

Chemical Analysis Report

WQAP-2022-06-17-04

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-2022-05-09-23**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd. Suite 232
Orlando, FL 32803
Attn: Matt Bearden

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: 07-JUL-2022 10:14

A handwritten signature in black ink, appearing to read "Liang Lin", is shown 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 Buffum - Boat Ramp

Collection Date/Time: 06/16/2022 12:40

Field ID: HABCE0127_LakeBuffum

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2335479	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415350	
		Cylindrospermopsin	0.10	U	ug/L	P415350	
		Desmethyl microcystin LR	0.25	U	ug/L	P415350	
		Microcystin HilR**	0.25	U	ug/L	P415350	
		Microcystin HtyR**	0.25	U	ug/L	P415350	
		Microcystin LA	0.10	U	ug/L	P415350	
		Microcystin LF	0.10	U	ug/L	P415350	
		Microcystin LR	0.25	U	ug/L	P415350	
		Microcystin LW	0.25	U	ug/L	P415350	
		Microcystin LY	0.10	U	ug/L	P415350	
		Microcystin RR	0.10	U	ug/L	P415350	
		Microcystin WR	0.50	U	ug/L	P415350	
		Microcystin YR	0.25	U	ug/L	P415350	
		Nodularin-R**	0.10	U	ug/L	P415350	
2335480	EPA 350.1 Rev. 2.0	Ammonia-N	0.039		mg N/L	P415879	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.83		mg N/L	P415784	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.054		mg N/L	P416127	
	EPA 365.1 Rev. 2.0	Total-P	0.047		mg P/L	P415812	
2335481	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.008	I	mg P/L	P415373	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415879

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415784

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416127

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415812

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415373

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

Reference Method: EPA 8321B
Batch ID: P415350

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HIR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415879

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	100		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415784

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416127

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415812

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415373

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

Reference Method: EPA 8321B
Batch ID: P415350

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	85.7		P	40 - 150
Cylindrospermopsin	88.9		P	40 - 150
Desmethyl microcystin LR	98.7		P	40 - 150
Microcystin HIR	86.3		P	40 - 150
Microcystin HtyR	88.6		P	40 - 150
Microcystin LA	93.7		P	40 - 150
Microcystin LF	115		P	40 - 150
Microcystin LR	99.0		P	40 - 150
Microcystin LW	114		P	40 - 150
Microcystin LY	83.2		P	40 - 150
Microcystin RR	83.8		P	40 - 150
Microcystin WR	81.4		P	40 - 150
Microcystin YR	81.5		P	40 - 150
Nodularin-R	85.4		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415879

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335448	Ammonia-N	97.4	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415784

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335448	Kjeldahl Nitrogen	102	96.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416127

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335416	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415812

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335450	Total-P	103	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335398	O-Phosphate-P	96.8	95.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P415350

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2335380	Anatoxin-a	80.6	84.1	P/P	40 - 150
2335380	Cylindrospermopsin	83.5	81.4	P/P	40 - 150
2335380	Desmethyl microcystin LR	101	99.7	P/P	40 - 150
2335380	Microcystin HiLR	93.3	89.9	P/P	40 - 150
2335380	Microcystin HtyR	85.4	79.0	P/P	40 - 150
2335380	Microcystin LA	82.3	82.7	P/P	40 - 150
2335380	Microcystin LF	112	116	P/P	40 - 150
2335380	Microcystin LR	91.5	87.1	P/P	40 - 150
2335380	Microcystin LW	101	110	P/P	40 - 150
2335380	Microcystin LY	91.3	100	P/P	40 - 150
2335380	Microcystin RR	82.9	81.2	P/P	40 - 150
2335380	Microcystin WR	81.4	72.6	P/P	40 - 150
2335380	Microcystin YR	86.8	79.8	P/P	40 - 150
2335380	Nodularin-R	84.9	81.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P415879

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335448	Ammonia-N	0.368	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P415784

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335448	Kjeldahl Nitrogen	3.37	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P416127

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335416	NO2NO3-N	0.499	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P415812

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335450	Total-P	1.44	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P415373

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335398	O-Phosphate-P	1.25	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P415350

