

Chemical Analysis Report

WQAP-2023-02-09-01

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

Event Description: **Algae Bloom Response NEROC-as needed**
Request ID: **RQ-2023-01-02-48**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 27-FEB-2023 10:08

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line extending from the end of the name.

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: George's Lake @ Center HAB

Collection Date/Time: 02/08/2023 11:20

Field ID: NEHAB0098

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2386149	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P425524	
		Cylindrospermopsin	0.10	U	ug/L	P425523	
		Desmethyl microcystin LR	0.25	U	ug/L	P425523	
		Microcystin HILR	0.25	U	ug/L	P425523	
		Microcystin HtyR	0.25	U	ug/L	P425523	
		Microcystin LA	0.10	U	ug/L	P425523	
		Microcystin LF	0.10	U	ug/L	P425523	
		Microcystin LR	3.2		ug/L	P425523	
		Microcystin LW	0.25	U	ug/L	P425523	
		Microcystin LY	0.10	U	ug/L	P425523	
		Microcystin RR	5.0		ug/L	P425523	
		Microcystin WR	0.50	U	ug/L	P425523	
		Neosaxitoxin	0.50	U	ug/L	P425524	
		Microcystin YR	0.28	I	ug/L	P425523	
		Saxitoxin	0.50	U	ug/L	P425524	
		Nodularin-R	0.10	U	ug/L	P425523	
2386150	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P425980	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.78		mg N/L	P425803	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.063		mg N/L	P425775	
	EPA 365.1 Rev. 2.0	Total-P	0.059		mg P/L	P425923	
2386151	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P425624	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P425980

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P425803

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P425775

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P425923

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P425624

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

Reference Method: EPA 8321B
Batch ID: P425523

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1LR	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: P425524

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: P425980

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: P425803

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.1		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P425775

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: P425923

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P425624

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.7		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P425523

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	89.5		P	40 - 150
Desmethyl microcystin LR	89.9		P	40 - 150
Microcystin H1R	89.3		P	40 - 150
Microcystin HtyR	79.3		P	40 - 150
Microcystin LA	78.4		P	40 - 150
Microcystin LF	74.4		P	40 - 150
Microcystin LR	90.2		P	40 - 150
Microcystin LW	65.2		P	40 - 150
Microcystin LY	95.4		P	40 - 150
Microcystin RR	85.6		P	40 - 150
Microcystin WR	78.8		P	40 - 150
Microcystin YR	84.0		P	40 - 150
Nodularin-R	79.6		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P425524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	110		P	40 - 150
Neosaxitoxin	120		P	40 - 150
Saxitoxin	99.9		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P425980

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2386461	Ammonia-N	99.0	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P425803

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2386272	Kjeldahl Nitrogen	93.8	98.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P425775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2386167	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P425923

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2386678	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P425624

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2386248	O-Phosphate-P	97.1	98.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P425523

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2385488	Cylindrospermopsin	97.8	97.0	P/P	40 - 150
2385488	Desmethyl microcystin LR	110	114	P/P	40 - 150
2385488	Microcystin HiLR	110	116	P/P	40 - 150
2385488	Microcystin HtyR	96.7	104	P/P	40 - 150
2385488	Microcystin LA	94.4	84.5	P/P	40 - 150
2385488	Microcystin LF	104	107	P/P	40 - 150
2385488	Microcystin LR	115	121	P/P	40 - 150
2385488	Microcystin LW	85.4	89.7	P/P	40 - 150
2385488	Microcystin LY	95.9	95.0	P/P	40 - 150
2385488	Microcystin RR	92.0	94.1	P/P	40 - 150
2385488	Microcystin WR	98.8	101	P/P	40 - 150
2385488	Microcystin YR	112	115	P/P	40 - 150
2385488	Nodularin-R	99.9	99.5	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P425524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2385488	Anatoxin-a	95.3	112	P/P	40 - 150
2385488	Neosaxitoxin	74.5	87.2	P/P	40 - 150
2385488	Saxitoxin	59.1	70.2	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P425980

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2386461	Ammonia-N	0.190	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P425803

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2386272	Kjeldahl Nitrogen	4.32	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P425775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2386167	NO2NO3-N	0.471	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P425923

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2386678	Total-P	1.49	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P425624

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2386248	O-Phosphate-P	1.10	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P425523

