

Chemical Analysis Report

WQAP-2022-07-22-01

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-2022-06-20-68**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Fort Pierce, FL 34945
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Date Certified: 04-AUG-2022 09:45



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: Santiago Canal

Collection Date/Time: 07/21/2022 09:35

Field ID: SEHAB0084

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2343366	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P416969	
		Cylindrospermopsin	0.10	U	ug/L	P417021	
		Desmethyl microcystin LR	0.25	U	ug/L	P417021	
		Microcystin HIR	0.25	U	ug/L	P417021	
		Microcystin HtyR	0.25	U	ug/L	P417021	
		Microcystin LA	0.10	U	ug/L	P417021	
		Microcystin LF	0.10	U	ug/L	P417021	
		Microcystin LR	0.25	U	ug/L	P417021	
		Microcystin LW	0.25	U	ug/L	P417021	
		Microcystin LY	0.10	U	ug/L	P417021	
		Microcystin RR	0.10	U	ug/L	P417021	
		Microcystin WR	0.50	U	ug/L	P417021	
		Microcystin YR	0.25	U	ug/L	P417021	
		Nodularin-R	0.10	U	ug/L	P417021	
2343367	EPA 350.1 Rev. 2.0	Ammonia-N	0.078		mg N/L	P417420	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.42		mg N/L	P417235	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.018		mg N/L	P417331	
	EPA 365.1 Rev. 2.0	Total-P	0.061		mg P/L	P417096	
2343368	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.044		mg P/L	P417046	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P417420

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417235

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417331

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417096

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417046

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

Reference Method: EPA 8321B
Batch ID: P416969

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L

Reference Method: EPA 8321B
Batch ID: P417021

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1LR	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: P417420

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	91.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417235

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: P417331

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417096

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417046

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

Reference Method: EPA 8321B
Batch ID: P416969

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	101		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417021

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	97.3		P	40 - 150
Desmethyl microcystin LR	96.9		P	40 - 150
Microcystin HILR	96.4		P	40 - 150
Microcystin HtyR	93.3		P	40 - 150
Microcystin LA	95.6		P	40 - 150
Microcystin LF	85.0		P	40 - 150
Microcystin LR	88.6		P	40 - 150
Microcystin LW	86.5		P	40 - 150
Microcystin LY	89.9		P	40 - 150
Microcystin RR	94.8		P	40 - 150
Microcystin WR	89.5		P	40 - 150
Microcystin YR	87.3		P	40 - 150
Nodularin-R	95.8		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P417420

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344026	Ammonia-N	100	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P417235

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343341	Kjeldahl Nitrogen	93.8	93.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P417331

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343212	NO2NO3-N	95.6	94.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P417096

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343187	Total-P	103	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P417046

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343368	O-Phosphate-P	99.9	99.4	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P416969

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343014	Anatoxin-a	91.6	96.6	P/P	40 - 150

Reference Method: EPA 8321B

Batch ID: P417021

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2343361	Cylindrospermopsin	86.7	91.8	P/P	40 - 150
2343361	Desmethyl microcystin LR	81.1	83.1	P/P	40 - 150
2343361	Microcystin H1LR	85.6	83.4	P/P	40 - 150
2343361	Microcystin HtyR	81.3	86.1	P/P	40 - 150
2343361	Microcystin LA	82.2	87.6	P/P	40 - 150
2343361	Microcystin LF	77.6	72.9	P/P	40 - 150
2343361	Microcystin LR	74.7	77.9	P/P	40 - 150
2343361	Microcystin LW	76.2	77.1	P/P	40 - 150
2343361	Microcystin LY	77.8	79.1	P/P	40 - 150
2343361	Microcystin RR	85.9	83.5	P/P	40 - 150
2343361	Microcystin WR	81.5	84.5	P/P	40 - 150
2343361	Microcystin YR	73.1	80.3	P/P	40 - 150
2343361	Nodularin-R	81.2	86.3	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P417420

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344026	Ammonia-N	0.116	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P417235

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343341	Kjeldahl Nitrogen	0.134	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P417331

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343212	NO2NO3-N	1.05	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P417096

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343187	Total-P	1.69	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P417046

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343368	O-Phosphate-P	0.348	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P416969

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343014	Anatoxin-a	5.28	Spike	P	0 - 30

