

Chemical Analysis Report

WQAP-2020-02-21-02

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response - SEROC**
Request ID: **RQ-2020-02-17-61**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 13-MAR-2020 12:45

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: Tarpon Lane

Collection Date/Time: 02/20/2020 11:03

Field ID: HAB_SE_0001

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2159908	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P379474	
		Cylindrospermopsin**	0.25	UJ	ug/L	P379474	MS
		Desmethyl microcystin LR**	0.25	U	ug/L	P379474	
		Microcystin LA**	0.25	U	ug/L	P379474	
		Microcystin LF**	0.25	U	ug/L	P379474	
		Microcystin LR**	0.25	U	ug/L	P379474	
		Microcystin LW**	0.25	U	ug/L	P379474	
		Microcystin LY**	0.25	U	ug/L	P379474	
		Microcystin RR**	0.25	U	ug/L	P379474	
		Microcystin WR**	0.50	U	ug/L	P379474	
		Microcystin YR**	0.25	U	ug/L	P379474	
2159909	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P379909	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.51		mg N/L	P379876	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.01	I	mg N/L	P380208	
	EPA 365.1 Rev. 2.0	Total-P	0.070		mg P/L	P379987	
2159910	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.038		mg P/L	P379440	

Ref. Method and Comment:

EPA 8321B: Refer to the Lab Analysis Report for an explanation of QC Codes.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379909

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P379876

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380208

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P379987

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P379440

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

Reference Method: EPA 8321B
Batch ID: P379474

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: P379909

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

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P379876

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

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P380208

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

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P379987

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P379440

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

Reference Method: EPA 8321B
 Batch ID: P379474

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	122		P	40 - 140
Cylindrospermopsin	98.3		P	40 - 140
Desmethyl microcystin LR	104		P	40 - 140
Microcystin LA	110		P	40 - 140
Microcystin LF	81.4		P	40 - 140
Microcystin LR	113		P	40 - 140
Microcystin LW	86.9		P	40 - 140
Microcystin LY	88.2		P	40 - 140
Microcystin RR	104		P	40 - 140
Microcystin WR	111		P	40 - 140
Microcystin YR	120		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P379909

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160259	Ammonia-N	104	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P379876

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2160836	Kjeldahl Nitrogen	101	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P380208

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2159067	NO2NO3-N	95.8	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P379987

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2159766	Total-P	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P379440

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2159910	O-Phosphate-P	98.8	97.0	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P379474

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2159908	Anatoxin-a	94.3	87.5	P/P	40 - 140
2159908	Cylindrospermopsin	31.6	30.1	F/F	40 - 140
2159908	Desmethyl microcystin LR	83.4	72.1	P/P	40 - 140
2159908	Microcystin LA	69.4	67.4	P/P	40 - 140
2159908	Microcystin LF	61.0	54.5	P/P	40 - 140
2159908	Microcystin LR	89.4	91.3	P/P	40 - 140
2159908	Microcystin LW	62.1	62.7	P/P	40 - 140
2159908	Microcystin LY	77.2	70.7	P/P	40 - 140
2159908	Microcystin RR	58.9	46.5	P/P	40 - 140
2159908	Microcystin WR	88.0	76.4	P/P	40 - 140
2159908	Microcystin YR	100	80.0	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P379909

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160259	Ammonia-N	2.92	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P379876

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2160836	Kjeldahl Nitrogen	0.480	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P380208

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159067	NO2NO3-N	2.96	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P379987

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159766	Total-P	0.994	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P379440

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159910	O-Phosphate-P	1.32	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P379474

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2159908	Anatoxin-a	7.44	Spike	P	0 - 30
2159908	Cylindrospermopsin	4.84	Spike	P	0 - 30
2159908	Desmethyl microcystin LR	14.5	Spike	P	0 - 30
2159908	Microcystin LA	2.91	Spike	P	0 - 30
2159908	Microcystin LF	11.2	Spike	P	0 - 30
2159908	Microcystin LR	2.07	Spike	P	0 - 30
2159908	Microcystin LW	1.03	Spike	P	0 - 30
2159908	Microcystin LY	8.80	Spike	P	0 - 30
2159908	Microcystin RR	23.6	Spike	P	0 - 30
2159908	Microcystin WR	14.1	Spike	P	0 - 30
2159908	Microcystin YR	22.3	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2159908
Field Sample ID: HAB_SE_0001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	83.3	P	40 - 150

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A97744

Included Lab Sample IDs: 2159910

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	97.1	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A97858

Included Lab Sample IDs: 2159908

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	119	118	P/P	50 - 160
Cylindrospermopsin	110	99.0	P/P	60 - 160
Desmethyl microcystin LR	114	108	P/P	60 - 160
Microcystin LA	86.2	94.2	P/P	50 - 160
Microcystin LF	79.3	83.3	P/P	60 - 160
Microcystin LR	124	127	P/P	60 - 160
Microcystin LW	88.1	93.5	P/P	60 - 160
Microcystin LY	103	104	P/P	60 - 160
Microcystin RR	108	93.6	P/P	60 - 160
Microcystin WR	120	113	P/P	60 - 160
Microcystin YR	130	147	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A97928

Included Lab Sample IDs: 2159909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A97957

Included Lab Sample IDs: 2159909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.1	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A97992

Included Lab Sample IDs: 2159909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A98039

Included Lab Sample IDs: 2159909

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	102	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	99.3	104	101			2.92
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	101	102			0.480
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	95.8	98.8			2.96
EPA 365.1 Rev. 2.0	Total-P	107	100	101			0.994
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	98.8	97.0			1.32
EPA 8321B	Anatoxin-a	122	94.3	87.5			7.44
	Cylindrospermopsin	98.3	31.6	30.1			4.84
	Desmethyl microcystin LR	104	83.4	72.1			14.5
	Microcystin LA	110	69.4	67.4			2.91
	Microcystin LF	81.4	61.0	54.5			11.2
	Microcystin LR	113	89.4	91.3			2.07
	Microcystin LW	86.9	62.1	62.7			1.03
	Microcystin LY	88.2	77.2	70.7			8.80
	Microcystin RR	104	58.9	46.5			23.6
	Microcystin WR	111	88.0	76.4			14.1
	Microcystin YR	120	100	80.0			22.3

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2159909
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2159909
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2159909
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2159909
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2159910
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2159908

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	02/21/2020			03/02/2020 11:03	Ping Hua	2159909
EPA 351.2 Rev. 2.0	02/21/2020	03/02/2020 14:25	Sima Feizi	03/03/2020 11:49	Jhamieka S. Greenwood	2159909
EPA 353.2 Rev. 2.0	02/21/2020			03/06/2020 10:22	Lauren Lees	2159909
EPA 365.1 Rev. 2.0	02/21/2020	03/03/2020 13:55	Yen Ta	03/04/2020 15:05	Benjamin T. Nordmann	2159909
EPA 365.1 Rev. 2.0 dissolved	02/21/2020			02/21/2020 19:23	Virginia P. Brown	2159910
EPA 8321B	02/21/2020	02/27/2020 09:00	Juyoung Kim	02/27/2020 11:35	Juyoung Kim	2159908