Chemical Analysis Report

WQAP-2022-10-20-01

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

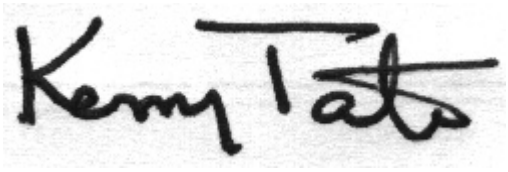
Event Description: **Algal Bloom Response - Orange Co**
Request ID: **RQ-2022-10-17-75**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd
Orlando, FL 32083
Attn: Matthew Bearden

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

Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 08-NOV-2022 10:17



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: Lake Speer - NW Lobe **Collection Date/Time: 10/19/2022 11:27**

Field ID: HABOC0009_LakeSpeer1 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2363881	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P421145	
		Cylindrospermopsin	0.10	U	ug/L	P421144	
		Desmethyl microcystin LR	0.25	U	ug/L	P421144	
		Microcystin HilR	0.25	U	ug/L	P421144	
		Microcystin HtyR	0.25	U	ug/L	P421144	
		Microcystin LA	0.10	U	ug/L	P421144	
		Microcystin LF	0.10	U	ug/L	P421144	
		Microcystin LR	1.1		ug/L	P421144	
		Microcystin LW	0.25	U	ug/L	P421144	
		Microcystin LY	0.10	U	ug/L	P421144	
		Microcystin RR	0.13	I	ug/L	P421144	
		Microcystin WR	0.50	U	ug/L	P421144	
		Microcystin YR	0.25	U	ug/L	P421144	
		Nodularin-R	0.10	U	ug/L	P421144	
2363882	EPA 350.1 Rev. 2.0	Ammonia-N	0.008		mg N/L	P421482	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.81		mg N/L	P421571	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P421376	
	EPA 365.1 Rev. 2.0	Total-P	0.051		mg P/L	P421342	
2363883	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.015		mg P/L	P421197	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421482

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421571

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421376

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421342

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421197

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

Reference Method: EPA 8321B
Batch ID: P421144

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: P421145

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: P421482

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421571

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421376

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	109		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421342

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: P421197

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

Reference Method: EPA 8321B
Batch ID: P421144

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	84.6		P	40 - 150
Desmethyl microcystin LR	91.0		P	40 - 150
Microcystin HilR	88.8		P	40 - 150
Microcystin HtyR	91.4		P	40 - 150
Microcystin LA	84.5		P	40 - 150
Microcystin LF	86.1		P	40 - 150
Microcystin LR	101		P	40 - 150
Microcystin LW	89.3		P	40 - 150
Microcystin LY	95.8		P	40 - 150
Microcystin RR	95.5		P	40 - 150
Microcystin WR	84.2		P	40 - 150
Microcystin YR	106		P	40 - 150
Nodularin-R	89.5		P	40 - 150

Reference Method: EPA 8321B
Batch ID: P421145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	68.0		P	40 - 160

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421482

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363804	Ammonia-N	95.0	99.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421571

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363742	Kjeldahl Nitrogen	95.8	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421376

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363804	NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363882	Total-P	102	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421197

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363805	O-Phosphate-P	99.1	99.1	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P421144

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363866	Cylindrospermopsin	81.2	82.7	P/P	40 - 150
2363866	Desmethyl microcystin LR	93.5	92.2	P/P	40 - 150
2363866	Microcystin HilR	88.4	89.2	P/P	40 - 150
2363866	Microcystin HtyR	93.5	91.5	P/P	40 - 150
2363866	Microcystin LA	83.8	79.5	P/P	40 - 150
2363866	Microcystin LF	84.4	86.9	P/P	40 - 150
2363866	Microcystin LR	116	113	P/P	40 - 150
2363866	Microcystin LW	85.2	84.8	P/P	40 - 150
2363866	Microcystin LY	97.8	92.9	P/P	40 - 150
2363866	Microcystin RR	99.7	94.6	P/P	40 - 150
2363866	Microcystin WR	82.6	81.8	P/P	40 - 150
2363866	Microcystin YR	115	112	P/P	40 - 150
2363866	Nodularin-R	93.0	91.3	P/P	40 - 150

Reference Method: EPA 8321B
Batch ID: P421145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2363866	Anatoxin-a	56.7	57.9	P/P	40 - 160

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P421482

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363804	Ammonia-N	4.08	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P421571

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363742	Kjeldahl Nitrogen	8.66	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P421376

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363804	NO2NO3-N	0.341	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P421342

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363882	Total-P	0.368	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P421197

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363805	O-Phosphate-P	0.0	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P421144

