

Chemical Analysis Report

WQAP-2020-10-14-01

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

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2020-08-31-57**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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2199 South Rock Road
Fort Pierce, FL 34945
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Date Certified: 30-OCT-2020 14:18



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: S80_10132020

Collection Date/Time: 10/13/2020 10:20

Field ID: S80_10132020

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2201645	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P388610	
		Cylindrospermopsin**	0.25	U	ug/L	P388610	
		Desmethyl microcystin LR**	0.25	U	ug/L	P388610	
		Microcystin LA**	0.25	U	ug/L	P388610	
		Microcystin LF**	0.25	U	ug/L	P388610	
		Microcystin LR**	0.25	U	ug/L	P388610	
		Microcystin LW**	0.25	U	ug/L	P388610	
		Microcystin LY**	0.25	U	ug/L	P388610	
		Microcystin RR**	0.25	U	ug/L	P388610	
		Microcystin WR**	0.50	U	ug/L	P388610	
		Microcystin YR**	0.25	U	ug/L	P388610	
2201646	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P388838	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P388758	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.33		mg N/L	P388802	
	EPA 365.1 Rev. 2.0	Total-P	0.29		mg P/L	P388728	
2201647	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.23		mg P/L	P388628	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P388838

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P388758

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P388802

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P388728

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P388628

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

Reference Method: EPA 8321B
Batch ID: P388610

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: P388838

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

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P388758

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

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P388802

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P388728

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P388628

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

Reference Method: EPA 8321B
 Batch ID: P388610

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 140
Cylindrospermopsin	96.5		P	40 - 140
Desmethyl microcystin LR	95.7		P	40 - 140
Microcystin LA	98.5		P	40 - 140
Microcystin LF	77.8		P	40 - 140
Microcystin LR	75.9		P	40 - 140
Microcystin LW	83.3		P	40 - 140
Microcystin LY	94.5		P	40 - 140
Microcystin RR	100		P	40 - 140
Microcystin WR	93.7		P	40 - 140
Microcystin YR	89.7		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P388838

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2201844	Ammonia-N	102	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P388758

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2201626	Kjeldahl Nitrogen	102	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P388802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2201646	NO2NO3-N	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P388728

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2201523	Total-P	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P388628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2201691	O-Phosphate-P	96.6	96.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P388610

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2201284	Anatoxin-a	81.3	75.0	P/P	40 - 140
2201284	Cylindrospermopsin	82.8	78.8	P/P	40 - 140
2201284	Desmethyl microcystin LR	127	132	P/P	40 - 140
2201284	Microcystin LA	91.0	90.9	P/P	40 - 140
2201284	Microcystin LF	82.3	83.5	P/P	40 - 140
2201284	Microcystin LR	114	115	P/P	40 - 140
2201284	Microcystin LW	71.8	72.0	P/P	40 - 140
2201284	Microcystin LY	85.2	85.3	P/P	40 - 140
2201284	Microcystin RR	107	105	P/P	40 - 140
2201284	Microcystin WR	104	100	P/P	40 - 140
2201284	Microcystin YR	126	123	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P388838

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2201844	Ammonia-N	0.602	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P388758

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2201626	Kjeldahl Nitrogen	0.480	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P388802

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2201646	NO2NO3-N	0.189	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P388728

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2201523	Total-P	0.390	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P388628

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2201691	O-Phosphate-P	0.152	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P388610

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2201284	Anatoxin-a	8.03	Spike	P	0 - 30
2201284	Cylindrospermopsin	4.92	Spike	P	0 - 30
2201284	Desmethyl microcystin LR	3.80	Spike	P	0 - 30
2201284	Microcystin LA	0.0927	Spike	P	0 - 30
2201284	Microcystin LF	1.50	Spike	P	0 - 30
2201284	Microcystin LR	0.538	Spike	P	0 - 30
2201284	Microcystin LW	0.388	Spike	P	0 - 30
2201284	Microcystin LY	0.166	Spike	P	0 - 30
2201284	Microcystin RR	2.27	Spike	P	0 - 30
2201284	Microcystin WR	4.00	Spike	P	0 - 30
2201284	Microcystin YR	2.49	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2201645
Field Sample ID: S80_10132020

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	103	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	95.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A101508

Included Lab Sample IDs: 2201647

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	98.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A101535

Included Lab Sample IDs: 2201646

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A101542

Included Lab Sample IDs: 2201645

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	103	102	P/P	50 - 160
Cylindrospermopsin	101	101	P/P	60 - 160
Desmethyl microcystin LR	99.8	107	P/P	60 - 160
Microcystin LA	107	110	P/P	50 - 160
Microcystin LF	96.1	88.6	P/P	60 - 160
Microcystin LR	81.5	79.5	P/P	60 - 160
Microcystin LW	86.0	85.5	P/P	60 - 160
Microcystin LY	95.5	100	P/P	60 - 160
Microcystin RR	101	101	P/P	60 - 160
Microcystin WR	99.9	97.4	P/P	60 - 160
Microcystin YR	84.7	84.3	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A101572

Included Lab Sample IDs: 2201646

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	99.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A101579

Included Lab Sample IDs: 2201646

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A101760

Included Lab Sample IDs: 2201646

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.7	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	101	102	101			0.602
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	102	103			0.480
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	98.0				0.189
EPA 365.1 Rev. 2.0	Total-P	105	107	107			0.390
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.8	96.6	96.4			0.152
EPA 8321B	Anatoxin-a	101	81.3	75.0			8.03
	Cylindrospermopsin	96.5	82.8	78.8			4.92
	Desmethyl microcystin LR	95.7	127	132			3.80
	Microcystin LA	98.5	91.0	90.9			0.0927
	Microcystin LF	77.8	82.3	83.5			1.50
	Microcystin LR	75.9	114	115			0.538
	Microcystin LW	83.3	71.8	72.0			0.388
	Microcystin LY	94.5	85.2	85.3			0.166
	Microcystin RR	100	107	105			2.27
	Microcystin WR	93.7	104	100			4.00
	Microcystin YR	89.7	126	123			2.49

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2201646
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2201646
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2201646
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2201646
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2201647
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2201645

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	10/14/2020			10/17/2020 13:48	Ping Hua	2201646
EPA 351.2 Rev. 2.0	10/14/2020	10/15/2020 13:33	David Boose	10/21/2020 22:26	Julia Storbeck	2201646
EPA 353.2 Rev. 2.0	10/14/2020			10/15/2020 10:48	Beverly Y. Sanders	2201646
EPA 365.1 Rev. 2.0	10/14/2020	10/15/2020 12:59	Yen Ta	10/16/2020 15:40	Lipi Saha	2201646
EPA 365.1 Rev. 2.0 dissolved	10/14/2020			10/14/2020 11:47	Samantha Davila	2201647
EPA 8321B	10/14/2020	10/15/2020 08:30	Juyoung Kim	10/15/2020 13:33	Pramila Ghimire	2201645