

Anatoxin-a, Cylindrospermopsin, Microcystin & Saxitoxin Report
(Utah Division of Water Quality)

<u>Sample Identification</u>	<u>Site</u>	<u>Collection Date</u>
Utah Lake	Lindon Boat Harbor/Marina	10/10/2014
Utah Lake	Provo State Park Harbor	10/10/2014
Utah Lake	Outlet to Jordan River	10/10/2014
Utah Lake	Target (Lindon Harbor Shoreline)	10/10/2014
Jordan River	4994790-Utah Lake Outlet	10/10/2014
Jordan River	4994720-Narrows Pump Station	10/10/2014

Toxins – Anatoxin-a (ANTX-A), cylindrospermopsin (CYN), microcystin (MC), saxitoxin (STX)

Sample Prep – The samples were ultra-sonicated to lyse all cells and release toxins. Solid phase extraction (SPE) was also utilized for anatoxin-a prep and pre-concentration (20x) followed by filtration. Lab Fortified Matrix (LFM) duplicates were prepared at 1.0 µg/L ANTX-A, 1.0 µg/L CYN and 0.2 µg/L STX.

Analytical Methodology – Liquid chromatography/ mass spectrometry/ mass spectrometry (LC/MS/MS) was utilized for the determination of ANTX-A. The $[M+H]^+$ ion for ANTX-A (m/z 166) was fragmented and the major product ions (m/z 91, 106, 131, 149) were monitored. The current method limit of detection (LOD) is 0.05 µg/L, with a limit of quantification (LOQ) of 0.1 µg/L for ANTX-A.

A microcystins enzyme linked immunosorbent assay (ELISA) was utilized for the quantitative and sensitive congener-independent detection of MCs. The current assay is sensitive to down to a LOD/LOQ of 0.15 µg/L for total MCs. The average recoveries of laboratory fortified blanks (LFB) spiked with 1 µg/L MCLR were 97% and 98%.

A cylindrospermopsin enzyme linked immunosorbent assay (ELISA) was also utilized for the quantitative detection of CYN. The current assay is sensitive down to a LOD/LOQ of 0.1 µg/L for CYN. A lab fortified blank (LFB) spiked with 1.0 µg/L CYN was recovered at 100%.

A saxitoxin enzyme linked immunosorbent assay (ELISA) was utilized for the quantitative detection of saxitoxin. The current assay is sensitive down to a LOD/LOQ of 0.02 µg/L saxitoxin. The LFB (0.2 µg/L STX spike) recovery was 100%.

Summary of Results

(µg/L)

<u>Sample</u>	<u>MC</u> (ELISA)	<u>CYN</u> (ELISA)	<u>STX</u> (ELISA)	<u>ANTX-A</u> (LC-MS/MS)
Utah Lake - Lindon Boat Harbor	0.80	ND	ND	0.05-0.1
Utah Lake - Provo State Park Harbor	ND	ND	ND	ND
Utah Lake - Outlet to Jordan River	0.23	ND	ND	ND
Utah Lake - Target (Lindon Harbor Shoreline)	730	0.37	ND	ND
Jordan River-4994790-Utah Lake Outlet	0.17	ND	ND	ND
Jordan River-4994720-Narrows Pump Station	1.39	ND	ND	ND

Detection Limits (µg/L)

0.15

0.10

0.05

0.05

ND = Not detected above the detection limit

Submitted by:



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Date:

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