

# America's green, toxic menace



**A potentially toxic blue-green algae bloom is seen in Provo Bay in Provo, Utah, on June 12. Researchers and officials across the country say increasingly frequent toxic algae blooms are a byproduct of global warming. They point to looming questions about their effects on human health.** Rick Egan, *The Salt Lake Tribune*

**Tom James** *Associated Press*

SALEM, OREGON — The words blasted to cellphones around Oregon's capital city were ominous: "Civil emergency. Prepare for action."

Within half an hour, a second official alert clarified the subject wasn't impending violence but toxins from an algae bloom, detected in Salem's water supply.

Across the U.S., reservoirs that supply drinking water and lakes used for recreation are experiencing similar events with growing frequency. The trend represents another impact of global warming and raises looming questions about the effects on human health, researchers say.

"When water bodies warm up earlier and stay warmer longer ... you increase the number of incidents," said Wayne Carmichael, a retired Ohio professor specializing in the organisms. "That's just logical, and it's being borne out."

Technically called cyanobacteria, the ancient class of organisms that create the blooms are present nearly everywhere water is found but thrive in warm, still bodies like lakes and ponds. They also create a unique class of toxins, the impact of which on humans is only partly understood.

Long linked to animal deaths, high doses of the toxins in humans can cause liver damage and attack the nervous system. In the largest outbreaks, hundreds have been sickened by blooms in reservoirs and lakes.

But less is known about exposure at lower doses, especially over the long term.

Small studies have linked exposure to liver cancer. One toxin is classified as a carcinogen, while others have pointed to potential links to neurodegenerative disease. Definitively proving those links will require larger studies, said Carmichael, who helped the World Health Organization set the first safe exposure standards for the toxins.

"It's absolutely certain in my mind that warming temperatures are going to end up causing more of these algal blooms," said Steven Chapra, an environmental engineering professor at Tufts University in Massachusetts.

Chapra led a team including scientists from the Massachusetts Institute of Technology and the U.S. Environmental Protection Agency in one of the most comprehensive studies of the interplay between global warming and the blooms, published in 2017.

Because they prefer warm water, the organisms receive help from higher summer temperatures and repeated heat waves. Also, more frequent droughts cause reservoirs to be shallower in summer, allowing them to warm faster.

And more intense rainstorms, also connected to climate change, can wash more nutrients into lakes and reservoirs, especially from farms that spread nitrogen and phosphorus-rich fertilizers into the soil.

Utah only recently began carefully logging the blooms, but one fact is already clear: The blooms are becoming more intense.