

Chemical Analysis Report

WQAP-2022-01-04-01

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-2021-12-13-22**
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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 24-JAN-2022 13:33



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 - East Shore

Collection Date/Time: 01/03/2022 13:00

Field ID: HABCE0105_TigerLake

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2297082	EPA 8321B	Anatoxin-a	0.25	UJ	ug/L	P408050	MS
		Cylindrospermopsin	0.10	U	ug/L	P408050	
		Desmethyl microcystin LR	0.25	U	ug/L	P408050	
		Microcystin HilR**	0.25	U	ug/L	P408050	
		Microcystin HtyR**	0.25	U	ug/L	P408050	
		Microcystin LA	0.19	I	ug/L	P408050	
		Microcystin LF	0.10	U	ug/L	P408050	
		Microcystin LR	1.3		ug/L	P408050	
		Microcystin LW	0.25	U	ug/L	P408050	
		Microcystin LY	0.23	I	ug/L	P408050	
		Microcystin RR	0.12	I	ug/L	P408050	
		Microcystin WR	0.50	U	ug/L	P408050	
		Microcystin YR	0.25	U	ug/L	P408050	
		Nodularin-R**	0.10	U	ug/L	P408050	
2297083	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P408294	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P408284	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P408221	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P408340	MS
2297084	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P408077	

Ref. Method and Comment:

EPA 8321B: Refer to the Lab Analysis Report for an explanation of QC Codes.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408294

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408284

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408221

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408340

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408077

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

Reference Method: EPA 8321B
Batch ID: P408050

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 H11R	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: P408294

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: P408284

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408221

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408340

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	108		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408077

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

Reference Method: EPA 8321B
Batch ID: P408050

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	76.9		P	40 - 150
Cylindrospermopsin	96.4		P	40 - 150
Desmethyl microcystin LR	87.6		P	40 - 150
Microcystin HIR	97.4		P	40 - 150
Microcystin HtyR	105		P	40 - 150
Microcystin LA	104		P	40 - 150
Microcystin LF	109		P	40 - 150
Microcystin LR	119		P	40 - 150
Microcystin LW	90.6		P	40 - 150
Microcystin LY	115		P	40 - 150
Microcystin RR	106		P	40 - 150
Microcystin WR	99.4		P	40 - 150
Microcystin YR	111		P	40 - 150
Nodularin-R	95.7		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408294

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297089	Ammonia-N	96.6	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408284

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297347	Kjeldahl Nitrogen	102	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408221

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297039	NO2NO3-N	96.7	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408340

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297090	Total-P	112	110	F/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408077

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297076	O-Phosphate-P	102	102	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P408050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2297082	Anatoxin-a	182	190	F/F	40 - 150
2297082	Cylindrospermopsin	113	110	P/P	40 - 150
2297082	Desmethyl microcystin LR	102	101	P/P	40 - 150
2297082	Microcystin HiLR	95.4	98.0	P/P	40 - 150
2297082	Microcystin HtyR	104	114	P/P	40 - 150
2297082	Microcystin LA	106	102	P/P	40 - 150
2297082	Microcystin LF	107	110	P/P	40 - 150
2297082	Microcystin LR	123	129	P/P	40 - 150
2297082	Microcystin LW	86.7	86.3	P/P	40 - 150
2297082	Microcystin LY	123	111	P/P	40 - 150
2297082	Microcystin RR	109	107	P/P	40 - 150
2297082	Microcystin WR	90.5	96.0	P/P	40 - 150
2297082	Microcystin YR	114	124	P/P	40 - 150
2297082	Nodularin-R	102	104	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P408294

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297089	Ammonia-N	0.308	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P408284

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297347	Kjeldahl Nitrogen	0.684	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P408221

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297039	NO2NO3-N	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P408340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297090	Total-P	1.47	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P408077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297076	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P408050

