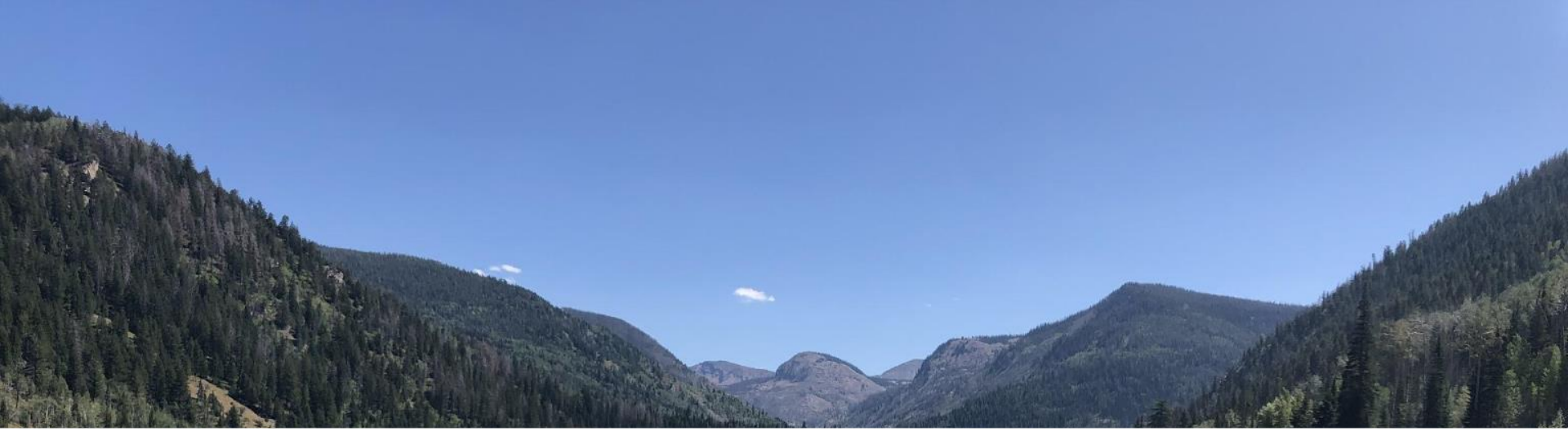


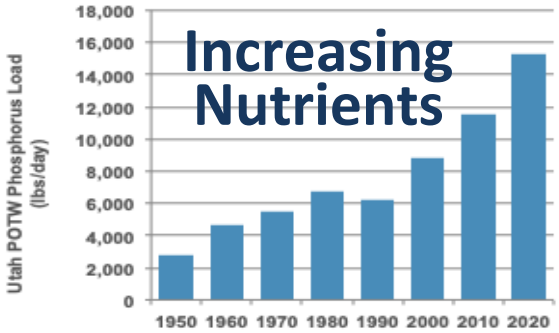
UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
WATER QUALITY

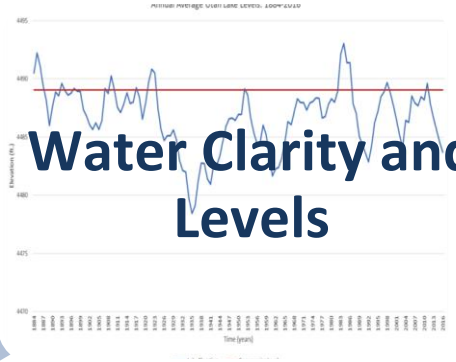
Utah Division of
Forestry, Fire & State Lands

