Chemical Analysis Report

WQAP-2021-03-25-01

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-2021-03-08-10**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 16-APR-2021 09:46

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 Anderson - NW corner **Collection Date/Time: 03/24/2021 09:40**

Field ID: HABCE0049_LakeAnderson Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2233595	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P395430	
		Cylindrospermopsin	0.25	U	ug/L	P395430	
		Desmethyl microcystin LR	0.25	U	ug/L	P395430	
		Microcystin HilR**	0.25	U	ug/L	P395430	
		Microcystin HtyR**	0.25	U	ug/L	P395430	
		Microcystin LA	0.25	U	ug/L	P395430	
		Microcystin LF	0.25	U	ug/L	P395430	
		Microcystin LR	1.2		ug/L	P395430	
		Microcystin LW	0.25	U	ug/L	P395430	
		Microcystin LY	0.25	U	ug/L	P395430	
		Microcystin RR	0.25	U	ug/L	P395430	
		Microcystin WR	0.50	U	ug/L	P395430	
		Microcystin YR	0.25	U	ug/L	P395430	
		Nodularin-R**	0.25	U	ug/L	P395430	
2233596	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P395912	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P395792	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.065		mg N/L	P395521	
	EPA 365.1 Rev. 2.0	Total-P	0.060		mg P/L	P395544	
2233597	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P395492	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395912

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395792

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395521

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395544

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395492

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

Reference Method: EPA 8321B
Batch ID: P395430

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: P395912

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395792

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395521

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395544

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395492

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

Reference Method: EPA 8321B
Batch ID: P395430

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	100		P	40 - 150
Cylindrospermopsin	92.0		P	40 - 150
Desmethyl microcystin LR	74.2		P	40 - 150
Microcystin HilR	83.6		P	40 - 150
Microcystin HtyR	80.2		P	40 - 150
Microcystin LA	81.3		P	40 - 150
Microcystin LF	83.0		P	40 - 150
Microcystin LR	68.0		P	40 - 150
Microcystin LW	82.7		P	40 - 150
Microcystin LY	81.1		P	40 - 150
Microcystin RR	85.3		P	40 - 150
Microcystin WR	81.2		P	40 - 150
Microcystin YR	76.6		P	40 - 150
Nodularin-R	81.3		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395912

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2233596	Ammonia-N	96.0	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395792

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2233535	Kjeldahl Nitrogen	100	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395521

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2233596	NO2NO3-N	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395544

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2233332	Total-P	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395492

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2233597	O-Phosphate-P	100	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P395430

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2233355	Anatoxin-a	113	115	P/P	40 - 150
2233355	Cylindrospermopsin	107	98.2	P/P	40 - 150
2233355	Desmethyl microcystin LR	98.2	96.0	P/P	40 - 150
2233355	Microcystin HilR	101	95.6	P/P	40 - 150
2233355	Microcystin HtyR	104	103	P/P	40 - 150
2233355	Microcystin LA	96.0	93.1	P/P	40 - 150
2233355	Microcystin LF	99.9	97.1	P/P	40 - 150
2233355	Microcystin LR	88.4	84.7	P/P	40 - 150
2233355	Microcystin LW	93.5	89.3	P/P	40 - 150
2233355	Microcystin LY	82.1	91.0	P/P	40 - 150
2233355	Microcystin RR	102	101	P/P	40 - 150
2233355	Microcystin WR	94.2	97.8	P/P	40 - 150
2233355	Microcystin YR	99.0	94.5	P/P	40 - 150
2233355	Nodularin-R	101	98.9	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P395912

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2233596	Ammonia-N	1.22	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P395792

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2233535	Kjeldahl Nitrogen	0.0145	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P395521

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2233596	NO2NO3-N	0.370	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P395544

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2233332	Total-P	0.0226	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P395492

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2233597	O-Phosphate-P	0.200	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P395430

