Chemical Analysis Report

WQAP-2023-06-16-03

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

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2023-06-12-19**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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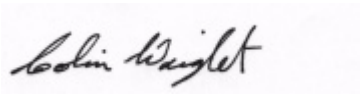

Case Narrative

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: Tiger Lake - Center **Collection Date/Time: 06/15/2023 11:40**

Field ID: HABCE0185_TigerLake2 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2418132	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P431369	
		Cylindrospermopsin	0.10	U	ug/L	P431368	
		Desmethyl microcystin LR	0.25	U	ug/L	P431368	
		Microcystin HilR	0.25	U	ug/L	P431368	
		Microcystin HtyR	0.25	U	ug/L	P431368	
		Microcystin LA	0.44		ug/L	P431368	
		Microcystin LF	0.17	I	ug/L	P431368	
		Microcystin LR	1.1		ug/L	P431368	
		Microcystin LW	0.25	U	ug/L	P431368	
		Microcystin LY	0.15	I	ug/L	P431368	
		Microcystin RR	0.18	I	ug/L	P431368	
		Microcystin WR	0.50	U	ug/L	P431368	
		Neosaxitoxin	0.50	U	ug/L	P431369	
		Microcystin YR	0.25	U	ug/L	P431368	
		Saxitoxin	0.50	U	ug/L	P431369	
		Nodularin-R	0.10	U	ug/L	P431368	
2418137	EPA 350.1 Rev. 2.0	Ammonia-N	0.010		mg N/L	P431663	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.9		mg N/L	P431649	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P431623	
	EPA 365.1 Rev. 2.0	Total-P	0.22		mg P/L	P431731	
2418138	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.01	I	mg P/L	P431424	

Ref. Method and Comment:
EPA 8321B: MS accuracy for microcystin LR could not be assessed due to high concentration of parameter in the spiked sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431663

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431649

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431623

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431731

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431424

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

Reference Method: EPA 8321B
Batch ID: P431368

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: P431369

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: P431663

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431649

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431623

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: P431731

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: P431424

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

Reference Method: EPA 8321B
Batch ID: P431368

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	114		P	40 - 160
Desmethyl microcystin LR	98.3		P	40 - 160
Microcystin HilR	98.4		P	40 - 160
Microcystin HtyR	95.4		P	40 - 160
Microcystin LA	104		P	40 - 160
Microcystin LF	105		P	40 - 160
Microcystin LR	106		P	40 - 160
Microcystin LW	105		P	40 - 160
Microcystin LY	113		P	40 - 160
Microcystin RR	94.9		P	40 - 160
Microcystin WR	95.1		P	40 - 160
Microcystin YR	99.3		P	40 - 160
Nodularin-R	104		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P431369

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	106		P	40 - 150
Neosaxitoxin	106		P	40 - 150
Saxitoxin	94.7		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418206	Ammonia-N	92.2	94.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431649

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418205	Kjeldahl Nitrogen	97.0	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431623

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418091	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431731

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2417107	Total-P	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431424

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418053	O-Phosphate-P	99.2	99.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P431368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418032	Cylindrospermopsin	113	105	P/P	40 - 160
2418032	Desmethyl microcystin LR	116	121	P/P	40 - 160
2418032	Microcystin HilR	115	102	P/P	40 - 160
2418032	Microcystin HtyR	104	109	P/P	40 - 160
2418032	Microcystin LA	113	100	P/P	40 - 160
2418032	Microcystin LF	115	101	P/P	40 - 160
2418032	Microcystin LW	104	103	P/P	40 - 160
2418032	Microcystin LY	117	115	P/P	40 - 160
2418032	Microcystin RR	94.5	90.2	P/P	40 - 160
2418032	Microcystin WR	108	103	P/P	40 - 160
2418032	Microcystin YR	108	114	P/P	40 - 160
2418032	Nodularin-R	113	105	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P431369

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2418032	Anatoxin-a	111	97.1	P/P	40 - 150
2418032	Neosaxitoxin	91.2	80.5	P/P	40 - 150
2418032	Saxitoxin	87.9	80.9	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418206	Ammonia-N	2.50	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431649

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418205	Kjeldahl Nitrogen	4.11	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431623

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418091	NO2NO3-N	0.482	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431731

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2417107	Total-P	0.290	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431424

