Chemical Analysis Report

WQAP-2023-04-06-02

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2023-01-09-47**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Fort Pierce, FL 34945
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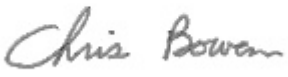
Date Certified: 21-APR-2023 11:04



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: L 8 Tieback Canal **Collection Date/Time: 04/05/2023 13:05**

Field ID: SEHAB0048 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2398683	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P428115	
		Cylindrospermopsin	0.10	U	ug/L	P428114	
		Desmethyl microcystin LR	0.25	U	ug/L	P428114	
		Microcystin HilR	0.25	U	ug/L	P428114	
		Microcystin HtyR	0.25	U	ug/L	P428114	
		Microcystin LA	0.10	U	ug/L	P428114	
		Microcystin LF	0.10	U	ug/L	P428114	
		Microcystin LR	0.25	U	ug/L	P428114	
		Microcystin LW	0.25	U	ug/L	P428114	
		Microcystin LY	0.10	U	ug/L	P428114	
		Microcystin RR	0.10	U	ug/L	P428114	
		Microcystin WR	0.50	U	ug/L	P428114	
		Neosaxitoxin	0.50	U	ug/L	P428115	
		Microcystin YR	0.25	U	ug/L	P428114	
		Saxitoxin	0.50	U	ug/L	P428115	
		Nodularin-R	0.10	U	ug/L	P428114	
2398692	EPA 350.1 Rev. 2.0	Ammonia-N	0.11		mg N/L	P428202	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P428585	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.43		mg N/L	P428305	
	EPA 365.1 Rev. 2.0	Total-P	0.21		mg P/L	P428241	
2398693	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.097		mg P/L	P428145	

Ref. Method and Comment:
EPA 351.2 Rev. 2.0: 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: P428202

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428585

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428305

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428241

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428145

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

Reference Method: EPA 8321B
Batch ID: P428114

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HilR	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

Reference Method: EPA 8321B
Batch ID: P428115

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428202

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428585

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428305

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: P428241

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	97.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428145

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

Reference Method: EPA 8321B
Batch ID: P428114

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	95.1		P	40 - 150
Desmethyl microcystin LR	95.1		P	40 - 150
Microcystin HilR	105		P	40 - 150
Microcystin HtyR	109		P	40 - 150
Microcystin LA	117		P	40 - 150
Microcystin LF	104		P	40 - 150
Microcystin LR	111		P	40 - 150
Microcystin LW	118		P	40 - 150
Microcystin LY	99.1		P	40 - 150
Microcystin RR	103		P	40 - 150
Microcystin WR	114		P	40 - 150
Microcystin YR	110		P	40 - 150
Nodularin-R	100		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P428115

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	72.0		P	40 - 150
Neosaxitoxin	102		P	40 - 150
Saxitoxin	82.5		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428202

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2398653	Ammonia-N	94.6	94.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428305

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2398639	NO2NO3-N	104	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428241

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2398653	Total-P	98.1	99.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2398756	O-Phosphate-P	95.7	96.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P428114

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2398636	Cylindrospermopsin	95.3	86.7	P/P	40 - 150
2398636	Desmethyl microcystin LR	97.6	96.8	P/P	40 - 150
2398636	Microcystin HilR	112	108	P/P	40 - 150
2398636	Microcystin HtyR	106	107	P/P	40 - 150
2398636	Microcystin LA	114	138	P/P	40 - 150
2398636	Microcystin LF	105	104	P/P	40 - 150
2398636	Microcystin LR	107	104	P/P	40 - 150
2398636	Microcystin LW	108	144	P/P	40 - 150
2398636	Microcystin LY	101	98.1	P/P	40 - 150
2398636	Microcystin RR	104	98.7	P/P	40 - 150
2398636	Microcystin WR	115	100	P/P	40 - 150
2398636	Microcystin YR	116	104	P/P	40 - 150
2398636	Nodularin-R	101	96.3	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P428115

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2398636	Anatoxin-a	76.4	64.9	P/P	40 - 150
2398636	Neosaxitoxin	88.5	76.5	P/P	40 - 150
2398636	Saxitoxin	76.4	62.6	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P428202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398653	Ammonia-N	0.212	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P428585

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398776	Kjeldahl Nitrogen	2.46	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P428305

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398639	NO2NO3-N	0.484	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P428241

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398653	Total-P	1.74	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P428145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398756	O-Phosphate-P	0.729	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P428114

