

Chemical Analysis Report

WQAP-2022-06-15-01

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

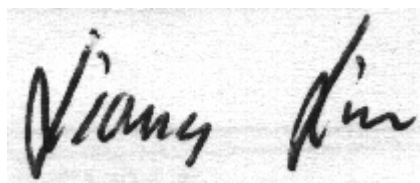
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-06-06-70**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: 06-JUL-2022 14:07

A handwritten signature in black ink, appearing to read "Liang Lin", 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 - South of boat ramp

Collection Date/Time: 06/14/2022 14:20

Field ID: SEHAB0078

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2334603	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415158	
		Cylindrospermopsin	0.10	U	ug/L	P415158	
		Desmethyl microcystin LR	0.25	U	ug/L	P415158	
		Microcystin HIR**	0.25	U	ug/L	P415158	
		Microcystin HtyR**	0.25	U	ug/L	P415158	
		Microcystin LA	0.54		ug/L	P415158	
		Microcystin LF	0.17	I	ug/L	P415158	
		Microcystin LR	2.4		ug/L	P415158	
		Microcystin LW	0.25	U	ug/L	P415158	
		Microcystin LY	0.50		ug/L	P415158	
		Microcystin RR	0.10	U	ug/L	P415158	
		Microcystin WR	0.50	U	ug/L	P415158	
		Microcystin YR	0.25	U	ug/L	P415158	
		Nodularin-R**	0.10	U	ug/L	P415158	
2334604	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P415676	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.1		mg N/L	P415619	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P415662	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P415571	
2334605	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P415276	

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: P415676

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415619

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415662

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415571

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415276

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

Reference Method: EPA 8321B
Batch ID: P415158

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HIR	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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415676

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415619

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: P415662

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: P415571

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415276

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

Reference Method: EPA 8321B
Batch ID: P415158

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	96.7		P	40 - 150
Cylindrospermopsin	91.0		P	40 - 150
Desmethyl microcystin LR	94.1		P	40 - 150
Microcystin HIR	90.1		P	40 - 150
Microcystin HtyR	95.7		P	40 - 150
Microcystin LA	96.2		P	40 - 150
Microcystin LF	93.7		P	40 - 150
Microcystin LR	84.9		P	40 - 150
Microcystin LW	91.7		P	40 - 150
Microcystin LY	90.4		P	40 - 150
Microcystin RR	94.5		P	40 - 150
Microcystin WR	89.4		P	40 - 150
Microcystin YR	89.8		P	40 - 150
Nodularin-R	89.5		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P415676

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334207	Ammonia-N	98.4	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P415662

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334640	NO2NO3-N	97.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P415571

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334559	Total-P	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P415276

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334451	O-Phosphate-P	99.8	99.7	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P415158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334168	Anatoxin-a	109	108	P/P	40 - 150
2334168	Cylindrospermopsin	94.7	97.5	P/P	40 - 150
2334168	Desmethyl microcystin LR	90.8	92.0	P/P	40 - 150
2334168	Microcystin HilR	97.2	94.9	P/P	40 - 150
2334168	Microcystin HtyR	97.2	96.0	P/P	40 - 150
2334168	Microcystin LA	96.9	93.7	P/P	40 - 150
2334168	Microcystin LF	94.5	91.4	P/P	40 - 150
2334168	Microcystin LR	87.9	91.1	P/P	40 - 150
2334168	Microcystin LW	81.4	74.8	P/P	40 - 150
2334168	Microcystin LY	90.2	88.1	P/P	40 - 150
2334168	Microcystin RR	95.5	92.4	P/P	40 - 150
2334168	Microcystin WR	87.6	84.0	P/P	40 - 150
2334168	Microcystin YR	93.6	87.8	P/P	40 - 150
2334168	Nodularin-R	95.0	90.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P415676

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334207	Ammonia-N	5.39	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P415619

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334604	Kjeldahl Nitrogen	2.35	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P415662

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334640	NO2NO3-N	2.53	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P415571

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334559	Total-P	1.04	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P415276

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334451	O-Phosphate-P	0.100	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P415158