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2233355	Anatoxin-a	1.55	Spike	P	0 - 30
2233355	Cylindrospermopsin	8.42	Spike	P	0 - 30
2233355	Desmethyl microcystin LR	2.24	Spike	P	0 - 30
2233355	Microcystin HilR	5.20	Spike	P	0 - 30
2233355	Microcystin HtyR	1.35	Spike	P	0 - 30
2233355	Microcystin LA	2.83	Spike	P	0 - 30
2233355	Microcystin LF	2.84	Spike	P	0 - 30
2233355	Microcystin LR	3.88	Spike	P	0 - 30
2233355	Microcystin LW	4.59	Spike	P	0 - 30
2233355	Microcystin LY	10.2	Spike	P	0 - 30
2233355	Microcystin RR	0.183	Spike	P	0 - 30
2233355	Microcystin WR	3.73	Spike	P	0 - 30
2233355	Microcystin YR	4.64	Spike	P	0 - 30
2233355	Nodularin-R	2.56	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: 2233595
Field Sample ID: HABCE0049_LakeAnderson

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	84.1	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	76.0	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A104273
Included Lab Sample IDs: 2233597

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: A104281
Included Lab Sample IDs: 2233595

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	99.6	101	P/P	50 - 160
Cylindrospermopsin	103	100	P/P	60 - 160
Desmethyl microcystin LR	82.4	83.2	P/P	60 - 160
Microcystin HilR	99.6	102	P/P	60 - 160
Microcystin HtyR	103	101	P/P	60 - 160
Microcystin LA	97.7	102	P/P	50 - 160
Microcystin LF	92.0	103	P/P	50 - 160
Microcystin LR	83.7	76.6	P/P	60 - 160
Microcystin LW	99.3	93.3	P/P	60 - 160
Microcystin LY	92.9	91.9	P/P	60 - 160
Microcystin RR	95.0	97.6	P/P	60 - 160
Microcystin WR	98.4	99.3	P/P	60 - 160
Microcystin YR	89.7	90.6	P/P	60 - 160
Nodularin-R	93.9	99.7	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A104290
Included Lab Sample IDs: 2233596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A104335
Included Lab Sample IDs: 2233596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A104453
Included Lab Sample IDs: 2233596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.5	94.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A104465
Included Lab Sample IDs: 2233596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	98.7	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	97.6	96.0	97.4			1.22
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	100	100			0.0145
EPA 353.2 Rev. 2.0	NO2NO3-N	104	103	103			0.370
EPA 365.1 Rev. 2.0	Total-P	107	105	105			0.0226
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	100	100			0.200
EPA 8321B	Anatoxin-a	100	113	115			1.55
	Cylindrospermopsin	92.0	107	98.2			8.42
	Desmethyl microcystin LR	74.2	98.2	96.0			2.24
	Microcystin HilR	83.6	101	95.6			5.20
	Microcystin HtyR	80.2	104	103			1.35
	Microcystin LA	81.3	96.0	93.1			2.83
	Microcystin LF	83.0	99.9	97.1			2.84
	Microcystin LR	68.0	88.4	84.7			3.88
	Microcystin LW	82.7	93.5	89.3			4.59
	Microcystin LY	81.1	82.1	91.0			10.2
	Microcystin RR	85.3	102	101			0.183
	Microcystin WR	81.2	94.2	97.8			3.73
	Microcystin YR	76.6	99.0	94.5			4.64
	Nodularin-R	81.3	101	98.9			2.56

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2233596
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2233596
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2233596
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2233596
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2233597
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2233595

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	03/25/2021			04/03/2021 11:09	Ping Hua	2233596
EPA 351.2 Rev. 2.0	03/25/2021	04/01/2021 12:36	Benjamin T. Nordmann	04/02/2021 12:12	Virginia P. Brown	2233596
EPA 353.2 Rev. 2.0	03/25/2021			03/26/2021 09:47	Beverly Y. Sanders	2233596
EPA 365.1 Rev. 2.0	03/25/2021	03/26/2021 12:49	Yen Ta	03/29/2021 14:55	Shengyu Ding	2233596
EPA 365.1 Rev. 2.0 dissolved	03/25/2021			03/25/2021 15:24	Blanca Fach	2233597
EPA 8321B	03/25/2021	03/25/2021 12:00	Pramila Ghimire	03/25/2021 18:59	Pramila Ghimire	2233595