Chemical Analysis Report

WQAP-2022-06-03-02

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

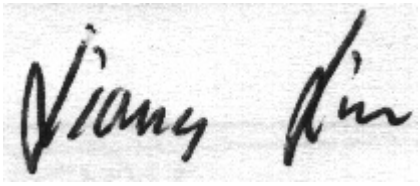
Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2022-04-25-22**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd. Suite 232
Orlando, FL 32803
Attn: Matt Bearden

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: 24-JUN-2022 09:20



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 Mariam - SE Corner **Collection Date/Time: 06/02/2022 12:13**

Field ID: HABCE0124_LakeMariam Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2331814	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P414745	
		Cylindrospermopsin	0.10	U	ug/L	P414745	
		Desmethyl microcystin LR	0.25	U	ug/L	P414745	
		Microcystin HilR**	0.25	U	ug/L	P414745	
		Microcystin HtyR**	0.25	U	ug/L	P414745	
		Microcystin LA	0.10	U	ug/L	P414745	
		Microcystin LF	0.10	U	ug/L	P414745	RPD
		Microcystin LR	0.25	U	ug/L	P414745	
		Microcystin LW	0.25	U	ug/L	P414745	
		Microcystin LY	0.10	U	ug/L	P414745	
		Microcystin RR	0.10	U	ug/L	P414745	
		Microcystin WR	0.50	U	ug/L	P414745	
		Microcystin YR	0.25	U	ug/L	P414745	
		Nodularin-R**	0.10	U	ug/L	P414745	
2331815	EPA 350.1 Rev. 2.0	Ammonia-N	0.028		mg N/L	P415440	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.82		mg N/L	P415257	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P414945	
	EPA 365.1 Rev. 2.0	Total-P	0.056		mg P/L	P414865	
2331816	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.018		mg P/L	P414721	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415440

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415257

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414945

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414865

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414721

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

Reference Method: EPA 8321B
Batch ID: P414745

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: P415440

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415257

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	95.4		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414945

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414865

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414721

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

Reference Method: EPA 8321B
Batch ID: P414745

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	98.1		P	40 - 150
Cylindrospermopsin	85.9		P	40 - 150
Desmethyl microcystin LR	96.7		P	40 - 150
Microcystin HilR	85.6		P	40 - 150
Microcystin HtyR	97.1		P	40 - 150
Microcystin LA	96.6		P	40 - 150
Microcystin LF	116		P	40 - 150
Microcystin LR	95.2		P	40 - 150
Microcystin LW	81.5		P	40 - 150
Microcystin LY	107		P	40 - 150
Microcystin RR	87.9		P	40 - 150
Microcystin WR	82.9		P	40 - 150
Microcystin YR	90.3		P	40 - 150
Nodularin-R	95.0		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415440

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2331664	Ammonia-N	105	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415257

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2331633	Kjeldahl Nitrogen	96.1	94.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414945

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2331888	NO2NO3-N	99.7	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414865

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2331878	Total-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414721

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2331791	O-Phosphate-P	98.4	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P414745

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2330792	Anatoxin-a	113	117	P/P	40 - 150
2330792	Cylindrospermopsin	96.5	96.5	P/P	40 - 150
2330792	Desmethyl microcystin LR	125	130	P/P	40 - 150
2330792	Microcystin HilR	106	104	P/P	40 - 150
2330792	Microcystin HtyR	105	109	P/P	40 - 150
2330792	Microcystin LA	84.0	84.6	P/P	40 - 150
2330792	Microcystin LF	80.9	118	P/P	40 - 150
2330792	Microcystin LR	115	123	P/P	40 - 150
2330792	Microcystin LW	106	84.3	P/P	40 - 150
2330792	Microcystin LY	108	103	P/P	40 - 150
2330792	Microcystin RR	93.0	95.3	P/P	40 - 150
2330792	Microcystin WR	85.5	101	P/P	40 - 150
2330792	Microcystin YR	119	119	P/P	40 - 150
2330792	Nodularin-R	102	106	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415440

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2331664	Ammonia-N	1.22	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415257

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2331633	Kjeldahl Nitrogen	1.44	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P414945

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2331888	NO2NO3-N	1.08	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P414865

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2331878	Total-P	0.433	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P414721

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2331791	O-Phosphate-P	0.709	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P414745