Harmful Algal Bloom Program 2021 Update

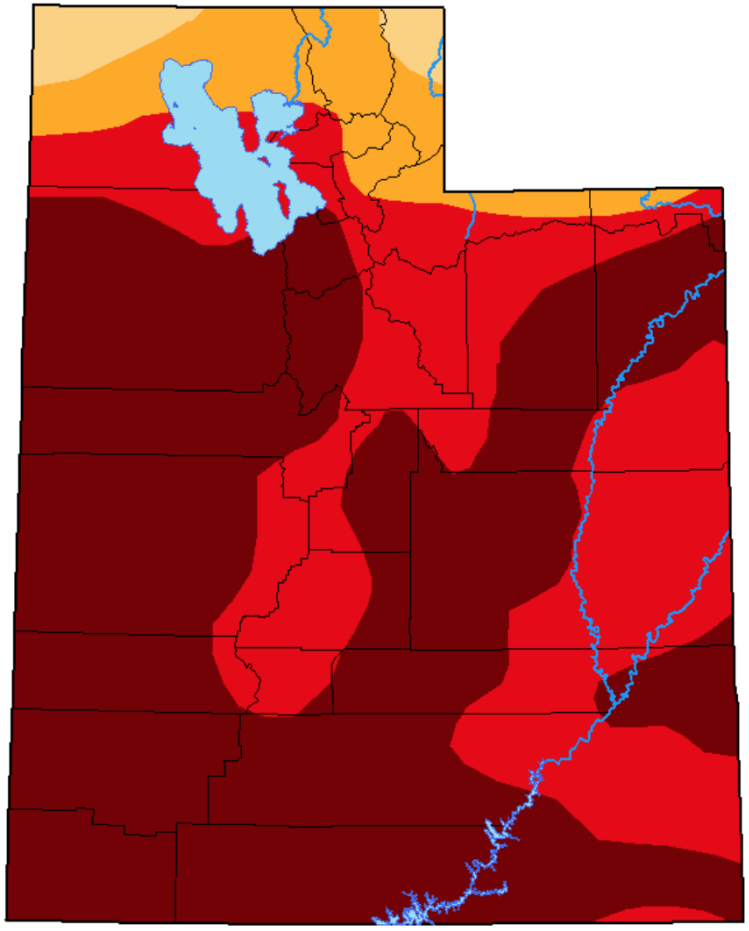
Erica Brown Gaddis, PhD, Director, DWQ
Jamie Phillips-Barnes, Interim Director, FFSL

Factors Contributing to Algal Blooms





2021 HAB Outlook – Drought



Map released: Thurs. June 3, 2021

Data valid: June 1, 2021 at 8 a.m. EDT

Intensity

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Harmful Algal Bloom Management

