

Chemical Analysis Report

WQAP-2022-08-23-02

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

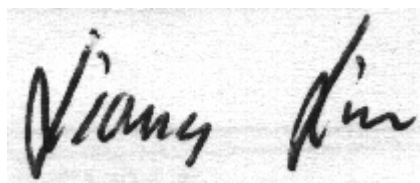
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2022-06-20-29**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 08-SEP-2022 11:30

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: Caloosahatchee River - SE 21St Ave Canal

Collection Date/Time: 08/22/2022 13:15

Field ID: HAB-SD-082222-1315

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2351351	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P418497	
		Cylindrospermopsin	0.10	U	ug/L	P418496	
		Desmethyl microcystin LR	0.25	U	ug/L	P418496	
		Microcystin HIR	0.25	U	ug/L	P418496	
		Microcystin HtyR	0.25	U	ug/L	P418496	
		Microcystin LA	0.10	U	ug/L	P418496	
		Microcystin LF	0.10	U	ug/L	P418496	
		Microcystin LR	0.25	U	ug/L	P418496	
		Microcystin LW	0.25	U	ug/L	P418496	
		Microcystin LY	0.10	U	ug/L	P418496	
		Microcystin RR	0.10	U	ug/L	P418496	
		Microcystin WR	0.50	U	ug/L	P418496	
		Microcystin YR	0.25	U	ug/L	P418496	
		Nodularin-R	0.10	U	ug/L	P418496	
2351352	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P419066	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P418645	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P418862	
	EPA 365.1 Rev. 2.0	Total-P	0.093		mg P/L	P418713	
2351353	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	UJ	mg P/L	P418655	LCS, MS

Ref. Method and Comment:

EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: 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: P419066

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418645

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418862

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418713

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418655

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

Reference Method: EPA 8321B
Batch ID: P418496

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: P418497

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: P419066

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418645

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418862

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: P418713

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418655

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	163		F	90 - 110

Reference Method: EPA 8321B
Batch ID: P418496

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	88.9		P	40 - 150
Desmethyl microcystin LR	83.3		P	40 - 150
Microcystin HILR	85.9		P	40 - 150
Microcystin HtyR	84.4		P	40 - 150
Microcystin LA	86.1		P	40 - 150
Microcystin LF	77.6		P	40 - 150
Microcystin LR	83.1		P	40 - 150
Microcystin LW	76.3		P	40 - 150
Microcystin LY	66.2		P	40 - 150
Microcystin RR	85.2		P	40 - 150
Microcystin WR	78.2		P	40 - 150
Microcystin YR	83.6		P	40 - 150
Nodularin-R	88.1		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418497

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	95.9		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419066

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351352	Ammonia-N	98.6	97.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418645

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351352	Kjeldahl Nitrogen	110	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418862

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351678	NO2NO3-N	96.2	96.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418713

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351352	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418655

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351223	O-Phosphate-P	112	101	F/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P418496

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351194	Cylindrospermopsin	97.8	98.4	P/P	40 - 150
2351194	Desmethyl microcystin LR	109	108	P/P	40 - 150
2351194	Microcystin HiLR	120	113	P/P	40 - 150
2351194	Microcystin HtyR	110	112	P/P	40 - 150
2351194	Microcystin LA	98.1	99.0	P/P	40 - 150
2351194	Microcystin LF	101	98.7	P/P	40 - 150
2351194	Microcystin LR	110	112	P/P	40 - 150
2351194	Microcystin LW	107	96.3	P/P	40 - 150
2351194	Microcystin LY	96.4	111	P/P	40 - 150
2351194	Microcystin RR	108	106	P/P	40 - 150
2351194	Microcystin WR	112	117	P/P	40 - 150
2351194	Microcystin YR	106	113	P/P	40 - 150
2351194	Nodularin-R	111	110	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418497

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2351194	Anatoxin-a	92.1	89.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P419066

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351352	Ammonia-N	0.835	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P418645

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351352	Kjeldahl Nitrogen	3.65	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P418862

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351678	NO2NO3-N	0.519	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P418713

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351352	Total-P	0.0867	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P418655

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351223	O-Phosphate-P	8.37	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P418496

