

Chemical Analysis Report

WQAP-2022-11-29-02

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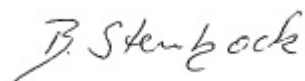
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-08-29-42**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Fort Pierce, FL 34945
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Date Certified: 12-DEC-2022 13:30



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: 11/28/2022 10:00

Field ID: SEHAB0089

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2371382	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P422957	
		Cylindrospermopsin	0.10	U	ug/L	P422932	
		Desmethyl microcystin LR	0.25	U	ug/L	P422932	
		Microcystin HILR	0.25	U	ug/L	P422932	
		Microcystin HtyR	0.25	U	ug/L	P422932	
		Microcystin LA	0.96		ug/L	P422932	
		Microcystin LF	0.14	I	ug/L	P422932	
		Microcystin LR	1.5		ug/L	P422932	
		Microcystin LW	0.25	U	ug/L	P422932	
		Microcystin LY	0.38	I	ug/L	P422932	
		Microcystin RR	0.21	I	ug/L	P422932	
		Microcystin WR	0.50	U	ug/L	P422932	
		Neosaxitoxin	0.50	U	ug/L	P422957	
		Microcystin YR	0.25	U	ug/L	P422932	
		Saxitoxin	0.50	U	ug/L	P422957	
		Nodularin-R	0.10	U	ug/L	P422932	
2371385	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P423314	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P422967	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.012		mg N/L	P422907	
	EPA 365.1 Rev. 2.0	Total-P	0.27		mg P/L	P422981	
2371386	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.087		mg P/L	P422874	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423314

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P422967

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422907

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422981

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P422874

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

Reference Method: EPA 8321B
Batch ID: P422932

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: P422957

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: P423314

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P422967

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422907

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: P422981

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: P422874

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

Reference Method: EPA 8321B
Batch ID: P422932

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	93.4		P	40 - 150
Desmethyl microcystin LR	82.8		P	40 - 150
Microcystin H1R	92.5		P	40 - 150
Microcystin HtyR	89.9		P	40 - 150
Microcystin LA	88.2		P	40 - 150
Microcystin LF	102		P	40 - 150
Microcystin LR	86.0		P	40 - 150
Microcystin LW	102		P	40 - 150
Microcystin LY	95.8		P	40 - 150
Microcystin RR	89.4		P	40 - 150
Microcystin WR	82.8		P	40 - 150
Microcystin YR	81.3		P	40 - 150
Nodularin-R	91.5		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P422957

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	90.0		P	40 - 150
Neosaxitoxin	89.6		P	40 - 150
Saxitoxin	72.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P423314

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371319	Ammonia-N	100	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P422967

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371460	Kjeldahl Nitrogen	99.0	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P422907

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371320	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P422981

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371330	Total-P	110	109	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P422874

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371325	O-Phosphate-P	101	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P422932

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371382	Cylindrospermopsin	80.2	85.8	P/P	40 - 150
2371382	Desmethyl microcystin LR	79.1	91.4	P/P	40 - 150
2371382	Microcystin HiLR	85.5	90.1	P/P	40 - 150
2371382	Microcystin HtyR	77.4	87.2	P/P	40 - 150
2371382	Microcystin LA	77.3	76.0	P/P	40 - 150
2371382	Microcystin LF	84.0	106	P/P	40 - 150
2371382	Microcystin LR	81.2	87.2	P/P	40 - 150
2371382	Microcystin LW	94.9	109	P/P	40 - 150
2371382	Microcystin LY	80.4	97.4	P/P	40 - 150
2371382	Microcystin RR	74.2	82.3	P/P	40 - 150
2371382	Microcystin WR	77.7	81.8	P/P	40 - 150
2371382	Microcystin YR	79.2	81.7	P/P	40 - 150
2371382	Nodularin-R	80.2	86.7	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P422957

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2371382	Anatoxin-a	94.1	91.0	P/P	40 - 150
2371382	Neosaxitoxin	60.8	62.8	P/P	40 - 150
2371382	Saxitoxin	55.5	52.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P423314

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371319	Ammonia-N	1.61	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P422967

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371460	Kjeldahl Nitrogen	5.30	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P422907

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371320	NO2NO3-N	0.335	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P422981

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371330	Total-P	0.273	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P422874

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371325	O-Phosphate-P	0.228	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P422932

