Chemical Analysis Report

WQAP-2023-05-17-02

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

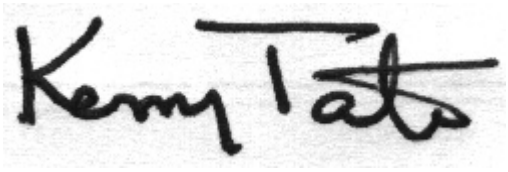
Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2023-05-15-67**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 26-MAY-2023 10:46



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: Tiger Lake - Center **Collection Date/Time: 05/16/2023 11:08**

Field ID: HABCE0185_TigerLake2 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2410182	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P429956	
		Cylindrospermopsin	0.10	U	ug/L	P429955	
		Desmethyl microcystin LR	0.25	U	ug/L	P429955	
		Microcystin HilR	0.25	U	ug/L	P429955	
		Microcystin HtyR	0.25	U	ug/L	P429955	
		Microcystin LA	0.40		ug/L	P429955	
		Microcystin LF	0.17	I	ug/L	P429955	
		Microcystin LR	1.1		ug/L	P429955	
		Microcystin LW	0.25	U	ug/L	P429955	
		Microcystin LY	0.27	I	ug/L	P429955	
		Microcystin RR	0.23	I	ug/L	P429955	
		Microcystin WR	0.50	U	ug/L	P429955	
		Neosaxitoxin	0.50	U	ug/L	P429956	
		Microcystin YR	0.25	U	ug/L	P429955	
		Saxitoxin	0.50	U	ug/L	P429956	
		Nodularin-R	0.10	U	ug/L	P429955	
2410183	EPA 350.1 Rev. 2.0	Ammonia-N	0.012		mg N/L	P430342	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P430050	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	I	mg N/L	P430233	
	EPA 365.1 Rev. 2.0	Total-P	0.11		mg P/L	P430041	
2410184	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.009	I	mg P/L	P429989	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430342

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430050

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430233

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430041

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P429989

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

Reference Method: EPA 8321B
Batch ID: P429955

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: P429956

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: P430342

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430050

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430233

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430041

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: P429989

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

Reference Method: EPA 8321B
Batch ID: P429955

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	104		P	40 - 150
Desmethyl microcystin LR	104		P	40 - 150
Microcystin HilR	101		P	40 - 150
Microcystin HtyR	97.9		P	40 - 150
Microcystin LA	125		P	40 - 150
Microcystin LF	119		P	40 - 150
Microcystin LR	93.1		P	40 - 150
Microcystin LW	108		P	40 - 150
Microcystin LY	116		P	40 - 150
Microcystin RR	97.7		P	40 - 150
Microcystin WR	100		P	40 - 150
Microcystin YR	99.0		P	40 - 150
Nodularin-R	95.2		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P429956

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	99.0		P	40 - 150
Neosaxitoxin	87.6		P	40 - 150
Saxitoxin	83.8		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410183	Ammonia-N	96.0	95.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410142	Kjeldahl Nitrogen	101	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410236	NO2NO3-N	98.0	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430041

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409991	Total-P	102	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P429989

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2409992	O-Phosphate-P	99.5	99.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P429955

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410148	Cylindrospermopsin	106	102	P/P	40 - 150
2410148	Desmethyl microcystin LR	110	113	P/P	40 - 150
2410148	Microcystin HilR	105	108	P/P	40 - 150
2410148	Microcystin HtyR	97.8	99.9	P/P	40 - 150
2410148	Microcystin LA	116	115	P/P	40 - 150
2410148	Microcystin LF	103	110	P/P	40 - 150
2410148	Microcystin LR	103	109	P/P	40 - 150
2410148	Microcystin LW	100	113	P/P	40 - 150
2410148	Microcystin LY	101	116	P/P	40 - 150
2410148	Microcystin RR	96.2	101	P/P	40 - 150
2410148	Microcystin WR	97.8	110	P/P	40 - 150
2410148	Microcystin YR	99.5	101	P/P	40 - 150
2410148	Nodularin-R	97.0	94.7	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P429956

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2410148	Anatoxin-a	93.4	90.4	P/P	40 - 150
2410148	Neosaxitoxin	63.2	62.4	P/P	40 - 150
2410148	Saxitoxin	70.5	65.8	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P430342

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410183	Ammonia-N	0.671	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P430050

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410142	Kjeldahl Nitrogen	0.182	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P430233

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410236	NO2NO3-N	1.54	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P430041

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409991	Total-P	2.48	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P429989

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2409992	O-Phosphate-P	0.301	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P429955

