

Chemical Analysis Report

WQAP-2020-03-13-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

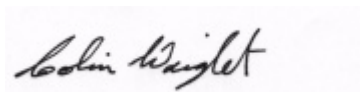
Event Description: **Algal Bloom Response - CEROC**
Request ID: **RQ-2020-03-09-30**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd
Suite 232
Orlando, FL 32806
Attn: Natalie Ayala

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: 31-MAR-2020 14:27

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 Minneola near Center

Collection Date/Time: 03/12/2020 11:15

Field ID: HABCE0025_Minneola Ctr

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2165025	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P380786	
		Cylindrospermopsin**	0.25	U	ug/L	P380786	
		Desmethyl microcystin LR**	0.25	U	ug/L	P380786	
		Microcystin LA**	0.25	U	ug/L	P380786	
		Microcystin LF**	0.25	U	ug/L	P380786	
		Microcystin LR**	0.25	U	ug/L	P380786	
		Microcystin LW**	0.25	U	ug/L	P380786	
		Microcystin LY**	0.25	U	ug/L	P380786	
		Microcystin RR**	0.25	U	ug/L	P380786	
		Microcystin WR**	0.50	U	ug/L	P380786	
		Microcystin YR**	0.25	U	ug/L	P380786	
2165051	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P381044	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P380958	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381326	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P380734	
2165053	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380647	

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: Lake Minneola near Beach

Collection Date/Time: 03/12/2020 11:31

Field ID: HABCE0024_Minneola Bch

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2165026	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P380786	
		Cylindrospermopsin**	0.25	U	ug/L	P380786	
		Desmethyl microcystin LR**	0.25	U	ug/L	P380786	
		Microcystin LA**	0.25	U	ug/L	P380786	
		Microcystin LF**	0.25	U	ug/L	P380786	
		Microcystin LR**	0.25	U	ug/L	P380786	
		Microcystin LW**	0.25	U	ug/L	P380786	
		Microcystin LY**	0.25	U	ug/L	P380786	
		Microcystin RR**	0.25	U	ug/L	P380786	
		Microcystin WR**	0.50	U	ug/L	P380786	
		Microcystin YR**	0.25	U	ug/L	P380786	
2165052	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P381044	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P380958	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P381326	
	EPA 365.1 Rev. 2.0	Total-P	0.027		mg P/L	P380734	
2165054	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380647	

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: P381044

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380958

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381326

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380734

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380647

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

Reference Method: EPA 8321B
Batch ID: P380786

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 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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P381044

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

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P380958

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	90.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P381326

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P380734

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P380647

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.1		P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P380786

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	87.8		P	40 - 140
Cylindrospermopsin	95.7		P	40 - 140
Desmethyl microcystin LR	65.8		P	40 - 140
Microcystin LA	85.6		P	40 - 140
Microcystin LF	93.2		P	40 - 140
Microcystin LR	69.1		P	40 - 140
Microcystin LW	77.1		P	40 - 140
Microcystin LY	91.3		P	40 - 140
Microcystin RR	83.0		P	40 - 140
Microcystin WR	71.8		P	40 - 140
Microcystin YR	85.2		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2165084	Ammonia-N	96.0	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381326

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2165003	NO2NO3-N	98.5	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380734

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2163542	Total-P	106	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380647

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2165053	O-Phosphate-P	97.9	98.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P380786

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2165025	Anatoxin-a	99.6	97.5	P/P	40 - 140
2165025	Cylindrospermopsin	91.8	92.0	P/P	40 - 140
2165025	Desmethyl microcystin LR	98.4	84.1	P/P	40 - 140
2165025	Microcystin LA	82.3	83.9	P/P	40 - 140
2165025	Microcystin LF	81.4	75.7	P/P	40 - 140
2165025	Microcystin LR	93.5	84.4	P/P	40 - 140
2165025	Microcystin LW	87.9	83.7	P/P	40 - 140
2165025	Microcystin LY	84.2	82.1	P/P	40 - 140
2165025	Microcystin RR	89.3	77.1	P/P	40 - 140
2165025	Microcystin WR	83.5	69.7	P/P	40 - 140
2165025	Microcystin YR	82.6	75.5	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P381044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2165084	Ammonia-N	2.10	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380958

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2165084	Kjeldahl Nitrogen	3.95	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P381326

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2165003	NO2NO3-N	0.509	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380734

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2163542	Total-P	1.91	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380647

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2165053	O-Phosphate-P	0.408	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P380786

