

# BEWARE TOXINS IN BLUE-GREEN

# ALGAE

Those who favor water recreation need to know of bacteria's danger



Jack Pockett of Greece leaves this area to find a better spot to fish on Sodus Bay in May. Toxic algae has been a problem in the past on Sodus Bay. TINA YEE STAFF/PHOTOGRAPHER

## STEVE ORR

Staff writer

Naturally occurring toxins that can harm humans, pets and wildlife have been found in more than 100 New York lakes, ponds and bays — in many cases, at levels considered unsafe.

First-ever state testing found cyanotoxins in every corner of New York over the last three years, according to sampling data obtained exclusively by the *Democrat and Chronicle*.

The prevalence and severity of the toxins, released by a form of plant-like bacteria commonly known as blue-green algae, appears to be growing.

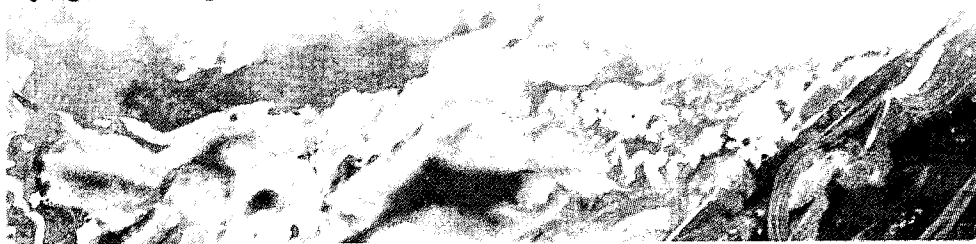
“We are hearing reports from people saying ‘I’m seeing a bloom on this lake

that I haven’t seen before,’” said Scott Kishbaugh, manager of a Department of Environmental Conservation program involved in the testing.

State officials are still honing a program to alert the public to the presence of the algal toxins, which can force closure of swimming beaches and inhibit water skiing or fishing.

But because officials rely partly on local governments and lake associations to inform lake users, there may be gaps. Some residents of Sodus Bay in Wayne County — beset by a huge blue-green algae bloom in 2010 — complain that the recurrence of algae last summer was kept from the public, for instance.

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A multi-colored patch of cyanobacteria, blue-green algae, is near the shore along South Shore Road in Sodus Point in 2010 during a large outbreak. SHAWN DOWD/FILE PHOTO

## FINDINGS

- » In New York, a liver toxin known as microcystin has been found in hundreds of water samples gathered for state testing over the last three years.
- » Traces of a very potent neurological inhibitor known as anatoxin-a have been found in three New York lakes.
- » Neither the federal nor state government has adopted safe levels for cyanotoxins.
- » State and local officials are still wrestling with how to best notify the public about the blue-green algae blooms.

## DATABASE & MAP

Click on this article at DemocratandChronicle.com for links to a map of the 40 lakes in the state that have recorded the highest levels of cyanotoxins, a database of the state testing results and a state sampling card with images of the various forms the algae takes.

## MORE INSIDE

- » Sodus Bay in Wayne County has become something of a test case for scientists examining this phenomenon.
- » A map highlights eight lakes in the state with the highest recorded levels of cyanotoxins.

Until now, there has been no broad picture of the extent of harmful algal blooms in the state — mainly because state Department of Health officials who began testing for toxins three years ago had been reluctant to release their findings en masse or even to publicly identify hot spots.

Because the hot spots are fleeting, health officials said they were concerned that any public notification would come after the fact. They were also working under a federal grant and were uncertain about the appropriateness of releasing research material, they said.

Some of the data was released pursuant to a Freedom of Information request by the *Democrat and Chronicle* after a delay of nearly 10 months. The rest of it was provided voluntarily in recent days.

