Chemical Analysis Report

WQAP-2022-01-20-01

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-2021-10-04-69**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 08-FEB-2022 09:01

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: Glenada Boat Ramp **Collection Date/Time: 01/19/2022 11:15**

Field ID: HAB-HC-011922-1115 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2300654	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P408728	
		Cylindrospermopsin	0.10	U	ug/L	P408728	
		Desmethyl microcystin LR	0.25	U	ug/L	P408728	
		Microcystin HilR**	0.25	U	ug/L	P408728	
		Microcystin HtyR**	0.25	U	ug/L	P408728	
		Microcystin LA	0.73		ug/L	P408728	
		Microcystin LF	0.10	U	ug/L	P408728	
		Microcystin LR	0.95	I	ug/L	P408728	
		Microcystin LW	0.25	U	ug/L	P408728	
		Microcystin LY	0.11	I	ug/L	P408728	
		Microcystin RR	0.94		ug/L	P408728	
		Microcystin WR	0.50	U	ug/L	P408728	
		Microcystin YR	0.25	U	ug/L	P408728	
		Nodularin-R**	0.10	U	ug/L	P408728	
2300663	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P409272	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P409067	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P408976	
	EPA 365.1 Rev. 2.0	Total-P	0.081		mg P/L	P408764	MS
2300664	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P408739	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P409272

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P409067

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408976

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408764

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408739

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

Reference Method: EPA 8321B
Batch ID: P408728

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 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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P409272

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P409067

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408976

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: P408764

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408739

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

Reference Method: EPA 8321B
Batch ID: P408728

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	92.2		P	40 - 150
Cylindrospermopsin	103		P	40 - 150
Desmethyl microcystin LR	111		P	40 - 150
Microcystin HilR	82.0		P	40 - 150
Microcystin HtyR	92.0		P	40 - 150
Microcystin LA	91.8		P	40 - 150
Microcystin LF	93.9		P	40 - 150
Microcystin LR	64.2		P	40 - 150
Microcystin LW	90.9		P	40 - 150
Microcystin LY	87.7		P	40 - 150
Microcystin RR	95.6		P	40 - 150
Microcystin WR	99.0		P	40 - 150
Microcystin YR	84.0		P	40 - 150
Nodularin-R	90.3		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P409272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2300663	Ammonia-N	95.0	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P409067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2300871	Kjeldahl Nitrogen	106	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408976

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2300527	NO2NO3-N	96.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408764

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2300614	Total-P	111	114	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2300541	O-Phosphate-P	98.1	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P408728

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2300618	Anatoxin-a	111	114	P/P	40 - 150
2300618	Cylindrospermopsin	125	143	P/P	40 - 150
2300618	Desmethyl microcystin LR	144	130	P/P	40 - 150
2300618	Microcystin HilR	103	103	P/P	40 - 150
2300618	Microcystin HtyR	107	111	P/P	40 - 150
2300618	Microcystin LA	96.6	104	P/P	40 - 150
2300618	Microcystin LF	95.1	110	P/P	40 - 150
2300618	Microcystin LR	78.7	84.2	P/P	40 - 150
2300618	Microcystin LW	105	92.3	P/P	40 - 150
2300618	Microcystin LY	95.8	88.1	P/P	40 - 150
2300618	Microcystin RR	112	110	P/P	40 - 150
2300618	Microcystin WR	103	104	P/P	40 - 150
2300618	Microcystin YR	106	112	P/P	40 - 150
2300618	Nodularin-R	103	109	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P409272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2300663	Ammonia-N	1.57	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P409067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2300871	Kjeldahl Nitrogen	0.186	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408976

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2300527	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408764

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2300614	Total-P	2.33	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408739

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2300541	O-Phosphate-P	2.02	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P408728

