Chemical Analysis Report

WQAP-2023-08-16-01

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

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2023-07-24-36**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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2199 South Rock Road
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Certified by: Colin Wright, Program Administrator

Date Certified: 08-SEP-2023 13:58

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: Santiago Canal **Collection Date/Time: 08/15/2023 10:30**

Field ID: SEHAB0084 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431317	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P433909	
		Cylindrospermopsin	0.10	U	ug/L	P433908	
		Desmethyl microcystin LR	0.25	U	ug/L	P433908	
		Microcystin HilR	0.25	U	ug/L	P433908	
		Microcystin HtyR	0.25	U	ug/L	P433908	
		Microcystin LA	0.10	U	ug/L	P433908	
		Microcystin LF	0.10	U	ug/L	P433908	
		Microcystin LR	0.25	U	ug/L	P433908	
		Microcystin LW	0.25	U	ug/L	P433908	
		Microcystin LY	0.10	U	ug/L	P433908	
		Microcystin RR	0.10	U	ug/L	P433908	
		Microcystin WR	0.50	U	ug/L	P433908	
		Neosaxitoxin	0.50	U	ug/L	P433909	
		Microcystin YR	0.25	U	ug/L	P433908	
		Saxitoxin	0.50	U	ug/L	P433909	
		Nodularin-R	0.10	U	ug/L	P433908	
2431318	EPA 350.1 Rev. 2.0	Ammonia-N	0.22		mg N/L	P434388	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P434035	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.085		mg N/L	P434628	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P434272	
2431319	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.080		mg P/L	P433938	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434388

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434035

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434628

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

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

Reference Method: EPA 8321B
Batch ID: P433908

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: P433909

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: P434388

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434035

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.9		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434628

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

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

Reference Method: EPA 8321B
Batch ID: P433908

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	137		P	40 - 160
Desmethyl microcystin LR	97.8		P	40 - 160
Microcystin HilR	96.4		P	40 - 160
Microcystin HtyR	86.0		P	40 - 160
Microcystin LA	100		P	40 - 160
Microcystin LF	92.4		P	40 - 160
Microcystin LR	90.6		P	40 - 160
Microcystin LW	95.1		P	40 - 160
Microcystin LY	86.7		P	40 - 160
Microcystin RR	93.7		P	40 - 160
Microcystin WR	109		P	40 - 160
Microcystin YR	75.8		P	40 - 160
Nodularin-R	97.3		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433909

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	106		P	40 - 150
Neosaxitoxin	113		P	40 - 150
Saxitoxin	90.2		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431289	Ammonia-N	99.8	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434035

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431367	Kjeldahl Nitrogen	109	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434628

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431276	NO2NO3-N	99.6	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431289	Total-P	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431467	O-Phosphate-P	96.3	98.0	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P433908

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431302	Cylindrospermopsin	125	121	P/P	40 - 160
2431302	Desmethyl microcystin LR	111	107	P/P	40 - 160
2431302	Microcystin HilR	101	100	P/P	40 - 160
2431302	Microcystin HtyR	94.8	92.2	P/P	40 - 160
2431302	Microcystin LA	103	99.6	P/P	40 - 160
2431302	Microcystin LF	100	93.4	P/P	40 - 160
2431302	Microcystin LR	104	101	P/P	40 - 160
2431302	Microcystin LW	101	94.3	P/P	40 - 160
2431302	Microcystin LY	90.4	88.6	P/P	40 - 160
2431302	Microcystin RR	103	98.0	P/P	40 - 160
2431302	Microcystin WR	113	107	P/P	40 - 160
2431302	Microcystin YR	89.6	87.7	P/P	40 - 160
2431302	Nodularin-R	96.0	105	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433909

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431302	Anatoxin-a	99.4	102	P/P	40 - 150
2431302	Neosaxitoxin	80.7	83.4	P/P	40 - 150
2431302	Saxitoxin	69.2	69.3	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431289	Ammonia-N	1.55	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434035

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431367	Kjeldahl Nitrogen	1.20	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434628

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431276	NO2NO3-N	0.962	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431289	Total-P	0.607	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433938

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431467	O-Phosphate-P	1.09	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P433908

