

Chemical Analysis Report

SO-DIST-2023-08-09-02

Florida DEP Laboratory
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Tallahassee, FL 32399-2400
DOH Accreditation E31780

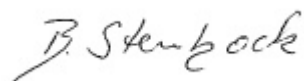
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-07-03-59**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901-3381
Attn: John Barrington

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Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator

Date Certified: 29-AUG-2023 12:00



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 - N of Loftons Island

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

Field ID: HAB-SD-080823-1040

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2429777	DEP SOP: NU-094-1	Color (true)	150		PCU	P433637	
2429778	EPA 350.1 Rev. 2.0	Ammonia-N	0.023		mg N/L	P434067	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P433841	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P434368	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P433768	
2429779	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.13		mg P/L	P433631	
2429788	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P433611	
		Cylindrospermopsin	0.10	U	ug/L	P433610	
		Desmethyl microcystin LR	0.25	U	ug/L	P433610	
		Microcystin HiLR	0.25	U	ug/L	P433610	
		Microcystin HtyR	0.25	U	ug/L	P433610	
		Microcystin LA	0.10	U	ug/L	P433610	
		Microcystin LF	0.10	U	ug/L	P433610	
		Microcystin LR	0.25	U	ug/L	P433610	
		Microcystin LW	0.25	U	ug/L	P433610	
		Microcystin LY	0.10	U	ug/L	P433610	
		Microcystin RR	0.10	U	ug/L	P433610	
		Microcystin WR	0.50	U	ug/L	P433610	
		Neosaxitoxin	0.50	U	ug/L	P433611	
		Microcystin YR	0.25	U	ug/L	P433610	
		Saxitoxin	0.50	U	ug/L	P433611	
		Nodularin-R	0.10	U	ug/L	P433610	

Ref. Method and Comment:

EPA 350.1 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: DEP SOP: NU-094-1
Batch ID: P433637

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434067

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433841

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434368

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433768

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433631

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

Reference Method: EPA 8321B
Batch ID: P433610

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

Method Blank Results

Reference Method: EPA 8321B
Batch ID: P433611

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: DEP SOP: NU-094-1
Batch ID: P433637

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434067

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: P433841

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: P434368

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433768

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.7		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433631

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

Reference Method: EPA 8321B
Batch ID: P433610

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	106		P	40 - 160
Desmethyl microcystin LR	112		P	40 - 160
Microcystin HILR	114		P	40 - 160
Microcystin HtyR	104		P	40 - 160
Microcystin LA	120		P	40 - 160
Microcystin LF	101		P	40 - 160
Microcystin LR	101		P	40 - 160
Microcystin LW	105		P	40 - 160
Microcystin LY	106		P	40 - 160
Microcystin RR	107		P	40 - 160
Microcystin WR	118		P	40 - 160
Microcystin YR	94.8		P	40 - 160
Nodularin-R	101		P	40 - 160

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 8321B
Batch ID: P433611

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	86.7		P	40 - 150
Neosaxitoxin	78.4		P	40 - 150
Saxitoxin	73.8		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433841

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2429400	Kjeldahl Nitrogen	98.9	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434368

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2429053	NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433768

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2429822	Total-P	105	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433631

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2429827	O-Phosphate-P	95.1	97.2	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P433610

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2429518	Cylindrospermopsin	107	104	P/P	40 - 160
2429518	Desmethyl microcystin LR	122	116	P/P	40 - 160
2429518	Microcystin HilR	118	115	P/P	40 - 160
2429518	Microcystin HtyR	108	106	P/P	40 - 160
2429518	Microcystin LA	116	119	P/P	40 - 160
2429518	Microcystin LF	107	103	P/P	40 - 160
2429518	Microcystin LR	100	103	P/P	40 - 160
2429518	Microcystin LW	107	107	P/P	40 - 160
2429518	Microcystin LY	107	106	P/P	40 - 160
2429518	Microcystin RR	107	106	P/P	40 - 160
2429518	Microcystin WR	123	122	P/P	40 - 160
2429518	Microcystin YR	95.1	94.1	P/P	40 - 160
2429518	Nodularin-R	108	106	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2429518	Anatoxin-a	72.2	77.6	P/P	40 - 150
2429518	Neosaxitoxin	51.9	55.6	P/P	40 - 150
2429518	Saxitoxin	50.3	54.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: DEP SOP: NU-094-1
Batch ID: P433637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429734	Color (true)	1.42	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P434067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429822	Ammonia-N	0.945	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433841

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429400	Kjeldahl Nitrogen	2.32	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P434368

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429053	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433768

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429822	Total-P	1.20	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433631

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429827	O-Phosphate-P	2.18	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P433610

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429518	Cylindrospermopsin	2.54	Spike	P	0 - 30
2429518	Desmethyl microcystin LR	5.04	Spike	P	0 - 30
2429518	Microcystin HtIR	2.77	Spike	P	0 - 30
2429518	Microcystin HtyR	2.04	Spike	P	0 - 30
2429518	Microcystin LA	2.08	Spike	P	0 - 30
2429518	Microcystin LF	4.07	Spike	P	0 - 30
2429518	Microcystin LR	2.11	Spike	P	0 - 30
2429518	Microcystin LW	0.504	Spike	P	0 - 30
2429518	Microcystin LY	1.60	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P433610

