Utah HAP, Spring 2021

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Division of Water Quality
April 7, 2021

Waterborne Pathogens

Goals of DWQ WP Advisory Program

Identify and quantify waterborne pathogens in the state of Utah to protect public health in recreational waterbodies

- Prioritize waterbodies
- Collect and summarize data
- Coordinate analysis
- Make action and advisory recommendations to local health departments
- Communicate emerging science and information to all stakeholders

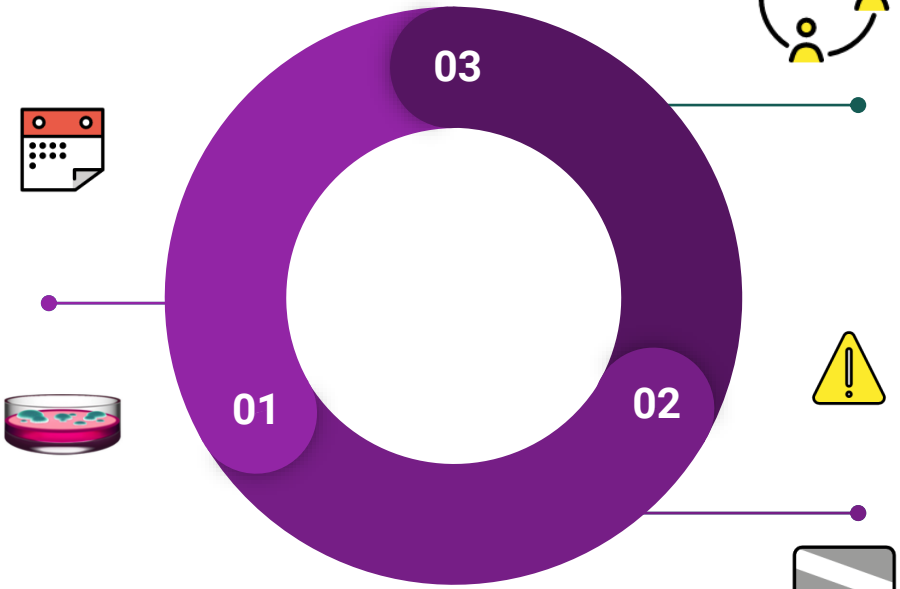
WP Advisory Process

Monitoring

Routine
DWQ and partners monitor prioritized lakes on a monthly basis

Response
DWQ and partners monitor lakes on advisory on a weekly basis

Data Collected
E. coli



Exceedance

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

Working towards a cohesive strategy

Identified issues with past programs

1. Disjointed program implementation across LHDs
2. Lacked consistent response protocol (data sharing, TAT, response, etc.)
3. Lacked DOH/LHD input
4. Advisory criteria lacked a connection to current recreational health risks
5. Priorities not efficiently or clearly conveyed to cooperative agencies
    a. focused on assessment or TMDL context
6. Missing multiple efficiencies to align with HAB program

Joint DOH/DWQ/LHD advisory guidance

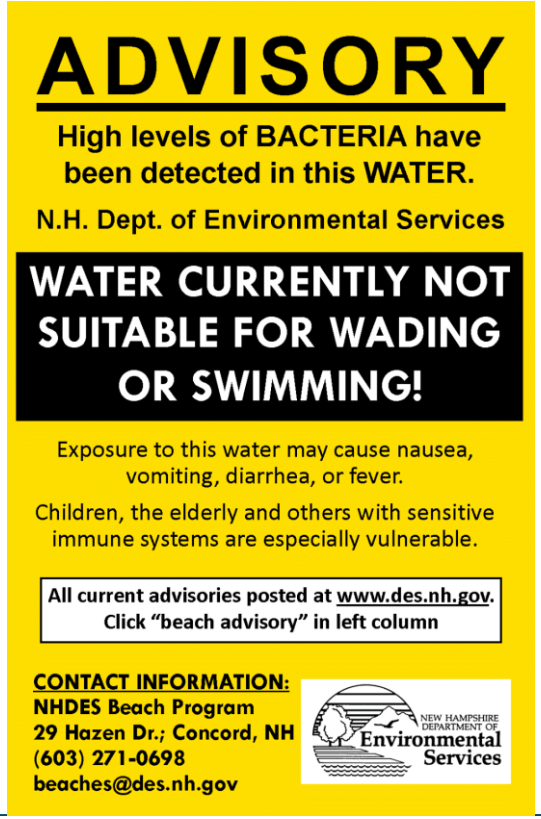
Workgroup objectives and tasks

1. Review/update advisory objectives and implementation
    a. Science and literature review
    b. Benchmarking across states
2. Establish priority waterbodies
    a. Develop transparent method
    b. DWQ's at-risk identification
    c. LHD input for local high recreation waters
    d. Cooperator input for local high recreation waters
3. Communication
    a. Align with current HAB program processes

