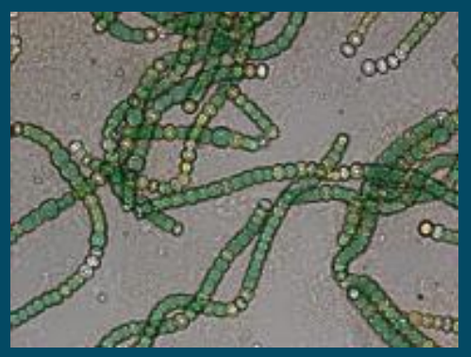



UTAH DEPARTMENT *of* ENVIRONMENTAL QUALITY

WATER QUALITY

Harmful Algal Blooms 2018 Update

MONITORING, RESPONSE, EXPENDITURES

NRAE Committee, July 18, 2018

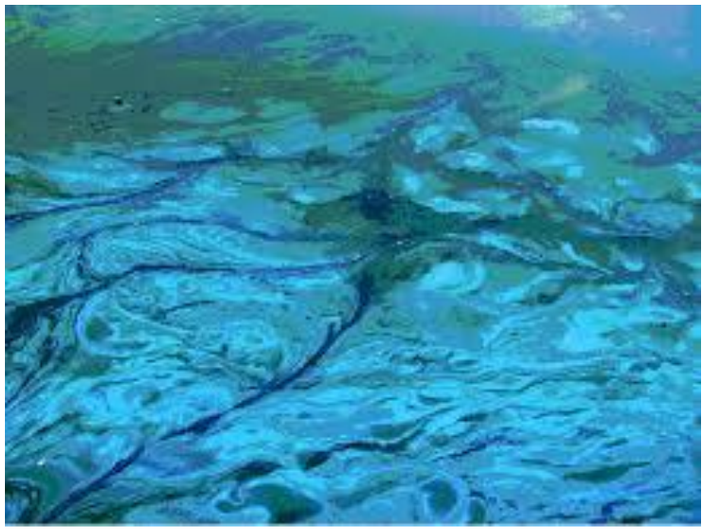
What are “harmful algal blooms”?

Cyanobacteria – or blue-green algae

Photosynthetic bacteria that are older than plants/algae

Bluish-green color (cyan)

Fix nitrogen from the atmosphere



Algal Blooms

Excessive algal (and cyanobacteria) growth

Cause oxygen depletion and “dead zones”

Harmful Algal Blooms (HABs)

Some produce toxins that can sicken people and have killed pets and wildlife

Found in all 50 states (fresh and marine waters) and around the world

Cyanobacteria and cyanotoxins

Liver, nerve, or skin toxins

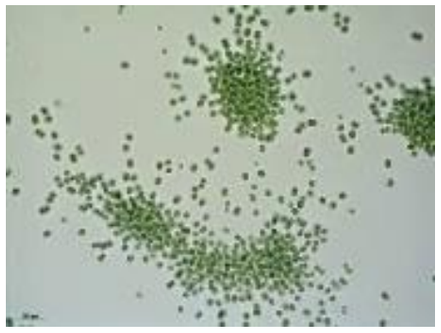
Selectively produced by many genera but not very predictable

Widely distributed but not often at acutely toxic levels

Analyses are available for some *but not all* of these toxins

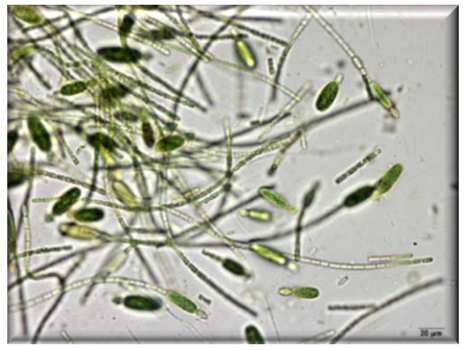
Dolichospermum

-Anatoxin-a/a(s) (nerve)
-Saxitoxins (nerve)
-Microcystins (liver)



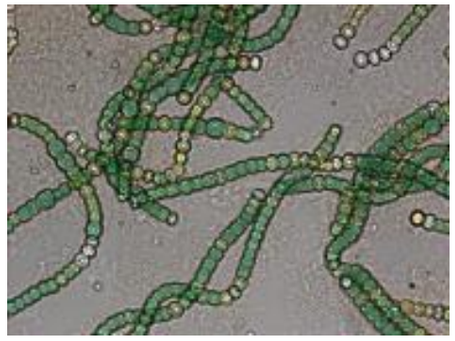
Microcystis

-Microcystins (liver)
-Toxin is most common and easily measured
-100 congeners



Cylindrospermopsis

-Cylindrospermopsins (liver)
-Saxitoxins (nerve)
-Benthic/epiphytic rather than planktonic



