

Chemical Analysis Report

WQAP-2023-08-17-02

Florida DEP Laboratory
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DOH Accreditation E31780

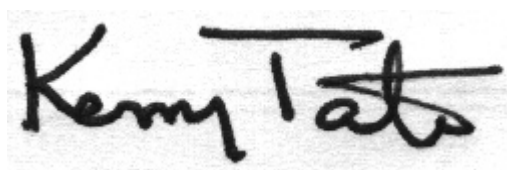
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2023-07-24-36**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

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Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 08-SEP-2023 14:41

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line extending from the end of the name.

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: C44 Canal - Timer Powers Park

Collection Date/Time: 08/16/2023 10:40

Field ID: SEHAB0046

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2431850	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P433961	
		Cylindrospermopsin	0.10	U	ug/L	P433960	
		Desmethyl microcystin LR	0.25	U	ug/L	P433960	
		Microcystin HILR	0.25	U	ug/L	P433960	
		Microcystin HtyR	0.25	U	ug/L	P433960	
		Microcystin LA	0.10	U	ug/L	P433960	
		Microcystin LF	0.10	U	ug/L	P433960	
		Microcystin LR	3.1		ug/L	P433960	
		Microcystin LW	0.25	U	ug/L	P433960	
		Microcystin LY	0.10	U	ug/L	P433960	
		Microcystin RR	0.10	U	ug/L	P433960	
		Microcystin WR	0.50	U	ug/L	P433960	
		Neosaxitoxin	0.50	U	ug/L	P433961	
		Microcystin YR	0.25	U	ug/L	P433960	
		Saxitoxin	0.50	U	ug/L	P433961	
		Nodularin-R	0.10	U	ug/L	P433960	
2431867	EPA 350.1 Rev. 2.0	Ammonia-N	0.078		mg N/L	P434434	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P434561	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.052		mg N/L	P434569	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P434111	
2431868	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P433983	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434434

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434569

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434111

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433983

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

Reference Method: EPA 8321B
Batch ID: P433960

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: P433961

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: P434434

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

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: P434569

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434111

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: P433983

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

Reference Method: EPA 8321B
Batch ID: P433960

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	103		P	40 - 160
Desmethyl microcystin LR	99.0		P	40 - 160
Microcystin H1R	88.9		P	40 - 160
Microcystin HtyR	88.1		P	40 - 160
Microcystin LA	96.7		P	40 - 160
Microcystin LF	79.6		P	40 - 160
Microcystin LR	91.8		P	40 - 160
Microcystin LW	83.6		P	40 - 160
Microcystin LY	85.4		P	40 - 160
Microcystin RR	90.5		P	40 - 160
Microcystin WR	101		P	40 - 160
Microcystin YR	78.3		P	40 - 160
Nodularin-R	98.1		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433961

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	99.7		P	40 - 150
Neosaxitoxin	116		P	40 - 150
Saxitoxin	90.8		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434434

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431882	Ammonia-N	96.6	98.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P434561

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2432122	Kjeldahl Nitrogen	109	94.9	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434569

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431768	NO2NO3-N	100	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P434111

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431908	Total-P	108	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433983

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431786	O-Phosphate-P	100	99.7	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P433960

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431736	Cylindrospermopsin	128	122	P/P	40 - 160
2431736	Desmethyl microcystin LR	101	107	P/P	40 - 160
2431736	Microcystin HiLR	106	96.5	P/P	40 - 160
2431736	Microcystin HtyR	98.4	90.5	P/P	40 - 160
2431736	Microcystin LA	112	97.3	P/P	40 - 160
2431736	Microcystin LF	94.3	85.8	P/P	40 - 160
2431736	Microcystin LR	104	98.2	P/P	40 - 160
2431736	Microcystin LW	92.7	90.2	P/P	40 - 160
2431736	Microcystin LY	90.5	82.2	P/P	40 - 160
2431736	Microcystin RR	97.1	94.9	P/P	40 - 160
2431736	Microcystin WR	110	107	P/P	40 - 160
2431736	Microcystin YR	88.0	84.2	P/P	40 - 160
2431736	Nodularin-R	114	106	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433961

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2431736	Anatoxin-a	86.7	90.8	P/P	40 - 150
2431736	Neosaxitoxin	71.5	72.5	P/P	40 - 150
2431736	Saxitoxin	60.7	60.5	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P434434

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431882	Ammonia-N	1.19	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P434561

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2432122	Kjeldahl Nitrogen	6.86	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P434569

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431768	NO2NO3-N	2.35	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P434111

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431908	Total-P	8.03	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P433983

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431786	O-Phosphate-P	0.500	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P433960

