

Chemical Analysis Report

WQAP-2021-10-12-02

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-2021-08-30-53**
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: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 03-NOV-2021 09:38



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 Emerald - SE park shore

Collection Date/Time: 10/11/2021 12:35

Field ID: HABCE0088_LakeEmerald

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2282621	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P404777	
		Cylindrospermopsin	0.10	U	ug/L	P404777	
		Desmethyl microcystin LR	0.25	U	ug/L	P404777	
		Microcystin HIR**	0.25	U	ug/L	P404777	
		Microcystin HtyR**	0.25	U	ug/L	P404777	
		Microcystin LA	0.10	U	ug/L	P404777	
		Microcystin LF	0.10	U	ug/L	P404777	
		Microcystin LR	0.25	U	ug/L	P404777	
		Microcystin LW	0.25	U	ug/L	P404777	
		Microcystin LY	0.10	U	ug/L	P404777	
		Microcystin RR	0.10	U	ug/L	P404777	
		Microcystin WR	0.50	U	ug/L	P404777	
		Microcystin YR	0.25	U	ug/L	P404777	
		Nodularin-R**	0.10	U	ug/L	P404777	
2282622	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P405233	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0	J	mg N/L	P405321	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P405094	
	EPA 365.1 Rev. 2.0	Total-P	0.062		mg P/L	P405144	
2282623	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P404930	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: 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: P405233

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P405321

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P405094

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P405144

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P404930

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

Reference Method: EPA 8321B
Batch ID: P404777

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 HIR	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: P405233

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: P405321

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P405094

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: P405144

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: P404930

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.9		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P404777

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	106		P	40 - 150
Cylindrospermopsin	97.3		P	40 - 150
Desmethyl microcystin LR	112		P	40 - 150
Microcystin HIR	122		P	40 - 150
Microcystin HtyR	122		P	40 - 150
Microcystin LA	118		P	40 - 150
Microcystin LF	124		P	40 - 150
Microcystin LR	127		P	40 - 150
Microcystin LW	126		P	40 - 150
Microcystin LY	129		P	40 - 150
Microcystin RR	109		P	40 - 150
Microcystin WR	120		P	40 - 150
Microcystin YR	128		P	40 - 150
Nodularin-R	107		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P405233

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2282586	Ammonia-N	99.6	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P405321

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2282622	Kjeldahl Nitrogen	89.9	98.0	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P405094

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2282622	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P405144

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2282445	Total-P	110	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P404930

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2282453	O-Phosphate-P	99.5	98.9	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P404777

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2282093	Anatoxin-a	116	111	P/P	40 - 150
2282093	Cylindrospermopsin	98.9	91.0	P/P	40 - 150
2282093	Desmethyl microcystin LR	112	112	P/P	40 - 150
2282093	Microcystin HiLR	116	116	P/P	40 - 150
2282093	Microcystin HtyR	127	119	P/P	40 - 150
2282093	Microcystin LA	108	107	P/P	40 - 150
2282093	Microcystin LF	118	115	P/P	40 - 150
2282093	Microcystin LR	122	122	P/P	40 - 150
2282093	Microcystin LW	118	120	P/P	40 - 150
2282093	Microcystin LY	124	117	P/P	40 - 150
2282093	Microcystin RR	108	104	P/P	40 - 150
2282093	Microcystin WR	111	113	P/P	40 - 150
2282093	Microcystin YR	122	116	P/P	40 - 150
2282093	Nodularin-R	109	110	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P405233

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2282586	Ammonia-N	0.125	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P405321

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2282622	Kjeldahl Nitrogen	4.58	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P405094

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2282622	NO2NO3-N	0.496	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P405144

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2282445	Total-P	2.79	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P404930

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2282453	O-Phosphate-P	0.335	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P404777

