Chemical Analysis Report

WQAP-2020-01-08-05

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

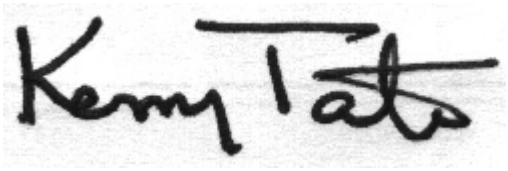
Event Description: **Lee County Bloom Response--As Needed**
Request ID: **RQ-2019-06-10-63**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 24-JAN-2020 09:03



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: Franklin Locks Upstream **Collection Date/Time: 01/07/2020 09:12**

Field ID: Franklin Locks Upstream Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2147518	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P376634	
		Cylindrospermopsin**	0.25	U	ug/L	P376634	
		Desmethyl microcystin LR**	0.25	U	ug/L	P376634	
		Microcystin LA**	0.25	U	ug/L	P376634	
		Microcystin LF**	0.25	U	ug/L	P376634	
		Microcystin LR**	0.63	I	ug/L	P376634	
		Microcystin LW**	0.25	U	ug/L	P376634	
		Microcystin LY**	0.25	U	ug/L	P376634	
		Microcystin RR**	0.25	U	ug/L	P376634	
		Microcystin WR**	0.50	U	ug/L	P376634	
		Microcystin YR**	0.25	U	ug/L	P376634	
2147519	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P376984	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P376992	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.042		mg N/L	P376896	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P377104	
2147520	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.044		mg P/L	P376901	

Ref. Method and Comment:
EPA 365.1 Rev. 2.0: Total-P: 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: P376984

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376992

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376896

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377104

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376901

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

Reference Method: EPA 8321B
Batch ID: P376634

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: P376984

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376992

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: P376896

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377104

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	96.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376901

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.6		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P376634

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	100		P	40 - 140
Cylindrospermopsin	111		P	40 - 140
Desmethyl microcystin LR	90.2		P	40 - 140
Microcystin LA	95.8		P	40 - 140
Microcystin LF	101		P	40 - 140
Microcystin LR	89.2		P	40 - 140
Microcystin LW	93.1		P	40 - 140
Microcystin LY	92.3		P	40 - 140
Microcystin RR	98.4		P	40 - 140
Microcystin WR	89.4		P	40 - 140
Microcystin YR	85.5		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376984

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2147519	Ammonia-N	98.8	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376992

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2147519	Kjeldahl Nitrogen	90.0	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376896

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2147519	NO2NO3-N	96.7	96.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376901

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2147423	O-Phosphate-P	95.6	97.0	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P376634

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2146426	Anatoxin-a	95.7	98.8	P/P	40 - 140
2146426	Cylindrospermopsin	103	104	P/P	40 - 140
2146426	Desmethyl microcystin LR	86.2	89.8	P/P	40 - 140
2146426	Microcystin LA	86.3	87.0	P/P	40 - 140
2146426	Microcystin LF	84.0	88.3	P/P	40 - 140
2146426	Microcystin LR	89.4	87.2	P/P	40 - 140
2146426	Microcystin LW	82.7	82.2	P/P	40 - 140
2146426	Microcystin LY	90.9	94.1	P/P	40 - 140
2146426	Microcystin RR	92.4	95.0	P/P	40 - 140
2146426	Microcystin WR	86.1	89.1	P/P	40 - 140
2146426	Microcystin YR	81.9	82.5	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P376984

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2147519	Ammonia-N	2.79	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P376992

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2147519	Kjeldahl Nitrogen	6.43	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P376896

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2147519	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P377104

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2147454	Total-P	1.14	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P376901

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2147423	O-Phosphate-P	0.996	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P376634

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2146426	Anatoxin-a	3.15	Spike	P	0 - 30
2146426	Cylindrospermopsin	1.09	Spike	P	0 - 30
2146426	Desmethyl microcystin LR	4.06	Spike	P	0 - 30
2146426	Microcystin LA	0.797	Spike	P	0 - 30
2146426	Microcystin LF	4.94	Spike	P	0 - 30
2146426	Microcystin LR	2.41	Spike	P	0 - 30
2146426	Microcystin LW	0.671	Spike	P	0 - 30
2146426	Microcystin LY	3.52	Spike	P	0 - 30
2146426	Microcystin RR	2.74	Spike	P	0 - 30
2146426	Microcystin WR	3.50	Spike	P	0 - 30
2146426	Microcystin YR	0.689	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2147518
Field Sample ID: Franklin Locks Upstream

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Carbamazepine-d10	103	P	30 - 165

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A96786
Included Lab Sample IDs: 2147518

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	104	96.0	P/P	50 - 160
Cylindrospermopsin	111	111	P/P	60 - 160
Desmethyl microcystin LR	91.2	94.9	P/P	60 - 160
Microcystin LA	96.7	90.5	P/P	50 - 160
Microcystin LF	104	95.2	P/P	60 - 160
Microcystin LR	93.7	85.8	P/P	60 - 160
Microcystin LW	95.8	90.8	P/P	60 - 160
Microcystin LY	98.6	98.9	P/P	60 - 160
Microcystin RR	105	99.5	P/P	60 - 160
Microcystin WR	97.2	97.0	P/P	60 - 160
Microcystin YR	94.1	83.9	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A96802
Included Lab Sample IDs: 2147519

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A96803
Included Lab Sample IDs: 2147520

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.8	97.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A96830
Included Lab Sample IDs: 2147519

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A96884
Included Lab Sample IDs: 2147519

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.2	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A96972
Included Lab Sample IDs: 2147519

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	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	103	98.8	102			2.79
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	90.0	105			6.43
EPA 353.2 Rev. 2.0	NO2NO3-N	99.5	96.7	96.7			0.0
EPA 365.1 Rev. 2.0	Total-P	96.6					1.14
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	95.6	97.0			0.996
EPA 8321B	Anatoxin-a	100	95.7	98.8			3.15
	Cylindrospermopsin	111	103	104			1.09
	Desmethyl microcystin LR	90.2	86.2	89.8			4.06
	Microcystin LA	95.8	86.3	87.0			0.797
	Microcystin LF	101	84.0	88.3			4.94
	Microcystin LR	89.2	89.4	87.2			2.41
	Microcystin LW	93.1	82.7	82.2			0.671
	Microcystin LY	92.3	90.9	94.1			3.52
	Microcystin RR	98.4	92.4	95.0			2.74
	Microcystin WR	89.4	86.1	89.1			3.50
	Microcystin YR	85.5	81.9	82.5			0.689

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2147519
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2147519
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2147519
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2147519
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2147520
EPA 8321B / E31780	Microcystins in water matrices by HPLC/MS/MS	2147518

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	01/08/2020			01/10/2020 13:53	Ping Hua	2147519
EPA 351.2 Rev. 2.0	01/08/2020	01/13/2020 16:15	Jhamieka S. Greenwood	01/14/2020 13:58	Jhamieka S. Greenwood	2147519
EPA 353.2 Rev. 2.0	01/08/2020			01/10/2020 08:46	Beverly Y. Sanders	2147519
EPA 365.1 Rev. 2.0	01/08/2020	01/14/2020 12:57	Yen Ta	01/15/2020 15:03	Benjamin T. Nordmann	2147519
EPA 365.1 Rev. 2.0 dissolved	01/08/2020			01/08/2020 14:47	Carlos Miranda	2147520
EPA 8321B	01/08/2020	01/09/2020 08:00	Juyoung Kim	01/09/2020 15:31	Juyoung Kim	2147518