

Chemical Analysis Report

WQAP-2022-04-15-01

Florida Department of Environmental Protection
Central Laboratory
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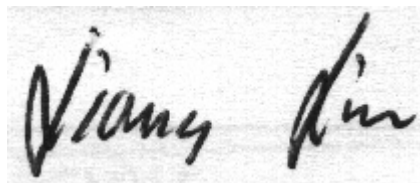
Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2022-02-07-25**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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

Date Certified: 05-MAY-2022 11:02

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 Glenada Boat Ramp

Collection Date/Time: 04/14/2022 12:00

Field ID: HAB-HC-041422-1200

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2319565	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P412615	
		Cylindrospermopsin	0.10	U	ug/L	P412615	
		Desmethyl microcystin LR	0.25	U	ug/L	P412615	
		Microcystin HIR**	0.25	U	ug/L	P412615	
		Microcystin HtyR**	0.25	U	ug/L	P412615	
		Microcystin LA	0.10	U	ug/L	P412615	
		Microcystin LF	0.10	U	ug/L	P412615	
		Microcystin LR	0.46	I	ug/L	P412615	
		Microcystin LW	0.25	U	ug/L	P412615	
		Microcystin LY	0.10	U	ug/L	P412615	
		Microcystin RR	0.12	I	ug/L	P412615	
		Microcystin WR	0.50	U	ug/L	P412615	
		Microcystin YR	0.25	U	ug/L	P412615	
		Nodularin-R**	0.10	U	ug/L	P412615	
2319566	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P412625	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P412837	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P412620	
	EPA 365.1 Rev. 2.0	Total-P	0.054		mg P/L	P412668	
2319567	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P412434	

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: P412625

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412837

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412620

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412668

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P412434

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

Reference Method: EPA 8321B
Batch ID: P412615

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: P412625

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: P412837

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.8		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412620

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412668

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: P412434

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

Reference Method: EPA 8321B
Batch ID: P412615

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	94.1		P	40 - 150
Cylindrospermopsin	92.4		P	40 - 150
Desmethyl microcystin LR	78.7		P	40 - 150
Microcystin HIR	87.1		P	40 - 150
Microcystin HtyR	91.3		P	40 - 150
Microcystin LA	93.6		P	40 - 150
Microcystin LF	88.1		P	40 - 150
Microcystin LR	77.6		P	40 - 150
Microcystin LW	91.9		P	40 - 150
Microcystin LY	87.5		P	40 - 150
Microcystin RR	90.5		P	40 - 150
Microcystin WR	89.7		P	40 - 150
Microcystin YR	85.0		P	40 - 150
Nodularin-R	87.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P412625

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319555	Ammonia-N	96.8	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P412620

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319566	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P412668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319575	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P412434

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319717	O-Phosphate-P	97.9	99.7	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P412615

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2319548	Anatoxin-a	114	122	P/P	40 - 150
2319548	Cylindrospermopsin	103	104	P/P	40 - 150
2319548	Desmethyl microcystin LR	99.2	104	P/P	40 - 150
2319548	Microcystin HilR	105	108	P/P	40 - 150
2319548	Microcystin HtyR	97.5	106	P/P	40 - 150
2319548	Microcystin LA	93.9	102	P/P	40 - 150
2319548	Microcystin LF	95.6	104	P/P	40 - 150
2319548	Microcystin LR	94.9	102	P/P	40 - 150
2319548	Microcystin LW	92.5	102	P/P	40 - 150
2319548	Microcystin LY	92.8	95.3	P/P	40 - 150
2319548	Microcystin RR	97.1	107	P/P	40 - 150
2319548	Microcystin WR	97.8	103	P/P	40 - 150
2319548	Microcystin YR	94.1	108	P/P	40 - 150
2319548	Nodularin-R	106	109	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P412625

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319555	Ammonia-N	0.361	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P412837

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319566	Kjeldahl Nitrogen	10.8	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P412620

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319566	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P412668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319575	Total-P	0.791	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P412434

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319717	O-Phosphate-P	1.51	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P412615