Prevention

- Root causes
- Utah Lake Study

Mitigation

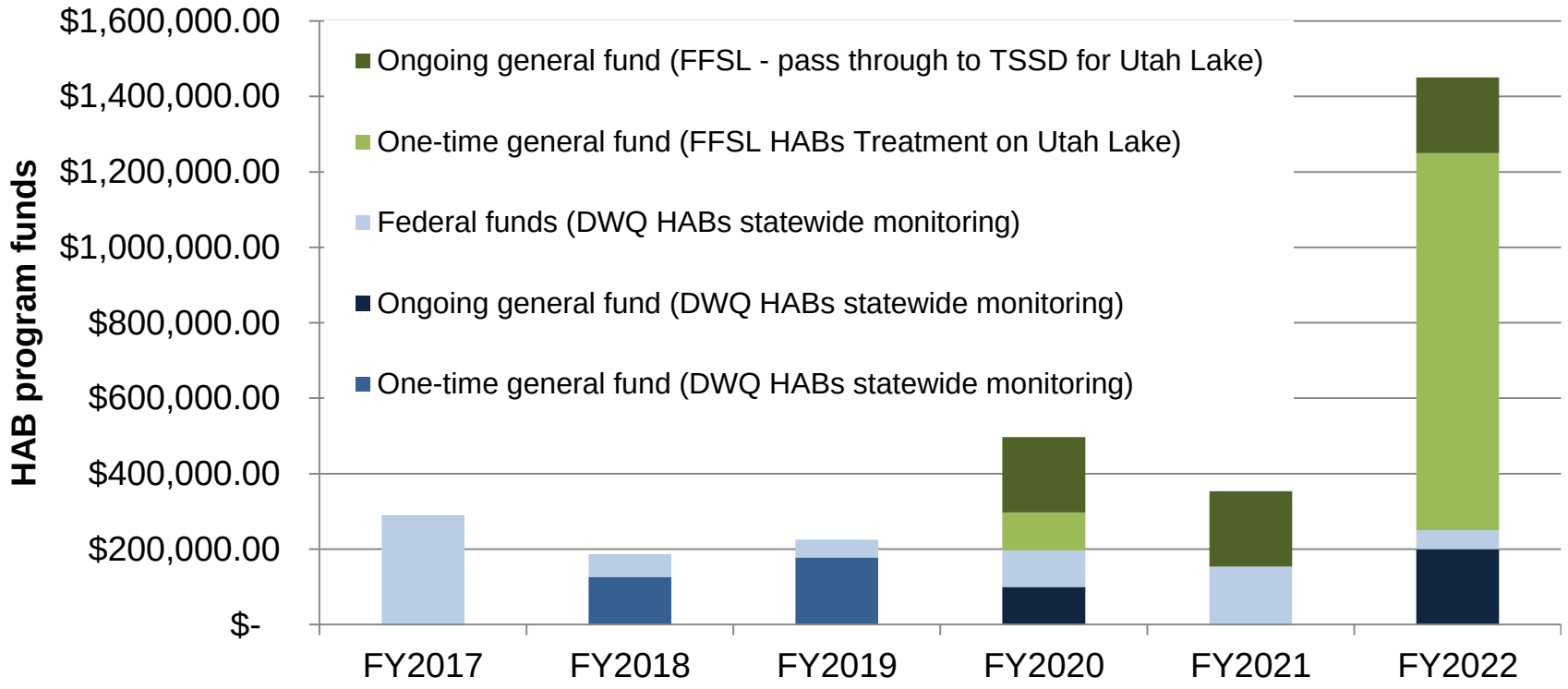
- Health advisories
- Education

Treatment

- Algaecides
- Harvesting

Monitoring

Harmful Algal Bloom funding history



DWQ Funded Activities

- Monitoring of ~40 waterbodies
- Coordination of advisory process with local health departments

FFSL Funded Activities

- Utah Lake algal treatment
- Pass through to Timpanogos Special Services District for Utah Lake study.

Harmful Algal Bloom program partners

And other experts and stakeholders

Harmful Algal Bloom Management

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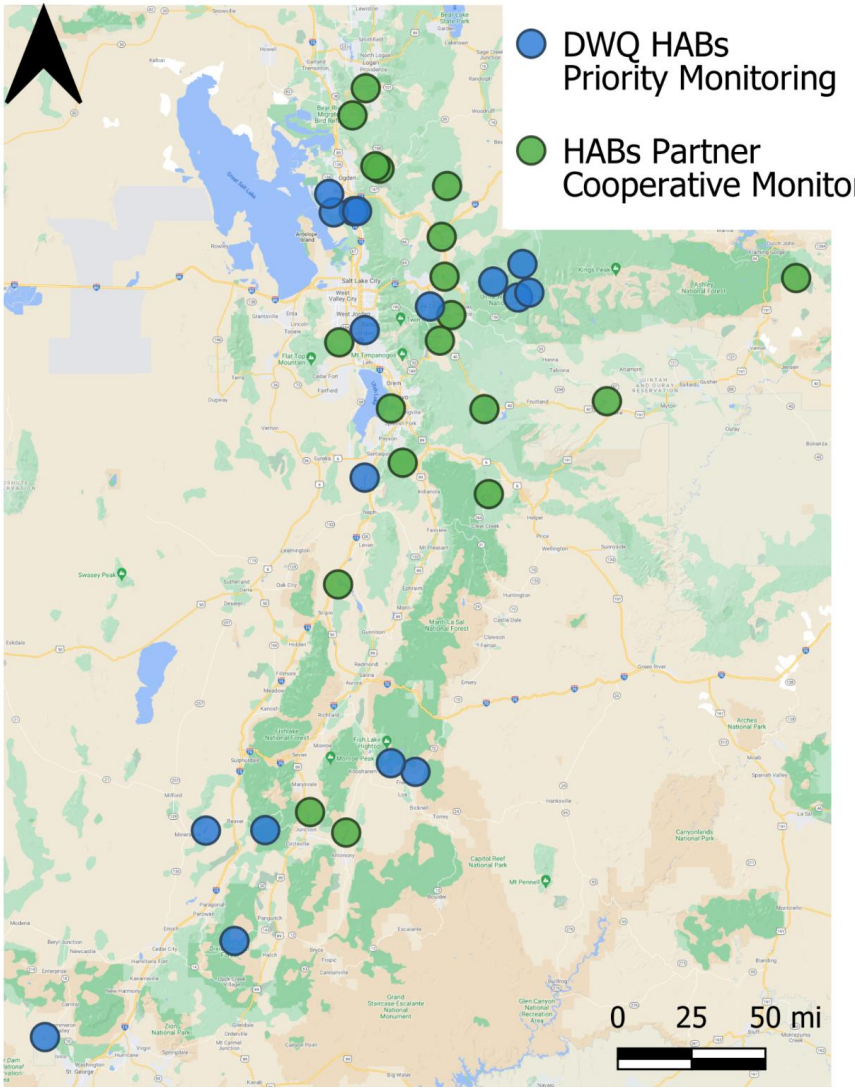
2021 Program Activities



