

Chemical Analysis Report

WQAP-2021-02-16-01

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-2021-02-22-33**

Customer: **WQAP**

Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd Ste 232
Orlando, FL 32803
Attn: Natalie Ayala

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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 04-MAR-2021 16:59



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 Conway @ SW Shore

Collection Date/Time: 02/15/2021 12:20

Field ID: HABCE0071_LakeConway2

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2225521	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P393910	
		Cylindrospermopsin	0.25	U	ug/L	P393910	
		Desmethyl microcystin LR	0.25	U	ug/L	P393910	
		Microcystin HilR**	0.25	U	ug/L	P393910	
		Microcystin HtyR**	0.25	U	ug/L	P393910	
		Microcystin LA	0.25	U	ug/L	P393910	
		Microcystin LF	0.25	U	ug/L	P393910	
		Microcystin LR	0.30	I	ug/L	P393910	
		Microcystin LW	0.25	UJ	ug/L	P393910	RPD
		Microcystin LY	0.25	U	ug/L	P393910	
		Microcystin RR	0.25	U	ug/L	P393910	
		Microcystin WR	0.50	U	ug/L	P393910	
		Microcystin YR	0.25	U	ug/L	P393910	
2225523	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P393915	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.38		mg N/L	P393892	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P393890	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P393923	
2225525	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393861	

Ref. Method and Comment:

EPA 8321B: Refer to the Lab Analysis Report for an explanation of QC Codes.

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Holden 90m S of Lake Holden Point

Collection Date/Time: 02/15/2021 10:53

Field ID: HABCE0072_LakeHolden

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2225522	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P393910	
		Cylindrospermopsin	0.25	U	ug/L	P393910	
		Desmethyl microcystin LR	0.25	U	ug/L	P393910	
		Microcystin HilR**	0.25	U	ug/L	P393910	
		Microcystin HtyR**	0.25	U	ug/L	P393910	
		Microcystin LA	0.30	I	ug/L	P393910	
		Microcystin LF	0.25	U	ug/L	P393910	
		Microcystin LR	0.37	I	ug/L	P393910	
		Microcystin LW	0.25	U	ug/L	P393910	RPD
		Microcystin LY	0.25	U	ug/L	P393910	
		Microcystin RR	0.25	U	ug/L	P393910	
		Microcystin WR	0.50	U	ug/L	P393910	
		Microcystin YR	0.25	U	ug/L	P393910	
2225524	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P393915	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.45		mg N/L	P393892	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.011		mg N/L	P393890	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P393923	
2225526	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P393861	

Ref. Method and Comment:

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P393915

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393892

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393890

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P393923

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393861

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

Reference Method: EPA 8321B
Batch ID: P393910

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 HIR	0.25	U	ug/L
Microcystin HtyR	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: P393915

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P393892

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P393890

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: P393923

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	107		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P393861

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P393910

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	125		P	40 - 150
Cylindrospermopsin	129		P	40 - 150
Desmethyl microcystin LR	110		P	40 - 150
Microcystin HIR	92.1		P	40 - 150
Microcystin HtyR	89.5		P	40 - 150
Microcystin LA	118		P	40 - 150
Microcystin LF	138		P	40 - 150
Microcystin LR	113		P	40 - 150
Microcystin LW	131		P	40 - 150
Microcystin LY	144		P	40 - 150
Microcystin RR	130		P	40 - 150
Microcystin WR	88.9		P	40 - 150
Microcystin YR	109		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P393915

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224373	Ammonia-N	94.4	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P393892

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2224715	Kjeldahl Nitrogen	110	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P393890

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2225509	NO2NO3-N	95.5	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P393861

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2225526	O-Phosphate-P	99.0	99.6	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P393910

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2225521	Anatoxin-a	106	115	P/P	40 - 150
2225521	Cylindrospermopsin	95.4	110	P/P	40 - 150
2225521	Desmethyl microcystin LR	83.6	99.0	P/P	40 - 150
2225521	Microcystin H1R	74.4	76.0	P/P	40 - 150
2225521	Microcystin HtyR	64.2	74.1	P/P	40 - 150
2225521	Microcystin LA	97.5	114	P/P	40 - 150
2225521	Microcystin LF	81.0	93.2	P/P	40 - 150
2225521	Microcystin LR	83.7	93.6	P/P	40 - 150
2225521	Microcystin LW	69.4	114	P/P	40 - 150
2225521	Microcystin LY	99.1	124	P/P	40 - 150
2225521	Microcystin RR	108	125	P/P	40 - 150
2225521	Microcystin WR	62.3	66.7	P/P	40 - 150
2225521	Microcystin YR	77.1	97.8	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P393915

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224373	Ammonia-N	2.74	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P393892

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2224715	Kjeldahl Nitrogen	3.54	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P393890

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2225509	NO2NO3-N	1.51	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P393923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2225480	Total-P	6.59	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P393861

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2225526	O-Phosphate-P	0.604	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P393910

