Chemical Analysis Report

WQAP-2020-06-03-01

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

Event Description: **Collier County-Algal Bloom Response**
Request ID: **RQ-2020-02-10-42**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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Certified by: Colin Wright, Program Administrator

Date Certified: 22-JUN-2020 09:05

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: Park Shore **Collection Date/Time: 06/02/2020 09:00**

Field ID: Park Shore Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2174542	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P382742	
		Cylindrospermopsin**	0.25	U	ug/L	P382742	
		Desmethyl microcystin LR**	0.25	U	ug/L	P382742	
		Microcystin LA**	0.25	U	ug/L	P382742	
		Microcystin LF**	0.25	U	ug/L	P382742	
		Microcystin LR**	0.25	U	ug/L	P382742	
		Microcystin LW**	0.25	U	ug/L	P382742	
		Microcystin LY**	0.25	U	ug/L	P382742	
		Microcystin RR**	0.25	U	ug/L	P382742	
		Microcystin WR**	0.50	U	ug/L	P382742	
		Microcystin YR**	0.25	U	ug/L	P382742	
2174549	EPA 350.1 Rev. 2.0	Ammonia-N	0.063		mg N/L	P382877	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P382941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.028		mg N/L	P382793	
	EPA 365.1 Rev. 2.0	Total-P	0.061		mg P/L	P382934	
2174550	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.023		mg P/L	P382775	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P382877

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P382941

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P382793

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P382934

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P382775

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

Reference Method: EPA 8321B
Batch ID: P382742

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: P382877

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P382941

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.2		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P382793

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: P382934

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P382775

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

Reference Method: EPA 8321B
Batch ID: P382742

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 140
Cylindrospermopsin	115		P	40 - 140
Desmethyl microcystin LR	94.8		P	40 - 140
Microcystin LA	117		P	40 - 140
Microcystin LF	98.3		P	40 - 140
Microcystin LR	96.2		P	40 - 140
Microcystin LW	83.5		P	40 - 140
Microcystin LY	122		P	40 - 140
Microcystin RR	114		P	40 - 140
Microcystin WR	93.0		P	40 - 140
Microcystin YR	88.1		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P382877

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2174460	Ammonia-N	106	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P382941

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2174461	Kjeldahl Nitrogen	100	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P382793

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2174460	NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P382934

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2174102	Total-P	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P382775

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2174550	O-Phosphate-P	91.7	92.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P382742

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2174377	Anatoxin-a	97.1	98.2	P/P	40 - 140
2174377	Cylindrospermopsin	113	115	P/P	40 - 140
2174377	Desmethyl microcystin LR	104	102	P/P	40 - 140
2174377	Microcystin LA	113	112	P/P	40 - 140
2174377	Microcystin LF	82.9	106	P/P	40 - 140
2174377	Microcystin LR	106	96.7	P/P	40 - 140
2174377	Microcystin LW	77.6	81.7	P/P	40 - 140
2174377	Microcystin LY	113	122	P/P	40 - 140
2174377	Microcystin RR	116	114	P/P	40 - 140
2174377	Microcystin WR	96.5	89.6	P/P	40 - 140
2174377	Microcystin YR	101	97.5	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P382877

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2174460	Ammonia-N	1.03	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P382941

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2174461	Kjeldahl Nitrogen	0.198	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P382793

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2174460	NO2NO3-N	0.414	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P382934

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2174102	Total-P	0.969	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P382775

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2174550	O-Phosphate-P	0.607	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P382742

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2174377	Anatoxin-a	1.13	Spike	P	0 - 30
2174377	Cylindrospermopsin	1.55	Spike	P	0 - 30
2174377	Desmethyl microcystin LR	1.71	Spike	P	0 - 30
2174377	Microcystin LA	0.660	Spike	P	0 - 30
2174377	Microcystin LF	24.4	Spike	P	0 - 30
2174377	Microcystin LR	9.24	Spike	P	0 - 30
2174377	Microcystin LW	5.13	Spike	P	0 - 30
2174377	Microcystin LY	7.64	Spike	P	0 - 30
2174377	Microcystin RR	1.33	Spike	P	0 - 30
2174377	Microcystin WR	7.43	Spike	P	0 - 30
2174377	Microcystin YR	3.64	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2174542
Field Sample ID: Park Shore

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	61.2	P	40 - 150

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A99149
Included Lab Sample IDs: 2174550

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.6	97.4	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A99154
Included Lab Sample IDs: 2174542

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	96.5	97.4	P/P	50 - 160
Cylindrospermopsin	108	118	P/P	60 - 160
Desmethyl microcystin LR	107	75.4	P/P	60 - 160
Microcystin LA	97.6	119	P/P	50 - 160
Microcystin LF	92.1	97.7	P/P	60 - 160
Microcystin LR	103	67.0	P/P	60 - 160
Microcystin LW	82.4	85.9	P/P	60 - 160
Microcystin LY	96.3	131	P/P	60 - 160
Microcystin RR	116	113	P/P	60 - 160
Microcystin WR	96.7	66.0	P/P	60 - 160
Microcystin YR	101	69.6	P/P	60 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A99159
Included Lab Sample IDs: 2174549

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A99191
Included Lab Sample IDs: 2174549

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A99235
Included Lab Sample IDs: 2174549

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	97.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A99244
Included Lab Sample IDs: 2174549

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.3	94.5	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		Precision		
					LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	101	106	104			1.03
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.2	100	101			0.198
EPA 353.2 Rev. 2.0	NO2NO3-N	100	101	101			0.414
EPA 365.1 Rev. 2.0	Total-P	109	106	105			0.969
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	95.6	91.7	92.4			0.607
EPA 8321B	Anatoxin-a	104	97.1	98.2			1.13
	Cylindrospermopsin	115	113	115			1.55
	Desmethyl microcystin LR	94.8	104	102			1.71
	Microcystin LA	117	113	112			0.660
	Microcystin LF	98.3	82.9	106			24.4
	Microcystin LR	96.2	106	96.7			9.24
	Microcystin LW	83.5	77.6	81.7			5.13
	Microcystin LY	122	113	122			7.64
	Microcystin RR	114	116	114			1.33
	Microcystin WR	93.0	96.5	89.6			7.43
	Microcystin YR	88.1	101	97.5			3.64

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2174549
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2174549
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2174549
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2174549
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2174550
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2174542

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	06/03/2020			06/06/2020 14:37	Ping Hua	2174549
EPA 351.2 Rev. 2.0	06/03/2020	06/09/2020 10:30	Sima Feizi	06/10/2020 12:41	Jhamieka S. Greenwood	2174549
EPA 353.2 Rev. 2.0	06/03/2020			06/04/2020 09:34	Beverly Y. Sanders	2174549
EPA 365.1 Rev. 2.0	06/03/2020	06/08/2020 17:04	Yen Ta	06/10/2020 08:23	Lipi Saha	2174549
EPA 365.1 Rev. 2.0 dissolved	06/03/2020			06/03/2020 16:11	Jhamieka S. Greenwood	2174550
EPA 8321B	06/03/2020	06/03/2020 14:00	Juyoung Kim	06/04/2020 06:34	Juyoung Kim	2174542