

Chemical Analysis Report

WQAP-2023-01-05-02

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

Event Description: **Algal Bloom Response -Cape Coral**
Request ID: **RQ-2022-07-25-07**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 18-JAN-2023 17:55

A handwritten signature in black ink, appearing to read "Liang Lin", on a light-colored background.

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 - Franklin Lock Upstream

Collection Date/Time: 01/04/2023 08:45

Field ID: HAB-SD-010423-0845

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2378079	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P424151	
		Cylindrospermopsin	0.10	U	ug/L	P424150	
		Desmethyl microcystin LR	0.25	U	ug/L	P424150	
		Microcystin HILR	0.25	U	ug/L	P424150	
		Microcystin HtyR	0.25	U	ug/L	P424150	
		Microcystin LA	0.10	U	ug/L	P424150	
		Microcystin LF	0.10	U	ug/L	P424150	
		Microcystin LR	0.25	U	ug/L	P424150	
		Microcystin LW	0.25	U	ug/L	P424150	
		Microcystin LY	0.10	U	ug/L	P424150	
		Microcystin RR	0.10	U	ug/L	P424150	
		Microcystin WR	0.50	U	ug/L	P424150	
		Neosaxitoxin	0.50	U	ug/L	P424151	
		Microcystin YR	0.25	U	ug/L	P424150	
		Saxitoxin	0.50	U	ug/L	P424151	
		Nodularin-R	0.10	U	ug/L	P424150	
2378090	EPA 350.1 Rev. 2.0	Ammonia-N	0.027		mg N/L	P424562	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.99		mg N/L	P424260	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P424413	
	EPA 365.1 Rev. 2.0	Total-P	0.091		mg P/L	P424330	
2378091	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.056		mg P/L	P424163	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424562

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424260

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424413

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P424330

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424163

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

Reference Method: EPA 8321B
Batch ID: P424150

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: P424151

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: P424562

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424260

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424413

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: P424330

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424163

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

Reference Method: EPA 8321B
Batch ID: P424150

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	87.7		P	40 - 150
Desmethyl microcystin LR	85.5		P	40 - 150
Microcystin H1R	85.7		P	40 - 150
Microcystin HtyR	78.9		P	40 - 150
Microcystin LA	92.3		P	40 - 150
Microcystin LF	76.2		P	40 - 150
Microcystin LR	86.3		P	40 - 150
Microcystin LW	85.8		P	40 - 150
Microcystin LY	87.5		P	40 - 150
Microcystin RR	82.1		P	40 - 150
Microcystin WR	87.5		P	40 - 150
Microcystin YR	72.2		P	40 - 150
Nodularin-R	78.3		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P424151

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	104		P	40 - 150
Neosaxitoxin	119		P	40 - 150
Saxitoxin	89.0		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424562

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2378461	Ammonia-N	98.2	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424260

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2378146	Kjeldahl Nitrogen	96.9	89.5	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424413

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2378090	NO2NO3-N	98.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P424330

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2378086	Total-P	108	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424163

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2378121	O-Phosphate-P	94.0	95.7	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P424150

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2377742	Cylindrospermopsin	101	95.4	P/P	40 - 150
2377742	Desmethyl microcystin LR	113	107	P/P	40 - 150
2377742	Microcystin HiLR	105	104	P/P	40 - 150
2377742	Microcystin HtyR	102	94.1	P/P	40 - 150
2377742	Microcystin LA	97.8	96.5	P/P	40 - 150
2377742	Microcystin LF	90.4	92.7	P/P	40 - 150
2377742	Microcystin LR	111	107	P/P	40 - 150
2377742	Microcystin LW	108	91.7	P/P	40 - 150
2377742	Microcystin LY	117	111	P/P	40 - 150
2377742	Microcystin RR	99.7	92.7	P/P	40 - 150
2377742	Microcystin WR	106	106	P/P	40 - 150
2377742	Microcystin YR	94.2	90.7	P/P	40 - 150
2377742	Nodularin-R	101	94.4	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P424151

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2377742	Anatoxin-a	117	114	P/P	40 - 150
2377742	Neosaxitoxin	110	116	P/P	40 - 150
2377742	Saxitoxin	103	101	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P424562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2378461	Ammonia-N	0.753	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P424260

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2378146	Kjeldahl Nitrogen	4.45	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P424413

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2378090	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P424330

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2378086	Total-P	0.345	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P424163

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2378121	O-Phosphate-P	1.63	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P424150

