

Chemical Analysis Report

WQAP-2022-06-23-01

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

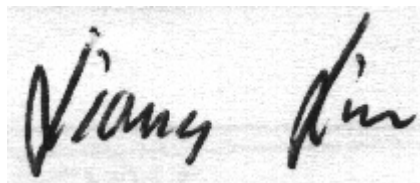
Event Description: **Algal Bloom Response -Cape Coral**
Request ID: **RQ-2021-06-07-53**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2295 Victoria AVE
Suite 364
Fort Myers, FL 33901
Attn: Kirby Wolfe

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 12-JUL-2022 16:57

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: Palaco Grande

Collection Date/Time: 06/22/2022 12:26

Field ID: HAB-CC-062222-1226

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2336752	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415603	
		Cylindrospermopsin	0.10	U	ug/L	P415603	
		Desmethyl microcystin LR	0.25	U	ug/L	P415603	
		Microcystin HIR**	0.25	U	ug/L	P415603	
		Microcystin HtyR**	0.25	U	ug/L	P415603	
		Microcystin LA	0.10	U	ug/L	P415603	
		Microcystin LF	0.10	U	ug/L	P415603	
		Microcystin LR	0.25	U	ug/L	P415603	
		Microcystin LW	0.25	U	ug/L	P415603	
		Microcystin LY	0.10	U	ug/L	P415603	
		Microcystin RR	0.10	U	ug/L	P415603	
		Microcystin WR	0.50	U	ug/L	P415603	
		Microcystin YR	0.25	U	ug/L	P415603	
		Nodularin-R**	0.10	U	ug/L	P415603	
2336754	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P415994	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.96		mg N/L	P415875	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P415741	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P415934	
2336756	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.054		mg P/L	P415666	

Sample Location: Plato Canal

Collection Date/Time: 06/22/2022 12:38

Field ID: HAB-CC-062222-1238

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2336753	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P415603	
		Cylindrospermopsin	0.10	U	ug/L	P415603	
		Desmethyl microcystin LR	0.25	U	ug/L	P415603	
		Microcystin HIR**	0.25	U	ug/L	P415603	
		Microcystin HtyR**	0.25	U	ug/L	P415603	
		Microcystin LA	0.10	U	ug/L	P415603	
		Microcystin LF	0.10	U	ug/L	P415603	
		Microcystin LR	0.25	U	ug/L	P415603	
		Microcystin LW	0.25	U	ug/L	P415603	
		Microcystin LY	0.10	U	ug/L	P415603	
		Microcystin RR	0.10	U	ug/L	P415603	
		Microcystin WR	0.50	U	ug/L	P415603	
		Microcystin YR	0.25	U	ug/L	P415603	
		Nodularin-R**	0.10	U	ug/L	P415603	
2336755	EPA 350.1 Rev. 2.0	Ammonia-N	0.018		mg N/L	P415994	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.85		mg N/L	P415875	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P415741	
	EPA 365.1 Rev. 2.0	Total-P	0.096		mg P/L	P415934	
2336757	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.067		mg P/L	P415666	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415994

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415875

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415741

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415934

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415666

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

Reference Method: EPA 8321B
Batch ID: P415603

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin HIR	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 Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415994

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415875

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415741

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	97.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415934

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415666

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

Reference Method: EPA 8321B
Batch ID: P415603

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	77.9		P	40 - 150
Cylindrospermopsin	90.2		P	40 - 150
Desmethyl microcystin LR	95.4		P	40 - 150
Microcystin HIR	90.9		P	40 - 150
Microcystin HtyR	81.5		P	40 - 150
Microcystin LA	83.4		P	40 - 150
Microcystin LF	114		P	40 - 150
Microcystin LR	89.6		P	40 - 150
Microcystin LW	115		P	40 - 150
Microcystin LY	83.6		P	40 - 150
Microcystin RR	81.6		P	40 - 150
Microcystin WR	83.9		P	40 - 150
Microcystin YR	84.5		P	40 - 150
Nodularin-R	84.7		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P415994

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336737	Ammonia-N	106	106	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P415875

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336754	Kjeldahl Nitrogen	105	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P415741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336754	NO2NO3-N	95.5	96.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P415934

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336768	Total-P	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P415666

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336800	O-Phosphate-P	95.8	96.0	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P415603

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2336670	Anatoxin-a	87.7	84.7	P/P	40 - 150
2336670	Cylindrospermopsin	84.6	87.9	P/P	40 - 150
2336670	Desmethyl microcystin LR	105	113	P/P	40 - 150
2336670	Microcystin HiLR	97.1	92.0	P/P	40 - 150
2336670	Microcystin HtyR	83.0	87.2	P/P	40 - 150
2336670	Microcystin LA	95.6	94.9	P/P	40 - 150
2336670	Microcystin LF	133	124	P/P	40 - 150
2336670	Microcystin LR	99.0	97.3	P/P	40 - 150
2336670	Microcystin LW	99.9	104	P/P	40 - 150
2336670	Microcystin LY	96.6	91.9	P/P	40 - 150
2336670	Microcystin RR	82.1	82.3	P/P	40 - 150
2336670	Microcystin WR	85.7	80.1	P/P	40 - 150
2336670	Microcystin YR	91.1	91.1	P/P	40 - 150
2336670	Nodularin-R	84.9	86.0	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P415994

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336737	Ammonia-N	0.377	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P415875

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336754	Kjeldahl Nitrogen	2.21	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P415741

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336754	NO2NO3-N	1.04	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P415934

