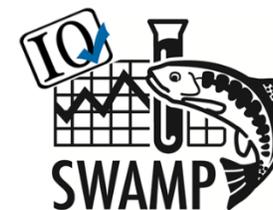


CyanoHABs Laboratory List

The purpose of this laboratory list is to readily provide information about laboratories capable of analyzing water samples for cyanobacteria and the toxins cyanobacteria can produce. This list is not intended to describe any regulatory requirements or make any laboratory endorsements. The laboratories are listed in alphabetic order. Please note – laboratories should be contacted prior to submitting any samples. Many laboratories discussed flexibility in prices and the need to coordinate any sampling and analysis. {This list was last updated September 2016}



Cyanotoxin Analysis								
Laboratory	Matrix	Cyanotoxin	Method	MDL (µg/L)	RL (µg/L)	Response Time	Sample Storage/ Shipping Condition	Shipping Preference
Beagle Bioproducts Inc. Contact: (614) 682-6588 info@beaglebioproducts.com Location: Columbus, OH	DW, AW	microcystins, total	ELISA	contact lab	contact lab	2 day response time. 24 hours response time upon request and additional fees.	Go to Beaglebioproduct.com for sampling kits & shipping containers for purchase.	Fedex overnight. Samples collected over weekend should be frozen and shipped Monday.
	DW, AW	microcystins	LC-MS	contact lab	contact lab			
	DW, AW	microcystins	LC-MSMS	contact lab	contact lab			
	DW, AW	anatoxin-a	ELISA	contact lab	contact lab			
	DW, AW	cylindrospermopsin	ELISA	contact lab	contact lab		Go to beaglebioproducts.com for sampling guide and more details.	
	DW, AW	saxitoxins	ELISA	contact lab	contact lab			
	DW, AW	anatoxin-a	LC-MS	contact lab	contact lab			
	DW, AW	cylindrospermopsin	LC-MS	contact lab	contact lab			
	DW, AW	saxitoxins	LC-MS	contact lab	contact lab			
<u>BEND GENETICS, LLC</u> LABORATORY Contact: (916) 550-1048 or customer_service@bendgenetics.com Location: Sacramento, CA	DW, AW	microcystins, total	ELISA	0.10	contact lab	Response time next day from sample receipt (Mon. – Thurs. delivery), and rush services (same day) can be arranged.	Frozen or on wet ice	No preference
	DW, AW	anatoxin-a	ELISA	0.10	contact lab			
	DW, AW	cylindrospermopsin	ELISA	0.04	contact lab			
	DW, AW	saxitoxins	ELISA	0.015	contact lab			
	DW, AW	domoic acid	ELISA	6	contact lab			
	Tissue (shellfish)	microcystins	ELISA	contact lab	contact lab			
	Tissue (shellfish)	saxitoxins	ELISA	0.015	contact lab			
	Tissue (shellfish)	domoic acid	ELISA	30	contact lab			
Tissue (shellfish)	okadaic acid	ELISA	100	contact lab				
CA Animal Health and Food Safety Lab (CAHFS), UC Davis Contact: (530) 752-7578 Location: Davis, CA	Note: Lab analyzes samples related to <i>animal health</i> . The lab can analyze animal samples (tissues and stomach contents) related to possible animal exposures to cyanotoxins from harmful algal blooms.			contact lab	contact lab	contact lab	contact lab	No preference

Cyanotoxin Analysis								
Laboratory	Matrix	Cyanotoxin	Method	MDL (µg/L)	RL (µg/L)	Response Time	Sample Storage/ Shipping Condition	Shipping Preference
CA Dept. of Fish & Wildlife, Water Pollution Control Lab Contact: Mary Curry (916) 358-4398 Location: Rancho Cordova, CA	AW	microcystins, total	ELISA	0.04	contact lab	Turnaround time: LC-MSMS analysis is 120 days, ELISA analysis is <96hrs per request	Water must be shipped on ice (frozen preferable). Tissue samples preferred frozen. 500 mL for water testing.	No preference
	AW	microcystins	LC-MSMS	0.059 - 0.294	contact lab			
	AW	anatoxin-a	RBA, ELISA	0.1-5	contact lab			
	AW	anatoxin-a	LC-MSMS	0.5	contact lab			
	AW	nodularin	LC-MSMS	0.059	contact lab			
	AW	cylindrospermopsin	ELISA	0.04	contact lab			
	Tissue (no liver)	microcystins	LC-MSMS	1.0	contact lab			
	Tissue (not liver)	domoic acid	LC-MSMS	1.0	contact lab			
	Tissue (not liver)	domoic acid	ELISA	5.0	contact lab			
	Tissue (not liver)	nodularin	LC-MSMS	0.059	contact lab			
Eurofins Eaton Analytical, Inc. – Monrovia, CA Contact: (800) 566-LABS (5227) or Us20_sales@eurofinsus.com	DW, AW	microcystins, total	ELISA	contact lab	0.16 – 0.3	48 Hrs.	Store and Ship cold in Dark. Ship Overnight on ice. Contact lab for details.	Eurofins Courier Pickup; Drop off at Eurofins; FedEx or other Courier
	DW, AW	microcystins (LA,LF,LR,LY,RR,YR)	EPA 544 & direct	contact lab	0.006 – 0.02			
	DW, AW	nodularin	LC-MSMS	contact lab	0.005 – 0.1			
	DW, AW	anatoxin-a	EPA 545 & direct	contact lab	0.02 - 0.03			
	DW, AW	cylindrospermopsin	LC-MSMS	contact lab	0.05 - 0.09			
	DW, AW	saxitoxin	LC-MSMS	contact lab	0.1			