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2377742	Cylindrospermopsin	5.68	Spike	P	0 - 30
2377742	Desmethyl microcystin LR	5.31	Spike	P	0 - 30
2377742	Microcystin H1LR	0.446	Spike	P	0 - 30
2377742	Microcystin HtyR	7.89	Spike	P	0 - 30
2377742	Microcystin LA	1.29	Spike	P	0 - 30
2377742	Microcystin LF	2.50	Spike	P	0 - 30
2377742	Microcystin LR	2.95	Spike	P	0 - 30
2377742	Microcystin LW	16.1	Spike	P	0 - 30
2377742	Microcystin LY	5.44	Spike	P	0 - 30
2377742	Microcystin RR	7.30	Spike	P	0 - 30
2377742	Microcystin WR	0.549	Spike	P	0 - 30
2377742	Microcystin YR	3.83	Spike	P	0 - 30
2377742	Nodularin-R	6.40	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P424151

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2377742	Anatoxin-a	2.24	Spike	P	0 - 30
2377742	Neosaxitoxin	5.28	Spike	P	0 - 30
2377742	Saxitoxin	1.95	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2378079
Field Sample ID: HAB-SD-010423-0845

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	92.3	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	66.3	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A116750

Included Lab Sample IDs: 2378091

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.7	96.2	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A116754

Included Lab Sample IDs: 2378079

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	97.1	104	P/P	50 - 160
Desmethyl microcystin LR	98.3	101	P/P	50 - 160
Microcystin HtR	101	104	P/P	50 - 160
Microcystin HtyR	89.7	93.1	P/P	50 - 160
Microcystin LA	88.8	108	P/P	50 - 160
Microcystin LF	91.5	103	P/P	50 - 160
Microcystin LR	99.6	99.6	P/P	50 - 160
Microcystin LW	107	113	P/P	50 - 160
Microcystin LY	113	116	P/P	50 - 160
Microcystin RR	93.9	97.4	P/P	50 - 160
Microcystin WR	101	104	P/P	50 - 160
Microcystin YR	87.1	90.1	P/P	50 - 160
Nodularin-R	93.6	93.6	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A116755

Included Lab Sample IDs: 2378079

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	105	97.1	P/P	50 - 160
Neosaxitoxin	120	115	P/P	50 - 160
Saxitoxin	91.0	88.2	P/P	50 - 160

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A116830

Included Lab Sample IDs: 2378090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.6	96.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A116841

Included Lab Sample IDs: 2378090

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: A116843

Included Lab Sample IDs: 2378090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A116902

Included Lab Sample IDs: 2378090

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.4	98.8	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 SMP	MS
			LCS	MS		
EPA 350.1 Rev. 2.0	Ammonia-N	99.4	98.2	99.0		0.753
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.0	96.9	89.5		4.45
EPA 353.2 Rev. 2.0	NO2NO3-N	104	98.2			0.0
EPA 365.1 Rev. 2.0	Total-P	105	108	107		0.345
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.7	94.0	95.7		1.63
EPA 8321B	Anatoxin-a	104	117	114		2.24
	Cylindrospermopsin	87.7	101	95.4		5.68
	Desmethyl microcystin LR	85.5	113	107		5.31
	Microcystin HiLR	85.7	105	104		0.446
	Microcystin HtyR	78.9	102	94.1		7.89
	Microcystin LA	92.3	97.8	96.5		1.29
	Microcystin LF	76.2	90.4	92.7		2.50
	Microcystin LR	86.3	111	107		2.95
	Microcystin LW	85.8	108	91.7		16.1
	Microcystin LY	87.5	117	111		5.44
	Microcystin RR	82.1	99.7	92.7		7.30
	Microcystin WR	87.5	106	106		0.549
	Microcystin YR	72.2	94.2	90.7		3.83
	Neosaxitoxin	119	110	116		5.28
	Nodularin-R	78.3	101	94.4		6.40
	Saxitoxin	89.0	103	101		1.95

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2378090
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2378090
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2378090
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2378090
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2378091
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2378079
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2378079

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	01/05/2023			01/13/2023 12:26	Ping Hua	2378090
EPA 351.2 Rev. 2.0	01/05/2023	01/09/2023 13:30	Simonne.V. Calhoun	01/10/2023 15:22	Samantha L Bates	2378090
EPA 353.2 Rev. 2.0	01/05/2023			01/11/2023 11:03	Beverly Y. Sanders	2378090
EPA 365.1 Rev. 2.0	01/05/2023	01/10/2023 15:33	Adam P Silver	01/11/2023 11:37	James L Waggeberby	2378090
EPA 365.1 Rev. 2.0 dissolved	01/05/2023			01/05/2023 15:56	Elise M. Gillis	2378091
EPA 8321B	01/05/2023	01/05/2023 12:00	Manjita Shrestha	01/05/2023 20:06	Manjita Shrestha	2378079
	01/05/2023	01/05/2023 12:00	Manjita Shrestha	01/06/2023 00:12	Manjita Shrestha	2378079