Objective 1: Science/Policy Review- Benchmark with States

1. Advisory Process
2. Advisory Thresholds
3. Communication and Signs

Breakout groups from work group: LHDs, DWQ, DOH, cooperators



Objective 1: Science/Policy Review- Benchmarking: Process and Thresholds

- Majority of states do not require a validation sample within 24 hours
  - However, this was requested by most Utah LHDs; data supports use
- Utah is the only Intermountain state not using the latest EPA Beach Action Value (BAV)

Objective 1: Science/Policy Review- E. coli Beach Action Value

New in the EPA 2012 RWQC document were:

1. Values that protect public health similarly in both **marine and fresh waters**
2. A new tool for use in notification programs:
   Beach Action Value, or BAV for use in notification/advisory programs.
1. A **single threshold** rather than different values based on use intensity

Past: **409 cfu**, based on EPA 1986 RWQC document and Utah WQ assessment criteria

"EPA suggests that states use a BAV as a conservative, precautionary tool for making beach notification decisions"

Table 5. Beach Action Values (BAVs).

Indicator	Estimated Illness Rate (NGI): 36 per 1,000 primary contact recreators BAV (Units per 100 mL)		Estimated Illness Rate (NGI): 32 per 1,000 primary contact recreators BAV (Units per 100 mL)
Enterococci – culturable (fresh and marine)[a]	70 cfu		60 cfu
E. coli – culturable (fresh)[b]	235 cfu	OR	190 cfu
Enterococcus spp. – qPCR (fresh and marine)[c]	1,000 cce		640 cce

[a] Enterococci measured using EPA Method 1600 (U.S. EPA, 2002a), or another equivalent method that measures culturable enterococci.
[b] *E. coli* measured using EPA Method 1603 (U.S. EPA, 2002b), or any other equivalent method that measures culturable *E. coli.*
[c] EPA *Enterococcus* spp. Method 1611 for qPCR (U.S. EPA, 2012b). See section 5.2.

Objective 2: Identifying Priority Waterbodies

a. Develop transparent method
b. DWQ's at-risk identification
c. LHD input for local high recreation waters
d. Cooperator input for local high recreation waters

What is risk?

‘Primary contact recreation typically includes activities where immersion and ingestion are likely and there is a high degree of bodily contact with the water, such as swimming, bathing, surfing, waterskiing, tubing, skin diving, water play by children, or similar water-contact activities.’

EPA Recreational Water Quality Criteria (2012)

Objective 2: Created list of ‘at-risk’ sites for 2020

Comprised of:

- DWQ identified beaches
- List of **local** high exposure risk waterbodies/ beaches