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429518	Microcystin RR	1.01	Spike	P	0 - 30
2429518	Microcystin WR	1.43	Spike	P	0 - 30
2429518	Microcystin YR	1.14	Spike	P	0 - 30
2429518	Nodularin-R	1.65	Spike	P	0 - 30

Reference Method: EPA 8321B
Batch ID: P433611

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2429518	Anatoxin-a	7.33	Spike	P	0 - 30
2429518	Neosaxitoxin	6.93	Spike	P	0 - 30
2429518	Saxitoxin	7.09	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2429788

Field Sample ID: HAB-SD-080823-1040

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	73.2	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	87.5	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A120923

Included Lab Sample IDs: 2429779

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	98.5	P/P	90 - 110

Reference Method: DEP SOP: NU-094-1

Run ID: A120926

Included Lab Sample IDs: 2429777

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.4	97.4	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A120933

Included Lab Sample IDs: 2429788

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	102	104	P/P	60 - 160
Desmethyl microcystin LR	104	103	P/P	50 - 160
Microcystin HiiR	108	107	P/P	60 - 160
Microcystin HtyR	94.9	96.1	P/P	60 - 160
Microcystin LA	107	113	P/P	50 - 160
Microcystin LF	89.2	89.4	P/P	60 - 160
Microcystin LR	98.9	98.5	P/P	60 - 160
Microcystin LW	92.2	91.9	P/P	60 - 160
Microcystin LY	97.4	99.8	P/P	60 - 160
Microcystin RR	97.4	98.7	P/P	60 - 160
Microcystin WR	113	109	P/P	60 - 160
Microcystin YR	90.6	84.2	P/P	60 - 160
Nodularin-R	96.2	97.5	P/P	60 - 160

Reference Method: EPA 8321B

Run ID: A120937

Included Lab Sample IDs: 2429788

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	90.9	91.4	P/P	50 - 160
Neosaxitoxin	83.6	85.7	P/P	50 - 160
Saxitoxin	79.4	80.3	P/P	50 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A121016

Included Lab Sample IDs: 2429778

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	96.2	97.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A121065

Included Lab Sample IDs: 2429778

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.1	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A121131

Included Lab Sample IDs: 2429778

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.0	98.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A121245

Included Lab Sample IDs: 2429778

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	98.5	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		LCS	Precision	MS
						SMP	
DEP SOP: NU-094-1	Color (true)	97.0				1.42	
EPA 350.1 Rev. 2.0	Ammonia-N	95.8					0.945
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	101	98.9	102			2.32
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	102	102			0.0
EPA 365.1 Rev. 2.0	Total-P	99.7	105	103			1.20
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	95.1	97.2			2.18
EPA 8321B	Anatoxin-a	86.7	72.2	77.6			7.33
	Cylindrospermopsin	106	107	104			2.54
	Desmethyl microcystin LR	112	122	116			5.04
	Microcystin H ₁ LR	114	118	115			2.77
	Microcystin H ₂ LR	104	108	106			2.04
	Microcystin LA	120	116	119			2.08
	Microcystin LF	101	107	103			4.07
	Microcystin LR	101	100	103			2.11
	Microcystin LW	105	107	107			0.504
	Microcystin LY	106	107	106			1.60
	Microcystin RR	107	107	106			1.01
	Microcystin WR	118	123	122			1.43
	Microcystin YR	94.8	95.1	94.1			1.14
	Neosaxitoxin	78.4	51.9	55.6			6.93
	Nodularin-R	101	108	106			1.65
	Saxitoxin	73.8	50.3	54.0			7.09

Reference Method Descriptions

Method	Description	Associated Samples
DEP SOP: NU-094-1	True Color measured at 450 nm (not valid for NPDES monitoring)	2429777
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2429778
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2429778
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2429778
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2429778
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2429779
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2429788
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2429788

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
DEP SOP: NU-094-1	08/09/2023			08/09/2023 15:42	Alexis Price	2429777
EPA 350.1 Rev. 2.0	08/09/2023			08/18/2023 15:15	Khloe J Berg	2429778
EPA 351.2 Rev. 2.0	08/09/2023	08/15/2023 11:03	Simonne.V. Calhoun	08/16/2023 11:24	Samantha L Bates	2429778
EPA 353.2 Rev. 2.0	08/09/2023			08/25/2023 09:44	Beverly Y. Sanders	2429778
EPA 365.1 Rev. 2.0	08/09/2023	08/11/2023 14:24	Alexis Price	08/14/2023 12:04	Simonne.V. Calhoun	2429778
EPA 365.1 Rev. 2.0 dissolved	08/09/2023			08/09/2023 14:08	Elise M. Gillis	2429779
EPA 8321B	08/09/2023	08/09/2023 15:00	Hana Lee	08/10/2023 01:01	Tae K Lee	2429788
	08/09/2023	08/09/2023 15:00	Hana Lee	08/10/2023 02:52	Tae K Lee	2429788