Chemical Analysis Report

WQAP-2022-07-26-01

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-2022-07-25-55**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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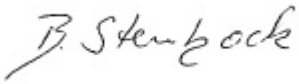
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 04-AUG-2022 15:20



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;Lake Little Red Water **Collection Date/Time: 07/25/2022 08:17**

Field ID: HAB-HC-072522-817 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2343689	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P417147	
		Cylindrospermopsin	0.10	U	ug/L	P417146	
		Desmethyl microcystin LR	0.25	U	ug/L	P417146	
		Microcystin HilR	0.25	U	ug/L	P417146	
		Microcystin HtyR	0.25	U	ug/L	P417146	
		Microcystin LA	0.13	I	ug/L	P417146	
		Microcystin LF	0.10	U	ug/L	P417146	
		Microcystin LR	0.44	I	ug/L	P417146	
		Microcystin LW	0.25	U	ug/L	P417146	
		Microcystin LY	0.10	U	ug/L	P417146	
		Microcystin RR	0.20	I	ug/L	P417146	
		Microcystin WR	0.50	U	ug/L	P417146	
		Microcystin YR	0.25	U	ug/L	P417146	
		Nodularin-R	0.10	U	ug/L	P417146	
2343690	EPA 350.1 Rev. 2.0	Ammonia-N	0.037		mg N/L	P417315	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.84		mg N/L	P417240	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.014		mg N/L	P417309	
	EPA 365.1 Rev. 2.0	Total-P	0.038		mg P/L	P417342	
2343691	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P417177	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417315

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417240

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417309

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417342

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417177

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

Reference Method: EPA 8321B
Batch ID: P417146

Component	Result	Code	Units
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

Reference Method: EPA 8321B
Batch ID: P417147

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417315

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: P417240

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417309

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417342

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417177

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

Reference Method: EPA 8321B
Batch ID: P417146

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	89.4		P	40 - 150
Desmethyl microcystin LR	92.0		P	40 - 150
Microcystin HilR	81.3		P	40 - 150
Microcystin HtyR	84.5		P	40 - 150
Microcystin LA	81.6		P	40 - 150
Microcystin LF	115		P	40 - 150
Microcystin LR	99.5		P	40 - 150
Microcystin LW	102		P	40 - 150
Microcystin LY	73.4		P	40 - 150
Microcystin RR	93.3		P	40 - 150
Microcystin WR	94.6		P	40 - 150
Microcystin YR	88.8		P	40 - 150
Nodularin-R	83.8		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417147

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	92.0		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343732	Ammonia-N	103	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417240

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343690	Kjeldahl Nitrogen	96.4	98.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343690	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343742	Total-P	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417177

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343691	O-Phosphate-P	101	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P417146

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343670	Cylindrospermopsin	89.3	92.7	P/P	40 - 150
2343670	Desmethyl microcystin LR	105	105	P/P	40 - 150
2343670	Microcystin HilR	88.5	91.3	P/P	40 - 150
2343670	Microcystin HtyR	97.3	103	P/P	40 - 150
2343670	Microcystin LA	83.7	87.2	P/P	40 - 150
2343670	Microcystin LF	86.8	116	P/P	40 - 150
2343670	Microcystin LR	110	123	P/P	40 - 150
2343670	Microcystin LW	82.3	73.8	P/P	40 - 150
2343670	Microcystin LY	77.0	83.2	P/P	40 - 150
2343670	Microcystin RR	95.8	97.9	P/P	40 - 150
2343670	Microcystin WR	103	112	P/P	40 - 150
2343670	Microcystin YR	99.9	112	P/P	40 - 150
2343670	Nodularin-R	93.8	96.8	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417147

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343514	Anatoxin-a	93.4	94.3	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343732	Ammonia-N	1.57	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417240

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343690	Kjeldahl Nitrogen	1.47	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343690	NO2NO3-N	0.462	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417342

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343742	Total-P	0.379	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417177

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343691	O-Phosphate-P	0.597	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P417146