Cyanotoxin Analysis								
Laboratory	Matrix	Cyanotoxin	Method	MDL (µg/L)	RL (µg/L)	Response Time	Sample Storage/ Shipping Condition	Shipping Preference
GreenWater Laboratories Contact: Info@greenwaterlab.com or (386) 328-0882 Location: Palatka, FL	DW, AW	microcystins (20+ congener scan)	LC-MSMS	0.1-1.0	contact lab	5 business days (shorter turnaround time available)	For liquid 250 mL. Dry weight 2 to 10 g. Samples must be shipped overnight and kept cool. Sampling kits are available upon request.	Any overnight carrier
	DW, AW	microcystins, total	ELISA	0.15	contact lab			
	DW, AW	microcystins	LC-MSMS	0.01-0.05	contact lab			
	DW, AW	cylindrospermopsin	ELISA	0.01	contact lab			
	DW, AW	cylindrospermopsin	LC-MSMS	0.01	contact lab			
	DW, AW	anatoxin-a	LC-MSMS	0.05	contact lab			
	DW, AW	saxitoxins suite	ELISA	0.02	contact lab			
	DW, AW	saxitoxins suite	LC-MSMS	0.02-0.5	contact lab			
	DW, AW	lyngbyatoxin-a	LC-MSMS	0.05	contact lab			
	DW, AW	nodularin	LC-MSMS	contact lab	contact lab			
	DW, AW	BMAA (AEL & DAB)	LC-MSMS	5.0	contact lab			
	Note: Lab also tests tissue and serum samples for various cyanotoxins including lyngbyatoxin, BMAA, others				contact lab			
King County Environmental Laboratory Contact: (206) 477-7200 Location: 322 W Ewing St, Seattle, WA 98119-1507	DW, AW	microcystins, total & nodularin	ELISA	0.16	contact lab	Typically 48-72 hours, depending on current sample load. Contact lab	Ship overnight on ice; keep sample in the dark. Water sample size 250 mL minimum.	Any overnight carrier
	DW, AW	microcystins & nodularin	LC-MSMS	0.2	contact lab			
	DW, AW	anatoxin-a	RBA	contact lab	contact lab			
	DW, AW	anatoxin-a	LC-MSMS	0.01	contact lab			
	DW, AW	saxitoxins	ELISA	0.16	contact lab			
	DW, AW	cylindrospermopsin	ELISA	0.16	contact lab			
	Note: Lab also tests sediment, tissue, and serum (dogs) samples for various cyanotoxins				contact lab			
LSSU Analysis Environmental lab Contact: (906) 635-2076 Location: Sault Ste. Marie, MI	DW, AW	microcystins, anatoxin-a, cylindrospermopsin, nodularin, saxitoxins	ELISA	contact lab	contact lab	ELISA & HPLC < 48 Hours (Upon receipt of sample). Liquid Samples & LC-MSMS ~ 72 Hours. Samples that require digestion, may add 1 day extra.	Contact lab	Contact lab
	DW, AW		HPLC	contact lab	contact lab			
	DW, AW		LC-MSMS	contact lab	contact lab			
	Note: Lab also tests tissue, serum, and powders for microcystin, anatoxin-a, cylindrospermopsin, saxitoxins				contact lab			

Cyanotoxin Analysis								
Laboratory	Matrix	Cyanotoxin	Method	MDL (µg/L)	RL (µg/L)	Response Time	Sample Storage/ Shipping Condition	Shipping Preference
UC Santa Cruz - Kudela Lab Contact: Raphael Kudela at kudela@ucsc.edu Location: Santa Cruz, CA	DW, AW	microcystins	LC-MS	< 0.25	contact lab	3 days upon receipt	250 mL sample size, amber glass bottles, store in cold and dark, ship cold.	Any overnight carrier
	DW, AW	anatoxin-a	LC-MS	< 0.26	contact lab			
	DW, AW	cylindrospermopsin, saxitoxins, lyngbyatoxin-a, yessotoxin	LC-MS	contact lab	contact lab			

