

Chemical Analysis Report

WQAP-2021-04-09-03

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-2021-04-05-17**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Date Certified: 28-APR-2021 09:49



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 Toho - Marina Dock

Collection Date/Time: 04/08/2021 13:21

Field ID: HABCE0080_LakeToho

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2238226	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P396281	
		Cylindrospermopsin	0.25	U	ug/L	P396281	
		Desmethyl microcystin LR	0.25	U	ug/L	P396281	
		Microcystin HIR**	0.25	U	ug/L	P396281	
		Microcystin HtyR**	0.25	U	ug/L	P396281	
		Microcystin LA	0.25	U	ug/L	P396281	
		Microcystin LF	0.25	U	ug/L	P396281	
		Microcystin LR	0.28	I	ug/L	P396281	
		Microcystin LW	0.25	U	ug/L	P396281	
		Microcystin LY	0.25	U	ug/L	P396281	
		Microcystin RR	0.25	U	ug/L	P396281	
		Microcystin WR	0.50	U	ug/L	P396281	
		Microcystin YR	0.25	U	ug/L	P396281	
		Nodularin-R**	0.25	U	ug/L	P396281	
2238227	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P396767	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P396556	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P396364	
	EPA 365.1 Rev. 2.0	Total-P	0.072		mg P/L	P396552	
2238228	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P396302	

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: P396767

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396556

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396364

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396552

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396302

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

Reference Method: EPA 8321B
Batch ID: P396281

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HIR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P396767

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P396556

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396364

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	93.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396552

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: P396302

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P396281

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	140		P	40 - 150
Cylindrospermopsin	98.9		P	40 - 150
Desmethyl microcystin LR	99.0		P	40 - 150
Microcystin HIR	92.2		P	40 - 150
Microcystin HtyR	102		P	40 - 150
Microcystin LA	107		P	40 - 150
Microcystin LF	105		P	40 - 150
Microcystin LR	95.3		P	40 - 150
Microcystin LW	105		P	40 - 150
Microcystin LY	100		P	40 - 150
Microcystin RR	96.9		P	40 - 150
Microcystin WR	95.8		P	40 - 150
Microcystin YR	96.9		P	40 - 150
Nodularin-R	97.9		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P396767

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238239	Ammonia-N	96.6	96.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P396364

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238227	NO2NO3-N	99.0	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P396552

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238205	Total-P	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P396302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238142	O-Phosphate-P	98.3	98.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P396281

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2238134	Anatoxin-a	132	121	P/P	40 - 150
2238134	Cylindrospermopsin	85.5	77.9	P/P	40 - 150
2238134	Desmethyl microcystin LR	87.8	79.1	P/P	40 - 150
2238134	Microcystin H1LR	86.2	81.4	P/P	40 - 150
2238134	Microcystin HtyR	91.6	85.2	P/P	40 - 150
2238134	Microcystin LA	89.9	88.4	P/P	40 - 150
2238134	Microcystin LF	84.4	81.4	P/P	40 - 150
2238134	Microcystin LR	79.0	79.3	P/P	40 - 150
2238134	Microcystin LW	83.7	82.6	P/P	40 - 150
2238134	Microcystin LY	88.7	82.0	P/P	40 - 150
2238134	Microcystin RR	86.6	80.2	P/P	40 - 150
2238134	Microcystin WR	86.2	84.2	P/P	40 - 150
2238134	Microcystin YR	89.5	82.7	P/P	40 - 150
2238134	Nodularin-R	88.0	81.4	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P396767

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238239	Ammonia-N	0.347	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P396556

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2239023	Kjeldahl Nitrogen	13.2	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P396364

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238227	NO2NO3-N	1.02	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P396552

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238205	Total-P	0.354	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P396302

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238142	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P396281

