

Chemical Analysis Report

WQAP-2021-10-01-03

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-2021-09-06-61**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 28-OCT-2021 10:40

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 Emerald - SE Park Shore

Collection Date/Time: 09/30/2021 12:25

Field ID: HABCE0088_LakeEmerald

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2279961	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P404439	
		Cylindrospermopsin	0.10	U	ug/L	P404439	
		Desmethyl microcystin LR	0.25	U	ug/L	P404439	
		Microcystin HIR**	0.25	U	ug/L	P404439	
		Microcystin HtyR**	0.25	U	ug/L	P404439	
		Microcystin LA	0.10	U	ug/L	P404439	
		Microcystin LF	0.10	U	ug/L	P404439	
		Microcystin LR	0.26	I	ug/L	P404439	
		Microcystin LW	0.25	U	ug/L	P404439	
		Microcystin LY	0.10	U	ug/L	P404439	
		Microcystin RR	0.10	U	ug/L	P404439	
		Microcystin WR	0.50	U	ug/L	P404439	
		Microcystin YR	0.25	U	ug/L	P404439	
		Nodularin-R**	0.10	U	ug/L	P404439	
2279962	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P404903	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.88		mg N/L	P404516	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P404779	
	EPA 365.1 Rev. 2.0	Total-P	0.059		mg P/L	P404672	
2279963	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P404469	

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: P404903

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404516

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404779

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404672

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404469

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

Reference Method: EPA 8321B
Batch ID: P404439

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: P404903

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P404516

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P404779

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P404672

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404469

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

Reference Method: EPA 8321B
Batch ID: P404439

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	107		P	40 - 150
Cylindrospermopsin	99.4		P	40 - 150
Desmethyl microcystin LR	92.9		P	40 - 150
Microcystin HIR	101		P	40 - 150
Microcystin HtyR	102		P	40 - 150
Microcystin LA	98.2		P	40 - 150
Microcystin LF	97.3		P	40 - 150
Microcystin LR	96.1		P	40 - 150
Microcystin LW	99.2		P	40 - 150
Microcystin LY	99.5		P	40 - 150
Microcystin RR	106		P	40 - 150
Microcystin WR	106		P	40 - 150
Microcystin YR	101		P	40 - 150
Nodularin-R	102		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P404903

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279962	Ammonia-N	98.4	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P404516

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279644	Kjeldahl Nitrogen	99.2	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P404779

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279962	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P404469

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279963	O-Phosphate-P	98.8	96.5	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P404439

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2279804	Anatoxin-a	96.4	93.0	P/P	40 - 150
2279804	Cylindrospermopsin	87.9	86.4	P/P	40 - 150
2279804	Desmethyl microcystin LR	77.1	74.4	P/P	40 - 150
2279804	Microcystin HilR	84.3	80.0	P/P	40 - 150
2279804	Microcystin HtyR	82.9	87.3	P/P	40 - 150
2279804	Microcystin LA	80.6	79.6	P/P	40 - 150
2279804	Microcystin LF	69.1	59.7	P/P	40 - 150
2279804	Microcystin LR	80.5	76.8	P/P	40 - 150
2279804	Microcystin LW	64.8	61.8	P/P	40 - 150
2279804	Microcystin LY	81.8	79.0	P/P	40 - 150
2279804	Microcystin RR	83.2	82.0	P/P	40 - 150
2279804	Microcystin WR	81.8	74.4	P/P	40 - 150
2279804	Microcystin YR	83.4	81.3	P/P	40 - 150
2279804	Nodularin-R	89.8	87.3	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P404903

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279962	Ammonia-N	1.08	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P404516

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279644	Kjeldahl Nitrogen	1.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P404779

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279962	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P404672

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279915	Total-P	0.838	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P404469

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279963	O-Phosphate-P	2.36	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P404439

