

Chemical Analysis Report

WQAP-2021-08-11-02

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-2021-07-19-08**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 02-SEP-2021 14:16

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

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 Howell - SW Corner

Collection Date/Time: 08/10/2021 12:20

Field ID: HABCE0086_LakeHowell

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2268505	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P402304	
		Cylindrospermopsin	0.10	U	ug/L	P402304	
		Desmethyl microcystin LR	0.25	U	ug/L	P402304	
		Microcystin HIR**	0.25	U	ug/L	P402304	
		Microcystin HtyR**	0.25	U	ug/L	P402304	
		Microcystin LA	0.10	U	ug/L	P402304	
		Microcystin LF	0.10	U	ug/L	P402304	
		Microcystin LR	0.27	I	ug/L	P402304	
		Microcystin LW	0.25	U	ug/L	P402304	
		Microcystin LY	0.10	U	ug/L	P402304	
		Microcystin RR	0.10	U	ug/L	P402304	
		Microcystin WR	0.50	U	ug/L	P402304	
		Microcystin YR	0.25	U	ug/L	P402304	
		Nodularin-R**	0.10	U	ug/L	P402304	
2268506	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P402460	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.79		mg N/L	P402966	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P402440	
	EPA 365.1 Rev. 2.0	Total-P	0.026		mg P/L	P402355	MS
2268507	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P402313	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402460

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402966

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402440

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402355

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402313

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

Reference Method: EPA 8321B
Batch ID: P402304

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: P402460

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: P402966

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P402440

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402355

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P402313

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

Reference Method: EPA 8321B
Batch ID: P402304

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	97.3		P	40 - 150
Cylindrospermopsin	89.6		P	40 - 150
Desmethyl microcystin LR	94.6		P	40 - 150
Microcystin HIR	91.5		P	40 - 150
Microcystin HtyR	94.4		P	40 - 150
Microcystin LA	95.7		P	40 - 150
Microcystin LF	94.5		P	40 - 150
Microcystin LR	88.0		P	40 - 150
Microcystin LW	95.5		P	40 - 150
Microcystin LY	90.7		P	40 - 150
Microcystin RR	92.4		P	40 - 150
Microcystin WR	94.8		P	40 - 150
Microcystin YR	88.7		P	40 - 150
Nodularin-R	89.3		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P402460

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268523	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P402966

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268511	Kjeldahl Nitrogen	112	102	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P402440

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268495	NO2NO3-N	98.8	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P402355

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268341	Total-P	110	108	F/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P402313

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268525	O-Phosphate-P	102	102	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P402304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2268494	Anatoxin-a	90.5	88.2	P/P	40 - 150
2268494	Cylindrospermopsin	81.1	82.0	P/P	40 - 150
2268494	Desmethyl microcystin LR	88.9	92.2	P/P	40 - 150
2268494	Microcystin HiLR	92.7	92.3	P/P	40 - 150
2268494	Microcystin HtyR	86.5	87.6	P/P	40 - 150
2268494	Microcystin LA	83.4	90.6	P/P	40 - 150
2268494	Microcystin LF	73.2	86.8	P/P	40 - 150
2268494	Microcystin LR	91.1	91.8	P/P	40 - 150
2268494	Microcystin LW	79.2	83.2	P/P	40 - 150
2268494	Microcystin LY	82.2	91.5	P/P	40 - 150
2268494	Microcystin RR	84.4	83.0	P/P	40 - 150
2268494	Microcystin WR	95.0	87.2	P/P	40 - 150
2268494	Microcystin YR	91.3	88.0	P/P	40 - 150
2268494	Nodularin-R	84.5	86.8	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P402460

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268523	Ammonia-N	0.787	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P402966

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268511	Kjeldahl Nitrogen	6.39	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P402440

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268495	NO2NO3-N	0.935	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P402355

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268341	Total-P	1.18	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P402313

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268525	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P402304

