Chemical Analysis Report

WQAP-2021-08-26-02

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-2021-08-02-13**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd Ste 232
Orlando, FL 32803
Attn: Leif Boman

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: Colin Wright, Program Administrator

Date Certified: 21-SEP-2021 10:51

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 Rowena - NE Corner **Collection Date/Time: 08/25/2021 12:25**

Field ID: HABCE0085_LakeRowena2 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2272096	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P402946	
		Cylindrospermopsin	0.12	I	ug/L	P402946	
		Desmethyl microcystin LR	0.25	U	ug/L	P402946	
		Microcystin HilR**	0.25	U	ug/L	P402946	
		Microcystin HtyR**	0.25	U	ug/L	P402946	
		Microcystin LA	0.10	U	ug/L	P402946	
		Microcystin LF	0.10	U	ug/L	P402946	
		Microcystin LR	0.25	U	ug/L	P402946	
		Microcystin LW	0.25	U	ug/L	P402946	
		Microcystin LY	0.10	U	ug/L	P402946	
		Microcystin RR	0.10	U	ug/L	P402946	
		Microcystin WR	0.50	U	ug/L	P402946	
		Microcystin YR	0.25	U	ug/L	P402946	
		Nodularin-R**	0.10	U	ug/L	P402946	
2272097	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P403209	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.71		mg N/L	P403312	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P403183	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P403140	
2272098	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P403037	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403209

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403312

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403183

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403140

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403037

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

Reference Method: EPA 8321B
Batch ID: P402946

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 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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403209

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403312

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403183

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403140

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	106		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403037

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

Reference Method: EPA 8321B
Batch ID: P402946

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	103		P	40 - 150
Cylindrospermopsin	93.3		P	40 - 150
Desmethyl microcystin LR	85.1		P	40 - 150
Microcystin HilR	86.3		P	40 - 150
Microcystin HtyR	87.7		P	40 - 150
Microcystin LA	93.8		P	40 - 150
Microcystin LF	84.8		P	40 - 150
Microcystin LR	86.1		P	40 - 150
Microcystin LW	83.0		P	40 - 150
Microcystin LY	88.3		P	40 - 150
Microcystin RR	93.4		P	40 - 150
Microcystin WR	86.8		P	40 - 150
Microcystin YR	86.2		P	40 - 150
Nodularin-R	89.8		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403209

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272078	Ammonia-N	97.0	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403312

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272078	Kjeldahl Nitrogen	98.9	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403183

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272078	NO2NO3-N	99.6	96.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403140

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272132	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403037

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2272098	O-Phosphate-P	97.5	97.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P402946

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2271724	Anatoxin-a	92.0	80.7	P/P	40 - 150
2271724	Cylindrospermopsin	79.4	73.4	P/P	40 - 150
2271724	Desmethyl microcystin LR	67.0	67.7	P/P	40 - 150
2271724	Microcystin HilR	69.0	69.6	P/P	40 - 150
2271724	Microcystin HtyR	65.5	65.7	P/P	40 - 150
2271724	Microcystin LA	77.2	73.9	P/P	40 - 150
2271724	Microcystin LF	58.3	50.4	P/P	40 - 150
2271724	Microcystin LR	65.8	66.2	P/P	40 - 150
2271724	Microcystin LW	56.2	57.1	P/P	40 - 150
2271724	Microcystin LY	79.9	72.2	P/P	40 - 150
2271724	Microcystin RR	79.4	70.7	P/P	40 - 150
2271724	Microcystin WR	63.1	61.6	P/P	40 - 150
2271724	Microcystin YR	66.2	67.0	P/P	40 - 150
2271724	Nodularin-R	77.1	70.4	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P403209

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272078	Ammonia-N	1.26	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P403312

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272078	Kjeldahl Nitrogen	4.24	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P403183

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272078	NO2NO3-N	2.94	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P403140

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272132	Total-P	1.02	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P403037

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2272098	O-Phosphate-P	0.103	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P402946

