

Chemical Analysis Report

WQAP-2022-09-01-02

Florida DEP Laboratory
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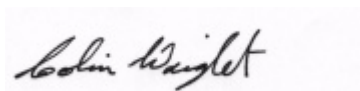
Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2022-08-08-59**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 14-SEP-2022 12:28

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light blue rectangular 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: Highlands County Saddlebags Lake

Collection Date/Time: 08/31/2022 09:31

Field ID: HAB-HC-083122-0931

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2353526	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P418975	
		Cylindrospermopsin	0.10	U	ug/L	P418963	
		Desmethyl microcystin LR	0.25	U	ug/L	P418963	
		Microcystin HILR	0.25	U	ug/L	P418963	
		Microcystin HtyR	0.25	U	ug/L	P418963	
		Microcystin LA	0.10	U	ug/L	P418963	
		Microcystin LF	0.10	U	ug/L	P418963	
		Microcystin LR	0.25	U	ug/L	P418963	
		Microcystin LW	0.25	U	ug/L	P418963	
		Microcystin LY	0.10	U	ug/L	P418963	
		Microcystin RR	0.10	U	ug/L	P418963	
		Microcystin WR	0.50	U	ug/L	P418963	
		Neosaxitoxin	0.50	U	ug/L	P418975	MS
		Microcystin YR	0.25	U	ug/L	P418963	
		Saxitoxin	0.50	U	ug/L	P418975	
		Nodularin-R	0.10	U	ug/L	P418963	
2353528	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P419309	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.52		mg N/L	P419098	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P419127	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P419132	
2353529	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P419024	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419309

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419098

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419127

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419132

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P419024

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

Reference Method: EPA 8321B
Batch ID: P418963

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1LR	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: P418975

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419309

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419098

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419127

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: P419132

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: P419024

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

Reference Method: EPA 8321B
Batch ID: P418963

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	96.0		P	40 - 150
Desmethyl microcystin LR	95.8		P	40 - 150
Microcystin H1R	104		P	40 - 150
Microcystin HtyR	110		P	40 - 150
Microcystin LA	123		P	40 - 150
Microcystin LF	113		P	40 - 150
Microcystin LR	98.6		P	40 - 150
Microcystin LW	108		P	40 - 150
Microcystin LY	105		P	40 - 150
Microcystin RR	105		P	40 - 150
Microcystin WR	108		P	40 - 150
Microcystin YR	99.6		P	40 - 150
Nodularin-R	97.3		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418975

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	69.2		P	40 - 150
Neosaxitoxin	80.1		P	40 - 150
Saxitoxin	124		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P419309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353499	Ammonia-N	98.0	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P419098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353658	Kjeldahl Nitrogen	101	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P419127

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353543	NO2NO3-N	100	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P419132

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353499	Total-P	101	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P419024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353529	O-Phosphate-P	91.9	93.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P418963

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353227	Cylindrospermopsin	90.9	88.9	P/P	40 - 150
2353227	Desmethyl microcystin LR	97.4	98.4	P/P	40 - 150
2353227	Microcystin HiLR	98.4	96.5	P/P	40 - 150
2353227	Microcystin HtyR	103	101	P/P	40 - 150
2353227	Microcystin LA	107	104	P/P	40 - 150
2353227	Microcystin LF	97.6	93.2	P/P	40 - 150
2353227	Microcystin LR	101	97.6	P/P	40 - 150
2353227	Microcystin LW	92.1	88.4	P/P	40 - 150
2353227	Microcystin LY	94.8	92.8	P/P	40 - 150
2353227	Microcystin RR	101	101	P/P	40 - 150
2353227	Microcystin WR	104	97.6	P/P	40 - 150
2353227	Microcystin YR	90.7	88.8	P/P	40 - 150
2353227	Nodularin-R	97.1	96.4	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418975

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2353227	Anatoxin-a	64.8	63.6	P/P	40 - 150
2353227	Neosaxitoxin	39.0	39.0	F/F	40 - 150
2353227	Saxitoxin	54.9	53.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P419309

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353499	Ammonia-N	0.465	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P419098

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353658	Kjeldahl Nitrogen	0.516	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P419127

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353543	NO2NO3-N	0.482	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P419132

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353499	Total-P	1.03	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P419024

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353529	O-Phosphate-P	1.30	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P418963

