

Chemical Analysis Report

WQAP-2021-05-14-01

Florida Department of Environmental Protection
Central Laboratory
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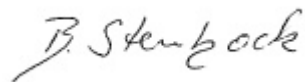
Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2021-03-22-17**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

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

Date Certified: 02-JUN-2021 19:15



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 Okeechobee-Clewiston Boat Ramp

Collection Date/Time: 05/13/2021 10:00

Field ID: HAB-SD051321-001

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2247452	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P398253	
		Cylindrospermopsin	0.10	U	ug/L	P398253	
		Desmethyl microcystin LR	0.33	I	ug/L	P398253	
		Microcystin HilR**	0.25	U	ug/L	P398253	
		Microcystin HtyR**	0.25	U	ug/L	P398253	
		Microcystin LA	0.10	U	ug/L	P398253	
		Microcystin LF	0.10	U	ug/L	P398253	
		Microcystin LR	10		ug/L	P398253	
		Microcystin LW	0.25	U	ug/L	P398253	
		Microcystin LY	0.10	U	ug/L	P398253	
		Microcystin RR	0.10	U	ug/L	P398253	
		Microcystin WR	0.50	U	ug/L	P398253	
		Microcystin YR	0.25	U	ug/L	P398253	
		Nodularin-R**	0.10	U	ug/L	P398253	
2247457	EPA 350.1 Rev. 2.0	Ammonia-N	0.045		mg N/L	P398993	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P398278	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.041		mg N/L	P398342	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P398540	
2247458	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.050		mg P/L	P398220	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398993

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398278

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398342

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398540

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398220

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

Reference Method: EPA 8321B
Batch ID: P398253

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: P398993

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398278

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	106		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398342

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398540

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: P398220

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

Reference Method: EPA 8321B
Batch ID: P398253

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	98.1		P	40 - 150
Cylindrospermopsin	98.6		P	40 - 150
Desmethyl microcystin LR	90.6		P	40 - 150
Microcystin HIR	95.3		P	40 - 150
Microcystin HtyR	95.0		P	40 - 150
Microcystin LA	103		P	40 - 150
Microcystin LF	109		P	40 - 150
Microcystin LR	93.6		P	40 - 150
Microcystin LW	123		P	40 - 150
Microcystin LY	114		P	40 - 150
Microcystin RR	115		P	40 - 150
Microcystin WR	94.6		P	40 - 150
Microcystin YR	95.5		P	40 - 150
Nodularin-R	102		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P398993

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247305	Ammonia-N	97.2	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P398278

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2246895	Kjeldahl Nitrogen	109	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P398342

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247464	NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P398540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247315	Total-P	105	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P398220

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247417	O-Phosphate-P	95.2	94.5	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P398253

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2247433	Anatoxin-a	97.2	102	P/P	40 - 150
2247433	Cylindrospermopsin	101	101	P/P	40 - 150
2247433	Desmethyl microcystin LR	83.2	90.5	P/P	40 - 150
2247433	Microcystin HiLR	91.5	96.9	P/P	40 - 150
2247433	Microcystin HtyR	87.9	88.7	P/P	40 - 150
2247433	Microcystin LA	96.2	101	P/P	40 - 150
2247433	Microcystin LF	66.7	68.9	P/P	40 - 150
2247433	Microcystin LR	95.7	94.1	P/P	40 - 150
2247433	Microcystin LW	61.7	59.3	P/P	40 - 150
2247433	Microcystin LY	97.1	98.7	P/P	40 - 150
2247433	Microcystin RR	108	111	P/P	40 - 150
2247433	Microcystin WR	79.4	80.4	P/P	40 - 150
2247433	Microcystin YR	98.3	97.0	P/P	40 - 150
2247433	Nodularin-R	102	104	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P398993

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247305	Ammonia-N	0.980	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P398278

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2246895	Kjeldahl Nitrogen	3.76	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P398342

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247464	NO2NO3-N	0.320	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P398540

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247315	Total-P	0.613	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P398220

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247417	O-Phosphate-P	0.558	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P398253