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410148	Cylindrospermopsin	3.87	Spike	P	0 - 30
2410148	Desmethyl microcystin LR	2.31	Spike	P	0 - 30
2410148	Microcystin HilR	3.27	Spike	P	0 - 30
2410148	Microcystin HtyR	2.13	Spike	P	0 - 30
2410148	Microcystin LA	1.18	Spike	P	0 - 30
2410148	Microcystin LF	7.19	Spike	P	0 - 30
2410148	Microcystin LR	5.82	Spike	P	0 - 30
2410148	Microcystin LW	12.4	Spike	P	0 - 30
2410148	Microcystin LY	13.9	Spike	P	0 - 30
2410148	Microcystin RR	5.20	Spike	P	0 - 30
2410148	Microcystin WR	12.0	Spike	P	0 - 30
2410148	Microcystin YR	1.31	Spike	P	0 - 30
2410148	Nodularin-R	2.38	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P429956

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2410148	Anatoxin-a	3.21	Spike	P	0 - 30
2410148	Neosaxitoxin	1.31	Spike	P	0 - 30
2410148	Saxitoxin	6.88	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2410182
Field Sample ID: HABCE0185_TigerLake2

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	129	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	71.6	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A119222
Included Lab Sample IDs: 2410184

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A119232
Included Lab Sample IDs: 2410182

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	111	113	P/P	50 - 160
Desmethyl microcystin LR	114	108	P/P	50 - 160
Microcystin HilR	116	114	P/P	50 - 160
Microcystin HtyR	102	105	P/P	50 - 160
Microcystin LA	134	125	P/P	50 - 160
Microcystin LF	101	109	P/P	50 - 160
Microcystin LR	111	107	P/P	50 - 160
Microcystin LW	102	112	P/P	50 - 160
Microcystin LY	140	132	P/P	50 - 160
Microcystin RR	104	108	P/P	50 - 160
Microcystin WR	110	105	P/P	50 - 160
Microcystin YR	114	104	P/P	50 - 160
Nodularin-R	102	105	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A119247
Included Lab Sample IDs: 2410182

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	94.5	93.5	P/P	50 - 160
Neosaxitoxin	83.7	82.3	P/P	50 - 160
Saxitoxin	86.3	87.5	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A119274
Included Lab Sample IDs: 2410183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A119280
Included Lab Sample IDs: 2410183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	98.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A119342
Included Lab Sample IDs: 2410183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	96.0	95.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A119375
Included Lab Sample IDs: 2410183

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.6	99.3	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	94.4	96.0	95.2			0.671
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	101	101			0.182
EPA 353.2 Rev. 2.0	NO2NO3-N	97.5	98.0	96.5			1.54
EPA 365.1 Rev. 2.0	Total-P	102	102	99.3			2.48
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	99.5	99.8			0.301
EPA 8321B	Anatoxin-a	99.0	93.4	90.4			3.21
	Cylindrospermopsin	104	106	102			3.87
	Desmethyl microcystin LR	104	110	113			2.31
	Microcystin HilR	101	105	108			3.27
	Microcystin HtyR	97.9	97.8	99.9			2.13
	Microcystin LA	125	116	115			1.18
	Microcystin LF	119	103	110			7.19
	Microcystin LR	93.1	103	109			5.82
	Microcystin LW	108	100	113			12.4
	Microcystin LY	116	101	116			13.9
	Microcystin RR	97.7	96.2	101			5.20
	Microcystin WR	100	97.8	110			12.0
	Microcystin YR	99.0	99.5	101			1.31
	Neosaxitoxin	87.6	63.2	62.4			1.31
	Nodularin-R	95.2	97.0	94.7			2.38
	Saxitoxin	83.8	70.5	65.8			6.88

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2410183
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2410183
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2410183
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2410183
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2410184
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2410182
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2410182

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	05/17/2023			05/24/2023 14:48	Ping Hua	2410183
EPA 351.2 Rev. 2.0	05/17/2023	05/18/2023 11:55	Simonne.V. Calhoun	05/19/2023 13:14	Ping Hua	2410183
EPA 353.2 Rev. 2.0	05/17/2023			05/23/2023 11:31	Beverly Y. Sanders	2410183
EPA 365.1 Rev. 2.0	05/17/2023	05/18/2023 13:13	Adam P Silver	05/19/2023 11:39	Chandler E Cox	2410183
EPA 365.1 Rev. 2.0 dissolved	05/17/2023			05/17/2023 12:58	Elise M. Gillis	2410184
EPA 8321B	05/17/2023	05/17/2023 13:00	Manjita Shrestha	05/17/2023 22:06	Manjita Shrestha	2410182
	05/17/2023	05/17/2023 13:00	Manjita Shrestha	05/18/2023 11:14	Manjita Shrestha	2410182