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2300618	Anatoxin-a	2.54	Spike	P	0 - 30
2300618	Cylindrospermopsin	12.9	Spike	P	0 - 30
2300618	Desmethyl microcystin LR	10.3	Spike	P	0 - 30
2300618	Microcystin HilR	0.786	Spike	P	0 - 30
2300618	Microcystin HtyR	3.54	Spike	P	0 - 30
2300618	Microcystin LA	7.06	Spike	P	0 - 30
2300618	Microcystin LF	14.2	Spike	P	0 - 30
2300618	Microcystin LR	6.75	Spike	P	0 - 30
2300618	Microcystin LW	12.4	Spike	P	0 - 30
2300618	Microcystin LY	8.40	Spike	P	0 - 30
2300618	Microcystin RR	1.87	Spike	P	0 - 30
2300618	Microcystin WR	0.792	Spike	P	0 - 30
2300618	Microcystin YR	5.49	Spike	P	0 - 30
2300618	Nodularin-R	5.77	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: 2300654
Field Sample ID: HAB-HC-011922-1115

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	98.5	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	116	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A109728
Included Lab Sample IDs: 2300654

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	108	108	P/P	50 - 160
Desmethyl microcystin LR	113	106	P/P	50 - 160
Microcystin HilR	86.7	87.6	P/P	50 - 160
Microcystin HtyR	89.5	87.5	P/P	50 - 160
Microcystin LA	92.3	95.6	P/P	50 - 160
Microcystin LF	90.2	94.1	P/P	50 - 160
Microcystin LR	64.5	67.6	P/P	50 - 160
Microcystin LW	92.0	95.4	P/P	50 - 160
Microcystin LY	83.2	84.0	P/P	50 - 160
Microcystin RR	99.0	96.4	P/P	50 - 160
Microcystin WR	91.9	86.5	P/P	50 - 160
Microcystin YR	82.1	83.4	P/P	50 - 160
Nodularin-R	90.7	87.2	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A109950
Included Lab Sample IDs: 2300664

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A110009
Included Lab Sample IDs: 2300663

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	107	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A110046
Included Lab Sample IDs: 2300663

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A110152
Included Lab Sample IDs: 2300663

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.1	95.9	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A408728
Included Lab Sample IDs: 2300654

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	85.1	89.4	P/P	50 - 160

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		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	96.0	95.0	97.0			1.57
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.6	106	106			0.186
EPA 353.2 Rev. 2.0	NO2NO3-N	100	96.2				0.0
EPA 365.1 Rev. 2.0	Total-P	110	111	114			2.33
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	98.1	100			2.02
EPA 8321B	Anatoxin-a	92.2	111	114			2.54
	Cylindrospermopsin	103	125	143			12.9
	Desmethyl microcystin LR	111	144	130			10.3
	Microcystin HilR	82.0	103	103			0.786
	Microcystin HtyR	92.0	107	111			3.54
	Microcystin LA	91.8	96.6	104			7.06
	Microcystin LF	93.9	95.1	110			14.2
	Microcystin LR	64.2	78.7	84.2			6.75
	Microcystin LW	90.9	105	92.3			12.4
	Microcystin LY	87.7	95.8	88.1			8.40
	Microcystin RR	95.6	112	110			1.87
	Microcystin WR	99.0	103	104			0.792
	Microcystin YR	84.0	106	112			5.49
	Nodularin-R	90.3	103	109			5.77

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2300663
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2300663
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2300663
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2300663
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2300664
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2300654

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	01/20/2022			02/01/2022 15:54	Roberta Tatti	2300663
EPA 351.2 Rev. 2.0	01/20/2022	01/28/2022 11:05	Samantha L Bates	02/01/2022 13:09	Virginia P. Brown	2300663
EPA 353.2 Rev. 2.0	01/20/2022			01/25/2022 13:46	Nathaniel J Jones	2300663
EPA 365.1 Rev. 2.0	01/20/2022	01/21/2022 15:10	Simonne.V. Calhoun	01/24/2022 12:15	Shengyu Ding	2300663
EPA 365.1 Rev. 2.0 dissolved	01/20/2022			01/20/2022 14:51	James L Waggerby	2300664
EPA 8321B	01/20/2022	01/20/2022 12:10	Manjita Shrestha	01/20/2022 14:21	Manjita Shrestha	2300654