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2282093	Anatoxin-a	3.72	Spike	P	0 - 30
2282093	Cylindrospermopsin	8.31	Spike	P	0 - 30
2282093	Desmethyl microcystin LR	0.176	Spike	P	0 - 30
2282093	Microcystin H1LR	0.00845	Spike	P	0 - 30
2282093	Microcystin HtyR	6.11	Spike	P	0 - 30
2282093	Microcystin LA	1.20	Spike	P	0 - 30
2282093	Microcystin LF	2.15	Spike	P	0 - 30
2282093	Microcystin LR	0.518	Spike	P	0 - 30
2282093	Microcystin LW	1.84	Spike	P	0 - 30
2282093	Microcystin LY	5.73	Spike	P	0 - 30
2282093	Microcystin RR	4.30	Spike	P	0 - 30
2282093	Microcystin WR	1.89	Spike	P	0 - 30
2282093	Microcystin YR	4.83	Spike	P	0 - 30
2282093	Nodularin-R	1.22	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: 2282621

Field Sample ID: HABCE0088_LakeEmerald

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	117	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	114	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A108286

Included Lab Sample IDs: 2282623

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.4	98.7	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A108296

Included Lab Sample IDs: 2282621

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	111	109	P/P	50 - 160
Cylindrospermopsin	106	106	P/P	50 - 160
Desmethyl microcystin LR	132	130	P/P	50 - 160
Microcystin HIR	139	138	P/P	50 - 160
Microcystin HtyR	142	137	P/P	50 - 160
Microcystin LA	126	129	P/P	50 - 160
Microcystin LF	145	147	P/P	50 - 160
Microcystin LR	136	145	P/P	50 - 160
Microcystin LW	147	149	P/P	50 - 160
Microcystin LY	141	139	P/P	50 - 160
Microcystin RR	117	118	P/P	50 - 160
Microcystin WR	136	141	P/P	50 - 160
Microcystin YR	129	126	P/P	50 - 160
Nodularin-R	115	115	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A108349

Included Lab Sample IDs: 2282622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A108403

Included Lab Sample IDs: 2282622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	108	106	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A108412

Included Lab Sample IDs: 2282622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A108465

Included Lab Sample IDs: 2282622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	99.5	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	97.6	99.6	99.8			0.125
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	89.9	98.0			4.58
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	101	100			0.496
EPA 365.1 Rev. 2.0	Total-P	106	110	106			2.79
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.9	99.5	98.9			0.335
EPA 8321B	Anatoxin-a	106	116	111			3.72
	Cylindrospermopsin	97.3	98.9	91.0			8.31
	Desmethyl microcystin LR	112	112	112			0.176
	Microcystin HiLR	122	116	116			0.0084
	Microcystin HtyR	122	127	119			6.11
	Microcystin LA	118	108	107			1.20
	Microcystin LF	124	118	115			2.15
	Microcystin LR	127	122	122			0.518
	Microcystin LW	126	118	120			1.84
	Microcystin LY	129	124	117			5.73
	Microcystin RR	109	108	104			4.30
	Microcystin WR	120	111	113			1.89
	Microcystin YR	128	122	116			4.83
	Nodularin-R	107	109	110			1.22

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2282622
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2282622
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2282622
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2282622
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2282623
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2282621

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	10/12/2021			10/19/2021 12:48	Ping Hua	2282622
EPA 351.2 Rev. 2.0	10/12/2021	10/20/2021 12:20	Benjamin T. Nordmann	10/21/2021 10:55	Alexandra J Mattheus	2282622
EPA 353.2 Rev. 2.0	10/12/2021			10/15/2021 09:30	Beverly Y. Sanders	2282622
EPA 365.1 Rev. 2.0	10/12/2021	10/18/2021 13:17	Simonne.V. Calhoun	10/19/2021 11:42	Lipi Saha	2282622
EPA 365.1 Rev. 2.0 dissolved	10/12/2021			10/12/2021 14:20	James L Waggeberby	2282623
EPA 8321B	10/12/2021	10/12/2021 11:00	Manjita Shrestha	10/12/2021 18:01	Manjita Shrestha	2282621