

Chemical Analysis Report

WQAP-2022-03-22-01

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

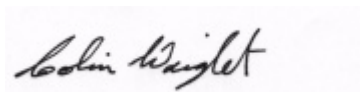
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2022-02-28-09**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 05-APR-2022 09:52

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray rectangular 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: Caloosahatchee River-Fort Myers Yacht Basin Collection Date/Time: 03/21/2022 11:05

Field ID: HAB-SD-032122-1105

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2313447	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P411444	
		Cylindrospermopsin	0.10	U	ug/L	P411444	
		Desmethyl microcystin LR	0.25	U	ug/L	P411444	
		Microcystin HilR**	0.25	U	ug/L	P411444	
		Microcystin HtyR**	0.25	U	ug/L	P411444	
		Microcystin LA	0.10	U	ug/L	P411444	
		Microcystin LF	0.10	U	ug/L	P411444	
		Microcystin LR	0.25	U	ug/L	P411444	
		Microcystin LW	0.25	U	ug/L	P411444	
		Microcystin LY	0.10	U	ug/L	P411444	
		Microcystin RR	0.10	U	ug/L	P411444	
		Microcystin WR	0.50	U	ug/L	P411444	
		Microcystin YR	0.25	U	ug/L	P411444	
		Nodularin-R**	0.10	U	ug/L	P411444	
2313448	EPA 350.1 Rev. 2.0	Ammonia-N	0.040		mg N/L	P411489	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P411531	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.096		mg N/L	P411481	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P411462	
2313449	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.072		mg P/L	P411415	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411489

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411531

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411481

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411462

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411415

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

Reference Method: EPA 8321B
Batch ID: P411444

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: P411489

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411531

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: P411481

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: P411462

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411415

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	99.1		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P411444

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	112		P	40 - 150
Cylindrospermopsin	92.7		P	40 - 150
Desmethyl microcystin LR	77.0		P	40 - 150
Microcystin HIR	87.1		P	40 - 150
Microcystin HtyR	94.3		P	40 - 150
Microcystin LA	88.2		P	40 - 150
Microcystin LF	75.4		P	40 - 150
Microcystin LR	80.0		P	40 - 150
Microcystin LW	79.0		P	40 - 150
Microcystin LY	76.4		P	40 - 150
Microcystin RR	95.2		P	40 - 150
Microcystin WR	93.4		P	40 - 150
Microcystin YR	96.9		P	40 - 150
Nodularin-R	97.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P411489

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313422	Ammonia-N	96.2	97.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P411531

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313422	Kjeldahl Nitrogen	94.0	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P411481

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313339	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P411462

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313420	Total-P	103	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P411415

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313501	O-Phosphate-P	98.2	98.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P411444

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2313327	Anatoxin-a	135	133	P/P	40 - 150
2313327	Cylindrospermopsin	96.5	96.9	P/P	40 - 150
2313327	Desmethyl microcystin LR	85.6	92.1	P/P	40 - 150
2313327	Microcystin HiLR	90.4	93.9	P/P	40 - 150
2313327	Microcystin HtyR	89.3	91.2	P/P	40 - 150
2313327	Microcystin LA	88.6	92.6	P/P	40 - 150
2313327	Microcystin LF	79.2	81.9	P/P	40 - 150
2313327	Microcystin LR	87.0	82.7	P/P	40 - 150
2313327	Microcystin LW	81.0	74.8	P/P	40 - 150
2313327	Microcystin LY	79.4	77.5	P/P	40 - 150
2313327	Microcystin RR	99.0	104	P/P	40 - 150
2313327	Microcystin WR	85.7	91.0	P/P	40 - 150
2313327	Microcystin YR	93.1	91.8	P/P	40 - 150
2313327	Nodularin-R	97.8	97.9	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P411489

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313422	Ammonia-N	0.987	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P411531

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313422	Kjeldahl Nitrogen	11.9	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P411481

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313339	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P411462

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313420	Total-P	1.92	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P411415

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313501	O-Phosphate-P	0.102	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P411444

