

Chemical Analysis Report

WQAP-2020-09-18-01

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-2020-08-31-52**
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: Colin Wright, Program Administrator

Date Certified: 05-OCT-2020 12:10

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a white rectangular 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: Lake Otis @ boat ramp

Collection Date/Time: 09/17/2020 11:23

Field ID: HABCE0043_Lake Otis

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2197048	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P387716	
		Cylindrospermopsin**	0.25	U	ug/L	P387716	
		Desmethyl microcystin LR**	0.25	U	ug/L	P387716	MS
		Microcystin LA**	0.25	U	ug/L	P387716	
		Microcystin LF**	0.25	U	ug/L	P387716	
		Microcystin LR**	0.25	U	ug/L	P387716	MS
		Microcystin LW**	0.25	U	ug/L	P387716	
		Microcystin LY**	0.25	U	ug/L	P387716	
		Microcystin RR**	0.25	U	ug/L	P387716	MS
		Microcystin WR**	0.50	U	ug/L	P387716	MS
		Microcystin YR**	0.25	U	ug/L	P387716	MS
2197050	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P387589	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P387687	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P387651	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P387859	
2197052	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P387569	

Sample Location: Lake Idyl @ dock

Collection Date/Time: 09/17/2020 12:00

Field ID: HABCE0044_Lake Idyl

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2197049	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P387716	
		Cylindrospermopsin**	0.25	U	ug/L	P387716	
		Desmethyl microcystin LR**	0.25	U	ug/L	P387716	MS
		Microcystin LA**	0.25	U	ug/L	P387716	
		Microcystin LF**	0.25	U	ug/L	P387716	
		Microcystin LR**	0.32	I	ug/L	P387716	MS
		Microcystin LW**	0.25	U	ug/L	P387716	
		Microcystin LY**	0.25	U	ug/L	P387716	
		Microcystin RR**	0.25	U	ug/L	P387716	MS
		Microcystin WR**	0.50	U	ug/L	P387716	MS
		Microcystin YR**	0.25	U	ug/L	P387716	MS
2197051	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P387589	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.97		mg N/L	P387687	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P387651	
	EPA 365.1 Rev. 2.0	Total-P	0.049		mg P/L	P387917	
2197053	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P387569	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387589

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387687

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387651

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387859

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387917

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387569

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

Reference Method: EPA 8321B
Batch ID: P387716

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: P387589

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387687

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387651

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: P387859

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387917

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: P387569

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.8		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P387716

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 140
Cylindrospermopsin	124		P	40 - 140
Desmethyl microcystin LR	122		P	40 - 140
Microcystin LA	125		P	40 - 140
Microcystin LF	114		P	40 - 140
Microcystin LR	109		P	40 - 140
Microcystin LW	95.3		P	40 - 140
Microcystin LY	127		P	40 - 140
Microcystin RR	122		P	40 - 140
Microcystin WR	122		P	40 - 140
Microcystin YR	121		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197050	Ammonia-N	99.4	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387687

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197017	Kjeldahl Nitrogen	106	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387651

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197020	NO2NO3-N	95.5	95.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387859

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2196931	Total-P	107	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387917

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197051	Total-P	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387569

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2196963	O-Phosphate-P	99.8	99.9	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P387716

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197630	Anatoxin-a	99.5	94.8	P/P	40 - 140
2197630	Cylindrospermopsin	101	92.1	P/P	40 - 140
2197630	Desmethyl microcystin LR	185	163	F/F	40 - 140
2197630	Microcystin LA	120	111	P/P	40 - 140
2197630	Microcystin LF	123	106	P/P	40 - 140
2197630	Microcystin LR	173	162	F/F	40 - 140
2197630	Microcystin LW	97.1	93.2	P/P	40 - 140
2197630	Microcystin LY	111	107	P/P	40 - 140
2197630	Microcystin RR	157	148	F/F	40 - 140
2197630	Microcystin WR	141	134	F/P	40 - 140
2197630	Microcystin YR	180	176	F/F	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197050	Ammonia-N	1.45	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387687

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197017	Kjeldahl Nitrogen	0.984	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387651

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197020	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387859

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2196931	Total-P	3.18	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387917

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197051	Total-P	0.105	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387569