*Waterbodies that may have emergencies or are monitored less frequently by local health departments. Samples and analysis paid for by UDWQ.

DWQ HAB Advisory Process

Monitoring

Routine
Monitor prioritized lakes on a monthly basis

Response
Monitor lakes on advisory on a weekly basis

Data Collected
Microcystin and Anatoxin-a
Cell Count (Taxonomy)

Detection

Inform LHD
Present data collected along with DWQ recommendation. Assist in answering site specific questions.

Communication
Phone call with all stakeholders (i.e. DNR, USFS, etc.) for site specific context

Advisory

Signs
Work with LHD and partners to post signs, make sure signs get posted

Communication
Alert stakeholders to advisory decision. Post information, maps, and narrative about advisory on habs.utah.gov

2021 Advisory Thresholds

	Warning	Danger
Relative Probability of Acute Health Risk	Moderate	High
Cyano Cell Density (cells/mL) Toxigenic species only	~~20,000~~ 100,000	~~10,000,000~~ NA
Microcystin (ug/L)	~~4~~ 8	2,000
Cylindrospermopsin (ug/L)	~~8~~ 15	~~8~~ 15
Anatoxin-a (ug/L)	~~Detection~~ 15	90
Health Risks	-Potential for long-term illness -Short term effects (e.g. skin and eye irritation, nausea, vomiting, diarrhea)	-Potential for acute poisoning -Potential for long-term illness -Short term effects (e.g. skin and eye irritation, nausea, vomiting, diarrhea)