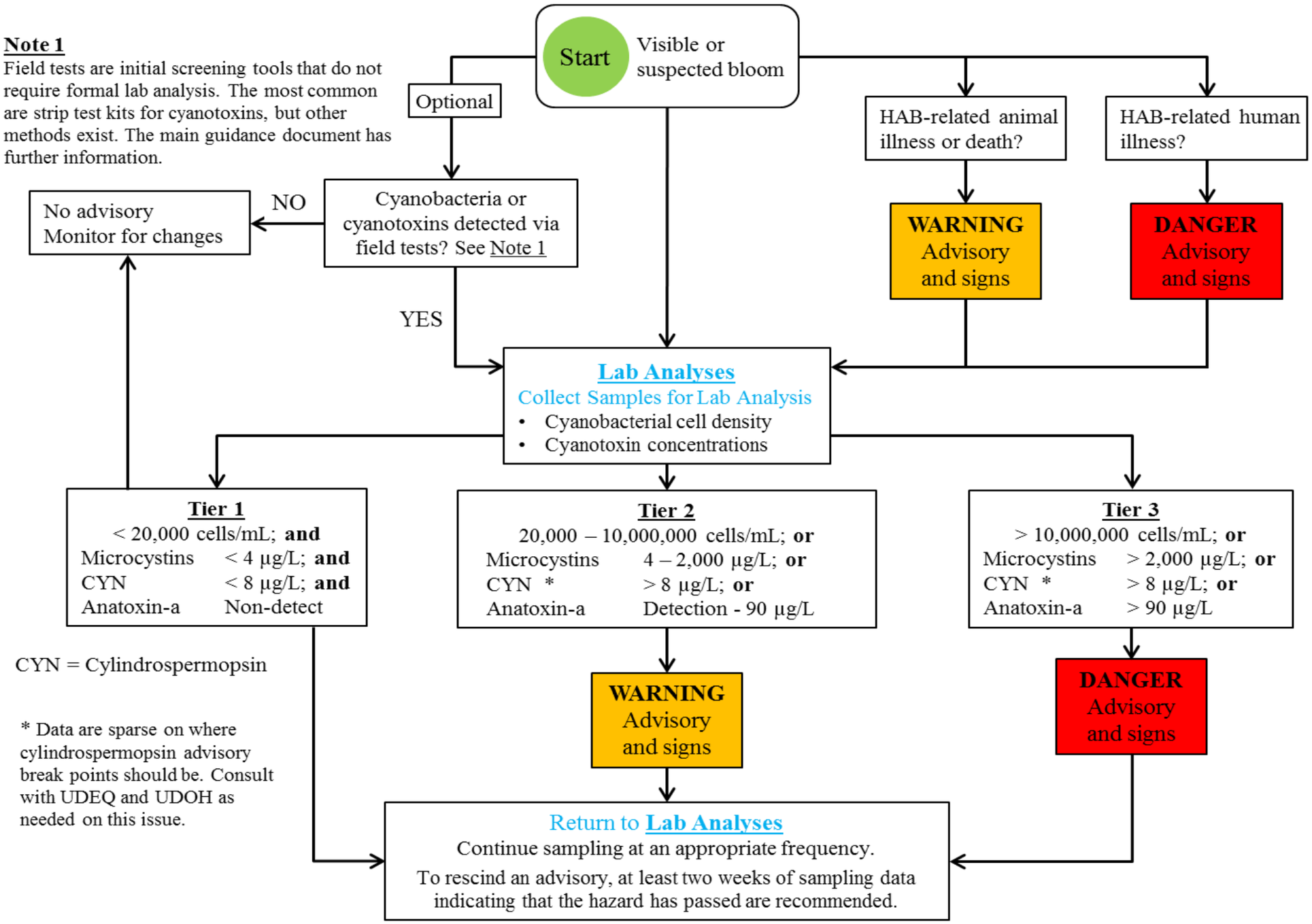
Nodularia

- Nodularins (liver)
- Found in brackish water including bays of Great Salt Lake

Aphanizomenon

-Anatoxins (nerve)
-Cylindrospermopsins (liver)
-Saxitoxins (nerve)

