Chemical Analysis Report

WQAP-2023-04-04-01

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

Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2023-03-27-15**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 20-APR-2023 09:08

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: 04/03/2023 12:14**

Field ID: HABCE0185_TigerLake2 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2397515	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P427990	
		Cylindrospermopsin	0.10	U	ug/L	P427989	
		Desmethyl microcystin LR	0.25	U	ug/L	P427989	
		Microcystin HilR	0.25	U	ug/L	P427989	
		Microcystin HtyR	0.25	U	ug/L	P427989	
		Microcystin LA	0.33	I	ug/L	P427989	
		Microcystin LF	0.24	I	ug/L	P427989	
		Microcystin LR	2.0		ug/L	P427989	
		Microcystin LW	0.25	U	ug/L	P427989	
		Microcystin LY	0.45		ug/L	P427989	
		Microcystin RR	0.25	I	ug/L	P427989	
		Microcystin WR	0.50	U	ug/L	P427989	
		Neosaxitoxin	0.50	U	ug/L	P427990	
		Microcystin YR	0.25	U	ug/L	P427989	
		Saxitoxin	0.50	U	ug/L	P427990	
		Nodularin-R	0.10	U	ug/L	P427989	
2397516	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P428118	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.1		mg N/L	P428097	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P428130	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P428288	
2397517	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P428003	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428118

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428097

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428130

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428288

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428003

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

Reference Method: EPA 8321B
Batch ID: P427989

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: P427990

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: P428118

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428097

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428130

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: P428288

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: P428003

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

Reference Method: EPA 8321B
Batch ID: P427989

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	91.0		P	40 - 150
Desmethyl microcystin LR	105		P	40 - 150
Microcystin HilR	109		P	40 - 150
Microcystin HtyR	107		P	40 - 150
Microcystin LA	119		P	40 - 150
Microcystin LF	116		P	40 - 150
Microcystin LR	104		P	40 - 150
Microcystin LW	120		P	40 - 150
Microcystin LY	120		P	40 - 150
Microcystin RR	102		P	40 - 150
Microcystin WR	96.8		P	40 - 150
Microcystin YR	116		P	40 - 150
Nodularin-R	100		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P427990

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	70.8		P	40 - 150
Neosaxitoxin	95.4		P	40 - 150
Saxitoxin	77.2		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428118

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2397776	Ammonia-N	98.6	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428097

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2397549	Kjeldahl Nitrogen	107	96.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428130

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2397428	NO2NO3-N	97.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428288

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2399030	Total-P	99.8	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428003

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2397778	O-Phosphate-P	100	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P427989

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2397482	Cylindrospermopsin	95.1	96.1	P/P	40 - 150
2397482	Desmethyl microcystin LR	100	103	P/P	40 - 150
2397482	Microcystin HilR	98.3	116	P/P	40 - 150
2397482	Microcystin HtyR	110	116	P/P	40 - 150
2397482	Microcystin LA	127	134	P/P	40 - 150
2397482	Microcystin LF	114	120	P/P	40 - 150
2397482	Microcystin LR	107	112	P/P	40 - 150
2397482	Microcystin LW	123	135	P/P	40 - 150
2397482	Microcystin LY	91.2	109	P/P	40 - 150
2397482	Microcystin RR	100	103	P/P	40 - 150
2397482	Microcystin WR	109	119	P/P	40 - 150
2397482	Microcystin YR	109	118	P/P	40 - 150
2397482	Nodularin-R	105	107	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P427990

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2397482	Anatoxin-a	66.1	67.0	P/P	40 - 150
2397482	Neosaxitoxin	73.3	70.4	P/P	40 - 150
2397482	Saxitoxin	62.3	60.6	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428118

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2397776	Ammonia-N	0.158	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428097

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2397549	Kjeldahl Nitrogen	7.65	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428130

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2397428	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428288

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2399030	Total-P	0.261	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428003

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2397778	O-Phosphate-P	1.10	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P427989

