

Chemical Analysis Report

WQAP-2021-11-17-03

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-2021-10-25-53**
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: Colin Wright, Program Administrator

Date Certified: 03-DEC-2021 09:46

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular 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 Lorraine - West

Collection Date/Time: 11/16/2021 12:00

Field ID: HABCE0091_LakeLorraine

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2289974	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P406395	
		Cylindrospermopsin	0.10	U	ug/L	P406395	
		Desmethyl microcystin LR	0.25	U	ug/L	P406395	
		Microcystin HIR**	0.25	U	ug/L	P406395	
		Microcystin HtyR**	0.25	U	ug/L	P406395	
		Microcystin LA	0.10	U	ug/L	P406395	
		Microcystin LF	0.10	U	ug/L	P406395	
		Microcystin LR	0.25	U	ug/L	P406395	
		Microcystin LW	0.25	U	ug/L	P406395	
		Microcystin LY	0.10	U	ug/L	P406395	
		Microcystin RR	0.10	U	ug/L	P406395	
		Microcystin WR	0.50	U	ug/L	P406395	
		Microcystin YR	0.25	U	ug/L	P406395	
		Nodularin-R**	0.10	U	ug/L	P406395	
2289975	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P406715	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P406474	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.040		mg N/L	P406612	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P406542	
2289976	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.030		mg P/L	P406450	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

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: P406715

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406474

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406612

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406542

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406450

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

Reference Method: EPA 8321B
Batch ID: P406395

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 H1R	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: P406715

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	93.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406474

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406612

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406542

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: P406450

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

Reference Method: EPA 8321B
Batch ID: P406395

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	96.1		P	40 - 150
Cylindrospermopsin	105		P	40 - 150
Desmethyl microcystin LR	111		P	40 - 150
Microcystin HIR	98.6		P	40 - 150
Microcystin HtyR	76.5		P	40 - 150
Microcystin LA	98.7		P	40 - 150
Microcystin LF	117		P	40 - 150
Microcystin LR	94.2		P	40 - 150
Microcystin LW	108		P	40 - 150
Microcystin LY	90.6		P	40 - 150
Microcystin RR	84.8		P	40 - 150
Microcystin WR	72.8		P	40 - 150
Microcystin YR	97.8		P	40 - 150
Nodularin-R	97.6		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P406715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289695	Ammonia-N	96.4	94.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P406612

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289866	NO2NO3-N	102	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P406450

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290011	O-Phosphate-P	99.3	98.4	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P406395

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2289572	Anatoxin-a	110	122	P/P	40 - 150
2289572	Cylindrospermopsin	96.0	107	P/P	40 - 150
2289572	Desmethyl microcystin LR	103	116	P/P	40 - 150
2289572	Microcystin HilR	95.5	108	P/P	40 - 150
2289572	Microcystin HtyR	72.0	80.5	P/P	40 - 150
2289572	Microcystin LA	93.3	102	P/P	40 - 150
2289572	Microcystin LF	109	123	P/P	40 - 150
2289572	Microcystin LR	93.5	99.6	P/P	40 - 150
2289572	Microcystin LW	103	109	P/P	40 - 150
2289572	Microcystin LY	86.3	92.1	P/P	40 - 150
2289572	Microcystin RR	77.2	88.8	P/P	40 - 150
2289572	Microcystin WR	66.7	83.4	P/P	40 - 150
2289572	Microcystin YR	94.7	107	P/P	40 - 150
2289572	Nodularin-R	95.4	103	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P406715

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289695	Ammonia-N	1.91	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P406474

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289975	Kjeldahl Nitrogen	1.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P406612

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289866	NO2NO3-N	0.613	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P406542

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289660	Total-P	0.945	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P406450

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290011	O-Phosphate-P	0.910	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P406395