HAB Decision-making algorithm



Monitoring HABs

Legislative appropriation FY19: $178,500

Statewide cyanobacteria bloom screening

- 130 monitoring locations
- 40 waterbodies

Real-time, water- quality data

Five real-time sensors stationed on at-risk waterbodies

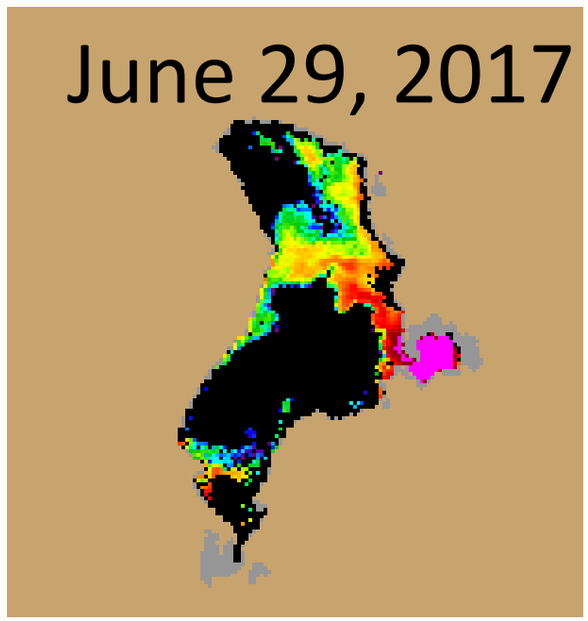
- Utah Lake
- Scofield Reservoir
- Deer Creek Reservoir

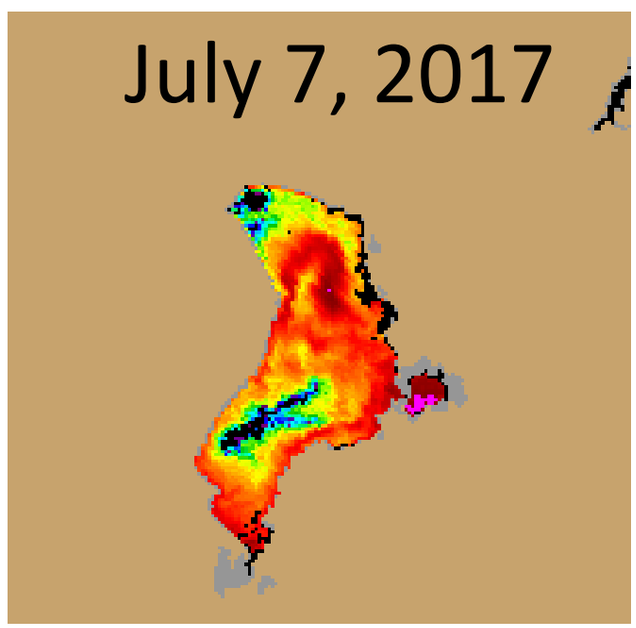
Satellite interpolation

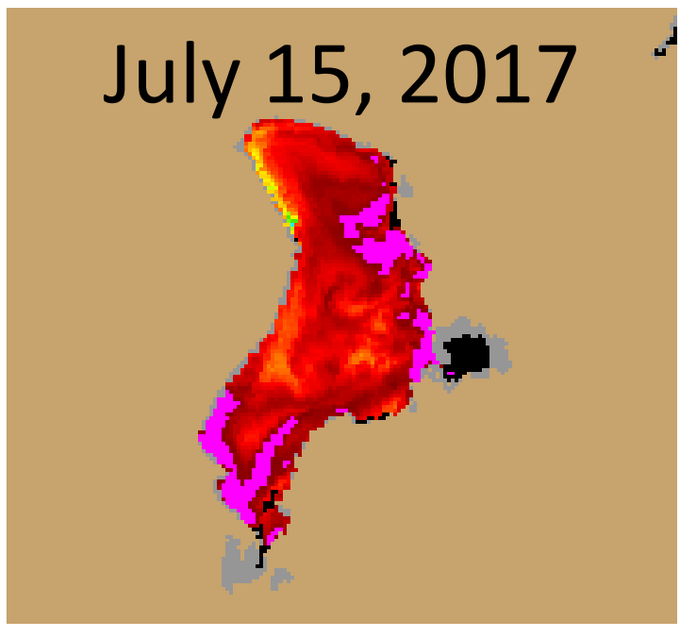
Near-daily satellite imagery from federal partners is interpolated for cyanobacteria concentrations.

