Chemical Analysis Report

WQAP-2023-05-23-02

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-05-01-42**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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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 Lotela - Boat Ramp **Collection Date/Time: 05/22/2023 10:00**

Field ID: HAB-SD-052223-1000 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2411790	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P430210	
		Cylindrospermopsin	0.10	U	ug/L	P430209	
		Desmethyl microcystin LR	0.25	U	ug/L	P430209	
		Microcystin HilR	0.25	U	ug/L	P430209	
		Microcystin HtyR	0.25	U	ug/L	P430209	
		Microcystin LA	0.10	U	ug/L	P430209	
		Microcystin LF	0.10	U	ug/L	P430209	
		Microcystin LR	0.25	U	ug/L	P430209	MS
		Microcystin LW	0.25	U	ug/L	P430209	
		Microcystin LY	0.10	U	ug/L	P430209	
		Microcystin RR	0.10	U	ug/L	P430209	
		Microcystin WR	0.50	U	ug/L	P430209	
		Neosaxitoxin	0.50	U	ug/L	P430210	
		Microcystin YR	0.25	U	ug/L	P430209	
		Saxitoxin	0.50	U	ug/L	P430210	
		Nodularin-R	0.10	U	ug/L	P430209	
2411795	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P430658	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.55		mg N/L	P430388	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P430732	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P430312	
2411796	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P430257	

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: P430658

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430388

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430732

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430312

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P430257

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

Reference Method: EPA 8321B
Batch ID: P430209

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: P430210

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: P430658

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430388

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.3		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430732

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430312

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P430257

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.9		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P430209

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	94.7		P	40 - 150
Desmethyl microcystin LR	115		P	40 - 150
Microcystin HilR	126		P	40 - 150
Microcystin HtyR	115		P	40 - 150
Microcystin LA	135		P	40 - 150
Microcystin LF	104		P	40 - 150
Microcystin LR	124		P	40 - 150
Microcystin LW	125		P	40 - 150
Microcystin LY	110		P	40 - 150
Microcystin RR	106		P	40 - 150
Microcystin WR	127		P	40 - 150
Microcystin YR	127		P	40 - 150
Nodularin-R	126		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P430210

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	86.0		P	40 - 150
Neosaxitoxin	81.3		P	40 - 150
Saxitoxin	82.3		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430658

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2411771	Ammonia-N	97.8	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2411834	Kjeldahl Nitrogen	94.2	95.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430732

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2411747	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P430257

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2411884	O-Phosphate-P	101	98.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P430209

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410639	Cylindrospermopsin	94.5	88.7	P/P	40 - 150
2410639	Desmethyl microcystin LR	129	137	P/P	40 - 150
2410639	Microcystin HilR	134	140	P/P	40 - 150
2410639	Microcystin HtyR	122	121	P/P	40 - 150
2410639	Microcystin LA	129	119	P/P	40 - 150
2410639	Microcystin LF	114	104	P/P	40 - 150
2410639	Microcystin LR	167	161	F/F	40 - 150
2410639	Microcystin LW	100	107	P/P	40 - 150
2410639	Microcystin LY	102	101	P/P	40 - 150
2410639	Microcystin RR	99.3	98.6	P/P	40 - 150
2410639	Microcystin WR	133	126	P/P	40 - 150
2410639	Microcystin YR	132	125	P/P	40 - 150
2410639	Nodularin-R	121	118	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P430210

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410639	Anatoxin-a	88.4	89.5	P/P	40 - 150
2410639	Neosaxitoxin	72.0	74.3	P/P	40 - 150
2410639	Saxitoxin	80.0	81.6	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430658

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2411771	Ammonia-N	0.697	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2411834	Kjeldahl Nitrogen	0.821	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430732

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2411747	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430312

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2411829	Total-P	0.436	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P430257

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2411884	O-Phosphate-P	1.81	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P430209

