Chemical Analysis Report

WQAP-2022-08-16-01

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

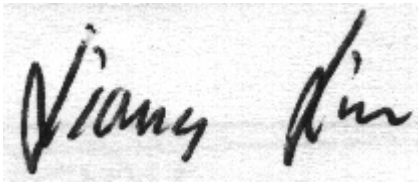
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-08-08-66**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: Liang Lin, Environmental Administrator

Date Certified: 02-SEP-2022 10:32



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: Intracoastal Waterway Canal/Marina - Loggerhead Marina

Collection Date/Time: 08/15/2022 11:20

Field ID: SEHAB0086

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2349474	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P418143	
		Cylindrospermopsin	0.10	U	ug/L	P417142	
		Desmethyl microcystin LR	0.25	U	ug/L	P417142	
		Microcystin HilR	0.25	U	ug/L	P417142	
		Microcystin HtyR	0.25	U	ug/L	P417142	
		Microcystin LA	0.10	U	ug/L	P417142	
		Microcystin LF	0.10	U	ug/L	P417142	
		Microcystin LR	0.25	U	ug/L	P417142	
		Microcystin LW	0.25	U	ug/L	P417142	
		Microcystin LY	0.10	U	ug/L	P417142	
		Microcystin RR	0.10	U	ug/L	P417142	
		Microcystin WR	0.50	U	ug/L	P417142	
		Microcystin YR	0.25	U	ug/L	P417142	
		Nodularin-R	0.10	U	ug/L	P417142	
2349475	EPA 350.1 Rev. 2.0	Ammonia-N	0.022		mg N/L	P418739	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.61		mg N/L	P418443	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P418378	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P418219	
2349476	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.074		mg P/L	P418172	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418739

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418443

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418378

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418219

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418172

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

Reference Method: EPA 8321B
Batch ID: P417142

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: P418143

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: P418739

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418443

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418378

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418219

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: P418172

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.8		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P417142

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	109		P	40 - 150
Desmethyl microcystin LR	95.4		P	40 - 150
Microcystin HilR	94.1		P	40 - 150
Microcystin HtyR	98.3		P	40 - 150
Microcystin LA	110		P	40 - 150
Microcystin LF	110		P	40 - 150
Microcystin LR	94.5		P	40 - 150
Microcystin LW	105		P	40 - 150
Microcystin LY	105		P	40 - 150
Microcystin RR	105		P	40 - 150
Microcystin WR	99.1		P	40 - 150
Microcystin YR	93.7		P	40 - 150
Nodularin-R	102		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418143

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418739

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349475	Ammonia-N	105	107	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418443

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349475	Kjeldahl Nitrogen	105	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418378

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2348766	NO2NO3-N	95.5	95.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418219

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349475	Total-P	92.6	93.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418172

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349476	O-Phosphate-P	98.4	99.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P417142

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349433	Cylindrospermopsin	92.2	91.1	P/P	40 - 150
2349433	Desmethyl microcystin LR	100	96.8	P/P	40 - 150
2349433	Microcystin HilR	90.7	90.5	P/P	40 - 150
2349433	Microcystin HtyR	91.3	91.0	P/P	40 - 150
2349433	Microcystin LA	96.6	94.4	P/P	40 - 150
2349433	Microcystin LF	94.0	92.1	P/P	40 - 150
2349433	Microcystin LR	95.6	98.6	P/P	40 - 150
2349433	Microcystin LW	89.2	84.1	P/P	40 - 150
2349433	Microcystin LY	90.2	95.2	P/P	40 - 150
2349433	Microcystin RR	95.2	93.0	P/P	40 - 150
2349433	Microcystin WR	89.7	84.1	P/P	40 - 150
2349433	Microcystin YR	86.2	84.4	P/P	40 - 150
2349433	Nodularin-R	95.0	96.5	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P418143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2349433	Anatoxin-a	111	127	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418739

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349475	Ammonia-N	1.72	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P418443

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349475	Kjeldahl Nitrogen	1.87	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P418378

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2348766	NO2NO3-N	0.501	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P418219

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349475	Total-P	0.821	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P418172

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349476	O-Phosphate-P	0.590	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P417142

