Chemical Analysis Report

WQAP-2019-10-31-01

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-2019-11-04-57**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Date Certified: 18-NOV-2019 10:47

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: HAB_10302019_Lake Olivia1 Center **Collection Date/Time: 10/30/2019 14:18**

Field ID: HAB_10302019_Lake Olivia1 Cen Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2132689	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P373478	
		Cylindrospermopsin**	0.26	I	ug/L	P373478	
		Desmethyl microcystin LR**	0.25	U	ug/L	P373478	
		Microcystin LA**	0.25	U	ug/L	P373478	
		Microcystin LF**	0.25	U	ug/L	P373478	
		Microcystin LR**	0.25	U	ug/L	P373478	
		Microcystin LW**	0.25	U	ug/L	P373478	
		Microcystin LY**	0.25	U	ug/L	P373478	
		Microcystin RR**	0.25	U	ug/L	P373478	
		Microcystin WR**	0.25	U	ug/L	P373478	
		Microcystin YR**	0.25	U	ug/L	P373478	
2132692	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P373638	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.59		mg N/L	P373809	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P373565	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P373920	
2132694	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P373549	

Ref. Method and Comment:
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: HAB_10302019_Lake Olivia2 North Boat Ramp **Collection Date/Time: 10/30/2019 14:28**

Field ID: HAB_10302019_Lake Olivia2 N Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2132690	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P373478	
		Cylindrospermopsin**	0.25	I	ug/L	P373478	
		Desmethyl microcystin LR**	0.25	U	ug/L	P373478	
		Microcystin LA**	0.25	U	ug/L	P373478	
		Microcystin LF**	0.25	U	ug/L	P373478	
		Microcystin LR**	0.25	U	ug/L	P373478	
		Microcystin LW**	0.25	U	ug/L	P373478	
		Microcystin LY**	0.25	U	ug/L	P373478	
		Microcystin RR**	0.25	U	ug/L	P373478	
		Microcystin WR**	0.25	U	ug/L	P373478	
		Microcystin YR**	0.25	U	ug/L	P373478	
2132693	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P373638	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.58		mg N/L	P373809	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.013		mg N/L	P373566	
	EPA 365.1 Rev. 2.0	Total-P	0.015		mg P/L	P373920	
2132695	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P373549	

Ref. Method and Comment:
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P373638

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P373809

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373565

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373566

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P373920

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373549

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

Reference Method: EPA 8321B
Batch ID: P373478

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: P373638

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P373809

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: P373565

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373566

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P373920

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: P373549

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

Reference Method: EPA 8321B
Batch ID: P373478

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	86.6		P	40 - 140
Cylindrospermopsin	93.6		P	40 - 140
Desmethyl microcystin LR	94.0		P	40 - 140
Microcystin LA	81.8		P	40 - 140
Microcystin LF	123		P	40 - 140
Microcystin LR	88.9		P	40 - 140
Microcystin LW	92.2		P	40 - 140
Microcystin LY	98.5		P	40 - 140
Microcystin RR	92.5		P	40 - 140
Microcystin WR	91.9		P	40 - 140
Microcystin YR	91.8		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P373638

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2132692	Ammonia-N	97.7	99.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P373809

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2132692	Kjeldahl Nitrogen	103	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373565

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2132620	NO2NO3-N	96.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373566

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2132693	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373549

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2132712	O-Phosphate-P	96.6	97.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P373478

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2132689	Anatoxin-a	86.5	77.2	P/P	40 - 140
2132689	Cylindrospermopsin	83.3	78.4	P/P	40 - 140
2132689	Desmethyl microcystin LR	101	90.7	P/P	40 - 140
2132689	Microcystin LA	82.7	69.4	P/P	40 - 140
2132689	Microcystin LF	131	109	P/P	40 - 140
2132689	Microcystin LR	97.5	88.4	P/P	40 - 140
2132689	Microcystin LW	91.3	85.8	P/P	40 - 140
2132689	Microcystin LY	95.7	83.7	P/P	40 - 140
2132689	Microcystin RR	97.0	81.6	P/P	40 - 140
2132689	Microcystin WR	105	90.5	P/P	40 - 140
2132689	Microcystin YR	95.9	89.2	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P373638

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132692	Ammonia-N	1.82	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P373809

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132692	Kjeldahl Nitrogen	2.75	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132620	NO2NO3-N	0.245	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P373566

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132693	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P373920

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132663	Total-P	1.80	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P373549