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2313327	Anatoxin-a	1.45	Spike	P	0 - 30
2313327	Cylindrospermopsin	0.437	Spike	P	0 - 30
2313327	Desmethyl microcystin LR	7.35	Spike	P	0 - 30
2313327	Microcystin H1LR	3.77	Spike	P	0 - 30
2313327	Microcystin HtyR	2.08	Spike	P	0 - 30
2313327	Microcystin LA	4.33	Spike	P	0 - 30
2313327	Microcystin LF	3.38	Spike	P	0 - 30
2313327	Microcystin LR	4.62	Spike	P	0 - 30
2313327	Microcystin LW	8.02	Spike	P	0 - 30
2313327	Microcystin LY	2.33	Spike	P	0 - 30
2313327	Microcystin RR	4.46	Spike	P	0 - 30
2313327	Microcystin WR	5.98	Spike	P	0 - 30
2313327	Microcystin YR	1.38	Spike	P	0 - 30
2313327	Nodularin-R	0.113	Spike	P	0 - 30

Quality Assurance Report Precision

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

Quality Assurance Report Surrogates

Lab Sample ID: 2313447
Field Sample ID: HAB-SD-032122-1105

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	56.7	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A111084

Included Lab Sample IDs: 2313449

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.7	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A111105

Included Lab Sample IDs: 2313448

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A111108

Included Lab Sample IDs: 2313448

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.7	100	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A111129

Included Lab Sample IDs: 2313447

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	109	108	P/P	50 - 160
Cylindrospermopsin	91.9	92.8	P/P	60 - 160
Desmethyl microcystin LR	81.3	75.4	P/P	60 - 160
Microcystin H1LR	87.1	79.7	P/P	60 - 160
Microcystin HtyR	84.4	81.0	P/P	60 - 160
Microcystin LA	86.3	86.4	P/P	50 - 160
Microcystin LF	76.5	76.8	P/P	60 - 160
Microcystin LR	76.0	76.0	P/P	60 - 160
Microcystin LW	80.7	72.3	P/P	60 - 160
Microcystin LY	75.0	75.9	P/P	60 - 160
Microcystin RR	95.8	94.8	P/P	60 - 160
Microcystin WR	79.4	79.4	P/P	60 - 160
Microcystin YR	83.6	79.2	P/P	60 - 160
Nodularin-R	88.3	88.6	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A111157

Included Lab Sample IDs: 2313448

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.6	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A111196

Included Lab Sample IDs: 2313448

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.0	104	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	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	96.2	96.2	97.4			0.987
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	94.0	109			11.9
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	102	102	102			0.0
EPA 365.1 Rev. 2.0	Total-P	102	103	100			1.92
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.1	98.2	98.3			0.102
EPA 8321B	Anatoxin-a	112	135	133			1.45
	Cylindrospermopsin	92.7	96.5	96.9			0.437
	Desmethyl microcystin LR	77.0	85.6	92.1			7.35
	Microcystin HiLR	87.1	90.4	93.9			3.77
	Microcystin HtyR	94.3	89.3	91.2			2.08
	Microcystin LA	88.2	88.6	92.6			4.33
	Microcystin LF	75.4	79.2	81.9			3.38
	Microcystin LR	80.0	87.0	82.7			4.62
	Microcystin LW	79.0	81.0	74.8			8.02
	Microcystin LY	76.4	79.4	77.5			2.33
	Microcystin RR	95.2	99.0	104			4.46
	Microcystin WR	93.4	85.7	91.0			5.98
	Microcystin YR	96.9	93.1	91.8			1.38
	Nodularin-R	97.0	97.8	97.9			0.113

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2313448
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2313448
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2313448
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2313448
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2313449
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2313447

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	03/22/2022			03/23/2022 12:34	Judith K. Clark	2313448
EPA 351.2 Rev. 2.0	03/22/2022	03/25/2022 10:06	Samantha L Bates	03/28/2022 14:41	Alexandra J Mattheus	2313448
EPA 353.2 Rev. 2.0	03/22/2022			03/23/2022 10:07	Beverly Y. Sanders	2313448
EPA 365.1 Rev. 2.0	03/22/2022	03/23/2022 17:20	Simonne.V. Calhoun	03/25/2022 13:13	Sarah A Nixon	2313448
EPA 365.1 Rev. 2.0 dissolved	03/22/2022			03/22/2022 14:33	James L Waggerby	2313449
EPA 8321B	03/22/2022	03/23/2022 11:00	Manjita Shrestha	03/23/2022 16:42	Manjita Shrestha	2313447
	03/22/2022	03/23/2022 11:00	Manjita Shrestha	03/23/2022 21:59	Manjita Shrestha	2313447