

Chemical Analysis Report

WQAP-2022-11-17-01

Florida DEP Laboratory
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Tallahassee, FL 32399-2400
DOH Accreditation E31780

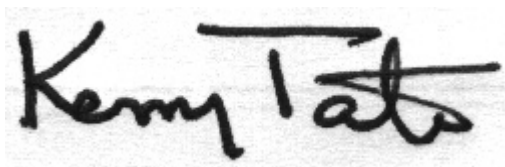
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-08-29-42**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 07-DEC-2022 11:05

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: Lake Marian - Boat Ramp

Collection Date/Time: 11/16/2022 09:00

Field ID: SEHAB0089

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2370190	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P422318	
		Cylindrospermopsin	0.10	U	ug/L	P422317	
		Desmethyl microcystin LR	0.25	U	ug/L	P422317	
		Microcystin HILR	0.25	U	ug/L	P422317	
		Microcystin HtyR	0.25	U	ug/L	P422317	
		Microcystin LA	1.1		ug/L	P422317	
		Microcystin LF	0.14	I	ug/L	P422317	
		Microcystin LR	1.7		ug/L	P422317	
		Microcystin LW	0.25	U	ug/L	P422317	
		Microcystin LY	0.65		ug/L	P422317	RPD
		Microcystin RR	0.30	I	ug/L	P422317	
		Microcystin WR	0.50	U	ug/L	P422317	
		Neosaxitoxin	0.50	U	ug/L	P422318	
		Microcystin YR	0.25	U	ug/L	P422317	
		Saxitoxin	0.50	U	ug/L	P422318	
		Nodularin-R	0.10	U	ug/L	P422317	
2370199	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P423042	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.5		mg N/L	P422890	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P422668	
	EPA 365.1 Rev. 2.0	Total-P	0.22		mg P/L	P422573	
2370200	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.067		mg P/L	P422516	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423042

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P422890

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422668

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422573

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P422516

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

Reference Method: EPA 8321B
Batch ID: P422317

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: P422318

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: P423042

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: P422890

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	93.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422668

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: P422573

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P422516

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

Reference Method: EPA 8321B
Batch ID: P422317

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	94.1		P	40 - 150
Desmethyl microcystin LR	80.1		P	40 - 150
Microcystin HILR	82.6		P	40 - 150
Microcystin HtyR	83.2		P	40 - 150
Microcystin LA	82.1		P	40 - 150
Microcystin LF	71.5		P	40 - 150
Microcystin LR	77.1		P	40 - 150
Microcystin LW	80.1		P	40 - 150
Microcystin LY	76.5		P	40 - 150
Microcystin RR	91.5		P	40 - 150
Microcystin WR	69.0		P	40 - 150
Microcystin YR	75.0		P	40 - 150
Nodularin-R	86.0		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P422318

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	113		P	40 - 150
Neosaxitoxin	134		P	40 - 150
Saxitoxin	112		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423042

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370199	Ammonia-N	99.4	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P422890

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370121	Kjeldahl Nitrogen	91.6	95.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370210	NO2NO3-N	105	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422573

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370208	Total-P	107	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P422516

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2370200	O-Phosphate-P	97.8	99.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P422317

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2369247	Cylindrospermopsin	92.4	96.4	P/P	40 - 150
2369247	Desmethyl microcystin LR	87.8	100	P/P	40 - 150
2369247	Microcystin HiLR	88.5	100	P/P	40 - 150
2369247	Microcystin HtyR	90.0	106	P/P	40 - 150
2369247	Microcystin LA	83.2	80.3	P/P	40 - 150
2369247	Microcystin LF	107	101	P/P	40 - 150
2369247	Microcystin LR	94.1	97.1	P/P	40 - 150
2369247	Microcystin LW	89.2	114	P/P	40 - 150
2369247	Microcystin LY	75.5	108	P/P	40 - 150
2369247	Microcystin RR	94.9	95.6	P/P	40 - 150
2369247	Microcystin WR	85.8	94.6	P/P	40 - 150
2369247	Microcystin YR	88.7	90.2	P/P	40 - 150
2369247	Nodularin-R	89.4	100	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P422318

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2369247	Anatoxin-a	104	111	P/P	40 - 150
2369247	Neosaxitoxin	81.6	86.4	P/P	40 - 150
2369247	Saxitoxin	60.8	62.8	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P423042

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370199	Ammonia-N	1.88	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P422890

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370121	Kjeldahl Nitrogen	3.39	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P422668

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370210	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P422573

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370208	Total-P	0.213	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P422516

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2370200	O-Phosphate-P	1.09	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P422317

