

Chemical Analysis Report

WQAP-2021-12-21-03

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-2021-10-18-53**
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: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 13-JAN-2022 09:32



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: Tarpon River

Collection Date/Time: 12/20/2021 10:30

Field ID: SEHAB0072

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2296340	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P407674	
		Cylindrospermopsin	0.10	U	ug/L	P407674	
		Desmethyl microcystin LR	0.25	U	ug/L	P407674	
		Microcystin HIR**	0.25	U	ug/L	P407674	
		Microcystin HtyR**	0.25	U	ug/L	P407674	
		Microcystin LA	0.10	U	ug/L	P407674	
		Microcystin LF	0.10	UJ	ug/L	P407674	LCS, MS
		Microcystin LR	0.25	U	ug/L	P407674	
		Microcystin LW	0.25	U	ug/L	P407674	
		Microcystin LY	0.10	U	ug/L	P407674	
		Microcystin RR	0.10	U	ug/L	P407674	
		Microcystin WR	0.50	U	ug/L	P407674	
		Microcystin YR	0.25	U	ug/L	P407674	
		Nodularin-R**	0.10	U	ug/L	P407674	
2296341	EPA 350.1 Rev. 2.0	Ammonia-N	0.057		mg N/L	P408235	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.56		mg N/L	P408010	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.21		mg N/L	P407921	
	EPA 365.1 Rev. 2.0	Total-P	0.058		mg P/L	P408000	
2296342	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.034		mg P/L	P407771	

Ref. Method and Comment:

EPA 8321B: 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: P408235

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408010

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407921

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408000

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407771

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

Reference Method: EPA 8321B
Batch ID: P407674

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 H1R	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: P408235

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408010

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: P407921

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: P408000

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	108		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407771

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

Reference Method: EPA 8321B
Batch ID: P407674

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 150
Cylindrospermopsin	97.2		P	40 - 150
Desmethyl microcystin LR	103		P	40 - 150
Microcystin HIR	105		P	40 - 150
Microcystin HtyR	98.5		P	40 - 150
Microcystin LA	128		P	40 - 150
Microcystin LF	154		F	40 - 150
Microcystin LR	93.5		P	40 - 150
Microcystin LW	127		P	40 - 150
Microcystin LY	135		P	40 - 150
Microcystin RR	103		P	40 - 150
Microcystin WR	94.1		P	40 - 150
Microcystin YR	107		P	40 - 150
Nodularin-R	108		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P408235

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296266	Ammonia-N	107	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P408010

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295947	Kjeldahl Nitrogen	99.8	97.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P407921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296281	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P408000

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296369	Total-P	105	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P407771

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2296268	O-Phosphate-P	99.6	97.1	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P407674

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2295870	Anatoxin-a	120	128	P/P	40 - 150
2295870	Cylindrospermopsin	94.2	102	P/P	40 - 150
2295870	Desmethyl microcystin LR	115	120	P/P	40 - 150
2295870	Microcystin HiLR	114	118	P/P	40 - 150
2295870	Microcystin HtyR	104	112	P/P	40 - 150
2295870	Microcystin LA	131	136	P/P	40 - 150
2295870	Microcystin LF	146	154	P/F	40 - 150
2295870	Microcystin LR	103	103	P/P	40 - 150
2295870	Microcystin LW	125	126	P/P	40 - 150
2295870	Microcystin LY	139	143	P/P	40 - 150
2295870	Microcystin RR	109	110	P/P	40 - 150
2295870	Microcystin WR	96.8	102	P/P	40 - 150
2295870	Microcystin YR	118	126	P/P	40 - 150
2295870	Nodularin-R	119	121	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P408235

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296266	Ammonia-N	1.36	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P408010

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295947	Kjeldahl Nitrogen	1.51	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P407921

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296281	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P408000

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296369	Total-P	0.835	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P407771

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2296268	O-Phosphate-P	2.41	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P407674

