

Chemical Analysis Report

WQAP-2021-06-16-03

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-2021-06-07-58**
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: 12-JUL-2021 12:33

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: 06/15/2021 10:00

Field ID: SE HAB 0051

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2255354	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P399836	
		Cylindrospermopsin	0.10	U	ug/L	P399836	
		Desmethyl microcystin LR	0.25	U	ug/L	P399836	
		Microcystin HIR**	0.25	U	ug/L	P399836	
		Microcystin HtyR**	0.25	U	ug/L	P399836	
		Microcystin LA	0.10	U	ug/L	P399836	
		Microcystin LF	0.10	U	ug/L	P399836	
		Microcystin LR	0.77	I	ug/L	P399836	
		Microcystin LW	0.25	U	ug/L	P399836	
		Microcystin LY	0.10	U	ug/L	P399836	
		Microcystin RR	0.10	U	ug/L	P399836	
		Microcystin WR	0.50	U	ug/L	P399836	
		Microcystin YR	0.25	U	ug/L	P399836	
		Nodularin-R**	0.10	U	ug/L	P399836	
2255355	EPA 350.1 Rev. 2.0	Ammonia-N	0.088		mg N/L	P400288	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.8		mg N/L	P399936	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.074		mg N/L	P399868	
	EPA 365.1 Rev. 2.0	Total-P	0.32		mg P/L	P400214	
2255356	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.058		mg P/L	P399787	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Batch relative percent difference is unavailable because of analytical difficulties.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400288

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399936

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399868

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400214

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399787

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

Reference Method: EPA 8321B
Batch ID: P399836

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1R	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400288

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399936

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399868

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: P400214

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399787

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

Reference Method: EPA 8321B
Batch ID: P399836

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	110		P	40 - 150
Cylindrospermopsin	117		P	40 - 150
Desmethyl microcystin LR	76.6		P	40 - 150
Microcystin HIR	82.7		P	40 - 150
Microcystin HtyR	85.7		P	40 - 150
Microcystin LA	108		P	40 - 150
Microcystin LF	110		P	40 - 150
Microcystin LR	73.1		P	40 - 150
Microcystin LW	95.6		P	40 - 150
Microcystin LY	117		P	40 - 150
Microcystin RR	116		P	40 - 150
Microcystin WR	86.9		P	40 - 150
Microcystin YR	99.9		P	40 - 150
Nodularin-R	107		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P400288

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2255303	Ammonia-N	97.4	98.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P399936

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2255110	Kjeldahl Nitrogen	103		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P399868

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2255343	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400214

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2255388	Total-P	108	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P399787

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2255304	O-Phosphate-P	96.8	98.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P399836

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2255349	Anatoxin-a	126	131	P/P	40 - 150
2255349	Cylindrospermopsin	121	122	P/P	40 - 150
2255349	Desmethyl microcystin LR	81.5	84.9	P/P	40 - 150
2255349	Microcystin HiLR	98.7	99.2	P/P	40 - 150
2255349	Microcystin HtyR	89.0	93.0	P/P	40 - 150
2255349	Microcystin LA	111	114	P/P	40 - 150
2255349	Microcystin LF	113	114	P/P	40 - 150
2255349	Microcystin LR	85.3	93.8	P/P	40 - 150
2255349	Microcystin LW	102	94.3	P/P	40 - 150
2255349	Microcystin LY	118	121	P/P	40 - 150
2255349	Microcystin RR	124	127	P/P	40 - 150
2255349	Microcystin WR	86.0	97.6	P/P	40 - 150
2255349	Microcystin YR	111	118	P/P	40 - 150
2255349	Nodularin-R	116	123	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P400288

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2255303	Ammonia-N	0.577	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P399868

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2255343	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P400214

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2255388	Total-P	0.675	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P399787

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2255304	O-Phosphate-P	1.54	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P399836

