P	40 - 140
2163225	Microcystin LF	88.2	92.2	P/P	40 - 140
2163225	Microcystin LR	112	89.6	P/P	40 - 140
2163225	Microcystin LW	84.3	101	P/P	40 - 140
2163225	Microcystin LY	91.7	94.3	P/P	40 - 140
2163225	Microcystin RR	94.5	89.7	P/P	40 - 140
2163225	Microcystin WR	99.3	85.8	P/P	40 - 140
2163225	Microcystin YR	88.5	88.0	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P380968

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163861	Ammonia-N	0.298	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P380630

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163847	Kjeldahl Nitrogen	0.168	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P381095

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163817	NO2NO3-N	0.758	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P380659

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163273	Total-P	0.779	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P380501

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163673	O-Phosphate-P	1.56	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P380462

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163225	Anatoxin-a	8.26	Spike	P	0 - 30
2163225	Cylindrospermopsin	14.0	Spike	P	0 - 30
2163225	Desmethyl microcystin LR	14.7	Spike	P	0 - 30
2163225	Microcystin LA	31.7	Spike	F	0 - 30
2163225	Microcystin LF	4.48	Spike	P	0 - 30
2163225	Microcystin LR	21.9	Spike	P	0 - 30
2163225	Microcystin LW	17.9	Spike	P	0 - 30
2163225	Microcystin LY	2.76	Spike	P	0 - 30
2163225	Microcystin RR	5.27	Spike	P	0 - 30
2163225	Microcystin WR	14.5	Spike	P	0 - 30
2163225	Microcystin YR	0.559	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2163846

Field Sample ID: HABCE0011_LAKE ARNOLD

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	98.7	P	40 - 150

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A98133

Included Lab Sample IDs: 2163848

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	98.4	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A98162

Included Lab Sample IDs: 2163846

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	88.7	90.0	P/P	50 - 160
Cylindrospermopsin	95.2	100	P/P	60 - 160
Desmethyl microcystin LR	107	105	P/P	60 - 160
Microcystin LA	85.1	104	P/P	50 - 160
Microcystin LF	95.4	117	P/P	60 - 160
Microcystin LR	95.4	101	P/P	60 - 160
Microcystin LW	104	114	P/P	60 - 160
Microcystin LY	87.7	131	P/P	60 - 160
Microcystin RR	105	105	P/P	60 - 160
Microcystin WR	107	104	P/P	60 - 160
Microcystin YR	97.3	90.3	P/P	60 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A98222

Included Lab Sample IDs: 2163847

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.9	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A98240

Included Lab Sample IDs: 2163847

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A98309

Included Lab Sample IDs: 2163847

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A98374

Included Lab Sample IDs: 2163847

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	99.0	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		Precision LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	102	99.4	99.1			0.298
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	99.2	99.5			0.168
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	98.0	97.0	96.0			0.758
EPA 365.1 Rev. 2.0	Total-P	106	105	104			0.779
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	95.2	97.0			1.56
EPA 8321B	Anatoxin-a	89.6	98.0	90.3			8.26
	Cylindrospermopsin	107	103	89.8			14.0
	Desmethyl microcystin LR	99.7	107	92.7			14.7
	Microcystin LA	98.5	118	85.9			31.7
	Microcystin LF	96.3	88.2	92.2			4.48
	Microcystin LR	103	112	89.6			21.9
	Microcystin LW	87.4	84.3	101			17.9
	Microcystin LY	107	91.7	94.3			2.76
	Microcystin RR	106	94.5	89.7			5.27
	Microcystin WR	97.4	99.3	85.8			14.5
	Microcystin YR	101	88.5	88.0			0.559

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2163847
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2163847
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2163847
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2163847
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2163848
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2163846

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	03/11/2020			03/19/2020 12:21	Ping Hua	2163847
EPA 351.2 Rev. 2.0	03/11/2020	03/13/2020 12:19	Sima Feizi	03/16/2020 14:46	Julia Storbeck	2163847
EPA 353.2 Rev. 2.0	03/11/2020			03/20/2020 10:34	Beverly Y. Sanders	2163847
EPA 365.1 Rev. 2.0	03/11/2020	03/13/2020 14:30	Yen Ta	03/16/2020 15:47	Benjamin T. Nordmann	2163847
EPA 365.1 Rev. 2.0 dissolved	03/11/2020			03/11/2020 14:13	Carlos Miranda	2163848
EPA 8321B	03/11/2020	03/12/2020 09:00	Juyoung Kim	03/12/2020 13:41	Juyoung Kim	2163846