

Chemical Analysis Report

WQAP-2020-10-23-01

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

Event Description: **Lake O Release SED**
Request ID: **RQ-2020-10-19-55**
Customer: **WQAP**
Project ID: **LKORELEASE**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399-2400
Attn: Dave Whiting

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: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 04-NOV-2020 10:18



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: S308_Lakeside

Collection Date/Time: 10/22/2020 10:30

Field ID: S308_Lakeside

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2204473	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P389137	
		Cylindrospermopsin**	0.25	U	ug/L	P389137	
		Desmethyl microcystin LR**	0.25	U	ug/L	P389137	
		Microcystin LA**	0.25	U	ug/L	P389137	
		Microcystin LF**	0.25	U	ug/L	P389137	
		Microcystin LR**	0.25	U	ug/L	P389137	
		Microcystin LW**	0.25	U	ug/L	P389137	
		Microcystin LY**	0.25	U	ug/L	P389137	
		Microcystin RR**	0.25	U	ug/L	P389137	
		Microcystin WR**	0.50	U	ug/L	P389137	
		Microcystin YR**	0.25	U	ug/L	P389137	
2204475	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P389199	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.92		mg N/L	P389283	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.24		mg N/L	P389250	
	EPA 365.1 Rev. 2.0	Total-P	0.12		mg P/L	P389405	
2204477	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.071		mg P/L	P389180	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: S308_East

Collection Date/Time: 10/22/2020 11:00

Field ID: S308_East

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2204474	EPA 8321B	Anatoxin-a**	0.25	U	ug/L	P389137	
		Cylindrospermopsin**	0.25	U	ug/L	P389137	
		Desmethyl microcystin LR**	0.25	U	ug/L	P389137	
		Microcystin LA**	0.25	U	ug/L	P389137	
		Microcystin LF**	0.25	U	ug/L	P389137	
		Microcystin LR**	0.25	U	ug/L	P389137	
		Microcystin LW**	0.25	U	ug/L	P389137	
		Microcystin LY**	0.25	U	ug/L	P389137	
		Microcystin RR**	0.25	U	ug/L	P389137	
		Microcystin WR**	0.50	U	ug/L	P389137	
		Microcystin YR**	0.25	U	ug/L	P389137	
2204476	EPA 350.1 Rev. 2.0	Ammonia-N	0.096		mg N/L	P389199	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P389283	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.26		mg N/L	P389250	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P389405	
2204478	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.092		mg P/L	P389180	

Ref. Method and Comment:

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389199

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P389283

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389250

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P389405

Component	Result	Code	Units
Total-P	0.005	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P389180

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

Reference Method: EPA 8321B
Batch ID: P389137

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Cylindrospermopsin	0.25	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin LA	0.25	U	ug/L
Microcystin LF	0.25	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.25	U	ug/L
Microcystin RR	0.25	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P389199

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: P389283

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P389250

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: P389405

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: P389180

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

Reference Method: EPA 8321B
Batch ID: P389137

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	94.4		P	40 - 150
Cylindrospermopsin	115		P	40 - 150
Desmethyl microcystin LR	109		P	40 - 150
Microcystin LA	118		P	40 - 150
Microcystin LF	107		P	40 - 150
Microcystin LR	110		P	40 - 150
Microcystin LW	98.3		P	40 - 150
Microcystin LY	118		P	40 - 150
Microcystin RR	95.8		P	40 - 150
Microcystin WR	121		P	40 - 150
Microcystin YR	107		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P389199

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2203334	Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P389250

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2204190	NO2NO3-N	91.5	91.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P389405

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2204622	Total-P	110	110	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P389180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2204477	O-Phosphate-P	99.2	99.5	P/P	90 - 110

Reference Method: EPA 8321B
 Batch ID: P389137

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2204564	Anatoxin-a	101	96.9	P/P	40 - 150
2204564	Cylindrospermopsin	99.2	100	P/P	40 - 150
2204564	Desmethyl microcystin LR	100	98.8	P/P	40 - 150
2204564	Microcystin LA	111	108	P/P	40 - 150
2204564	Microcystin LF	115	101	P/P	40 - 150
2204564	Microcystin LR	97.1	103	P/P	40 - 150
2204564	Microcystin LW	121	118	P/P	40 - 150
2204564	Microcystin LY	102	109	P/P	40 - 150
2204564	Microcystin RR	91.9	95.9	P/P	40 - 150
2204564	Microcystin WR	104	110	P/P	40 - 150
2204564	Microcystin YR	106	102	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P389199

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203334	Ammonia-N	2.01	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P389283

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2203781	Kjeldahl Nitrogen	0.370	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P389250

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204190	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P389405

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204622	Total-P	0.149	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P389180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204477	O-Phosphate-P	0.176	Spike	P	0 - 20

