Chemical Analysis Report

WQAP-2020-08-06-02

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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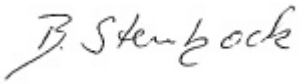
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 21-AUG-2020 14:02



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: North Lake Trafford **Collection Date/Time: 08/05/2020 10:01**

Field ID: North Lake Trafford Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2188808	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P385706	
		Cylindrospermopsin**	0.25	U	ug/L	P385706	
		Desmethyl microcystin LR**	0.25	U	ug/L	P385706	
		Microcystin LA**	0.25	U	ug/L	P385706	
		Microcystin LF**	0.25	U	ug/L	P385706	
		Microcystin LR**	0.25	U	ug/L	P385706	
		Microcystin LW**	0.25	U	ug/L	P385706	
		Microcystin LY**	0.25	U	ug/L	P385706	
		Microcystin RR**	0.25	U	ug/L	P385706	
		Microcystin WR**	0.50	U	ug/L	P385706	
		Microcystin YR**	0.25	U	ug/L	P385706	
2188809	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P385803	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P385879	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P385764	
	EPA 365.1 Rev. 2.0	Total-P	0.062		mg P/L	P385826	
2188810	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P385738	

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: P385803

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385879

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385764

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385826

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385738

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

Reference Method: EPA 8321B
Batch ID: P385706

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: P385803

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385879

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385764

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: P385826

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: P385738

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

Reference Method: EPA 8321B
Batch ID: P385706

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	83.4		P	40 - 140
Cylindrospermopsin	79.1		P	40 - 140
Desmethyl microcystin LR	82.9		P	40 - 140
Microcystin LA	81.2		P	40 - 140
Microcystin LF	76.5		P	40 - 140
Microcystin LR	75.3		P	40 - 140
Microcystin LW	83.8		P	40 - 140
Microcystin LY	78.1		P	40 - 140
Microcystin RR	88.6		P	40 - 140
Microcystin WR	81.2		P	40 - 140
Microcystin YR	71.4		P	40 - 140

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385803

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2188772	Ammonia-N	97.4	96.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385879

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2188772	Kjeldahl Nitrogen	103	99.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385764

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2188685	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385738

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2188773	O-Phosphate-P	100	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P385706

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2188858	Anatoxin-a	80.1	82.0	P/P	40 - 140
2188858	Cylindrospermopsin	77.4	75.0	P/P	40 - 140
2188858	Desmethyl microcystin LR	95.2	87.1	P/P	40 - 140
2188858	Microcystin LA	86.4	80.2	P/P	40 - 140
2188858	Microcystin LF	79.0	75.3	P/P	40 - 140
2188858	Microcystin LR	84.7	76.5	P/P	40 - 140
2188858	Microcystin LW	72.8	70.3	P/P	40 - 140
2188858	Microcystin LY	81.7	76.4	P/P	40 - 140
2188858	Microcystin RR	92.2	94.6	P/P	40 - 140
2188858	Microcystin WR	71.1	68.1	P/P	40 - 140
2188858	Microcystin YR	84.5	83.1	P/P	40 - 140

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385803

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2188772	Ammonia-N	0.684	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385879

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2188772	Kjeldahl Nitrogen	1.52	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385764

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2188685	NO2NO3-N	0.482	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385826

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2188779	Total-P	0.919	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385738

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2188773	O-Phosphate-P	0.0816	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P385706

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2188858	Anatoxin-a	2.41	Spike	P	0 - 30
2188858	Cylindrospermopsin	3.06	Spike	P	0 - 30
2188858	Desmethyl microcystin LR	8.91	Spike	P	0 - 30
2188858	Microcystin LA	7.36	Spike	P	0 - 30
2188858	Microcystin LF	4.85	Spike	P	0 - 30
2188858	Microcystin LR	9.79	Spike	P	0 - 30
2188858	Microcystin LW	3.59	Spike	P	0 - 30
2188858	Microcystin LY	6.74	Spike	P	0 - 30
2188858	Microcystin RR	2.56	Spike	P	0 - 30
2188858	Microcystin WR	4.28	Spike	P	0 - 30
2188858	Microcystin YR	1.68	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2188808
Field Sample ID: North Lake Trafford

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	113	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A100318
Included Lab Sample IDs: 2188808

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.4	91.9	P/P	50 - 160
Cylindrospermopsin	95.9	97.9	P/P	60 - 160
Desmethyl microcystin LR	101	101	P/P	60 - 160
Microcystin LA	100	91.9	P/P	50 - 160
Microcystin LF	95.4	91.5	P/P	60 - 160
Microcystin LR	94.6	90.9	P/P	60 - 160
Microcystin LW	100	99.2	P/P	60 - 160
Microcystin LY	94.9	89.0	P/P	60 - 160
Microcystin RR	106	102	P/P	60 - 160
Microcystin WR	103	89.5	P/P	60 - 160
Microcystin YR	87.7	92.5	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A100321
Included Lab Sample IDs: 2188810

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	98.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A100340
Included Lab Sample IDs: 2188809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A100352
Included Lab Sample IDs: 2188809

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
Run ID: A100396
Included Lab Sample IDs: 2188809

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A100416
Included Lab Sample IDs: 2188809

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	93.7	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	98.4	97.4	96.4			0.684
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	103	99.9			1.52
EPA 353.2 Rev. 2.0	NO2NO3-N	102	104	104			0.482
EPA 365.1 Rev. 2.0	Total-P	101					0.919
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.6	100	100			0.0816
EPA 8321B	Anatoxin-a	83.4	80.1	82.0			2.41
	Cylindrospermopsin	79.1	77.4	75.0			3.06
	Desmethyl microcystin LR	82.9	95.2	87.1			8.91
	Microcystin LA	81.2	86.4	80.2			7.36
	Microcystin LF	76.5	79.0	75.3			4.85
	Microcystin LR	75.3	84.7	76.5			9.79
	Microcystin LW	83.8	72.8	70.3			3.59
	Microcystin LY	78.1	81.7	76.4			6.74
	Microcystin RR	88.6	92.2	94.6			2.56
	Microcystin WR	81.2	71.1	68.1			4.28
	Microcystin YR	71.4	84.5	83.1			1.68

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2188809
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2188809
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2188809
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2188809
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2188810
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2188808

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	08/06/2020			08/08/2020 14:29	Ping Hua	2188809
EPA 351.2 Rev. 2.0	08/06/2020	08/11/2020 09:50	Sima Feizi	08/12/2020 13:24	Jhamieka S. Greenwood	2188809
EPA 353.2 Rev. 2.0	08/06/2020			08/07/2020 09:39	Beverly Y. Sanders	2188809
EPA 365.1 Rev. 2.0	08/06/2020	08/10/2020 11:00	Shengyu Wang	08/11/2020 12:46	Benjamin T. Nordmann	2188809
EPA 365.1 Rev. 2.0 dissolved	08/06/2020			08/06/2020 15:28	Samantha Davila	2188810
EPA 8321B	08/06/2020	08/06/2020 12:00	Juyoung Kim	08/06/2020 16:31	Juyoung Kim	2188808