Chemical Analysis Report

WQAP-2023-06-09-03

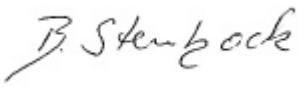
Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2023-05-29-50**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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

For additional information please contact
Colin Wright, Ph.D.
Chris Bowen, B.S.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 19-JUN-2023 14:00



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 Minnehaha - E Dock **Collection Date/Time: 06/08/2023 12:04**

Field ID: HABCE0194_LakeMinnehaha3 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2416386	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P431049	
		Cylindrospermopsin	0.18	I	ug/L	P431048	
		Desmethyl microcystin LR	0.25	U	ug/L	P431048	
		Microcystin HilR	0.25	U	ug/L	P431048	
		Microcystin HtyR	0.25	U	ug/L	P431048	
		Microcystin LA	0.10	U	ug/L	P431048	
		Microcystin LF	0.10	U	ug/L	P431048	
		Microcystin LR	0.25	U	ug/L	P431048	
		Microcystin LW	0.25	U	ug/L	P431048	
		Microcystin LY	0.10	U	ug/L	P431048	
		Microcystin RR	0.10	U	ug/L	P431048	
		Microcystin WR	0.50	U	ug/L	P431048	
		Neosaxitoxin	0.50	U	ug/L	P431049	
		Microcystin YR	0.25	U	ug/L	P431048	
		Saxitoxin	0.50	U	ug/L	P431049	
		Nodularin-R	0.10	U	ug/L	P431048	
2416387	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P431186	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.67		mg N/L	P431267	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P431388	
	EPA 365.1 Rev. 2.0	Total-P	0.034		mg P/L	P431218	
2416388	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P431086	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431186

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431267

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431388

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431218

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431086

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

Reference Method: EPA 8321B
Batch ID: P431048

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: P431049

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431186

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431267

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.3		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431388

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: P431218

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431086

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

Reference Method: EPA 8321B
Batch ID: P431048

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	95.3		P	40 - 150
Desmethyl microcystin LR	96.9		P	40 - 150
Microcystin HilR	100		P	40 - 150
Microcystin HtyR	88.8		P	40 - 150
Microcystin LA	110		P	40 - 150
Microcystin LF	87.7		P	40 - 150
Microcystin LR	100		P	40 - 150
Microcystin LW	82.4		P	40 - 150
Microcystin LY	109		P	40 - 150
Microcystin RR	100		P	40 - 150
Microcystin WR	90.6		P	40 - 150
Microcystin YR	87.6		P	40 - 150
Nodularin-R	98.2		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P431049

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	111		P	40 - 150
Neosaxitoxin	111		P	40 - 150
Saxitoxin	106		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431186

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2416293	Ammonia-N	97.6	95.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431267

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2416387	Kjeldahl Nitrogen	105	95.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431388

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2416293	NO2NO3-N	95.8		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431218

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2416412	Total-P	98.7	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431086

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2416309	O-Phosphate-P	101	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P431048

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2414501	Cylindrospermopsin	94.0	101	P/P	40 - 150
2414501	Desmethyl microcystin LR	105	124	P/P	40 - 150
2414501	Microcystin HilR	102	118	P/P	40 - 150
2414501	Microcystin HtyR	110	118	P/P	40 - 150
2414501	Microcystin LA	82.9	97.9	P/P	40 - 150
2414501	Microcystin LF	89.9	113	P/P	40 - 150
2414501	Microcystin LR	105	124	P/P	40 - 150
2414501	Microcystin LW	92.8	109	P/P	40 - 150
2414501	Microcystin LY	99.8	112	P/P	40 - 150
2414501	Microcystin RR	106	115	P/P	40 - 150
2414501	Microcystin WR	92.8	113	P/P	40 - 150
2414501	Microcystin YR	106	123	P/P	40 - 150
2414501	Nodularin-R	105	121	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P431049

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2414501	Anatoxin-a	109	116	P/P	40 - 150
2414501	Neosaxitoxin	94.6	93.4	P/P	40 - 150
2414501	Saxitoxin	81.4	83.2	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P431186

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2416293	Ammonia-N	2.05	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P431267

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2416387	Kjeldahl Nitrogen	6.78	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P431388

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2416293	NO2NO3-N	0.201	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P431218

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2416412	Total-P	0.807	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431086

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2416309	O-Phosphate-P	0.0990	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P431048