Objective 2: Waterborne Pathogen Site Prioritization

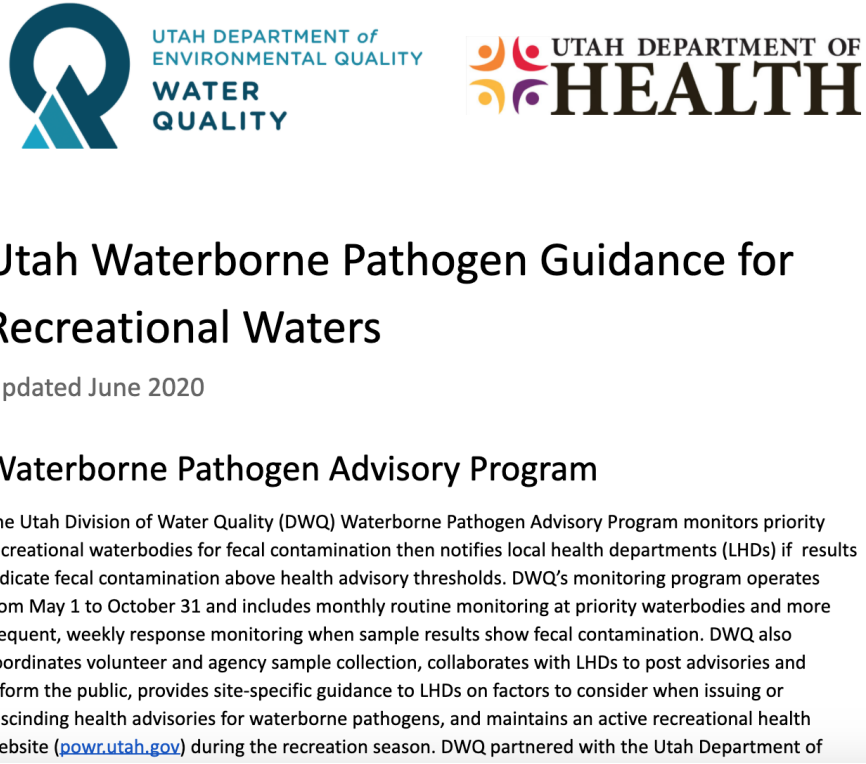
How will the prioritization be used?

Determine how to best allocate resources

- DWQ monitoring assistance
- Monitoring supplies
- Speed of response follow-up monitoring
    - recommend within 24 hours as much as possible
- Placement of signs where resources are limited

Benchmarked WP Advisory Guidance

THANK YOU to LHDs that participated in reviewing draft



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WATER QUALITY

UTAH DEPARTMENT OF HEALTH

Utah Waterborne Pathogen Guidance for Recreational Waters

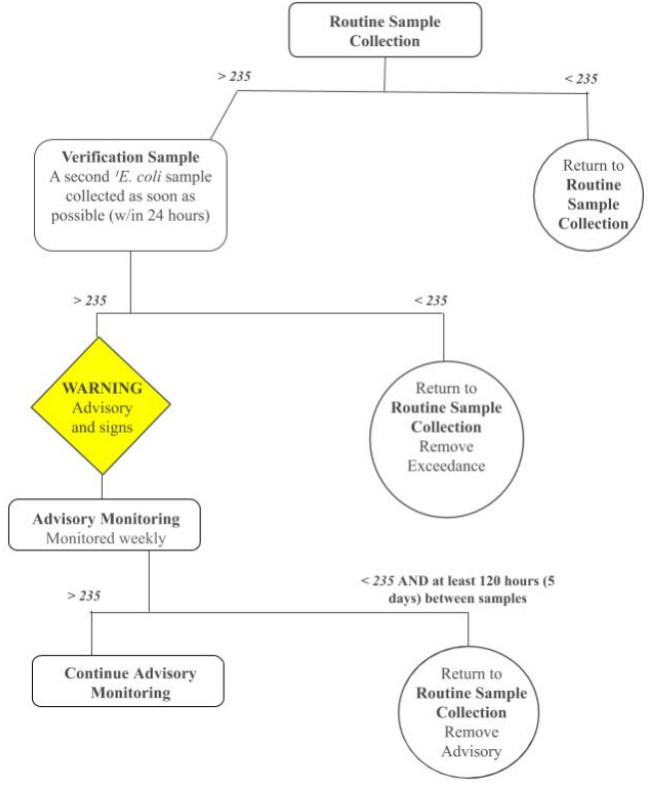
Updated June 2020

Waterborne Pathogen Advisory Program

The Utah Division of Water Quality (DWQ) Waterborne Pathogen Advisory Program monitors priority recreational waterbodies for fecal contamination then notifies local health departments (LHDs) if results indicate fecal contamination above health advisory thresholds. DWQ's monitoring program operates from May 1 to October 31 and includes monthly routine monitoring at priority waterbodies and more frequent, weekly response monitoring when sample results show fecal contamination. DWQ also coordinates volunteer and agency sample collection, collaborates with LHDs to post advisories and inform the public, provides site-specific guidance to LHDs on factors to consider when issuing or rescinding health advisories for waterborne pathogens, and maintains an active recreational health website (powr.utah.gov) during the recreation season. DWQ partnered with the Utah Department of