Utah Poison Control Center HAB Reports

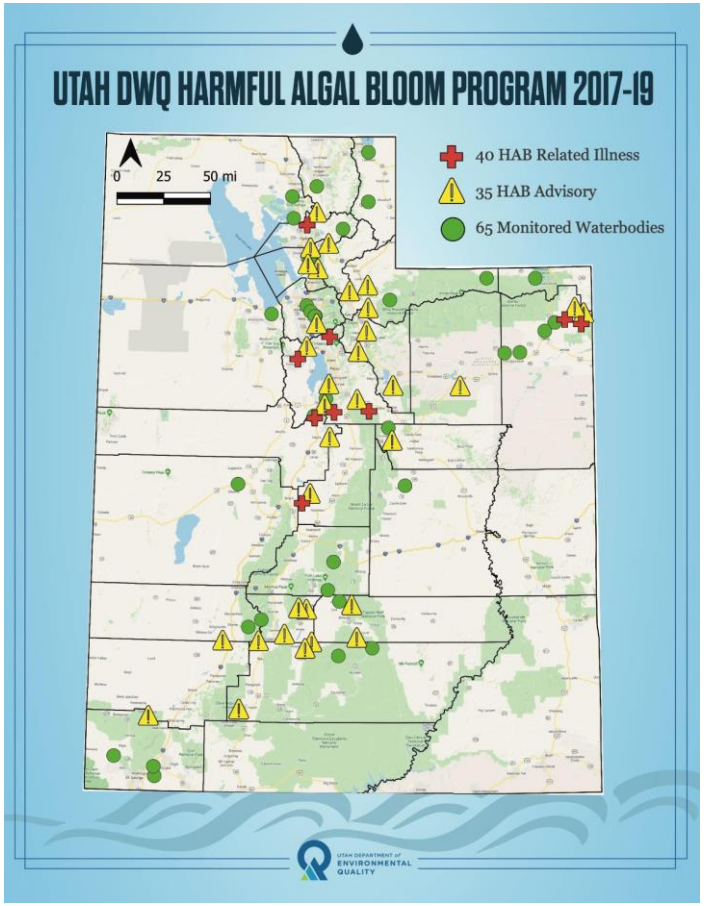
Cases reported

- 2016: 676 cases (32% adverse effects)
- 2017: 173 cases (30% adverse effects)
- 2018: 224 cases (30% adverse effects)
- 2019: 285 cases (23% adverse effects)
- 2020: 391 cases (26% adverse effects)

Symptoms reported

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

POISON Help 1-800-222-1222



Alternatives to Closing Waters

Site Specific Advisories

Evaluate if bloom should be waterbody-wide or specific area

- When possible, issue advisory for specific area
- 70% of advisories issued in 2021 were beach specific
- Identify other recreational opportunities within the county

Reducing Full Waterbody Advisories

Health Watch

Not a formal advisory level - evidence that a cyano bloom is present or may become more severe. Increased monitoring and surveillance are strongly recommended. Indicators may include:

- Visual reports
- Reports of animal or human illness
- Detection of cyanotoxins below thresholds
- Detectable levels should be defined using appropriate QA/QC procedures

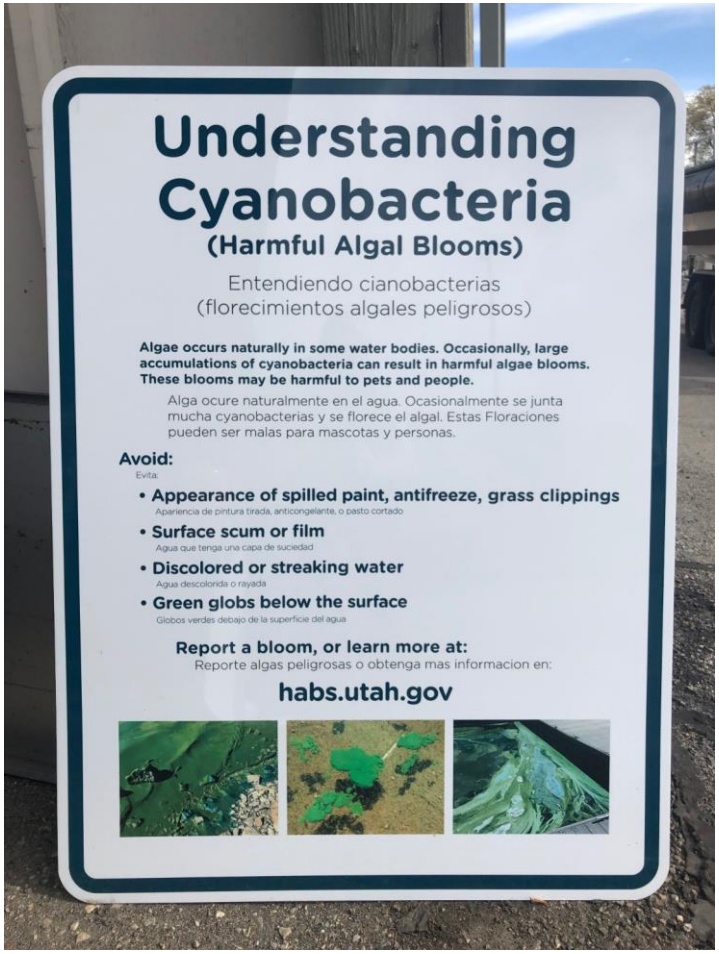
Consider cautioning users of the waterbody depending on specifics of the event and waterbody.