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431302	Cylindrospermopsin	3.23	Spike	P	0 - 30
2431302	Desmethyl microcystin LR	4.11	Spike	P	0 - 30
2431302	Microcystin HilR	1.02	Spike	P	0 - 30
2431302	Microcystin HtyR	2.85	Spike	P	0 - 30
2431302	Microcystin LA	3.80	Spike	P	0 - 30
2431302	Microcystin LF	6.93	Spike	P	0 - 30
2431302	Microcystin LR	3.65	Spike	P	0 - 30
2431302	Microcystin LW	6.74	Spike	P	0 - 30
2431302	Microcystin LY	2.00	Spike	P	0 - 30
2431302	Microcystin RR	4.78	Spike	P	0 - 30
2431302	Microcystin WR	4.94	Spike	P	0 - 30
2431302	Microcystin YR	2.15	Spike	P	0 - 30
2431302	Nodularin-R	8.96	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P433909

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431302	Anatoxin-a	2.17	Spike	P	0 - 30
2431302	Neosaxitoxin	3.34	Spike	P	0 - 30
2431302	Saxitoxin	0.159	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2431317
Field Sample ID: SEHAB0084

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	76.7	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	92.0	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A121069
Included Lab Sample IDs: 2431319

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.1	96.7	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A121105
Included Lab Sample IDs: 2431317

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	120	130	P/P	60 - 160
Desmethyl microcystin LR	96.2	90.9	P/P	50 - 160
Microcystin HilR	90.7	90.5	P/P	60 - 160
Microcystin HtyR	84.6	84.9	P/P	60 - 160
Microcystin LA	86.9	93.2	P/P	50 - 160
Microcystin LF	82.7	81.3	P/P	60 - 160
Microcystin LR	91.0	86.7	P/P	60 - 160
Microcystin LW	85.8	83.2	P/P	60 - 160
Microcystin LY	83.9	83.1	P/P	60 - 160
Microcystin RR	87.1	87.1	P/P	60 - 160
Microcystin WR	99.7	95.6	P/P	60 - 160
Microcystin YR	80.4	77.5	P/P	60 - 160
Nodularin-R	96.1	97.6	P/P	60 - 160

Reference Method: EPA 8321B
Run ID: A121106
Included Lab Sample IDs: 2431317

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	109	106	P/P	50 - 160
Neosaxitoxin	112	120	P/P	50 - 160
Saxitoxin	91.8	94.9	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A121149
Included Lab Sample IDs: 2431318

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.6	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A121256
Included Lab Sample IDs: 2431318

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A121257
Included Lab Sample IDs: 2431318

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	99.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A121381
Included Lab Sample IDs: 2431318

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	99.0	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	94.8	99.8	102			1.55
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.9	109	107			1.20
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	99.6	101			0.962
EPA 365.1 Rev. 2.0	Total-P	106	104	105			0.607
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.7	96.3	98.0			1.09
EPA 8321B	Anatoxin-a	106	99.4	102			2.17
	Cylindrospermopsin	137	125	121			3.23
	Desmethyl microcystin LR	97.8	111	107			4.11
	Microcystin HilR	96.4	101	100			1.02
	Microcystin HtyR	86.0	94.8	92.2			2.85
	Microcystin LA	100	103	99.6			3.80
	Microcystin LF	92.4	100	93.4			6.93
	Microcystin LR	90.6	104	101			3.65
	Microcystin LW	95.1	101	94.3			6.74
	Microcystin LY	86.7	90.4	88.6			2.00
	Microcystin RR	93.7	103	98.0			4.78
	Microcystin WR	109	113	107			4.94
	Microcystin YR	75.8	89.6	87.7			2.15
	Neosaxitoxin	113	80.7	83.4			3.34
	Nodularin-R	97.3	96.0	105			8.96
	Saxitoxin	90.2	69.2	69.3			0.159

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2431318
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2431318
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2431318
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2431318
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2431319
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2431317
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2431317

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	08/16/2023			08/25/2023 14:09	Khloe J Berg	2431318
EPA 351.2 Rev. 2.0	08/16/2023	08/18/2023 12:57	Simonne.V. Calhoun	08/21/2023 12:11	Samantha L Bates	2431318
EPA 353.2 Rev. 2.0	08/16/2023			09/06/2023 12:16	Anna M. Plaviak	2431318
EPA 365.1 Rev. 2.0	08/16/2023	08/24/2023 14:28	Alexis Price	08/25/2023 12:23	James L Waggerby	2431318
EPA 365.1 Rev. 2.0 dissolved	08/16/2023			08/16/2023 14:37	Elise M. Gillis	2431319
EPA 8321B	08/16/2023	08/17/2023 10:30	Tae K Lee	08/17/2023 12:25	Hana Lee	2431317
	08/16/2023	08/17/2023 10:30	Tae K Lee	08/17/2023 18:57	Hana Lee	2431317