

## FAQ about $\beta$ -Methylamino-L-alanine (BMAA)

### What is BMAA?

$\beta$ -Methylamino-L-alanine (BMAA) is an amino acid produced by some cyanobacteria that has been postulated as a causal factor for degenerative neurological diseases that affect large numbers of individuals. However, the links between BMAA and neurological diseases has been highly contested between scientists. It is currently widely agreed upon amongst scientists that our understanding of BMAA, causes and effects, is still in its infancy and thus we are unable to answer many questions related to this topic.

### What are cyanobacteria and harmful algal blooms?

Cyanobacteria (also known as blue-green algae) and algae occur in freshwater and estuarine waterbodies. Algae and cyanobacteria have been around for billions of years and are natural components of ecosystems. They perform many roles that are vital to our aquatic communities, by being a food source and producing oxygen. However, when certain conditions are favorable for these organisms, algae and cyanobacteria can rapidly grow to cause “blooms.”

Algae and cyanobacteria can produce harmful compounds, such as toxins and taste and odor compounds, that cause health risks to humans and animals. When blooms pose a risk to humans, animals, and the environment, they are referred to as harmful algal blooms (HABs). Some algae grow at the surface of a water body (planktonic) and some grow attached to the bottom (benthic) and can form algal mats. Learn more about HABs [here](#).

### What is the Freshwater and Estuarine Harmful Algal Bloom (FHAB) Program?

[Assembly Bill No. 834](#) was approved in 2019 requiring the State Board to establish a Freshwater and Estuarine Harmful Algal Bloom Program to protect water quality and public health from HABs. The FHAB Program utilizes the [California Voluntary Guidance for Response to HABs in Recreational Inland Waters](#) when monitoring for HABs. The mission of The FHAB Program is to support the protection of environmental, animal, and human health by being a resource for coordinated HAB research, monitoring, and response. We aim to inform management decision-making by expanding our understanding of California HAB occurrences and drivers through statewide monitoring, assessment, and scientific initiatives.

### What toxins can we monitor and why?

We currently monitor for 4 major groups of toxins: microcystins, cylindrospermopsin, anatoxin-a, and saxitoxin. These toxins are monitored because they have known negative effects on human health and because we have accepted standardized scientific methods to quantify these toxins.

## Are the Water Boards currently monitoring for HABs?

When the public reports a possible HAB sighting or human or animal illness through this [bloom report form](#), Water Board staff respond by collecting and testing water samples when resources are available. Staff routinely assesses popular waterbodies (including Lake Tahoe) at numerous locations before popular holiday weekends, such as Memorial Day, Fourth of July, and Labor Day.

The Tahoe Keys have been monitored monthly since 2019 for microcystins, cylindrospermopsin, anatoxin-a, and saxitoxin while access permits (typically April – November). Serene Lakes are not currently routinely monitored for HABs and the FHAB Program has not historically received HAB reports from these waterbodies.

The FHAB team posts our latest HAB advisories on this [statewide HAB map](#). For a summary of Tahoe Keys and Lake Tahoe 2022 HAB testing and results, visit this [League to Save Lake Tahoe article](#).

## Is the Water Boards FHAB Program testing for BMAA and why not?

No. There are several reasons why we do not currently monitor for BMAA.

- 1) The scientific community does not currently have a widely accepted and standardized analytical method for BMAA.
- 2) Scientific literature has not directly linked BMAA to human health risks. Because there is limited knowledge as to human health risks and route of exposure (water contact; fish consumption; aerosols), there are no thresholds developed to compare human exposure levels to toxin concentrations. As an agency, the Water Boards do not conduct epidemiological work; research of this nature is beyond the scope of the agency.

## Does BMAA cause neurological diseases?

Current research does not show that BMAA causes neurological diseases. [This peer-reviewed article](#) reviews research on the topic. The *World Health Organization Toxic Cyanobacteria in Water (second edition 2021)* Ch. 2, Section 2.7 is also a good resource in reviewing current scientific literature.

## How can I protect myself from harmful algae blooms?

Practice healthy water habits like:

- Avoiding algae and scum in the water
- Keeping an eye on children and pets (dogs); they are most susceptible for exposure
- If in doubt, keep pets out! Do not let pets and other animals go into or drink the water, or eat scum on the shore

- Not drinking this water or using it for cooking
- Washing yourself, your family and your pets with CLEAN water after playing in waterbody
- If an advisory is posted, follow all instructions on posted advisory

Please [visit our health water habits](#) webpage for further recommendations on how to keep you and your pets safe from blooms.

### **Where can I go to determine if HABs are present in my area?**

The FHAB team post our latest HAB advisories on this [statewide map](#). The map displays locations where harmful algal blooms (HABs) are reported through our online [Report Form](#) and water monitoring data that is submitted to the CA Water Boards.

### **Where can I learn more about HABs and BMAA?**

- Peer-reviewed review article about BMAA's effect on human health: [A critical review of the postulated role of the non-essential amino acid,  \$\beta\$ -N-methylamino-L-alanine, in neurodegenerative disease in humans - PMC \(nih.gov\)](#)
- General Information about harmful algal blooms: [My Water Quality: California Harmful Algal Blooms \(HABs\) Portal](#)
- Report a bloom: [My Water Quality: California Harmful Algal Blooms \(HABs\)](#)
- Interstate Technology Regulatory Council: <https://hcb-2.itrcweb.org/cyanotoxins/>

*(This Fact Sheet was last updated on November 17, 2022)*