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2335380	Anatoxin-a	4.19	Spike	P	0 - 30
2335380	Cylindrospermopsin	2.55	Spike	P	0 - 30
2335380	Desmethyl microcystin LR	0.876	Spike	P	0 - 30
2335380	Microcystin HtIR	3.75	Spike	P	0 - 30
2335380	Microcystin HtyR	7.82	Spike	P	0 - 30
2335380	Microcystin LA	0.464	Spike	P	0 - 30
2335380	Microcystin LF	3.68	Spike	P	0 - 30
2335380	Microcystin LR	4.87	Spike	P	0 - 30
2335380	Microcystin LW	8.51	Spike	P	0 - 30
2335380	Microcystin LY	9.38	Spike	P	0 - 30
2335380	Microcystin RR	2.02	Spike	P	0 - 30
2335380	Microcystin WR	11.4	Spike	P	0 - 30
2335380	Microcystin YR	8.37	Spike	P	0 - 30
2335380	Nodularin-R	3.63	Spike	P	0 - 30

Quality Assurance Report Precision

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

Quality Assurance Report Surrogates

Lab Sample ID: 2335479

Field Sample ID: HABCE0127_LakeBuffum

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	107	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A112903

Included Lab Sample IDs: 2335481

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	98.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A112941

Included Lab Sample IDs: 2335479

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	92.9	92.1	P/P	50 - 160
Cylindrospermopsin	96.8	94.2	P/P	60 - 160
Desmethyl microcystin LR	115	120	P/P	60 - 160
Microcystin H1R	97.4	101	P/P	60 - 160
Microcystin HtyR	90.2	95.8	P/P	60 - 160
Microcystin LA	100	111	P/P	50 - 160
Microcystin LF	120	117	P/P	60 - 160
Microcystin LR	102	97.2	P/P	60 - 160
Microcystin LW	123	126	P/P	60 - 160
Microcystin LY	99.7	111	P/P	60 - 160
Microcystin RR	91.1	96.2	P/P	60 - 160
Microcystin WR	98.3	97.8	P/P	60 - 160
Microcystin YR	82.3	92.3	P/P	60 - 160
Nodularin-R	92.0	97.4	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113138

Included Lab Sample IDs: 2335480

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113163

Included Lab Sample IDs: 2335480

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	107	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113208

Included Lab Sample IDs: 2335480

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113268

Included Lab Sample IDs: 2335480

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	100	P/P	90 - 110

Quality Assurance Report

Calibration Verification

* 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	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	100	97.4	97.8			0.368
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	102	96.0			3.37
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	100	100			0.499
EPA 365.1 Rev. 2.0	Total-P	102	103	105			1.44
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.3	96.8	95.6			1.25
EPA 8321B	Anatoxin-a	85.7	80.6	84.1			4.19
	Cylindrospermopsin	88.9	83.5	81.4			2.55
	Desmethyl microcystin LR	98.7	101	99.7			0.876
	Microcystin HiLR	86.3	93.3	89.9			3.75
	Microcystin HtyR	88.6	85.4	79.0			7.82
	Microcystin LA	93.7	82.3	82.7			0.464
	Microcystin LF	115	112	116			3.68
	Microcystin LR	99.0	91.5	87.1			4.87
	Microcystin LW	114	101	110			8.51
	Microcystin LY	83.2	91.3	100			9.38
	Microcystin RR	83.8	82.9	81.2			2.02
	Microcystin WR	81.4	81.4	72.6			11.4
	Microcystin YR	81.5	86.8	79.8			8.37
	Nodularin-R	85.4	84.9	81.9			3.63

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2335480
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2335480
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2335480
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2335480
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2335481
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2335479

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	06/17/2022			06/28/2022 10:14	Ping Hua	2335480
EPA 351.2 Rev. 2.0	06/17/2022	06/28/2022 15:50	Samantha L Bates	06/29/2022 11:57	Alexandra J Mattheus	2335480
EPA 353.2 Rev. 2.0	06/17/2022			07/05/2022 08:47	Beverly Y. Sanders	2335480
EPA 365.1 Rev. 2.0	06/17/2022	06/28/2022 16:02	Adam P Silver	06/30/2022 14:24	James L Waggeberby	2335480
EPA 365.1 Rev. 2.0 dissolved	06/17/2022			06/17/2022 15:31	Nathaniel J Jones	2335481
EPA 8321B	06/17/2022	06/20/2022 09:00	Manjita Shrestha	06/20/2022 17:00	Manjita Shrestha	2335479