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410639	Cylindrospermopsin	6.30	Spike	P	0 - 30
2410639	Desmethyl microcystin LR	5.78	Spike	P	0 - 30
2410639	Microcystin HilR	3.89	Spike	P	0 - 30
2410639	Microcystin HtyR	0.357	Spike	P	0 - 30
2410639	Microcystin LA	7.94	Spike	P	0 - 30
2410639	Microcystin LF	9.39	Spike	P	0 - 30
2410639	Microcystin LR	3.73	Spike	P	0 - 30
2410639	Microcystin LW	6.82	Spike	P	0 - 30
2410639	Microcystin LY	1.21	Spike	P	0 - 30
2410639	Microcystin RR	0.719	Spike	P	0 - 30
2410639	Microcystin WR	5.14	Spike	P	0 - 30
2410639	Microcystin YR	5.85	Spike	P	0 - 30
2410639	Nodularin-R	2.52	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P430210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410639	Anatoxin-a	1.21	Spike	P	0 - 30
2410639	Neosaxitoxin	3.17	Spike	P	0 - 30
2410639	Saxitoxin	1.97	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2411790
Field Sample ID: HAB-SD-052223-1000

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	90.8	P	30 - 160
EPA 8321B	Saxitoxin-15N7	71.6	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A119318
Included Lab Sample IDs: 2411790

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	88.4	81.6	P/P	50 - 160
Desmethyl microcystin LR	111	110	P/P	50 - 160
Microcystin HilR	115	111	P/P	50 - 160
Microcystin HtyR	113	102	P/P	50 - 160
Microcystin LA	118	114	P/P	50 - 160
Microcystin LF	82.9	90.1	P/P	50 - 160
Microcystin LR	127	130	P/P	50 - 160
Microcystin LW	107	106	P/P	50 - 160
Microcystin LY	110	114	P/P	50 - 160
Microcystin RR	96.7	92.5	P/P	50 - 160
Microcystin WR	109	108	P/P	50 - 160
Microcystin YR	116	105	P/P	50 - 160
Nodularin-R	113	104	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A119320
Included Lab Sample IDs: 2411790

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	82.9	80.9	P/P	50 - 160
Neosaxitoxin	83.7	81.9	P/P	50 - 160
Saxitoxin	84.2	80.3	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A119354
Included Lab Sample IDs: 2411796

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A119405
Included Lab Sample IDs: 2411795

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A119430
Included Lab Sample IDs: 2411795

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.9	95.1	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A119511
Included Lab Sample IDs: 2411795

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A119541
Included Lab Sample IDs: 2411795

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	104	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	97.4	97.8	98.6			0.697
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.3	94.2	95.0			0.821
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	104			0.0
EPA 365.1 Rev. 2.0	Total-P	101					0.436
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.9	101	98.8			1.81
EPA 8321B	Anatoxin-a	86.0	88.4	89.5			1.21
	Cylindrospermopsin	94.7	94.5	88.7			6.30
	Desmethyl microcystin LR	115	129	137			5.78
	Microcystin HilR	126	134	140			3.89
	Microcystin HtyR	115	122	121			0.357
	Microcystin LA	135	129	119			7.94
	Microcystin LF	104	114	104			9.39
	Microcystin LR	124	167	161			3.73
	Microcystin LW	125	100	107			6.82
	Microcystin LY	110	102	101			1.21
	Microcystin RR	106	99.3	98.6			0.719
	Microcystin WR	127	133	126			5.14
	Microcystin YR	127	132	125			5.85
	Neosaxitoxin	81.3	72.0	74.3			3.17
	Nodularin-R	126	121	118			2.52
	Saxitoxin	82.3	80.0	81.6			1.97

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2411795
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2411795
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2411795
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2411795
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2411796
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2411790
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2411790

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	05/23/2023			05/31/2023 15:05	Khloe J Berg	2411795
EPA 351.2 Rev. 2.0	05/23/2023	05/25/2023 11:53	Dana G. Hughes	05/26/2023 08:57	Samantha L Bates	2411795
EPA 353.2 Rev. 2.0	05/23/2023			06/02/2023 10:13	Beverly Y. Sanders	2411795
EPA 365.1 Rev. 2.0	05/23/2023	05/24/2023 14:00	Alexis Price	05/25/2023 11:28	Simonne.V. Calhoun	2411795
EPA 365.1 Rev. 2.0 dissolved	05/23/2023			05/23/2023 14:53	Elise M. Gillis	2411796
EPA 8321B	05/23/2023	05/23/2023 12:00	Touraj Touran	05/23/2023 16:13	Touraj Touran	2411790
	05/23/2023	05/23/2023 12:00	Touraj Touran	05/24/2023 02:11	Touraj Touran	2411790