

Harmful Algal Bloom Monitoring Instructions

USU Water Quality Extension & Utah Water Watch

(Available online at: <http://extension.usu.edu/utahwaterwatch/monitoring/Lakes/Hab>)

Introduction

What are harmful algal blooms?

Harmful algal blooms (HABs) are large growths of cyanobacteria that may change the water color or form surface scums and occur in lakes, reservoirs, ponds, and less frequently in streams. Cyanobacteria blooms are occurring more frequently in Utah, likely in response to increased nutrients and a warmer climate. These tiny plant-like bacteria can produce deadly toxins that are harmful to humans, livestock, and pets.

For up-to-date info on algal blooms, including toxin levels check habs.utah.gov.

Program overview:

USU Water Quality Extension is helping to collect important real-time data on the status of HABs. Utah HAB Squad volunteers have been asked to make frequent (weekly or every other week) observations of priority lake and stream sites and collect data on where and when HABs are showing up.

Document outline:

These instructions will guide you through: (1) identifying a bloom, (2) reporting a suspected bloom, and (3) documenting the presence or absence of a bloom.

Field Supplies needed:

- Field identification sheet
- Datasheet
- Camera (can use your phone's camera)

For field ID sheets and more information on HAB monitoring, visit <http://extension.usu.edu/utahwaterwatch/monitoring/Lakes/Hab>.

Safety First

As discussed above, blooms can be dangerous to human and animal health. Cyanobacteria produces toxins that can attack the liver and nervous system and irritate the skin. A review of the occupational hazards related to cyanobacterial exposure (Stewart et al 2009) found moderate risks. Animals and swimmers, which often ingest surface waters, are at particular risk. According to the review, most people who ingest small amounts of the toxin report flu-like symptoms. People in contact with cyanobacteria scums have reported skin irritation and nausea from breathing fumes. Skin irritation is a symptom of exposure to cyanobacteria. Though nausea from breathing fumes has been reported anecdotally, scientific evidence shows that the risk of this symptom is negligible for the general public.

To prevent accidental swallowing of cyanobacteria, volunteers should take care and avoid getting into the water. Be sure to avoid steep banks and slippery surfaces.

Avoid exposure to cyanotoxins by following these simple safety guidelines:

- Do not ingest water or allow water to come into contact with exposed skin.
- Avoid inhaling spray caused by boats, wind, or other water surface disturbances. If these conditions are present, wear a mask to avoid inhalation of water spray and airborne particles.
- Wash hands thoroughly with soap before eating or drinking.

NOTE: You do not need to touch the water to make the observations needed.

Citation

Stewart I., Webb P. M., Schluter P. J., Shaw G. R. (2006a). Recreational and occupational field exposure to freshwater cyanobacteria - A review of anecdotal and case reports, epidemiological studies and the challenges for epidemiologic assessment. *Environ. Health* 24:6 10.1186/1476-069X-5-6

Steps to Take

Step 1. Identify Presence or Absence of a Bloom

If the water is clear and you do not see signs of a bloom, please record the absence of a bloom and skip to Step 3. If you suspect a bloom, please proceed.

To begin, make sure the suspected bloom is not filamentous green algae or duckweed, two common and harmless aquatic plants.

A. Is this filamentous green algae?

Types of green algae can look a lot like cyanobacteria and grow in similar nutrient-enriched waterbodies. Unlike cyanobacteria, green algae may form long filamentous strands that make up silky "clouds" below the surface or viscous mats on the surface.

The stick test:

Find a sturdy stick or pole and pull it through the algae. If the stick pulls out strands that look like green hair or threads, the mat on the pond is likely filamentous green algae (non-toxic). If not, you may have a harmful algal bloom. (Source: Kansas Dept. of Health and the Environment)



Examples of filamentous green algae.

Sources: Clemson U. (L), NYS Department of Environmental Conservation (M, R)

B. Is this duckweed?

Duckweed are tiny aquatic plants with a grainy texture that can cover the entire surface of calm, nutrient-enriched ponds. If you collect them using a stick as you did in part A, you will notice their tiny leaves and root structures.



Examples of the aquatic plant duckweed.

Source: Ohio Environmental Protection Agency.

C. Is this a HAB?

Cyanobacteria blooms tend to take two forms: they can be suspended throughout the water column or form a thick scum on the surface.

Surface scums develop when the cyanobacteria begin to die and cannot control their buoyancy. **Be careful, these scums can be especially toxic!** These HABs are often described as looking like “spilled paint” or streaks on the water surface and may change color (green, white, blue, red, purple, brown) over time. Blooms forming in the water column can look like “pea soup,” green clumps or globules, green mats, or grass clippings.

