

Chemical Analysis Report

WQAP-2022-08-04-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Algal Bloom Response -Cape Coral**
Request ID: **RQ-2022-07-18-31**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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

Date Certified: 25-AUG-2022 18:29



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: 3306 SE 22nd AVE, Cape Coral, FL 33904

Collection Date/Time: 08/03/2022 09:38

Field ID: HAB-CC080322-01

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2346021	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P417620	
		Cylindrospermopsin	0.10	U	ug/L	P417619	
		Desmethyl microcystin LR	0.25	U	ug/L	P417619	
		Microcystin HlR	0.25	U	ug/L	P417619	
		Microcystin HtyR	0.25	U	ug/L	P417619	
		Microcystin LA	0.10	U	ug/L	P417619	
		Microcystin LF	0.10	U	ug/L	P417619	
		Microcystin LR	0.25	U	ug/L	P417619	
		Microcystin LW	0.25	U	ug/L	P417619	
		Microcystin LY	0.10	U	ug/L	P417619	
		Microcystin RR	0.10	U	ug/L	P417619	
		Microcystin WR	0.50	U	ug/L	P417619	
		Microcystin YR	0.25	U	ug/L	P417619	
		Nodularin-R	0.10	U	ug/L	P417619	
2346022	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P418414	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P417713	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.029		mg N/L	P417823	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P417791	
2346023	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P417668	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418414

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417713

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417823

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417791

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417668

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

Reference Method: EPA 8321B
Batch ID: P417619

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: P417620

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418414

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.6		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417713

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417823

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: P417791

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: P417668

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

Reference Method: EPA 8321B
Batch ID: P417619

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	95.7		P	40 - 150
Desmethyl microcystin LR	84.7		P	40 - 150
Microcystin HILR	91.5		P	40 - 150
Microcystin HtyR	93.9		P	40 - 150
Microcystin LA	101		P	40 - 150
Microcystin LF	88.2		P	40 - 150
Microcystin LR	85.0		P	40 - 150
Microcystin LW	90.8		P	40 - 150
Microcystin LY	91.5		P	40 - 150
Microcystin RR	94.9		P	40 - 150
Microcystin WR	91.1		P	40 - 150
Microcystin YR	84.3		P	40 - 150
Nodularin-R	88.6		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417620

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	95.7		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418414

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345632	Ammonia-N	101	103	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417713

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344932	Kjeldahl Nitrogen	105	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417823

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345745	NO2NO3-N	95.3	94.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417791

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2345944	Total-P	106	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417668

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2346023	O-Phosphate-P	105	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P417619

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344997	Cylindrospermopsin	84.9	81.7	P/P	40 - 150
2344997	Desmethyl microcystin LR	88.4	83.2	P/P	40 - 150
2344997	Microcystin HiLR	88.0	84.5	P/P	40 - 150
2344997	Microcystin HtyR	89.9	85.6	P/P	40 - 150
2344997	Microcystin LA	90.4	84.5	P/P	40 - 150
2344997	Microcystin LF	91.8	82.6	P/P	40 - 150
2344997	Microcystin LR	81.9	81.0	P/P	40 - 150
2344997	Microcystin LW	80.4	79.8	P/P	40 - 150
2344997	Microcystin LY	84.6	77.4	P/P	40 - 150
2344997	Microcystin RR	87.8	85.5	P/P	40 - 150
2344997	Microcystin WR	84.8	81.7	P/P	40 - 150
2344997	Microcystin YR	82.1	79.0	P/P	40 - 150
2344997	Nodularin-R	85.7	80.7	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P417620

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2344997	Anatoxin-a	97.0	99.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P418414

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345632	Ammonia-N	1.65	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P417713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344932	Kjeldahl Nitrogen	1.71	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P417823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345745	NO2NO3-N	0.526	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P417791

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2345944	Total-P	0.367	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P417668

