

Chemical Analysis Report

WQAP-2023-07-06-01

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

Event Description: **Algal Bloom Response -SOROC**
Request ID: **RQ-2023-07-10-54**
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

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

Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant

Date Certified: 20-JUL-2023 11:56



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 - Whitecap Cir Dock

Collection Date/Time: 07/05/2023 11:35

Field ID: HAB-SD-070523-1135

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2421388	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P432025	
		Cylindrospermopsin	0.10	U	ug/L	P432024	
		Desmethyl microcystin LR	2.2		ug/L	P432024	
		Microcystin HILR	0.55	I	ug/L	P432024	
		Microcystin HtyR	0.25	U	ug/L	P432024	
		Microcystin LA	0.43		ug/L	P432024	
		Microcystin LF	0.10	U	ug/L	P432024	
		Microcystin LR	43		ug/L	P432024	
		Microcystin LW	0.25	U	ug/L	P432024	
		Microcystin LY	0.10	U	ug/L	P432024	
		Microcystin RR	0.10	U	ug/L	P432024	
		Microcystin WR	0.50	U	ug/L	P432024	
		Neosaxitoxin	0.50	U	ug/L	P432025	
		Microcystin YR	0.25	U	ug/L	P432024	
		Saxitoxin	0.50	U	ug/L	P432025	
		Nodularin-R	0.10	U	ug/L	P432024	
2421402	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P432183	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P432143	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.038		mg N/L	P432238	
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P432189	
2421407	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P432155	

Sample Location: Caloosahatchee - End of Canal Cir

Collection Date/Time: 07/05/2023 11:10

Field ID: HAB-SD-070523-1110

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2421387	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P432025	
		Cylindrospermopsin	0.10	U	ug/L	P432024	
		Desmethyl microcystin LR	0.25	U	ug/L	P432024	
		Microcystin HILR	0.25	U	ug/L	P432024	
		Microcystin HtyR	0.25	U	ug/L	P432024	
		Microcystin LA	0.10	U	ug/L	P432024	
		Microcystin LF	0.10	U	ug/L	P432024	
		Microcystin LR	2.5		ug/L	P432024	
		Microcystin LW	0.25	U	ug/L	P432024	
		Microcystin LY	0.10	U	ug/L	P432024	
		Microcystin RR	0.10	U	ug/L	P432024	
		Microcystin WR	0.50	U	ug/L	P432024	
		Neosaxitoxin	0.50	U	ug/L	P432025	
		Microcystin YR	0.25	U	ug/L	P432024	
		Saxitoxin	0.50	U	ug/L	P432025	
		Nodularin-R	0.10	U	ug/L	P432024	
2421401	EPA 350.1 Rev. 2.0	Ammonia-N	0.007		mg N/L	P432183	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P432143	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P432237	
	EPA 365.1 Rev. 2.0	Total-P	0.19		mg P/L	P432189	
2421406	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P432155	

Sample Location: Caloosahatchee - Jaycee Park

Collection Date/Time: 07/05/2023 13:45

Field ID: HAB-SD-070523-1345

Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2421391	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P432025	
		Cylindrospermopsin	0.10	U	ug/L	P432024	
		Desmethyl microcystin LR	0.25	U	ug/L	P432024	
		Microcystin HILR	0.25	U	ug/L	P432024	
		Microcystin HtyR	0.25	U	ug/L	P432024	
		Microcystin LA	0.10	U	ug/L	P432024	
		Microcystin LF	0.10	U	ug/L	P432024	
		Microcystin LR	2.8		ug/L	P432024	
		Microcystin LW	0.25	U	ug/L	P432024	
		Microcystin LY	0.10	U	ug/L	P432024	
		Microcystin RR	0.10	U	ug/L	P432024	
		Microcystin WR	0.50	U	ug/L	P432024	
		Neosaxitoxin	0.50	U	ug/L	P432025	
		Microcystin YR	0.25	U	ug/L	P432024	
		Saxitoxin	0.50	U	ug/L	P432025	
		Nodularin-R	0.10	U	ug/L	P432024	
2421405	EPA 350.1 Rev. 2.0	Ammonia-N	0.040		mg N/L	P432419	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P432264	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.076		mg N/L	P432348	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P432376	
2421410	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P432154	

