Chemical Analysis Report

WQAP-2022-10-25-03

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

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

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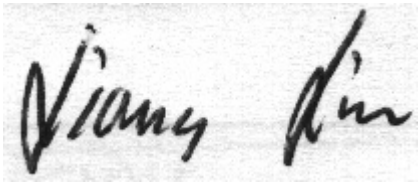
Date Certified: 09-NOV-2022 10:24



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- Santa Fe Canal **Collection Date/Time: 10/24/2022 08:25**

Field ID: HAB-SD-102422-0825 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2364626	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P421364	
		Cylindrospermopsin	0.10	U	ug/L	P421363	
		Desmethyl microcystin LR	0.25	U	ug/L	P421363	
		Microcystin HilR	0.25	U	ug/L	P421363	
		Microcystin HtyR	0.25	U	ug/L	P421363	
		Microcystin LA	0.10	U	ug/L	P421363	
		Microcystin LF	0.10	U	ug/L	P421363	
		Microcystin LR	0.25	U	ug/L	P421363	
		Microcystin LW	0.25	U	ug/L	P421363	
		Microcystin LY	0.10	U	ug/L	P421363	
		Microcystin RR	0.10	U	ug/L	P421363	
		Microcystin WR	0.50	U	ug/L	P421363	
		Microcystin YR	0.25	U	ug/L	P421363	
		Nodularin-R	0.10	U	ug/L	P421363	
2364627	EPA 350.1 Rev. 2.0	Ammonia-N	0.047		mg N/L	P421910	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.72		mg N/L	P421756	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.033		mg N/L	P421606	
	EPA 365.1 Rev. 2.0	Total-P	0.072		mg P/L	P421506	
2364628	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.040		mg P/L	P421400	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421910

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421756

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421606

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421506

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421400

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

Reference Method: EPA 8321B
Batch ID: P421363

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: P421364

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: P421910

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421756

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421606

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421506

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421400

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

Reference Method: EPA 8321B
Batch ID: P421363

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	100		P	40 - 150
Desmethyl microcystin LR	99.4		P	40 - 150
Microcystin HilR	102		P	40 - 150
Microcystin HtyR	105		P	40 - 150
Microcystin LA	105		P	40 - 150
Microcystin LF	108		P	40 - 150
Microcystin LR	84.7		P	40 - 150
Microcystin LW	95.4		P	40 - 150
Microcystin LY	93.2		P	40 - 150
Microcystin RR	96.9		P	40 - 150
Microcystin WR	98.7		P	40 - 150
Microcystin YR	84.9		P	40 - 150
Nodularin-R	97.9		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P421364

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	85.1		P	40 - 150

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421910

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364491	Ammonia-N	97.0	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421756

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364650	Kjeldahl Nitrogen	102	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364589	NO2NO3-N	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421506

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364627	Total-P	106	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421400

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364729	O-Phosphate-P	100	99.3	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P421363

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364510	Cylindrospermopsin	88.2	92.0	P/P	40 - 150
2364510	Desmethyl microcystin LR	92.4	103	P/P	40 - 150
2364510	Microcystin HilR	94.7	96.8	P/P	40 - 150
2364510	Microcystin HtyR	98.0	105	P/P	40 - 150
2364510	Microcystin LA	89.2	107	P/P	40 - 150
2364510	Microcystin LF	100	119	P/P	40 - 150
2364510	Microcystin LR	81.2	90.5	P/P	40 - 150
2364510	Microcystin LW	91.3	114	P/P	40 - 150
2364510	Microcystin LY	105	102	P/P	40 - 150
2364510	Microcystin RR	88.0	93.4	P/P	40 - 150
2364510	Microcystin WR	95.7	112	P/P	40 - 150
2364510	Microcystin YR	80.1	87.5	P/P	40 - 150
2364510	Nodularin-R	88.4	92.3	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P421364

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2364510	Anatoxin-a	92.8	93.2	P/P	40 - 150

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421910

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364491	Ammonia-N	1.82	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421756

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364650	Kjeldahl Nitrogen	0.213	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364589	NO2NO3-N	0.487	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421506

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364627	Total-P	1.16	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364729	O-Phosphate-P	0.902	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P421363

