Chemical Analysis Report

WQAP-2021-06-10-02

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-2021-06-07-22**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 02-JUL-2021 08:22

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 Eustis @ NW Corner **Collection Date/Time: 06/09/2021 11:37**

Field ID: HABCE0075_Lake Eustis Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2254370	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P399484	
		Cylindrospermopsin	0.10	U	ug/L	P399484	
		Desmethyl microcystin LR	0.25	U	ug/L	P399484	
		Microcystin HilR**	0.25	U	ug/L	P399484	
		Microcystin HtyR**	0.25	U	ug/L	P399484	
		Microcystin LA	0.10	U	ug/L	P399484	
		Microcystin LF	0.10	U	ug/L	P399484	
		Microcystin LR	0.25	U	ug/L	P399484	
		Microcystin LW	0.25	U	ug/L	P399484	
		Microcystin LY	0.10	U	ug/L	P399484	
		Microcystin RR	0.10	U	ug/L	P399484	
		Microcystin WR	0.50	U	ug/L	P399484	
		Microcystin YR	0.25	U	ug/L	P399484	
		Nodularin-R**	0.10	U	ug/L	P399484	
2254378	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P399990	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P399715	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P399692	
	EPA 365.1 Rev. 2.0	Total-P	0.017		mg P/L	P400124	
2254380	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P399512	

Ref. Method and Comment:
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Dead River - Residential Canal S of US 441 **Collection Date/Time: 06/09/2021 12:08**

Field ID: HABCE0081_DeadRiver Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2254371	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P399484	
		Cylindrospermopsin	0.10	U	ug/L	P399484	
		Desmethyl microcystin LR	0.25	U	ug/L	P399484	
		Microcystin HilR**	0.25	U	ug/L	P399484	
		Microcystin HtyR**	0.25	U	ug/L	P399484	
		Microcystin LA	0.10	U	ug/L	P399484	
		Microcystin LF	0.10	U	ug/L	P399484	
		Microcystin LR	0.27	I	ug/L	P399484	
		Microcystin LW	0.25	U	ug/L	P399484	
		Microcystin LY	0.10	U	ug/L	P399484	
		Microcystin RR	0.10	U	ug/L	P399484	
		Microcystin WR	0.50	U	ug/L	P399484	
		Microcystin YR	0.25	U	ug/L	P399484	
		Nodularin-R**	0.10	U	ug/L	P399484	
2254379	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P399990	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.9		mg N/L	P399715	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P399692	
	EPA 365.1 Rev. 2.0	Total-P	0.031		mg P/L	P400124	
2254381	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P399512	

Ref. Method and Comment:
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399990

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399715

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399692

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400124

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

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

Reference Method: EPA 8321B
Batch ID: P399484

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: P399990

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399715

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	92.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399692

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: P400124

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

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

Reference Method: EPA 8321B
Batch ID: P399484

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	96.2		P	40 - 150
Cylindrospermopsin	103		P	40 - 150
Desmethyl microcystin LR	88.7		P	40 - 150
Microcystin HilR	85.4		P	40 - 150
Microcystin HtyR	87.4		P	40 - 150
Microcystin LA	103		P	40 - 150
Microcystin LF	105		P	40 - 150
Microcystin LR	80.9		P	40 - 150
Microcystin LW	91.5		P	40 - 150
Microcystin LY	101		P	40 - 150
Microcystin RR	102		P	40 - 150
Microcystin WR	87.2		P	40 - 150
Microcystin YR	93.2		P	40 - 150
Nodularin-R	103		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399990

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254344	Ammonia-N	98.0	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399692

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254350	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400124

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254350	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254249	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P399484

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2254196	Anatoxin-a	104	112	P/P	40 - 150
2254196	Cylindrospermopsin	94.4	101	P/P	40 - 150
2254196	Desmethyl microcystin LR	77.2	83.9	P/P	40 - 150
2254196	Microcystin HilR	87.1	90.5	P/P	40 - 150
2254196	Microcystin HtyR	84.7	93.3	P/P	40 - 150
2254196	Microcystin LA	97.7	106	P/P	40 - 150
2254196	Microcystin LF	95.5	103	P/P	40 - 150
2254196	Microcystin LR	77.8	84.6	P/P	40 - 150
2254196	Microcystin LW	85.7	86.6	P/P	40 - 150
2254196	Microcystin LY	98.4	99.0	P/P	40 - 150
2254196	Microcystin RR	104	108	P/P	40 - 150
2254196	Microcystin WR	81.5	88.9	P/P	40 - 150
2254196	Microcystin YR	91.7	95.3	P/P	40 - 150
2254196	Nodularin-R	98.2	99.8	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P399990

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254344	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399715

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254378	Kjeldahl Nitrogen	5.32	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399692

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254350	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400124

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254350	Total-P	1.25	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399512

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254249	O-Phosphate-P	0.797	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P399484