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2268494	Anatoxin-a	2.56	Spike	P	0 - 30
2268494	Cylindrospermopsin	1.15	Spike	P	0 - 30
2268494	Desmethyl microcystin LR	3.67	Spike	P	0 - 30
2268494	Microcystin H1LR	0.440	Spike	P	0 - 30
2268494	Microcystin HtyR	1.21	Spike	P	0 - 30
2268494	Microcystin LA	8.28	Spike	P	0 - 30
2268494	Microcystin LF	17.0	Spike	P	0 - 30
2268494	Microcystin LR	0.753	Spike	P	0 - 30
2268494	Microcystin LW	4.88	Spike	P	0 - 30
2268494	Microcystin LY	10.8	Spike	P	0 - 30
2268494	Microcystin RR	1.74	Spike	P	0 - 30
2268494	Microcystin WR	8.56	Spike	P	0 - 30
2268494	Microcystin YR	3.72	Spike	P	0 - 30
2268494	Nodularin-R	2.65	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: 2268505

Field Sample ID: HABCE0086_LakeHowell

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	92.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	85.6	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A107178

Included Lab Sample IDs: 2268507

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.8	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A107215

Included Lab Sample IDs: 2268505

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	108	110	P/P	50 - 160
Cylindrospermopsin	90.6	102	P/P	60 - 160
Desmethyl microcystin LR	99.1	121	P/P	60 - 160
Microcystin HIR	97.4	116	P/P	60 - 160
Microcystin HtyR	101	116	P/P	60 - 160
Microcystin LA	121	120	P/P	50 - 160
Microcystin LF	108	95.5	P/P	60 - 160
Microcystin LR	101	117	P/P	60 - 160
Microcystin LW	104	110	P/P	60 - 160
Microcystin LY	103	103	P/P	60 - 160
Microcystin RR	99.0	104	P/P	60 - 160
Microcystin WR	106	115	P/P	60 - 160
Microcystin YR	104	112	P/P	60 - 160
Nodularin-R	103	105	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A107236

Included Lab Sample IDs: 2268506

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: A107243

Included Lab Sample IDs: 2268506

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.4	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107248

Included Lab Sample IDs: 2268506

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107494

Included Lab Sample IDs: 2268506

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	97.2	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	99.4	101	102			0.787
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	112	102			6.39
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	98.5	98.8	99.8			0.935
EPA 365.1 Rev. 2.0	Total-P	108	110	108			1.18
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	102	102			0.0
EPA 8321B	Anatoxin-a	97.3	90.5	88.2			2.56
	Cylindrospermopsin	89.6	81.1	82.0			1.15
	Desmethyl microcystin LR	94.6	88.9	92.2			3.67
	Microcystin HiLR	91.5	92.7	92.3			0.440
	Microcystin HtyR	94.4	86.5	87.6			1.21
	Microcystin LA	95.7	83.4	90.6			8.28
	Microcystin LF	94.5	73.2	86.8			17.0
	Microcystin LR	88.0	91.1	91.8			0.753
	Microcystin LW	95.5	79.2	83.2			4.88
	Microcystin LY	90.7	82.2	91.5			10.8
	Microcystin RR	92.4	84.4	83.0			1.74
	Microcystin WR	94.8	95.0	87.2			8.56
	Microcystin YR	88.7	91.3	88.0			3.72
	Nodularin-R	89.3	84.5	86.8			2.65

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2268506
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2268506
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2268506
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2268506
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2268507
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2268505

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	08/11/2021			08/13/2021 13:39	Ping Hua	2268506
EPA 351.2 Rev. 2.0	08/11/2021	08/25/2021 13:54	Benjamin T. Nordmann	08/26/2021 12:14	Virginia P. Brown	2268506
EPA 353.2 Rev. 2.0	08/11/2021			08/13/2021 10:31	Beverly Y. Sanders	2268506
EPA 365.1 Rev. 2.0	08/11/2021	08/12/2021 15:49	Simonne.V. Calhoun	08/13/2021 15:30	Shengyu Ding	2268506
EPA 365.1 Rev. 2.0 dissolved	08/11/2021			08/11/2021 11:20	Patrick M. Roche	2268507
EPA 8321B	08/11/2021	08/12/2021 08:00	Pramila Ghimire	08/12/2021 09:24	Pramila Ghimire	2268505