

Chemical Analysis Report

WQAP-2020-12-18-02

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-2020-11-30-20**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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

Date Certified: 11-JAN-2021 12:28

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 Formosa @ Asher Lane

Collection Date/Time: 12/17/2020 12:14

Field ID: HABCE0055_Lake Formosa

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2214696	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P391590	
		Cylindrospermopsin**	0.25	U	ug/L	P391590	
		Desmethyl microcystin LR**	0.25	U	ug/L	P391590	
		Microcystin LA**	0.25	U	ug/L	P391590	
		Microcystin LF**	0.25	U	ug/L	P391590	
		Microcystin LR**	0.46	I	ug/L	P391590	
		Microcystin LW**	0.25	U	ug/L	P391590	
		Microcystin LY**	0.25	U	ug/L	P391590	
		Microcystin RR**	0.25	U	ug/L	P391590	
		Microcystin WR**	0.50	U	ug/L	P391590	
		Microcystin YR**	0.25	U	ug/L	P391590	
2214701	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P391736	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P391932	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.014		mg N/L	P391593	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P391533	
2214702	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P391461	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391736

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391932

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P391593

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P391533

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P391461

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

Reference Method: EPA 8321B
Batch ID: P391590

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	0.50	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: P391736

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391932

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: P391593

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P391533

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P391461

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

Reference Method: EPA 8321B
Batch ID: P391590

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	81.0		P	40 - 150
Cylindrospermopsin	84.9		P	40 - 150
Desmethyl microcystin LR	80.1		P	40 - 150
Microcystin LA	68.1		P	40 - 150
Microcystin LF	66.4		P	40 - 150
Microcystin LR	78.6		P	40 - 150
Microcystin LW	71.3		P	40 - 150
Microcystin LY	79.5		P	40 - 150
Microcystin RR	86.3		P	40 - 150
Microcystin WR	90.7		P	40 - 150
Microcystin YR	85.4		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391736

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2214701	Ammonia-N	94.6	95.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391932

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2214701	Kjeldahl Nitrogen	105	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P391593

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2214870	NO2NO3-N	97.2	97.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P391533

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2214599	Total-P	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P391461

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2214569	O-Phosphate-P	104	105	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P391590

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2214565	Anatoxin-a	93.6	92.8	P/P	40 - 150
2214565	Cylindrospermopsin	96.6	85.2	P/P	40 - 150
2214565	Desmethyl microcystin LR	99.9	86.8	P/P	40 - 150
2214565	Microcystin LA	74.6	74.5	P/P	40 - 150
2214565	Microcystin LF	64.4	64.1	P/P	40 - 150
2214565	Microcystin LR	96.8	87.1	P/P	40 - 150
2214565	Microcystin LW	75.0	78.9	P/P	40 - 150
2214565	Microcystin LY	78.9	75.9	P/P	40 - 150
2214565	Microcystin RR	88.4	88.8	P/P	40 - 150
2214565	Microcystin WR	109	97.4	P/P	40 - 150
2214565	Microcystin YR	99.5	95.5	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391736

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2214701	Ammonia-N	0.822	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391932

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2214701	Kjeldahl Nitrogen	1.36	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P391593

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2214870	NO2NO3-N	0.477	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P391533

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2214599	Total-P	0.298	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P391461

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2214569	O-Phosphate-P	0.479	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P391590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2214565	Anatoxin-a	0.873	Spike	P	0 - 30
2214565	Cylindrospermopsin	12.5	Spike	P	0 - 30
2214565	Desmethyl microcystin LR	14.0	Spike	P	0 - 30
2214565	Microcystin LA	0.0845	Spike	P	0 - 30
2214565	Microcystin LF	0.540	Spike	P	0 - 30
2214565	Microcystin LR	7.40	Spike	P	0 - 30
2214565	Microcystin LW	4.98	Spike	P	0 - 30
2214565	Microcystin LY	3.88	Spike	P	0 - 30
2214565	Microcystin RR	0.418	Spike	P	0 - 30
2214565	Microcystin WR	11.3	Spike	P	0 - 30
2214565	Microcystin YR	4.09	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2214696

Field Sample ID: HABCE0055_Lake Formosa

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	81.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	82.8	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A102678

Included Lab Sample IDs: 2214702

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.2	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A102715

Included Lab Sample IDs: 2214701

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A102753

Included Lab Sample IDs: 2214701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	100	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A102759

Included Lab Sample IDs: 2214696

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	90.8	94.5	P/P	50 - 160
Cylindrospermopsin	99.8	104	P/P	60 - 160
Desmethyl microcystin LR	99.4	102	P/P	60 - 160
Microcystin LA	82.7	74.8	P/P	50 - 160
Microcystin LF	71.7	71.0	P/P	50 - 160
Microcystin LR	94.1	91.2	P/P	60 - 160
Microcystin LW	78.2	71.9	P/P	60 - 160
Microcystin LY	88.9	77.9	P/P	60 - 160
Microcystin RR	100	106	P/P	60 - 160
Microcystin WR	106	108	P/P	60 - 160
Microcystin YR	94.5	80.5	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A102784

Included Lab Sample IDs: 2214701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	94.9	95.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A102889

Included Lab Sample IDs: 2214701

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.1	96.8	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 SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	95.0	94.6	95.6		0.822
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	105	102		1.36
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	97.2	97.6		0.477
EPA 365.1 Rev. 2.0	Total-P	101	101	101		0.298
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	104	105		0.479
EPA 8321B	Anatoxin-a	81.0	93.6	92.8		0.873
	Cylindrospermopsin	84.9	96.6	85.2		12.5
	Desmethyl microcystin LR	80.1	99.9	86.8		14.0
	Microcystin LA	68.1	74.6	74.5		0.0845
	Microcystin LF	66.4	64.4	64.1		0.540
	Microcystin LR	78.6	96.8	87.1		7.40
	Microcystin LW	71.3	75.0	78.9		4.98
	Microcystin LY	79.5	78.9	75.9		3.88
	Microcystin RR	86.3	88.4	88.8		0.418
	Microcystin WR	90.7	109	97.4		11.3
	Microcystin YR	85.4	99.5	95.5		4.09

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2214701
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2214701
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2214701
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2214701
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2214702
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2214696

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	12/18/2020			12/27/2020 16:53	Ping Hua	2214701
EPA 351.2 Rev. 2.0	12/18/2020	01/04/2021 15:30	David Boose	01/05/2021 15:23	Virginia P. Brown	2214701
EPA 353.2 Rev. 2.0	12/18/2020			12/22/2020 10:34	Beverly Y. Sanders	2214701
EPA 365.1 Rev. 2.0	12/18/2020	12/21/2020 12:50	Yen Ta	12/23/2020 11:57	Shengyu Wang	2214701
EPA 365.1 Rev. 2.0 dissolved	12/18/2020			12/18/2020 16:14	Ping Hua	2214702
EPA 8321B	12/18/2020	12/22/2020 12:00	Juyoung Kim	12/23/2020 14:53	Juyoung Kim	2214696