

Chemical Analysis Report

WQAP-2021-12-02-01

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-2021-11-15-16**
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: Liang Lin, Environmental Administrator

Date Certified: 21-DEC-2021 11:58

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 Speer - SE boat ramp

Collection Date/Time: 12/01/2021 14:35

Field ID: HABCE0098_LakeSpeer

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2292441	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P406875	
		Cylindrospermopsin	0.10	U	ug/L	P406875	
		Desmethyl microcystin LR	0.30	I	ug/L	P406875	
		Microcystin HilR**	0.25	U	ug/L	P406875	
		Microcystin HtyR**	0.25	U	ug/L	P406875	
		Microcystin LA	0.10	U	ug/L	P406875	
		Microcystin LF	0.10	U	ug/L	P406875	
		Microcystin LR	3.8		ug/L	P406875	
		Microcystin LW	0.25	U	ug/L	P406875	
		Microcystin LY	0.10	U	ug/L	P406875	
		Microcystin RR	2.5		ug/L	P406875	
		Microcystin WR	1.1	I	ug/L	P406875	
		Microcystin YR	0.25	U	ug/L	P406875	
		Nodularin-R**	0.10	U	ug/L	P406875	
2292442	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P407583	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.90	J	mg N/L	P407368	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.017		mg N/L	P407057	
	EPA 365.1 Rev. 2.0	Total-P	0.046		mg P/L	P407040	
2292443	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P406961	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Refer to the Lab Analysis Report for an explanation of QC Codes.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P407583

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407368

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407057

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407040

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406961

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

Reference Method: EPA 8321B
Batch ID: P406875

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: P407583

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407368

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407057

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: P407040

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: P406961

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

Reference Method: EPA 8321B
Batch ID: P406875

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	109		P	40 - 150
Cylindrospermopsin	98.1		P	40 - 150
Desmethyl microcystin LR	99.6		P	40 - 150
Microcystin HIR	100		P	40 - 150
Microcystin HtyR	87.8		P	40 - 150
Microcystin LA	120		P	40 - 150
Microcystin LF	147		P	40 - 150
Microcystin LR	88.3		P	40 - 150
Microcystin LW	101		P	40 - 150
Microcystin LY	114		P	40 - 150
Microcystin RR	99.5		P	40 - 150
Microcystin WR	71.2		P	40 - 150
Microcystin YR	86.5		P	40 - 150
Nodularin-R	98.7		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P407583

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292550	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292442	Kjeldahl Nitrogen	101	114	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407057

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292442	NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407040

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292380	Total-P	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406961

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292551	O-Phosphate-P	92.1	93.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P406875

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2291419	Anatoxin-a	116	118	P/P	40 - 150
2291419	Cylindrospermopsin	90.9	89.0	P/P	40 - 150
2291419	Desmethyl microcystin LR	107	104	P/P	40 - 150
2291419	Microcystin HiLR	101	98.4	P/P	40 - 150
2291419	Microcystin HtyR	91.2	91.0	P/P	40 - 150
2291419	Microcystin LA	110	119	P/P	40 - 150
2291419	Microcystin LF	139	145	P/P	40 - 150
2291419	Microcystin LR	92.8	88.8	P/P	40 - 150
2291419	Microcystin LW	91.9	92.4	P/P	40 - 150
2291419	Microcystin LY	109	114	P/P	40 - 150
2291419	Microcystin RR	100	99.4	P/P	40 - 150
2291419	Microcystin WR	77.2	76.5	P/P	40 - 150
2291419	Microcystin YR	86.7	88.6	P/P	40 - 150
2291419	Nodularin-R	102	102	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P407583

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292550	Ammonia-N	0.327	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P407368

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292442	Kjeldahl Nitrogen	6.82	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P407057

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292442	NO2NO3-N	0.905	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P407040

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292380	Total-P	1.25	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P406961

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292551	O-Phosphate-P	1.51	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P406875