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2385488	Cylindrospermopsin	0.845	Spike	P	0 - 30
2385488	Desmethyl microcystin LR	3.28	Spike	P	0 - 30
2385488	Microcystin H1LR	5.42	Spike	P	0 - 30
2385488	Microcystin HtyR	7.12	Spike	P	0 - 30
2385488	Microcystin LA	11.0	Spike	P	0 - 30
2385488	Microcystin LF	2.79	Spike	P	0 - 30
2385488	Microcystin LR	4.92	Spike	P	0 - 30
2385488	Microcystin LW	4.89	Spike	P	0 - 30
2385488	Microcystin LY	0.901	Spike	P	0 - 30
2385488	Microcystin RR	2.26	Spike	P	0 - 30
2385488	Microcystin WR	2.15	Spike	P	0 - 30
2385488	Microcystin YR	2.08	Spike	P	0 - 30
2385488	Nodularin-R	0.375	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P425524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2385488	Anatoxin-a	15.9	Spike	P	0 - 30
2385488	Neosaxitoxin	15.7	Spike	P	0 - 30
2385488	Saxitoxin	17.1	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2386149
Field Sample ID: NEHAB0098

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	84.3	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	88.8	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A117321
Included Lab Sample IDs: 2386149

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	94.0	87.6	P/P	50 - 160
Neosaxitoxin	97.9	92.9	P/P	50 - 160
Saxitoxin	82.7	82.7	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A117359
Included Lab Sample IDs: 2386151

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	99.0	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A117361
Included Lab Sample IDs: 2386149

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	100	101	P/P	50 - 160
Desmethyl microcystin LR	100	102	P/P	50 - 160
Microcystin HtR	101	99.0	P/P	50 - 160
Microcystin HtyR	88.1	92.9	P/P	50 - 160
Microcystin LA	77.9	72.0	P/P	50 - 160
Microcystin LF	90.9	75.9	P/P	50 - 160
Microcystin LR	102	99.7	P/P	50 - 160
Microcystin LW	99.5	94.2	P/P	50 - 160
Microcystin LY	83.2	98.1	P/P	50 - 160
Microcystin RR	91.1	92.5	P/P	50 - 160
Microcystin WR	107	106	P/P	50 - 160
Microcystin YR	102	97.3	P/P	50 - 160
Nodularin-R	91.8	88.3	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A117432
Included Lab Sample IDs: 2386150

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A117495
Included Lab Sample IDs: 2386150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.1	98.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A117572
Included Lab Sample IDs: 2386150

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

Quality Assurance Report

Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A117612

Included Lab Sample IDs: 2386150

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	99.0	98.8			0.190
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.1	93.8	98.8			4.32
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102	102			0.471
EPA 365.1 Rev. 2.0	Total-P	99.9	102	104			1.49
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	97.1	98.3			1.10
EPA 8321B	Anatoxin-a	110	95.3	112			15.9
	Cylindrospermopsin	89.5	97.8	97.0			0.845
	Desmethyl microcystin LR	89.9	110	114			3.28
	Microcystin HiLR	89.3	110	116			5.42
	Microcystin HtyR	79.3	96.7	104			7.12
	Microcystin LA	78.4	94.4	84.5			11.0
	Microcystin LF	74.4	104	107			2.79
	Microcystin LR	90.2	115	121			4.92
	Microcystin LW	65.2	85.4	89.7			4.89
	Microcystin LY	95.4	95.9	95.0			0.901
	Microcystin RR	85.6	92.0	94.1			2.26
	Microcystin WR	78.8	98.8	101			2.15
	Microcystin YR	84.0	112	115			2.08
	Neosaxitoxin	120	74.5	87.2			15.7
	Nodularin-R	79.6	99.9	99.5			0.375
	Saxitoxin	99.9	59.1	70.2			17.1

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2386150
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2386150
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2386150
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2386150
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2386151
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2386149
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2386149

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	02/09/2023			02/16/2023 13:50	Ping Hua	2386150
EPA 351.2 Rev. 2.0	02/09/2023	02/15/2023 11:45	Samantha L Bates	02/22/2023 15:01	Samantha L Bates	2386150
EPA 353.2 Rev. 2.0	02/09/2023			02/14/2023 11:07	Beverly Y. Sanders	2386150
EPA 365.1 Rev. 2.0	02/09/2023	02/16/2023 16:29	Adam P Silver	02/17/2023 09:14	James L Waggeberby	2386150
EPA 365.1 Rev. 2.0 dissolved	02/09/2023			02/09/2023 14:54	Elise M. Gillis	2386151
EPA 8321B	02/09/2023	02/09/2023 12:00	Manjita Shrestha	02/09/2023 19:02	Manjita Shrestha	2386149
	02/09/2023	02/09/2023 13:00	Manjita Shrestha	02/10/2023 02:59	Manjita Shrestha	2386149