Chemical Analysis Report

WQAP-2022-03-15-01

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

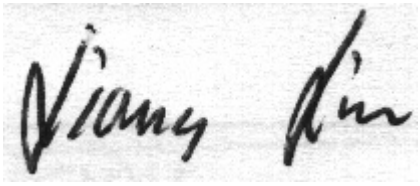
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2022-01-31-59**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: 29-MAR-2022 16:18



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: Indian River Lagoon - near Mullet Creek **Collection Date/Time: 03/14/2022 15:30**

Field ID: SEHAB0073 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2312186	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P411111	
		Cylindrospermopsin	0.10	U	ug/L	P411111	
		Desmethyl microcystin LR	0.25	U	ug/L	P411111	
		Microcystin HilR**	0.25	U	ug/L	P411111	
		Microcystin HtyR**	0.25	U	ug/L	P411111	
		Microcystin LA	0.10	U	ug/L	P411111	
		Microcystin LF	0.10	U	ug/L	P411111	
		Microcystin LR	0.25	U	ug/L	P411111	
		Microcystin LW	0.25	U	ug/L	P411111	
		Microcystin LY	0.10	U	ug/L	P411111	
		Microcystin RR	0.10	U	ug/L	P411111	
		Microcystin WR	0.50	U	ug/L	P411111	
		Microcystin YR	0.25	U	ug/L	P411111	
		Nodularin-R**	0.10	U	ug/L	P411111	
2312187	EPA 350.1 Rev. 2.0	Ammonia-N	0.36		mg N/L	P411185	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5	J	mg N/L	P411276	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.023		mg N/L	P411252	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P411385	
2312188	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.048		mg P/L	P411127	

Ref. Method and Comment:
EPA 351.2 Rev. 2.0: Refer to the Lab Analysis Report for an explanation of QC Codes.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411185

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411276

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411252

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411385

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411127

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

Reference Method: EPA 8321B
Batch ID: P411111

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411185

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411276

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411252

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411385

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411127

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

Reference Method: EPA 8321B
Batch ID: P411111

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 150
Cylindrospermopsin	100		P	40 - 150
Desmethyl microcystin LR	99.5		P	40 - 150
Microcystin HilR	94.7		P	40 - 150
Microcystin HtyR	94.6		P	40 - 150
Microcystin LA	98.5		P	40 - 150
Microcystin LF	97.4		P	40 - 150
Microcystin LR	85.1		P	40 - 150
Microcystin LW	95.1		P	40 - 150
Microcystin LY	95.6		P	40 - 150
Microcystin RR	99.6		P	40 - 150
Microcystin WR	98.3		P	40 - 150
Microcystin YR	99.4		P	40 - 150
Nodularin-R	98.9		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411185

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312505	Ammonia-N	103	95.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411276

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312187	Kjeldahl Nitrogen	101	86.9	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411252

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311996	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411385

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2311786	Total-P	93.2	96.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411127

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312188	O-Phosphate-P	99.2	99.0	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P411111

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2312186	Anatoxin-a	85.2	93.8	P/P	40 - 150
2312186	Cylindrospermopsin	72.4	75.2	P/P	40 - 150
2312186	Desmethyl microcystin LR	85.3	92.0	P/P	40 - 150
2312186	Microcystin HilR	85.7	88.0	P/P	40 - 150
2312186	Microcystin HtyR	84.3	93.4	P/P	40 - 150
2312186	Microcystin LA	94.4	99.1	P/P	40 - 150
2312186	Microcystin LF	80.0	85.5	P/P	40 - 150
2312186	Microcystin LR	83.0	91.6	P/P	40 - 150
2312186	Microcystin LW	69.5	72.2	P/P	40 - 150
2312186	Microcystin LY	75.6	81.4	P/P	40 - 150
2312186	Microcystin RR	94.9	98.1	P/P	40 - 150
2312186	Microcystin WR	76.3	75.9	P/P	40 - 150
2312186	Microcystin YR	85.3	96.0	P/P	40 - 150
2312186	Nodularin-R	90.4	102	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411185

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312505	Ammonia-N	6.40	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411276

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312187	Kjeldahl Nitrogen	8.97	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411252

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311996	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411385

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2311786	Total-P	3.03	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411127

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312188	O-Phosphate-P	0.136	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P411111