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349433	Cylindrospermopsin	1.15	Spike	P	0 - 30
2349433	Desmethyl microcystin LR	3.46	Spike	P	0 - 30
2349433	Microcystin HilR	0.285	Spike	P	0 - 30
2349433	Microcystin HtyR	0.335	Spike	P	0 - 30
2349433	Microcystin LA	2.29	Spike	P	0 - 30
2349433	Microcystin LF	2.06	Spike	P	0 - 30
2349433	Microcystin LR	3.09	Spike	P	0 - 30
2349433	Microcystin LW	5.81	Spike	P	0 - 30
2349433	Microcystin LY	5.45	Spike	P	0 - 30
2349433	Microcystin RR	2.37	Spike	P	0 - 30
2349433	Microcystin WR	6.51	Spike	P	0 - 30
2349433	Microcystin YR	2.08	Spike	P	0 - 30
2349433	Nodularin-R	1.59	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P418143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2349433	Anatoxin-a	13.4	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2349474
Field Sample ID: SEHAB0086

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	75.6	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	36.7	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A114128
Included Lab Sample IDs: 2349476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	100	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A114169
Included Lab Sample IDs: 2349474

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	93.0	105	P/P	60 - 160
Desmethyl microcystin LR	91.4	85.4	P/P	60 - 160
Microcystin HilR	90.5	81.3	P/P	60 - 160
Microcystin HtyR	94.3	87.7	P/P	60 - 160
Microcystin LA	101	98.9	P/P	50 - 160
Microcystin LF	93.5	86.8	P/P	60 - 160
Microcystin LR	91.9	80.3	P/P	60 - 160
Microcystin LW	109	94.2	P/P	60 - 160
Microcystin LY	119	104	P/P	60 - 160
Microcystin RR	98.7	96.2	P/P	60 - 160
Microcystin WR	97.7	88.0	P/P	60 - 160
Microcystin YR	92.5	75.0	P/P	60 - 160
Nodularin-R	97.9	94.2	P/P	60 - 160

Reference Method: EPA 8321B
Run ID: A114170
Included Lab Sample IDs: 2349474

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	121	120	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A114185
Included Lab Sample IDs: 2349475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.8	99.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A114209
Included Lab Sample IDs: 2349475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	98.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A114314
Included Lab Sample IDs: 2349475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.3	96.1	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A114376
Included Lab Sample IDs: 2349475

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.6	97.4	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	98.2	105	107			1.72
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.7	105	103			1.87
EPA 353.2 Rev. 2.0	NO2NO3-N	100	95.5	95.0			0.501
EPA 365.1 Rev. 2.0	Total-P	101	92.6	93.4			0.821
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.8	98.4	99.2			0.590
EPA 8321B	Anatoxin-a	121	111	127			13.4
	Cylindrospermopsin	109	92.2	91.1			1.15
	Desmethyl microcystin LR	95.4	100	96.8			3.46
	Microcystin HilR	94.1	90.7	90.5			0.285
	Microcystin HtyR	98.3	91.3	91.0			0.335
	Microcystin LA	110	96.6	94.4			2.29
	Microcystin LF	110	94.0	92.1			2.06
	Microcystin LR	94.5	95.6	98.6			3.09
	Microcystin LW	105	89.2	84.1			5.81
	Microcystin LY	105	90.2	95.2			5.45
	Microcystin RR	105	95.2	93.0			2.37
	Microcystin WR	99.1	89.7	84.1			6.51
	Microcystin YR	93.7	86.2	84.4			2.08
	Nodularin-R	102	95.0	96.5			1.59

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2349475
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2349475
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2349475
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2349475
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2349476
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2349474
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2349474

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	08/16/2022			08/26/2022 11:10	Judith K. Clark	2349475
EPA 351.2 Rev. 2.0	08/16/2022	08/22/2022 16:54	Samantha L Bates	08/24/2022 16:04	Samantha L Bates	2349475
EPA 353.2 Rev. 2.0	08/16/2022			08/19/2022 11:07	Beverly Y. Sanders	2349475
EPA 365.1 Rev. 2.0	08/16/2022	08/17/2022 15:03	Adam P Silver	08/18/2022 09:42	James L Waggerby	2349475
EPA 365.1 Rev. 2.0 dissolved	08/16/2022			08/16/2022 14:53	Elise M. Gillis	2349476
EPA 8321B	08/16/2022	08/17/2022 13:00	Manjita Shrestha	08/17/2022 16:40	Manjita Shrestha	2349474
	08/16/2022	08/17/2022 13:00	Umesh Chiluwal	08/17/2022 16:24	Umesh Chiluwal	2349474