

Chemical Analysis Report

WQAP-2022-03-08-02

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

Event Description: **Algal Bloom Response -SOROC- Highlands**
Request ID: **RQ-2022-01-31-26**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 25-MAR-2022 17:51



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: 03/07/2022 13:00

Field ID: HAB-HC-030722-1300

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2310698	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P410780	
		Cylindrospermopsin	0.10	U	ug/L	P410780	
		Desmethyl microcystin LR	0.25	U	ug/L	P410780	
		Microcystin HIR**	0.25	U	ug/L	P410780	
		Microcystin HtyR**	0.25	U	ug/L	P410780	
		Microcystin LA	0.16	I	ug/L	P410780	
		Microcystin LF	0.10	U	ug/L	P410780	
		Microcystin LR	0.60	I	ug/L	P410780	
		Microcystin LW	0.25	U	ug/L	P410780	
		Microcystin LY	0.10	U	ug/L	P410780	
		Microcystin RR	0.10	U	ug/L	P410780	
		Microcystin WR	0.50	U	ug/L	P410780	
		Microcystin YR	0.25	U	ug/L	P410780	
		Nodularin-R**	0.10	U	ug/L	P410780	
2310699	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P410877	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P411002	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.031		mg N/L	P411044	
	EPA 365.1 Rev. 2.0	Total-P	0.058		mg P/L	P411073	
2310700	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P410808	

Ref. Method and Comment:

EPA 365.1 Rev. 2.0: Total-P: 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: P410877

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411002

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411044

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411073

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P410808

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

Reference Method: EPA 8321B
Batch ID: P410780

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 H1R	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: P410877

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411002

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411044

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: P411073

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: P410808

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	100		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P410780

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 150
Cylindrospermopsin	96.8		P	40 - 150
Desmethyl microcystin LR	89.9		P	40 - 150
Microcystin HIR	96.8		P	40 - 150
Microcystin HtyR	84.1		P	40 - 150
Microcystin LA	96.9		P	40 - 150
Microcystin LF	85.3		P	40 - 150
Microcystin LR	89.7		P	40 - 150
Microcystin LW	72.5		P	40 - 150
Microcystin LY	79.5		P	40 - 150
Microcystin RR	95.8		P	40 - 150
Microcystin WR	90.8		P	40 - 150
Microcystin YR	84.6		P	40 - 150
Nodularin-R	88.3		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P410877

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2310662	Ammonia-N	94.2	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P411002

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2310528	Kjeldahl Nitrogen	106	94.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P411044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2310203	NO2NO3-N	97.6	97.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P410808

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2310663	O-Phosphate-P	97.8	99.1	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P410780

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2310572	Anatoxin-a	121	127	P/P	40 - 150
2310572	Cylindrospermopsin	107	107	P/P	40 - 150
2310572	Desmethyl microcystin LR	102	111	P/P	40 - 150
2310572	Microcystin H1R	98.0	102	P/P	40 - 150
2310572	Microcystin HtyR	96.8	101	P/P	40 - 150
2310572	Microcystin LA	92.4	103	P/P	40 - 150
2310572	Microcystin LF	79.8	85.0	P/P	40 - 150
2310572	Microcystin LR	94.0	101	P/P	40 - 150
2310572	Microcystin LW	87.4	86.4	P/P	40 - 150
2310572	Microcystin LY	80.3	92.2	P/P	40 - 150
2310572	Microcystin RR	107	113	P/P	40 - 150
2310572	Microcystin WR	96.4	99.8	P/P	40 - 150
2310572	Microcystin YR	93.4	94.2	P/P	40 - 150
2310572	Nodularin-R	103	109	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410877

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2310662	Ammonia-N	2.56	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411002

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2310528	Kjeldahl Nitrogen	10.4	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2310203	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2310740	Total-P	1.21	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P410808

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2310663	O-Phosphate-P	1.32	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P410780