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2238134	Anatoxin-a	8.84	Spike	P	0 - 30
2238134	Cylindrospermopsin	9.33	Spike	P	0 - 30
2238134	Desmethyl microcystin LR	10.3	Spike	P	0 - 30
2238134	Microcystin H1LR	5.79	Spike	P	0 - 30
2238134	Microcystin HtyR	7.24	Spike	P	0 - 30
2238134	Microcystin LA	1.75	Spike	P	0 - 30
2238134	Microcystin LF	3.63	Spike	P	0 - 30
2238134	Microcystin LR	0.348	Spike	P	0 - 30
2238134	Microcystin LW	1.36	Spike	P	0 - 30
2238134	Microcystin LY	7.78	Spike	P	0 - 30
2238134	Microcystin RR	7.43	Spike	P	0 - 30
2238134	Microcystin WR	2.37	Spike	P	0 - 30
2238134	Microcystin YR	7.91	Spike	P	0 - 30
2238134	Nodularin-R	7.80	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: 2238226

Field Sample ID: HABCE0080_LakeToho

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	97.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	80.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A104630

Included Lab Sample IDs: 2238228

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.9	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A104635

Included Lab Sample IDs: 2238226

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	97.8	92.1	P/P	50 - 160
Cylindrospermopsin	102	103	P/P	60 - 160
Desmethyl microcystin LR	110	106	P/P	60 - 160
Microcystin HIR	104	112	P/P	60 - 160
Microcystin HtyR	103	108	P/P	60 - 160
Microcystin LA	113	124	P/P	50 - 160
Microcystin LF	113	133	P/P	50 - 160
Microcystin LR	96.5	107	P/P	60 - 160
Microcystin LW	114	134	P/P	60 - 160
Microcystin LY	106	118	P/P	60 - 160
Microcystin RR	101	102	P/P	60 - 160
Microcystin WR	101	116	P/P	60 - 160
Microcystin YR	101	109	P/P	60 - 160
Nodularin-R	106	105	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A104656

Included Lab Sample IDs: 2238227

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A104750

Included Lab Sample IDs: 2238227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	104	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A104767

Included Lab Sample IDs: 2238227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.5	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A104809

Included Lab Sample IDs: 2238227

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.4	97.6	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	96.6	96.2			0.347
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101					13.2
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	93.0	99.0	98.0			1.02
EPA 365.1 Rev. 2.0	Total-P	104	103	103			0.354
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.1	98.3	98.3			0.0
EPA 8321B	Anatoxin-a	140	132	121			8.84
	Cylindrospermopsin	98.9	85.5	77.9			9.33
	Desmethyl microcystin LR	99.0	87.8	79.1			10.3
	Microcystin HiLR	92.2	86.2	81.4			5.79
	Microcystin HtyR	102	91.6	85.2			7.24
	Microcystin LA	107	89.9	88.4			1.75
	Microcystin LF	105	84.4	81.4			3.63
	Microcystin LR	95.3	79.0	79.3			0.348
	Microcystin LW	105	83.7	82.6			1.36
	Microcystin LY	100	88.7	82.0			7.78
	Microcystin RR	96.9	86.6	80.2			7.43
	Microcystin WR	95.8	86.2	84.2			2.37
	Microcystin YR	96.9	89.5	82.7			7.91
	Nodularin-R	97.9	88.0	81.4			7.80

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2238227
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2238227
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2238227
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2238227
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2238228
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2238226

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	04/09/2021			04/18/2021 13:38	Ping Hua	2238227
EPA 351.2 Rev. 2.0	04/09/2021	04/14/2021 12:50	Yen Ta	04/15/2021 14:41	Virginia P. Brown	2238227
EPA 353.2 Rev. 2.0	04/09/2021			04/12/2021 11:43	Beverly Y. Sanders	2238227
EPA 365.1 Rev. 2.0	04/09/2021	04/14/2021 16:27	Madeline Gruver	04/15/2021 11:26	Shengyu Ding	2238227
EPA 365.1 Rev. 2.0 dissolved	04/09/2021			04/09/2021 15:34	Patrick M. Roche	2238228
EPA 8321B	04/09/2021	04/09/2021 13:00	Juyoung Kim	04/10/2021 00:08	Pramila Ghimire	2238226