Reference Method: EPA 8321B
 Batch ID: P389137

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2204564	Anatoxin-a	4.59	Spike	P	0 - 30
2204564	Cylindrospermopsin	1.02	Spike	P	0 - 30
2204564	Desmethyl microcystin LR	1.44	Spike	P	0 - 30
2204564	Microcystin LA	3.27	Spike	P	0 - 30
2204564	Microcystin LF	12.6	Spike	P	0 - 30
2204564	Microcystin LR	6.10	Spike	P	0 - 30
2204564	Microcystin LW	2.71	Spike	P	0 - 30
2204564	Microcystin LY	6.14	Spike	P	0 - 30
2204564	Microcystin RR	4.24	Spike	P	0 - 30
2204564	Microcystin WR	5.96	Spike	P	0 - 30
2204564	Microcystin YR	3.25	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2204473

Field Sample ID: S308_Lakeside

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	92.4	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	98.4	P	30 - 160

Lab Sample ID: 2204474

Field Sample ID: S308_East

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR-d7	88.5	P	30 - 160
EPA 8321B	Microcystin LR ethyl-d5	85.0	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B

Run ID: A101729

Included Lab Sample IDs: 2204473, 2204474

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	93.6	93.5	P/P	50 - 160
Cylindrospermopsin	111	109	P/P	60 - 160
Desmethyl microcystin LR	101	127	P/P	60 - 160
Microcystin LA	120	143	P/P	50 - 160
Microcystin LF	111	126	P/P	60 - 160
Microcystin LR	106	118	P/P	60 - 160
Microcystin LW	110	139	P/P	60 - 160
Microcystin LY	114	135	P/P	60 - 160
Microcystin RR	95.2	97.8	P/P	60 - 160
Microcystin WR	99.1	117	P/P	60 - 160
Microcystin YR	100	109	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A101731

Included Lab Sample IDs: 2204477, 2204478

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A101736

Included Lab Sample IDs: 2204475, 2204476

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A101763

Included Lab Sample IDs: 2204475, 2204476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A101801

Included Lab Sample IDs: 2204475, 2204476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.2	97.4	P/P	90 - 110
Kjeldahl Nitrogen	98.7	97.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A101879

Included Lab Sample IDs: 2204475, 2204476

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	102	P/P	90 - 110
Total-P	102	103	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 SMP	MS
EPA 350.1 Rev. 2.0	Ammonia-N	102	103	105			2.01
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107					0.370
EPA 353.2 Rev. 2.0	NO2NO3-N	100	91.5	91.5			0.0
EPA 365.1 Rev. 2.0	Total-P	107	110	110			0.149
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.3	99.2	99.5			0.176
EPA 8321B	Anatoxin-a	94.4	101	96.9			4.59
	Cylindrospermopsin	115	99.2	100			1.02
	Desmethyl microcystin LR	109	100	98.8			1.44
	Microcystin LA	118	111	108			3.27
	Microcystin LF	107	115	101			12.6
	Microcystin LR	110	97.1	103			6.10
	Microcystin LW	98.3	121	118			2.71
	Microcystin LY	118	102	109			6.14
	Microcystin RR	95.8	91.9	95.9			4.24
	Microcystin WR	121	104	110			5.96
	Microcystin YR	107	106	102			3.25

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2204475, 2204476
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2204475, 2204476
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2204475, 2204476
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2204475, 2204476
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2204477, 2204478
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2204473, 2204474

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	10/23/2020			10/24/2020 15:55	Ping Hua	2204475
	10/23/2020			10/24/2020 15:57	Ping Hua	2204476
EPA 351.2 Rev. 2.0	10/23/2020	10/26/2020 11:45	David Boose	10/27/2020 14:02	Elliott Rodriguez	2204475
	10/23/2020	10/26/2020 11:45	David Boose	10/27/2020 14:07	Elliott Rodriguez	2204476
EPA 353.2 Rev. 2.0	10/23/2020			10/26/2020 11:34	Beverly Y. Sanders	2204475
	10/23/2020			10/26/2020 11:35	Beverly Y. Sanders	2204476
EPA 365.1 Rev. 2.0	10/23/2020	10/28/2020 13:34	Yen Ta	10/30/2020 13:29	Benjamin T. Nordmann	2204475
	10/23/2020	10/28/2020 13:34	Yen Ta	10/30/2020 13:31	Benjamin T. Nordmann	2204476
EPA 365.1 Rev. 2.0 dissolved	10/23/2020			10/23/2020 15:19	Blanca Fach	2204477
	10/23/2020			10/23/2020 15:23	Blanca Fach	2204478
EPA 8321B	10/23/2020	10/23/2020 10:24	Juyoung Kim	10/23/2020 12:09	Juyoung Kim	2204474
	10/23/2020	10/23/2020 10:25	Juyoung Kim	10/23/2020 11:53	Juyoung Kim	2204473