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2310572	Anatoxin-a	4.40	Spike	P	0 - 30
2310572	Cylindrospermopsin	0.553	Spike	P	0 - 30
2310572	Desmethyl microcystin LR	8.90	Spike	P	0 - 30
2310572	Microcystin HtIR	3.64	Spike	P	0 - 30
2310572	Microcystin HtyR	3.95	Spike	P	0 - 30
2310572	Microcystin LA	10.6	Spike	P	0 - 30
2310572	Microcystin LF	6.32	Spike	P	0 - 30
2310572	Microcystin LR	7.53	Spike	P	0 - 30
2310572	Microcystin LW	1.12	Spike	P	0 - 30
2310572	Microcystin LY	13.9	Spike	P	0 - 30
2310572	Microcystin RR	5.58	Spike	P	0 - 30
2310572	Microcystin WR	3.54	Spike	P	0 - 30
2310572	Microcystin YR	0.778	Spike	P	0 - 30
2310572	Nodularin-R	5.58	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: 2310698
Field Sample ID: HAB-HC-030722-1300

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	93.4	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A110813

Included Lab Sample IDs: 2310700

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	99.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A110840

Included Lab Sample IDs: 2310699

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.2	95.4	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A110871

Included Lab Sample IDs: 2310698

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	104	108	P/P	50 - 160
Cylindrospermopsin	98.3	97.4	P/P	60 - 160
Desmethyl microcystin LR	88.7	88.4	P/P	60 - 160
Microcystin HILR	90.4	97.3	P/P	60 - 160
Microcystin HtyR	88.2	86.0	P/P	60 - 160
Microcystin LA	95.3	90.6	P/P	50 - 160
Microcystin LF	89.9	86.2	P/P	60 - 160
Microcystin LR	89.7	83.5	P/P	60 - 160
Microcystin LW	88.7	85.6	P/P	60 - 160
Microcystin LY	82.3	83.7	P/P	60 - 160
Microcystin RR	98.9	101	P/P	60 - 160
Microcystin WR	91.5	93.7	P/P	60 - 160
Microcystin YR	89.2	81.1	P/P	60 - 160
Nodularin-R	91.5	85.7	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A110916

Included Lab Sample IDs: 2310699

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A110987

Included Lab Sample IDs: 2310699

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A110999

Included Lab Sample IDs: 2310699

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.7	101	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		Precision SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	96.6	94.2	96.8		2.56
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	106	94.6		10.4
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.0	97.6	97.6		0.0
EPA 365.1 Rev. 2.0	Total-P	102				1.21
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.8	99.1		1.32
EPA 8321B	Anatoxin-a	104	121	127		4.40
	Cylindrospermopsin	96.8	107	107		0.553
	Desmethyl microcystin LR	89.9	102	111		8.90
	Microcystin HiLR	96.8	98.0	102		3.64
	Microcystin HtyR	84.1	96.8	101		3.95
	Microcystin LA	96.9	92.4	103		10.6
	Microcystin LF	85.3	79.8	85.0		6.32
	Microcystin LR	89.7	94.0	101		7.53
	Microcystin LW	72.5	87.4	86.4		1.12
	Microcystin LY	79.5	80.3	92.2		13.9
	Microcystin RR	95.8	107	113		5.58
	Microcystin WR	90.8	96.4	99.8		3.54
	Microcystin YR	84.6	93.4	94.2		0.778
	Nodularin-R	88.3	103	109		5.58

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2310699
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2310699
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2310699
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2310699
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2310700
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2310698

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	03/08/2022			03/09/2022 12:00	Judith K. Clark	2310699
EPA 351.2 Rev. 2.0	03/08/2022	03/15/2022 17:10	Samantha L Bates	03/17/2022 14:01	Alexandra J Mattheus	2310699
EPA 353.2 Rev. 2.0	03/08/2022			03/14/2022 10:05	Beverly Y. Sanders	2310699
EPA 365.1 Rev. 2.0	03/08/2022	03/15/2022 14:55	Simonne.V. Calhoun	03/16/2022 18:32	Sarah A Nixon	2310699
EPA 365.1 Rev. 2.0 dissolved	03/08/2022			03/08/2022 14:38	James L Waggerby	2310700
EPA 8321B	03/08/2022	03/10/2022 08:00	Manjita Shrestha	03/10/2022 11:58	Manjita Shrestha	2310698