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398636	Cylindrospermopsin	9.53	Spike	P	0 - 30
2398636	Desmethyl microcystin LR	0.830	Spike	P	0 - 30
2398636	Microcystin HilR	3.95	Spike	P	0 - 30
2398636	Microcystin HtyR	1.73	Spike	P	0 - 30
2398636	Microcystin LA	19.3	Spike	P	0 - 30
2398636	Microcystin LF	1.01	Spike	P	0 - 30
2398636	Microcystin LR	2.66	Spike	P	0 - 30
2398636	Microcystin LW	28.1	Spike	P	0 - 30
2398636	Microcystin LY	2.77	Spike	P	0 - 30
2398636	Microcystin RR	4.66	Spike	P	0 - 30
2398636	Microcystin WR	13.8	Spike	P	0 - 30
2398636	Microcystin YR	10.9	Spike	P	0 - 30
2398636	Nodularin-R	4.72	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P428115

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2398636	Anatoxin-a	16.4	Spike	P	0 - 30
2398636	Neosaxitoxin	14.6	Spike	P	0 - 30
2398636	Saxitoxin	19.8	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2398683
Field Sample ID: SEHAB0048

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	99.8	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	81.0	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A118420
Included Lab Sample IDs: 2398693

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	100	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A118423
Included Lab Sample IDs: 2398683

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	81.5	93.1	P/P	50 - 160
Desmethyl microcystin LR	96.3	104	P/P	50 - 160
Microcystin HilR	100	106	P/P	50 - 160
Microcystin HtyR	102	102	P/P	50 - 160
Microcystin LA	107	130	P/P	50 - 160
Microcystin LF	89.9	128	P/P	50 - 160
Microcystin LR	100	104	P/P	50 - 160
Microcystin LW	112	116	P/P	50 - 160
Microcystin LY	91.9	134	P/P	50 - 160
Microcystin RR	96.4	101	P/P	50 - 160
Microcystin WR	105	108	P/P	50 - 160
Microcystin YR	117	108	P/P	50 - 160
Nodularin-R	95.0	98.3	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A118424
Included Lab Sample IDs: 2398683

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	67.5	64.0	P/P	50 - 160
Neosaxitoxin	95.3	90.4	P/P	50 - 160
Saxitoxin	77.9	77.8	P/P	50 - 160

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A118446
Included Lab Sample IDs: 2398692

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.0	97.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A118495
Included Lab Sample IDs: 2398692

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A118498
Included Lab Sample IDs: 2398692

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A118660
Included Lab Sample IDs: 2398692

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	101	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	95.0	94.6	94.4			0.212
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	96.6					2.46
EPA 353.2 Rev. 2.0	NO2NO3-N	102	104	103			0.484
EPA 365.1 Rev. 2.0	Total-P	97.0	98.1	99.9			1.74
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	95.7	96.4			0.729
EPA 8321B	Anatoxin-a	72.0	76.4	64.9			16.4
	Cylindrospermopsin	95.1	95.3	86.7			9.53
	Desmethyl microcystin LR	95.1	97.6	96.8			0.830
	Microcystin HilR	105	112	108			3.95
	Microcystin HtyR	109	106	107			1.73
	Microcystin LA	117	114	138			19.3
	Microcystin LF	104	105	104			1.01
	Microcystin LR	111	107	104			2.66
	Microcystin LW	118	108	144			28.1
	Microcystin LY	99.1	101	98.1			2.77
	Microcystin RR	103	104	98.7			4.66
	Microcystin WR	114	115	100			13.8
	Microcystin YR	110	116	104			10.9
	Neosaxitoxin	102	88.5	76.5			14.6
	Nodularin-R	100	101	96.3			4.72
	Saxitoxin	82.5	76.4	62.6			19.8

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2398692
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2398692
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2398692
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2398692
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2398693
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2398683
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2398683

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	04/06/2023			04/07/2023 13:45	Khloe J Berg	2398692
EPA 351.2 Rev. 2.0	04/06/2023	04/18/2023 09:03	Simonne.V. Calhoun	04/19/2023 13:06	Samantha L Bates	2398692
EPA 353.2 Rev. 2.0	04/06/2023			04/11/2023 09:56	Beverly Y. Sanders	2398692
EPA 365.1 Rev. 2.0	04/06/2023	04/10/2023 17:45	Alexis Price	04/11/2023 10:59	Simonne.V. Calhoun	2398692
EPA 365.1 Rev. 2.0 dissolved	04/06/2023			04/06/2023 14:55	James L Waggerby	2398693
EPA 8321B	04/06/2023	04/06/2023 12:00	Manjita Shrestha	04/06/2023 15:10	Manjita Shrestha	2398683
	04/06/2023	04/06/2023 12:00	Manjita Shrestha	04/06/2023 19:35	Manjita Shrestha	2398683