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2271724	Anatoxin-a	13.1	Spike	P	0 - 30
2271724	Cylindrospermopsin	7.75	Spike	P	0 - 30
2271724	Desmethyl microcystin LR	1.01	Spike	P	0 - 30
2271724	Microcystin HilR	0.911	Spike	P	0 - 30
2271724	Microcystin HtyR	0.210	Spike	P	0 - 30
2271724	Microcystin LA	4.40	Spike	P	0 - 30
2271724	Microcystin LF	14.5	Spike	P	0 - 30
2271724	Microcystin LR	0.710	Spike	P	0 - 30
2271724	Microcystin LW	1.48	Spike	P	0 - 30
2271724	Microcystin LY	10.0	Spike	P	0 - 30
2271724	Microcystin RR	11.6	Spike	P	0 - 30
2271724	Microcystin WR	2.37	Spike	P	0 - 30
2271724	Microcystin YR	1.11	Spike	P	0 - 30
2271724	Nodularin-R	9.13	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: 2272096
Field Sample ID: HABCE0085_LakeRowena2

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	103	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	80.9	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A107484
Included Lab Sample IDs: 2272098

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	99.7	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A107493
Included Lab Sample IDs: 2272096

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	78.4	80.6	P/P	50 - 160
Cylindrospermopsin	91.1	89.2	P/P	50 - 160
Desmethyl microcystin LR	78.6	79.4	P/P	50 - 160
Microcystin HilR	85.6	84.6	P/P	50 - 160
Microcystin HtyR	80.0	86.0	P/P	50 - 160
Microcystin LA	109	114	P/P	50 - 160
Microcystin LF	85.0	87.2	P/P	50 - 160
Microcystin LR	81.6	85.4	P/P	50 - 160
Microcystin LW	89.0	88.4	P/P	50 - 160
Microcystin LY	101	101	P/P	50 - 160
Microcystin RR	89.0	94.2	P/P	50 - 160
Microcystin WR	79.8	78.3	P/P	50 - 160
Microcystin YR	77.2	79.1	P/P	50 - 160
Nodularin-R	83.4	83.3	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A107555
Included Lab Sample IDs: 2272097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	99.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A107569
Included Lab Sample IDs: 2272097

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A107570
Included Lab Sample IDs: 2272097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A107640
Included Lab Sample IDs: 2272097

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.5	97.2	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	99.0	97.0	98.4			1.26
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.2	98.9	107			4.24
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	99.6	96.6			2.94
EPA 365.1 Rev. 2.0	Total-P	106	105	104			1.02
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	97.5	97.6			0.103
EPA 8321B	Anatoxin-a	103	92.0	80.7			13.1
	Cylindrospermopsin	93.3	79.4	73.4			7.75
	Desmethyl microcystin LR	85.1	67.0	67.7			1.01
	Microcystin HilR	86.3	69.0	69.6			0.911
	Microcystin HtyR	87.7	65.5	65.7			0.210
	Microcystin LA	93.8	77.2	73.9			4.40
	Microcystin LF	84.8	58.3	50.4			14.5
	Microcystin LR	86.1	65.8	66.2			0.710
	Microcystin LW	83.0	56.2	57.1			1.48
	Microcystin LY	88.3	79.9	72.2			10.0
	Microcystin RR	93.4	79.4	70.7			11.6
	Microcystin WR	86.8	63.1	61.6			2.37
	Microcystin YR	86.2	66.2	67.0			1.11
	Nodularin-R	89.8	77.1	70.4			9.13

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2272097
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2272097
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2272097
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2272097
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2272098
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2272096

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	08/26/2021			08/31/2021 11:56	Ping Hua	2272097
EPA 351.2 Rev. 2.0	08/26/2021	09/02/2021 16:07	Benjamin T. Nordmann	09/03/2021 10:55	Alexandra J Mattheus	2272097
EPA 353.2 Rev. 2.0	08/26/2021			08/30/2021 10:21	Beverly Y. Sanders	2272097
EPA 365.1 Rev. 2.0	08/26/2021	08/30/2021 14:00	Simonne.V. Calhoun	08/31/2021 14:20	Shengyu Ding	2272097
EPA 365.1 Rev. 2.0 dissolved	08/26/2021			08/26/2021 14:28	James L Waggerby	2272098
EPA 8321B	08/26/2021	08/26/2021 10:30	Juyoung Kim	08/26/2021 20:29	Juyoung Kim	2272096