Chemical Analysis Report

WQAP-2019-11-07-01

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-2019-10-21-58**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd
Suite 232
Orlando, FL 32806
Attn: Mike Linger

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: Colin Wright, Program Administrator

Date Certified: 26-NOV-2019 08:42

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 Grace HAB **Collection Date/Time: 11/06/2019 13:20**

Field ID: Lake Grace HAB Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2134500	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P373743	
		Cylindrospermopsin**	0.25	U	ug/L	P373743	
		Desmethyl microcystin LR**	0.25	U	ug/L	P373743	
		Microcystin LA**	0.25	U	ug/L	P373743	
		Microcystin LF**	0.25	U	ug/L	P373743	
		Microcystin LR**	0.30	I	ug/L	P373743	
		Microcystin LW**	0.25	U	ug/L	P373743	
		Microcystin LY**	0.25	U	ug/L	P373743	
		Microcystin RR**	0.25	U	ug/L	P373743	
		Microcystin WR**	0.25	U	ug/L	P373743	
		Microcystin YR**	0.25	U	ug/L	P373743	
2134504	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P374259	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.68		mg N/L	P374223	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P373945	
	EPA 365.1 Rev. 2.0	Total-P	0.030		mg P/L	P374422	
2134505	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P373909	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P374259

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P374223

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373945

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P374422

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373909

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

Reference Method: EPA 8321B
Batch ID: P373743

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 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	0.25	U	ug/L
Microcystin YR	0.25	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P374259

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P374223

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.1		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373945

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: P374422

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373909

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.6		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P373743

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	123		P	40 - 140
Cylindrospermopsin	115		P	40 - 140
Desmethyl microcystin LR	106		P	40 - 140
Microcystin LA	72.5		P	40 - 140
Microcystin LF	120		P	40 - 140
Microcystin LR	93.2		P	40 - 140
Microcystin LW	96.0		P	40 - 140
Microcystin LY	86.7		P	40 - 140
Microcystin RR	97.2		P	40 - 140
Microcystin WR	104		P	40 - 140
Microcystin YR	91.7		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P374259

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2134837	Ammonia-N	95.5	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P374223

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2134856	Kjeldahl Nitrogen	101	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373945

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2134470	NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P374422

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2134504	Total-P	97.6	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373909

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2134826	O-Phosphate-P	95.8	95.7	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P373743

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2133990	Anatoxin-a	99.9	106	P/P	40 - 140
2133990	Cylindrospermopsin	82.7	92.5	P/P	40 - 140
2133990	Desmethyl microcystin LR	85.2	92.4	P/P	40 - 140
2133990	Microcystin LA	60.7	64.4	P/P	40 - 140
2133990	Microcystin LF	98.3	98.0	P/P	40 - 140
2133990	Microcystin LR	81.6	87.7	P/P	40 - 140
2133990	Microcystin LW	77.1	79.3	P/P	40 - 140
2133990	Microcystin LY	75.1	77.2	P/P	40 - 140
2133990	Microcystin RR	85.1	89.4	P/P	40 - 140
2133990	Microcystin WR	94.7	85.7	P/P	40 - 140
2133990	Microcystin YR	78.0	82.7	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P374259

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2134837	Ammonia-N	1.69	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P374223

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2134856	Kjeldahl Nitrogen	7.14	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373945

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2134470	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P374422

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2134504	Total-P	0.526	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373909

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2134826	O-Phosphate-P	0.0844	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P373743

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2133990	Anatoxin-a	5.43	Spike	P	0 - 30
2133990	Cylindrospermopsin	11.1	Spike	P	0 - 30
2133990	Desmethyl microcystin LR	8.13	Spike	P	0 - 30
2133990	Microcystin LA	6.04	Spike	P	0 - 30
2133990	Microcystin LF	0.281	Spike	P	0 - 30
2133990	Microcystin LR	6.93	Spike	P	0 - 30
2133990	Microcystin LW	2.87	Spike	P	0 - 30
2133990	Microcystin LY	2.75	Spike	P	0 - 30
2133990	Microcystin RR	4.29	Spike	P	0 - 30
2133990	Microcystin WR	8.48	Spike	P	0 - 30
2133990	Microcystin YR	5.84	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Surrogates

Lab Sample ID: 2134500
Field Sample ID: Lake Grace HAB

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	89.4	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A95549
Included Lab Sample IDs: 2134500

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	110	108	P/P	50 - 160
Cylindrospermopsin	115	107	P/P	60 - 160
Desmethyl microcystin LR	89.0	82.7	P/P	50 - 160
Microcystin LA	71.6	67.7	P/P	50 - 160
Microcystin LF	97.6	92.3	P/P	60 - 160
Microcystin LR	83.1	80.2	P/P	60 - 160
Microcystin LW	75.8	78.6	P/P	50 - 160
Microcystin LY	82.6	80.2	P/P	60 - 160
Microcystin RR	91.1	93.0	P/P	60 - 160
Microcystin WR	94.2	93.3	P/P	60 - 160
Microcystin YR	78.9	79.5	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A95574
Included Lab Sample IDs: 2134505

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A95598
Included Lab Sample IDs: 2134504

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A95747
Included Lab Sample IDs: 2134504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.7	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A95831
Included Lab Sample IDs: 2134504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A95931
Included Lab Sample IDs: 2134504

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

* 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	97.9	95.5	98.6			1.69
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.1	101	108			7.14
EPA 353.2 Rev. 2.0	NO2NO3-N	102	98.5				0.0
EPA 365.1 Rev. 2.0	Total-P	99.4	97.6	98.2			0.526
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.6	95.8	95.7			0.0844
EPA 8321B	Anatoxin-a	123	99.9	106			5.43
	Cylindrospermopsin	115	82.7	92.5			11.1
	Desmethyl microcystin LR	106	85.2	92.4			8.13
	Microcystin LA	72.5	60.7	64.4			6.04
	Microcystin LF	120	98.3	98.0			0.281
	Microcystin LR	93.2	81.6	87.7			6.93
	Microcystin LW	96.0	77.1	79.3			2.87
	Microcystin LY	86.7	75.1	77.2			2.75
	Microcystin RR	97.2	85.1	89.4			4.29
	Microcystin WR	104	94.7	85.7			8.48
	Microcystin YR	91.7	78.0	82.7			5.84

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2134504
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2134504
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2134504
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2134504
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2134505
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2134500

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	11/07/2019			11/14/2019 12:10	Ping Hua	2134504
EPA 351.2 Rev. 2.0	11/07/2019	11/14/2019 18:43	Sima Feizi	11/19/2019 16:26	Jhamieka S. Greenwood	2134504
EPA 353.2 Rev. 2.0	11/07/2019			11/08/2019 12:44	Beverly Y. Sanders	2134504
EPA 365.1 Rev. 2.0	11/07/2019	11/19/2019 12:09	Yen Ta	11/22/2019 12:58	Benjamin T. Nordmann	2134504
EPA 365.1 Rev. 2.0 dissolved	11/07/2019			11/07/2019 15:50	Samantha Davila	2134505
EPA 8321B	11/07/2019	11/07/2019 11:30	Juyoung Kim	11/07/2019 12:00	Juyoung Kim	2134500