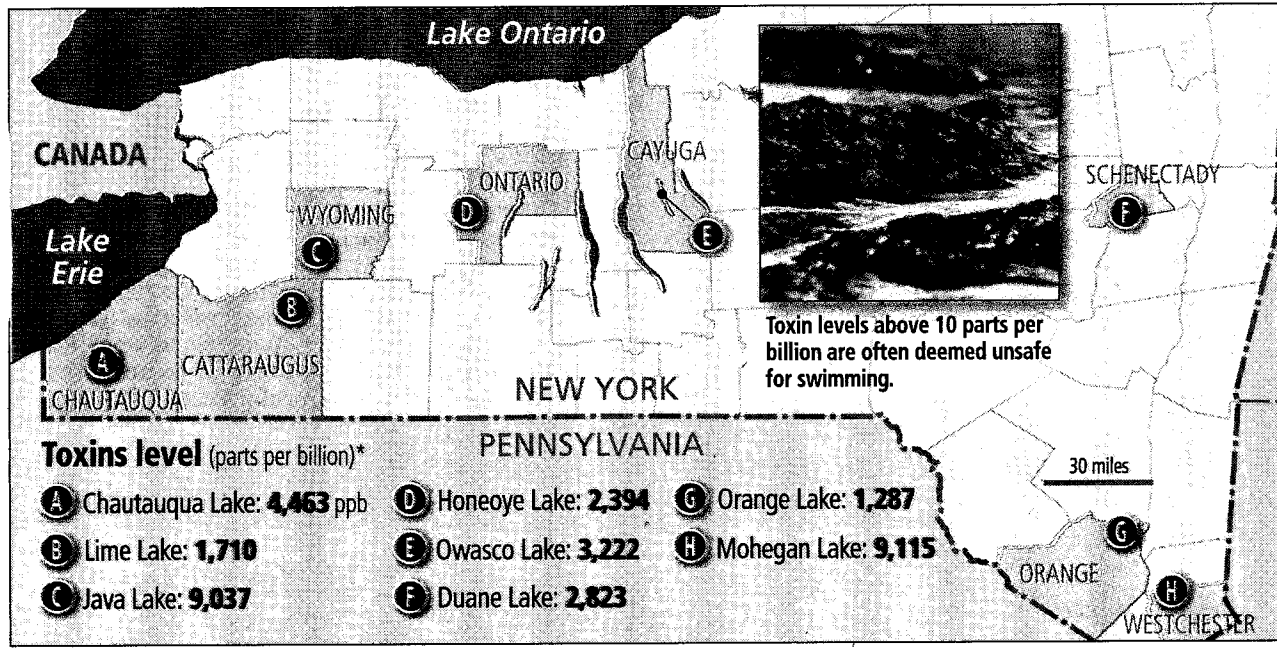
The eruption of cyanobacteria, which can turn water a thick pea green or a striking turquoise dotted with white froth, is not a new phenomenon in some places.

"It's been here a long time," said Betsy Moll, an Erie County resident who has a second home on Wyoming County's little Java Lake, where some of the highest toxin levels in the state were found in the last three years. "Did we know it was dangerous? Did we know what it was? We didn't know there was (toxin) until the Health Department began doing its studies."

Gregory Boyer, an internationally recognized expert on harmful algal blooms who is working with state officials, said the bacteria are being supercharged by ever-growing human activity near lakes and bays that generates nutrients. As well, he said, climate change has brought more of the kind of weather the organisms crave — rainy springs and hot, calm stretches in summer.

Some experts also point to the spread of invasive mussels and clams, which consume algae but leave cyanobacteria untouched

## Eight top algae toxin sites: Highest readings in each lake



\* One-time readings that were taken during blue-green algae blooms.

KEVIN M. SMITH/GRAPHICS EDITOR

"I do think the problem is getting worse," said Boyer, chairman of the chemistry department at the State University College of Environmental Science and Forestry in Syracuse. "What you are seeing is that this is not necessarily a localized issue but a sign of a bigger generic stressor on the lakes."

### Symptoms

Certain types of cyanobacteria can release toxins.



Kishbaugh

ins. In lower doses, they cause problems in humans such as skin rashes or upset stomachs. In greater doses, toxins harm the liver or neurological system.

The worst health problems result when tainted water is ingested, though skin contact or inhalation of contaminated droplets can cause harm.

Numerous human deaths overseas have been attributed to cyanotoxins, though only one is suspected in this country. Illnesses here are becoming more common, though; an Ohio man was hospitalized two summers ago with numbness and memory loss after cleaning a dog that had paddled through a toxin-riddled lake.

The state Department of Health, which has a five-year, \$750,000 grant to study cyanobacteria in New York, has recorded three to five incidents in which people have become ill after exposure to water that might have contained toxins. The connections weren't confirmed, however, said department spokesman Jeffrey Hammond.

There have been a number of reported dog fatalities in New York as well.

In New York, a liver toxin known as microcystin has been found in hundreds of water samples gathered for state testing over the last three years. Most samples contained only traces of microcystin, though some measured as high as 8,000 or 9,000 parts per billion.

Traces of a very potent neurological inhibitor known as anatoxin-a have been found in three New York lakes. Those samples are being re-analyzed to determine how much was present, officials

said.

Neither the federal nor state government has set safe levels for cyanotoxins. Ten to 20 parts per billion (ppb) is a typical guideline elsewhere for skin contact, and 1 ppb for drinking water.

The state Health Department began testing for cyanotoxins in 2009 under its grant, which runs through next year. It has focused on bodies of water with known or suspected algae problems.

The DEC has used \$30,000 in federal aid to look for toxin in 120 lakes where volunteers help with a state water-quality program. That money runs out this year.

Overall, the two agencies' sampling has looked at 151 lakes, ponds and bays. It found microcystin in 120 of them at least once.