Sample Location: Caloosahatchee - End of SE 13th Ave

Collection Date/Time: 07/05/2023 13:10

Field ID: HAB-SD-070523-1310

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2421390	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P432025	
		Cylindrospermopsin	0.10	U	ug/L	P432024	
		Desmethyl microcystin LR	0.25	U	ug/L	P432024	
		Microcystin HILR	0.25	U	ug/L	P432024	
		Microcystin HtyR	0.25	U	ug/L	P432024	
		Microcystin LA	0.10	U	ug/L	P432024	
		Microcystin LF	0.10	U	ug/L	P432024	
		Microcystin LR	0.25	U	ug/L	P432024	
		Microcystin LW	0.25	U	ug/L	P432024	
		Microcystin LY	0.10	U	ug/L	P432024	
		Microcystin RR	0.10	U	ug/L	P432024	
		Microcystin WR	0.50	U	ug/L	P432024	
		Neosaxitoxin	0.50	U	ug/L	P432025	
		Microcystin YR	0.25	U	ug/L	P432024	
		Saxitoxin	0.50	U	ug/L	P432025	
		Nodularin-R	0.10	U	ug/L	P432024	
2421404	EPA 350.1 Rev. 2.0	Ammonia-N	0.037		mg N/L	P432183	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.6		mg N/L	P432144	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.062		mg N/L	P432238	
	EPA 365.1 Rev. 2.0	Total-P	0.13		mg P/L	P432189	
2421409	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P432152	

Sample Location: Caloosahatchee - Coral Point Dr

Collection Date/Time: 07/05/2023 12:00

Field ID: HAB-SD-070523-1200

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2421389	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P432025	
		Cylindrospermopsin	0.10	U	ug/L	P432024	
		Desmethyl microcystin LR	0.63	I	ug/L	P432024	
		Microcystin HILR	0.25	U	ug/L	P432024	
		Microcystin HtyR	0.25	U	ug/L	P432024	
		Microcystin LA	0.13	I	ug/L	P432024	
		Microcystin LF	0.10	U	ug/L	P432024	
		Microcystin LR	16		ug/L	P432024	
		Microcystin LW	0.25	U	ug/L	P432024	
		Microcystin LY	0.10	U	ug/L	P432024	
		Microcystin RR	0.10	U	ug/L	P432024	
		Microcystin WR	0.50	U	ug/L	P432024	
		Neosaxitoxin	0.50	U	ug/L	P432025	
		Microcystin YR	0.25	U	ug/L	P432024	
		Saxitoxin	0.50	U	ug/L	P432025	
		Nodularin-R	0.10	U	ug/L	P432024	
2421403	EPA 350.1 Rev. 2.0	Ammonia-N	0.036		mg N/L	P432183	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P432143	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.013		mg N/L	P432238	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P432189	
2421408	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.11		mg P/L	P432152	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432183

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432419

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432143

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432144

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432264

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432237

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432238

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432348

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432189

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432376

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P432152

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P432154

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P432155

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

Reference Method: EPA 8321B
Batch ID: P432024

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: P432025

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432183

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432419

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432143

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432144

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432264

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432237

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432238

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432348

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: P432189

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.7		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432376

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P432152

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P432154

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P432155

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

Reference Method: EPA 8321B
Batch ID: P432024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	70.0		P	40 - 160
Desmethyl microcystin LR	133		P	40 - 160
Microcystin HilR	128		P	40 - 160
Microcystin HtyR	115		P	40 - 160
Microcystin LA	93.2		P	40 - 160
Microcystin LF	108		P	40 - 160
Microcystin LR	126		P	40 - 160
Microcystin LW	77.7		P	40 - 160
Microcystin LY	94.4		P	40 - 160
Microcystin RR	73.7		P	40 - 160
Microcystin WR	127		P	40 - 160
Microcystin YR	121		P	40 - 160
Nodularin-R	83.4		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P432025

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	124		P	40 - 150
Neosaxitoxin	107		P	40 - 150
Saxitoxin	102		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432183

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421396	Ammonia-N	95.6	97.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432419

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421105	Ammonia-N	99.6	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432143

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421397	Kjeldahl Nitrogen	108	111	P/F	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432144

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421431	Kjeldahl Nitrogen	109	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432264

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2422054	Kjeldahl Nitrogen	98.1	99.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421319	NO2NO3-N	98.5	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432238

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421402	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432348

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420224	NO2NO3-N	110	110	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432189

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421397	Total-P	102	101	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P432376

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2422558	Total-P	95.0	95.1	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P432152