Monitoring and Sampling on Utah Lake

Satellite Imagery for HAB monitoring



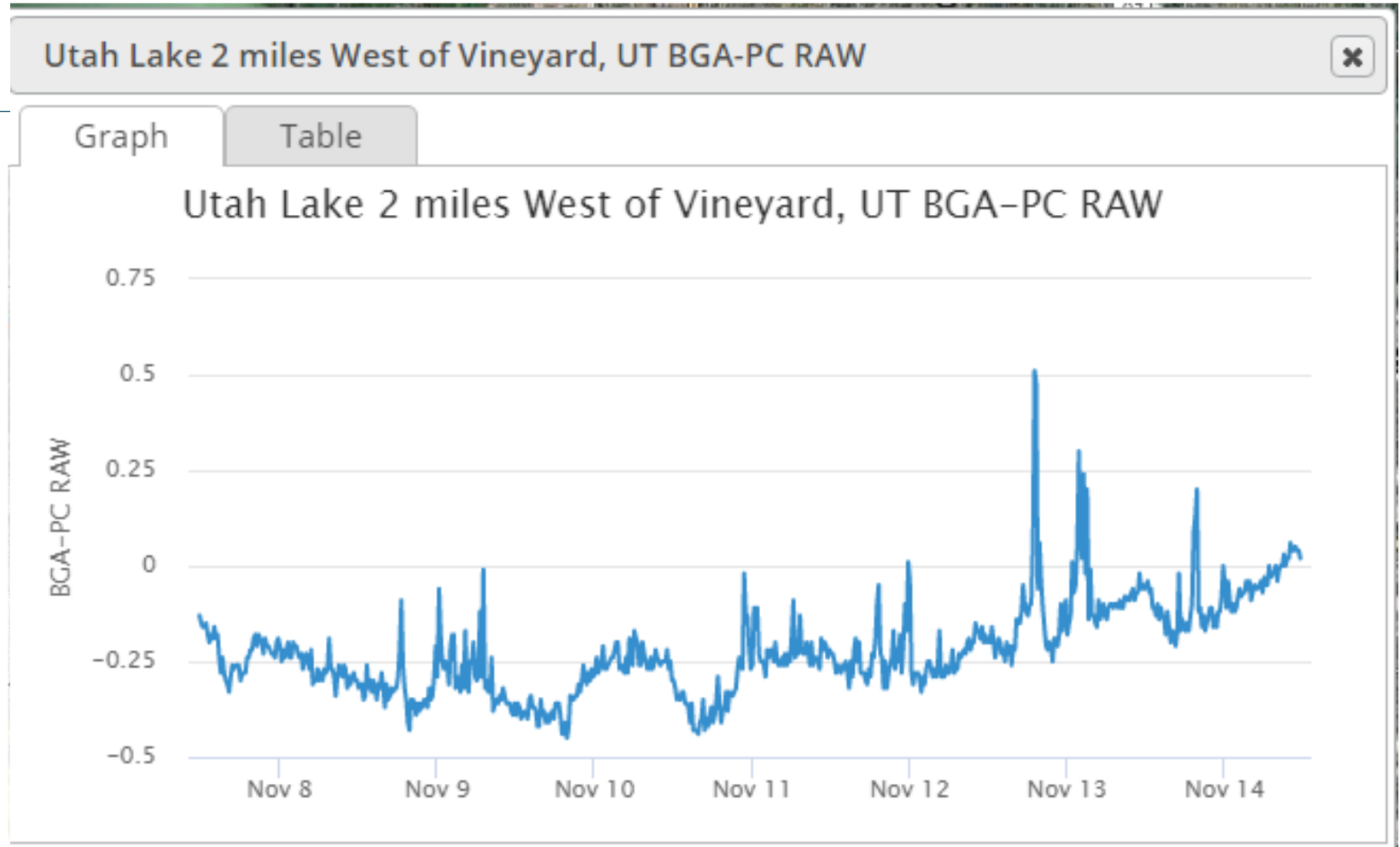


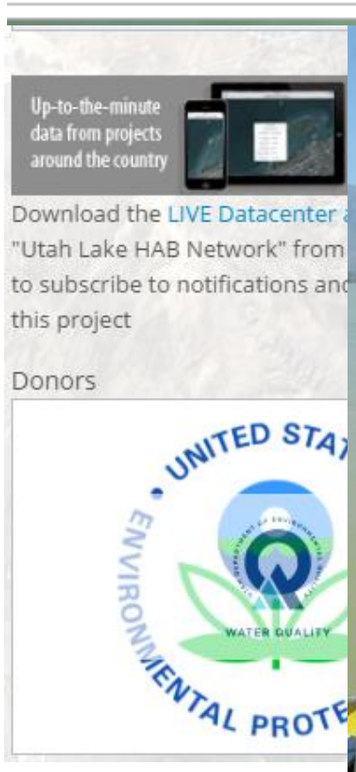


Utah Lake Buoy Network

- 3 high frequency sondes
- Telemetered every 60 min.
- Parameters:
  - Temperature
  - Conductance
  - pH
  - Dissolved oxygen
  - DO saturation
  - Chlorophyll
  - Turbidity
  - Blue-green algae
- iUTAH partnership

https://wqdatalive.com/public/669





Utah Lake Bloom - 2018

April 21, 2018

Satellite imagery triggered weekly sampling.