Benchmarked WP Advisory Guidance

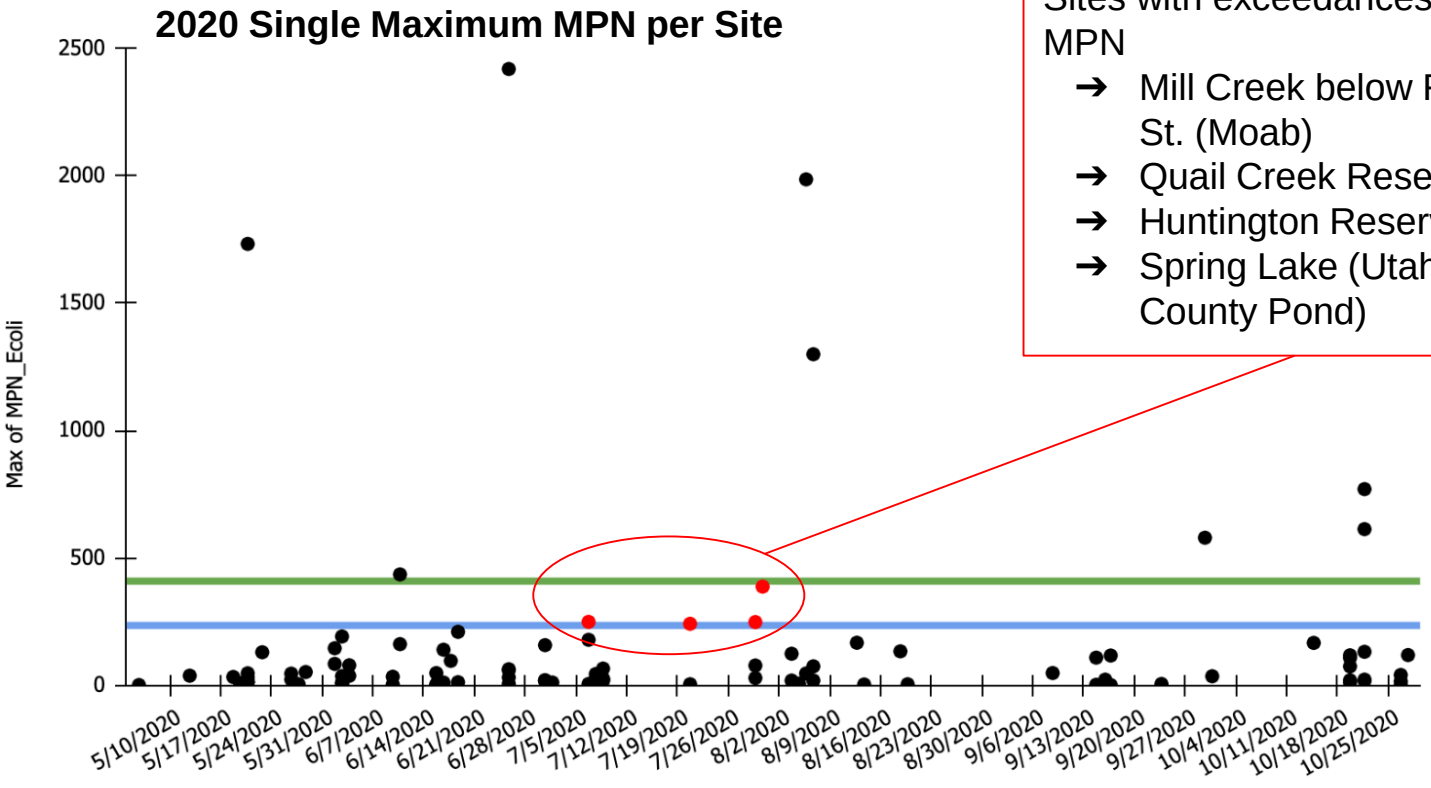
- **Did NOT implement new threshold in 2020**
- **Did implement new strategic monitoring plan**