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2397482	Cylindrospermopsin	1.03	Spike	P	0 - 30
2397482	Desmethyl microcystin LR	2.11	Spike	P	0 - 30
2397482	Microcystin HilR	16.7	Spike	P	0 - 30
2397482	Microcystin HtyR	5.87	Spike	P	0 - 30
2397482	Microcystin LA	5.56	Spike	P	0 - 30
2397482	Microcystin LF	5.30	Spike	P	0 - 30
2397482	Microcystin LR	4.52	Spike	P	0 - 30
2397482	Microcystin LW	9.71	Spike	P	0 - 30
2397482	Microcystin LY	17.4	Spike	P	0 - 30
2397482	Microcystin RR	3.12	Spike	P	0 - 30
2397482	Microcystin WR	8.74	Spike	P	0 - 30
2397482	Microcystin YR	8.27	Spike	P	0 - 30
2397482	Nodularin-R	2.04	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P427990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2397482	Anatoxin-a	1.33	Spike	P	0 - 30
2397482	Neosaxitoxin	3.94	Spike	P	0 - 30
2397482	Saxitoxin	2.76	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2397515
Field Sample ID: HABCE0185_TigerLake2

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	111	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	63.4	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A118364
Included Lab Sample IDs: 2397517

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A118397
Included Lab Sample IDs: 2397515

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	88.0	84.6	P/P	50 - 160
Desmethyl microcystin LR	91.5	96.1	P/P	50 - 160
Microcystin HilR	98.9	99.2	P/P	50 - 160
Microcystin HtyR	103	104	P/P	50 - 160
Microcystin LA	104	126	P/P	50 - 160
Microcystin LF	117	112	P/P	50 - 160
Microcystin LR	96.4	100	P/P	50 - 160
Microcystin LW	104	101	P/P	50 - 160
Microcystin LY	89.4	94.0	P/P	50 - 160
Microcystin RR	93.1	96.4	P/P	50 - 160
Microcystin WR	96.0	101	P/P	50 - 160
Microcystin YR	104	98.6	P/P	50 - 160
Nodularin-R	93.1	98.4	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A118399
Included Lab Sample IDs: 2397515

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	66.0	65.8	P/P	50 - 160
Neosaxitoxin	86.2	83.1	P/P	50 - 160
Saxitoxin	69.3	68.3	P/P	50 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A118409
Included Lab Sample IDs: 2397516

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A118411
Included Lab Sample IDs: 2397516

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A118450
Included Lab Sample IDs: 2397516

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.8	96.5	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A118520
Included Lab Sample IDs: 2397516

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	98.4	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	100	98.6	98.8			0.158
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.0	107	96.8			7.65
EPA 353.2 Rev. 2.0	NO2NO3-N	102	97.2				0.0
EPA 365.1 Rev. 2.0	Total-P	100	99.8	99.6			0.261
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	100	99.1			1.10
EPA 8321B	Anatoxin-a	70.8	66.1	67.0			1.33
	Cylindrospermopsin	91.0	95.1	96.1			1.03
	Desmethyl microcystin LR	105	100	103			2.11
	Microcystin HilR	109	98.3	116			16.7
	Microcystin HtyR	107	110	116			5.87
	Microcystin LA	119	127	134			5.56
	Microcystin LF	116	114	120			5.30
	Microcystin LR	104	107	112			4.52
	Microcystin LW	120	123	135			9.71
	Microcystin LY	120	91.2	109			17.4
	Microcystin RR	102	100	103			3.12
	Microcystin WR	96.8	109	119			8.74
	Microcystin YR	116	109	118			8.27
	Neosaxitoxin	95.4	73.3	70.4			3.94
	Nodularin-R	100	105	107			2.04
	Saxitoxin	77.2	62.3	60.6			2.76

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2397516
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2397516
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2397516
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2397516
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2397517
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2397515
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2397515

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	04/04/2023			04/06/2023 10:22	Ping Hua	2397516
EPA 351.2 Rev. 2.0	04/04/2023	04/06/2023 13:00	Simonne.V. Calhoun	04/07/2023 13:52	Judith K. Clark	2397516
EPA 353.2 Rev. 2.0	04/04/2023			04/06/2023 09:44	Beverly Y. Sanders	2397516
EPA 365.1 Rev. 2.0	04/04/2023	04/11/2023 15:03	Adam P Silver	04/12/2023 09:25	James L Waggerby	2397516
EPA 365.1 Rev. 2.0 dissolved	04/04/2023			04/04/2023 14:02	James L Waggerby	2397517
EPA 8321B	04/04/2023	04/05/2023 11:59	Manjita Shrestha	04/05/2023 15:51	Manjita Shrestha	2397515
	04/04/2023	04/05/2023 11:59	Manjita Shrestha	04/05/2023 23:56	Manjita Shrestha	2397515