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2289572	Anatoxin-a	10.5	Spike	P	0 - 30
2289572	Cylindrospermopsin	11.1	Spike	P	0 - 30
2289572	Desmethyl microcystin LR	12.2	Spike	P	0 - 30
2289572	Microcystin HtIR	12.3	Spike	P	0 - 30
2289572	Microcystin HtyR	11.1	Spike	P	0 - 30
2289572	Microcystin LA	8.54	Spike	P	0 - 30
2289572	Microcystin LF	11.8	Spike	P	0 - 30
2289572	Microcystin LR	6.37	Spike	P	0 - 30
2289572	Microcystin LW	5.38	Spike	P	0 - 30
2289572	Microcystin LY	6.50	Spike	P	0 - 30
2289572	Microcystin RR	13.9	Spike	P	0 - 30
2289572	Microcystin WR	22.2	Spike	P	0 - 30
2289572	Microcystin YR	12.4	Spike	P	0 - 30
2289572	Nodularin-R	7.92	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: 2289974

Field Sample ID: HABCE0091_LakeLorraine

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	78.9	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	85.9	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A108949

Included Lab Sample IDs: 2289976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	98.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A108983

Included Lab Sample IDs: 2289974

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	117	116	P/P	50 - 160
Cylindrospermopsin	110	117	P/P	60 - 160
Desmethyl microcystin LR	109	109	P/P	60 - 160
Microcystin HtR	95.7	90.7	P/P	60 - 160
Microcystin HtyR	78.9	73.8	P/P	60 - 160
Microcystin LA	101	94.9	P/P	50 - 160
Microcystin LF	120	116	P/P	60 - 160
Microcystin LR	91.4	89.9	P/P	60 - 160
Microcystin LW	111	110	P/P	60 - 160
Microcystin LY	88.7	84.7	P/P	60 - 160
Microcystin RR	88.0	85.4	P/P	60 - 160
Microcystin WR	75.4	73.2	P/P	60 - 160
Microcystin YR	104	89.5	P/P	60 - 160
Nodularin-R	94.4	93.2	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109021

Included Lab Sample IDs: 2289975

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109032

Included Lab Sample IDs: 2289975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.5	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A109059

Included Lab Sample IDs: 2289975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	93.6	94.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109062

Included Lab Sample IDs: 2289975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	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		Precision SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	93.6	96.4	94.2		1.91
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103				1.73
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	100		0.613
EPA 365.1 Rev. 2.0	Total-P	102				0.945
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.3	98.4		0.910
EPA 8321B	Anatoxin-a	96.1	110	122		10.5
	Cylindrospermopsin	105	96.0	107		11.1
	Desmethyl microcystin LR	111	103	116		12.2
	Microcystin HiLR	98.6	95.5	108		12.3
	Microcystin HtyR	76.5	72.0	80.5		11.1
	Microcystin LA	98.7	93.3	102		8.54
	Microcystin LF	117	109	123		11.8
	Microcystin LR	94.2	93.5	99.6		6.37
	Microcystin LW	108	103	109		5.38
	Microcystin LY	90.6	86.3	92.1		6.50
	Microcystin RR	84.8	77.2	88.8		13.9
	Microcystin WR	72.8	66.7	83.4		22.2
	Microcystin YR	97.8	94.7	107		12.4
	Nodularin-R	97.6	95.4	103		7.92

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2289975
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2289975
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2289975
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2289975
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2289976
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2289974

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	11/17/2021			11/23/2021 13:51	Roberta Tatti	2289975
EPA 351.2 Rev. 2.0	11/17/2021	11/18/2021 12:27	Benjamin T. Nordmann	11/22/2021 11:13	Alexandra J Mattheus	2289975
EPA 353.2 Rev. 2.0	11/17/2021			11/19/2021 10:20	Beverly Y. Sanders	2289975
EPA 365.1 Rev. 2.0	11/17/2021	11/19/2021 14:45	Madeline Gruver	11/22/2021 13:21	Sarah A Nixon	2289975
EPA 365.1 Rev. 2.0 dissolved	11/17/2021			11/17/2021 14:28	James L Waggerby	2289976
EPA 8321B	11/17/2021	11/18/2021 08:00	Manjita Shrestha	11/18/2021 13:37	Manjita Shrestha	2289974