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132712	O-Phosphate-P	0.494	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P373478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132689	Anatoxin-a	11.4	Spike	P	0 - 30
2132689	Cylindrospermopsin	5.92	Spike	P	0 - 30
2132689	Desmethyl microcystin LR	11.2	Spike	P	0 - 30
2132689	Microcystin LA	17.6	Spike	P	0 - 30
2132689	Microcystin LF	18.2	Spike	P	0 - 30
2132689	Microcystin LR	9.74	Spike	P	0 - 30
2132689	Microcystin LW	6.19	Spike	P	0 - 30
2132689	Microcystin LY	13.4	Spike	P	0 - 30
2132689	Microcystin RR	17.3	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P373478

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2132689	Microcystin WR	14.5	Spike	P	0 - 30
2132689	Microcystin YR	7.26	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2132689
Field Sample ID: HAB_10302019_Lake Olivia1 Cen

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	107	P	30 - 165

Lab Sample ID: 2132690
Field Sample ID: HAB_10302019_Lake Olivia2 N

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	104	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A95389
Included Lab Sample IDs: 2132694, 2132695

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A95392
Included Lab Sample IDs: 2132692, 2132693

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

Reference Method: EPA 8321B
Run ID: A95401
Included Lab Sample IDs: 2132689, 2132690

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	87.9	86.3	P/P	50 - 160
Cylindrospermopsin	94.6	99.6	P/P	60 - 160
Desmethyl microcystin LR	94.8	94.8	P/P	50 - 160
Microcystin LA	84.2	75.5	P/P	50 - 160
Microcystin LF	104	97.9	P/P	60 - 160
Microcystin LR	97.5	99.6	P/P	60 - 160
Microcystin LW	86.9	84.9	P/P	50 - 160
Microcystin LY	93.0	97.2	P/P	60 - 160
Microcystin RR	88.6	91.5	P/P	60 - 160
Microcystin WR	95.7	95.5	P/P	60 - 160
Microcystin YR	95.5	95.4	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A95438
Included Lab Sample IDs: 2132692, 2132693

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A95638
Included Lab Sample IDs: 2132692, 2132693

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	101	P/P	90 - 110
Kjeldahl Nitrogen	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A95662
Included Lab Sample IDs: 2132692, 2132693

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	100	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	100	97.7	99.6			1.82
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	103	107			2.75
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	96.2				0.245
	NO2NO3-N	99.0	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	101					1.80
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.6	97.2			0.494
EPA 8321B	Anatoxin-a	86.6	86.5	77.2			11.4
	Cylindrospermopsin	93.6	83.3	78.4			5.92
	Desmethyl microcystin LR	94.0	101	90.7			11.2
	Microcystin LA	81.8	82.7	69.4			17.6
	Microcystin LF	123	131	109			18.2
	Microcystin LR	88.9	97.5	88.4			9.74
	Microcystin LW	92.2	91.3	85.8			6.19
	Microcystin LY	98.5	95.7	83.7			13.4
	Microcystin RR	92.5	97.0	81.6			17.3
	Microcystin WR	91.9	105	90.5			14.5
	Microcystin YR	91.8	95.9	89.2			7.26

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2132692, 2132693
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2132692, 2132693
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2132692, 2132693
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2132692, 2132693
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2132694, 2132695
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2132689, 2132690

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	10/31/2019			11/01/2019 13:43	Ping Hua	2132692
	10/31/2019			11/01/2019 13:44	Ping Hua	2132693
EPA 351.2 Rev. 2.0	10/31/2019	11/06/2019 12:52	Sima Feizi	11/07/2019 20:55	Jhamieka S. Greenwood	2132692
	10/31/2019	11/06/2019 12:52	Sima Feizi	11/07/2019 21:15	Jhamieka S. Greenwood	2132693
EPA 353.2 Rev. 2.0	10/31/2019			11/01/2019 10:22	Beverly Y. Sanders	2132692
	10/31/2019			11/01/2019 10:29	Beverly Y. Sanders	2132693
EPA 365.1 Rev. 2.0	10/31/2019	11/08/2019 13:00	Lipi Saha	11/12/2019 15:39	Benjamin T. Nordmann	2132692
	10/31/2019	11/08/2019 13:00	Lipi Saha	11/12/2019 15:40	Benjamin T. Nordmann	2132693
EPA 365.1 Rev. 2.0 dissolved	10/31/2019			10/31/2019 16:19	Samantha Davila	2132694
	10/31/2019			10/31/2019 16:20	Samantha Davila	2132695
EPA 8321B	10/31/2019	10/31/2019 11:50	Juyoung Kim	11/01/2019 13:22	Juyoung Kim	2132689
	10/31/2019	10/31/2019 11:50	Juyoung Kim	11/01/2019 13:39	Juyoung Kim	2132690