Chemical Analysis Report

WQAP-2020-02-05-02

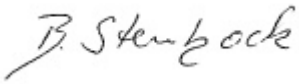
Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Lee County Bloom Response--As Needed**
Request ID: **RQ-2019-07-08-26**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
Lee County Environmental Lab
60-2 Danley Drive
Fort Meyers, FL 33907
Attn: Sue Davis

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: 24-FEB-2020 12:32



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: Alva Boat Ramp **Collection Date/Time: 02/04/2020 08:43**

Field ID: Alva Boat Ramp Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2154446	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P378316	
		Cylindrospermopsin**	0.25	U	ug/L	P378316	
		Desmethyl microcystin LR**	0.25	U	ug/L	P378316	
		Microcystin LA**	0.29	I	ug/L	P378316	
		Microcystin LF**	0.25	U	ug/L	P378316	
		Microcystin LR**	1.2		ug/L	P378316	
		Microcystin LW**	0.25	U	ug/L	P378316	
		Microcystin LY**	0.25	U	ug/L	P378316	
		Microcystin RR**	0.25	U	ug/L	P378316	
		Microcystin WR**	0.50	U	ug/L	P378316	
		Microcystin YR**	0.25	U	ug/L	P378316	
2154447	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P378569	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P378668	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.13		mg N/L	P378948	
	EPA 365.1 Rev. 2.0	Total-P	0.068		mg P/L	P378611	
2154448	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.038		mg P/L	P378354	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378569

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378668

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378948

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P378611

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378354

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

Reference Method: EPA 8321B
Batch ID: P378316

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: P378569

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378668

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378948

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: P378611

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378354

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

Reference Method: EPA 8321B
Batch ID: P378316

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	102		P	40 - 140
Cylindrospermopsin	101		P	40 - 140
Desmethyl microcystin LR	81.8		P	40 - 140
Microcystin LA	82.9		P	40 - 140
Microcystin LF	99.3		P	40 - 140
Microcystin LR	83.6		P	40 - 140
Microcystin LW	98.0		P	40 - 140
Microcystin LY	123		P	40 - 140
Microcystin RR	91.5		P	40 - 140
Microcystin WR	76.3		P	40 - 140
Microcystin YR	91.3		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378569

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2153400	Ammonia-N	101	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154412	Kjeldahl Nitrogen	87.7	86.7	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378948

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154413	NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P378611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154412	Total-P	105	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378354

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154415	O-Phosphate-P	97.8	96.8	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P378316

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2154169	Anatoxin-a	110	108	P/P	40 - 140
2154169	Cylindrospermopsin	98.2	91.1	P/P	40 - 140
2154169	Desmethyl microcystin LR	93.8	90.6	P/P	40 - 140
2154169	Microcystin LA	85.5	97.7	P/P	40 - 140
2154169	Microcystin LF	103	87.2	P/P	40 - 140
2154169	Microcystin LR	90.2	89.4	P/P	40 - 140
2154169	Microcystin LW	111	105	P/P	40 - 140
2154169	Microcystin LY	90.7	106	P/P	40 - 140
2154169	Microcystin RR	101	101	P/P	40 - 140
2154169	Microcystin WR	84.6	88.1	P/P	40 - 140
2154169	Microcystin YR	93.2	96.4	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P378569

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2153400	Ammonia-N	0.983	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154412	Kjeldahl Nitrogen	0.627	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P378948

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154413	NO2NO3-N	0.501	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P378611

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154412	Total-P	2.88	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378354

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154415	O-Phosphate-P	0.914	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P378316

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2154169	Anatoxin-a	1.93	Spike	P	0 - 30
2154169	Cylindrospermopsin	7.47	Spike	P	0 - 30
2154169	Desmethyl microcystin LR	3.47	Spike	P	0 - 30
2154169	Microcystin LA	13.3	Spike	P	0 - 30
2154169	Microcystin LF	16.6	Spike	P	0 - 30
2154169	Microcystin LR	0.840	Spike	P	0 - 30
2154169	Microcystin LW	4.95	Spike	P	0 - 30
2154169	Microcystin LY	15.7	Spike	P	0 - 30
2154169	Microcystin RR	0.0757	Spike	P	0 - 30
2154169	Microcystin WR	4.11	Spike	P	0 - 30
2154169	Microcystin YR	3.38	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2154446
Field Sample ID: Alva Boat Ramp

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	99.7	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A97339
Included Lab Sample IDs: 2154448

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.1	96.9	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A97357
Included Lab Sample IDs: 2154446

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	112	99.1	P/P	50 - 160
Cylindrospermopsin	109	102	P/P	60 - 160
Desmethyl microcystin LR	107	88.0	P/P	60 - 160
Microcystin LA	96.8	89.4	P/P	50 - 160
Microcystin LF	108	107	P/P	60 - 160
Microcystin LR	105	86.4	P/P	60 - 160
Microcystin LW	110	99.3	P/P	60 - 160
Microcystin LY	112	104	P/P	60 - 160
Microcystin RR	109	93.8	P/P	60 - 160
Microcystin WR	91.5	80.2	P/P	60 - 160
Microcystin YR	108	90.5	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A97409
Included Lab Sample IDs: 2154447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A97476
Included Lab Sample IDs: 2154447

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A97482
Included Lab Sample IDs: 2154447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A97486
Included Lab Sample IDs: 2154447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	97.2	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		Precision		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	102	101	99.7			0.983
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.0	87.7	86.7			0.627
EPA 353.2 Rev. 2.0	NO2NO3-N	100	99.5	100			0.501
EPA 365.1 Rev. 2.0	Total-P	101	105	102			2.88
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.8	96.8			0.914
EPA 8321B	Anatoxin-a	102	110	108			1.93
	Cylindrospermopsin	101	98.2	91.1			7.47
	Desmethyl microcystin LR	81.8	93.8	90.6			3.47
	Microcystin LA	82.9	85.5	97.7			13.3
	Microcystin LF	99.3	103	87.2			16.6
	Microcystin LR	83.6	90.2	89.4			0.840
	Microcystin LW	98.0	111	105			4.95
	Microcystin LY	123	90.7	106			15.7
	Microcystin RR	91.5	101	101			0.0757
	Microcystin WR	76.3	84.6	88.1			4.11
	Microcystin YR	91.3	93.2	96.4			3.38

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2154447
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2154447
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2154447
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2154447
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2154448
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2154446

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	02/05/2020			02/07/2020 13:28	Ping Hua	2154447
EPA 351.2 Rev. 2.0	02/05/2020	02/11/2020 11:45	Jhamieka S. Greenwood	02/12/2020 11:21	Jhamieka S. Greenwood	2154447
EPA 353.2 Rev. 2.0	02/05/2020			02/12/2020 11:08	Beverly Y. Sanders	2154447
EPA 365.1 Rev. 2.0	02/05/2020	02/10/2020 17:16	Yen Ta	02/11/2020 13:24	Benjamin T. Nordmann	2154447
EPA 365.1 Rev. 2.0 dissolved	02/05/2020			02/05/2020 18:21	Carlos Miranda	2154448
EPA 8321B	02/05/2020	02/06/2020 09:00	Juyoung Kim	02/06/2020 12:28	Juyoung Kim	2154446