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371382	Cylindrospermopsin	6.70	Spike	P	0 - 30
2371382	Desmethyl microcystin LR	14.5	Spike	P	0 - 30
2371382	Microcystin H1LR	5.23	Spike	P	0 - 30
2371382	Microcystin HtyR	11.9	Spike	P	0 - 30
2371382	Microcystin LA	1.53	Spike	P	0 - 30
2371382	Microcystin LF	22.8	Spike	P	0 - 30
2371382	Microcystin LR	6.04	Spike	P	0 - 30
2371382	Microcystin LW	13.4	Spike	P	0 - 30
2371382	Microcystin LY	18.3	Spike	P	0 - 30
2371382	Microcystin RR	10.1	Spike	P	0 - 30
2371382	Microcystin WR	5.14	Spike	P	0 - 30
2371382	Microcystin YR	3.02	Spike	P	0 - 30
2371382	Nodularin-R	7.81	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P422957

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2371382	Anatoxin-a	3.44	Spike	P	0 - 30
2371382	Neosaxitoxin	3.34	Spike	P	0 - 30
2371382	Saxitoxin	4.89	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2371382
Field Sample ID: SEHAB0089

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	76.1	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	67.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A116169

Included Lab Sample IDs: 2371386

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A116183

Included Lab Sample IDs: 2371385

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

Reference Method: EPA 8321B

Run ID: A116213

Included Lab Sample IDs: 2371382

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	93.8	105	P/P	50 - 160
Desmethyl microcystin LR	93.1	96.4	P/P	50 - 160
Microcystin HiiR	93.1	98.8	P/P	50 - 160
Microcystin HtyR	89.9	94.8	P/P	50 - 160
Microcystin LA	102	96.3	P/P	50 - 160
Microcystin LF	96.4	128	P/P	50 - 160
Microcystin LR	85.9	94.3	P/P	50 - 160
Microcystin LW	115	112	P/P	50 - 160
Microcystin LY	102	111	P/P	50 - 160
Microcystin RR	92.0	97.7	P/P	50 - 160
Microcystin WR	82.4	91.7	P/P	50 - 160
Microcystin YR	85.3	88.3	P/P	50 - 160
Nodularin-R	91.1	93.2	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A116215

Included Lab Sample IDs: 2371382

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	94.1	P/P	50 - 160
Neosaxitoxin	108	96.6	P/P	50 - 160
Saxitoxin	79.6	75.5	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A116227

Included Lab Sample IDs: 2371385

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A116241

Included Lab Sample IDs: 2371385

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.7	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A116336

Included Lab Sample IDs: 2371385

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.1	99.1	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	95.6	100	98.6			1.61
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	99.0	108			5.30
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	104	104	104			0.335
EPA 365.1 Rev. 2.0	Total-P	106	110	109			0.273
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	101	101			0.228
EPA 8321B	Anatoxin-a	90.0	94.1	91.0			3.44
	Cylindrospermopsin	93.4	80.2	85.8			6.70
	Desmethyl microcystin LR	82.8	79.1	91.4			14.5
	Microcystin HiLR	92.5	85.5	90.1			5.23
	Microcystin HtyR	89.9	77.4	87.2			11.9
	Microcystin LA	88.2	77.3	76.0			1.53
	Microcystin LF	102	84.0	106			22.8
	Microcystin LR	86.0	81.2	87.2			6.04
	Microcystin LW	102	94.9	109			13.4
	Microcystin LY	95.8	80.4	97.4			18.3
	Microcystin RR	89.4	74.2	82.3			10.1
	Microcystin WR	82.8	77.7	81.8			5.14
	Microcystin YR	81.3	79.2	81.7			3.02
	Neosaxitoxin	89.6	60.8	62.8			3.34
	Nodularin-R	91.5	80.2	86.7			7.81
	Saxitoxin	72.0	55.5	52.9			4.89

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2371385
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2371385
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2371385
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2371385
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2371386
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2371382
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2371382

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	11/29/2022			12/08/2022 13:25	Ping Hua	2371385
EPA 351.2 Rev. 2.0	11/29/2022	12/01/2022 13:05	Simonne.V. Calhoun	12/02/2022 14:10	Judith K. Clark	2371385
EPA 353.2 Rev. 2.0	11/29/2022			11/30/2022 09:21	Beverly Y. Sanders	2371385
EPA 365.1 Rev. 2.0	11/29/2022	12/01/2022 13:57	Adam P Silver	12/02/2022 10:16	James L Waggeberby	2371385
EPA 365.1 Rev. 2.0 dissolved	11/29/2022			11/29/2022 14:31	Elise M. Gillis	2371386
EPA 8321B	11/29/2022	12/01/2022 09:00	Umesh Chiluwal	12/01/2022 11:27	Umesh Chiluwal	2371382
	11/29/2022	12/01/2022 12:00	Umesh Chiluwal	12/01/2022 17:45	Umesh Chiluwal	2371382