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2196963	O-Phosphate-P	0.100	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P387716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197630	Anatoxin-a	4.78	Spike	P	0 - 30
2197630	Cylindrospermopsin	9.42	Spike	P	0 - 30
2197630	Desmethyl microcystin LR	13.0	Spike	P	0 - 30
2197630	Microcystin LA	7.42	Spike	P	0 - 30
2197630	Microcystin LF	14.4	Spike	P	0 - 30
2197630	Microcystin LR	6.61	Spike	P	0 - 30
2197630	Microcystin LW	4.12	Spike	P	0 - 30
2197630	Microcystin LY	3.51	Spike	P	0 - 30
2197630	Microcystin RR	6.34	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P387716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197630	Microcystin WR	4.97	Spike	P	0 - 30
2197630	Microcystin YR	2.61	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2197048

Field Sample ID: HABCE0043_Lake Otis

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	106	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	64.3	P	30 - 160

Lab Sample ID: 2197049

Field Sample ID: HABCE0044_Lake Idyl

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	111	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	91.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A101084

Included Lab Sample IDs: 2197052, 2197053

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.9	98.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A101088

Included Lab Sample IDs: 2197050, 2197051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A101119

Included Lab Sample IDs: 2197050, 2197051

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

Reference Method: EPA 8321B

Run ID: A101187

Included Lab Sample IDs: 2197048, 2197049

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.4	92.5	P/P	50 - 160
Cylindrospermopsin	112	110	P/P	60 - 160
Desmethyl microcystin LR	103	110	P/P	60 - 160
Microcystin LA	114	127	P/P	50 - 160
Microcystin LF	112	117	P/P	60 - 160
Microcystin LR	106	112	P/P	60 - 160
Microcystin LW	106	89.7	P/P	60 - 160
Microcystin LY	107	117	P/P	60 - 160
Microcystin RR	112	114	P/P	60 - 160
Microcystin WR	106	121	P/P	60 - 160
Microcystin YR	105	111	P/P	60 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A101190

Included Lab Sample IDs: 2197050, 2197051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.9	94.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A101257

Included Lab Sample IDs: 2197050

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	95.5	95.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A101310

Included Lab Sample IDs: 2197051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	94.2	93.8	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		LCS	Precision SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.4	101			1.45
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	106	105			0.984
EPA 353.2 Rev. 2.0	NO2NO3-N	100	95.5	95.5			0.0
EPA 365.1 Rev. 2.0	Total-P	106	107	103			3.18
	Total-P	106	107	107			0.105
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.8	99.8	99.9			0.100
EPA 8321B	Anatoxin-a	102	99.5	94.8			4.78
	Cylindrospermopsin	124	101	92.1			9.42
	Desmethyl microcystin LR	122	185	163			13.0
	Microcystin LA	125	120	111			7.42
	Microcystin LF	114	123	106			14.4
	Microcystin LR	109	173	162			6.61
	Microcystin LW	95.3	97.1	93.2			4.12
	Microcystin LY	127	111	107			3.51
	Microcystin RR	122	157	148			6.34
	Microcystin WR	122	141	134			4.97
	Microcystin YR	121	180	176			2.61

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2197050, 2197051
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2197050, 2197051
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2197050, 2197051
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2197050, 2197051
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2197052, 2197053
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2197048, 2197049

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	09/18/2020			09/20/2020 10:35	Ping Hua	2197050
	09/18/2020			09/20/2020 10:43	Ping Hua	2197051
EPA 351.2 Rev. 2.0	09/18/2020	09/22/2020 11:40	David Boose	09/24/2020 19:38	Elliott Rodriguez	2197050
	09/18/2020	09/22/2020 11:40	David Boose	09/24/2020 19:40	Elliott Rodriguez	2197051
EPA 353.2 Rev. 2.0	09/18/2020			09/22/2020 09:19	Beverly Y. Sanders	2197050
	09/18/2020			09/22/2020 09:20	Beverly Y. Sanders	2197051
EPA 365.1 Rev. 2.0	09/18/2020	09/25/2020 12:17	Yen Ta	09/29/2020 14:15	Lipi Saha	2197050
	09/18/2020	09/28/2020 12:44	Yen Ta	10/01/2020 12:22	Lipi Saha	2197051
EPA 365.1 Rev. 2.0 dissolved	09/18/2020			09/18/2020 16:19	Julia Storbeck	2197052
	09/18/2020			09/18/2020 16:20	Julia Storbeck	2197053
EPA 8321B	09/18/2020	09/24/2020 08:30	Mohammad Ghaffari	09/24/2020 13:20	Juyoung Kim	2197048
	09/18/2020	09/24/2020 08:30	Mohammad Ghaffari	09/24/2020 13:37	Juyoung Kim	2197049