Chemical Analysis Report

WQAP-2021-05-19-01

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

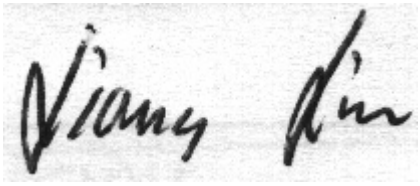
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2021-05-10-70**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: 04-JUN-2021 11:37



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 Clarke Shores **Collection Date/Time: 05/18/2021 13:45**

Field ID: SEHAB0043 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2248245	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P398352	
		Cylindrospermopsin	0.10	U	ug/L	P398352	
		Desmethyl microcystin LR	0.25	U	ug/L	P398352	
		Microcystin HilR**	0.25	U	ug/L	P398352	
		Microcystin HtyR**	0.25	U	ug/L	P398352	
		Microcystin LA	0.10	U	ug/L	P398352	
		Microcystin LF	0.10	U	ug/L	P398352	
		Microcystin LR	6.0		ug/L	P398352	
		Microcystin LW	0.25	U	ug/L	P398352	
		Microcystin LY	0.10	U	ug/L	P398352	
		Microcystin RR	0.10	U	ug/L	P398352	
		Microcystin WR	0.50	U	ug/L	P398352	
		Microcystin YR	0.25	U	ug/L	P398352	
		Nodularin-R**	0.10	U	ug/L	P398352	
2248246	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P399058	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.97		mg N/L	P398617	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.015		mg N/L	P398485	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P398590	
2248247	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.054		mg P/L	P398453	

Ref. Method and Comment:
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399058

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398617

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398485

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398590

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398453

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

Reference Method: EPA 8321B
Batch ID: P398352

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: P399058

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398617

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398485

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: P398590

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: P398453

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.5		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P398352

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	98.7		P	40 - 150
Cylindrospermopsin	101		P	40 - 150
Desmethyl microcystin LR	88.7		P	40 - 150
Microcystin HilR	94.1		P	40 - 150
Microcystin HtyR	96.3		P	40 - 150
Microcystin LA	97.5		P	40 - 150
Microcystin LF	92.5		P	40 - 150
Microcystin LR	91.1		P	40 - 150
Microcystin LW	95.2		P	40 - 150
Microcystin LY	102		P	40 - 150
Microcystin RR	111		P	40 - 150
Microcystin WR	91.7		P	40 - 150
Microcystin YR	99.3		P	40 - 150
Nodularin-R	107		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399058

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248246	Ammonia-N	96.0	97.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398485

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248246	NO2NO3-N	97.7	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398590

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248146	Total-P	108	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398453

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2248482	O-Phosphate-P	99.3	97.9	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P398352

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247820	Anatoxin-a	92.5	91.3	P/P	40 - 150
2247820	Cylindrospermopsin	95.2	94.5	P/P	40 - 150
2247820	Desmethyl microcystin LR	88.8	92.7	P/P	40 - 150
2247820	Microcystin HilR	96.0	95.5	P/P	40 - 150
2247820	Microcystin HtyR	92.8	97.8	P/P	40 - 150
2247820	Microcystin LA	92.1	95.9	P/P	40 - 150
2247820	Microcystin LF	94.1	92.4	P/P	40 - 150
2247820	Microcystin LR	93.2	100	P/P	40 - 150
2247820	Microcystin LW	89.8	97.8	P/P	40 - 150
2247820	Microcystin LY	99.2	104	P/P	40 - 150
2247820	Microcystin RR	108	108	P/P	40 - 150
2247820	Microcystin WR	91.4	92.2	P/P	40 - 150
2247820	Microcystin YR	99.1	97.4	P/P	40 - 150
2247820	Nodularin-R	105	110	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399058

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248246	Ammonia-N	0.966	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398617

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248093	Kjeldahl Nitrogen	2.17	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398485

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248246	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248146	Total-P	1.34	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398453

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2248482	O-Phosphate-P	1.33	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P398352