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2254196	Anatoxin-a	7.15	Spike	P	0 - 30
2254196	Cylindrospermopsin	6.96	Spike	P	0 - 30
2254196	Desmethyl microcystin LR	8.31	Spike	P	0 - 30
2254196	Microcystin HilR	3.81	Spike	P	0 - 30
2254196	Microcystin HtyR	9.67	Spike	P	0 - 30
2254196	Microcystin LA	7.74	Spike	P	0 - 30
2254196	Microcystin LF	7.19	Spike	P	0 - 30
2254196	Microcystin LR	8.37	Spike	P	0 - 30
2254196	Microcystin LW	0.960	Spike	P	0 - 30
2254196	Microcystin LY	0.554	Spike	P	0 - 30
2254196	Microcystin RR	3.23	Spike	P	0 - 30
2254196	Microcystin WR	8.59	Spike	P	0 - 30
2254196	Microcystin YR	3.81	Spike	P	0 - 30
2254196	Nodularin-R	1.61	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: 2254370
Field Sample ID: HABCE0075_Lake Eustis

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	97.2	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	83.3	P	30 - 160

Lab Sample ID: 2254371
Field Sample ID: HABCE0081_DeadRiver

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	105	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	102	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A105989
Included Lab Sample IDs: 2254380, 2254381

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	100	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A106002
Included Lab Sample IDs: 2254370, 2254371

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	77.7	76.3	P/P	50 - 160
Cylindrospermopsin	106	109	P/P	50 - 160
Desmethyl microcystin LR	89.8	87.6	P/P	50 - 160
Microcystin HilR	94.0	96.4	P/P	50 - 160
Microcystin HtyR	95.4	89.4	P/P	50 - 160
Microcystin LA	109	120	P/P	50 - 160
Microcystin LF	116	113	P/P	50 - 160
Microcystin LR	90.5	97.7	P/P	50 - 160
Microcystin LW	92.1	97.6	P/P	50 - 160
Microcystin LY	115	114	P/P	50 - 160
Microcystin RR	107	112	P/P	50 - 160
Microcystin WR	89.2	74.4	P/P	50 - 160
Microcystin YR	111	110	P/P	50 - 160
Nodularin-R	111	106	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A106065
Included Lab Sample IDs: 2254378, 2254379

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A106117
Included Lab Sample IDs: 2254378, 2254379

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	90.6	94.9	P/P	90 - 110
Kjeldahl Nitrogen	94.8	90.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A106195
Included Lab Sample IDs: 2254378, 2254379

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.6	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A106257
Included Lab Sample IDs: 2254378, 2254379

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	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	101	98.0	98.0			0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	92.7					5.32
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	100	100			0.0
EPA 365.1 Rev. 2.0	Total-P	99.0	102	103			1.25
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	104	100	101			0.797
EPA 8321B	Anatoxin-a	96.2	104	112			7.15
	Cylindrospermopsin	103	94.4	101			6.96
	Desmethyl microcystin LR	88.7	77.2	83.9			8.31
	Microcystin HilR	85.4	87.1	90.5			3.81
	Microcystin HtyR	87.4	84.7	93.3			9.67
	Microcystin LA	103	97.7	106			7.74
	Microcystin LF	105	95.5	103			7.19
	Microcystin LR	80.9	77.8	84.6			8.37
	Microcystin LW	91.5	85.7	86.6			0.960
	Microcystin LY	101	98.4	99.0			0.554
	Microcystin RR	102	104	108			3.23
	Microcystin WR	87.2	81.5	88.9			8.59
	Microcystin YR	93.2	91.7	95.3			3.81
	Nodularin-R	103	98.2	99.8			1.61

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2254378, 2254379
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2254378, 2254379
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2254378, 2254379
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2254378, 2254379
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2254380, 2254381
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2254370, 2254371

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	06/10/2021			06/21/2021 12:19	Ping Hua	2254378
	06/10/2021			06/21/2021 12:21	Ping Hua	2254379
EPA 351.2 Rev. 2.0	06/10/2021	06/15/2021 14:18	Benjamin T. Nordmann	06/16/2021 11:38	Virginia P. Brown	2254378
	06/10/2021	06/15/2021 14:18	Benjamin T. Nordmann	06/16/2021 11:46	Virginia P. Brown	2254379
EPA 353.2 Rev. 2.0	06/10/2021			06/15/2021 10:07	Beverly Y. Sanders	2254378
	06/10/2021			06/15/2021 10:08	Beverly Y. Sanders	2254379
EPA 365.1 Rev. 2.0	06/10/2021	06/23/2021 13:50	Shengyu Ding	06/24/2021 13:50	Shengyu Ding	2254378
	06/10/2021	06/23/2021 13:50	Shengyu Ding	06/24/2021 13:51	Shengyu Ding	2254379
EPA 365.1 Rev. 2.0 dissolved	06/10/2021			06/10/2021 13:49	Ping Hua	2254380
	06/10/2021			06/10/2021 13:50	Ping Hua	2254381
EPA 8321B	06/10/2021	06/10/2021 12:00	Pramila Ghimire	06/10/2021 20:25	Pramila Ghimire	2254370
	06/10/2021	06/10/2021 12:00	Pramila Ghimire	06/10/2021 20:41	Pramila Ghimire	2254371