

Chemical Analysis Report

WQAP-2022-12-13-02

Florida DEP Laboratory
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DOH Accreditation E31780

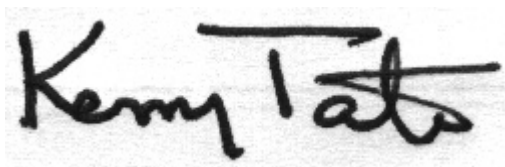
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-12-12-33**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: 06-JAN-2023 09:20

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 Okeechobee - Pahokee Marina

Collection Date/Time: 12/12/2022 13:05

Field ID: SEHAB0022

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2374585	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P423451	
		Cylindrospermopsin	0.10	U	ug/L	P423450	
		Desmethyl microcystin LR	0.25	U	ug/L	P423450	
		Microcystin HILR	0.25	U	ug/L	P423450	
		Microcystin HtyR	0.25	U	ug/L	P423450	
		Microcystin LA	0.10	U	ug/L	P423450	
		Microcystin LF	0.10	U	ug/L	P423450	
		Microcystin LR	0.25	U	ug/L	P423450	
		Microcystin LW	0.25	U	ug/L	P423450	
		Microcystin LY	0.10	U	ug/L	P423450	
		Microcystin RR	0.10	U	ug/L	P423450	
		Microcystin WR	0.50	U	ug/L	P423450	
		Neosaxitoxin	0.50	U	ug/L	P423451	
		Microcystin YR	0.25	U	ug/L	P423450	
		Saxitoxin	0.50	U	ug/L	P423451	
		Nodularin-R	0.10	U	ug/L	P423450	
2374586	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P424099	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.98		mg N/L	P423519	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.48		mg N/L	P423524	
	EPA 365.1 Rev. 2.0	Total-P	0.19		mg P/L	P423482	
2374587	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P423463	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P423463

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

Reference Method: EPA 8321B
Batch ID: P423450

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: P423451

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: P424099

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	101		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P423463

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P423450

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	114		P	40 - 150
Desmethyl microcystin LR	100		P	40 - 150
Microcystin H1R	103		P	40 - 150
Microcystin HtyR	109		P	40 - 150
Microcystin LA	92.5		P	40 - 150
Microcystin LF	122		P	40 - 150
Microcystin LR	106		P	40 - 150
Microcystin LW	104		P	40 - 150
Microcystin LY	92.1		P	40 - 150
Microcystin RR	108		P	40 - 150
Microcystin WR	100		P	40 - 150
Microcystin YR	103		P	40 - 150
Nodularin-R	105		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P423451

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	89.3		P	40 - 150
Neosaxitoxin	89.5		P	40 - 150
Saxitoxin	75.4		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374616	Ammonia-N	96.6	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P423519

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374504	Kjeldahl Nitrogen	108	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P423524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374614	NO2NO3-N	95.2	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P423482

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374615	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P423463

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374508	O-Phosphate-P	97.2	98.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P423450

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374268	Cylindrospermopsin	105	104	P/P	40 - 150
2374268	Desmethyl microcystin LR	106	113	P/P	40 - 150
2374268	Microcystin HiLR	103	107	P/P	40 - 150
2374268	Microcystin HtyR	104	108	P/P	40 - 150
2374268	Microcystin LA	86.0	85.9	P/P	40 - 150
2374268	Microcystin LF	101	124	P/P	40 - 150
2374268	Microcystin LR	108	116	P/P	40 - 150
2374268	Microcystin LW	94.4	95.2	P/P	40 - 150
2374268	Microcystin LY	90.8	98.2	P/P	40 - 150
2374268	Microcystin RR	98.8	101	P/P	40 - 150
2374268	Microcystin WR	97.2	107	P/P	40 - 150
2374268	Microcystin YR	106	112	P/P	40 - 150
2374268	Nodularin-R	101	105	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P423451

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2374268	Anatoxin-a	89.6	88.3	P/P	40 - 150
2374268	Neosaxitoxin	62.5	60.1	P/P	40 - 150
2374268	Saxitoxin	54.6	54.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P424099

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374616	Ammonia-N	0.314	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P423519

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374504	Kjeldahl Nitrogen	0.758	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P423524

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374614	NO2NO3-N	0.381	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P423482

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374615	Total-P	1.06	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P423463

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374508	O-Phosphate-P	1.05	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P423450