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2279804	Anatoxin-a	3.59	Spike	P	0 - 30
2279804	Cylindrospermopsin	1.73	Spike	P	0 - 30
2279804	Desmethyl microcystin LR	3.54	Spike	P	0 - 30
2279804	Microcystin HtIR	5.28	Spike	P	0 - 30
2279804	Microcystin HtyR	5.22	Spike	P	0 - 30
2279804	Microcystin LA	1.34	Spike	P	0 - 30
2279804	Microcystin LF	14.6	Spike	P	0 - 30
2279804	Microcystin LR	4.69	Spike	P	0 - 30
2279804	Microcystin LW	4.76	Spike	P	0 - 30
2279804	Microcystin LY	3.48	Spike	P	0 - 30
2279804	Microcystin RR	1.49	Spike	P	0 - 30
2279804	Microcystin WR	9.45	Spike	P	0 - 30
2279804	Microcystin YR	2.55	Spike	P	0 - 30
2279804	Nodularin-R	2.75	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: 2279961

Field Sample ID: HABCE0088_LakeEmerald

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	78.0	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	68.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A108107

Included Lab Sample IDs: 2279963

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.7	98.6	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A108156

Included Lab Sample IDs: 2279961

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	97.8	97.3	P/P	50 - 160
Cylindrospermopsin	91.0	98.0	P/P	50 - 160
Desmethyl microcystin LR	85.9	80.4	P/P	50 - 160
Microcystin HIR	93.9	85.3	P/P	50 - 160
Microcystin HtyR	91.9	88.8	P/P	50 - 160
Microcystin LA	88.2	91.1	P/P	50 - 160
Microcystin LF	91.7	89.8	P/P	50 - 160
Microcystin LR	84.6	81.4	P/P	50 - 160
Microcystin LW	90.0	84.7	P/P	50 - 160
Microcystin LY	93.9	89.8	P/P	50 - 160
Microcystin RR	94.8	96.7	P/P	50 - 160
Microcystin WR	91.5	90.0	P/P	50 - 160
Microcystin YR	90.1	84.7	P/P	50 - 160
Nodularin-R	95.7	92.3	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A108176

Included Lab Sample IDs: 2279962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A108203

Included Lab Sample IDs: 2279962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A108229

Included Lab Sample IDs: 2279962

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A108277

Included Lab Sample IDs: 2279962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.6	99.1	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	99.4	98.4	99.6		1.08
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.5	99.2	102		1.73
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	102	102		0.0
EPA 365.1 Rev. 2.0	Total-P	105				0.838
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.0	98.8	96.5		2.36
EPA 8321B	Anatoxin-a	107	96.4	93.0		3.59
	Cylindrospermopsin	99.4	87.9	86.4		1.73
	Desmethyl microcystin LR	92.9	77.1	74.4		3.54
	Microcystin HiLR	101	84.3	80.0		5.28
	Microcystin HtyR	102	82.9	87.3		5.22
	Microcystin LA	98.2	80.6	79.6		1.34
	Microcystin LF	97.3	69.1	59.7		14.6
	Microcystin LR	96.1	80.5	76.8		4.69
	Microcystin LW	99.2	64.8	61.8		4.76
	Microcystin LY	99.5	81.8	79.0		3.48
	Microcystin RR	106	83.2	82.0		1.49
	Microcystin WR	106	81.8	74.4		9.45
	Microcystin YR	101	83.4	81.3		2.55
	Nodularin-R	102	89.8	87.3		2.75

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2279962
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2279962
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2279962
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2279962
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2279963
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2279961

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	10/01/2021			10/11/2021 12:53	Ping Hua	2279962
EPA 351.2 Rev. 2.0	10/01/2021	10/04/2021 17:50	Benjamin T. Nordmann	10/06/2021 12:03	Alexandra J Mattheus	2279962
EPA 353.2 Rev. 2.0	10/01/2021			10/08/2021 09:55	Beverly Y. Sanders	2279962
EPA 365.1 Rev. 2.0	10/01/2021	10/06/2021 12:50	Simonne.V. Calhoun	10/07/2021 11:02	Lipi Saha	2279962
EPA 365.1 Rev. 2.0 dissolved	10/01/2021			10/01/2021 14:31	James L Waggeberby	2279963
EPA 8321B	10/01/2021	10/05/2021 10:00	Manjita Shrestha	10/05/2021 19:19	Manjita Shrestha	2279961