

Chemical Analysis Report

WQAP-2022-08-18-03

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

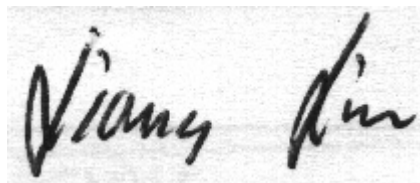
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-08-09-49**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
Fort Myers, FL 33901
Attn: Kirby Wolfe

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: Liang Lin, Environmental Administrator

Date Certified: 06-SEP-2022 15:09

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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: Caloosahatchee River - SE 32nd St

Collection Date/Time: 08/17/2022 09:05

Field ID: HAB-SD-081722-0905

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2350554	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P418296	
		Cylindrospermopsin	0.10	U	ug/L	P418295	
		Desmethyl microcystin LR	0.25	U	ug/L	P418295	
		Microcystin HlR	0.25	U	ug/L	P418295	
		Microcystin HtyR	0.25	U	ug/L	P418295	
		Microcystin LA	0.10	U	ug/L	P418295	
		Microcystin LF	0.10	U	ug/L	P418295	
		Microcystin LR	0.25	U	ug/L	P418295	
		Microcystin LW	0.25	U	ug/L	P418295	
		Microcystin LY	0.10	U	ug/L	P418295	
		Microcystin RR	0.10	U	ug/L	P418295	
		Microcystin WR	0.50	U	ug/L	P418295	
		Microcystin YR	0.25	U	ug/L	P418295	
		Nodularin-R	0.10	U	ug/L	P418295	
2350555	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P418539	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.9		mg N/L	P418507	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P418467	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P418514	
2350556	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P418334	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418539

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418507

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418467

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418514

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418334

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

Reference Method: EPA 8321B
Batch ID: P418295

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: P418296

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: P418539

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: P418507

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418467

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418514

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418334

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

Reference Method: EPA 8321B
Batch ID: P418295

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	113		P	40 - 150
Desmethyl microcystin LR	87.8		P	40 - 150
Microcystin HILR	90.7		P	40 - 150
Microcystin HtyR	89.4		P	40 - 150
Microcystin LA	107		P	40 - 150
Microcystin LF	90.9		P	40 - 150
Microcystin LR	84.0		P	40 - 150
Microcystin LW	88.6		P	40 - 150
Microcystin LY	90.6		P	40 - 150
Microcystin RR	92.1		P	40 - 150
Microcystin WR	87.2		P	40 - 150
Microcystin YR	80.0		P	40 - 150
Nodularin-R	90.4		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418296

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: P418539

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2350387	Ammonia-N	98.4	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P418507

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2347656	Kjeldahl Nitrogen	98.8	99.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P418467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2350386	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P418514

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2350116	Total-P	98.3	99.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P418334

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2350556	O-Phosphate-P	98.2	97.7	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P418295

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2350538	Cylindrospermopsin	102	99.0	P/P	40 - 150
2350538	Desmethyl microcystin LR	104	107	P/P	40 - 150
2350538	Microcystin HiLR	100	104	P/P	40 - 150
2350538	Microcystin HtyR	97.0	101	P/P	40 - 150
2350538	Microcystin LA	108	111	P/P	40 - 150
2350538	Microcystin LF	98.1	102	P/P	40 - 150
2350538	Microcystin LR	97.9	98.7	P/P	40 - 150
2350538	Microcystin LW	89.6	92.5	P/P	40 - 150
2350538	Microcystin LY	97.4	94.1	P/P	40 - 150
2350538	Microcystin RR	103	106	P/P	40 - 150
2350538	Microcystin WR	93.1	97.0	P/P	40 - 150
2350538	Microcystin YR	90.9	93.8	P/P	40 - 150
2350538	Nodularin-R	97.0	102	P/P	40 - 150

Reference Method: EPA 8321B

Batch ID: P418296

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2350538	Anatoxin-a	101	99.5	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P418539

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2350387	Ammonia-N	3.12	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P418507

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2347656	Kjeldahl Nitrogen	0.394	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P418467

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2350386	NO2NO3-N	0.480	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P418514

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2350116	Total-P	0.780	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P418334

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2350556	O-Phosphate-P	0.480	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P418295