Early June, 2018

Recreational Warning Advisory from Utah County Health

- Provo Bay
- Utah Lake State Park
- Lincoln Marina
- Sandy Beach

June 25, 2018

Cyanobacteria levels > 36 million cells per milliliter

Microcystin > 500 micrograms per liter

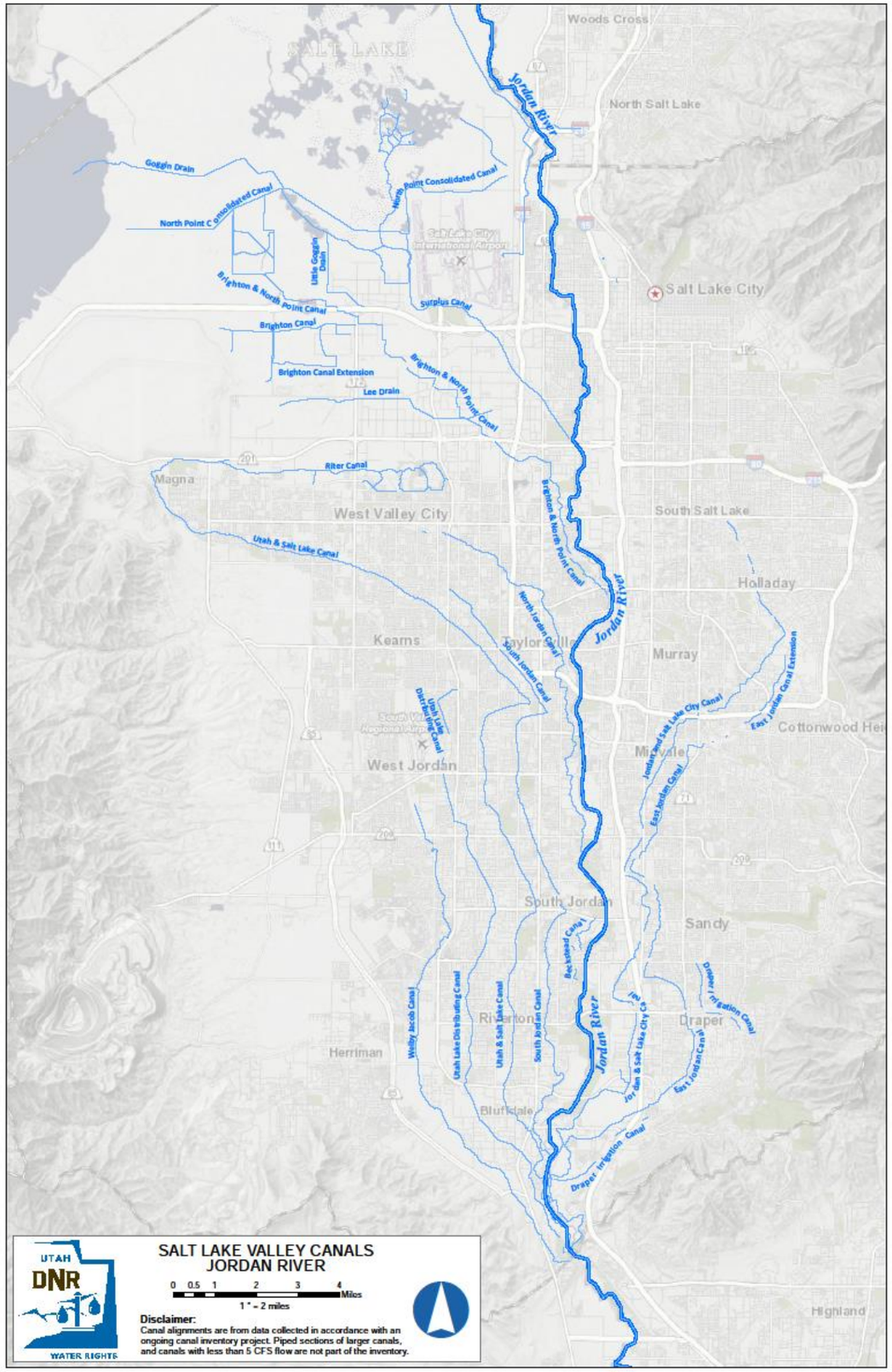
Closure of Lincoln Marina.