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374268	Cylindrospermopsin	0.817	Spike	P	0 - 30
2374268	Desmethyl microcystin LR	6.62	Spike	P	0 - 30
2374268	Microcystin H1LR	3.72	Spike	P	0 - 30
2374268	Microcystin HtyR	3.56	Spike	P	0 - 30
2374268	Microcystin LA	0.175	Spike	P	0 - 30
2374268	Microcystin LF	20.3	Spike	P	0 - 30
2374268	Microcystin LR	6.98	Spike	P	0 - 30
2374268	Microcystin LW	0.822	Spike	P	0 - 30
2374268	Microcystin LY	7.82	Spike	P	0 - 30
2374268	Microcystin RR	2.37	Spike	P	0 - 30
2374268	Microcystin WR	9.78	Spike	P	0 - 30
2374268	Microcystin YR	5.22	Spike	P	0 - 30
2374268	Nodularin-R	3.96	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P423451

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2374268	Anatoxin-a	1.47	Spike	P	0 - 30
2374268	Neosaxitoxin	3.87	Spike	P	0 - 30
2374268	Saxitoxin	0.557	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2374585
Field Sample ID: SEHAB0022

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	71.9	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	56.1	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A116409

Included Lab Sample IDs: 2374587

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A116429

Included Lab Sample IDs: 2374586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.5	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A116444

Included Lab Sample IDs: 2374586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.9	99.3	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A116455

Included Lab Sample IDs: 2374585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	88.3	84.2	P/P	50 - 160
Neosaxitoxin	80.0	82.1	P/P	50 - 160
Saxitoxin	74.9	73.8	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A116476

Included Lab Sample IDs: 2374586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	94.4	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A116482

Included Lab Sample IDs: 2374585

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	114	113	P/P	50 - 160
Desmethyl microcystin LR	107	125	P/P	50 - 160
Microcystin H1IR	108	122	P/P	50 - 160
Microcystin HtyR	118	128	P/P	50 - 160
Microcystin LA	104	117	P/P	50 - 160
Microcystin LF	125	138	P/P	50 - 160
Microcystin LR	112	123	P/P	50 - 160
Microcystin LW	135	136	P/P	50 - 160
Microcystin LY	126	143	P/P	50 - 160
Microcystin RR	112	112	P/P	50 - 160
Microcystin WR	107	119	P/P	50 - 160
Microcystin YR	117	130	P/P	50 - 160
Nodularin-R	113	118	P/P	50 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A116722

Included Lab Sample IDs: 2374586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.6	98.7	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	101	96.6	97.0			0.314
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	108	106			0.758
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	95.2	95.8			0.381
EPA 365.1 Rev. 2.0	Total-P	101	105	104			1.06
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	97.2	98.4			1.05
EPA 8321B	Anatoxin-a	89.3	89.6	88.3			1.47
	Cylindrospermopsin	114	104	105			0.817
	Desmethyl microcystin LR	100	113	106			6.62
	Microcystin HiLR	103	107	103			3.72
	Microcystin HtyR	109	108	104			3.56
	Microcystin LA	92.5	85.9	86.0			0.175
	Microcystin LF	122	101	124			20.3
	Microcystin LR	106	116	108			6.98
	Microcystin LW	104	94.4	95.2			0.822
	Microcystin LY	92.1	90.8	98.2			7.82
	Microcystin RR	108	101	98.8			2.37
	Microcystin WR	100	107	97.2			9.78
	Microcystin YR	103	112	106			5.22
	Neosaxitoxin	89.5	62.5	60.1			3.87
	Nodularin-R	105	105	101			3.96
	Saxitoxin	75.4	54.6	54.9			0.557

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2374586
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2374586
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2374586
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2374586
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2374587
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2374585
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2374585

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	12/13/2022			01/04/2023 11:45	Ping Hua	2374586
EPA 351.2 Rev. 2.0	12/13/2022	12/14/2022 13:18	Simonne.V. Calhoun	12/15/2022 13:49	Samantha L Bates	2374586
EPA 353.2 Rev. 2.0	12/13/2022			12/14/2022 10:09	Beverly Y. Sanders	2374586
EPA 365.1 Rev. 2.0	12/13/2022	12/14/2022 13:07	Adam P Silver	12/14/2022 16:15	James L Waggeberby	2374586
EPA 365.1 Rev. 2.0 dissolved	12/13/2022			12/13/2022 14:51	Elise M. Gillis	2374587
EPA 8321B	12/13/2022	12/14/2022 10:00	Umesh Chiluwal	12/14/2022 14:07	Umesh Chiluwal	2374585
	12/13/2022	12/15/2022 09:00	Umesh Chiluwal	12/15/2022 14:30	Umesh Chiluwal	2374585