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421399	O-Phosphate-P	97.8	97.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P432154

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421410	O-Phosphate-P	99.6	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P432155

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421398	O-Phosphate-P	95.1	95.4	P/P	90 - 110

Reference Method: EPA 8321B

Batch ID: P432024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421263	Cylindrospermopsin	68.4	66.0	P/P	40 - 160
2421263	Desmethyl microcystin LR	136	136	P/P	40 - 160
2421263	Microcystin HilR	127	123	P/P	40 - 160
2421263	Microcystin HtyR	112	112	P/P	40 - 160
2421263	Microcystin LA	89.5	92.7	P/P	40 - 160
2421263	Microcystin LF	102	110	P/P	40 - 160
2421263	Microcystin LR	119	123	P/P	40 - 160
2421263	Microcystin LW	74.5	73.2	P/P	40 - 160
2421263	Microcystin LY	79.7	80.8	P/P	40 - 160
2421263	Microcystin RR	72.4	71.2	P/P	40 - 160
2421263	Microcystin WR	116	118	P/P	40 - 160
2421263	Microcystin YR	115	112	P/P	40 - 160
2421263	Nodularin-R	79.3	76.9	P/P	40 - 160

Reference Method: EPA 8321B

Batch ID: P432025

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2421263	Anatoxin-a	102	98.3	P/P	40 - 150
2421263	Neosaxitoxin	60.7	58.6	P/P	40 - 150
2421263	Saxitoxin	70.3	65.1	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432183

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421396	Ammonia-N	1.29	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432419

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421105	Ammonia-N	0.666	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432143

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421397	Kjeldahl Nitrogen	1.97	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432144

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421431	Kjeldahl Nitrogen	0.840	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432264

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2422054	Kjeldahl Nitrogen	1.29	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421319	NO2NO3-N	0.567	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432238

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421402	NO2NO3-N	0.419	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432348

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420224	NO2NO3-N	0.0	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P432189

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421397	Total-P	1.29	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P432376

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2422558	Total-P	0.101	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P432152

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421399	O-Phosphate-P	0.102	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P432154

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421410	O-Phosphate-P	0.576	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P432155

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421398	O-Phosphate-P	0.315	Spike	P	0 - 20

Reference Method: EPA 8321B

Batch ID: P432024

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421263	Cylindrospermopsin	3.68	Spike	P	0 - 30
2421263	Desmethyl microcystin LR	0.286	Spike	P	0 - 30
2421263	Microcystin HiLR	3.07	Spike	P	0 - 30
2421263	Microcystin HtyR	0.542	Spike	P	0 - 30
2421263	Microcystin LA	3.41	Spike	P	0 - 30
2421263	Microcystin LF	7.21	Spike	P	0 - 30
2421263	Microcystin LR	2.89	Spike	P	0 - 30
2421263	Microcystin LW	1.70	Spike	P	0 - 30
2421263	Microcystin LY	1.38	Spike	P	0 - 30
2421263	Microcystin RR	1.67	Spike	P	0 - 30
2421263	Microcystin WR	2.11	Spike	P	0 - 30
2421263	Microcystin YR	2.32	Spike	P	0 - 30
2421263	Nodularin-R	3.06	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P432025

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2421263	Anatoxin-a	3.51	Spike	P	0 - 30
2421263	Neosaxitoxin	3.49	Spike	P	0 - 30
2421263	Saxitoxin	7.66	Spike	P	0 - 30

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

Quality Assurance Report Surrogates

Lab Sample ID: 2421387
Field Sample ID: HAB-SD-070523-1110

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	121	P	30 - 160
EPA 8321B	Saxitoxin-15N7	74.6	P	30 - 160

Lab Sample ID: 2421388
Field Sample ID: HAB-SD-070523-1135

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	116	P	30 - 160
EPA 8321B	Saxitoxin-15N7	73.8	P	30 - 160

Lab Sample ID: 2421389
Field Sample ID: HAB-SD-070523-1200

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	101	P	30 - 160
EPA 8321B	Saxitoxin-15N7	65.5	P	30 - 160

Lab Sample ID: 2421390
Field Sample ID: HAB-SD-070523-1310

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	109	P	30 - 160
EPA 8321B	Saxitoxin-15N7	73.2	P	30 - 160

Lab Sample ID: 2421391
Field Sample ID: HAB-SD-070523-1345

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	122	P	30 - 160
EPA 8321B	Saxitoxin-15N7	71.2	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 8321B

