

Chemical Analysis Report

WQAP-2022-08-09-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

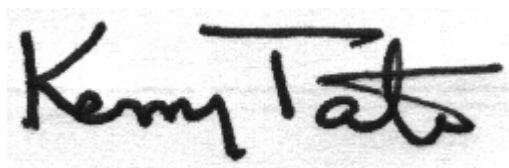
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-08-08-66**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

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

Date Certified: 30-AUG-2022 10:23

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the "T" and a long horizontal stroke at the end.

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: 08/08/2022 09:40

Field ID: SEHAB0022

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2347184	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P417830	
		Cylindrospermopsin	0.10	U	ug/L	P417829	
		Desmethyl microcystin LR	0.25	U	ug/L	P417829	
		Microcystin HlR	0.25	U	ug/L	P417829	
		Microcystin HtyR	0.25	U	ug/L	P417829	
		Microcystin LA	0.10	U	ug/L	P417829	
		Microcystin LF	0.10	U	ug/L	P417829	
		Microcystin LR	0.25	U	ug/L	P417829	
		Microcystin LW	0.25	U	ug/L	P417829	
		Microcystin LY	0.10	U	ug/L	P417829	
		Microcystin RR	0.10	U	ug/L	P417829	
		Microcystin WR	0.50	U	ug/L	P417829	
		Microcystin YR	0.25	U	ug/L	P417829	
		Nodularin-R	0.10	U	ug/L	P417829	
2347189	EPA 350.1 Rev. 2.0	Ammonia-N	0.080		mg N/L	P418038	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P418279	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.20		mg N/L	P417902	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P417929	
2347190	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.086		mg P/L	P417849	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418038

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418279

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417902

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417929

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417849

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

Reference Method: EPA 8321B
Batch ID: P417829

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: P417830

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418038

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418279

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: P417902

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417929

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: P417849

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

Reference Method: EPA 8321B
Batch ID: P417829

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	87.4		P	40 - 150
Desmethyl microcystin LR	123		P	40 - 150
Microcystin HILR	116		P	40 - 150
Microcystin HtyR	116		P	40 - 150
Microcystin LA	141		P	40 - 150
Microcystin LF	141		P	40 - 150
Microcystin LR	122		P	40 - 150
Microcystin LW	147		P	40 - 150
Microcystin LY	138		P	40 - 150
Microcystin RR	101		P	40 - 150
Microcystin WR	137		P	40 - 150
Microcystin YR	112		P	40 - 150
Nodularin-R	85.8		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417830

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	122		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418038

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2346684	Ammonia-N	95.8	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418279

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2347196	Kjeldahl Nitrogen	114	106	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417902

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2346642	NO2NO3-N	105	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417929

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2347209	Total-P	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417849

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2347247	O-Phosphate-P	98.8	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P417829

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2346831	Cylindrospermopsin	79.8	73.8	P/P	40 - 150
2346831	Desmethyl microcystin LR	121	124	P/P	40 - 150
2346831	Microcystin HILR	115	117	P/P	40 - 150
2346831	Microcystin HtyR	121	121	P/P	40 - 150
2346831	Microcystin LA	118	115	P/P	40 - 150
2346831	Microcystin LF	111	122	P/P	40 - 150
2346831	Microcystin LR	119	124	P/P	40 - 150
2346831	Microcystin LW	140	147	P/P	40 - 150
2346831	Microcystin LY	131	119	P/P	40 - 150
2346831	Microcystin RR	89.3	93.4	P/P	40 - 150
2346831	Microcystin WR	149	147	P/P	40 - 150
2346831	Microcystin YR	107	110	P/P	40 - 150
2346831	Nodularin-R	87.5	88.4	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417830

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2346831	Anatoxin-a	121	117	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418038

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2346684	Ammonia-N	4.05	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418279

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2347196	Kjeldahl Nitrogen	4.84	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417902

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2346642	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417929

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2347209	Total-P	0.910	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417849

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2347247	O-Phosphate-P	1.61	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P417829