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2247433	Anatoxin-a	4.59	Spike	P	0 - 30
2247433	Cylindrospermopsin	0.437	Spike	P	0 - 30
2247433	Desmethyl microcystin LR	8.38	Spike	P	0 - 30
2247433	Microcystin H1LR	5.72	Spike	P	0 - 30
2247433	Microcystin HtyR	0.874	Spike	P	0 - 30
2247433	Microcystin LA	5.21	Spike	P	0 - 30
2247433	Microcystin LF	3.15	Spike	P	0 - 30
2247433	Microcystin LR	1.66	Spike	P	0 - 30
2247433	Microcystin LW	4.06	Spike	P	0 - 30
2247433	Microcystin LY	1.66	Spike	P	0 - 30
2247433	Microcystin RR	2.56	Spike	P	0 - 30
2247433	Microcystin WR	1.21	Spike	P	0 - 30
2247433	Microcystin YR	1.29	Spike	P	0 - 30
2247433	Nodularin-R	1.77	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: 2247452
Field Sample ID: HAB-SD051321-001

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	98.1	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	86.3	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A105435

Included Lab Sample IDs: 2247458

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.5	98.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A105490

Included Lab Sample IDs: 2247457

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A105507

Included Lab Sample IDs: 2247457

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	109	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A105508

Included Lab Sample IDs: 2247452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	101	101	P/P	50 - 160
Cylindrospermopsin	95.4	113	P/P	60 - 160
Desmethyl microcystin LR	85.3	88.3	P/P	60 - 160
Microcystin HILR	87.1	99.2	P/P	60 - 160
Microcystin HtyR	90.8	93.7	P/P	60 - 160
Microcystin LA	97.0	97.5	P/P	50 - 160
Microcystin LF	128	99.3	P/P	60 - 160
Microcystin LR	91.1	96.8	P/P	60 - 160
Microcystin LW	109	89.4	P/P	60 - 160
Microcystin LY	100	103	P/P	60 - 160
Microcystin RR	95.1	110	P/P	60 - 160
Microcystin WR	75.1	86.1	P/P	60 - 160
Microcystin YR	88.5	91.9	P/P	60 - 160
Nodularin-R	93.5	101	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A105588

Included Lab Sample IDs: 2247457

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A105765

Included Lab Sample IDs: 2247457

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	98.7	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		Precision LCS	SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	98.2	97.2	98.8			0.980
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	109	102			3.76
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101	98.5	99.0			0.320
EPA 365.1 Rev. 2.0	Total-P	105	105	106			0.613
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	102	95.2	94.5			0.558
EPA 8321B	Anatoxin-a	98.1	97.2	102			4.59
	Cylindrospermopsin	98.6	101	101			0.437
	Desmethyl microcystin LR	90.6	83.2	90.5			8.38
	Microcystin HiLR	95.3	91.5	96.9			5.72
	Microcystin HtyR	95.0	87.9	88.7			0.874
	Microcystin LA	103	96.2	101			5.21
	Microcystin LF	109	66.7	68.9			3.15
	Microcystin LR	93.6	95.7	94.1			1.66
	Microcystin LW	123	61.7	59.3			4.06
	Microcystin LY	114	97.1	98.7			1.66
	Microcystin RR	115	108	111			2.56
	Microcystin WR	94.6	79.4	80.4			1.21
	Microcystin YR	95.5	98.3	97.0			1.29
	Nodularin-R	102	102	104			1.77

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2247457
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2247457
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2247457
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2247457
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2247458
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2247452

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	05/14/2021			05/28/2021 12:20	Roberta Tatti	2247457
EPA 351.2 Rev. 2.0	05/14/2021	05/17/2021 12:37	Benjamin T. Nordmann	05/18/2021 14:01	Virginia P. Brown	2247457
EPA 353.2 Rev. 2.0	05/14/2021			05/18/2021 11:06	Beverly Y. Sanders	2247457
EPA 365.1 Rev. 2.0	05/14/2021	05/20/2021 14:05	Yen Ta	05/21/2021 10:40	Shengyu Ding	2247457
EPA 365.1 Rev. 2.0 dissolved	05/14/2021			05/14/2021 14:32	Lipi Saha	2247458
EPA 8321B	05/14/2021	05/18/2021 08:30	Pramila Ghimire	05/18/2021 11:08	Pramila Ghimire	2247452