

Chemical Analysis Report

WQAP-2023-08-29-02

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

Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2023-07-24-36**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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2199 South Rock Road
Fort Pierce, FL 34945
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Certified by: Chris Bowen, Environmental Administrator

Date Certified: 18-SEP-2023 12:50



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: Loxahatchee River SE County Line Road Bridge

Collection Date/Time: 08/28/2023 14:20

Field ID: SEHAB0102

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2433967	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P434459	
		Cylindrospermopsin	0.10	U	ug/L	P434456	
		Desmethyl microcystin LR	0.25	U	ug/L	P434456	
		Microcystin HilR	0.25	U	ug/L	P434456	
		Microcystin HtyR	0.25	U	ug/L	P434456	
		Microcystin LA	0.10	U	ug/L	P434456	
		Microcystin LF	0.10	U	ug/L	P434456	
		Microcystin LR	0.25	U	ug/L	P434456	
		Microcystin LW	0.25	U	ug/L	P434456	
		Microcystin LY	0.10	U	ug/L	P434456	
		Microcystin RR	0.10	U	ug/L	P434456	
		Microcystin WR	0.50	U	ug/L	P434456	
		Neosaxitoxin	0.50	U	ug/L	P434459	
		Microcystin YR	0.25	U	ug/L	P434456	
		Saxitoxin	0.50	U	ug/L	P434459	
		Nodularin-R	0.10	U	ug/L	P434456	
2433968	EPA 350.1 Rev. 2.0	Ammonia-N	0.050		mg N/L	P434575	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.84		mg N/L	P434761	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P434757	
	EPA 365.1 Rev. 2.0	Total-P	0.054		mg P/L	P434847	
2433969	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.013		mg P/L	P434485	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434575

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434761

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434757

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434847

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434485

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

Reference Method: EPA 8321B
Batch ID: P434456

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

Reference Method: EPA 8321B
Batch ID: P434459

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: P434575

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434761

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434757

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434847

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	107		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434485

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

Reference Method: EPA 8321B
Batch ID: P434456

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	101		P	40 - 160
Desmethyl microcystin LR	96.6		P	40 - 160
Microcystin H1R	92.6		P	40 - 160
Microcystin HtyR	98.7		P	40 - 160
Microcystin LA	87.3		P	40 - 160
Microcystin LF	103		P	40 - 160
Microcystin LR	91.9		P	40 - 160
Microcystin LW	104		P	40 - 160
Microcystin LY	99.6		P	40 - 160
Microcystin RR	93.5		P	40 - 160
Microcystin WR	105		P	40 - 160
Microcystin YR	91.7		P	40 - 160
Nodularin-R	87.3		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P434459

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	107		P	40 - 150
Neosaxitoxin	97.8		P	40 - 150
Saxitoxin	95.2		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434575

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433934	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434761

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433936	Kjeldahl Nitrogen	102	96.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434757

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433932	NO2NO3-N	97.4	98.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434847

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2434025	Total-P	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434485

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433895	O-Phosphate-P	102	103	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P434456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433823	Cylindrospermopsin	95.4	94.8	P/P	40 - 160
2433823	Desmethyl microcystin LR	89.9	86.5	P/P	40 - 160
2433823	Microcystin HiLR	85.8	77.6	P/P	40 - 160
2433823	Microcystin HtyR	86.9	84.0	P/P	40 - 160
2433823	Microcystin LA	81.0	76.9	P/P	40 - 160
2433823	Microcystin LF	105	101	P/P	40 - 160
2433823	Microcystin LR	85.8	74.3	P/P	40 - 160
2433823	Microcystin LW	103	101	P/P	40 - 160
2433823	Microcystin LY	90.7	90.3	P/P	40 - 160
2433823	Microcystin RR	81.6	77.3	P/P	40 - 160
2433823	Microcystin WR	97.6	88.0	P/P	40 - 160
2433823	Microcystin YR	78.9	77.4	P/P	40 - 160
2433823	Nodularin-R	78.1	73.5	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P434459

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2433823	Anatoxin-a	99.2	103	P/P	40 - 150
2433823	Neosaxitoxin	65.2	68.3	P/P	40 - 150
2433823	Saxitoxin	76.9	80.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434575

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433934	Ammonia-N	0.538	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434761

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433936	Kjeldahl Nitrogen	4.47	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434757

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433932	NO2NO3-N	0.995	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434847

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2434025	Total-P	0.391	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P434485

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433895	O-Phosphate-P	0.777	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P434456

