

Chemical Analysis Report

WQAP-2020-12-03-02

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-2020-02-03-81**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 21-DEC-2020 17:07



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: 12/02/2020 14:16

Field ID: Park Shore

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2210388	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P390641	
		Cylindrospermopsin**	0.25	U	ug/L	P390641	
		Desmethyl microcystin LR**	0.25	U	ug/L	P390641	
		Microcystin LA**	0.25	U	ug/L	P390641	
		Microcystin LF**	0.25	U	ug/L	P390641	
		Microcystin LR**	0.25	U	ug/L	P390641	
		Microcystin LW**	0.25	U	ug/L	P390641	
		Microcystin LY**	0.25	U	ug/L	P390641	
		Microcystin RR**	0.25	U	ug/L	P390641	
		Microcystin WR**	0.50	U	ug/L	P390641	
		Microcystin YR**	0.25	U	ug/L	P390641	
2210389	EPA 350.1 Rev. 2.0	Ammonia-N	0.072		mg N/L	P391074	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.64		mg N/L	P390833	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.029		mg N/L	P390762	
	EPA 365.1 Rev. 2.0	Total-P	0.046		mg P/L	P390862	
2210390	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P390663	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391074

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390862

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

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

Reference Method: EPA 8321B
Batch ID: P390641

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: P391074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

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: P390862

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.9		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P390641

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	115		P	40 - 140
Cylindrospermopsin	97.5		P	40 - 140
Desmethyl microcystin LR	120		P	40 - 140
Microcystin LA	139		P	40 - 140
Microcystin LF	92.7		P	40 - 140
Microcystin LR	99.6		P	40 - 140
Microcystin LW	108		P	40 - 140
Microcystin LY	108		P	40 - 140
Microcystin RR	110		P	40 - 140
Microcystin WR	125		P	40 - 140
Microcystin YR	137		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210255	Ammonia-N	102	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P390833

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210284	Kjeldahl Nitrogen	115	112	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390762

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210282	NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390862

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2209878	Total-P	105	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390663

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210247	O-Phosphate-P	99.9	99.6	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P390641

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2210242	Anatoxin-a	115	111	P/P	40 - 140
2210242	Cylindrospermopsin	93.2	99.2	P/P	40 - 140
2210242	Desmethyl microcystin LR	96.4	92.9	P/P	40 - 140
2210242	Microcystin LA	92.4	83.6	P/P	40 - 140
2210242	Microcystin LF	68.1	69.0	P/P	40 - 140
2210242	Microcystin LR	103	96.0	P/P	40 - 140
2210242	Microcystin LW	71.2	76.6	P/P	40 - 140
2210242	Microcystin LY	95.9	87.6	P/P	40 - 140
2210242	Microcystin RR	86.9	92.6	P/P	40 - 140
2210242	Microcystin WR	97.9	99.8	P/P	40 - 140
2210242	Microcystin YR	99.3	92.6	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P391074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210255	Ammonia-N	0.130	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P390833

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210284	Kjeldahl Nitrogen	2.02	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P390762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210282	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P390862

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2209878	Total-P	1.42	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P390663

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210247	O-Phosphate-P	0.227	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P390641

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210242	Anatoxin-a	3.64	Spike	P	0 - 30
2210242	Cylindrospermopsin	6.18	Spike	P	0 - 30
2210242	Desmethyl microcystin LR	3.70	Spike	P	0 - 30
2210242	Microcystin LA	9.96	Spike	P	0 - 30
2210242	Microcystin LF	1.24	Spike	P	0 - 30
2210242	Microcystin LR	6.77	Spike	P	0 - 30
2210242	Microcystin LW	7.40	Spike	P	0 - 30
2210242	Microcystin LY	9.13	Spike	P	0 - 30
2210242	Microcystin RR	6.26	Spike	P	0 - 30
2210242	Microcystin WR	1.93	Spike	P	0 - 30
2210242	Microcystin YR	7.03	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2210388
Field Sample ID: Park Shore

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	105	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	96.9	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A102398
Included Lab Sample IDs: 2210388

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	113	P/P	50 - 160
Cylindrospermopsin	97.2	97.6	P/P	60 - 160
Desmethyl microcystin LR	108	106	P/P	60 - 160
Microcystin LA	113	119	P/P	50 - 160
Microcystin LF	69.6	81.1	P/P	50 - 160
Microcystin LR	111	98.7	P/P	60 - 160
Microcystin LW	84.3	77.9	P/P	60 - 160
Microcystin LY	114	88.0	P/P	60 - 160
Microcystin RR	108	101	P/P	60 - 160
Microcystin WR	112	103	P/P	60 - 160
Microcystin YR	105	101	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A102399
Included Lab Sample IDs: 2210390

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	98.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A102442
Included Lab Sample IDs: 2210389

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A102547
Included Lab Sample IDs: 2210389

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.2	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A102553
Included Lab Sample IDs: 2210389

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.2	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A102570
Included Lab Sample IDs: 2210389

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	96.8	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	97.0	102	102			0.130
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	115	112			2.02
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	99.5	99.5			0.0
EPA 365.1 Rev. 2.0	Total-P	106	105	103			1.42
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.9	99.9	99.6			0.227
EPA 8321B	Anatoxin-a	115	115	111			3.64
	Cylindrospermopsin	97.5	93.2	99.2			6.18
	Desmethyl microcystin LR	120	96.4	92.9			3.70
	Microcystin LA	139	92.4	83.6			9.96
	Microcystin LF	92.7	68.1	69.0			1.24
	Microcystin LR	99.6	103	96.0			6.77
	Microcystin LW	108	71.2	76.6			7.40
	Microcystin LY	108	95.9	87.6			9.13
	Microcystin RR	110	86.9	92.6			6.26
	Microcystin WR	125	97.9	99.8			1.93
	Microcystin YR	137	99.3	92.6			7.03

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2210389
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2210389
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2210389
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2210389
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2210390
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2210388

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	12/03/2020			12/13/2020 11:05	Ping Hua	2210389
EPA 351.2 Rev. 2.0	12/03/2020	12/07/2020 15:00	David Boose	12/11/2020 17:05	Julia Storbeck	2210389
EPA 353.2 Rev. 2.0	12/03/2020			12/07/2020 11:18	Beverly Y. Sanders	2210389
EPA 365.1 Rev. 2.0	12/03/2020	12/08/2020 17:16	Yen Ta	12/14/2020 11:56	Lipi Saha	2210389
EPA 365.1 Rev. 2.0 dissolved	12/03/2020			12/03/2020 15:49	Samantha Davila	2210390
EPA 8321B	12/03/2020	12/03/2020 13:40	Juyoung Kim	12/03/2020 15:00	Mohammad Ghaffari	2210388