

Chemical Analysis Report

WQAP-2020-07-31-01

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

Event Description: **Algal Bloom Response - SWD**
Request ID: **RQ-2020-04-13-44**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
13051 N. Telecom Parkway
Temple Terrace, FL 33637
Attn: Matthew 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: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 25-AUG-2020 16:53



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: Reclaimed Mine Lake - Near Ramp

Collection Date/Time: 07/30/2020 10:15

Field ID: HAB-SW-021

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2187618	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P385435	
		Cylindrospermopsin**	0.25	U	ug/L	P385435	
		Desmethyl microcystin LR**	0.25	U	ug/L	P385435	
		Microcystin LA**	0.25	U	ug/L	P385435	
		Microcystin LF**	0.25	U	ug/L	P385435	
		Microcystin LR**	2.1		ug/L	P385435	
		Microcystin LW**	0.25	U	ug/L	P385435	
		Microcystin LY**	0.25	U	ug/L	P385435	
		Microcystin RR**	0.25	U	ug/L	P385435	
		Microcystin WR**	0.50	U	ug/L	P385435	
		Microcystin YR**	0.25	U	ug/L	P385435	
2187622	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P385485	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P385669	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P385532	
	EPA 365.1 Rev. 2.0	Total-P	0.23		mg P/L	P385643	
2187624	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.049		mg P/L	P385497	

Sample Location: Scott Lake - West

Collection Date/Time: 07/30/2020 11:30

Field ID: HAB-SW-007

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2187619	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P385435	
		Cylindrospermopsin**	0.25	U	ug/L	P385435	
		Desmethyl microcystin LR**	0.25	U	ug/L	P385435	
		Microcystin LA**	0.25	U	ug/L	P385435	
		Microcystin LF**	0.25	U	ug/L	P385435	
		Microcystin LR**	1.3		ug/L	P385435	
		Microcystin LW**	0.25	U	ug/L	P385435	
		Microcystin LY**	0.25	U	ug/L	P385435	
		Microcystin RR**	0.25	U	ug/L	P385435	
		Microcystin WR**	0.50	U	ug/L	P385435	
		Microcystin YR**	0.25	U	ug/L	P385435	
2187623	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P385485	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0	J	mg N/L	P385970	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P385532	
	EPA 365.1 Rev. 2.0	Total-P	0.084		mg P/L	P385643	
2187625	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P385497	

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: P385485

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385669

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385970

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385532

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385643

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385497

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

Reference Method: EPA 8321B
Batch ID: P385435

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: P385485

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385669

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385970

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.1		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385532

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385643

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385497

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.8		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P385435

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	86.6		P	40 - 140
Cylindrospermopsin	85.0		P	40 - 140
Desmethyl microcystin LR	82.6		P	40 - 140
Microcystin LA	83.2		P	40 - 140
Microcystin LF	80.0		P	40 - 140
Microcystin LR	77.6		P	40 - 140
Microcystin LW	85.0		P	40 - 140
Microcystin LY	79.1		P	40 - 140
Microcystin RR	83.7		P	40 - 140
Microcystin WR	76.4		P	40 - 140
Microcystin YR	90.5		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385485

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187540	Ammonia-N	97.2	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385669

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187406	Kjeldahl Nitrogen	106	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385970

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187623	Kjeldahl Nitrogen	104	87.7	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385532

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187623	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187541	Total-P	107	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385497

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187536	O-Phosphate-P	102	102	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P385435

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2187511	Anatoxin-a	80.8	77.7	P/P	40 - 140
2187511	Cylindrospermopsin	61.6	74.0	P/P	40 - 140
2187511	Desmethyl microcystin LR	74.3	85.4	P/P	40 - 140
2187511	Microcystin LA	77.3	75.4	P/P	40 - 140
2187511	Microcystin LF	71.0	79.0	P/P	40 - 140
2187511	Microcystin LR	69.8	82.4	P/P	40 - 140
2187511	Microcystin LW	79.9	81.1	P/P	40 - 140
2187511	Microcystin LY	76.8	78.4	P/P	40 - 140
2187511	Microcystin RR	83.1	90.4	P/P	40 - 140
2187511	Microcystin WR	76.3	82.1	P/P	40 - 140
2187511	Microcystin YR	88.9	88.1	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385485

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187540	Ammonia-N	1.55	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385669

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187406	Kjeldahl Nitrogen	3.15	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385970

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187623	Kjeldahl Nitrogen	9.19	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385532

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187623	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187541	Total-P	2.68	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385497

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187536	O-Phosphate-P	0.294	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P385435