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351194	Cylindrospermopsin	0.653	Spike	P	0 - 30
2351194	Desmethyl microcystin LR	1.11	Spike	P	0 - 30
2351194	Microcystin H1LR	6.47	Spike	P	0 - 30
2351194	Microcystin HtyR	2.36	Spike	P	0 - 30
2351194	Microcystin LA	0.937	Spike	P	0 - 30
2351194	Microcystin LF	2.46	Spike	P	0 - 30
2351194	Microcystin LR	2.54	Spike	P	0 - 30
2351194	Microcystin LW	10.2	Spike	P	0 - 30
2351194	Microcystin LY	13.8	Spike	P	0 - 30
2351194	Microcystin RR	1.77	Spike	P	0 - 30
2351194	Microcystin WR	4.40	Spike	P	0 - 30
2351194	Microcystin YR	6.96	Spike	P	0 - 30
2351194	Nodularin-R	1.04	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P418497

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2351194	Anatoxin-a	2.34	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2351351
Field Sample ID: HAB-SD-082222-1315

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	94.2	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	32.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A114308
Included Lab Sample IDs: 2351351

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	93.6	95.9	P/P	50 - 160
Desmethyl microcystin LR	88.8	93.1	P/P	50 - 160
Microcystin HILR	92.4	94.0	P/P	50 - 160
Microcystin HtyR	93.8	103	P/P	50 - 160
Microcystin LA	85.6	95.4	P/P	50 - 160
Microcystin LF	92.2	90.9	P/P	50 - 160
Microcystin LR	89.4	99.5	P/P	50 - 160
Microcystin LW	90.6	99.5	P/P	50 - 160
Microcystin LY	102	89.8	P/P	50 - 160
Microcystin RR	80.3	94.4	P/P	50 - 160
Microcystin WR	97.8	95.1	P/P	50 - 160
Microcystin YR	85.2	95.6	P/P	50 - 160
Nodularin-R	88.7	102	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A114328
Included Lab Sample IDs: 2351353

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	102	101	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A114331
Included Lab Sample IDs: 2351351

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	80.4	83.3	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A114393
Included Lab Sample IDs: 2351352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.6	97.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A114428
Included Lab Sample IDs: 2351352

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A114435
Included Lab Sample IDs: 2351352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	99.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A114517

Included Lab Sample IDs: 2351352

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	96.9	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	94.4	98.6	97.6			0.835
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	110	103			3.65
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	96.2	96.7			0.519
EPA 365.1 Rev. 2.0	Total-P	103	104	104			0.0867
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	163	112	101			8.37
EPA 8321B	Anatoxin-a	95.9	92.1	89.9			2.34
	Cylindrospermopsin	88.9	97.8	98.4			0.653
	Desmethyl microcystin LR	83.3	109	108			1.11
	Microcystin HiLR	85.9	120	113			6.47
	Microcystin HtyR	84.4	110	112			2.36
	Microcystin LA	86.1	98.1	99.0			0.937
	Microcystin LF	77.6	101	98.7			2.46
	Microcystin LR	83.1	110	112			2.54
	Microcystin LW	76.3	107	96.3			10.2
	Microcystin LY	66.2	96.4	111			13.8
	Microcystin RR	85.2	108	106			1.77
	Microcystin WR	78.2	112	117			4.40
	Microcystin YR	83.6	106	113			6.96
	Nodularin-R	88.1	111	110			1.04

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2351352
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2351352
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2351352
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2351352
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2351353
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2351351
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2351351

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	08/23/2022			09/02/2022 10:47	Ping Hua	2351352
EPA 351.2 Rev. 2.0	08/23/2022	08/25/2022 14:20	Alexandra J Mattheus	08/26/2022 14:16	Alexandra J Mattheus	2351352
EPA 353.2 Rev. 2.0	08/23/2022			08/30/2022 10:19	Beverly Y. Sanders	2351352
EPA 365.1 Rev. 2.0	08/23/2022	08/26/2022 08:28	Simonne.V. Calhoun	08/30/2022 14:50	Simonne.V. Calhoun	2351352
EPA 365.1 Rev. 2.0 dissolved	08/23/2022			08/23/2022 19:26	Elise M. Gillis	2351353
EPA 8321B	08/23/2022	08/24/2022 09:00	Manjita Shrestha	08/24/2022 15:55	Manjita Shrestha	2351351
	08/23/2022	08/24/2022 13:00	Manjita Shrestha	08/25/2022 02:06	Manjita Shrestha	2351351