

Chemical Analysis Report

WQAP-2021-11-02-01

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-2021-10-18-57**
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: Colin Wright, Program Administrator

Date Certified: 22-NOV-2021 08:31

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular background.

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 Lorraine - West

Collection Date/Time: 11/01/2021 13:45

Field ID: HABCE0091_LakeLorraine

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2287134	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P405834	MS
		Cylindrospermopsin	0.10	U	ug/L	P405834	
		Desmethyl microcystin LR	0.25	U	ug/L	P405834	
		Microcystin HilR**	0.25	U	ug/L	P405834	
		Microcystin HtyR**	0.25	U	ug/L	P405834	
		Microcystin LA	0.10	U	ug/L	P405834	
		Microcystin LF	0.10	U	ug/L	P405834	
		Microcystin LR	0.26	I	ug/L	P405834	
		Microcystin LW	0.25	U	ug/L	P405834	
		Microcystin LY	0.10	U	ug/L	P405834	
		Microcystin RR	0.10	U	ug/L	P405834	
		Microcystin WR	0.50	U	ug/L	P405834	
		Microcystin YR	0.25	U	ug/L	P405834	
		Nodularin-R**	0.10	U	ug/L	P405834	
2287135	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P406245	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P406009	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P406050	
	EPA 365.1 Rev. 2.0	Total-P	0.15		mg P/L	P405926	
2287136	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.032		mg P/L	P405872	

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: P406245

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406009

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406050

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P405926

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P405872

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

Reference Method: EPA 8321B
Batch ID: P405834

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: P406245

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: P406009

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406050

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P405926

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P405872

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P405834

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	144		P	40 - 150
Cylindrospermopsin	125		P	40 - 150
Desmethyl microcystin LR	125		P	40 - 150
Microcystin HIR	130		P	40 - 150
Microcystin HtyR	125		P	40 - 150
Microcystin LA	132		P	40 - 150
Microcystin LF	144		P	40 - 150
Microcystin LR	120		P	40 - 150
Microcystin LW	140		P	40 - 150
Microcystin LY	137		P	40 - 150
Microcystin RR	127		P	40 - 150
Microcystin WR	130		P	40 - 150
Microcystin YR	131		P	40 - 150
Nodularin-R	132		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P406245

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2287090	Ammonia-N	98.0	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P406050

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2287043	NO2NO3-N	96.8	96.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P405926

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2287044	Total-P	110	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P405872

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2287103	O-Phosphate-P	93.7	92.2	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P405834

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2287123	Anatoxin-a	148	156	P/F	40 - 150
2287123	Cylindrospermopsin	136	139	P/P	40 - 150
2287123	Desmethyl microcystin LR	131	137	P/P	40 - 150
2287123	Microcystin HilR	128	142	P/P	40 - 150
2287123	Microcystin HtyR	132	130	P/P	40 - 150
2287123	Microcystin LA	132	140	P/P	40 - 150
2287123	Microcystin LF	136	129	P/P	40 - 150
2287123	Microcystin LR	123	122	P/P	40 - 150
2287123	Microcystin LW	119	140	P/P	40 - 150
2287123	Microcystin LY	130	134	P/P	40 - 150
2287123	Microcystin RR	133	135	P/P	40 - 150
2287123	Microcystin WR	126	132	P/P	40 - 150
2287123	Microcystin YR	126	130	P/P	40 - 150
2287123	Nodularin-R	139	140	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P406245

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2287090	Ammonia-N	0.656	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P406009

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2287135	Kjeldahl Nitrogen	4.99	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P406050

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2287043	NO2NO3-N	0.499	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P405926

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2287044	Total-P	2.63	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P405872

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2287103	O-Phosphate-P	1.55	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P405834