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2165025	Anatoxin-a	2.08	Spike	P	0 - 30
2165025	Cylindrospermopsin	0.262	Spike	P	0 - 30
2165025	Desmethyl microcystin LR	15.7	Spike	P	0 - 30
2165025	Microcystin LA	1.99	Spike	P	0 - 30
2165025	Microcystin LF	7.25	Spike	P	0 - 30
2165025	Microcystin LR	10.2	Spike	P	0 - 30
2165025	Microcystin LW	4.96	Spike	P	0 - 30
2165025	Microcystin LY	2.60	Spike	P	0 - 30
2165025	Microcystin RR	14.6	Spike	P	0 - 30
2165025	Microcystin WR	18.1	Spike	P	0 - 30
2165025	Microcystin YR	8.97	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Surrogates

Lab Sample ID: 2165025

Field Sample ID: HABCE0025_Minneola Ctr

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	94.4	P	30 - 160

Lab Sample ID: 2165026

Field Sample ID: HABCE0024_Minneola Bch

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	90.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A98188

Included Lab Sample IDs: 2165053, 2165054

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.4	95.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A98268

Included Lab Sample IDs: 2165051, 2165052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	99.0	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A98306

Included Lab Sample IDs: 2165025, 2165026

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	87.4	83.3	P/P	50 - 160
Cylindrospermopsin	95.8	89.5	P/P	60 - 160
Desmethyl microcystin LR	84.8	78.1	P/P	60 - 160
Microcystin LA	101	78.9	P/P	50 - 160
Microcystin LF	95.9	97.1	P/P	60 - 160
Microcystin LR	90.0	76.9	P/P	60 - 160
Microcystin LW	78.2	96.1	P/P	60 - 160
Microcystin LY	116	95.6	P/P	60 - 160
Microcystin RR	84.3	77.3	P/P	60 - 160
Microcystin WR	86.8	71.1	P/P	60 - 160
Microcystin YR	90.5	71.9	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A98337

Included Lab Sample IDs: 2165051, 2165052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	99.9	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A98369

Included Lab Sample IDs: 2165051, 2165052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.5	96.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A98453

Included Lab Sample IDs: 2165051, 2165052

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	98.5	P/P	90 - 110

* 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 SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	98.2	96.0	98.4			2.10
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	90.2					3.95
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	98.5	98.0			0.509
EPA 365.1 Rev. 2.0	Total-P	108	106	108			1.91
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	97.9	98.3			0.408
EPA 8321B	Anatoxin-a	87.8	99.6	97.5			2.08
	Cylindrospermopsin	95.7	91.8	92.0			0.262
	Desmethyl microcystin LR	65.8	98.4	84.1			15.7
	Microcystin LA	85.6	82.3	83.9			1.99
	Microcystin LF	93.2	81.4	75.7			7.25
	Microcystin LR	69.1	93.5	84.4			10.2
	Microcystin LW	77.1	87.9	83.7			4.96
	Microcystin LY	91.3	84.2	82.1			2.60
	Microcystin RR	83.0	89.3	77.1			14.6
	Microcystin WR	71.8	83.5	69.7			18.1
	Microcystin YR	85.2	82.6	75.5			8.97

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2165051, 2165052
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2165051, 2165052
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2165051, 2165052
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2165051, 2165052
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2165053, 2165054
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2165025, 2165026

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	03/13/2020			03/20/2020 15:35	Ping Hua	2165051
	03/13/2020			03/20/2020 15:36	Ping Hua	2165052
EPA 351.2 Rev. 2.0	03/13/2020	03/19/2020 11:55	Sima Feizi	03/23/2020 09:24	Jhamieka S. Greenwood	2165051
	03/13/2020	03/19/2020 11:55	Sima Feizi	03/23/2020 09:26	Jhamieka S. Greenwood	2165052
EPA 353.2 Rev. 2.0	03/13/2020			03/26/2020 11:01	Beverly Y. Sanders	2165051
	03/13/2020			03/26/2020 11:02	Beverly Y. Sanders	2165052
EPA 365.1 Rev. 2.0	03/13/2020	03/16/2020 14:28	Yen Ta	03/17/2020 17:13	Benjamin T. Nordmann	2165051
	03/13/2020	03/16/2020 14:28	Yen Ta	03/17/2020 17:14	Benjamin T. Nordmann	2165052
EPA 365.1 Rev. 2.0 dissolved	03/13/2020			03/13/2020 14:40	Carlos Miranda	2165053
	03/13/2020			03/13/2020 14:42	Carlos Miranda	2165054
EPA 8321B	03/13/2020	03/19/2020 09:00	Juyoung Kim	03/19/2020 11:42	Juyoung Kim	2165025
	03/13/2020	03/19/2020 09:00	Juyoung Kim	03/19/2020 11:59	Juyoung Kim	2165026