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2330792	Anatoxin-a	3.51	Spike	P	0 - 30
2330792	Cylindrospermopsin	0.0339	Spike	P	0 - 30
2330792	Desmethyl microcystin LR	4.13	Spike	P	0 - 30
2330792	Microcystin HilR	1.11	Spike	P	0 - 30
2330792	Microcystin HtyR	4.00	Spike	P	0 - 30
2330792	Microcystin LA	0.712	Spike	P	0 - 30
2330792	Microcystin LF	36.7	Spike	F	0 - 30
2330792	Microcystin LR	5.68	Spike	P	0 - 30
2330792	Microcystin LW	23.2	Spike	P	0 - 30
2330792	Microcystin LY	4.28	Spike	P	0 - 30
2330792	Microcystin RR	2.37	Spike	P	0 - 30
2330792	Microcystin WR	17.0	Spike	P	0 - 30
2330792	Microcystin YR	0.00696	Spike	P	0 - 30
2330792	Nodularin-R	3.24	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: 2331814
Field Sample ID: HABCE0124_LakeMariam

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	69.8	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A112603
Included Lab Sample IDs: 2331816

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.8	98.8	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A112639
Included Lab Sample IDs: 2331814

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	106	109	P/P	50 - 160
Cylindrospermopsin	92.2	95.1	P/P	50 - 160
Desmethyl microcystin LR	111	110	P/P	50 - 160
Microcystin HilR	92.0	94.0	P/P	50 - 160
Microcystin HtyR	108	110	P/P	50 - 160
Microcystin LA	98.2	108	P/P	50 - 160
Microcystin LF	112	134	P/P	50 - 160
Microcystin LR	99.2	108	P/P	50 - 160
Microcystin LW	112	104	P/P	50 - 160
Microcystin LY	96.8	126	P/P	50 - 160
Microcystin RR	92.2	99.3	P/P	50 - 160
Microcystin WR	96.9	98.7	P/P	50 - 160
Microcystin YR	100	106	P/P	50 - 160
Nodularin-R	94.9	101	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A112696
Included Lab Sample IDs: 2331815

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: A112729
Included Lab Sample IDs: 2331815

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	98.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A112932
Included Lab Sample IDs: 2331815

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.8	97.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A112942
Included Lab Sample IDs: 2331815

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.3	102	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	103	105	103			1.22
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	95.4	96.1	94.0			1.44
EPA 353.2 Rev. 2.0	NO2NO3-N	103	99.7	101			1.08
EPA 365.1 Rev. 2.0	Total-P	100	102	102			0.433
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	98.4	99.1			0.709
EPA 8321B	Anatoxin-a	98.1	113	117			3.51
	Cylindrospermopsin	85.9	96.5	96.5			0.0339
	Desmethyl microcystin LR	96.7	125	130			4.13
	Microcystin HilR	85.6	106	104			1.11
	Microcystin HtyR	97.1	105	109			4.00
	Microcystin LA	96.6	84.0	84.6			0.712
	Microcystin LF	116	80.9	118			36.7
	Microcystin LR	95.2	115	123			5.68
	Microcystin LW	81.5	106	84.3			23.2
	Microcystin LY	107	108	103			4.28
	Microcystin RR	87.9	93.0	95.3			2.37
	Microcystin WR	82.9	85.5	101			17.0
	Microcystin YR	90.3	119	119			0.0069
	Nodularin-R	95.0	102	106			3.24

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2331815
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2331815
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2331815
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2331815
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2331816
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2331814

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	06/03/2022			06/20/2022 14:24	Ping Hua	2331815
EPA 351.2 Rev. 2.0	06/03/2022	06/17/2022 11:47	Samantha L Bates	06/20/2022 15:29	Alexandra J Mattheus	2331815
EPA 353.2 Rev. 2.0	06/03/2022			06/07/2022 17:38	Touraj Touran	2331815
EPA 365.1 Rev. 2.0	06/03/2022	06/08/2022 15:25	Adam P Silver	06/09/2022 10:37	James L Waggerby	2331815
EPA 365.1 Rev. 2.0 dissolved	06/03/2022			06/03/2022 13:53	James L Waggerby	2331816
EPA 8321B	06/03/2022	06/06/2022 09:00	Manjita Shrestha	06/06/2022 20:31	Manjita Shrestha	2331814