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433823	Cylindrospermopsin	0.576	Spike	P	0 - 30
2433823	Desmethyl microcystin LR	3.85	Spike	P	0 - 30
2433823	Microcystin H1LR	10.0	Spike	P	0 - 30
2433823	Microcystin HtyR	3.38	Spike	P	0 - 30
2433823	Microcystin LA	5.22	Spike	P	0 - 30
2433823	Microcystin LF	4.05	Spike	P	0 - 30
2433823	Microcystin LR	14.4	Spike	P	0 - 30
2433823	Microcystin LW	1.22	Spike	P	0 - 30
2433823	Microcystin LY	0.508	Spike	P	0 - 30
2433823	Microcystin RR	5.38	Spike	P	0 - 30
2433823	Microcystin WR	10.3	Spike	P	0 - 30
2433823	Microcystin YR	1.98	Spike	P	0 - 30
2433823	Nodularin-R	6.11	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P434459

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2433823	Anatoxin-a	4.11	Spike	P	0 - 30
2433823	Neosaxitoxin	4.62	Spike	P	0 - 30
2433823	Saxitoxin	3.88	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2433967
Field Sample ID: SEHAB0102

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	82.1	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	83.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A121310

Included Lab Sample IDs: 2433969

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	98.7	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A121334

Included Lab Sample IDs: 2433967

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	98.8	P/P	50 - 160
Neosaxitoxin	101	101	P/P	50 - 160
Saxitoxin	108	106	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A121336

Included Lab Sample IDs: 2433967

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	100	98.8	P/P	60 - 160
Desmethyl microcystin LR	87.5	95.3	P/P	50 - 160
Microcystin H1R	78.7	84.0	P/P	60 - 160
Microcystin HtyR	87.2	91.1	P/P	60 - 160
Microcystin LA	79.2	80.7	P/P	50 - 160
Microcystin LF	87.0	81.1	P/P	60 - 160
Microcystin LR	82.1	77.7	P/P	60 - 160
Microcystin LW	80.7	78.1	P/P	60 - 160
Microcystin LY	83.4	78.5	P/P	60 - 160
Microcystin RR	92.1	92.5	P/P	60 - 160
Microcystin WR	86.5	95.4	P/P	60 - 160
Microcystin YR	86.7	77.1	P/P	60 - 160
Nodularin-R	89.6	85.4	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A121357

Included Lab Sample IDs: 2433968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.8	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A121435

Included Lab Sample IDs: 2433968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A121508

Included Lab Sample IDs: 2433968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	100	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A121547

Included Lab Sample IDs: 2433968

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.9	97.9	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
EPA 350.1 Rev. 2.0	Ammonia-N	95.8	101	102		0.538
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	102	96.6		4.47
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	97.4	98.4		0.995
EPA 365.1 Rev. 2.0	Total-P	107	102	102		0.391
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	102	103		0.777
EPA 8321B	Anatoxin-a	107	99.2	103		4.11
	Cylindrospermopsin	101	95.4	94.8		0.576
	Desmethyl microcystin LR	96.6	89.9	86.5		3.85
	Microcystin HiLR	92.6	85.8	77.6		10.0
	Microcystin HtyR	98.7	86.9	84.0		3.38
	Microcystin LA	87.3	81.0	76.9		5.22
	Microcystin LF	103	105	101		4.05
	Microcystin LR	91.9	85.8	74.3		14.4
	Microcystin LW	104	103	101		1.22
	Microcystin LY	99.6	90.7	90.3		0.508
	Microcystin RR	93.5	81.6	77.3		5.38
	Microcystin WR	105	97.6	88.0		10.3
	Microcystin YR	91.7	78.9	77.4		1.98
	Neosaxitoxin	97.8	65.2	68.3		4.62
	Nodularin-R	87.3	78.1	73.5		6.11
	Saxitoxin	95.2	76.9	80.0		3.88

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2433968
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2433968
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2433968
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2433968
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2433969
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2433967
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2433967

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	08/29/2023			09/05/2023 13:28	Khloe J Berg	2433968
EPA 351.2 Rev. 2.0	08/29/2023	09/11/2023 13:57	Simonne.V. Calhoun	09/14/2023 15:49	Samantha L Bates	2433968
EPA 353.2 Rev. 2.0	08/29/2023			09/08/2023 12:39	Anna M. Plaviak	2433968
EPA 365.1 Rev. 2.0	08/29/2023	09/12/2023 17:58	Adam P Silver	09/13/2023 14:04	Simonne.V. Calhoun	2433968
EPA 365.1 Rev. 2.0 dissolved	08/29/2023			08/29/2023 13:22	Elise M. Gillis	2433969
EPA 8321B	08/29/2023	08/30/2023 12:00	Tae K Lee	09/01/2023 14:41	Hana Lee	2433967
	08/29/2023	09/01/2023 10:00	Tae K Lee	09/01/2023 13:36	Hana Lee	2433967