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334168	Anatoxin-a	1.12	Spike	P	0 - 30
2334168	Cylindrospermopsin	2.98	Spike	P	0 - 30
2334168	Desmethyl microcystin LR	1.32	Spike	P	0 - 30
2334168	Microcystin HtIR	2.40	Spike	P	0 - 30
2334168	Microcystin HtyR	1.17	Spike	P	0 - 30
2334168	Microcystin LA	3.32	Spike	P	0 - 30
2334168	Microcystin LF	3.37	Spike	P	0 - 30
2334168	Microcystin LR	3.64	Spike	P	0 - 30
2334168	Microcystin LW	8.46	Spike	P	0 - 30
2334168	Microcystin LY	2.30	Spike	P	0 - 30
2334168	Microcystin RR	3.29	Spike	P	0 - 30
2334168	Microcystin WR	4.09	Spike	P	0 - 30
2334168	Microcystin YR	6.37	Spike	P	0 - 30
2334168	Nodularin-R	4.45	Spike	P	0 - 30

Quality Assurance Report Precision

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

Quality Assurance Report Surrogates

Lab Sample ID: 2334603
Field Sample ID: SEHAB0078

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	75.7	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A112857

Included Lab Sample IDs: 2334605

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	102	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A112879

Included Lab Sample IDs: 2334603

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	101	103	P/P	50 - 160
Cylindrospermopsin	95.2	92.5	P/P	60 - 160
Desmethyl microcystin LR	89.6	93.4	P/P	60 - 160
Microcystin HIR	94.3	93.8	P/P	60 - 160
Microcystin HtyR	97.4	94.2	P/P	60 - 160
Microcystin LA	99.4	100	P/P	50 - 160
Microcystin LF	91.7	93.4	P/P	60 - 160
Microcystin LR	87.8	87.1	P/P	60 - 160
Microcystin LW	93.5	91.2	P/P	60 - 160
Microcystin LY	90.0	85.8	P/P	60 - 160
Microcystin RR	95.2	93.9	P/P	60 - 160
Microcystin WR	93.6	97.0	P/P	60 - 160
Microcystin YR	88.3	86.3	P/P	60 - 160
Nodularin-R	92.1	89.4	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113014

Included Lab Sample IDs: 2334604

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113018

Included Lab Sample IDs: 2334604

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113043

Included Lab Sample IDs: 2334604

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113135

Included Lab Sample IDs: 2334604

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	104	P/P	90 - 110

Quality Assurance Report

Calibration Verification

* 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	96.4	98.4	104			5.39
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103					2.35
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	97.5	100			2.53
EPA 365.1 Rev. 2.0	Total-P	102	103	104			1.04
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.0	99.8	99.7			0.100
EPA 8321B	Anatoxin-a	96.7	109	108			1.12
	Cylindrospermopsin	91.0	94.7	97.5			2.98
	Desmethyl microcystin LR	94.1	90.8	92.0			1.32
	Microcystin HiLR	90.1	97.2	94.9			2.40
	Microcystin HtyR	95.7	97.2	96.0			1.17
	Microcystin LA	96.2	96.9	93.7			3.32
	Microcystin LF	93.7	94.5	91.4			3.37
	Microcystin LR	84.9	87.9	91.1			3.64
	Microcystin LW	91.7	81.4	74.8			8.46
	Microcystin LY	90.4	90.2	88.1			2.30
	Microcystin RR	94.5	95.5	92.4			3.29
	Microcystin WR	89.4	87.6	84.0			4.09
	Microcystin YR	89.8	93.6	87.8			6.37
	Nodularin-R	89.5	95.0	90.9			4.45

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2334604
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2334604
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2334604
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2334604
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2334605
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2334603

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	06/15/2022			06/23/2022 12:41	Judith K. Clark	2334604
EPA 351.2 Rev. 2.0	06/15/2022	06/24/2022 10:30	Samantha L Bates	06/28/2022 10:55	Alexandra J Mattheus	2334604
EPA 353.2 Rev. 2.0	06/15/2022			06/22/2022 17:52	Touraj Touran	2334604
EPA 365.1 Rev. 2.0	06/15/2022	06/23/2022 14:45	Simonne.V. Calhoun	06/24/2022 10:55	James L Waggeberby	2334604
EPA 365.1 Rev. 2.0 dissolved	06/15/2022			06/15/2022 16:29	Blanca Fach	2334605
EPA 8321B	06/15/2022	06/15/2022 14:00	Manjita Shrestha	06/16/2022 11:03	Manjita Shrestha	2334603