Alternatives to Closing Waters

Education

Permanent educational signs co-developed with Department of Natural Resources and State Parks

- Located at every State Park with a recreational waterbody



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Utah Lake Algal Treatment Demos

2020 Experimental Treatments

- $134,000 one-time funds through FFSL
- 3 marinas
- 2 vendors companies using several algaecides
- $2,500 - $5,000/acre on 57 acres treated of Utah Lake's 90,000
- HAB advisories on all 3 treated marinas

Algal Bloom Peak - July 28, 2020 to Aug 11, 2020

UTAH HEALTH UTAH COUNTY

Company tests algae solution that could be both short- and long-term fix for Utah Lake

By Daedan Olander | Sep 27, 2020, 4:27pm MDT

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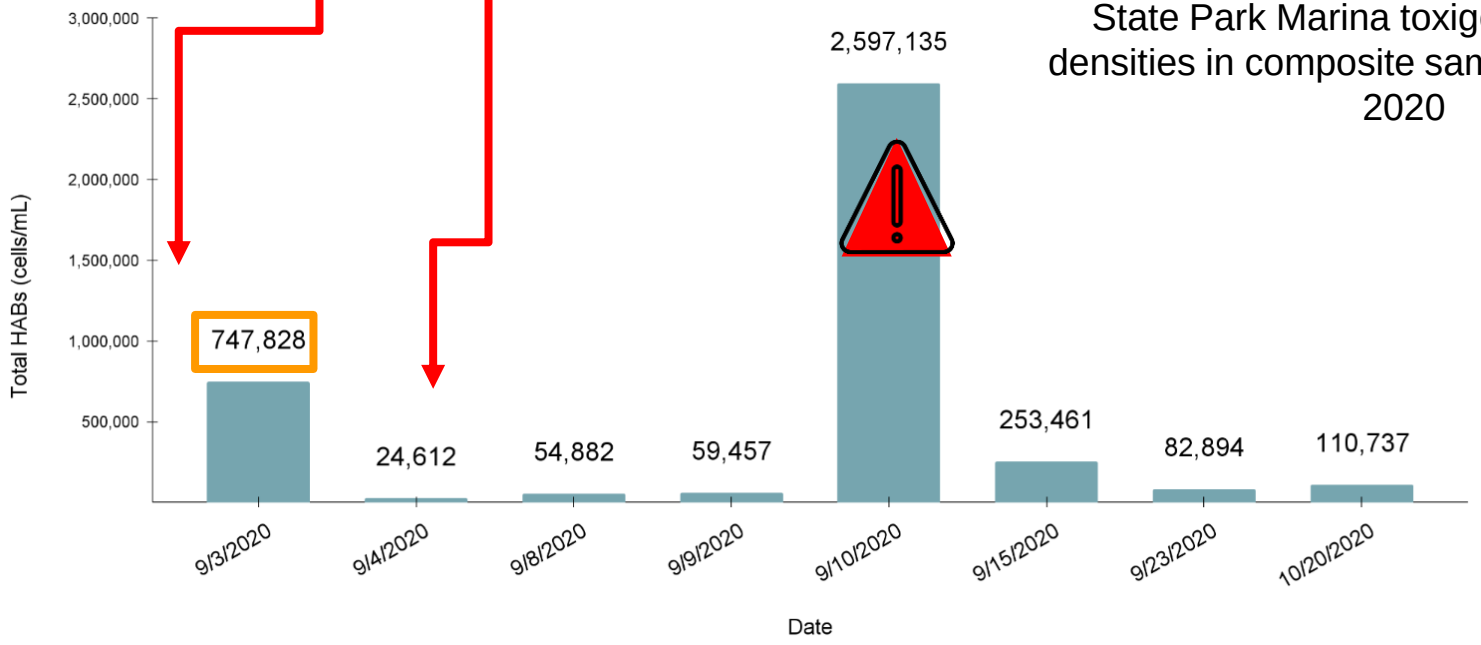
Utah Lake Algal Treatment Demos

