Chemical Analysis Report

WQAP-2023-01-12-01

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

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2022-12-19-32**
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: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 01-FEB-2023 09:50

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 Mann - McQueen Park **Collection Date/Time: 01/11/2023 12:58**

Field ID: HABCE0112_LakeMann Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2380365	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P424450	
		Cylindrospermopsin	0.31	I	ug/L	P424449	
		Desmethyl microcystin LR	0.25	U	ug/L	P424449	MS
		Microcystin HilR	0.25	U	ug/L	P424449	MS
		Microcystin HtyR	0.25	U	ug/L	P424449	MS
		Microcystin LA	0.10	U	ug/L	P424449	
		Microcystin LF	0.10	U	ug/L	P424449	
		Microcystin LR	0.25	U	ug/L	P424449	MS
		Microcystin LW	0.25	U	ug/L	P424449	
		Microcystin LY	0.10	U	ug/L	P424449	
		Microcystin RR	0.10	U	ug/L	P424449	
		Microcystin WR	0.50	U	ug/L	P424449	
		Neosaxitoxin	0.50	U	ug/L	P424450	
		Microcystin YR	0.25	U	ug/L	P424449	MS
		Saxitoxin	0.50	U	ug/L	P424450	
		Nodularin-R	0.10	U	ug/L	P424449	MS
2380366	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P425101	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P424671	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P424838	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P424647	
2380367	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P424483	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P425101

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424671

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424838

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P424647

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424483

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

Reference Method: EPA 8321B
Batch ID: P424449

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: P424450

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: P425101

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424671

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424838

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: P424647

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424483

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

Reference Method: EPA 8321B
Batch ID: P424449

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	99.9		P	40 - 150
Desmethyl microcystin LR	104		P	40 - 150
Microcystin HilR	103		P	40 - 150
Microcystin HtyR	102		P	40 - 150
Microcystin LA	102		P	40 - 150
Microcystin LF	98.7		P	40 - 150
Microcystin LR	104		P	40 - 150
Microcystin LW	92.3		P	40 - 150
Microcystin LY	106		P	40 - 150
Microcystin RR	107		P	40 - 150
Microcystin WR	96.8		P	40 - 150
Microcystin YR	109		P	40 - 150
Nodularin-R	105		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P424450

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	128		P	40 - 150
Neosaxitoxin	146		P	40 - 150
Saxitoxin	107		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P425101

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2380257	Ammonia-N	100	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424671

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2380366	Kjeldahl Nitrogen	107	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424838

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2380366	NO2NO3-N	104	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P424647

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2380378	Total-P	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424483

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2380381	O-Phosphate-P	95.7	96.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P424449

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2382734	Cylindrospermopsin	104	106	P/P	40 - 150
2382734	Desmethyl microcystin LR	161	173	F/F	40 - 150
2382734	Microcystin HilR	157	168	F/F	40 - 150
2382734	Microcystin HtyR	158	176	F/F	40 - 150
2382734	Microcystin LA	102	111	P/P	40 - 150
2382734	Microcystin LF	107	128	P/P	40 - 150
2382734	Microcystin LR	173	186	F/F	40 - 150
2382734	Microcystin LW	97.0	120	P/P	40 - 150
2382734	Microcystin LY	115	113	P/P	40 - 150
2382734	Microcystin RR	110	117	P/P	40 - 150
2382734	Microcystin WR	131	144	P/P	40 - 150
2382734	Microcystin YR	197	216	F/F	40 - 150
2382734	Nodularin-R	206	226	F/F	40 - 150

Reference Method: EPA 8321B
Batch ID: P424450

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2380281	Anatoxin-a	123	134	P/P	40 - 150
2380281	Neosaxitoxin	106	107	P/P	40 - 150
2380281	Saxitoxin	74.1	81.6	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P425101

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2380257	Ammonia-N	0.400	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424671

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2380366	Kjeldahl Nitrogen	1.12	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424838

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2380366	NO2NO3-N	1.94	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P424647

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2380378	Total-P	0.0442	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424483

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2380381	O-Phosphate-P	0.936	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P424449