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187511	Anatoxin-a	3.84	Spike	P	0 - 30
2187511	Cylindrospermopsin	18.3	Spike	P	0 - 30
2187511	Desmethyl microcystin LR	13.9	Spike	P	0 - 30
2187511	Microcystin LA	2.61	Spike	P	0 - 30
2187511	Microcystin LF	10.7	Spike	P	0 - 30
2187511	Microcystin LR	14.6	Spike	P	0 - 30
2187511	Microcystin LW	1.52	Spike	P	0 - 30
2187511	Microcystin LY	2.12	Spike	P	0 - 30
2187511	Microcystin RR	8.45	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P385435

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2187511	Microcystin WR	7.28	Spike	P	0 - 30
2187511	Microcystin YR	0.895	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2187618
Field Sample ID: HAB-SW-021

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	75.0	P	30 - 160

Lab Sample ID: 2187619
Field Sample ID: HAB-SW-007

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	82.8	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A100213

Included Lab Sample IDs: 2187622, 2187623

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.8	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A100219

Included Lab Sample IDs: 2187624, 2187625

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A100229

Included Lab Sample IDs: 2187622, 2187623

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

Reference Method: EPA 8321B

Run ID: A100263

Included Lab Sample IDs: 2187618, 2187619

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	93.8	94.5	P/P	50 - 160
Cylindrospermopsin	101	101	P/P	60 - 160
Desmethyl microcystin LR	85.6	87.4	P/P	60 - 160
Microcystin LA	95.5	91.2	P/P	50 - 160
Microcystin LF	88.9	88.9	P/P	60 - 160
Microcystin LR	88.6	84.2	P/P	60 - 160
Microcystin LW	94.2	95.2	P/P	60 - 160
Microcystin LY	91.8	86.5	P/P	60 - 160
Microcystin RR	88.2	93.2	P/P	60 - 160
Microcystin WR	86.6	91.7	P/P	60 - 160
Microcystin YR	93.6	84.4	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A100314

Included Lab Sample IDs: 2187622, 2187623

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100324

Included Lab Sample IDs: 2187622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.4	105	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100463

Included Lab Sample IDs: 2187623

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	93.8	95.4	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	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	100	97.2	99.0			1.55
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	106	102			3.15
	Kjeldahl Nitrogen	96.1	104	87.7			9.19
EPA 353.2 Rev. 2.0	NO2NO3-N	102	102	102			0.0
EPA 365.1 Rev. 2.0	Total-P	102	107	104			2.68
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.8	102	102			0.294
EPA 8321B	Anatoxin-a	86.6	80.8	77.7			3.84
	Cylindrospermopsin	85.0	61.6	74.0			18.3
	Desmethyl microcystin LR	82.6	74.3	85.4			13.9
	Microcystin LA	83.2	77.3	75.4			2.61
	Microcystin LF	80.0	71.0	79.0			10.7
	Microcystin LR	77.6	69.8	82.4			14.6
	Microcystin LW	85.0	79.9	81.1			1.52
	Microcystin LY	79.1	76.8	78.4			2.12
	Microcystin RR	83.7	83.1	90.4			8.45
	Microcystin WR	76.4	76.3	82.1			7.28
	Microcystin YR	90.5	88.9	88.1			0.895

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2187622, 2187623
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2187622, 2187623
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2187622, 2187623
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2187622, 2187623
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2187624, 2187625
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2187618, 2187619

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	07/31/2020			08/02/2020 13:53	Ping Hua	2187622
	07/31/2020			08/02/2020 13:55	Ping Hua	2187623
EPA 351.2 Rev. 2.0	07/31/2020	08/05/2020 10:42	Sima Feizi	08/06/2020 17:11	Jhamieka S. Greenwood	2187622
	07/31/2020	08/13/2020 10:15	Sima Feizi	08/14/2020 10:42	Jhamieka S. Greenwood	2187623
EPA 353.2 Rev. 2.0	07/31/2020			08/03/2020 10:36	Beverly Y. Sanders	2187622
	07/31/2020			08/03/2020 10:38	Beverly Y. Sanders	2187623
EPA 365.1 Rev. 2.0	07/31/2020	08/05/2020 10:35	Lipi Saha	08/06/2020 09:04	Benjamin T. Nordmann	2187622
	07/31/2020	08/05/2020 10:35	Lipi Saha	08/06/2020 09:05	Benjamin T. Nordmann	2187623
EPA 365.1 Rev. 2.0 dissolved	07/31/2020			07/31/2020 15:35	Virginia P. Brown	2187624
	07/31/2020			07/31/2020 15:36	Virginia P. Brown	2187625
EPA 8321B	07/31/2020	07/31/2020 13:30	Juyoung Kim	08/04/2020 15:14	Juyoung Kim	2187618
	07/31/2020	07/31/2020 13:30	Juyoung Kim	08/04/2020 15:31	Juyoung Kim	2187619