Run ID: A120204

Included Lab Sample IDs: 2421387, 2421388, 2421389, 2421390, 2421391

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	107	104	P/P	50 - 160
Anatoxin-a	112	107	P/P	50 - 160
Neosaxitoxin	89.9	92.7	P/P	50 - 160
Neosaxitoxin	92.4	89.9	P/P	50 - 160
Saxitoxin	90.7	90.8	P/P	50 - 160
Saxitoxin	90.8	91.6	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A120205

Included Lab Sample IDs: 2421387, 2421388, 2421389, 2421390, 2421391

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	73.2	75.4	P/P	60 - 160
Cylindrospermopsin	75.4	73.2	P/P	60 - 160
Desmethyl microcystin LR	130	135	P/P	50 - 160
Desmethyl microcystin LR	134	130	P/P	50 - 160
Microcystin HII R	121	123	P/P	60 - 160
Microcystin HII R	125	121	P/P	60 - 160
Microcystin HtyR	113	115	P/P	60 - 160
Microcystin HtyR	115	113	P/P	60 - 160
Microcystin LA	88.0	92.2	P/P	50 - 160
Microcystin LA	92.2	93.3	P/P	50 - 160
Microcystin LF	90.3	94.8	P/P	60 - 160
Microcystin LF	90.4	90.3	P/P	60 - 160
Microcystin LR	113	115	P/P	60 - 160
Microcystin LR	116	113	P/P	60 - 160
Microcystin LW	71.5	74.9	P/P	60 - 160
Microcystin LW	74.9	73.5	P/P	60 - 160
Microcystin LY	78.2	83.9	P/P	60 - 160
Microcystin LY	79.9	78.2	P/P	60 - 160
Microcystin RR	73.2	74.3	P/P	60 - 160
Microcystin RR	74.3	73.4	P/P	60 - 160
Microcystin WR	129	130	P/P	60 - 160
Microcystin WR	130	129	P/P	60 - 160
Microcystin YR	106	111	P/P	60 - 160
Microcystin YR	112	106	P/P	60 - 160
Nodularin-R	81.2	79.5	P/P	60 - 160
Nodularin-R	82.3	81.2	P/P	60 - 160

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A120214

Included Lab Sample IDs: 2421406, 2421407, 2421408, 2421409, 2421410

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	98.2	99.9	P/P	90 - 110
O-Phosphate-P	99.1	98.2	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A120229

Included Lab Sample IDs: 2421401, 2421402, 2421403, 2421404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	99.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A120254

Included Lab Sample IDs: 2421402, 2421403, 2421404

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A120259

Included Lab Sample IDs: 2421401, 2421402, 2421403, 2421404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	100	P/P	90 - 110
NO2NO3-N	104	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A120264

Included Lab Sample IDs: 2421401

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A120266

Included Lab Sample IDs: 2421401, 2421402, 2421403, 2421404

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.5	98.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A120313

Included Lab Sample IDs: 2421405

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A120314

Included Lab Sample IDs: 2421405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	106	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A120349

Included Lab Sample IDs: 2421405

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

Quality Assurance Report

Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A120381

Included Lab Sample IDs: 2421405

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	101	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		LCS	Precision	MS
						SMP	
EPA 350.1 Rev. 2.0	Ammonia-N	94.8	95.6	97.2			1.29
	Ammonia-N	97.4	99.6	98.8			0.666
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	108	111			1.97
	Kjeldahl Nitrogen	106	109	108			0.840
	Kjeldahl Nitrogen	98.6	98.1	99.7			1.29
EPA 353.2 Rev. 2.0	NO2NO3-N	99.0	98.5	99.5			0.567
	NO2NO3-N	103	100	100			0.419
	NO2NO3-N	100	110	110			0.0
EPA 365.1 Rev. 2.0	Total-P	99.7	102	101			1.29
	Total-P	103	95.0	95.1			0.101
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.8	97.9			0.102
	O-Phosphate-P	102	99.6	100			0.576
	O-Phosphate-P	101	95.1	95.4			0.315
EPA 8321B	Anatoxin-a	124	102	98.3			3.51
	Cylindrospermopsin	70.0	68.4	66.0			3.68
	Desmethyl microcystin LR	133	136	136			0.286
	Microcystin H1LR	128	127	123			3.07
	Microcystin HtyR	115	112	112			0.542
	Microcystin LA	93.2	89.5	92.7			3.41
	Microcystin LF	108	102	110			7.21
	Microcystin LR	126	119	123			2.89
	Microcystin LW	77.7	74.5	73.2			1.70
	Microcystin LY	94.4	79.7	80.8			1.38
	Microcystin RR	73.7	72.4	71.2			1.67
	Microcystin WR	127	116	118			2.11
	Microcystin YR	121	115	112			2.32
	Neosaxitoxin	107	60.7	58.6			3.49
	Nodularin-R	83.4	79.3	76.9			3.06
	Saxitoxin	102	70.3	65.1			7.66

