

Chemical Analysis Report

WQAP-2021-08-24-01

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-2021-08-02-13**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 17-SEP-2021 13:13

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 Emerald - SE park Shore

Collection Date/Time: 08/23/2021 14:20

Field ID: HABCE0088_LakeEmerald

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2271344	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P402863	
		Cylindrospermopsin	0.10	U	ug/L	P402863	
		Desmethyl microcystin LR	0.25	U	ug/L	P402863	
		Microcystin HIR**	0.25	U	ug/L	P402863	
		Microcystin HtyR**	0.25	U	ug/L	P402863	
		Microcystin LA	0.10	U	ug/L	P402863	
		Microcystin LF	0.10	U	ug/L	P402863	
		Microcystin LR	0.25	U	ug/L	P402863	
		Microcystin LW	0.25	U	ug/L	P402863	
		Microcystin LY	0.10	U	ug/L	P402863	
		Microcystin RR	0.10	U	ug/L	P402863	
		Microcystin WR	0.50	U	ug/L	P402863	
		Microcystin YR	0.25	U	ug/L	P402863	
		Nodularin-R**	0.10	U	ug/L	P402863	
2271345	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P403136	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.93		mg N/L	P403261	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P403070	
	EPA 365.1 Rev. 2.0	Total-P	0.060		mg P/L	P402951	
2271346	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P402911	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403136

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403261

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403070

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402951

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402911

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

Reference Method: EPA 8321B
Batch ID: P402863

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: P403136

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403261

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403070

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: P402951

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402911

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

Reference Method: EPA 8321B
Batch ID: P402863

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	94.4		P	40 - 150
Cylindrospermopsin	83.7		P	40 - 150
Desmethyl microcystin LR	93.8		P	40 - 150
Microcystin HIR	96.7		P	40 - 150
Microcystin HtyR	95.2		P	40 - 150
Microcystin LA	102		P	40 - 150
Microcystin LF	93.3		P	40 - 150
Microcystin LR	89.0		P	40 - 150
Microcystin LW	92.1		P	40 - 150
Microcystin LY	93.3		P	40 - 150
Microcystin RR	100		P	40 - 150
Microcystin WR	94.9		P	40 - 150
Microcystin YR	94.7		P	40 - 150
Nodularin-R	97.4		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403136

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271345	Ammonia-N	96.4	96.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403261

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271142	Kjeldahl Nitrogen	99.4	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403070

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271099	NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402951

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271365	Total-P	108	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402911

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271366	O-Phosphate-P	101	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P402863

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271324	Anatoxin-a	95.9	88.5	P/P	40 - 150
2271324	Cylindrospermopsin	83.3	77.1	P/P	40 - 150
2271324	Desmethyl microcystin LR	93.4	82.7	P/P	40 - 150
2271324	Microcystin HiLR	96.5	89.2	P/P	40 - 150
2271324	Microcystin HtyR	95.1	89.7	P/P	40 - 150
2271324	Microcystin LA	96.7	85.9	P/P	40 - 150
2271324	Microcystin LF	88.0	83.7	P/P	40 - 150
2271324	Microcystin LR	93.9	85.5	P/P	40 - 150
2271324	Microcystin LW	84.5	82.0	P/P	40 - 150
2271324	Microcystin LY	89.5	83.2	P/P	40 - 150
2271324	Microcystin RR	96.5	88.8	P/P	40 - 150
2271324	Microcystin WR	93.9	89.7	P/P	40 - 150
2271324	Microcystin YR	91.7	88.3	P/P	40 - 150
2271324	Nodularin-R	99.0	91.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P403136

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271345	Ammonia-N	0.187	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P403261

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271142	Kjeldahl Nitrogen	4.09	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P403070

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271099	NO2NO3-N	0.506	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P402951

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271365	Total-P	0.173	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P402911

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271366	O-Phosphate-P	0.199	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P402863

