Chemical Analysis Report

WQAP-2021-04-08-01

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-2021-04-12-59**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd Ste 232
Orlando, FL 32803
Attn: Natalie Ayala

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: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 27-APR-2021 10:09

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 Minnehaha 75m S of Lakeshore Dr. **Collection Date/Time: 04/07/2021 11:24**

Field ID: HABCE0069_LakeMinnehaha1 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2237566	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P396090	
		Cylindrospermopsin	0.25	U	ug/L	P396090	
		Desmethyl microcystin LR	0.25	U	ug/L	P396090	
		Microcystin HilR**	0.25	U	ug/L	P396090	
		Microcystin HtyR**	0.25	U	ug/L	P396090	
		Microcystin LA	0.25	U	ug/L	P396090	
		Microcystin LF	0.25	U	ug/L	P396090	
		Microcystin LR	0.25	U	ug/L	P396090	
		Microcystin LW	0.25	U	ug/L	P396090	
		Microcystin LY	0.25	U	ug/L	P396090	
		Microcystin RR	0.25	U	ug/L	P396090	
		Microcystin WR	0.50	U	ug/L	P396090	
		Microcystin YR	0.25	U	ug/L	P396090	
		Nodularin-R**	0.25	U	ug/L	P396090	
2237567	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P397019	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.92		mg N/L	P396691	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.086		mg N/L	P396275	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P396308	
2237568	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P396235	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397019

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396691

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396275

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396308

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396235

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

Reference Method: EPA 8321B
Batch ID: P396090

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HilR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.25	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397019

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: P396691

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396275

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: P396308

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396235

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P396090

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	82.0		P	40 - 150
Cylindrospermopsin	106		P	40 - 150
Desmethyl microcystin LR	96.1		P	40 - 150
Microcystin HilR	95.6		P	40 - 150
Microcystin HtyR	101		P	40 - 150
Microcystin LA	99.0		P	40 - 150
Microcystin LF	111		P	40 - 150
Microcystin LR	101		P	40 - 150
Microcystin LW	98.4		P	40 - 150
Microcystin LY	112		P	40 - 150
Microcystin RR	105		P	40 - 150
Microcystin WR	101		P	40 - 150
Microcystin YR	103		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: P397019

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2237567	Ammonia-N	95.8	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396691

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2237446	Kjeldahl Nitrogen	113	114	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396275

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2236232	NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396308

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2236945	Total-P	107	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396235

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2237709	O-Phosphate-P	99.4	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P396090

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2235700	Anatoxin-a	94.6	101	P/P	40 - 150
2235700	Cylindrospermopsin	99.8	108	P/P	40 - 150
2235700	Desmethyl microcystin LR	100	107	P/P	40 - 150
2235700	Microcystin HilR	95.9	109	P/P	40 - 150
2235700	Microcystin HtyR	102	105	P/P	40 - 150
2235700	Microcystin LA	96.8	104	P/P	40 - 150
2235700	Microcystin LF	102	104	P/P	40 - 150
2235700	Microcystin LR	99.7	100	P/P	40 - 150
2235700	Microcystin LW	106	102	P/P	40 - 150
2235700	Microcystin LY	99.7	109	P/P	40 - 150
2235700	Microcystin RR	95.9	113	P/P	40 - 150
2235700	Microcystin WR	95.0	98.5	P/P	40 - 150
2235700	Microcystin YR	92.1	105	P/P	40 - 150
2235700	Nodularin-R	98.7	107	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P397019

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2237567	Ammonia-N	0.854	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396691

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2237446	Kjeldahl Nitrogen	0.569	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396275

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2236232	NO2NO3-N	0.506	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396308

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2236945	Total-P	1.39	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396235

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2237709	O-Phosphate-P	0.848	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P396090