State Park Marina

Issued Danger Advisory after treatments -- ended season above thresholds

Date	Treatment #	Technology	Amount
08/04/2020	1	SeClear	168.5 Gallons
08/20/2020	2	SeClear	181 Gallons
09/04/2020	3	SeClear	180 Gallons



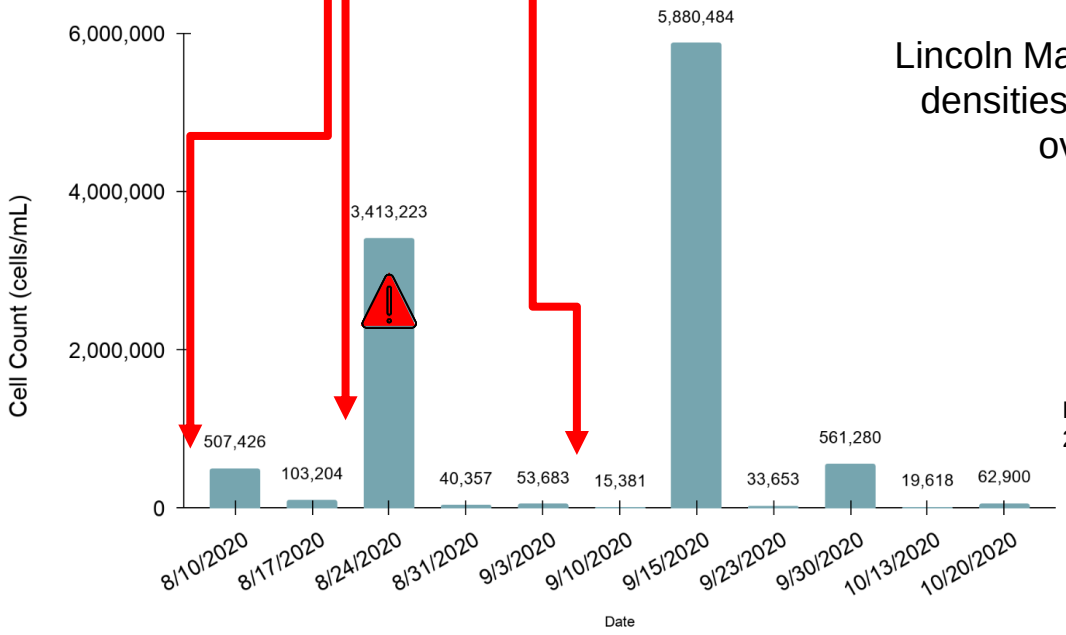
State Park Marina toxigenic cell count densities in composite samples over time - 2020

Utah Lake Algal Treatment Demos

Lincoln Marina

Issued Danger Advisory after treatments

Date	Treatment #	Technology	Amount
06/17/2020	1	SeClear	60 Gallons
07/08/2020	2	PAK 27 Phoslock	1,250lbs 1,155 lbs
08/04/2020	3	SeClear	41.5 Gallons
08/20/2020	4	SeClear	44 Gallons
09/04/2020	5	SeClear	45 Gallons



Lincoln Marina toxigenic cell count densities in composite samples over time - 2020