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2319548	Anatoxin-a	7.11	Spike	P	0 - 30
2319548	Cylindrospermopsin	1.01	Spike	P	0 - 30
2319548	Desmethyl microcystin LR	4.84	Spike	P	0 - 30
2319548	Microcystin H1IR	3.00	Spike	P	0 - 30
2319548	Microcystin HtyR	8.26	Spike	P	0 - 30
2319548	Microcystin LA	8.15	Spike	P	0 - 30
2319548	Microcystin LF	8.19	Spike	P	0 - 30
2319548	Microcystin LR	6.70	Spike	P	0 - 30
2319548	Microcystin LW	9.77	Spike	P	0 - 30
2319548	Microcystin LY	2.70	Spike	P	0 - 30
2319548	Microcystin RR	9.11	Spike	P	0 - 30
2319548	Microcystin WR	5.29	Spike	P	0 - 30
2319548	Microcystin YR	14.1	Spike	P	0 - 30
2319548	Nodularin-R	2.85	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: 2319565
Field Sample ID: HAB-HC-041422-1200

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	91.3	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A111504

Included Lab Sample IDs: 2319567

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A111572

Included Lab Sample IDs: 2319566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	98.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A111574

Included Lab Sample IDs: 2319566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.9	97.0	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A111616

Included Lab Sample IDs: 2319565

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	101	100	P/P	50 - 160
Cylindrospermopsin	93.8	99.8	P/P	60 - 160
Desmethyl microcystin LR	90.0	90.8	P/P	60 - 160
Microcystin HiLR	94.4	94.2	P/P	60 - 160
Microcystin HtyR	98.3	94.2	P/P	60 - 160
Microcystin LA	99.1	104	P/P	50 - 160
Microcystin LF	88.6	85.0	P/P	60 - 160
Microcystin LR	87.8	86.8	P/P	60 - 160
Microcystin LW	85.4	80.4	P/P	60 - 160
Microcystin LY	95.8	102	P/P	60 - 160
Microcystin RR	98.3	95.1	P/P	60 - 160
Microcystin WR	86.8	94.1	P/P	60 - 160
Microcystin YR	88.7	93.7	P/P	60 - 160
Nodularin-R	95.7	91.9	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A111672

Included Lab Sample IDs: 2319566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A111850

Included Lab Sample IDs: 2319566

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	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 SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	94.4	96.8	96.4			0.361
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.8					10.8
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	103	103	102			0.791
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	97.9	99.7			1.51
EPA 8321B	Anatoxin-a	94.1	114	122			7.11
	Cylindrospermopsin	92.4	103	104			1.01
	Desmethyl microcystin LR	78.7	99.2	104			4.84
	Microcystin HiLR	87.1	105	108			3.00
	Microcystin HtyR	91.3	97.5	106			8.26
	Microcystin LA	93.6	93.9	102			8.15
	Microcystin LF	88.1	95.6	104			8.19
	Microcystin LR	77.6	94.9	102			6.70
	Microcystin LW	91.9	92.5	102			9.77
	Microcystin LY	87.5	92.8	95.3			2.70
	Microcystin RR	90.5	97.1	107			9.11
	Microcystin WR	89.7	97.8	103			5.29
	Microcystin YR	85.0	94.1	108			14.1
	Nodularin-R	87.0	106	109			2.85

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2319566
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2319566
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2319566
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2319566
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2319567
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2319565

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	04/15/2022			04/20/2022 10:28	Ping Hua	2319566
EPA 351.2 Rev. 2.0	04/15/2022	04/28/2022 09:58	Samantha L Bates	05/02/2022 12:13	Alexandra J Mattheus	2319566
EPA 353.2 Rev. 2.0	04/15/2022			04/19/2022 15:47	Nathaniel J Jones	2319566
EPA 365.1 Rev. 2.0	04/15/2022	04/22/2022 16:40	Simonne.V. Calhoun	04/25/2022 14:14	Sarah A Nixon	2319566
EPA 365.1 Rev. 2.0 dissolved	04/15/2022			04/15/2022 14:44	James L Waggeberby	2319567
EPA 8321B	04/15/2022	04/20/2022 12:30	Manjita Shrestha	04/21/2022 16:21	Manjita Shrestha	2319565