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2382734	Cylindrospermopsin	2.16	Spike	P	0 - 30
2382734	Desmethyl microcystin LR	7.07	Spike	P	0 - 30
2382734	Microcystin HilR	7.21	Spike	P	0 - 30
2382734	Microcystin HtyR	10.8	Spike	P	0 - 30
2382734	Microcystin LA	8.69	Spike	P	0 - 30
2382734	Microcystin LF	17.6	Spike	P	0 - 30
2382734	Microcystin LR	6.96	Spike	P	0 - 30
2382734	Microcystin LW	21.1	Spike	P	0 - 30
2382734	Microcystin LY	1.06	Spike	P	0 - 30
2382734	Microcystin RR	6.41	Spike	P	0 - 30
2382734	Microcystin WR	9.71	Spike	P	0 - 30
2382734	Microcystin YR	9.38	Spike	P	0 - 30
2382734	Nodularin-R	8.97	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P424450

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2380281	Anatoxin-a	8.38	Spike	P	0 - 30
2380281	Neosaxitoxin	1.43	Spike	P	0 - 30
2380281	Saxitoxin	9.54	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2380365
Field Sample ID: HABCE0112_LakeMann

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Neosaxitoxin-15N7	113	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A116851
Included Lab Sample IDs: 2380365

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	81.8	79.2	P/P	50 - 160
Desmethyl microcystin LR	87.1	90.6	P/P	50 - 160
Microcystin HilR	91.9	96.9	P/P	50 - 160
Microcystin HtyR	87.9	84.3	P/P	50 - 160
Microcystin LA	90.3	89.2	P/P	50 - 160
Microcystin LF	83.6	81.8	P/P	50 - 160
Microcystin LR	91.1	93.2	P/P	50 - 160
Microcystin LW	90.2	77.8	P/P	50 - 160
Microcystin LY	92.4	99.0	P/P	50 - 160
Microcystin RR	85.2	91.0	P/P	50 - 160
Microcystin WR	88.3	91.5	P/P	50 - 160
Microcystin YR	76.8	76.1	P/P	50 - 160
Nodularin-R	88.6	88.7	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A116860
Included Lab Sample IDs: 2380365

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	118	111	P/P	50 - 160
Neosaxitoxin	138	133	P/P	50 - 160
Saxitoxin	96.4	98.9	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A116877
Included Lab Sample IDs: 2380367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.8	97.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A116980
Included Lab Sample IDs: 2380366

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A116986
Included Lab Sample IDs: 2380366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A117039
Included Lab Sample IDs: 2380366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A117140
Included Lab Sample IDs: 2380366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.5	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	97.6	100	99.8			0.400
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	107	108			1.12
EPA 353.2 Rev. 2.0	NO2NO3-N	103	104	102			1.94
EPA 365.1 Rev. 2.0	Total-P	104	105	105			0.0442
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	95.7	96.6			0.936
EPA 8321B	Anatoxin-a	128	123	134			8.38
	Cylindrospermopsin	99.9	104	106			2.16
	Desmethyl microcystin LR	104	161	173			7.07
	Microcystin HilR	103	157	168			7.21
	Microcystin HtyR	102	158	176			10.8
	Microcystin LA	102	102	111			8.69
	Microcystin LF	98.7	107	128			17.6
	Microcystin LR	104	173	186			6.96
	Microcystin LW	92.3	97.0	120			21.1
	Microcystin LY	106	115	113			1.06
	Microcystin RR	107	110	117			6.41
	Microcystin WR	96.8	131	144			9.71
	Microcystin YR	109	197	216			9.38
	Neosaxitoxin	146	106	107			1.43
	Nodularin-R	105	206	226			8.97
	Saxitoxin	107	74.1	81.6			9.54

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2380366
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2380366
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2380366
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2380366
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2380367
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2380365
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2380365

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	01/12/2023			01/27/2023 14:03	Ping Hua	2380366
EPA 351.2 Rev. 2.0	01/12/2023	01/19/2023 12:53	Judith K. Clark	01/23/2023 12:43	Samantha L Bates	2380366
EPA 353.2 Rev. 2.0	01/12/2023			01/19/2023 09:42	Beverly Y. Sanders	2380366
EPA 365.1 Rev. 2.0	01/12/2023	01/18/2023 15:47	Adam P Silver	01/19/2023 13:25	James L Waggerby	2380366
EPA 365.1 Rev. 2.0 dissolved	01/12/2023			01/12/2023 14:06	Elise M. Gillis	2380367
EPA 8321B	01/12/2023	01/12/2023 12:00	Manjita Shrestha	01/12/2023 18:02	Manjita Shrestha	2380365
	01/12/2023	01/12/2023 12:00	Manjita Shrestha	01/13/2023 06:44	Manjita Shrestha	2380365