

Chemical Analysis Report

WQAP-2020-09-09-01

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-2020-03-02-59**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 29-SEP-2020 14:16

A handwritten signature in black ink, appearing to read "Liang Lin", is shown 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: IRL @ Pineda Causeway

Collection Date/Time: 09/08/2020 14:30

Field ID: HABCE0040_Indian River1

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2195121	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P387141	
		Cylindrospermopsin**	0.25	U	ug/L	P387141	
		Desmethyl microcystin LR**	0.25	U	ug/L	P387141	
		Microcystin LA**	0.25	U	ug/L	P387141	
		Microcystin LF**	0.25	U	ug/L	P387141	
		Microcystin LR**	0.55	I	ug/L	P387141	
		Microcystin LW**	0.25	U	ug/L	P387141	
		Microcystin LY**	0.25	U	ug/L	P387141	
		Microcystin RR**	0.25	U	ug/L	P387141	
		Microcystin WR**	0.50	U	ug/L	P387141	
		Microcystin YR**	0.25	U	ug/L	P387141	
2195122	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P387294	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	3.5		mg N/L	P387327	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P387371	
	EPA 365.1 Rev. 2.0	Total-P	0.26		mg P/L	P387768	
2195123	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P387163	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387294

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387327

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387371

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387768

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387163

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

Reference Method: EPA 8321B
Batch ID: P387141

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: P387294

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P387327

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

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P387371

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: P387768

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: P387163

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

Reference Method: EPA 8321B
 Batch ID: P387141

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 140
Cylindrospermopsin	106		P	40 - 140
Desmethyl microcystin LR	93.5		P	40 - 140
Microcystin LA	110		P	40 - 140
Microcystin LF	91.2		P	40 - 140
Microcystin LR	84.0		P	40 - 140
Microcystin LW	80.3		P	40 - 140
Microcystin LY	97.2		P	40 - 140
Microcystin RR	112		P	40 - 140
Microcystin WR	97.2		P	40 - 140
Microcystin YR	84.5		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387294

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194558	Ammonia-N	94.3	99.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2195041	Kjeldahl Nitrogen	102	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387371

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194557	NO2NO3-N	98.6	98.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387768

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2195025	Total-P	98.3	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387163

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194778	O-Phosphate-P	93.8	98.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P387141

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194953	Anatoxin-a	86.6	91.0	P/P	40 - 140
2194953	Cylindrospermopsin	90.5	94.6	P/P	40 - 140
2194953	Desmethyl microcystin LR	104	101	P/P	40 - 140
2194953	Microcystin LA	89.6	97.1	P/P	40 - 140
2194953	Microcystin LF	89.8	91.4	P/P	40 - 140
2194953	Microcystin LR	99.4	101	P/P	40 - 140
2194953	Microcystin LW	70.3	67.6	P/P	40 - 140
2194953	Microcystin LY	85.4	90.0	P/P	40 - 140
2194953	Microcystin RR	110	115	P/P	40 - 140
2194953	Microcystin WR	111	106	P/P	40 - 140
2194953	Microcystin YR	97.3	106	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387294

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194558	Ammonia-N	4.59	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2195041	Kjeldahl Nitrogen	3.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387371

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194557	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387768

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2195025	Total-P	0.528	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387163

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194778	O-Phosphate-P	4.37	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P387141

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194953	Anatoxin-a	4.95	Spike	P	0 - 30
2194953	Cylindrospermopsin	4.42	Spike	P	0 - 30
2194953	Desmethyl microcystin LR	2.65	Spike	P	0 - 30
2194953	Microcystin LA	8.06	Spike	P	0 - 30
2194953	Microcystin LF	1.83	Spike	P	0 - 30
2194953	Microcystin LR	1.50	Spike	P	0 - 30
2194953	Microcystin LW	3.93	Spike	P	0 - 30
2194953	Microcystin LY	5.22	Spike	P	0 - 30
2194953	Microcystin RR	3.82	Spike	P	0 - 30
2194953	Microcystin WR	4.94	Spike	P	0 - 30
2194953	Microcystin YR	8.66	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2195121

Field Sample ID: HABCE0040_Indian River1

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	101	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	128	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A100885

Included Lab Sample IDs: 2195123

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	98.9	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A100904

Included Lab Sample IDs: 2195121

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	97.6	98.3	P/P	50 - 160
Cylindrospermopsin	96.5	94.9	P/P	60 - 160
Desmethyl microcystin LR	92.3	89.3	P/P	60 - 160
Microcystin LA	102	100	P/P	50 - 160
Microcystin LF	77.9	83.2	P/P	50 - 160
Microcystin LR	75.2	67.3	P/P	60 - 160
Microcystin LW	62.0	66.7	P/P	60 - 160
Microcystin LY	84.5	81.9	P/P	60 - 160
Microcystin RR	100	104	P/P	60 - 160
Microcystin WR	80.8	81.8	P/P	60 - 160
Microcystin YR	73.7	70.6	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A100944

Included Lab Sample IDs: 2195122

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.2	97.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A100978

Included Lab Sample IDs: 2195122

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A101047

Included Lab Sample IDs: 2195122

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.9	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A101197

Included Lab Sample IDs: 2195122

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	103	P/P	85 - 115

* 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	98.8	94.3	99.3			4.59
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	102	107			3.73
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	98.6	98.6			0.0
EPA 365.1 Rev. 2.0	Total-P	106	98.3	97.7			0.528
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	93.8	98.2			4.37
EPA 8321B	Anatoxin-a	104	86.6	91.0			4.95
	Cylindrospermopsin	106	90.5	94.6			4.42
	Desmethyl microcystin LR	93.5	104	101			2.65
	Microcystin LA	110	89.6	97.1			8.06
	Microcystin LF	91.2	89.8	91.4			1.83
	Microcystin LR	84.0	99.4	101			1.50
	Microcystin LW	80.3	70.3	67.6			3.93
	Microcystin LY	97.2	85.4	90.0			5.22
	Microcystin RR	112	110	115			3.82
	Microcystin WR	97.2	111	106			4.94
	Microcystin YR	84.5	97.3	106			8.66

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2195122
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2195122
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2195122
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2195122
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2195123
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2195121

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	09/09/2020			09/12/2020 14:40	Ping Hua	2195122
EPA 351.2 Rev. 2.0	09/09/2020	09/14/2020 12:35	David Boose	09/16/2020 17:28	Elliott Rodriguez	2195122
EPA 353.2 Rev. 2.0	09/09/2020			09/15/2020 09:54	Beverly Y. Sanders	2195122
EPA 365.1 Rev. 2.0	09/09/2020	09/23/2020 17:40	Madeline Gruver	09/25/2020 12:04	Lipi Saha	2195122
EPA 365.1 Rev. 2.0 dissolved	09/09/2020			09/09/2020 16:14	Virginia P. Brown	2195123
EPA 8321B	09/09/2020	09/09/2020 13:00	Juyoung Kim	09/10/2020 02:40	Pramila Ghimire	2195121