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2297082	Anatoxin-a	4.05	Spike	P	0 - 30
2297082	Cylindrospermopsin	2.47	Spike	P	0 - 30
2297082	Desmethyl microcystin LR	0.809	Spike	P	0 - 30
2297082	Microcystin HtIR	2.78	Spike	P	0 - 30
2297082	Microcystin HtyR	9.30	Spike	P	0 - 30
2297082	Microcystin LA	3.60	Spike	P	0 - 30
2297082	Microcystin LF	3.30	Spike	P	0 - 30
2297082	Microcystin LR	4.18	Spike	P	0 - 30
2297082	Microcystin LW	0.468	Spike	P	0 - 30
2297082	Microcystin LY	9.34	Spike	P	0 - 30
2297082	Microcystin RR	1.68	Spike	P	0 - 30
2297082	Microcystin WR	5.85	Spike	P	0 - 30
2297082	Microcystin YR	8.26	Spike	P	0 - 30
2297082	Nodularin-R	1.40	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: 2297082

Field Sample ID: HABCE0105_TigerLake

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	119	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	110	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A109660

Included Lab Sample IDs: 2297084

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

Reference Method: EPA 8321B

Run ID: A109716

Included Lab Sample IDs: 2297082

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	82.5	80.1	P/P	50 - 160
Cylindrospermopsin	97.6	94.8	P/P	50 - 160
Desmethyl microcystin LR	82.7	85.2	P/P	50 - 160
Microcystin H1R	88.0	96.1	P/P	50 - 160
Microcystin HtyR	92.8	97.3	P/P	50 - 160
Microcystin LA	96.2	93.3	P/P	50 - 160
Microcystin LF	96.5	99.7	P/P	50 - 160
Microcystin LR	105	108	P/P	50 - 160
Microcystin LW	79.0	86.5	P/P	50 - 160
Microcystin LY	113	105	P/P	50 - 160
Microcystin RR	98.9	97.1	P/P	50 - 160
Microcystin WR	87.6	93.0	P/P	50 - 160
Microcystin YR	92.8	109	P/P	50 - 160
Nodularin-R	92.1	93.7	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109728

Included Lab Sample IDs: 2297083

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A109770

Included Lab Sample IDs: 2297083

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.2	97.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109815

Included Lab Sample IDs: 2297083

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.5	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109865

Included Lab Sample IDs: 2297083

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	105	106	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	97.6	96.6	97.2			0.308
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	102	101			0.684
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	96.7	97.7			1.01
EPA 365.1 Rev. 2.0	Total-P	108	112	110			1.47
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	102	102			0.0
EPA 8321B	Anatoxin-a	76.9	182	190			4.05
	Cylindrospermopsin	96.4	113	110			2.47
	Desmethyl microcystin LR	87.6	102	101			0.809
	Microcystin HiLR	97.4	95.4	98.0			2.78
	Microcystin HtyR	105	104	114			9.30
	Microcystin LA	104	106	102			3.60
	Microcystin LF	109	107	110			3.30
	Microcystin LR	119	123	129			4.18
	Microcystin LW	90.6	86.7	86.3			0.468
	Microcystin LY	115	123	111			9.34
	Microcystin RR	106	109	107			1.68
	Microcystin WR	99.4	90.5	96.0			5.85
	Microcystin YR	111	114	124			8.26
	Nodularin-R	95.7	102	104			1.40

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2297083
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2297083
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2297083
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2297083
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2297084
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2297082

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	01/04/2022			01/10/2022 11:26	Ping Hua	2297083
EPA 351.2 Rev. 2.0	01/04/2022	01/11/2022 11:32	Samantha L Bates	01/12/2022 10:45	Alexandra J Mattheus	2297083
EPA 353.2 Rev. 2.0	01/04/2022			01/07/2022 10:25	Beverly Y. Sanders	2297083
EPA 365.1 Rev. 2.0	01/04/2022	01/12/2022 15:15	Simonne.V. Calhoun	01/13/2022 15:03	Shengyu Ding	2297083
EPA 365.1 Rev. 2.0 dissolved	01/04/2022			01/04/2022 13:05	Blanca Fach	2297084
EPA 8321B	01/04/2022	01/06/2022 11:30	Juyoung Kim	01/07/2022 07:50	Juyoung Kim	2297082