Chemical Analysis Report

SO-DIST-2023-08-03-02

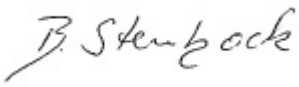
Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response -SOROC w/ blank**
Request ID: **RQ-2023-07-17-61**
Customer: **SO-DIST**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 314
Fort Myers, FL 33901-3381
Attn: John Barrington

For additional information please contact
Colin Wright, Ph.D.
Chris Bowen, B.S.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 10-AUG-2023 18:33



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 - Horton Park **Collection Date/Time: 08/02/2023 13:30**

Field ID: HAB-SD-080223-1330 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2428439	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P433330	
		Cylindrospermopsin	0.10	U	ug/L	P433329	
		Desmethyl microcystin LR	0.33	I	ug/L	P433329	
		Microcystin HilR	0.25	U	ug/L	P433329	
		Microcystin HtyR	0.25	U	ug/L	P433329	
		Microcystin LA	0.10	U	ug/L	P433329	
		Microcystin LF	0.10	U	ug/L	P433329	
		Microcystin LR	10		ug/L	P433329	
		Microcystin LW	0.25	U	ug/L	P433329	
		Microcystin LY	0.10	U	ug/L	P433329	
		Microcystin RR	0.10	U	ug/L	P433329	
		Microcystin WR	0.50	U	ug/L	P433329	
		Neosaxitoxin	0.50	U	ug/L	P433330	
		Microcystin YR	0.25	U	ug/L	P433329	
		Saxitoxin	0.50	U	ug/L	P433330	
		Nodularin-R	0.10	U	ug/L	P433329	
2428440	EPA 350.1 Rev. 2.0	Ammonia-N	0.078		mg N/L	P433561	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P433433	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.23		mg N/L	P433453	
	EPA 365.1 Rev. 2.0	Total-P	0.20		mg P/L	P433469	
2428441	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.16		mg P/L	P433403	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433561

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433433

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433453

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433469

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433403

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

Reference Method: EPA 8321B
Batch ID: P433329

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: P433330

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: P433561

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433433

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.4		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433453

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	105		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433469

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433403

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

Reference Method: EPA 8321B
Batch ID: P433329

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	103		P	40 - 160
Desmethyl microcystin LR	107		P	40 - 160
Microcystin HilR	111		P	40 - 160
Microcystin HtyR	102		P	40 - 160
Microcystin LA	112		P	40 - 160
Microcystin LF	96.5		P	40 - 160
Microcystin LR	107		P	40 - 160
Microcystin LW	108		P	40 - 160
Microcystin LY	114		P	40 - 160
Microcystin RR	109		P	40 - 160
Microcystin WR	118		P	40 - 160
Microcystin YR	102		P	40 - 160
Nodularin-R	104		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433330

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	92.2		P	40 - 150
Neosaxitoxin	87.9		P	40 - 150
Saxitoxin	85.3		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433561

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428465	Ammonia-N	97.4	98.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433433

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2427984	Kjeldahl Nitrogen	104	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433453

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428395	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433469

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428416	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433403

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428328	O-Phosphate-P	100	99.4	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P433329

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428329	Cylindrospermopsin	103	107	P/P	40 - 160
2428329	Desmethyl microcystin LR	107	104	P/P	40 - 160
2428329	Microcystin HilR	113	114	P/P	40 - 160
2428329	Microcystin HtyR	103	105	P/P	40 - 160
2428329	Microcystin LA	110	111	P/P	40 - 160
2428329	Microcystin LF	107	110	P/P	40 - 160
2428329	Microcystin LR	105	108	P/P	40 - 160
2428329	Microcystin LW	109	113	P/P	40 - 160
2428329	Microcystin LY	108	108	P/P	40 - 160
2428329	Microcystin RR	103	108	P/P	40 - 160
2428329	Microcystin WR	116	115	P/P	40 - 160
2428329	Microcystin YR	99.1	96.8	P/P	40 - 160
2428329	Nodularin-R	106	104	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P433330

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2428329	Anatoxin-a	85.6	86.5	P/P	40 - 150
2428329	Neosaxitoxin	95.9	103	P/P	40 - 150
2428329	Saxitoxin	93.4	103	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P433561

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428465	Ammonia-N	0.701	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P433433

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2427984	Kjeldahl Nitrogen	3.81	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P433453

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428395	NO2NO3-N	0.396	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P433469

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428416	Total-P	0.183	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P433403

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428328	O-Phosphate-P	0.765	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P433329

