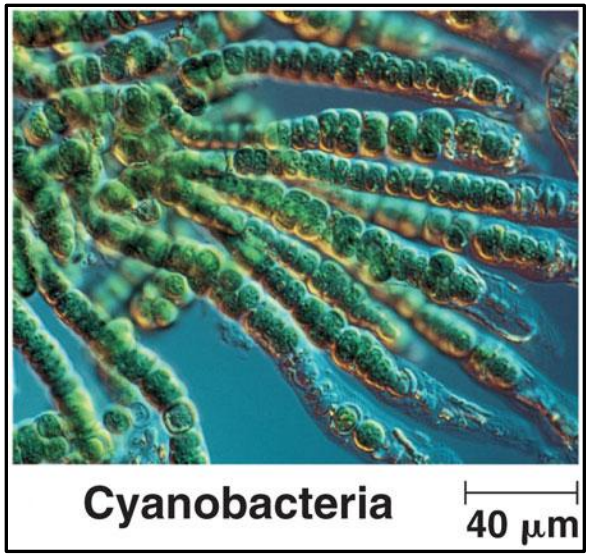
Cyanobacteria and Drinking Water Supplies

Cyanobacteria

- Microscopic Organisms
- Once Called Blue-green Algae
- Many Different Types
- Found in All Water Bodies
- Usually Found in Low Numbers



Increased Concentrations May Create Problem Blooms

- Low Water Flow
- Warm Summer Water Temperatures
- Nitrogen & Phosphorus Enter the Water

- Taste and Odor Problems for PWS
- Public Health Concerns for Humans & Pets
- Cells May Contain Toxin

Cyanobacteria Commonly Found in Lakes, Ponds and Reservoirs in New England

Genus	Toxins Produced
Anabaena	Anatoxins, Microcystins, Saxitoxins
Aphanizomenon	Saxitoxins, Cylindrospermopsins
Microcystis	Microcystins
Common Cyanobacteria	
Anabaenopsis	Microcystins
Cylindrospermopsis	Cylindrospermopsins, Saxitoxins
Nostoc	Microcystins
Phormidium (*Oscillatoria*)	Anatoxin
Planktothrix (*Oscillatoria*)	Anatoxins, Aplysiatoxins, Microcystins, Saxitoxins
Hapalosiphon	Microcystins
Lyngbya	Aplysiatoxins, Lyngbyatoxin a
Nodularia	Nodularin

Health Concerns Depend Upon

- Type of Exposure
- Concentrations of Cyanobacteria Species & Toxins Present

Routes of Exposure in DW

Dermal Contact

Toxins are released when the cells are ingested and they break down in the stomach.

After an algae bloom ends and the organisms die, the toxins are released into the water where they can be directly ingested.

Symptoms From Exposure

- Skin Rash
- Numb lips
- Tingling fingers & toes
- Dizziness
- Abdominal pain
- Diarrhea
- Vomiting

Symptoms from Exposure

- Elevated Levels of Toxin:

  Serious liver damage

- Deaths in Animals (dogs) Have Occurred in Massachusetts At Recreational Waters

- Cyanobacteria are not regulated by EPA or by Massachusetts.

- Some DW Treatment Plant Processes Are Effective In Removing Some Cells and/or Some Toxins

In Lake Treatments

- Chemicals
- Aerators & Mixers
- Dilution & Flushing
- Algal Harvesting
- Sediment Removal
- Ultrasound
- Ozone Injection

Source Water Protection

- Reduce nitrogen and phosphorus in watersheds.

- Septic Systems
- Lawn/Gardens
- Agricultural
- Golf Courses
- Other

Direct Flow or Through Stormwater

More Cyanobacteria Blooms Are Expected As Climate Change Results in Warmer Water Temperatures & Periodic Drought (Low Flow) Conditions.

DWP Outreach & Training Plan for Surface Water Suppliers

- MassDEP Committee
- DWM research document
- DWP fact sheet (monitor for, treat, prevent)
- DWP template for a cyanobacteria plan
- Incorporate into PWS Emer. Response Plan
- Article in ITM, etc.
- Training in spring 2014

Partners

- DWP
- DWM
- ORS
- WES
- MassDPH
- Other NE States & NY
- NEIWPCC
- PWS & Boards of Health

MassDEP Contacts

- WERO Kim Longridge (or Deirdre Cabral)
- CERO Bob Bostwick
- NERO Nick Zessoules (or Tom Mahin)
- SERO Rick Rondeau
- Boston Kathy Romero