July 2018

Advisory locations evaluated weekly, and bloom screens evaluated frequently to target potential new locations.

Lincoln Marina

Monitoring for potential downstream impacts



Mantua Reservoir Bloom

May 22, 2018

USU volunteer discovered bloom

Microcystin detected below advisory thresholds

May 30, 2018

Microcystin > 5 ug/L

Cyanobacteria cell > 2.3 million cells/mL per milliliter

Bloom subsided two weeks later

Current situation

Brigham City, owner of Mantua Reservoir, continues to monitor and test the reservoir for blooms.

Mantua Reservoir Northwest Corner

Scofield Reservoir Bloom

July 5, 2018

DWQ monitors collected samples at two locations

Positive for anatoxin-a

Cyanobacteria cell count exceeded 3.4 million cells per milliliter.

July 10, 2018

Cyanobacteria cell counts > 6.9 million cells/mL

July 13, 2018

The Southeast Utah Health Department issued a lake-wide Warning Advisory for swimming.

July 16, 2018

Bloom appears to be expanding

Coordinated weekly sampling: DWQ, Southeast Utah Health, drinking water utilities, Utah Department of Agriculture and Food (UDAF).

Scofield Reservoir near the dam

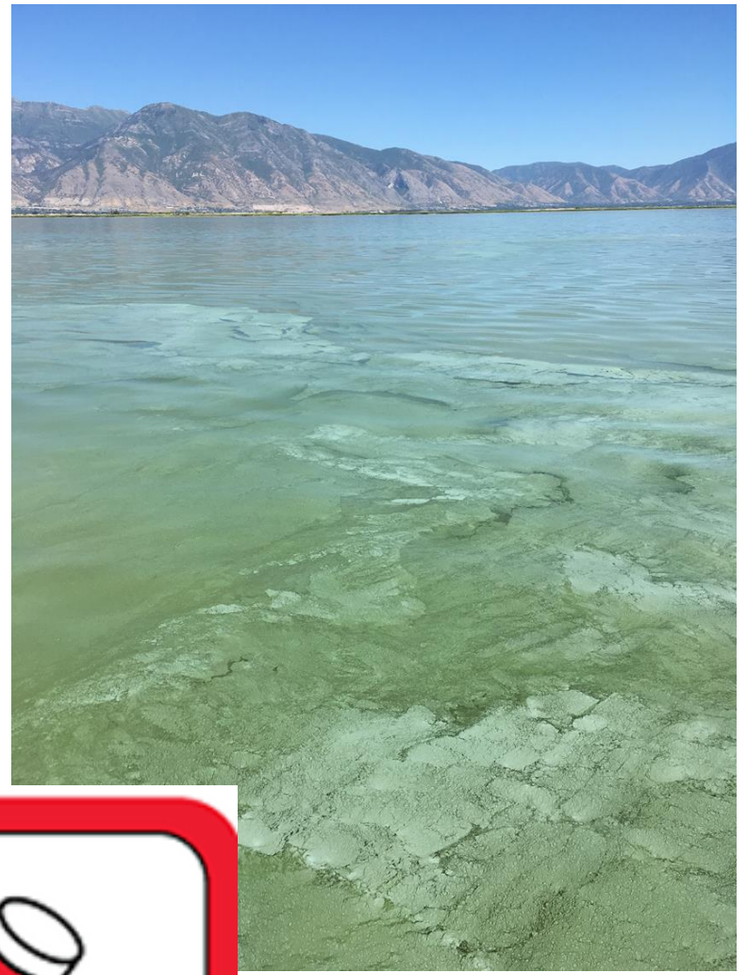
Utah Poison Control Center HAB Reports

Cases reported

- 2016: 676 cases (32% symptomatic)
- 2017: 173 cases (30% symptomatic)
- 2018 (June): 41 cases

Symptoms reported

- Gastrointestinal: diarrhea, nausea, vomiting, and abdominal pain
- Skin: irritation
- Neuro: headache, dizziness



POISON Help 1-800-222-1222

Management of Harmful Algal Blooms

Prevention

- Reduction of nutrient inputs
- Water management
- ***Implementation takes decades***