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2414501	Cylindrospermopsin	7.15	Spike	P	0 - 30
2414501	Desmethyl microcystin LR	16.5	Spike	P	0 - 30
2414501	Microcystin HilR	15.1	Spike	P	0 - 30
2414501	Microcystin HtyR	7.24	Spike	P	0 - 30
2414501	Microcystin LA	16.5	Spike	P	0 - 30
2414501	Microcystin LF	22.6	Spike	P	0 - 30
2414501	Microcystin LR	16.3	Spike	P	0 - 30
2414501	Microcystin LW	16.0	Spike	P	0 - 30
2414501	Microcystin LY	11.4	Spike	P	0 - 30
2414501	Microcystin RR	8.35	Spike	P	0 - 30
2414501	Microcystin WR	19.7	Spike	P	0 - 30
2414501	Microcystin YR	14.8	Spike	P	0 - 30
2414501	Nodularin-R	14.6	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P431049

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2414501	Anatoxin-a	6.39	Spike	P	0 - 30
2414501	Neosaxitoxin	1.27	Spike	P	0 - 30
2414501	Saxitoxin	2.21	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2416386
Field Sample ID: HABCE0194_LakeMinnehaha3

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	120	P	30 - 160
EPA 8321B	Saxitoxin-15N7	87.8	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A119686
Included Lab Sample IDs: 2416386

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	100	95.1	P/P	50 - 160
Neosaxitoxin	111	106	P/P	50 - 160
Saxitoxin	103	96.3	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A119699
Included Lab Sample IDs: 2416388

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.9	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A119706
Included Lab Sample IDs: 2416386

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	99.4	99.6	P/P	50 - 160
Desmethyl microcystin LR	103	97.8	P/P	50 - 160
Microcystin HilR	94.8	96.1	P/P	50 - 160
Microcystin HtyR	93.3	99.2	P/P	50 - 160
Microcystin LA	76.2	88.3	P/P	50 - 160
Microcystin LF	69.7	68.8	P/P	50 - 160
Microcystin LR	95.6	103	P/P	50 - 160
Microcystin LW	80.9	80.0	P/P	50 - 160
Microcystin LY	99.3	115	P/P	50 - 160
Microcystin RR	98.8	98.0	P/P	50 - 160
Microcystin WR	92.2	100	P/P	50 - 160
Microcystin YR	91.2	90.9	P/P	50 - 160
Nodularin-R	101	100	P/P	50 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A119760
Included Lab Sample IDs: 2416387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A119834
Included Lab Sample IDs: 2416387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	98.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A119852
Included Lab Sample IDs: 2416387

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A119856
Included Lab Sample IDs: 2416387

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	97.7	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	96.2	97.6	95.2			2.05
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.3	105	95.8			6.78
EPA 353.2 Rev. 2.0	NO2NO3-N	102	95.8				0.201
EPA 365.1 Rev. 2.0	Total-P	98.0	98.7	99.5			0.807
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	101	101			0.0990
EPA 8321B	Anatoxin-a	111	109	116			6.39
	Cylindrospermopsin	95.3	94.0	101			7.15
	Desmethyl microcystin LR	96.9	105	124			16.5
	Microcystin HilR	100	102	118			15.1
	Microcystin HtyR	88.8	110	118			7.24
	Microcystin LA	110	82.9	97.9			16.5
	Microcystin LF	87.7	89.9	113			22.6
	Microcystin LR	100	105	124			16.3
	Microcystin LW	82.4	92.8	109			16.0
	Microcystin LY	109	99.8	112			11.4
	Microcystin RR	100	106	115			8.35
	Microcystin WR	90.6	92.8	113			19.7
	Microcystin YR	87.6	106	123			14.8
	Neosaxitoxin	111	94.6	93.4			1.27
	Nodularin-R	98.2	105	121			14.6
	Saxitoxin	106	81.4	83.2			2.21

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2416387
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2416387
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2416387
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2416387
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2416388
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2416386
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2416386

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	06/09/2023			06/13/2023 11:55	Khloe J Berg	2416387
EPA 351.2 Rev. 2.0	06/09/2023	06/14/2023 12:52	Ping Hua	06/16/2023 10:55	Samantha L Bates	2416387
EPA 353.2 Rev. 2.0	06/09/2023			06/16/2023 09:43	Beverly Y. Sanders	2416387
EPA 365.1 Rev. 2.0	06/09/2023	06/14/2023 13:30	Simonne.V. Calhoun	06/15/2023 14:24	Simonne.V. Calhoun	2416387
EPA 365.1 Rev. 2.0 dissolved	06/09/2023			06/09/2023 14:44	Elise M. Gillis	2416388
EPA 8321B	06/09/2023	06/09/2023 14:00	Touraj Touran	06/09/2023 22:27	Touraj Touran	2416386
	06/09/2023	06/09/2023 14:00	Touraj Touran	06/10/2023 09:27	Manjita Shrestha	2416386