2020 WP Recreation Season by the numbers

- **53** - Waterbodies sampled through the season
- **100** - Primary sites sampled through the season
- **656** - Data submissions
- **1738** - Samples collected and processed
- **12** - Number of organizations participating besides DWQ - (Tri-County, Southeast, Central, Utah County, Weber-Morgan County, Davis County, San Juan County LHDs; Utah Water Watch, Bear Lake Regional Commission, BLM, State Parks, DEQ District Engineers).
- **7** - **Sites with exceedances of 409 MPN**
  - Rockport Reservoir - Pinery Picnic Area
  - Farmington Pond
  - Highland Glen Pond
  - Utah Lake near Spanish Fork River (Cleared on follow-up)
  - Utah Lake at State Park Marina (Cleared on follow-up)
  - San Juan River Mexican Hat (Cleared on follow-up), much less instances than last year
  - Bountiful Pond (Late Sept., no follow-up)
- **3** - **Sites with advisories**
  - Rockport Reservoir - Pinery Picnic Area (May 18- May 27)
  - Farmington Pond (June - October)
  - Highland Glen Pond (August 5-Sept 8)

Data overview



Sites with exceedances of 235 MPN

- ➔ Mill Creek below Forth E St. (Moab)
- ➔ Quail Creek Reservoir
- ➔ Huntington Reservoir
- ➔ Spring Lake (Utah County Pond)

HABs

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ENVIRONMENTAL QUALITY
WATER
QUALITY

Goals of DWQ HABs Advisory Program

Identify and quantify toxic cyanobacteria blooms in the state of Utah to protect public health in recreational waterbodies

- Prioritize waterbodies
- Collect and summarize data
- Coordinate analysis
- Make action and advisory recommendations to local health departments
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Recreation Season Advisory Process

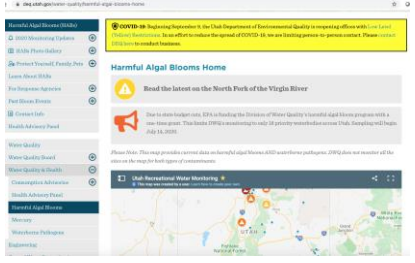
Detection

Advisory

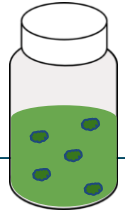
HAB Advisory Program

Testing

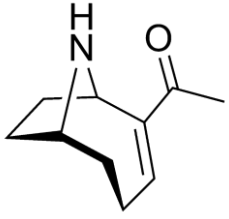
Communication



Monitoring

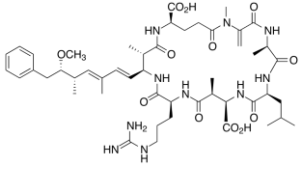


Cyanotoxins - ELISA & LCMS Analysis



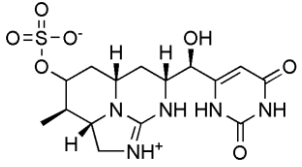
Anatoxin-a

- Neurotoxin
- Also known as Very Fast Death Factor (VFDF)
- Produced by many cyanobacteria species, including those found in Utah waterbodies



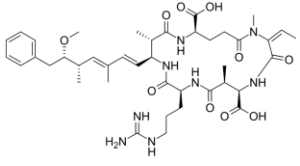
Microcystin

- Hepatotoxin
- Produced by many cyanobacteria species, including those found in Utah waterbodies



Cylindrospermopsin

- Hepatotoxin
- Nephrotoxin
- Produced by many cyanobacteria species, including those found in Utah waterbodies



Nodularin

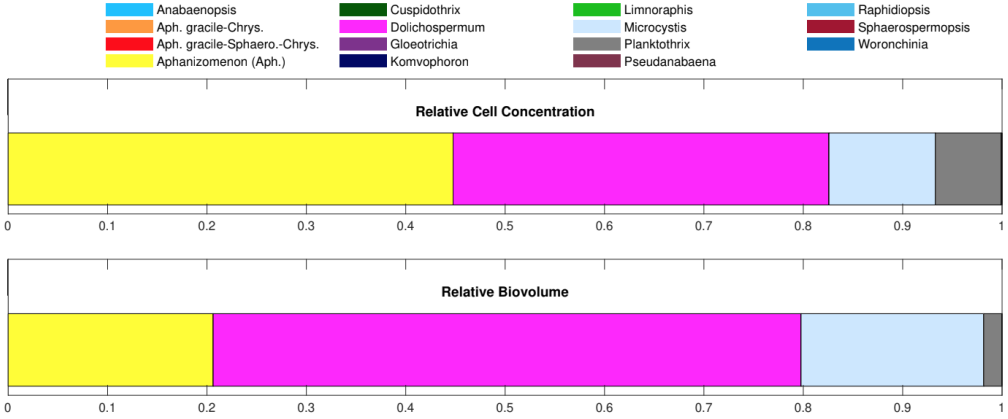
- Hepatotoxin
- Very similar to microcystin
- **<u>Not</u>** produced by many cyanobacteria species rarely found in Utah waterbodies***