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2346023	O-Phosphate-P	4.03	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P417619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344997	Cylindrospermopsin	3.82	Spike	P	0 - 30
2344997	Desmethyl microcystin LR	6.05	Spike	P	0 - 30
2344997	Microcystin H1LR	4.11	Spike	P	0 - 30
2344997	Microcystin HtyR	4.92	Spike	P	0 - 30
2344997	Microcystin LA	6.67	Spike	P	0 - 30
2344997	Microcystin LF	10.5	Spike	P	0 - 30
2344997	Microcystin LR	1.11	Spike	P	0 - 30
2344997	Microcystin LW	0.686	Spike	P	0 - 30
2344997	Microcystin LY	8.90	Spike	P	0 - 30
2344997	Microcystin RR	2.69	Spike	P	0 - 30
2344997	Microcystin WR	3.73	Spike	P	0 - 30
2344997	Microcystin YR	3.84	Spike	P	0 - 30
2344997	Nodularin-R	5.92	Spike	P	0 - 30

Quality Assurance Report

Precision

Reference Method: EPA 8321B
Batch ID: P417620

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2344997	Anatoxin-a	2.07	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2346021
Field Sample ID: HAB-CC080322-01

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	86.4	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	70.1	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B
Run ID: A113568
Included Lab Sample IDs: 2346021

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	93.9	94.3	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A113885
Included Lab Sample IDs: 2346021

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	91.9	89.1	P/P	60 - 160
Desmethyl microcystin LR	77.7	75.5	P/P	60 - 160
Microcystin HtR	81.1	79.2	P/P	60 - 160
Microcystin HtyR	80.6	77.8	P/P	60 - 160
Microcystin LA	88.1	85.8	P/P	50 - 160
Microcystin LF	67.5	62.4	P/P	60 - 160
Microcystin LR	75.1	73.7	P/P	60 - 160
Microcystin LW	71.2	68.2	P/P	60 - 160
Microcystin LY	83.4	77.4	P/P	60 - 160
Microcystin RR	80.1	77.1	P/P	60 - 160
Microcystin WR	77.7	71.9	P/P	60 - 160
Microcystin YR	73.0	68.3	P/P	60 - 160
Nodularin-R	79.9	79.7	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A113915
Included Lab Sample IDs: 2346023

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113985
Included Lab Sample IDs: 2346022

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A114046
Included Lab Sample IDs: 2346022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.6	96.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A114051
Included Lab Sample IDs: 2346022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	95.2	93.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A114221

Included Lab Sample IDs: 2346022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	107	107	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	MS
EPA 350.1 Rev. 2.0	Ammonia-N	97.6	101	103		1.65
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103	105	103		1.71
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	95.3	94.8		0.526
EPA 365.1 Rev. 2.0	Total-P	107	106	106		0.367
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	105	100		4.03
EPA 8321B	Anatoxin-a	95.7	97.0	99.0		2.07
	Cylindrospermopsin	95.7	84.9	81.7		3.82
	Desmethyl microcystin LR	84.7	88.4	83.2		6.05
	Microcystin HiLR	91.5	88.0	84.5		4.11
	Microcystin HtyR	93.9	89.9	85.6		4.92
	Microcystin LA	101	90.4	84.5		6.67
	Microcystin LF	88.2	91.8	82.6		10.5
	Microcystin LR	85.0	81.9	81.0		1.11
	Microcystin LW	90.8	80.4	79.8		0.686
	Microcystin LY	91.5	84.6	77.4		8.90
	Microcystin RR	94.9	87.8	85.5		2.69
	Microcystin WR	91.1	84.8	81.7		3.73
	Microcystin YR	84.3	82.1	79.0		3.84
	Nodularin-R	88.6	85.7	80.7		5.92

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2346022
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2346022
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2346022
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2346022
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2346023
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2346021
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2346021

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	08/04/2022			08/19/2022 11:56	Judith K. Clark	2346022
EPA 351.2 Rev. 2.0	08/04/2022	08/08/2022 14:48	Samantha L Bates	08/11/2022 14:00	Alexandra J Mattheus	2346022
EPA 353.2 Rev. 2.0	08/04/2022			08/09/2022 12:16	Beverly Y. Sanders	2346022
EPA 365.1 Rev. 2.0	08/04/2022	08/09/2022 09:37	Simonne.V. Calhoun	08/12/2022 09:56	James L Waggeberby	2346022
EPA 365.1 Rev. 2.0 dissolved	08/04/2022			08/04/2022 15:56	Chandler E Cox	2346023
EPA 8321B	08/04/2022	08/04/2022 12:00	Umesh Chiluwal	08/04/2022 19:45	Umesh Chiluwal	2346021
	08/04/2022	08/04/2022 12:00	Umesh Chiluwal	08/04/2022 20:23	Umesh Chiluwal	2346021