Toxic algal blooms behind Klamath River dams create health risks far downstream

June 16 2015

This algal bloom on the Copco Reservoir on the Klamath River can be transported downstream and cause health risks to people and wildlife. Credit: Oregon State University

A new study has found that toxic algal blooms in reservoirs on the Klamath River can travel more than 180 miles downriver in a few days, survive passage through hydroelectric turbines and create unsafe water conditions on lower parts of the river in northern California.

Water-borne algal blooms can accumulate to concentrations that can pose health risks to people, pets and wildlife, and improved monitoring and public health outreach is needed to address this issue, researchers said.

The frequency, duration and magnitude of harmful algal blooms appear to be increasing.

The findings were made by researchers from Oregon State University, based on data from an extensive survey of the Klamath River in 2012, and just published in *Harmful Algae*, a professional journal.

The toxins may be a special concern if they are bioaccumulated in some animal species, such as freshwater mussels in which the level of the toxin can be more than 100 times higher than ambient concentrations.

"It's clear that these harmful algal blooms can travel long distances on the river, delivering toxins to areas that are presently underappreciated, such as coastal margins," said Timothy Otten, an OSU postdoctoral scholar in the OSU College of Science and College of Agricultural Sciences.

"And the blooms are dynamic, since they can move up and down in the water column and are physically distributed throughout the reservoir," he said. "This means you can't just measure water in one place and at one time and adequately estimate the public health risk."

Microcystis is a seasonal blue-green cyanobacterium found around the world, preferring warm waters in lakes and reservoirs. Some strains are toxic, others are not. Its magnitude and persistence may increase with global climate change, researchers say, and it can cause a range of health issues, including liver damage, rashes, gastrointestinal illness, and other concerns. The toxin is not destroyed by boiling, making it unique from many other biological drinking water contaminants.

Improved awareness of the ability of blooms to travel significant distances downstream, and communication based on that, would help better inform the public, the OSU scientists said. But individual knowledge and awareness would also help.

"On a lake or river, if you see a green band along the shore or green scum on the surface, the water may not be safe to recreate in," Otten said. "Because this problem is so diffuse, it's often not possible to put up posters or signs everywhere that there's a problem in real-time, so people need to learn what to watch for. Just as with poison ivy or oak, the general public needs to learn to recognize what these hazards look like, and know to avoid them in order to safeguard their own health."

In this and other recent research, the OSU scientists have also developed genetic tools that can help identify problems with Microcystis, more quickly and at lower cost than some older methods. But those tools have not yet been widely adopted by the monitoring community.

"Right now, some lakes are not sampled at all for algal blooms, so we don't really know if there's a problem or not," said Theo Dreher, the Pernot Professor and former chair of the Department of Microbiology in the OSU College of Science and College of Agricultural Sciences. "There's no doubt we could use improved monitoring in highly used lakes and reservoirs, or in rivers downstream of them when toxic blooms are found."

In this study, researchers found that intensive blooms of Microcystis in Iron Gate Reservoir on the Klamath River were the primary source of toxic algae observed downstream. They used genetic tracking technology to establish what many may have suspected when observing Microcystis in the lower reaches of the Klamath River. This transport of algae has been very little studied, even though it's likely common.

The possible removal of dams on the Klamath River after 2020 may ultimately help mitigate this problem, the researchers said. Their study found no evidence of endemic Microcystis populations in the flowing regions of the Klamath River, both upstream and downstream of the Copco and Iron Gate reservoirs.

The problem with these bacteria is national and global in scope, especially in summer.

There are more than 123,000 lakes greater than 10 acres in size across the United States, and based on an EPA National Lakes Assessment, at least one-third may contain toxin-producing cyanobacteria. Dams, rising temperatures and atmospheric carbon dioxide concentrations, extreme weather and increased runoff of nutrients from urban and agricultural lands are all compounding the problem.

Many large, eutrophic lakes such as Lake Erie are plagued each year by algal blooms so massive that they are visible from outer space. Dogs have died from drinking contaminated water, and sea otter deaths in Monterey Bay have been attributed to eating shellfish contaminated with toxin produced by Microsystis.

Provided by Oregon State University

Citation: Toxic algal blooms behind Klamath River dams create health risks far downstream (2015, June 16) retrieved 6 May 2024 from https://phys.org/news/2015-06-toxic-algal-blooms-klamath-river.html