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2235700	Anatoxin-a	6.25	Spike	P	0 - 30
2235700	Cylindrospermopsin	8.00	Spike	P	0 - 30
2235700	Desmethyl microcystin LR	6.66	Spike	P	0 - 30
2235700	Microcystin HilR	12.8	Spike	P	0 - 30
2235700	Microcystin HtyR	2.90	Spike	P	0 - 30
2235700	Microcystin LA	7.07	Spike	P	0 - 30
2235700	Microcystin LF	2.09	Spike	P	0 - 30
2235700	Microcystin LR	0.253	Spike	P	0 - 30
2235700	Microcystin LW	3.80	Spike	P	0 - 30
2235700	Microcystin LY	8.60	Spike	P	0 - 30
2235700	Microcystin RR	16.5	Spike	P	0 - 30
2235700	Microcystin WR	3.57	Spike	P	0 - 30
2235700	Microcystin YR	13.0	Spike	P	0 - 30
2235700	Nodularin-R	8.27	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: 2237566
Field Sample ID: HABCE0069_LakeMinnehaha1

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	88.0	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	69.3	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A104577
Included Lab Sample IDs: 2237566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	87.5	89.9	P/P	50 - 160
Cylindrospermopsin	97.4	102	P/P	60 - 160
Desmethyl microcystin LR	98.0	93.8	P/P	60 - 160
Microcystin HilR	98.7	88.0	P/P	60 - 160
Microcystin HtyR	93.5	85.6	P/P	60 - 160
Microcystin LA	97.9	87.3	P/P	50 - 160
Microcystin LF	93.7	76.2	P/P	50 - 160
Microcystin LR	86.9	87.9	P/P	60 - 160
Microcystin LW	93.2	71.7	P/P	60 - 160
Microcystin LY	96.1	82.2	P/P	60 - 160
Microcystin RR	99.4	100	P/P	60 - 160
Microcystin WR	90.1	90.2	P/P	60 - 160
Microcystin YR	92.5	91.9	P/P	60 - 160
Nodularin-R	94.8	97.3	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104594
Included Lab Sample IDs: 2237568

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104617
Included Lab Sample IDs: 2237567

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104669
Included Lab Sample IDs: 2237567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104871
Included Lab Sample IDs: 2237567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104919
Included Lab Sample IDs: 2237567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	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		Precision		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	95.8	96.8			0.854
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	113	114			0.569
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	99.0	98.5			0.506
EPA 365.1 Rev. 2.0	Total-P	106	107	109			1.39
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.7	99.4	100			0.848
EPA 8321B	Anatoxin-a	82.0	94.6	101			6.25
	Cylindrospermopsin	106	99.8	108			8.00
	Desmethyl microcystin LR	96.1	100	107			6.66
	Microcystin HilR	95.6	95.9	109			12.8
	Microcystin HtyR	101	102	105			2.90
	Microcystin LA	99.0	96.8	104			7.07
	Microcystin LF	111	102	104			2.09
	Microcystin LR	101	99.7	100			0.253
	Microcystin LW	98.4	106	102			3.80
	Microcystin LY	112	99.7	109			8.60
	Microcystin RR	105	95.9	113			16.5
	Microcystin WR	101	95.0	98.5			3.57
	Microcystin YR	103	92.1	105			13.0
	Nodularin-R	102	98.7	107			8.27

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2237567
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2237567
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2237567
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2237567
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2237568
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2237566

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	04/08/2021			04/22/2021 17:21	Ping Hua	2237567
EPA 351.2 Rev. 2.0	04/08/2021	04/16/2021 13:55	Benjamin T. Nordmann	04/20/2021 16:15	Virginia P. Brown	2237567
EPA 353.2 Rev. 2.0	04/08/2021			04/09/2021 11:33	Beverly Y. Sanders	2237567
EPA 365.1 Rev. 2.0	04/08/2021	04/09/2021 15:30	Yen Ta	04/12/2021 14:31	Shengyu Ding	2237567
EPA 365.1 Rev. 2.0 dissolved	04/08/2021			04/08/2021 16:21	Blanca Fach	2237568
EPA 8321B	04/08/2021	04/08/2021 11:00	Pramila Ghimire	04/08/2021 12:47	Pramila Ghimire	2237566