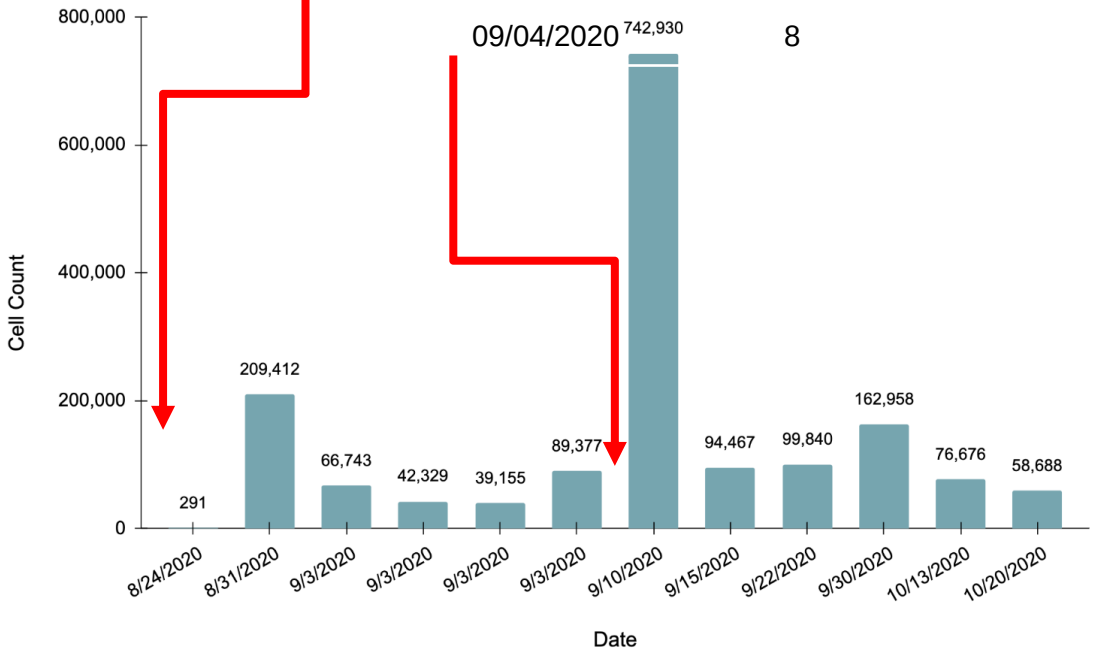
Ended the season with 222 ug/L of microcystin

Utah Lake Algal Treatment Demos

Lindon Marina

Advisory remained after treatments

Date	Treatment #	Technology	Amount (Gallons)
07/06/2020	1	EarthTec	32
07/20/2020	2	EarthTec	32
07/27/2020	3	EarthTec	34
07/28/2020	4	EarthTec	34
07/30/2020	5	EarthTec	100
08/03/2020	6	EarthTec	160
08/15/2020	7	EarthTec	160
09/04/2020	8	EarthTec	150



Lessons learned: 2020 HAB treatments

- Need objective approach to monitoring for efficacy and treatment comparison
- Copper works but very temporary
- May need barrier system installed at marinas
- Utah Lake permit to track multiple treatments

$1 million FY22 Funding for HAB Treatment

Senate Bill 2, New Fiscal Year Supplemental Appropriations

$406,100, UVU

- Algae harvesting study for purposes of algal bloom remediation, MOA in process for distribution of funds

$593,900, used in collaboration with DWQ on HAB projects

1. Develop a Strategic Utah Lake Harmful Algal Bloom Treatment Plan - $150,000
2. Implement 2-3 treatment strategies in targeted areas of Utah Lake in Summer 2021 - $293,900
3. Provide independent monitoring of treatments in Utah Lake to communicate efficacy - $150,000

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Wastewater and Storm Water Infrastructure

$15 billion by 2060

$2.7 billion by 2030

More details at Reclaim60.org

Low Impact Development

Stormwater Management approach which aims to mimic a site's pre-development conditions

- Infiltrate
- Filter
- Store
- Reuse
- Detain runoff close to its source
- Minimize impervious cover
  - Permeable pavement
  - Cluster development

Agricultural Voluntary Incentive Program (AgVIP)

*Goal: **Incentivize** agricultural producers to **voluntarily** adopt nutrient management practices in **targeted** watersheds that add value to their operations while improving water quality.*

Target: Increase nutrient management plan adoption from 1% of Utah's agricultural acres to at least 10% (100,000 acres).


Questions &
Discussion