Molecular Analysis (Commercial Lab Services)							
Laboratory	Matrix	Metagenomics - 16S/18S Amplicon or Shotgun (Identification & enumeration of cyanobacteria or microbial community)	Additional Information	Molecular Diagnostics PCR/QPCR (Rapid enumeration of toxin and taste & odor producing cyanobacteria/bacteria)	Additional Information	Sample Bottles/Storing	Shipping Condition
BEND GENETICS, LLC Laboratory Contact: (541) 600-GENE or customer_service@bendgenetics.com Location: Sacramento, CA	DW	X	http://bendgenetics.com/?page_id=22	X	http://bendgenetics.com/?page_id=8	Water samples need to be stored cold (4°C) and dark, <u>never frozen</u> . <OR> Samples can be concentrated onto glass fiber filters or membrane filters and stored frozen (similar to Chl- <i>a</i> sample prep).	Within 48 hours of collection if not frozen
	AW	X		X			
	Tissue (shellfish)	X		X			
	Sediments	X		X			

Molecular Analysis (In-House Lab Use)

Commercial kits for molecular analysis are available at:

Diagnostic TECHNOLOGY, Pty Ltd

www.phytoxigene.com

Contact for North America: Greg Ford, Tel: (858) 335-2993, gford@phytoxigene.com

Cyanobacteria Measurements								
Laboratory	Identification (Genus/Species)	Cell Density	Enumeration	Pigments - Chlorophyll-a	Pigments - Phycocyanin	Response Time	Sample Storing/ Shipping	Shipping Preference
Aquatic Services Contact: wayne.carmichael@wright.edu Location: Seaside, OR	X		X			Contact lab	None specified	No preference
Beagle Bioproducts Inc. Contact: (614) 682-6588 info@beaglebioproducts.com Location: Columbus, OH	X			X ¹	X	Contact lab	Samples for algae ID should not be frozen.	Overnight Fedex/UPS
<u>BEND GENETICS, LLC</u> Laboratory Contact: (541) 600-GENE or customer_service@bendgenetics.com Location: Sacramento, CA	X ²					1.5 days	Store samples cold (4°C) and dark, never frozen. Must not be preserved (e.g., Lugols) if molecular analysis (by qPCR) is desired.	No preference
CA Dept. of Fish & Wildlife, Water Pollution Control Lab Contact: Mary Curry (916) 358-4398 Location: Rancho Cordova, CA				X		Contact lab	None specified	No preference
CSU San Marcos, CA Primary Algae Laboratory Contact: rsheath@csusm.edu (760) 750-8023 Location: San Marcos, CA	X	X	X			Rush service available	Prefer 2 sets of samples: 1 fresh/live sample kept cool and 1 preserved by Lugol's. Ship cold ASAP	No preference
EcoAnalysts, Inc. Contact: http://www.ecoanalysts.com/ Location: Moscow, ID	X	X	X	X		1-5 business days	If preserved, preserved in Lugol's. No glass containers. If collected fresh, put on ice and overnight them Monday-Friday.	Fedex

Cyanobacteria Measurements								
Laboratory	Identification (Genus/Species)	Cell Density	Enumeration	Pigments - Chlorophyll-a	Pigments - Phycocyanin	Response Time	Sample Storing/ Shipping	Shipping Preference
Eurofins Eaton Analytical, Inc. – Monrovia, CA Contact: (800) 566-LABS (5227) or Us20_sales@eurofinsus.com	X	X	X			Contact lab	Store and Ship cold in Dark. Ship Overnight on ice. Contact lab for details.	Eurofins Courier Pickup; Drop off at lab; or other Courier
GreenWater Laboratories Contact: Info@greenwaterlab.com or (386) 328-0882 Location: Palatka, Florida	X	X (bio-volume)	X			Contact lab	None specified	No preference
King County Env Laboratory Contact: (206) 477-7200 Location: Seattle, WA	X	X	X	X		Contact lab	Ship on ice in the dark.	Overnight Fedex/UPS
LSSU Analysis Environmental lab Contact: (906) 635-2076 Location: Sault Ste. Marie, MI	X		X	X		Contact lab	None specified	Overnight Fedex/UPS
¹ Contact lab for information on handheld Fluorometers & Calibrators (http://beaglebioproducts.com/) ² Lab provides genus/species identification by microscopy or DNA analysis. Identification by microscopy includes a photograph of the sample. ³ Lab provides genus or gene enumeration by molecular methods (qPCR)								

This laboratory list is not an exhaustive review of available laboratories. If there is a laboratory that wishes to be considered for this list or if there are any corrections, please contact OIMA-Helpdesk@waterboards.ca.gov.

Definitions

- Analytical methods – As of August 2015, there are no promulgated US EPA standardized methods for cyanobacteria toxin (cyanotoxins) analysis. For quality control considerations, please contact the laboratory to learn about their laboratory quality management system.
- AW – Samples collected for ambient water analysis, this includes sampling for protection of recreation uses.
- DW – Samples collected for drinking water analysis
- ELISA – Enzyme Linked Immunosorbent Assay
- LC-MS Analytical methods – liquid chromatography mass spectrometry
- LC-MS-MS Analytical methods – liquid chromatography with multiple mass spectrometry
- MDL – Method detection limit
- RBA – Receptor binding assay
- RL – Reporting limit