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431736	Cylindrospermopsin	4.87	Spike	P	0 - 30
2431736	Desmethyl microcystin LR	5.58	Spike	P	0 - 30
2431736	Microcystin H1LR	9.19	Spike	P	0 - 30
2431736	Microcystin HtyR	8.33	Spike	P	0 - 30
2431736	Microcystin LA	14.0	Spike	P	0 - 30
2431736	Microcystin LF	9.41	Spike	P	0 - 30
2431736	Microcystin LR	5.26	Spike	P	0 - 30
2431736	Microcystin LW	2.72	Spike	P	0 - 30
2431736	Microcystin LY	9.55	Spike	P	0 - 30
2431736	Microcystin RR	2.24	Spike	P	0 - 30
2431736	Microcystin WR	2.87	Spike	P	0 - 30
2431736	Microcystin YR	4.34	Spike	P	0 - 30
2431736	Nodularin-R	7.60	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P433961

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2431736	Anatoxin-a	4.69	Spike	P	0 - 30
2431736	Neosaxitoxin	1.38	Spike	P	0 - 30
2431736	Saxitoxin	0.235	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2431850
Field Sample ID: SEHAB0046

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	84.5	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	86.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A121095

Included Lab Sample IDs: 2431868

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	97.3	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A121105

Included Lab Sample IDs: 2431850

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	115	120	P/P	60 - 160
Desmethyl microcystin LR	91.7	91.6	P/P	50 - 160
Microcystin HtIR	90.5	89.2	P/P	60 - 160
Microcystin HtyR	84.8	79.2	P/P	60 - 160
Microcystin LA	88.5	94.1	P/P	50 - 160
Microcystin LF	79.9	80.2	P/P	60 - 160
Microcystin LR	86.9	89.5	P/P	60 - 160
Microcystin LW	83.4	82.3	P/P	60 - 160
Microcystin LY	78.9	83.7	P/P	60 - 160
Microcystin RR	91.4	92.4	P/P	60 - 160
Microcystin WR	95.6	92.6	P/P	60 - 160
Microcystin YR	77.1	81.3	P/P	60 - 160
Nodularin-R	93.9	92.7	P/P	60 - 160

Reference Method: EPA 8321B

Run ID: A121106

Included Lab Sample IDs: 2431850

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	102	98.6	P/P	50 - 160
Neosaxitoxin	128	127	P/P	50 - 160
Saxitoxin	94.3	93.8	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A121162

Included Lab Sample IDs: 2431867

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A121289

Included Lab Sample IDs: 2431867

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

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A121383

Included Lab Sample IDs: 2431867

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	97.7	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		Precision	MS
			LCS	SMP		
EPA 350.1 Rev. 2.0	Ammonia-N	101	96.6	98.2		1.19
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	109	94.9		6.86
EPA 353.2 Rev. 2.0	NO2NO3-N	104	100	102		2.35
EPA 365.1 Rev. 2.0	Total-P	103	108	99.8		8.03
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	100	99.7		0.500
EPA 8321B	Anatoxin-a	99.7	86.7	90.8		4.69
	Cylindrospermopsin	103	128	122		4.87
	Desmethyl microcystin LR	99.0	101	107		5.58
	Microcystin HiLR	88.9	106	96.5		9.19
	Microcystin HtyR	88.1	98.4	90.5		8.33
	Microcystin LA	96.7	112	97.3		14.0
	Microcystin LF	79.6	94.3	85.8		9.41
	Microcystin LR	91.8	104	98.2		5.26
	Microcystin LW	83.6	92.7	90.2		2.72
	Microcystin LY	85.4	90.5	82.2		9.55
	Microcystin RR	90.5	97.1	94.9		2.24
	Microcystin WR	101	110	107		2.87
	Microcystin YR	78.3	88.0	84.2		4.34
	Neosaxitoxin	116	71.5	72.5		1.38
	Nodularin-R	98.1	114	106		7.60
	Saxitoxin	90.8	60.7	60.5		0.235

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2431867
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2431867
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2431867
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2431867
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2431868
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2431850
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2431850

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	08/17/2023			08/28/2023 13:24	Khloe J Berg	2431867
EPA 351.2 Rev. 2.0	08/17/2023	09/05/2023 15:58	Simonne.V. Calhoun	09/06/2023 16:53	Samantha L Bates	2431867
EPA 353.2 Rev. 2.0	08/17/2023			09/01/2023 12:55	Anna M. Plaviak	2431867
EPA 365.1 Rev. 2.0	08/17/2023	08/21/2023 16:54	Adam P Silver	08/22/2023 10:00	James L Waggeberby	2431867
EPA 365.1 Rev. 2.0 dissolved	08/17/2023			08/17/2023 12:28	Elise M. Gillis	2431868
EPA 8321B	08/17/2023	08/17/2023 13:00	Tae K Lee	08/17/2023 23:40	Hana Lee	2431850
	08/17/2023	08/17/2023 13:00	Tae K Lee	08/18/2023 04:14	Hana Lee	2431850