



Risk Communication of Harmful Algal Blooms

Missouri Department of Natural Resources

Missouri Department of Health and Senior Services

Background and Environmental Agency Program/Capacity

The Missouri Department of Natural Resources (DNR) is an independent agency tasked with environmental protection in the state. It works in close coordination with the Missouri Department of Health and Senior Services (DHSS) and Missouri Department of Conservation (MDC) to sample, test, and communicate about HABs and related health risks. The joint partnership is a subset of a larger HABs workgroup that includes the U.S. EPA, U.S. Army Corps of Engineers, Missouri Department of Agriculture, and University of Missouri.

Missouri provides numerous avenues for the public to report a bloom. These include:

- Phone complaint to the DNR hotline or DHSS emergency response number;
- Call directly to offices;
- [Suspected Harmful Algal Bloom Notification Form](#). This can be emailed to all members of the Interagency HAB Response Team; and
- [BloomWatch](#) app for smart devices. This crowdsourcing app was developed through the Cyanobacteria Monitoring Collaborative program and is moderated by EPA.

The agencies then follow DNR's draft HABs response plan, which includes a Hazard Level Recommendation Matrix, described below.

Rollout and Dissemination of Advisory and Relevant Resources

DNR and DHSS work in close coordination to disseminate information to the public. DNR's Water Protection Program, Public Drinking Water Branch coordinates responses regarding drinking water supplies, and handles logistics like sampling intervals, interpreting and providing results, and notifications. DHSS deals with recreational exposures to HABs and typically handles the potential human health impacts like recommended signage, activities to avoid, and educational materials. Non-drinking water-related response efforts are limited to waterbodies that are owned or managed by a federal or state agency. DHSS forwards the information about potentially harmful blooms to the local public health or other appropriate agency regardless of ownership or management.

If the lake is privately owned, the owner or manager will be provided educational materials, action recommendations, and a list of private labs for analysis, if the owner chooses. If the lake is privately owned, but has public recreation access, concerns will be evaluated and response options communicated to the owner. Ultimately, it is the owner/manager's decision to pursue the presented options. If the waterbody is managed by a state or federal agency, DNR is available to assist with sample analysis. In all cases DNR and DHSS are available to provide guidance on interpreting and assessing results.

If the affected waterbody is private, the agencies communicate with MDC and the governing entity (e.g. homeowner or association) to share educational materials. The owner or manager can choose whether to proceed with testing on its own and can request DNR's technical assistance. If a HAB in a privately owned lake tests positive, DHSS

recommends that recreators be notified and advised not to swim or eat fish. DHSS also recommends that pet owners keep pets away from the water. However, the city, association, or private owner is not required to follow DHSS' recommendations.

All recommended actions and guidance are defined by a Hazard Level Recommendation Matrix. The matrix defines three hazard condition levels and corresponding recommended actions. Level 1 is a non-specific bloom that is not confirmed to consist of cyanobacteria. Level 2 is a confirmed cyanobacteria bloom, with unknown presence of toxins. Level 3 is HAB with confirmed toxin production, cell densities that are extremely high, or a suspected or confirmed illness due to exposure. Threat levels increase from Level 1 (non-specific bloom) to Level 3 (HAB) based upon observations and analytical results.

DNR and DHSS's communication methods include educational information on their [websites](#), notification signs at recreational waterbodies, and press releases for large, public waterbodies or drinking water sources. Advisory notices remain active depending on the status of the bloom and need for further sampling.

Key Messages for the Public

DNR notes that the key to successful risk communication is not just the timing of the communication but also the content of the press releases and website materials. Consistent messaging is important and should contain information on the location of the affected waterbody, size of the bloom, which activities are not recommended, and ways in which the public can contact the agencies. DNR also shares links to resources such as a [brochure](#), directions for conducting a [jar and stick test](#), and a [list of laboratories](#) that can analyze HABs samples from private entities.

Gaps and Challenges

DNR and DHSS noted that risk communication challenges include:

- Establishing a good communication plan across agencies to know which agency handles each task in the process.
- Developing a process to help existing staff and brief new staff and leadership on the communication process.
- Identifying a lead agency for each step of the process.
- Balancing the differences between EPA's draft swimming advisory levels and the state's recommended advisory levels. This is a particular issue for federally owned waterbodies (e.g. Army Corps of Engineers public beaches).

Gaps for future action include:

- Researching how fish react to algal bloom toxins. DNR and DHSS recently partnered with a limnology professor at the University of Missouri who investigates whether cyanotoxins accumulate in fish tissue. DHSS is working to coordinate with MDC on testing fish for algal toxins;
- Replicating the process of their fish kill hotline for a DHSS HABs hotline that the public can call if they see a bloom;
- Determining a "general" timeline for how long advisories stay in effect;
- Setting up an email chain for all entities coordinating on HABs. While the interagency response team includes most members that should be notified, DNR also coordinates with a larger workgroup. The response team and local DNR or MDC offices are always contacted with a report, and they include others as the scope increases; and
- Adding a link to agency websites to enable the public to see when and where HABs are occurring.