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428329	Cylindrospermopsin	4.01	Spike	P	0 - 30
2428329	Desmethyl microcystin LR	2.81	Spike	P	0 - 30
2428329	Microcystin HilR	1.07	Spike	P	0 - 30
2428329	Microcystin HtyR	2.46	Spike	P	0 - 30
2428329	Microcystin LA	0.945	Spike	P	0 - 30
2428329	Microcystin LF	2.94	Spike	P	0 - 30
2428329	Microcystin LR	2.79	Spike	P	0 - 30
2428329	Microcystin LW	3.35	Spike	P	0 - 30
2428329	Microcystin LY	0.0692	Spike	P	0 - 30
2428329	Microcystin RR	4.33	Spike	P	0 - 30
2428329	Microcystin WR	1.07	Spike	P	0 - 30
2428329	Microcystin YR	2.30	Spike	P	0 - 30
2428329	Nodularin-R	2.17	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P433330

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2428329	Anatoxin-a	0.971	Spike	P	0 - 30
2428329	Neosaxitoxin	7.11	Spike	P	0 - 30
2428329	Saxitoxin	9.63	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2428439
Field Sample ID: HAB-SD-080223-1330

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Anatoxin-a 13C4	67.6	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	104	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A120804
Included Lab Sample IDs: 2428439

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	101	100	P/P	60 - 160
Desmethyl microcystin LR	101	95.9	P/P	50 - 160
Microcystin HilR	101	104	P/P	60 - 160
Microcystin HtyR	92.1	96.3	P/P	60 - 160
Microcystin LA	108	104	P/P	50 - 160
Microcystin LF	80.6	75.4	P/P	60 - 160
Microcystin LR	94.3	93.4	P/P	60 - 160
Microcystin LW	92.8	88.6	P/P	60 - 160
Microcystin LY	101	102	P/P	60 - 160
Microcystin RR	99.1	97.6	P/P	60 - 160
Microcystin WR	102	104	P/P	60 - 160
Microcystin YR	83.4	81.6	P/P	60 - 160
Nodularin-R	96.9	95.1	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A120825
Included Lab Sample IDs: 2428441

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.1	98.6	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A120830
Included Lab Sample IDs: 2428439

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	88.0	86.4	P/P	50 - 160
Neosaxitoxin	91.3	86.6	P/P	50 - 160
Saxitoxin	83.1	83.5	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A120849
Included Lab Sample IDs: 2428440

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A120869
Included Lab Sample IDs: 2428440

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A120876
Included Lab Sample IDs: 2428440

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.6	92.8	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A120891
Included Lab Sample IDs: 2428440

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	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	96.6	97.4	98.6			0.701
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.4	104	97.8			3.81
EPA 353.2 Rev. 2.0	NO2NO3-N	105	104	104			0.396
EPA 365.1 Rev. 2.0	Total-P	101	105	104			0.183
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	100	99.4			0.765
EPA 8321B	Anatoxin-a	92.2	85.6	86.5			0.971
	Cylindrospermopsin	103	103	107			4.01
	Desmethyl microcystin LR	107	107	104			2.81
	Microcystin HilR	111	113	114			1.07
	Microcystin HtyR	102	103	105			2.46
	Microcystin LA	112	110	111			0.945
	Microcystin LF	96.5	107	110			2.94
	Microcystin LR	107	105	108			2.79
	Microcystin LW	108	109	113			3.35
	Microcystin LY	114	108	108			0.0692
	Microcystin RR	109	103	108			4.33
	Microcystin WR	118	116	115			1.07
	Microcystin YR	102	99.1	96.8			2.30
	Neosaxitoxin	87.9	95.9	103			7.11
	Nodularin-R	104	106	104			2.17
	Saxitoxin	85.3	93.4	103			9.63

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2428440
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2428440
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2428440
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2428440
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2428441
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2428439
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2428439

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	08/03/2023			08/08/2023 12:45	Khloe J Berg	2428440
EPA 351.2 Rev. 2.0	08/03/2023	08/04/2023 10:07	Dana G. Hughes	08/07/2023 12:32	Samantha L Bates	2428440
EPA 353.2 Rev. 2.0	08/03/2023			08/04/2023 10:48	Beverly Y. Sanders	2428440
EPA 365.1 Rev. 2.0	08/03/2023	08/04/2023 15:30	Alexis Price	08/07/2023 10:17	James L Waggerby	2428440
EPA 365.1 Rev. 2.0 dissolved	08/03/2023			08/03/2023 14:56	Elise M. Gillis	2428441
EPA 8321B	08/03/2023	08/03/2023 12:00	Tae K Lee	08/03/2023 17:51	Hana Lee	2428439
	08/03/2023	08/03/2023 12:00	Tae K Lee	08/03/2023 22:11	Hana Lee	2428439