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2421401, 2421402, 2421403, 2421404, 2421405
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2421401, 2421402, 2421403, 2421404, 2421405
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2421401, 2421402, 2421403, 2421404, 2421405
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2421401, 2421402, 2421403, 2421404, 2421405
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2421406, 2421407, 2421408, 2421409, 2421410
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2421387, 2421388, 2421389, 2421390, 2421391
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2421387, 2421388, 2421389, 2421390, 2421391

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	07/06/2023			07/07/2023 12:53	Ping Hua	2421401
	07/06/2023			07/07/2023 12:54	Ping Hua	2421402
	07/06/2023			07/07/2023 12:56	Ping Hua	2421403
	07/06/2023			07/07/2023 12:57	Ping Hua	2421404
	07/06/2023			07/13/2023 10:50	Khloe J Berg	2421405
EPA 351.2 Rev. 2.0	07/06/2023	07/07/2023 11:48	Simonne.V. Calhoun	07/10/2023 09:55	Samantha L Bates	2421402
	07/06/2023	07/07/2023 11:48	Simonne.V. Calhoun	07/10/2023 09:56	Samantha L Bates	2421403
	07/06/2023	07/07/2023 11:48	Simonne.V. Calhoun	07/10/2023 10:01	Samantha L Bates	2421404
	07/06/2023	07/07/2023 11:48	Simonne.V. Calhoun	07/10/2023 12:50	Samantha L Bates	2421401
	07/06/2023	07/11/2023 09:49	Samantha L Bates	07/12/2023 10:54	Samantha L Bates	2421405
EPA 353.2 Rev. 2.0	07/06/2023			07/10/2023 11:21	Beverly Y. Sanders	2421401
	07/06/2023			07/10/2023 11:28	Beverly Y. Sanders	2421402
	07/06/2023			07/10/2023 11:34	Beverly Y. Sanders	2421403
	07/06/2023			07/10/2023 11:35	Beverly Y. Sanders	2421404
	07/06/2023			07/12/2023 10:54	Beverly Y. Sanders	2421405
EPA 365.1 Rev. 2.0	07/06/2023	07/07/2023 16:02	Adam P Silver	07/10/2023 13:06	Chandler E Cox	2421401
	07/06/2023	07/07/2023 16:02	Adam P Silver	07/10/2023 13:07	Chandler E Cox	2421402
	07/06/2023	07/07/2023 16:02	Adam P Silver	07/10/2023 13:08	Chandler E Cox	2421403
	07/06/2023	07/07/2023 16:02	Adam P Silver	07/10/2023 13:09	Chandler E Cox	2421404
	07/06/2023	07/13/2023 16:15	Adam P Silver	07/13/2023 19:39	James L Waggeberby	2421405
EPA 365.1 Rev. 2.0 dissolved	07/06/2023			07/07/2023 09:47	James L Waggeberby	2421408
	07/06/2023			07/07/2023 09:48	James L Waggeberby	2421409
	07/06/2023			07/07/2023 10:05	James L Waggeberby	2421410
	07/06/2023			07/07/2023 10:25	James L Waggeberby	2421406
	07/06/2023			07/07/2023 10:26	James L Waggeberby	2421407
EPA 8321B	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 20:10	Hana Lee	2421387
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 20:24	Hana Lee	2421388
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 20:38	Hana Lee	2421389
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 21:06	Hana Lee	2421390
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 21:20	Hana Lee	2421391
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 21:31	Juyoung Kim	2421387
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 21:48	Juyoung Kim	2421388
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 22:05	Juyoung Kim	2421389
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 22:39	Juyoung Kim	2421390
	07/06/2023	07/06/2023 11:00	Tae K Lee	07/06/2023 22:56	Juyoung Kim	2421391