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336768	Total-P	1.91	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P415666

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336800	O-Phosphate-P	0.195	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P415603

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2336670	Anatoxin-a	3.40	Spike	P	0 - 30
2336670	Cylindrospermopsin	3.84	Spike	P	0 - 30
2336670	Desmethyl microcystin LR	6.81	Spike	P	0 - 30
2336670	Microcystin HtIR	5.38	Spike	P	0 - 30
2336670	Microcystin HtyR	4.95	Spike	P	0 - 30
2336670	Microcystin LA	0.693	Spike	P	0 - 30
2336670	Microcystin LF	6.75	Spike	P	0 - 30
2336670	Microcystin LR	1.69	Spike	P	0 - 30
2336670	Microcystin LW	4.14	Spike	P	0 - 30
2336670	Microcystin LY	4.97	Spike	P	0 - 30
2336670	Microcystin RR	0.232	Spike	P	0 - 30
2336670	Microcystin WR	6.76	Spike	P	0 - 30
2336670	Microcystin YR	0.0419	Spike	P	0 - 30
2336670	Nodularin-R	1.26	Spike	P	0 - 30

Quality Assurance Report Precision

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

Quality Assurance Report Surrogates

Lab Sample ID: 2336752
Field Sample ID: HAB-CC-062222-1226

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	120	P	30 - 160

Lab Sample ID: 2336753
Field Sample ID: HAB-CC-062222-1238

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	118	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A113017

Included Lab Sample IDs: 2336756, 2336757

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.0	99.9	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A113023

Included Lab Sample IDs: 2336752, 2336753

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	76.7	75.5	P/P	50 - 160
Cylindrospermopsin	88.6	90.3	P/P	50 - 160
Desmethyl microcystin LR	86.0	89.1	P/P	50 - 160
Microcystin HIR	74.8	75.1	P/P	50 - 160
Microcystin HtyR	75.3	74.7	P/P	50 - 160
Microcystin LA	75.3	78.3	P/P	50 - 160
Microcystin LF	70.3	60.1	P/P	50 - 160
Microcystin LR	79.6	79.1	P/P	50 - 160
Microcystin LW	85.9	81.6	P/P	50 - 160
Microcystin LY	86.7	68.7	P/P	50 - 160
Microcystin RR	71.6	71.5	P/P	50 - 160
Microcystin WR	80.7	70.3	P/P	50 - 160
Microcystin YR	79.5	74.3	P/P	50 - 160
Nodularin-R	76.7	79.1	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A113061

Included Lab Sample IDs: 2336754, 2336755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	98.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A113171

Included Lab Sample IDs: 2336754, 2336755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	97.4	97.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A113221

Included Lab Sample IDs: 2336754, 2336755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.9	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A113235

Included Lab Sample IDs: 2336754, 2336755

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.4	100	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	100	106	106			0.377
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.5	105	101			2.21
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	97.5	95.5	96.5			1.04
EPA 365.1 Rev. 2.0	Total-P	102	102	104			1.91
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.2	95.8	96.0			0.195
EPA 8321B	Anatoxin-a	77.9	87.7	84.7			3.40
	Cylindrospermopsin	90.2	84.6	87.9			3.84
	Desmethyl microcystin LR	95.4	105	113			6.81
	Microcystin HiLR	90.9	97.1	92.0			5.38
	Microcystin HtyR	81.5	83.0	87.2			4.95
	Microcystin LA	83.4	95.6	94.9			0.693
	Microcystin LF	114	133	124			6.75
	Microcystin LR	89.6	99.0	97.3			1.69
	Microcystin LW	115	99.9	104			4.14
	Microcystin LY	83.6	96.6	91.9			4.97
	Microcystin RR	81.6	82.1	82.3			0.232
	Microcystin WR	83.9	85.7	80.1			6.76
	Microcystin YR	84.5	91.1	91.1			0.0419
	Nodularin-R	84.7	84.9	86.0			1.26

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2336754, 2336755
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2336754, 2336755
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2336754, 2336755
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2336754, 2336755
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2336756, 2336757
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2336752, 2336753

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	06/23/2022			06/29/2022 16:31	Judith K. Clark	2336754
	06/23/2022			06/29/2022 16:33	Judith K. Clark	2336755
EPA 351.2 Rev. 2.0	06/23/2022	06/29/2022 14:45	Samantha L Bates	06/30/2022 15:22	Alexandra J Mattheus	2336754
	06/23/2022	06/29/2022 14:45	Samantha L Bates	06/30/2022 15:27	Alexandra J Mattheus	2336755
EPA 353.2 Rev. 2.0	06/23/2022			06/25/2022 17:49	Touraj Touran	2336754
	06/23/2022			06/25/2022 17:55	Touraj Touran	2336755
EPA 365.1 Rev. 2.0	06/23/2022	06/30/2022 14:54	Adam P Silver	07/01/2022 12:44	James L Waggerby	2336754
	06/23/2022	06/30/2022 14:54	Adam P Silver	07/01/2022 12:45	James L Waggerby	2336755
EPA 365.1 Rev. 2.0 dissolved	06/23/2022			06/23/2022 15:41	Nathaniel J Jones	2336756
	06/23/2022			06/23/2022 15:42	Nathaniel J Jones	2336757
EPA 8321B	06/23/2022	06/23/2022 10:30	Manjita Shrestha	06/24/2022 02:03	Manjita Shrestha	2336752
	06/23/2022	06/23/2022 10:30	Manjita Shrestha	06/24/2022 02:20	Manjita Shrestha	2336753