

Chemical Analysis Report

WQAP-2022-07-08-02

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-2022-06-20-68**
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

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 25-JUL-2022 14:54

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: Lake Marian Pavilion

Collection Date/Time: 07/07/2022 09:30

Field ID: SEHAB0083

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2339962	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P416330	
		Cylindrospermopsin	0.10	U	ug/L	P416327	
		Desmethyl microcystin LR	0.25	U	ug/L	P416327	
		Microcystin HILR	0.25	U	ug/L	P416327	
		Microcystin HtyR	0.25	U	ug/L	P416327	
		Microcystin LA	0.16	I	ug/L	P416327	
		Microcystin LF	0.26	I	ug/L	P416327	
		Microcystin LR	2.8		ug/L	P416327	
		Microcystin LW	0.25	U	ug/L	P416327	
		Microcystin LY	1.1		ug/L	P416327	
		Microcystin RR	0.19	I	ug/L	P416327	
		Microcystin WR	0.50	U	ug/L	P416327	
		Microcystin YR	0.25	U	ug/L	P416327	
		Nodularin-R	0.10	U	ug/L	P416327	
2339975	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P416669	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.8		mg N/L	P416704	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P416712	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P416802	
2339976	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P416362	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: 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: P416669

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P416704

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416712

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416802

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416362

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

Reference Method: EPA 8321B
Batch ID: P416327

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HILR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Reference Method: EPA 8321B
Batch ID: P416330

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416669

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: P416704

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: P416712

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: P416802

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: P416362

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

Reference Method: EPA 8321B
Batch ID: P416327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	104		P	40 - 150
Desmethyl microcystin LR	88.3		P	40 - 150
Microcystin HILR	91.4		P	40 - 150
Microcystin HtyR	100		P	40 - 150
Microcystin LA	111		P	40 - 150
Microcystin LF	107		P	40 - 150
Microcystin LR	81.2		P	40 - 150
Microcystin LW	115		P	40 - 150
Microcystin LY	102		P	40 - 150
Microcystin RR	91.2		P	40 - 150
Microcystin WR	98.4		P	40 - 150
Microcystin YR	104		P	40 - 150
Nodularin-R	89.7		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P416330

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	97.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P416669

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2340078	Ammonia-N	100	97.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P416712

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2340225	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P416802

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2340324	Total-P	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P416362

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2340082	O-Phosphate-P	96.7	97.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P416327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2339962	Cylindrospermopsin	93.3	97.7	P/P	40 - 150
2339962	Desmethyl microcystin LR	90.5	90.7	P/P	40 - 150
2339962	Microcystin HilR	91.8	91.0	P/P	40 - 150
2339962	Microcystin HtyR	95.5	94.2	P/P	40 - 150
2339962	Microcystin LA	100	105	P/P	40 - 150
2339962	Microcystin LF	96.6	99.9	P/P	40 - 150
2339962	Microcystin LR	82.6	79.8	P/P	40 - 150
2339962	Microcystin LW	104	103	P/P	40 - 150
2339962	Microcystin LY	92.4	98.1	P/P	40 - 150
2339962	Microcystin RR	83.1	83.6	P/P	40 - 150
2339962	Microcystin WR	92.7	88.4	P/P	40 - 150
2339962	Microcystin YR	102	106	P/P	40 - 150
2339962	Nodularin-R	86.5	87.7	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P416330

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2339962	Anatoxin-a	96.4	99.2	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P416669

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2340078	Ammonia-N	2.43	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P416704

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2339975	Kjeldahl Nitrogen	1.58	Sample	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P416712

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2340225	NO2NO3-N	0.380	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P416802

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2340324	Total-P	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P416362

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2340082	O-Phosphate-P	0.824	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P416327