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2369247	Cylindrospermopsin	4.23	Spike	P	0 - 30
2369247	Desmethyl microcystin LR	13.1	Spike	P	0 - 30
2369247	Microcystin H1LR	12.1	Spike	P	0 - 30
2369247	Microcystin HtyR	16.5	Spike	P	0 - 30
2369247	Microcystin LA	3.47	Spike	P	0 - 30
2369247	Microcystin LF	5.80	Spike	P	0 - 30
2369247	Microcystin LR	3.12	Spike	P	0 - 30
2369247	Microcystin LW	24.2	Spike	P	0 - 30
2369247	Microcystin LY	35.9	Spike	F	0 - 30
2369247	Microcystin RR	0.702	Spike	P	0 - 30
2369247	Microcystin WR	9.78	Spike	P	0 - 30
2369247	Microcystin YR	1.65	Spike	P	0 - 30
2369247	Nodularin-R	11.4	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P422318

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2369247	Anatoxin-a	6.82	Spike	P	0 - 30
2369247	Neosaxitoxin	5.62	Spike	P	0 - 30
2369247	Saxitoxin	3.22	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2370190
Field Sample ID: SEHAB0089

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	69.9	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	67.9	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A116001

Included Lab Sample IDs: 2370200

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: A116008

Included Lab Sample IDs: 2370190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	95.6	95.7	P/P	60 - 160
Desmethyl microcystin LR	78.8	81.5	P/P	60 - 160
Microcystin HtR	83.5	86.6	P/P	60 - 160
Microcystin HtyR	85.1	85.9	P/P	60 - 160
Microcystin LA	91.3	107	P/P	60 - 160
Microcystin LF	93.3	99.2	P/P	60 - 160
Microcystin LR	78.9	81.0	P/P	60 - 160
Microcystin LW	99.6	110	P/P	60 - 160
Microcystin LY	101	98.4	P/P	60 - 160
Microcystin RR	93.8	92.7	P/P	60 - 160
Microcystin WR	75.7	73.5	P/P	60 - 160
Microcystin YR	72.5	78.4	P/P	60 - 160
Nodularin-R	90.6	91.9	P/P	60 - 160

Reference Method: EPA 8321B

Run ID: A116009

Included Lab Sample IDs: 2370190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	90.6	87.3	P/P	50 - 160
Neosaxitoxin	113	113	P/P	50 - 160
Saxitoxin	92.8	94.1	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A116065

Included Lab Sample IDs: 2370199

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A116067

Included Lab Sample IDs: 2370199

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A116198

Included Lab Sample IDs: 2370199

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.1	96.2	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A116231

Included Lab Sample IDs: 2370199

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.2	100	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	99.4	102			1.88
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	93.7	91.6	95.0			3.39
EPA 353.2 Rev. 2.0	NO2NO3-N	104	105	106			0.475
EPA 365.1 Rev. 2.0	Total-P	104	107	107			0.213
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.8	99.6			1.09
EPA 8321B	Anatoxin-a	113	104	111			6.82
	Cylindrospermopsin	94.1	92.4	96.4			4.23
	Desmethyl microcystin LR	80.1	87.8	100			13.1
	Microcystin HiLR	82.6	88.5	100			12.1
	Microcystin HtyR	83.2	90.0	106			16.5
	Microcystin LA	82.1	83.2	80.3			3.47
	Microcystin LF	71.5	107	101			5.80
	Microcystin LR	77.1	94.1	97.1			3.12
	Microcystin LW	80.1	89.2	114			24.2
	Microcystin LY	76.5	75.5	108			35.9
	Microcystin RR	91.5	94.9	95.6			0.702
	Microcystin WR	69.0	85.8	94.6			9.78
	Microcystin YR	75.0	88.7	90.2			1.65
	Neosaxitoxin	134	81.6	86.4			5.62
	Nodularin-R	86.0	89.4	100			11.4
	Saxitoxin	112	60.8	62.8			3.22

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2370199
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2370199
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2370199
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2370199
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2370200
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2370190
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2370190

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	11/17/2022			12/02/2022 11:36	Ping Hua	2370199
EPA 351.2 Rev. 2.0	11/17/2022	11/21/2022 13:35	Alexandra J Mattheus	11/30/2022 15:15	Judith K. Clark	2370199
EPA 353.2 Rev. 2.0	11/17/2022			11/21/2022 11:46	Beverly Y. Sanders	2370199
EPA 365.1 Rev. 2.0	11/17/2022	11/18/2022 07:29	Adam P Silver	11/21/2022 10:57	James L Waggeberby	2370199
EPA 365.1 Rev. 2.0 dissolved	11/17/2022			11/17/2022 14:45	Elise M. Gillis	2370200
EPA 8321B	11/17/2022	11/17/2022 11:15	Manjita Shrestha	11/17/2022 18:44	Manjita Shrestha	2370190
	11/17/2022	11/17/2022 13:00	Manjita Shrestha	11/18/2022 02:07	Manjita Shrestha	2370190