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2295870	Anatoxin-a	6.72	Spike	P	0 - 30
2295870	Cylindrospermopsin	8.26	Spike	P	0 - 30
2295870	Desmethyl microcystin LR	3.90	Spike	P	0 - 30
2295870	Microcystin H1LR	3.18	Spike	P	0 - 30
2295870	Microcystin HtyR	7.41	Spike	P	0 - 30
2295870	Microcystin LA	3.37	Spike	P	0 - 30
2295870	Microcystin LF	5.42	Spike	P	0 - 30
2295870	Microcystin LR	0.616	Spike	P	0 - 30
2295870	Microcystin LW	0.711	Spike	P	0 - 30
2295870	Microcystin LY	3.08	Spike	P	0 - 30
2295870	Microcystin RR	1.29	Spike	P	0 - 30
2295870	Microcystin WR	5.01	Spike	P	0 - 30
2295870	Microcystin YR	6.67	Spike	P	0 - 30
2295870	Nodularin-R	2.02	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: 2296340
Field Sample ID: SEHAB0072

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	79.7	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	79.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A109514

Included Lab Sample IDs: 2296342

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.9	99.8	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A109518

Included Lab Sample IDs: 2296340

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	87.0	72.3	P/P	50 - 160
Cylindrospermopsin	98.4	98.7	P/P	60 - 160
Desmethyl microcystin LR	105	101	P/P	60 - 160
Microcystin HIR	104	105	P/P	60 - 160
Microcystin HtyR	99.4	101	P/P	60 - 160
Microcystin LA	128	129	P/P	50 - 160
Microcystin LF	153	158	P/P	60 - 160
Microcystin LR	92.9	94.2	P/P	60 - 160
Microcystin LW	123	122	P/P	60 - 160
Microcystin LY	138	130	P/P	60 - 160
Microcystin RR	101	105	P/P	60 - 160
Microcystin WR	97.1	91.3	P/P	60 - 160
Microcystin YR	102	104	P/P	60 - 160
Nodularin-R	109	105	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109583

Included Lab Sample IDs: 2296341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109706

Included Lab Sample IDs: 2296341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.2	96.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109713

Included Lab Sample IDs: 2296341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.6	94.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A109738

Included Lab Sample IDs: 2296341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	99.6	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	99.0	107	105			1.36
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.0	99.8	97.9			1.51
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	104	104			0.0
EPA 365.1 Rev. 2.0	Total-P	108	105	106			0.835
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	99.6	97.1			2.41
EPA 8321B	Anatoxin-a	104	120	128			6.72
	Cylindrospermopsin	97.2	94.2	102			8.26
	Desmethyl microcystin LR	103	115	120			3.90
	Microcystin HiLR	105	114	118			3.18
	Microcystin HtyR	98.5	104	112			7.41
	Microcystin LA	128	131	136			3.37
	Microcystin LF	154	146	154			5.42
	Microcystin LR	93.5	103	103			0.616
	Microcystin LW	127	125	126			0.711
	Microcystin LY	135	139	143			3.08
	Microcystin RR	103	109	110			1.29
	Microcystin WR	94.1	96.8	102			5.01
	Microcystin YR	107	118	126			6.67
	Nodularin-R	108	119	121			2.02

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2296341
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2296341
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2296341
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2296341
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2296342
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2296340

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	12/21/2021			01/07/2022 14:38	Ping Hua	2296341
EPA 351.2 Rev. 2.0	12/21/2021	01/04/2022 12:52	Samantha L Bates	01/06/2022 15:40	Alexandra J Mattheus	2296341
EPA 353.2 Rev. 2.0	12/21/2021			12/28/2021 10:30	Beverly Y. Sanders	2296341
EPA 365.1 Rev. 2.0	12/21/2021	01/04/2022 16:25	Simonne.V. Calhoun	01/06/2022 14:54	Shengyu Ding	2296341
EPA 365.1 Rev. 2.0 dissolved	12/21/2021			12/21/2021 15:12	James L Waggerby	2296342
EPA 8321B	12/21/2021	12/21/2021 12:00	Manjita Shrestha	12/21/2021 16:31	Manjita Shrestha	2296340