Toxigenic Cell Density and Taxonomy

Sample ID: D20201002T192643
Customer ID: 336
Tracking Code: 200228-336
Sample Info: UTA-7-093020-C

System: Utah Lake
Site: UTA-7-093020-C
Station: 4917708
Level: Composite

Date Sampled: 9/30/2020
Date Received: 10/1/2020
Date Analyzed: 10/2/2020



Total Algal Concentration: 582928 cells/mL
HAB Concentration: 561280 cells/mL
HAB Relative Concentration: 96%

Total Biovolume: 175532625 um^3/mL
HAB Biovolume: 158258837 um^3/mL
HAB Relative Biovolume: 90%

! WARNING !

HAB concentration is high - Toxin testing recommended.

2020 Guidance

- Developed collaboratively with Utah Department of Health
- Benchmarked with EPA guidance and other States
- Not inclusive of all cyanotoxins
  - Not all toxins have been researched enough for developing guidance
  - UDOH/DWQ treats “new” cyanotoxins as binary presence/absence
- Only local health departments and UDOH have authority to issue public advisory
  - DWQ only makes recommendation

Health Watch		Warning Advisory	Danger Advisory
This is not a formal advisory level. Rather, these are indicators that a bloom may exist 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 or toxigenic cyannobacterial cell density 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.	**Toxigenic Cyanobacterial Cell Density (cells/mL)** [1, 2, 3]	100,000 [A]	10,000,000
	Microcystins (µg/L) [1, 2]	8	2,000
	Cylindrospermopsin (µg/L) [3]	15 [B]	
	Anatoxin-a (µg/L) [3, 4, 5]	15	90
	Health Risks [1, 2, 3]	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)
	Recommended Actions	Issue **WARNING** advisory to avoid primary contact recreation Post **WARNING** signs Sampling recommended at least weekly	Issue **DANGER** advisory to stay away from the waterbody Post **DANGER** signs Consider **CLOSURE** Sampling recommended at least weekly

[1] WHO, 1999. Toxic cyanobacteria in water.
[2] WHO, 2003. Guidelines for safe recreational water environments, Volume 1, Chapter 8: Algae and cyanobacteria in fresh water.
[3] EPA, 2019. Recommended human health recreational ambient water quality criteria or swimming advisories for microcystins and cylindrospermopsin.
[4] OHA, 2019. Oregon Health Authority. Recreational use public advisory guidelines: cyanobacterial blooms in freshwater bodies.
[5] CWQMC, 2016. California Water Quality Monitoring Council. Cyanobacteria guidance for recreational and related water uses (2016 update).
[A] Human symptoms have been reported between 5,000 – 100,000 cells ml (EPA 2019). At 5,000 – 100,000 cells/mL, LHDs should take into account contextual information and consider issuing an advisory.
[B] Data are sparse on where cylindrospermopsin advisory break points should be. Consult with UDEQ and UDOH as needed on this issue.

“Pre-Advisory” Tier: Health Watch

This is **not a formal advisory level**. Rather, these are lines of 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.

Discussion Topic: Danger Advisories

- Proposal: remove danger advisory threshold for toxigenic cyanobacteria cell counts
- This would mean DWQ would not recommend a danger advisory if cell counts >10,000,000
  - Only recommend danger if toxins exceeded thresholds
- **LHDs would have to use BPJ to be more protective**
- Cell counts are most often first line of defense
- Toxins are not the only concern
- A Warning Advisory is protective of primary contact uses

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2022 Integrated Report

- Not assessing HABs for 2022 due to EPA guidance that DWQ needs to review


THANK YOU
Questions &
Discussion