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418053	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P431368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418032	Cylindrospermopsin	6.87	Spike	P	0 - 30
2418032	Desmethyl microcystin LR	3.10	Spike	P	0 - 30
2418032	Microcystin HilR	11.0	Spike	P	0 - 30
2418032	Microcystin HtyR	4.52	Spike	P	0 - 30
2418032	Microcystin LA	11.3	Spike	P	0 - 30
2418032	Microcystin LF	13.0	Spike	P	0 - 30
2418032	Microcystin LR	0.743	Spike	P	0 - 30
2418032	Microcystin LW	0.0643	Spike	P	0 - 30
2418032	Microcystin LY	1.56	Spike	P	0 - 30
2418032	Microcystin RR	4.63	Spike	P	0 - 30
2418032	Microcystin WR	5.34	Spike	P	0 - 30
2418032	Microcystin YR	5.41	Spike	P	0 - 30
2418032	Nodularin-R	7.48	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P431369

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2418032	Anatoxin-a	13.7	Spike	P	0 - 30
2418032	Neosaxitoxin	12.5	Spike	P	0 - 30
2418032	Saxitoxin	8.32	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2418132
Field Sample ID: HABCE0185_TigerLake2

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	124	P	30 - 160
EPA 8321B	Saxitoxin-15N7	41.8	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: 119977
Included Lab Sample IDs: 2418137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.8	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A119862
Included Lab Sample IDs: 2418138

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	99.0	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A119867
Included Lab Sample IDs: 2418132

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	110	115	P/P	60 - 160
Desmethyl microcystin LR	103	103	P/P	50 - 160
Microcystin HilR	100	102	P/P	60 - 160
Microcystin HtyR	99.0	104	P/P	60 - 160
Microcystin LA	103	109	P/P	50 - 160
Microcystin LF	86.8	98.4	P/P	60 - 160
Microcystin LR	110	104	P/P	60 - 160
Microcystin LW	94.2	96.3	P/P	60 - 160
Microcystin LY	111	121	P/P	60 - 160
Microcystin RR	92.2	103	P/P	60 - 160
Microcystin WR	102	107	P/P	60 - 160
Microcystin YR	97.6	96.1	P/P	60 - 160
Nodularin-R	102	109	P/P	60 - 160

Reference Method: EPA 8321B
Run ID: A119869
Included Lab Sample IDs: 2418132

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	88.8	86.4	P/P	50 - 160
Neosaxitoxin	101	105	P/P	50 - 160
Saxitoxin	89.0	93.0	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A119959
Included Lab Sample IDs: 2418137

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A119997
Included Lab Sample IDs: 2418137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.8	98.3	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A120031
Included Lab Sample IDs: 2418137

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.8	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	97.2	92.2	94.8			2.50
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	97.0	104			4.11
EPA 353.2 Rev. 2.0	NO2NO3-N	104	104	104			0.482
EPA 365.1 Rev. 2.0	Total-P	100	100	101			0.290
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.9	99.2	99.2			0.0
EPA 8321B	Anatoxin-a	106	111	97.1			13.7
	Cylindrospermopsin	114	113	105			6.87
	Desmethyl microcystin LR	98.3	116	121			3.10
	Microcystin HilR	98.4	115	102			11.0
	Microcystin HtyR	95.4	104	109			4.52
	Microcystin LA	104	113	100			11.3
	Microcystin LF	105	115	101			13.0
	Microcystin LR	106					0.743
	Microcystin LW	105	104	103			0.0643
	Microcystin LY	113	117	115			1.56
	Microcystin RR	94.9	94.5	90.2			4.63
	Microcystin WR	95.1	108	103			5.34
	Microcystin YR	99.3	108	114			5.41
	Neosaxitoxin	106	91.2	80.5			12.5
	Nodularin-R	104	113	105			7.48
	Saxitoxin	94.7	87.9	80.9			8.32

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2418137
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2418137
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2418137
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2418137
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2418138
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2418132
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2418132

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	06/16/2023			06/22/2023 14:49	Ping Hua	2418137
EPA 351.2 Rev. 2.0	06/16/2023	06/22/2023 12:16	Dana G. Hughes	06/23/2023 11:29	Ping Hua	2418137
EPA 353.2 Rev. 2.0	06/16/2023			06/22/2023 10:46	Beverly Y. Sanders	2418137
EPA 365.1 Rev. 2.0	06/16/2023	06/23/2023 15:29	Adam P Silver	06/26/2023 13:34	Simonne.V. Calhoun	2418137
EPA 365.1 Rev. 2.0 dissolved	06/16/2023			06/16/2023 15:48	Elise M. Gillis	2418138
EPA 8321B	06/16/2023	06/16/2023 12:00	Touraj Touran	06/16/2023 20:23	Touraj Touran	2418132
	06/16/2023	06/16/2023 12:00	Touraj Touran	06/17/2023 07:51	Touraj Touran	2418132