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363866	Cylindrospermopsin	1.79	Spike	P	0 - 30
2363866	Desmethyl microcystin LR	1.39	Spike	P	0 - 30
2363866	Microcystin HilR	0.952	Spike	P	0 - 30
2363866	Microcystin HtyR	2.20	Spike	P	0 - 30
2363866	Microcystin LA	5.26	Spike	P	0 - 30
2363866	Microcystin LF	2.98	Spike	P	0 - 30
2363866	Microcystin LR	2.64	Spike	P	0 - 30
2363866	Microcystin LW	0.456	Spike	P	0 - 30
2363866	Microcystin LY	5.21	Spike	P	0 - 30
2363866	Microcystin RR	5.30	Spike	P	0 - 30
2363866	Microcystin WR	0.929	Spike	P	0 - 30
2363866	Microcystin YR	2.52	Spike	P	0 - 30
2363866	Nodularin-R	1.83	Spike	P	0 - 30

Quality Assurance Report
Precision

Reference Method: EPA 8321B
Batch ID: P421145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2363866	Anatoxin-a	2.10	Spike	P	0 - 30

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

Quality Assurance Report
Surrogates

Lab Sample ID: 2363881
Field Sample ID: HABOC0009_LakeSpeer1

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	81.0	P	30 - 160
EPA 8321B	Neosaxitoxin-15N7	64.0	P	30 - 160

Quality Assurance Report
Calibration Verification

Reference Method: EPA 8321B
Run ID: A115400
Included Lab Sample IDs: 2363881

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	66.8	71.2	P/P	50 - 160

Reference Method: EPA 8321B
Run ID: A115401
Included Lab Sample IDs: 2363881

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	88.2	99.2	P/P	60 - 160
Desmethyl microcystin LR	99.4	100	P/P	60 - 160
Microcystin HilR	92.4	93.3	P/P	60 - 160
Microcystin HtyR	101	102	P/P	60 - 160
Microcystin LA	90.2	94.4	P/P	50 - 160
Microcystin LF	98.5	106	P/P	60 - 160
Microcystin LR	110	111	P/P	60 - 160
Microcystin LW	96.5	107	P/P	60 - 160
Microcystin LY	105	110	P/P	60 - 160
Microcystin RR	101	103	P/P	60 - 160
Microcystin WR	93.3	94.8	P/P	60 - 160
Microcystin YR	113	116	P/P	60 - 160
Nodularin-R	93.4	93.3	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A115437
Included Lab Sample IDs: 2363883

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.5	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A115501
Included Lab Sample IDs: 2363882

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: A115530
Included Lab Sample IDs: 2363882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.1	99.0	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A115545
Included Lab Sample IDs: 2363882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.5	98.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A115643
Included Lab Sample IDs: 2363882

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.0	99.4	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	96.8	95.0	99.2			4.08
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	100	95.8	105			8.66
EPA 353.2 Rev. 2.0	NO2NO3-N	109	102				0.341
EPA 365.1 Rev. 2.0	Total-P	101	102	103			0.368
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	99.1	99.1			0.0
EPA 8321B	Anatoxin-a	68.0	56.7	57.9			2.10
	Cylindrospermopsin	84.6	81.2	82.7			1.79
	Desmethyl microcystin LR	91.0	93.5	92.2			1.39
	Microcystin HilR	88.8	88.4	89.2			0.952
	Microcystin HtyR	91.4	93.5	91.5			2.20
	Microcystin LA	84.5	83.8	79.5			5.26
	Microcystin LF	86.1	84.4	86.9			2.98
	Microcystin LR	101	116	113			2.64
	Microcystin LW	89.3	85.2	84.8			0.456
	Microcystin LY	95.8	97.8	92.9			5.21
	Microcystin RR	95.5	99.7	94.6			5.30
	Microcystin WR	84.2	82.6	81.8			0.929
	Microcystin YR	106	115	112			2.52
	Nodularin-R	89.5	93.0	91.3			1.83

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2363882
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2363882
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2363882
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2363882
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2363883
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2363881
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2363881

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	10/20/2022			10/26/2022 14:49	Judith K. Clark	2363882
EPA 351.2 Rev. 2.0	10/20/2022	10/28/2022 11:18	Simonne.V. Calhoun	10/31/2022 11:59	Alexandra J Mattheus	2363882
EPA 353.2 Rev. 2.0	10/20/2022			10/25/2022 10:01	Beverly Y. Sanders	2363882
EPA 365.1 Rev. 2.0	10/20/2022	10/25/2022 12:45	Simonne.V. Calhoun	10/26/2022 09:48	James L Waggerby	2363882
EPA 365.1 Rev. 2.0 dissolved	10/20/2022			10/20/2022 14:51	Elise M. Gillis	2363883
EPA 8321B	10/20/2022	10/20/2022 12:00	Umesh Chiluwal	10/20/2022 20:41	Umesh Chiluwal	2363881
	10/20/2022	10/20/2022 13:00	Manjita Shrestha	10/20/2022 21:12	Manjita Shrestha	2363881