Reference Method: EPA 8321B

Batch ID: P417021

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343361	Cylindrospermopsin	5.65	Spike	P	0 - 30
2343361	Desmethyl microcystin LR	2.47	Spike	P	0 - 30
2343361	Microcystin HtLR	2.50	Spike	P	0 - 30
2343361	Microcystin HtyR	5.76	Spike	P	0 - 30
2343361	Microcystin LA	6.25	Spike	P	0 - 30
2343361	Microcystin LF	6.28	Spike	P	0 - 30
2343361	Microcystin LR	4.16	Spike	P	0 - 30
2343361	Microcystin LW	1.18	Spike	P	0 - 30
2343361	Microcystin LY	1.72	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P417021

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2343361	Microcystin RR	2.80	Spike	P	0 - 30
2343361	Microcystin WR	3.55	Spike	P	0 - 30
2343361	Microcystin YR	9.41	Spike	P	0 - 30
2343361	Nodularin-R	6.05	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2343366
Field Sample ID: SEHAB0084

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	72.9	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	43.8	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A113623
Included Lab Sample IDs: 2343366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	91.3	91.4	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113668
Included Lab Sample IDs: 2343368

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	96.9	97.4	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A113671
Included Lab Sample IDs: 2343366

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	109	108	P/P	60 - 160
Desmethyl microcystin LR	94.3	98.9	P/P	60 - 160
Microcystin HII R	97.5	104	P/P	60 - 160
Microcystin HtyR	96.9	103	P/P	60 - 160
Microcystin LA	104	105	P/P	50 - 160
Microcystin LF	97.5	99.0	P/P	60 - 160
Microcystin LR	96.2	92.4	P/P	60 - 160
Microcystin LW	97.9	101	P/P	60 - 160
Microcystin LY	94.5	98.4	P/P	60 - 160
Microcystin RR	99.6	102	P/P	60 - 160
Microcystin WR	104	102	P/P	60 - 160
Microcystin YR	95.8	91.0	P/P	60 - 160
Nodularin-R	98.9	98.4	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113735
Included Lab Sample IDs: 2343367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113764
Included Lab Sample IDs: 2343367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.8	99.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113767
Included Lab Sample IDs: 2343367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113803

Included Lab Sample IDs: 2343367

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.2	99.3	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	91.0	100	99.8			0.116
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	93.8	93.7			0.134
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	95.6	94.6			1.05
EPA 365.1 Rev. 2.0	Total-P	103	103	105			1.69
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.4	99.4	99.9			0.348
EPA 8321B	Anatoxin-a	101	91.6	96.6			5.28
	Cylindrospermopsin	97.3	86.7	91.8			5.65
	Desmethyl microcystin LR	96.9	81.1	83.1			2.47
	Microcystin HiLR	96.4	85.6	83.4			2.50
	Microcystin HtyR	93.3	81.3	86.1			5.76
	Microcystin LA	95.6	82.2	87.6			6.25
	Microcystin LF	85.0	77.6	72.9			6.28
	Microcystin LR	88.6	74.7	77.9			4.16
	Microcystin LW	86.5	76.2	77.1			1.18
	Microcystin LY	89.9	77.8	79.1			1.72
	Microcystin RR	94.8	85.9	83.5			2.80
	Microcystin WR	89.5	81.5	84.5			3.55
	Microcystin YR	87.3	73.1	80.3			9.41
	Nodularin-R	95.8	81.2	86.3			6.05

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2343367
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2343367
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2343367
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2343367
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2343368
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2343366
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2343366

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	07/22/2022			07/29/2022 11:38	Ping Hua	2343367
EPA 351.2 Rev. 2.0	07/22/2022	07/27/2022 11:55	Simonne.V. Calhoun	07/28/2022 12:41	Samantha L Bates	2343367
EPA 353.2 Rev. 2.0	07/22/2022			07/27/2022 17:03	Touraj Touran	2343367
EPA 365.1 Rev. 2.0	07/22/2022	07/25/2022 15:50	Adam P Silver	07/27/2022 14:21	James L Waggeberby	2343367
EPA 365.1 Rev. 2.0 dissolved	07/22/2022			07/22/2022 15:49	Chandler E Cox	2343368
EPA 8321B	07/22/2022	07/22/2022 12:00	Manjita Shrestha	07/22/2022 15:16	Manjita Shrestha	2343366
	07/22/2022	07/22/2022 12:00	Umesh Chiluwal	07/22/2022 17:28	Umesh Chiluwal	2343366