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2346831	Cylindrospermopsin	7.77	Spike	P	0 - 30
2346831	Desmethyl microcystin LR	2.40	Spike	P	0 - 30
2346831	Microcystin HiLR	1.97	Spike	P	0 - 30
2346831	Microcystin HtyR	0.446	Spike	P	0 - 30
2346831	Microcystin LA	2.14	Spike	P	0 - 30
2346831	Microcystin LF	9.18	Spike	P	0 - 30
2346831	Microcystin LR	3.79	Spike	P	0 - 30
2346831	Microcystin LW	5.01	Spike	P	0 - 30
2346831	Microcystin LY	9.22	Spike	P	0 - 30
2346831	Microcystin RR	4.57	Spike	P	0 - 30
2346831	Microcystin WR	1.32	Spike	P	0 - 30
2346831	Microcystin YR	2.87	Spike	P	0 - 30
2346831	Nodularin-R	1.02	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P417830

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2346831	Anatoxin-a	2.99	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2347184
Field Sample ID: SEHAB0022

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	112	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	102	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A113989

Included Lab Sample IDs: 2347190

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A114006

Included Lab Sample IDs: 2347189

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

Reference Method: EPA 8321B

Run ID: A114013

Included Lab Sample IDs: 2347184

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	94.9	92.1	P/P	50 - 160
Desmethyl microcystin LR	121	121	P/P	50 - 160
Microcystin HII R	118	114	P/P	50 - 160
Microcystin HtyR	127	123	P/P	50 - 160
Microcystin LA	119	122	P/P	50 - 160
Microcystin LF	87.6	86.1	P/P	50 - 160
Microcystin LR	120	116	P/P	50 - 160
Microcystin LW	151	150	P/P	50 - 160
Microcystin LY	139	138	P/P	50 - 160
Microcystin RR	104	102	P/P	50 - 160
Microcystin WR	160	157	P/P	50 - 160
Microcystin YR	114	107	P/P	50 - 160
Nodularin-R	87.4	90.0	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A114028

Included Lab Sample IDs: 2347184

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	129	117	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A114034

Included Lab Sample IDs: 2347189

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A114057

Included Lab Sample IDs: 2347189

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.1	98.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A114262

Included Lab Sample IDs: 2347189

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	96.8	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	95.8	95.8	102			4.05
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104	114	106			4.84
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	103	105	106			0.475
EPA 365.1 Rev. 2.0	Total-P	106	106	105			0.910
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.8	98.8	100			1.61
EPA 8321B	Anatoxin-a	122	121	117			2.99
	Cylindrospermopsin	87.4	79.8	73.8			7.77
	Desmethyl microcystin LR	123	121	124			2.40
	Microcystin HiLR	116	115	117			1.97
	Microcystin HtyR	116	121	121			0.446
	Microcystin LA	141	118	115			2.14
	Microcystin LF	141	111	122			9.18
	Microcystin LR	122	119	124			3.79
	Microcystin LW	147	140	147			5.01
	Microcystin LY	138	131	119			9.22
	Microcystin RR	101	89.3	93.4			4.57
	Microcystin WR	137	149	147			1.32
	Microcystin YR	112	107	110			2.87
	Nodularin-R	85.8	87.5	88.4			1.02

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2347189
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2347189
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2347189
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2347189
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2347190
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2347184
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2347184

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	08/09/2022			08/12/2022 11:59	Judith K. Clark	2347189
EPA 351.2 Rev. 2.0	08/09/2022	08/19/2022 10:09	Samantha L Bates	08/22/2022 12:07	Alexandra J Mattheus	2347189
EPA 353.2 Rev. 2.0	08/09/2022			08/10/2022 10:45	Judith K. Clark	2347189
EPA 365.1 Rev. 2.0	08/09/2022	08/10/2022 16:53	Adam P Silver	08/11/2022 12:24	James L Waggeberby	2347189
EPA 365.1 Rev. 2.0 dissolved	08/09/2022			08/09/2022 15:10	Elise M. Gillis	2347190
EPA 8321B	08/09/2022	08/10/2022 13:00	Umesh Chiluwal	08/10/2022 18:23	Umesh Chiluwal	2347184
	08/09/2022	08/11/2022 09:00	Umesh Chiluwal	08/11/2022 12:28	Umesh Chiluwal	2347184