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2287123	Anatoxin-a	5.19	Spike	P	0 - 30
2287123	Cylindrospermopsin	2.28	Spike	P	0 - 30
2287123	Desmethyl microcystin LR	4.82	Spike	P	0 - 30
2287123	Microcystin HtIR	10.4	Spike	P	0 - 30
2287123	Microcystin HtyR	1.44	Spike	P	0 - 30
2287123	Microcystin LA	5.71	Spike	P	0 - 30
2287123	Microcystin LF	5.20	Spike	P	0 - 30
2287123	Microcystin LR	0.392	Spike	P	0 - 30
2287123	Microcystin LW	16.7	Spike	P	0 - 30
2287123	Microcystin LY	2.44	Spike	P	0 - 30
2287123	Microcystin RR	1.35	Spike	P	0 - 30
2287123	Microcystin WR	4.37	Spike	P	0 - 30
2287123	Microcystin YR	2.66	Spike	P	0 - 30
2287123	Nodularin-R	1.03	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: 2287134

Field Sample ID: HABCE0091_LakeLorraine

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	118	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	108	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A108663

Included Lab Sample IDs: 2287136

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	98.5	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A108701

Included Lab Sample IDs: 2287134

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	117	118	P/P	50 - 160
Cylindrospermopsin	105	108	P/P	60 - 160
Desmethyl microcystin LR	96.4	107	P/P	60 - 160
Microcystin HIR	103	109	P/P	60 - 160
Microcystin HtyR	99.2	107	P/P	60 - 160
Microcystin LA	107	108	P/P	50 - 160
Microcystin LF	117	113	P/P	60 - 160
Microcystin LR	90.7	100	P/P	60 - 160
Microcystin LW	115	112	P/P	60 - 160
Microcystin LY	110	113	P/P	60 - 160
Microcystin RR	104	111	P/P	60 - 160
Microcystin WR	99.4	102	P/P	60 - 160
Microcystin YR	102	105	P/P	60 - 160
Nodularin-R	106	114	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A108724

Included Lab Sample IDs: 2287135

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A108740

Included Lab Sample IDs: 2287135

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A108742

Included Lab Sample IDs: 2287135

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A108837

Included Lab Sample IDs: 2287135

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.4	98.4	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 SMP	MS
			LCS			
EPA 350.1 Rev. 2.0	Ammonia-N	99.0	98.0	99.0		0.656
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.7				4.99
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.0	96.8	96.3		0.499
EPA 365.1 Rev. 2.0	Total-P	103	110	107		2.63
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.1	93.7	92.2		1.55
EPA 8321B	Anatoxin-a	144	148	156		5.19
	Cylindrospermopsin	125	136	139		2.28
	Desmethyl microcystin LR	125	131	137		4.82
	Microcystin HiLR	130	128	142		10.4
	Microcystin HtyR	125	132	130		1.44
	Microcystin LA	132	132	140		5.71
	Microcystin LF	144	136	129		5.20
	Microcystin LR	120	123	122		0.392
	Microcystin LW	140	119	140		16.7
	Microcystin LY	137	130	134		2.44
	Microcystin RR	127	133	135		1.35
	Microcystin WR	130	126	132		4.37
	Microcystin YR	131	126	130		2.66
	Nodularin-R	132	139	140		1.03

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2287135
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2287135
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2287135
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2287135
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2287136
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2287134

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	11/02/2021			11/05/2021 12:19	Ping Hua	2287135
EPA 351.2 Rev. 2.0	11/02/2021	11/04/2021 12:46	Benjamin T. Nordmann	11/05/2021 11:03	Alexandra J Mattheus	2287135
EPA 353.2 Rev. 2.0	11/02/2021			11/05/2021 09:57	Beverly Y. Sanders	2287135
EPA 365.1 Rev. 2.0	11/02/2021	11/03/2021 16:35	Simonne.V. Calhoun	11/04/2021 15:10	Lipi Saha	2287135
EPA 365.1 Rev. 2.0 dissolved	11/02/2021			11/02/2021 15:10	James L Waggeberby	2287136
EPA 8321B	11/02/2021	11/03/2021 07:00	Manjita Shrestha	11/03/2021 10:29	Manjita Shrestha	2287134