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353227	Cylindrospermopsin	2.16	Spike	P	0 - 30
2353227	Desmethyl microcystin LR	1.10	Spike	P	0 - 30
2353227	Microcystin H1LR	1.93	Spike	P	0 - 30
2353227	Microcystin HtyR	1.88	Spike	P	0 - 30
2353227	Microcystin LA	3.43	Spike	P	0 - 30
2353227	Microcystin LF	4.53	Spike	P	0 - 30
2353227	Microcystin LR	3.53	Spike	P	0 - 30
2353227	Microcystin LW	4.09	Spike	P	0 - 30
2353227	Microcystin LY	2.17	Spike	P	0 - 30
2353227	Microcystin RR	0.300	Spike	P	0 - 30
2353227	Microcystin WR	6.15	Spike	P	0 - 30
2353227	Microcystin YR	2.16	Spike	P	0 - 30
2353227	Nodularin-R	0.736	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P418975

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2353227	Anatoxin-a	1.82	Spike	P	0 - 30
2353227	Neosaxitoxin	0.0162	Spike	P	0 - 30
2353227	Saxitoxin	3.49	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2353526

Field Sample ID: HAB-HC-083122-0931

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	73.4	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	56.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A114496

Included Lab Sample IDs: 2353529

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	97.9	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A114497

Included Lab Sample IDs: 2353526

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	93.8	105	P/P	60 - 160
Desmethyl microcystin LR	91.4	96.9	P/P	60 - 160
Microcystin HtR	94.0	99.7	P/P	60 - 160
Microcystin HtyR	96.2	96.3	P/P	60 - 160
Microcystin LA	111	112	P/P	50 - 160
Microcystin LF	102	112	P/P	60 - 160
Microcystin LR	85.4	92.8	P/P	60 - 160
Microcystin LW	100	99.8	P/P	60 - 160
Microcystin LY	95.4	96.4	P/P	60 - 160
Microcystin RR	95.2	99.8	P/P	60 - 160
Microcystin WR	99.7	108	P/P	60 - 160
Microcystin YR	86.7	86.0	P/P	60 - 160
Nodularin-R	87.5	89.4	P/P	60 - 160

Reference Method: EPA 8321B

Run ID: A114502

Included Lab Sample IDs: 2353526

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	69.8	81.2	P/P	50 - 160
Neosaxitoxin	79.7	83.1	P/P	50 - 160
Saxitoxin	122	129	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A114545

Included Lab Sample IDs: 2353528

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A114576

Included Lab Sample IDs: 2353528

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A114613

Included Lab Sample IDs: 2353528

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.7	99.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A114650

Included Lab Sample IDs: 2353528

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.5	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	99.6	98.0	98.6			0.465
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.6	101	102			0.516
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	100	99.6			0.482
EPA 365.1 Rev. 2.0	Total-P	102	101	105			1.03
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	91.9	93.1			1.30
EPA 8321B	Anatoxin-a	69.2	64.8	63.6			1.82
	Cylindrospermopsin	96.0	90.9	88.9			2.16
	Desmethyl microcystin LR	95.8	97.4	98.4			1.10
	Microcystin HiLR	104	98.4	96.5			1.93
	Microcystin HtyR	110	103	101			1.88
	Microcystin LA	123	107	104			3.43
	Microcystin LF	113	97.6	93.2			4.53
	Microcystin LR	98.6	101	97.6			3.53
	Microcystin LW	108	92.1	88.4			4.09
	Microcystin LY	105	94.8	92.8			2.17
	Microcystin RR	105	101	101			0.300
	Microcystin WR	108	104	97.6			6.15
	Microcystin YR	99.6	90.7	88.8			2.16
	Neosaxitoxin	80.1	39.0	39.0			0.0162
	Nodularin-R	97.3	97.1	96.4			0.736
	Saxitoxin	124	54.9	53.0			3.49

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2353528
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2353528
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2353528
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2353528
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2353529
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2353526
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2353526

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	09/01/2022			09/08/2022 12:57	Ping Hua	2353528
EPA 351.2 Rev. 2.0	09/01/2022	09/06/2022 14:30	Alexandra J Mattheus	09/07/2022 12:02	Alexandra J Mattheus	2353528
EPA 353.2 Rev. 2.0	09/01/2022			09/06/2022 10:27	Beverly Y. Sanders	2353528
EPA 365.1 Rev. 2.0	09/01/2022	09/07/2022 16:10	Simonne.V. Calhoun	09/09/2022 13:30	James L Waggeberby	2353528
EPA 365.1 Rev. 2.0 dissolved	09/01/2022			09/01/2022 16:11	Elise M. Gillis	2353529
EPA 8321B	09/01/2022	09/01/2022 11:20	Umesh Chiluwal	09/01/2022 15:06	Umesh Chiluwal	2353526
	09/01/2022	09/01/2022 13:00	Manjita Shrestha	09/02/2022 05:11	Manjita Shrestha	2353526