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2225521	Anatoxin-a	8.40	Spike	P	0 - 30
2225521	Cylindrospermopsin	13.8	Spike	P	0 - 30
2225521	Desmethyl microcystin LR	16.9	Spike	P	0 - 30
2225521	Microcystin HtIR	2.06	Spike	P	0 - 30
2225521	Microcystin HtyR	14.3	Spike	P	0 - 30
2225521	Microcystin LA	16.0	Spike	P	0 - 30
2225521	Microcystin LF	14.0	Spike	P	0 - 30
2225521	Microcystin LR	10.8	Spike	P	0 - 30
2225521	Microcystin LW	48.6	Spike	F	0 - 30
2225521	Microcystin LY	22.1	Spike	P	0 - 30
2225521	Microcystin RR	14.5	Spike	P	0 - 30
2225521	Microcystin WR	6.85	Spike	P	0 - 30
2225521	Microcystin YR	23.6	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2225521

Field Sample ID: HABCE0071_LakeConway2

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	89.2	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	41.8	P	30 - 160

Lab Sample ID: 2225522

Field Sample ID: HABCE0072_LakeHolden

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	81.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	49.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A103613

Included Lab Sample IDs: 2225525, 2225526

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	99.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A103630

Included Lab Sample IDs: 2225523, 2225524

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A103638

Included Lab Sample IDs: 2225523, 2225524

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.0	97.7	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A103653

Included Lab Sample IDs: 2225521, 2225522

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	118	104	P/P	50 - 160
Cylindrospermopsin	109	94.3	P/P	60 - 160
Desmethyl microcystin LR	87.8	80.9	P/P	60 - 160
Microcystin HILR	84.7	63.6	P/P	60 - 160
Microcystin HtyR	80.4	69.2	P/P	60 - 160
Microcystin LA	108	95.5	P/P	50 - 160
Microcystin LF	116	97.3	P/P	60 - 160
Microcystin LR	83.0	79.6	P/P	60 - 160
Microcystin LW	139	99.0	P/P	60 - 160
Microcystin LY	140	106	P/P	60 - 160
Microcystin RR	116	106	P/P	60 - 160
Microcystin WR	83.1	72.7	P/P	60 - 160
Microcystin YR	89.5	82.0	P/P	60 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A103666

Included Lab Sample IDs: 2225523, 2225524

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A103692

Included Lab Sample IDs: 2225523, 2225524

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	98.8	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		Precision LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	96.8	94.4	97.6			2.74
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	110	105			3.54
EPA 353.2 Rev. 2.0	NO2NO3-N	103	95.5	97.0			1.51
EPA 365.1 Rev. 2.0	Total-P	107					6.59
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.7	99.0	99.6			0.604
EPA 8321B	Anatoxin-a	125	106	115			8.40
	Cylindrospermopsin	129	95.4	110			13.8
	Desmethyl microcystin LR	110	83.6	99.0			16.9
	Microcystin HiLR	92.1	74.4	76.0			2.06
	Microcystin HtyR	89.5	64.2	74.1			14.3
	Microcystin LA	118	97.5	114			16.0
	Microcystin LF	138	81.0	93.2			14.0
	Microcystin LR	113	83.7	93.6			10.8
	Microcystin LW	131	69.4	114			48.6
	Microcystin LY	144	99.1	124			22.1
	Microcystin RR	130	108	125			14.5
	Microcystin WR	88.9	62.3	66.7			6.85
	Microcystin YR	109	77.1	97.8			23.6

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2225523, 2225524
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2225523, 2225524
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2225523, 2225524
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2225523, 2225524
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2225525, 2225526
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2225521, 2225522

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	02/16/2021			02/17/2021 16:40	Ping Hua	2225523
	02/16/2021			02/17/2021 16:41	Ping Hua	2225524
EPA 351.2 Rev. 2.0	02/16/2021	02/17/2021 12:20	Yen Ta	02/18/2021 16:13	Julia Storbeck	2225523
	02/16/2021	02/17/2021 12:20	Yen Ta	02/18/2021 16:14	Julia Storbeck	2225524
EPA 353.2 Rev. 2.0	02/16/2021			02/17/2021 10:14	Beverly Y. Sanders	2225523
	02/16/2021			02/17/2021 10:16	Beverly Y. Sanders	2225524
EPA 365.1 Rev. 2.0	02/16/2021	02/18/2021 16:15	Shengyu Wang	02/19/2021 14:26	Shengyu Wang	2225523
	02/16/2021	02/18/2021 16:15	Shengyu Wang	02/19/2021 14:27	Shengyu Wang	2225524
EPA 365.1 Rev. 2.0 dissolved	02/16/2021			02/16/2021 15:53	Blanca Fach	2225526
	02/16/2021			02/16/2021 15:56	Blanca Fach	2225525
EPA 8321B	02/16/2021	02/18/2021 08:00	Pramila Ghimire	02/18/2021 11:22	Juyoung Kim	2225521
	02/16/2021	02/18/2021 08:00	Pramila Ghimire	02/18/2021 11:38	Juyoung Kim	2225522