Chemical Analysis Report

WQAP-2021-06-09-01

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-2021-05-17-46**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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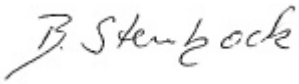
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 01-JUL-2021 12:24



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: Huckleberry Lake Boat Ramp/Canal Entrance **Collection Date/Time: 06/08/2021 10:00**

Field ID: HAB-HC-060821-001 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2253616	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P399411	
		Cylindrospermopsin	0.10	U	ug/L	P399411	
		Desmethyl microcystin LR	0.25	U	ug/L	P399411	
		Microcystin HilR**	0.25	U	ug/L	P399411	
		Microcystin HtyR**	0.25	U	ug/L	P399411	
		Microcystin LA	0.10	U	ug/L	P399411	
		Microcystin LF	0.10	U	ug/L	P399411	
		Microcystin LR	0.32	I	ug/L	P399411	
		Microcystin LW	0.25	U	ug/L	P399411	
		Microcystin LY	0.10	U	ug/L	P399411	
		Microcystin RR	0.10	U	ug/L	P399411	
		Microcystin WR	0.50	U	ug/L	P399411	
		Microcystin YR	0.25	U	ug/L	P399411	
		Nodularin-R**	0.10	U	ug/L	P399411	
2253617	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P399646	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P399711	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P399690	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P399591	
2253618	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P399452	

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: P399646

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399711

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399690

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399591

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399452

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

Reference Method: EPA 8321B
Batch ID: P399411

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: P399646

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399711

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: P399690

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: P399591

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399452

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

Reference Method: EPA 8321B
Batch ID: P399411

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 150
Cylindrospermopsin	109		P	40 - 150
Desmethyl microcystin LR	84.5		P	40 - 150
Microcystin HilR	92.2		P	40 - 150
Microcystin HtyR	96.1		P	40 - 150
Microcystin LA	111		P	40 - 150
Microcystin LF	107		P	40 - 150
Microcystin LR	87.6		P	40 - 150
Microcystin LW	101		P	40 - 150
Microcystin LY	114		P	40 - 150
Microcystin RR	107		P	40 - 150
Microcystin WR	87.6		P	40 - 150
Microcystin YR	102		P	40 - 150
Nodularin-R	106		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399646

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253342	Ammonia-N	94.4	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399690

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253617	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399591

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2252712	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399452

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253344	O-Phosphate-P	99.9	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P399411

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2253418	Anatoxin-a	107	106	P/P	40 - 150
2253418	Cylindrospermopsin	96.3	104	P/P	40 - 150
2253418	Desmethyl microcystin LR	89.1	94.1	P/P	40 - 150
2253418	Microcystin HilR	92.2	91.6	P/P	40 - 150
2253418	Microcystin HtyR	88.6	90.9	P/P	40 - 150
2253418	Microcystin LA	105	105	P/P	40 - 150
2253418	Microcystin LF	111	109	P/P	40 - 150
2253418	Microcystin LR	82.1	90.8	P/P	40 - 150
2253418	Microcystin LW	91.7	97.6	P/P	40 - 150
2253418	Microcystin LY	107	110	P/P	40 - 150
2253418	Microcystin RR	103	103	P/P	40 - 150
2253418	Microcystin WR	91.5	93.8	P/P	40 - 150
2253418	Microcystin YR	95.5	102	P/P	40 - 150
2253418	Nodularin-R	106	102	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399646

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253342	Ammonia-N	3.46	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253743	Kjeldahl Nitrogen	2.16	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399690

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253617	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P399591

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2252712	Total-P	1.50	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399452

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253344	O-Phosphate-P	0.0884	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P399411