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343670	Cylindrospermopsin	3.77	Spike	P	0 - 30
2343670	Desmethyl microcystin LR	0.194	Spike	P	0 - 30
2343670	Microcystin HilR	3.18	Spike	P	0 - 30
2343670	Microcystin HtyR	5.66	Spike	P	0 - 30
2343670	Microcystin LA	4.09	Spike	P	0 - 30
2343670	Microcystin LF	28.8	Spike	P	0 - 30
2343670	Microcystin LR	11.6	Spike	P	0 - 30
2343670	Microcystin LW	10.9	Spike	P	0 - 30
2343670	Microcystin LY	7.79	Spike	P	0 - 30
2343670	Microcystin RR	2.18	Spike	P	0 - 30
2343670	Microcystin WR	8.36	Spike	P	0 - 30
2343670	Microcystin YR	11.7	Spike	P	0 - 30
2343670	Nodularin-R	3.13	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P417147

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343514	Anatoxin-a	0.889	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2343689
Field Sample ID: HAB-HC-072522-817

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	130	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	83.5	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113710
Included Lab Sample IDs: 2343691

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.7	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A113743
Included Lab Sample IDs: 2343689

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	87.1	86.6	P/P	50 - 160
Desmethyl microcystin LR	73.9	70.1	P/P	50 - 160
Microcystin HilR	65.2	60.0	P/P	50 - 160
Microcystin HtyR	73.6	66.9	P/P	50 - 160
Microcystin LA	77.6	66.8	P/P	50 - 160
Microcystin LF	91.2	82.8	P/P	50 - 160
Microcystin LR	85.1	76.1	P/P	50 - 160
Microcystin LW	67.3	78.1	P/P	50 - 160
Microcystin LY	71.2	68.3	P/P	50 - 160
Microcystin RR	78.5	69.5	P/P	50 - 160
Microcystin WR	81.4	78.1	P/P	50 - 160
Microcystin YR	76.4	69.7	P/P	50 - 160
Nodularin-R	72.1	67.5	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113761
Included Lab Sample IDs: 2343690

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A113763
Included Lab Sample IDs: 2343690

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	98.4	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A113774
Included Lab Sample IDs: 2343689

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	99.5	94.0	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113782
Included Lab Sample IDs: 2343690

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113800
Included Lab Sample IDs: 2343690

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	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	96.0	103	101			1.57
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	96.4	98.9			1.47
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101	101			0.462
EPA 365.1 Rev. 2.0	Total-P	100	104	104			0.379
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	101	100			0.597
EPA 8321B	Anatoxin-a	92.0	93.4	94.3			0.889
	Cylindrospermopsin	89.4	89.3	92.7			3.77
	Desmethyl microcystin LR	92.0	105	105			0.194
	Microcystin HilR	81.3	88.5	91.3			3.18
	Microcystin HtyR	84.5	97.3	103			5.66
	Microcystin LA	81.6	83.7	87.2			4.09
	Microcystin LF	115	86.8	116			28.8
	Microcystin LR	99.5	110	123			11.6
	Microcystin LW	102	82.3	73.8			10.9
	Microcystin LY	73.4	77.0	83.2			7.79
	Microcystin RR	93.3	95.8	97.9			2.18
	Microcystin WR	94.6	103	112			8.36
	Microcystin YR	88.8	99.9	112			11.7
	Nodularin-R	83.8	93.8	96.8			3.13

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2343690
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2343690
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2343690
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2343690
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2343691
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2343689
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2343689

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	07/26/2022			07/28/2022 12:25	Ping Hua	2343690
EPA 351.2 Rev. 2.0	07/26/2022	07/28/2022 11:30	Simonne.V. Calhoun	07/28/2022 17:20	Samantha L Bates	2343690
EPA 353.2 Rev. 2.0	07/26/2022			07/28/2022 11:04	Beverly Y. Sanders	2343690
EPA 365.1 Rev. 2.0	07/26/2022	07/28/2022 17:50	Adam P Silver	07/29/2022 13:41	James L Waggerby	2343690
EPA 365.1 Rev. 2.0 dissolved	07/26/2022			07/26/2022 14:14	Chandler E Cox	2343691
EPA 8321B	07/26/2022	07/27/2022 09:00	Manjita Shrestha	07/27/2022 13:39	Manjita Shrestha	2343689
	07/26/2022	07/27/2022 12:00	Manjita Shrestha	07/28/2022 12:43	Manjita Shrestha	2343689