

Chemical Analysis Report

WQAP-2020-07-28-02

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

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2020-03-23-45**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 10-AUG-2020 15:46

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

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: Pahokee Marina

Collection Date/Time: 07/27/2020 11:20

Field ID: Pahokee Marina

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2186344	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P385250	
		Cylindrospermopsin**	0.25	U	ug/L	P385250	
		Desmethyl microcystin LR**	0.25	U	ug/L	P385250	
		Microcystin LA**	0.25	U	ug/L	P385250	
		Microcystin LF**	0.25	U	ug/L	P385250	
		Microcystin LR**	1.6		ug/L	P385250	
		Microcystin LW**	0.25	U	ug/L	P385250	
		Microcystin LY**	0.25	U	ug/L	P385250	
		Microcystin RR**	0.25	U	ug/L	P385250	
		Microcystin WR**	0.50	U	ug/L	P385250	
		Microcystin YR**	0.25	U	ug/L	P385250	
2186345	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P385479	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P385373	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.26		mg N/L	P385368	
	EPA 365.1 Rev. 2.0	Total-P	0.18		mg P/L	P385415	
2186346	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.075		mg P/L	P385282	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385479

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385373

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385368

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385415

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385282

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

Reference Method: EPA 8321B
Batch ID: P385250

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: P385479

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385373

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385368

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385415

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385282

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

Reference Method: EPA 8321B
Batch ID: P385250

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	97.0		P	40 - 140
Cylindrospermopsin	102		P	40 - 140
Desmethyl microcystin LR	94.3		P	40 - 140
Microcystin LA	110		P	40 - 140
Microcystin LF	104		P	40 - 140
Microcystin LR	107		P	40 - 140
Microcystin LW	117		P	40 - 140
Microcystin LY	112		P	40 - 140
Microcystin RR	98.1		P	40 - 140
Microcystin WR	95.3		P	40 - 140
Microcystin YR	99.3		P	40 - 140

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385479

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2186371	Ammonia-N	97.0	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385373

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2186338	Kjeldahl Nitrogen	113	108	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2186345	NO2NO3-N	98.8	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385415

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185610	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385282

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2186372	O-Phosphate-P	101	101	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P385250

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2185447	Anatoxin-a	99.6	90.4	P/P	40 - 140
2185447	Cylindrospermopsin	95.3	89.1	P/P	40 - 140
2185447	Desmethyl microcystin LR	110	100	P/P	40 - 140
2185447	Microcystin LA	102	101	P/P	40 - 140
2185447	Microcystin LF	88.3	95.1	P/P	40 - 140
2185447	Microcystin LR	116	108	P/P	40 - 140
2185447	Microcystin LW	95.3	86.5	P/P	40 - 140
2185447	Microcystin LY	111	103	P/P	40 - 140
2185447	Microcystin RR	117	110	P/P	40 - 140
2185447	Microcystin WR	91.0	92.5	P/P	40 - 140
2185447	Microcystin YR	122	117	P/P	40 - 140

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P385479

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2186371	Ammonia-N	0.0	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P385373

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2186338	Kjeldahl Nitrogen	2.84	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P385368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2186345	NO2NO3-N	0.462	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P385415

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185610	Total-P	1.56	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P385282

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2186372	O-Phosphate-P	0.0992	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P385250

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2185447	Anatoxin-a	9.60	Spike	P	0 - 30
2185447	Cylindrospermopsin	6.75	Spike	P	0 - 30
2185447	Desmethyl microcystin LR	9.36	Spike	P	0 - 30
2185447	Microcystin LA	1.88	Spike	P	0 - 30
2185447	Microcystin LF	7.43	Spike	P	0 - 30
2185447	Microcystin LR	7.30	Spike	P	0 - 30
2185447	Microcystin LW	9.66	Spike	P	0 - 30
2185447	Microcystin LY	7.80	Spike	P	0 - 30
2185447	Microcystin RR	5.59	Spike	P	0 - 30
2185447	Microcystin WR	1.66	Spike	P	0 - 30
2185447	Microcystin YR	4.58	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2186344
Field Sample ID: Pahokee Marina

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	86.9	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A100133

Included Lab Sample IDs: 2186346

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A100175

Included Lab Sample IDs: 2186345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	99.0	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A100184

Included Lab Sample IDs: 2186344

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	93.4	102	P/P	50 - 160
Cylindrospermopsin	103	103	P/P	60 - 160
Desmethyl microcystin LR	86.9	98.8	P/P	60 - 160
Microcystin LA	106	102	P/P	50 - 160
Microcystin LF	94.5	109	P/P	60 - 160
Microcystin LR	91.9	99.2	P/P	60 - 160
Microcystin LW	108	118	P/P	60 - 160
Microcystin LY	91.0	97.2	P/P	60 - 160
Microcystin RR	84.4	95.8	P/P	60 - 160
Microcystin WR	102	104	P/P	60 - 160
Microcystin YR	101	106	P/P	60 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100209

Included Lab Sample IDs: 2186345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	95.3	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A100212

Included Lab Sample IDs: 2186345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.9	98.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A100231

Included Lab Sample IDs: 2186345

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.1	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	99.0	97.0	97.0			0.0
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.6	113	108			2.84
EPA 353.2 Rev. 2.0	NO2NO3-N	101	98.8	98.0			0.462
EPA 365.1 Rev. 2.0	Total-P	99.4	102	104			1.56
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	101	101			0.0992
EPA 8321B	Anatoxin-a	97.0	99.6	90.4			9.60
	Cylindrospermopsin	102	95.3	89.1			6.75
	Desmethyl microcystin LR	94.3	110	100			9.36
	Microcystin LA	110	102	101			1.88
	Microcystin LF	104	88.3	95.1			7.43
	Microcystin LR	107	116	108			7.30
	Microcystin LW	117	95.3	86.5			9.66
	Microcystin LY	112	111	103			7.80
	Microcystin RR	98.1	117	110			5.59
	Microcystin WR	95.3	91.0	92.5			1.66
	Microcystin YR	99.3	122	117			4.58

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2186345
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2186345
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2186345
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2186345
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2186346
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2186344

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	07/28/2020			08/01/2020 18:19	Ping Hua	2186345
EPA 351.2 Rev. 2.0	07/28/2020	07/30/2020 12:15	Jhamieka S. Greenwood	07/31/2020 14:29	Jhamieka S. Greenwood	2186345
EPA 353.2 Rev. 2.0	07/28/2020			07/30/2020 08:11	Beverly Y. Sanders	2186345
EPA 365.1 Rev. 2.0	07/28/2020	07/31/2020 10:10	Lipi Saha	08/03/2020 09:13	Benjamin T. Nordmann	2186345
EPA 365.1 Rev. 2.0 dissolved	07/28/2020			07/28/2020 16:18	Samantha Davila	2186346
EPA 8321B	07/28/2020	07/29/2020 12:00	Juyoung Kim	07/30/2020 11:50	Juyoung Kim	2186344