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2312186	Anatoxin-a	9.70	Spike	P	0 - 30
2312186	Cylindrospermopsin	3.78	Spike	P	0 - 30
2312186	Desmethyl microcystin LR	7.49	Spike	P	0 - 30
2312186	Microcystin HilR	2.59	Spike	P	0 - 30
2312186	Microcystin HtyR	10.2	Spike	P	0 - 30
2312186	Microcystin LA	4.85	Spike	P	0 - 30
2312186	Microcystin LF	6.70	Spike	P	0 - 30
2312186	Microcystin LR	9.89	Spike	P	0 - 30
2312186	Microcystin LW	3.82	Spike	P	0 - 30
2312186	Microcystin LY	7.31	Spike	P	0 - 30
2312186	Microcystin RR	3.39	Spike	P	0 - 30
2312186	Microcystin WR	0.463	Spike	P	0 - 30
2312186	Microcystin YR	11.9	Spike	P	0 - 30
2312186	Nodularin-R	12.0	Spike	P	0 - 30

Quality Assurance Report
Precision

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2312186
Field Sample ID: SEHAB0073

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	93.8	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A110945
Included Lab Sample IDs: 2312188

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	102	99.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A110971
Included Lab Sample IDs: 2312187

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.8	98.6	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A111007
Included Lab Sample IDs: 2312186

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	108	P/P	50 - 160
Cylindrospermopsin	99.4	102	P/P	60 - 160
Desmethyl microcystin LR	89.8	88.3	P/P	60 - 160
Microcystin HilR	94.8	92.0	P/P	60 - 160
Microcystin HtyR	89.2	89.7	P/P	60 - 160
Microcystin LA	92.5	98.7	P/P	50 - 160
Microcystin LF	93.4	85.4	P/P	60 - 160
Microcystin LR	86.4	91.3	P/P	60 - 160
Microcystin LW	92.3	90.3	P/P	60 - 160
Microcystin LY	96.1	88.2	P/P	60 - 160
Microcystin RR	99.1	102	P/P	60 - 160
Microcystin WR	94.8	93.2	P/P	60 - 160
Microcystin YR	100	98.6	P/P	60 - 160
Nodularin-R	97.8	96.5	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A111008
Included Lab Sample IDs: 2312187

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A111110
Included Lab Sample IDs: 2312187

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A111130
Included Lab Sample IDs: 2312187

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.7	95.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

* 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	97.4	103	95.8			6.40
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.6	101	86.9			8.97
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101	101			0.0
EPA 365.1 Rev. 2.0	Total-P	102	93.2	96.6			3.03
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.2	99.0			0.136
EPA 8321B	Anatoxin-a	102	85.2	93.8			9.70
	Cylindrospermopsin	100	72.4	75.2			3.78
	Desmethyl microcystin LR	99.5	85.3	92.0			7.49
	Microcystin HilR	94.7	85.7	88.0			2.59
	Microcystin HtyR	94.6	84.3	93.4			10.2
	Microcystin LA	98.5	94.4	99.1			4.85
	Microcystin LF	97.4	80.0	85.5			6.70
	Microcystin LR	85.1	83.0	91.6			9.89
	Microcystin LW	95.1	69.5	72.2			3.82
	Microcystin LY	95.6	75.6	81.4			7.31
	Microcystin RR	99.6	94.9	98.1			3.39
	Microcystin WR	98.3	76.3	75.9			0.463
	Microcystin YR	99.4	85.3	96.0			11.9
	Nodularin-R	98.9	90.4	102			12.0

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2312187
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2312187
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2312187
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2312187
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2312188
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2312186

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	03/15/2022			03/16/2022 13:26	Ping Hua	2312187
EPA 351.2 Rev. 2.0	03/15/2022	03/22/2022 11:30	Samantha L Bates	03/24/2022 12:07	Alexandra J Mattheus	2312187
EPA 353.2 Rev. 2.0	03/15/2022			03/17/2022 17:49	Nathaniel J Jones	2312187
EPA 365.1 Rev. 2.0	03/15/2022	03/22/2022 17:15	Simonne.V. Calhoun	03/23/2022 11:33	Sarah A Nixon	2312187
EPA 365.1 Rev. 2.0 dissolved	03/15/2022			03/15/2022 15:09	Blanca Fach	2312188
EPA 8321B	03/15/2022	03/17/2022 08:00	Manjita Shrestha	03/17/2022 15:36	Manjita Shrestha	2312186