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247820	Anatoxin-a	1.30	Spike	P	0 - 30
2247820	Cylindrospermopsin	0.772	Spike	P	0 - 30
2247820	Desmethyl microcystin LR	4.33	Spike	P	0 - 30
2247820	Microcystin HilR	0.473	Spike	P	0 - 30
2247820	Microcystin HtyR	5.20	Spike	P	0 - 30
2247820	Microcystin LA	4.01	Spike	P	0 - 30
2247820	Microcystin LF	1.81	Spike	P	0 - 30
2247820	Microcystin LR	6.45	Spike	P	0 - 30
2247820	Microcystin LW	8.53	Spike	P	0 - 30
2247820	Microcystin LY	5.04	Spike	P	0 - 30
2247820	Microcystin RR	0.280	Spike	P	0 - 30
2247820	Microcystin WR	0.872	Spike	P	0 - 30
2247820	Microcystin YR	1.75	Spike	P	0 - 30
2247820	Nodularin-R	4.34	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: 2248245
Field Sample ID: SEHAB0043

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	112	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	97.2	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A105535
Included Lab Sample IDs: 2248247

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A105538
Included Lab Sample IDs: 2248245

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	89.0	98.3	P/P	50 - 160
Cylindrospermopsin	99.1	107	P/P	60 - 160
Desmethyl microcystin LR	104	95.0	P/P	60 - 160
Microcystin HilR	112	103	P/P	60 - 160
Microcystin HtyR	112	101	P/P	60 - 160
Microcystin LA	108	102	P/P	50 - 160
Microcystin LF	93.0	95.9	P/P	60 - 160
Microcystin LR	115	104	P/P	60 - 160
Microcystin LW	107	96.4	P/P	60 - 160
Microcystin LY	124	111	P/P	60 - 160
Microcystin RR	124	121	P/P	60 - 160
Microcystin WR	121	106	P/P	60 - 160
Microcystin YR	115	103	P/P	60 - 160
Nodularin-R	116	108	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A105553
Included Lab Sample IDs: 2248246

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A105612
Included Lab Sample IDs: 2248246

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A105619
Included Lab Sample IDs: 2248246

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.0	99.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A105796
Included Lab Sample IDs: 2248246

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.2	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	99.2	96.0	97.2			0.966
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.8					2.17
EPA 353.2 Rev. 2.0	NO2NO3-N	100	97.7	97.7			0.0
EPA 365.1 Rev. 2.0	Total-P	106	108	106			1.34
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.5	99.3	97.9			1.33
EPA 8321B	Anatoxin-a	98.7	92.5	91.3			1.30
	Cylindrospermopsin	101	95.2	94.5			0.772
	Desmethyl microcystin LR	88.7	88.8	92.7			4.33
	Microcystin HilR	94.1	96.0	95.5			0.473
	Microcystin HtyR	96.3	92.8	97.8			5.20
	Microcystin LA	97.5	92.1	95.9			4.01
	Microcystin LF	92.5	94.1	92.4			1.81
	Microcystin LR	91.1	93.2	100			6.45
	Microcystin LW	95.2	89.8	97.8			8.53
	Microcystin LY	102	99.2	104			5.04
	Microcystin RR	111	108	108			0.280
	Microcystin WR	91.7	91.4	92.2			0.872
	Microcystin YR	99.3	99.1	97.4			1.75
	Nodularin-R	107	105	110			4.34

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2248246
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2248246
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2248246
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2248246
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2248247
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2248245

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	05/19/2021			06/01/2021 13:33	Roberta Tatti	2248246
EPA 351.2 Rev. 2.0	05/19/2021	05/21/2021 13:20	Benjamin T. Nordmann	05/24/2021 11:06	Virginia P. Brown	2248246
EPA 353.2 Rev. 2.0	05/19/2021			05/20/2021 09:38	Beverly Y. Sanders	2248246
EPA 365.1 Rev. 2.0	05/19/2021	05/21/2021 13:27	Yen Ta	05/24/2021 11:12	Shengyu Ding	2248246
EPA 365.1 Rev. 2.0 dissolved	05/19/2021			05/19/2021 15:30	Blanca Fach	2248247
EPA 8321B	05/19/2021	05/19/2021 12:10	Pramila Ghimire	05/19/2021 13:35	Pramila Ghimire	2248245