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364510	Cylindrospermopsin	4.27	Spike	P	0 - 30
2364510	Desmethyl microcystin LR	10.6	Spike	P	0 - 30
2364510	Microcystin HilR	2.19	Spike	P	0 - 30
2364510	Microcystin HtyR	6.79	Spike	P	0 - 30
2364510	Microcystin LA	18.0	Spike	P	0 - 30
2364510	Microcystin LF	17.1	Spike	P	0 - 30
2364510	Microcystin LR	10.8	Spike	P	0 - 30
2364510	Microcystin LW	22.5	Spike	P	0 - 30
2364510	Microcystin LY	2.35	Spike	P	0 - 30
2364510	Microcystin RR	6.00	Spike	P	0 - 30
2364510	Microcystin WR	15.7	Spike	P	0 - 30
2364510	Microcystin YR	8.78	Spike	P	0 - 30
2364510	Nodularin-R	4.31	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P421364

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2364510	Anatoxin-a	0.423	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2364626
Field Sample ID: HAB-SD-102422-0825

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	103	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	52.2	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A115507
Included Lab Sample IDs: 2364628

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	102	101	P/P	90 - 110

Reference Method: EPA 8321B
Run ID: A115554
Included Lab Sample IDs: 2364626

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	116	130	P/P	50 - 160
Desmethyl microcystin LR	121	126	P/P	50 - 160
Microcystin HilR	116	130	P/P	50 - 160
Microcystin HtyR	127	124	P/P	50 - 160
Microcystin LA	121	127	P/P	50 - 160
Microcystin LF	142	150	P/P	50 - 160
Microcystin LR	103	109	P/P	50 - 160
Microcystin LW	115	111	P/P	50 - 160
Microcystin LY	129	127	P/P	50 - 160
Microcystin RR	112	113	P/P	50 - 160
Microcystin WR	112	128	P/P	50 - 160
Microcystin YR	108	108	P/P	50 - 160
Nodularin-R	112	113	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A115566
Included Lab Sample IDs: 2364626

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	83.9	81.8	P/P	50 - 160

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A115597
Included Lab Sample IDs: 2364627

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A115600
Included Lab Sample IDs: 2364627

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.6	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A115651
Included Lab Sample IDs: 2364627

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	102	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A115748
Included Lab Sample IDs: 2364627

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	100	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	102	97.0	99.0			1.82
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	102	101			0.213
EPA 353.2 Rev. 2.0	NO2NO3-N	103	103	102			0.487
EPA 365.1 Rev. 2.0	Total-P	100	106	107			1.16
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	100	99.3			0.902
EPA 8321B	Anatoxin-a	85.1	92.8	93.2			0.423
	Cylindrospermopsin	100	88.2	92.0			4.27
	Desmethyl microcystin LR	99.4	92.4	103			10.6
	Microcystin HilR	102	94.7	96.8			2.19
	Microcystin HtyR	105	98.0	105			6.79
	Microcystin LA	105	89.2	107			18.0
	Microcystin LF	108	100	119			17.1
	Microcystin LR	84.7	81.2	90.5			10.8
	Microcystin LW	95.4	91.3	114			22.5
	Microcystin LY	93.2	105	102			2.35
	Microcystin RR	96.9	88.0	93.4			6.00
	Microcystin WR	98.7	95.7	112			15.7
	Microcystin YR	84.9	80.1	87.5			8.78
	Nodularin-R	97.9	88.4	92.3			4.31

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2364627
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2364627
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2364627
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2364627
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2364628
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2364626
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2364626

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	10/25/2022			11/04/2022 13:16	Ping Hua	2364627
EPA 351.2 Rev. 2.0	10/25/2022	10/28/2022 11:30	Simonne.V. Calhoun	11/01/2022 10:51	Samantha L Bates	2364627
EPA 353.2 Rev. 2.0	10/25/2022			10/28/2022 10:37	Beverly Y. Sanders	2364627
EPA 365.1 Rev. 2.0	10/25/2022	10/26/2022 13:59	Adam P Silver	10/28/2022 10:41	James L Waggerby	2364627
EPA 365.1 Rev. 2.0 dissolved	10/25/2022			10/25/2022 14:32	Elise M. Gillis	2364628
EPA 8321B	10/25/2022	10/25/2022 12:00	Manjita Shrestha	10/25/2022 18:41	Manjita Shrestha	2364626
	10/25/2022	10/26/2022 09:00	Manjita Shrestha	10/26/2022 17:52	Manjita Shrestha	2364626