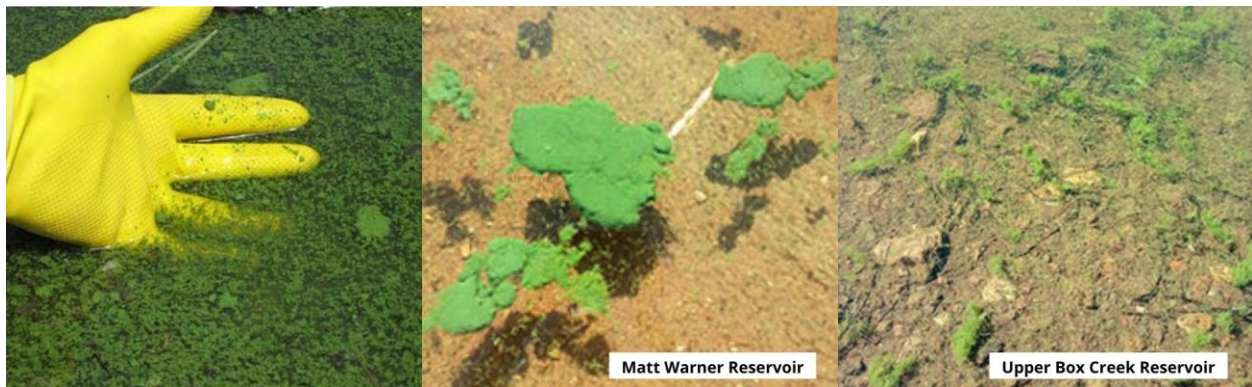
Find more photos examples of HAB types at <https://deq.utah.gov/water-quality/photo-gallery-harmful-algal-blooms-habs>.

Commonly identified cyanobacteria:



Examples of spilled paint HABs.

Sources: Utah Department of Environmental Quality; Utah County Health Department



Examples of clump or globule HABs.

Source: Utah Department of Environmental Quality



Examples of pea soup HABs.

Source: Utah Department of Environmental Quality



Examples of green mat HABs.

Source: Utah Department of Environmental Quality

Step 2. Call the HAB Hotline Immediately

If you suspect a bloom, it is important to notify the appropriate agencies as soon as possible. They will determine if further testing is necessary and if a health watch or advisory needs to be issued. Please complete the following steps:

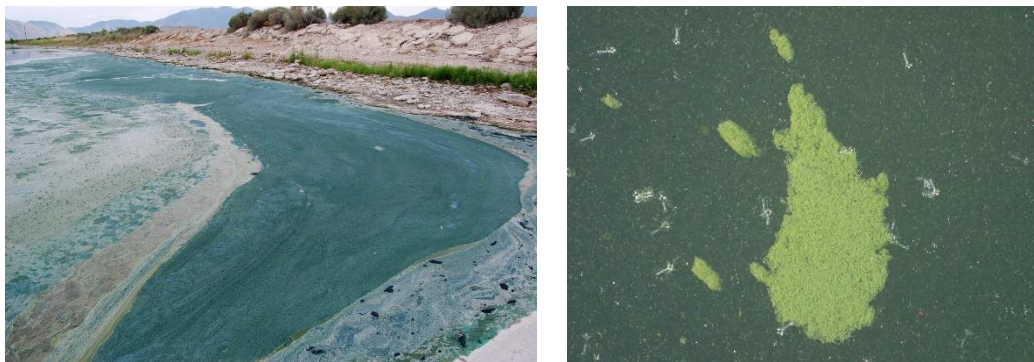
1. Call the 24-hour Environmental Incidents Line at **(801) 536-4123** immediately.
2. Contact UWW by phone or email to alert them of a potential HAB. UWW will follow up with the Utah Division of Water Quality to ensure the HAB has been reported.
3. Upload data into CitSci as soon as possible.

Step 3. Record Observations on Datasheet and Submit in CitSci

Record observations and take photos in the field, then submit the **presence or absence** of a bloom in CitSci.org.

1. Record observations on your datasheet while in the field.
2. If you observe a bloom, take 2 photos- landscape and close-up.
See below for an example of a landscape photo to capture extent of the bloom and close-up photo to capture detail of the bloom.

If you do not observe a bloom, take a photo of water conditions at the site.



Examples of landscape (L) and close-up (R) photos.

3. When you return home, go to CitSci.org (www.citsci.org), log into your account, and access the Utah Water Watch project.
4. Open the Harmful Algal Bloom (HAB) / Cyanobacteria Datasheet in CitSci.
5. Enter your observations into the datasheet.

Note: If you are reporting that no cyanobacteria was observed, only fill out information for the site, wind, weather, and comments sections.

6. Click “Submit” at the bottom of the page.

The screenshot shows the CitSci.org website interface for the 'Harmful Algal Bloom (HAB) / Cyanobacteria Datasheet'. The page has a green header with the CitSci.org logo and navigation links. The main content area contains the following sections:

- Date of Observation:** A text input field for the date.
- Recorder:** A dropdown menu with 'Hope Braithwaite' selected.
- Comments:** A large text area for entering observations.
- Location Information:** A section with instructions: 'Please enter either (a) enter latitude longitude coordinates below from the GPS unit you used, or (b) click on the map to the right and/or enter an address in the search box to determine and provide an approximate location for your observation.' It includes a search box, a 'Locate' button, and a map showing a location in Utah.

NOTE: If you collected additional water quality data for Utah Water Watch, please remember to submit that data through the appropriate datasheet on CitSci (e.g. Tier 1 Lake or Stream Datasheet).