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271324	Anatoxin-a	8.06	Spike	P	0 - 30
2271324	Cylindrospermopsin	7.67	Spike	P	0 - 30
2271324	Desmethyl microcystin LR	12.2	Spike	P	0 - 30
2271324	Microcystin H1LR	7.89	Spike	P	0 - 30
2271324	Microcystin HtyR	5.82	Spike	P	0 - 30
2271324	Microcystin LA	11.7	Spike	P	0 - 30
2271324	Microcystin LF	5.05	Spike	P	0 - 30
2271324	Microcystin LR	8.45	Spike	P	0 - 30
2271324	Microcystin LW	2.99	Spike	P	0 - 30
2271324	Microcystin LY	7.25	Spike	P	0 - 30
2271324	Microcystin RR	8.22	Spike	P	0 - 30
2271324	Microcystin WR	4.53	Spike	P	0 - 30
2271324	Microcystin YR	3.78	Spike	P	0 - 30
2271324	Nodularin-R	7.49	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: 2271344

Field Sample ID: HABCE0088_LakeEmerald

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	89.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	89.2	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A107438

Included Lab Sample IDs: 2271346

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

Reference Method: EPA 8321B

Run ID: A107444

Included Lab Sample IDs: 2271344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	90.8	89.3	P/P	50 - 160
Cylindrospermopsin	98.4	93.5	P/P	50 - 160
Desmethyl microcystin LR	105	103	P/P	50 - 160
Microcystin H1R	107	106	P/P	50 - 160
Microcystin HtyR	112	107	P/P	50 - 160
Microcystin LA	118	116	P/P	50 - 160
Microcystin LF	111	111	P/P	50 - 160
Microcystin LR	118	112	P/P	50 - 160
Microcystin LW	106	98.7	P/P	50 - 160
Microcystin LY	109	102	P/P	50 - 160
Microcystin RR	110	111	P/P	50 - 160
Microcystin WR	106	103	P/P	50 - 160
Microcystin YR	103	93.4	P/P	50 - 160
Nodularin-R	111	108	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107485

Included Lab Sample IDs: 2271345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	106	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A107506

Included Lab Sample IDs: 2271345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	99.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A107544

Included Lab Sample IDs: 2271345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.3	97.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107619

Included Lab Sample IDs: 2271345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.4	101	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	98.4	96.4	96.2			0.187
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.6	99.4	104			4.09
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	99.0	98.5			0.506
EPA 365.1 Rev. 2.0	Total-P	104	108	109			0.173
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	101	101			0.199
EPA 8321B	Anatoxin-a	94.4	95.9	88.5			8.06
	Cylindrospermopsin	83.7	83.3	77.1			7.67
	Desmethyl microcystin LR	93.8	93.4	82.7			12.2
	Microcystin HiLR	96.7	96.5	89.2			7.89
	Microcystin HtyR	95.2	95.1	89.7			5.82
	Microcystin LA	102	96.7	85.9			11.7
	Microcystin LF	93.3	88.0	83.7			5.05
	Microcystin LR	89.0	93.9	85.5			8.45
	Microcystin LW	92.1	84.5	82.0			2.99
	Microcystin LY	93.3	89.5	83.2			7.25
	Microcystin RR	100	96.5	88.8			8.22
	Microcystin WR	94.9	93.9	89.7			4.53
	Microcystin YR	94.7	91.7	88.3			3.78
	Nodularin-R	97.4	99.0	91.9			7.49

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2271345
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2271345
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2271345
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2271345
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2271346
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2271344

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	08/24/2021			08/30/2021 11:52	Ping Hua	2271345
EPA 351.2 Rev. 2.0	08/24/2021	09/01/2021 12:09	Benjamin T. Nordmann	09/02/2021 12:46	Alexandra J Mattheus	2271345
EPA 353.2 Rev. 2.0	08/24/2021			08/27/2021 10:46	Beverly Y. Sanders	2271345
EPA 365.1 Rev. 2.0	08/24/2021	08/25/2021 14:45	Simonne.V. Calhoun	08/26/2021 15:17	Shengyu Ding	2271345
EPA 365.1 Rev. 2.0 dissolved	08/24/2021			08/24/2021 14:40	James L Waggeberby	2271346
EPA 8321B	08/24/2021	08/24/2021 12:00	Juyoung Kim	08/24/2021 17:57	Juyoung Kim	2271344