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2350538	Cylindrospermopsin	2.60	Spike	P	0 - 30
2350538	Desmethyl microcystin LR	2.11	Spike	P	0 - 30
2350538	Microcystin H1LR	3.63	Spike	P	0 - 30
2350538	Microcystin HtyR	4.02	Spike	P	0 - 30
2350538	Microcystin LA	3.14	Spike	P	0 - 30
2350538	Microcystin LF	3.86	Spike	P	0 - 30
2350538	Microcystin LR	0.766	Spike	P	0 - 30
2350538	Microcystin LW	3.18	Spike	P	0 - 30
2350538	Microcystin LY	3.43	Spike	P	0 - 30
2350538	Microcystin RR	3.25	Spike	P	0 - 30
2350538	Microcystin WR	4.05	Spike	P	0 - 30
2350538	Microcystin YR	3.20	Spike	P	0 - 30
2350538	Nodularin-R	5.16	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P418296

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2350538	Anatoxin-a	1.49	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2350554
Field Sample ID: HAB-SD-081722-0905

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	130	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	58.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A114169
Included Lab Sample IDs: 2350554

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	108	112	P/P	60 - 160
Desmethyl microcystin LR	68.4	87.9	P/P	60 - 160
Microcystin HILR	71.8	89.3	P/P	60 - 160
Microcystin HtyR	69.7	89.8	P/P	60 - 160
Microcystin LA	90.4	102	P/P	50 - 160
Microcystin LF	68.3	92.1	P/P	60 - 160
Microcystin LR	70.9	82.9	P/P	60 - 160
Microcystin LW	67.4	91.6	P/P	60 - 160
Microcystin LY	81.2	91.3	P/P	60 - 160
Microcystin RR	75.6	90.1	P/P	60 - 160
Microcystin WR	71.1	92.4	P/P	60 - 160
Microcystin YR	65.6	80.4	P/P	60 - 160
Nodularin-R	84.2	94.0	P/P	60 - 160

Reference Method: EPA 8321B
Run ID: A114170
Included Lab Sample IDs: 2350554

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	107	106	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A114190
Included Lab Sample IDs: 2350556

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A114243
Included Lab Sample IDs: 2350555

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: A114274
Included Lab Sample IDs: 2350555

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A114337
Included Lab Sample IDs: 2350555

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.5	94.1	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A114345

Included Lab Sample IDs: 2350555

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	103	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 SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	101	98.4	104		3.12
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.0	98.8	99.3		0.394
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	101	101		0.480
EPA 365.1 Rev. 2.0	Total-P	103	98.3	99.1		0.780
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	98.2	97.7		0.480
EPA 8321B	Anatoxin-a	122	101	99.5		1.49
	Cylindrospermopsin	113	102	99.0		2.60
	Desmethyl microcystin LR	87.8	104	107		2.11
	Microcystin HiLR	90.7	100	104		3.63
	Microcystin HtyR	89.4	97.0	101		4.02
	Microcystin LA	107	108	111		3.14
	Microcystin LF	90.9	98.1	102		3.86
	Microcystin LR	84.0	97.9	98.7		0.766
	Microcystin LW	88.6	89.6	92.5		3.18
	Microcystin LY	90.6	97.4	94.1		3.43
	Microcystin RR	92.1	103	106		3.25
	Microcystin WR	87.2	93.1	97.0		4.05
	Microcystin YR	80.0	90.9	93.8		3.20
	Nodularin-R	90.4	97.0	102		5.16

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2350555
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2350555
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2350555
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2350555
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2350556
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2350554
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2350554

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	08/18/2022			08/23/2022 14:42	Judith K. Clark	2350555
EPA 351.2 Rev. 2.0	08/18/2022	08/24/2022 13:32	Alexandra J Mattheus	08/25/2022 11:45	Samantha L Bates	2350555
EPA 353.2 Rev. 2.0	08/18/2022			08/22/2022 11:09	Beverly Y. Sanders	2350555
EPA 365.1 Rev. 2.0	08/18/2022	08/24/2022 15:20	Simonne.V. Calhoun	08/25/2022 13:44	James L Waggeberby	2350555
EPA 365.1 Rev. 2.0 dissolved	08/18/2022			08/18/2022 14:24	Chandler E Cox	2350556
EPA 8321B	08/18/2022	08/18/2022 12:00	Manjita Shrestha	08/18/2022 22:09	Manjita Shrestha	2350554
	08/18/2022	08/18/2022 12:00	Umesh Chiluwal	08/19/2022 02:19	Umesh Chiluwal	2350554