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2339962	Cylindrospermopsin	4.59	Spike	P	0 - 30
2339962	Desmethyl microcystin LR	0.218	Spike	P	0 - 30
2339962	Microcystin H1LR	0.820	Spike	P	0 - 30
2339962	Microcystin HtyR	1.39	Spike	P	0 - 30
2339962	Microcystin LA	4.72	Spike	P	0 - 30
2339962	Microcystin LF	3.25	Spike	P	0 - 30
2339962	Microcystin LR	2.55	Spike	P	0 - 30
2339962	Microcystin LW	0.533	Spike	P	0 - 30
2339962	Microcystin LY	5.32	Spike	P	0 - 30
2339962	Microcystin RR	0.629	Spike	P	0 - 30
2339962	Microcystin WR	4.79	Spike	P	0 - 30
2339962	Microcystin YR	3.36	Spike	P	0 - 30
2339962	Nodularin-R	1.34	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P416330

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2339962	Anatoxin-a	2.90	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2339962
Field Sample ID: SEHAB0083

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	105	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	69.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A113386

Included Lab Sample IDs: 2339976

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.7	99.6	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A113391

Included Lab Sample IDs: 2339962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	88.2	87.2	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A113392

Included Lab Sample IDs: 2339962

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	99.7	103	P/P	60 - 160
Desmethyl microcystin LR	84.9	92.0	P/P	60 - 160
Microcystin HILR	89.6	91.1	P/P	60 - 160
Microcystin HtyR	97.4	100	P/P	60 - 160
Microcystin LA	109	112	P/P	50 - 160
Microcystin LF	98.4	102	P/P	60 - 160
Microcystin LR	81.5	80.8	P/P	60 - 160
Microcystin LW	106	107	P/P	60 - 160
Microcystin LY	99.9	104	P/P	60 - 160
Microcystin RR	87.0	89.5	P/P	60 - 160
Microcystin WR	96.1	94.4	P/P	60 - 160
Microcystin YR	108	105	P/P	60 - 160
Nodularin-R	84.2	87.9	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113507

Included Lab Sample IDs: 2339975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.5	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113527

Included Lab Sample IDs: 2339975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	106	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113582

Included Lab Sample IDs: 2339975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.4	96.4	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113606

Included Lab Sample IDs: 2339975

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.6	96.8	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	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	100	100	97.4			2.43
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102				1.58	
EPA 353.2 Rev. 2.0	NO2NO3-N	100	101	102			0.380
EPA 365.1 Rev. 2.0	Total-P	101	103	103			0.0
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.5	96.7	97.5			0.824
EPA 8321B	Anatoxin-a	97.0	96.4	99.2			2.90
	Cylindrospermopsin	104	93.3	97.7			4.59
	Desmethyl microcystin LR	88.3	90.5	90.7			0.218
	Microcystin HiLR	91.4	91.8	91.0			0.820
	Microcystin HtyR	100	95.5	94.2			1.39
	Microcystin LA	111	100	105			4.72
	Microcystin LF	107	96.6	99.9			3.25
	Microcystin LR	81.2	82.6	79.8			2.55
	Microcystin LW	115	104	103			0.533
	Microcystin LY	102	92.4	98.1			5.32
	Microcystin RR	91.2	83.1	83.6			0.629
	Microcystin WR	98.4	92.7	88.4			4.79
	Microcystin YR	104	102	106			3.36
	Nodularin-R	89.7	86.5	87.7			1.34

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2339975
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2339975
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2339975
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2339975
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2339976
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2339962
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2339962

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	07/08/2022			07/14/2022 13:39	Ping Hua	2339975
EPA 351.2 Rev. 2.0	07/08/2022	07/18/2022 16:27	Samantha L Bates	07/19/2022 11:21	Alexandra J Mattheus	2339975
EPA 353.2 Rev. 2.0	07/08/2022			07/15/2022 11:10	Beverly Y. Sanders	2339975
EPA 365.1 Rev. 2.0	07/08/2022	07/19/2022 16:00	Adam P Silver	07/20/2022 09:27	James L Waggeberby	2339975
EPA 365.1 Rev. 2.0 dissolved	07/08/2022			07/08/2022 14:44	Chandler E Cox	2339976
EPA 8321B	07/08/2022	07/08/2022 13:00	Manjita Shrestha	07/08/2022 21:26	Manjita Shrestha	2339962
	07/08/2022	07/08/2022 13:00	Umesh Chiluwal	07/08/2022 20:26	Umesh Chiluwal	2339962