Mitigation

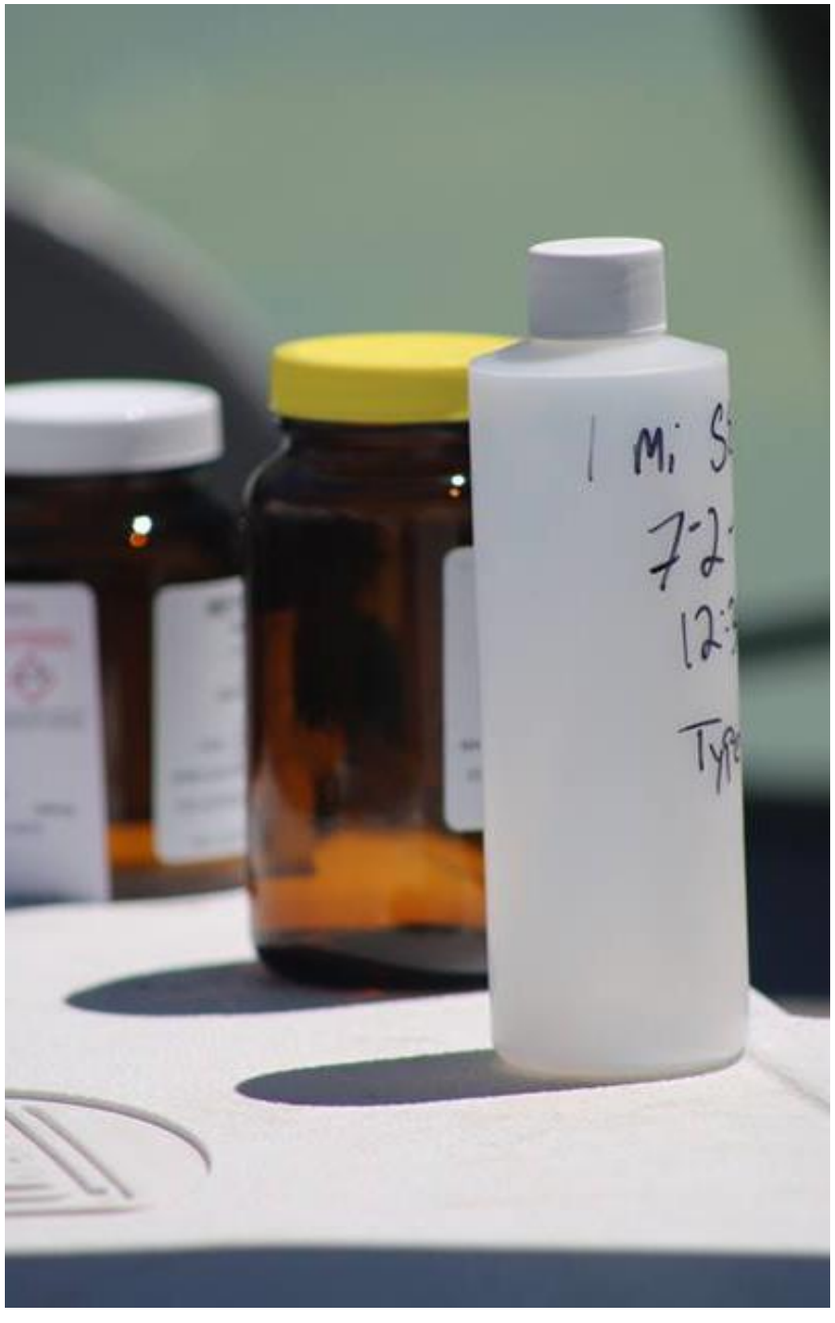
- Monitoring for cells and toxins
- Forecasting and public notification
- ***Ongoing funding source needed***

Control

- Biological –viruses, bacteria, parasites, grazers
- Chemical– barley straw, copper sulfate
- Chemical and clay flocculation
- ***Bloom control research is relatively immature.***
- ***Actions would need to be vetted and permitted by multiple agencies.***