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291419	Anatoxin-a	1.65	Spike	P	0 - 30
2291419	Cylindrospermopsin	2.19	Spike	P	0 - 30
2291419	Desmethyl microcystin LR	2.78	Spike	P	0 - 30
2291419	Microcystin H1LR	3.03	Spike	P	0 - 30
2291419	Microcystin HtyR	0.128	Spike	P	0 - 30
2291419	Microcystin LA	7.70	Spike	P	0 - 30
2291419	Microcystin LF	4.33	Spike	P	0 - 30
2291419	Microcystin LR	4.38	Spike	P	0 - 30
2291419	Microcystin LW	0.536	Spike	P	0 - 30
2291419	Microcystin LY	4.25	Spike	P	0 - 30
2291419	Microcystin RR	0.809	Spike	P	0 - 30
2291419	Microcystin WR	0.885	Spike	P	0 - 30
2291419	Microcystin YR	2.25	Spike	P	0 - 30
2291419	Nodularin-R	0.578	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: 2292441

Field Sample ID: HABCE0098_LakeSpeer

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	89.8	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	93.1	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A109178

Included Lab Sample IDs: 2292443

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.9	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A109182

Included Lab Sample IDs: 2292441

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	114	114	P/P	50 - 160
Cylindrospermopsin	92.9	96.5	P/P	60 - 160
Desmethyl microcystin LR	109	99.6	P/P	60 - 160
Microcystin H1R	95.5	97.0	P/P	60 - 160
Microcystin HtyR	84.5	83.4	P/P	60 - 160
Microcystin LA	120	125	P/P	50 - 160
Microcystin LF	149	149	P/P	60 - 160
Microcystin LR	78.4	85.2	P/P	60 - 160
Microcystin LW	97.1	93.5	P/P	60 - 160
Microcystin LY	110	111	P/P	60 - 160
Microcystin RR	101	103	P/P	60 - 160
Microcystin WR	70.8	72.3	P/P	60 - 160
Microcystin YR	84.1	79.2	P/P	60 - 160
Nodularin-R	101	94.5	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109216

Included Lab Sample IDs: 2292442

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109274

Included Lab Sample IDs: 2292442

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109421

Included Lab Sample IDs: 2292442

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.3	90.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A109444

Included Lab Sample IDs: 2292442

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.7	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 SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	101	102		0.327
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	101	114		6.82
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	101	102		0.905
EPA 365.1 Rev. 2.0	Total-P	108	106	105		1.25
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	92.1	93.5		1.51
EPA 8321B	Anatoxin-a	109	116	118		1.65
	Cylindrospermopsin	98.1	90.9	89.0		2.19
	Desmethyl microcystin LR	99.6	107	104		2.78
	Microcystin HiLR	100	101	98.4		3.03
	Microcystin HtyR	87.8	91.2	91.0		0.128
	Microcystin LA	120	110	119		7.70
	Microcystin LF	147	139	145		4.33
	Microcystin LR	88.3	92.8	88.8		4.38
	Microcystin LW	101	91.9	92.4		0.536
	Microcystin LY	114	109	114		4.25
	Microcystin RR	99.5	100	99.4		0.809
	Microcystin WR	71.2	77.2	76.5		0.885
	Microcystin YR	86.5	86.7	88.6		2.25
	Nodularin-R	98.7	102	102		0.578

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2292442
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2292442
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2292442
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2292442
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2292443
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2292441

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	12/02/2021			12/14/2021 12:05	Ping Hua	2292442
EPA 351.2 Rev. 2.0	12/02/2021	12/13/2021 13:19	Alexandra J Mattheus	12/14/2021 12:16	Alexandra J Mattheus	2292442
EPA 353.2 Rev. 2.0	12/02/2021			12/06/2021 09:46	Beverly Y. Sanders	2292442
EPA 365.1 Rev. 2.0	12/02/2021	12/07/2021 16:30	Simonne.V. Calhoun	12/08/2021 13:35	Shengyu Ding	2292442
EPA 365.1 Rev. 2.0 dissolved	12/02/2021			12/02/2021 14:49	James L Waggerby	2292443
EPA 8321B	12/02/2021	12/02/2021 12:30	Manjita Shrestha	12/02/2021 16:30	Manjita Shrestha	2292441