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2255349	Anatoxin-a	3.74	Spike	P	0 - 30
2255349	Cylindrospermopsin	1.51	Spike	P	0 - 30
2255349	Desmethyl microcystin LR	4.14	Spike	P	0 - 30
2255349	Microcystin H1LR	0.581	Spike	P	0 - 30
2255349	Microcystin HtyR	4.32	Spike	P	0 - 30
2255349	Microcystin LA	2.69	Spike	P	0 - 30
2255349	Microcystin LF	0.611	Spike	P	0 - 30
2255349	Microcystin LR	8.90	Spike	P	0 - 30
2255349	Microcystin LW	7.65	Spike	P	0 - 30
2255349	Microcystin LY	2.72	Spike	P	0 - 30
2255349	Microcystin RR	2.94	Spike	P	0 - 30
2255349	Microcystin WR	12.7	Spike	P	0 - 30
2255349	Microcystin YR	6.25	Spike	P	0 - 30
2255349	Nodularin-R	5.41	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2255354
Field Sample ID: SE HAB 0051

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	101	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	81.7	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A106113

Included Lab Sample IDs: 2255356

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	97.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106142

Included Lab Sample IDs: 2255355

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

Reference Method: EPA 8321B

Run ID: A106147

Included Lab Sample IDs: 2255354

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	114	115	P/P	50 - 160
Cylindrospermopsin	119	115	P/P	50 - 160
Desmethyl microcystin LR	78.1	82.9	P/P	50 - 160
Microcystin HILR	79.9	94.6	P/P	50 - 160
Microcystin HtyR	85.1	85.4	P/P	50 - 160
Microcystin LA	105	111	P/P	50 - 160
Microcystin LF	109	110	P/P	50 - 160
Microcystin LR	77.2	82.7	P/P	50 - 160
Microcystin LW	89.9	89.8	P/P	50 - 160
Microcystin LY	110	122	P/P	50 - 160
Microcystin RR	123	119	P/P	50 - 160
Microcystin WR	85.3	84.5	P/P	50 - 160
Microcystin YR	97.8	95.6	P/P	50 - 160
Nodularin-R	112	115	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A106244

Included Lab Sample IDs: 2255355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	92.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106315

Included Lab Sample IDs: 2255355

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A106327

Included Lab Sample IDs: 2255355

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.1	98.7	P/P	90 - 110

Quality Assurance Report

Calibration Verification

* 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		LCS	Precision SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	99.2	97.4	98.0			0.577
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	103				
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	102			0.0
EPA 365.1 Rev. 2.0	Total-P	105	108	108			0.675
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	96.8	98.3			1.54
EPA 8321B	Anatoxin-a	110	126	131			3.74
	Cylindrospermopsin	117	121	122			1.51
	Desmethyl microcystin LR	76.6	81.5	84.9			4.14
	Microcystin HiLR	82.7	98.7	99.2			0.581
	Microcystin HtyR	85.7	89.0	93.0			4.32
	Microcystin LA	108	111	114			2.69
	Microcystin LF	110	113	114			0.611
	Microcystin LR	73.1	85.3	93.8			8.90
	Microcystin LW	95.6	102	94.3			7.65
	Microcystin LY	117	118	121			2.72
	Microcystin RR	116	124	127			2.94
	Microcystin WR	86.9	86.0	97.6			12.7
	Microcystin YR	99.9	111	118			6.25
	Nodularin-R	107	116	123			5.41

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2255355
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2255355
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2255355
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2255355
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2255356
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2255354

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	06/16/2021			06/28/2021 13:07	Ping Hua	2255355
EPA 351.2 Rev. 2.0	06/16/2021	06/18/2021 14:20	Benjamin T. Nordmann	06/23/2021 16:00	Letuzia M De Oliveira	2255355
EPA 353.2 Rev. 2.0	06/16/2021			06/17/2021 10:22	Beverly Y. Sanders	2255355
EPA 365.1 Rev. 2.0	06/16/2021	06/25/2021 12:24	Madeline Gruver	06/28/2021 09:22	Shengyu Ding	2255355
EPA 365.1 Rev. 2.0 dissolved	06/16/2021			06/16/2021 11:49	Ping Hua	2255356
EPA 8321B	06/16/2021	06/17/2021 12:00	Pramila Ghimire	06/17/2021 14:55	Pramila Ghimire	2255354