Source: Mario Sengco- US EPA

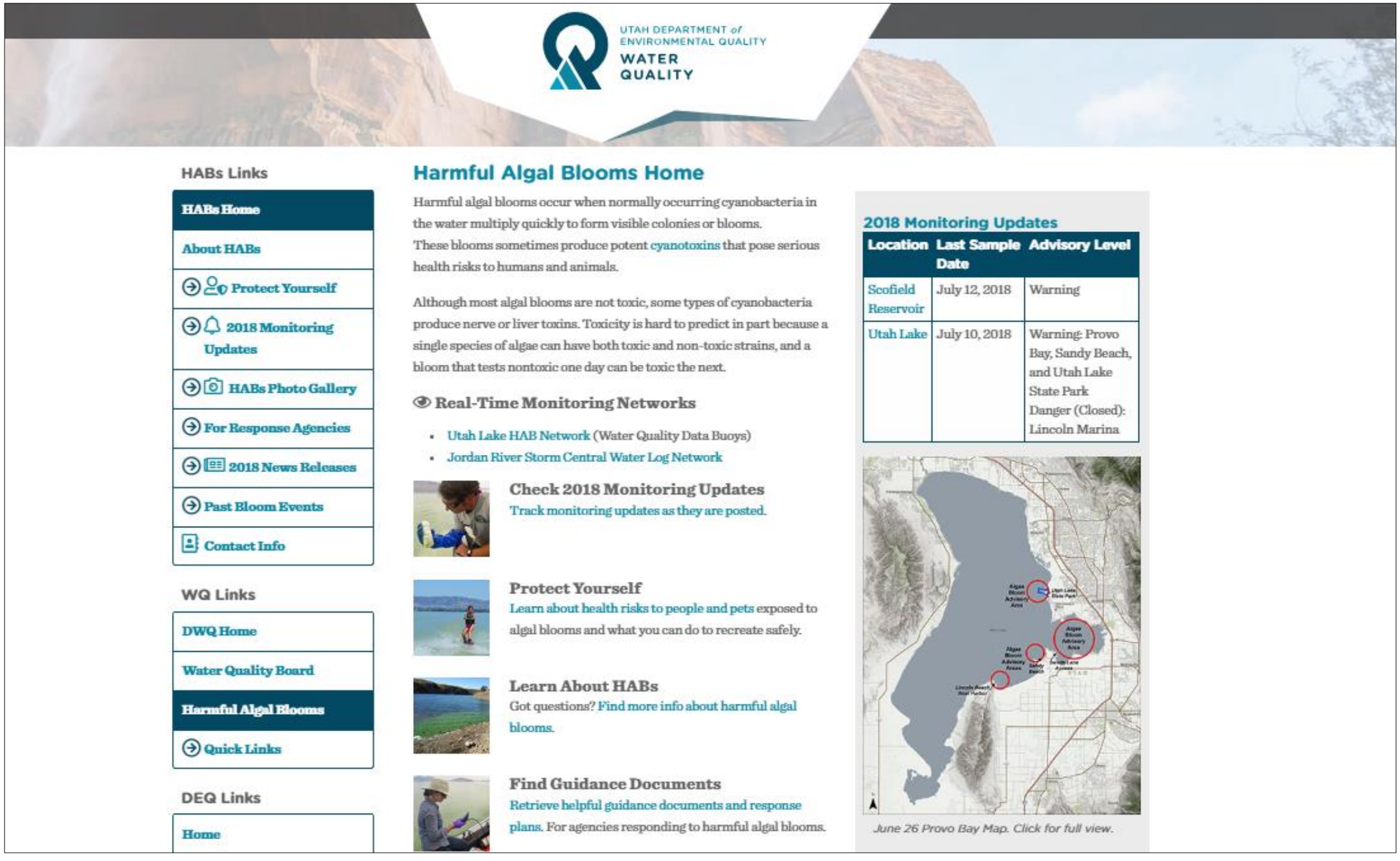
Costs: Monitoring, Testing, Response



FY19 HAB Response Building Block

Category	Legislatively Appropriated for FY19	DWQ expenditures through July 15
Personnel	$62,400	$8,415
Travel	$8,350	$674
Equipment and Supplies	$9,000	$3,975
Laboratory Services	$31,500	$0
Local Health Departments	$67,275	$0
Total	$178,500	$9,089

Questions?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For Response Agencies
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Harmful Algal Blooms Home
Harmful algal blooms occur when normally occurring cyanobacteria in the water multiply quickly to form visible colonies or blooms. These blooms sometimes produce potent cyanotoxins that pose serious health risks to humans and animals.
Although most algal blooms are not toxic, some types of cyanobacteria produce nerve or liver toxins. Toxicity is hard to predict in part because a single species of algae can have both toxic and non-toxic strains, and a bloom that tests nontoxic one day can be toxic the next.
Real-Time Monitoring Networks
Utah Lake HAB Network (Water Quality Data Buoys)
Jordan River Storm Central Water Log Network
Check 2018 Monitoring Updates
Track monitoring updates as they are posted.
Protect Yourself
Learn about health risks to people and pets exposed to algal blooms and what you can do to recreate safely.
Learn About HABs
Got questions? Find more info about harmful algal blooms.
Find Guidance Documents
Retrieve helpful guidance documents and response plans. For agencies responding to harmful algal blooms.
2018 Monitoring Updates
Location
Last Sample Date
Advisory Level
Scofield Reservoir
July 12, 2018
Warning
Utah Lake
July 10, 2018
Warning: Provo Bay, Sandy Beach, and Utah Lake State Park
Danger (Closed): Lincoln Marina
June 26 Provo Bay Map. Click for full view.