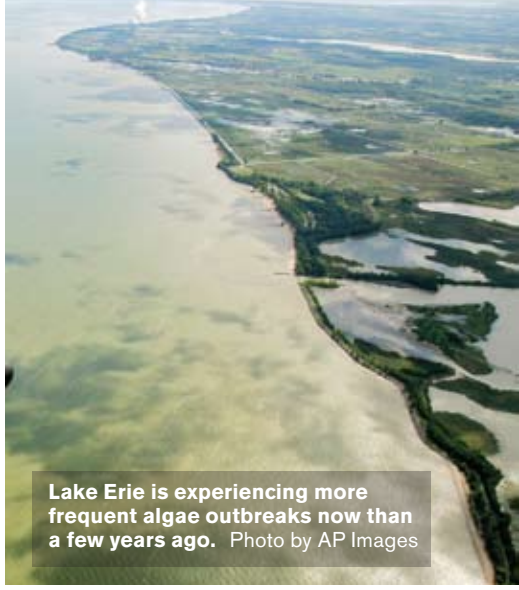
The algae scourge

More than pesky surface scum, new algae blooms are killing fish, poisoning wildlife and harming humans



Lake Erie is experiencing more frequent algae outbreaks now than a few years ago. Photo by AP Images

MORGANTOWN, W.Va. – As pollution degrades our water, it also feeds a toxic outbreak that threatens our fisheries and our future.

"We are approaching a tipping point where we might not be able to get back to what used to be," said Dr. Ken Hudnell, a neurotoxicologist and adjunct associate research professor at the University of North Carolina-Charlotte.

"We could lose ecosystems, leaving only cesspools of cyanobacteria that can't be used for recreation or drinking water."

The growing danger for fresh water, not only in the United States but worldwide, exists in cellular populations described collectively as Harmful Algal Blooms (HABs). Cyanobacteria, also known as blue-green algae, are the most notorious, and some species are potentially harmful to humans. Golden alga, a dinoflagellate, is a relentless killer of fish. Didymo is a diatom that has smothered streambeds in several states.

All are spreading and increasing the duration and intensity of their blooms.

For example, golden algae obliterated all aquatic life in a 30-mile stretch of West Virginia's Dunkard Creek last fall. Until that kill, it was thought to be confined mainly to brackish waters typical of rivers and reservoirs in east Texas, Oklahoma and Wyoming. Now, resource managers fear that another 21 streams in the state could be at risk because of similar water conditions, as well as waterways in Pennsylvania, Virginia, Maryland and Kentucky.

Paul Ziemkiewicz, director of the Water Research Institute at West Virginia University, said the Dunkard incident was "the worst fish kill I've experienced in 21 years in West Virginia."

In Ohio, meanwhile, the *Akron Beacon Journal* newspaper recently reported, "The number of [blue-green algae] blooms producing scary toxins or poisons is growing in frequency and duration in Lake Erie and many inland lakes and waterways in Ohio and elsewhere.

"The threat is gaining attention as new testing shows the toxin microcystin from the planktonic bacteria is present in popular recreational lakes and city water supplies, including Akron's."

Late last summer, Western Lake Erie Waterkeeper Sandy Bihn told *BASS Times*, "Old-time boaters say the algae is as bad or worse than it was in the '60s and '70s. I think Lake Erie is poised for something awful that will make national news."

In Florida, Hudnell said, studies have revealed that toxins from some of these blue-green blooms "are higher in drinking water than raw water because the cells are lysed during processing and release all their toxins.

"It's very difficult to remove all cyanotoxins from drinking water, and utilities don't monitor for them. They are only concerned about other cyanochemicals that cause taste and odor problems — and phone calls."

In a letter to the U.S. Environmental Protection Agency (EPA), Earthjustice said, "Potentially toxigenic cyanobacteria have been found statewide, including river and stream systems such as the St. Johns River in the Northeast Region and the Caloosahatchee River in the Southwest Region."

Bill Frazier, a water quality expert for a municipality as well as conservation director for the North Carolina BASS Federation Nation, has been watching the growing assault on our waters and sounding the alarm for some time.

"HABs are a type of canary in the coal mine," he said. "The fact that they are present is an indicator of an out-of-balance ecosystems. Nothing good can outcompete them for living space. And the space we are talking about is water — the substance that allows us to live on this planet.

"Add to that the fact that HABs are exchanging genetic material in order to allow them to adapt to conditions they otherwise couldn't tolerate, and it no longer is a wakeup call. It's more like a piercing scream. Unfortunately, only a very few of us are listening."

In fact, Hudnell resigned from EPA because it would not start a freshwater HAB research and control program. He and Dr. Wayne Carmichael now are leading an informal coalition of more than 500 people in lobbying for passage of the Freshwater Harmful Algal Bloom Research and Control Act of 2010. (See related story.)

"It's an emerging story, a fascinating story, a very scary story, and an incredibly complicated issue," said scientist Julie Weatherington-Rice of Ohio State University. She was speaking specifically about blue-green blooms in Lake Erie and other Ohio waters, but her assessment also accurately describes the HAB problem nationally.

Why is this happening?

To simplify: All blooms benefit from four "stimulatory factors," according to Hudnell. They are sunlight for photosynthesis, warmth (in general, the warmer the better), nutrients (particularly nitrogen and phosphorus) and calm, even stagnant, water (often brought on by drought).

"Good things just don't happen in stagnant water," he said. "A water body, like a human body, needs good circulation to function properly."

But it is what we continue to discharge into our waters — dissolved solids, salts and particularly phosphorus-laden nutrients from our cities and agricultural lands — that drives this threat.

"In Lake Erie, the cure in the '70s was the ban on phosphorus in laundry detergent, which reduced the phosphorus in the lakes," Bihn said. "About 1995, the phosphorus curve reversed its downward trend and began once again increasing. This time, it is said to be dissolved phosphorus rather than total phosphorus."

Hudnell added, "The No. 1 problem is too many nutrients. This allows HABs to dominate, to crowd out and shade out the good algae. As these occur for longer times and in more places, it's going to be more and more difficult to reverse the trend."

ROBERT MONTGOMERY

Hudnell and supporters lobby for FHAB Act

CHARLOTTE, N.C. – Watershed management has helped clean up our waters, but its effectiveness has been limited, according to Dr. Ken Hudnell. "Despite a long history and vast expense, we have not curbed the rise in impaired waters and HABs," he said.

Hudnell and his supporters hope that passage of the Freshwater Harmful Algal Bloom Research & Control Act of 2010 (www.freshwaterhablegislation.com) will jumpstart a more contemporary and aggressive plan for control of harmful blooms.

What's needed now is within-water-body management," the scientist added. That would include circulating the water, as well as limiting discharge of and recapturing phosphorus for reuse.

"One of the reasons we don't have effective management of our water bodies now is that earlier we used copper sulfate to kill HABs, and engineers ran the show," he continued. "We ignored having healthy water bodies. We can't just rely on a watershed approach. We need to keep surface waters in good shape with less processing. It's healthier for ecosystems and recreation."

In addition to pressuring the federal government to recognize and respond to the seriousness of this problem, Hudnell is working on an accompanying solution as vice president and director of science for SolarBee Inc. (www.solarbee.com).

One SolarBee unit can circulate the upper reaches of 35 acres of water. "There's vertical mixing and no stagnant water, so HABs are kept in check," he said.