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2253418	Anatoxin-a	0.835	Spike	P	0 - 30
2253418	Cylindrospermopsin	7.29	Spike	P	0 - 30
2253418	Desmethyl microcystin LR	5.50	Spike	P	0 - 30
2253418	Microcystin HilR	0.667	Spike	P	0 - 30
2253418	Microcystin HtyR	2.59	Spike	P	0 - 30
2253418	Microcystin LA	0.0406	Spike	P	0 - 30
2253418	Microcystin LF	2.14	Spike	P	0 - 30
2253418	Microcystin LR	9.25	Spike	P	0 - 30
2253418	Microcystin LW	6.18	Spike	P	0 - 30
2253418	Microcystin LY	2.79	Spike	P	0 - 30
2253418	Microcystin RR	0.189	Spike	P	0 - 30
2253418	Microcystin WR	2.48	Spike	P	0 - 30
2253418	Microcystin YR	6.89	Spike	P	0 - 30
2253418	Nodularin-R	3.17	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: 2253616
Field Sample ID: HAB-HC-060821-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	79.0	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	74.5	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A105970
Included Lab Sample IDs: 2253618

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	98.4	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A105974
Included Lab Sample IDs: 2253616

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	73.8	74.1	P/P	50 - 160
Cylindrospermopsin	107	107	P/P	50 - 160
Desmethyl microcystin LR	93.6	90.5	P/P	50 - 160
Microcystin HilR	91.9	95.7	P/P	50 - 160
Microcystin HtyR	93.4	105	P/P	50 - 160
Microcystin LA	112	113	P/P	50 - 160
Microcystin LF	118	118	P/P	50 - 160
Microcystin LR	92.7	95.0	P/P	50 - 160
Microcystin LW	94.9	97.7	P/P	50 - 160
Microcystin LY	118	119	P/P	50 - 160
Microcystin RR	113	110	P/P	50 - 160
Microcystin WR	88.4	89.8	P/P	50 - 160
Microcystin YR	101	109	P/P	50 - 160
Nodularin-R	106	111	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106033
Included Lab Sample IDs: 2253617

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	106	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106044
Included Lab Sample IDs: 2253617

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106065
Included Lab Sample IDs: 2253617

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: A106117
Included Lab Sample IDs: 2253617

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.1	91.5	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		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	94.4	98.0			3.46
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107					2.16
EPA 353.2 Rev. 2.0	NO2NO3-N	100	101	100			0.496
EPA 365.1 Rev. 2.0	Total-P	104	102	104			1.50
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	99.9	100			0.0884
EPA 8321B	Anatoxin-a	101	107	106			0.835
	Cylindrospermopsin	109	96.3	104			7.29
	Desmethyl microcystin LR	84.5	89.1	94.1			5.50
	Microcystin HilR	92.2	92.2	91.6			0.667
	Microcystin HtyR	96.1	88.6	90.9			2.59
	Microcystin LA	111	105	105			0.0406
	Microcystin LF	107	111	109			2.14
	Microcystin LR	87.6	82.1	90.8			9.25
	Microcystin LW	101	91.7	97.6			6.18
	Microcystin LY	114	107	110			2.79
	Microcystin RR	107	103	103			0.189
	Microcystin WR	87.6	91.5	93.8			2.48
	Microcystin YR	102	95.5	102			6.89
	Nodularin-R	106	106	102			3.17

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2253617
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2253617
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2253617
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2253617
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2253618
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2253616

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	06/09/2021			06/14/2021 15:16	Roberta Tatti	2253617
EPA 351.2 Rev. 2.0	06/09/2021	06/15/2021 14:13	Benjamin T. Nordmann	06/16/2021 13:04	Virginia P. Brown	2253617
EPA 353.2 Rev. 2.0	06/09/2021			06/15/2021 09:14	Beverly Y. Sanders	2253617
EPA 365.1 Rev. 2.0	06/09/2021	06/11/2021 14:33	Madeline Gruver	06/14/2021 09:38	Shengyu Ding	2253617
EPA 365.1 Rev. 2.0 dissolved	06/09/2021			06/09/2021 14:58	Blanca Fach	2253618
EPA 8321B	06/09/2021	06/09/2021 12:00	Pramila Ghimire	06/09/2021 23:01	Pramila Ghimire	2253616