In 41 water bodies, samples collected during visible cyanobacteria blooms contained microcystin in concentrations of 10 parts per billion or more.

No one part of the state suffers more than another. High levels were detected at the state's west end in Chautauqua and Java lakes, for instance, and in five lakes in Westchester County just north of New York City. A lake near the Canadian border in St. Lawrence County made the elevated-level list, as did several near the state's southern border with Pennsylvania.

State testing found microcystin in three Finger Lakes — Honeoye, Oswego and Canandaigua. Other Finger Lakes haven't been included in the sampling because they don't have lake associations enrolled in the volunteer water-quality program, state officials said.

### Sodus' experience

In the late summer of 2010, blue-green algae laid waste to large parts of Sodus Bay, the popula-

Lake Ontario inlet in Wayne County.

But last summer, in 2011, the news was good. Sampling at predetermined spots on the bay found little or no blue-green algae toxin, and a Sodus Bay citizens group sent out positive bulletins to its members. The town of Huron website likewise said toxin testing was negative.

But it wasn't. In some parts of the bay, the algae had returned. Homeowners went to a public meeting and gave samples to Boyer for testing, and he reported later that microcystin levels were slightly elevated.

But neither the citizens group, Save Our Sodus, nor the town notified the public last summer or fall.

One homeowner whose shoreline was algal ridden, Don Eckrich, said town officials were present when Boyer was giving the samples, which he said looked like "milk shakes with green foam on top."

"I assumed ... they would publicize how many (of the samples) were toxic and where the samples came from. Apparently none of that happened," Eckrich said.

Huron town Supervisor Laurie Crane said town officials knew of the 2011 algal bloom but didn't see the results until late in the year. She said the town and other agencies involved in bay water quality have been "very up front and open with the public on this issue."

Ed Leroux, president of Save Our Sodus, said the group chose not to report the findings because they were "isolated incidents."

He said his group had gotten little direction from state officials about when and how they should inform the public of algae data.

"I imagine the state Health Department will catch up to it," Leroux said.

Public notification of cyanobacteria outbreaks remains a work in progress.

Health and environmental officials say they inform local agencies, lake associations and swimming beach operators as soon as possible if a sample tests positive for algal toxin.

They also have spread the word among local agencies and others that all blue-green algae blooms should be treated as toxic even before any tests are run.

How quickly this information reaches the public isn't clear. Kishbaugh said some lake associations — whose members collect water samples for the state and are pipelines for information in return — are more diligent than others.

"You span the gamut of their understanding and interest in the issue. Some of them don't believe that it's a problem," he said.

Even those that are involved in collecting samples and are concerned about lake water quality may be uncomfortable with the role of passing on bad news to their neighbors, he said.

The same may be true of local Health Departments. The health agency in Chautauqua County, where Findley Lake and especially Chautauqua Lake have had big algae-toxin problems, has done a great deal of public outreach since state officials red-flagged the issue several years ago.

"If there's a noticeable bloom, we encourage the public to call us and let us know where it's occurred. We can then provide them with guidance," said William Boria, a water resource specialist for the county Health Department. Chautauqua has a response plan on its website and has even asked local physicians to be alert for toxin-related health problems.

By contrast, the West-

chester County Health Department has never heard from the state about sampling of lakes there, spokeswoman Caren Halbfinger said, and had no public inquiries about algal toxin. Elevated microcystins have been measured in five Westchester lakes, including Mohegan Lake, which has been among the worst in the state. The department has now contacted the state and is has started planning for any future outbreaks.

Ken Belfer, president of the Mohegan Lake Improvement District, said his group is still learning about blue-green algae and how to respond to its presence.

"Three years ago, if somebody said to me 'There's algae that has toxins in it that could be hazardous to your health,' I would have said, 'You're crazy,'" Belfer said.

Though samples collected in Mohegan Lake in 2009 showed toxin levels that were hundreds of times higher than the safe-swimming guideline, Belfer said they weren't notified by state officials.

Though the improvement district is getting more information now, they're not sure what to do with it. "We are struggling right now, to tell you the truth, with what to communicate and when," he said.

Kishbaugh said state health and environmental officials are in "active discussion" about how best to inform people of their findings. "We have had work groups to identify as many outreach opportunities as possible," he said.

The state DEC has beefed up its algae Web page, and officials are talking about posting sampling results or bloom information online. One problem is that it takes about two weeks to analyze a sample and report back on any toxins; another problem is the state has no money for routine lake sampling after next year.

So officials are analyzing data to see whether they can correlate the level of toxin with the appearance of the algal bloom at the time the sample was gathered. The hope is that they can devise a scheme under which beach operators, local health agencies and lake users could judge how dangerous the water is by its appearance.

"I think the goal is not only to understand how all of these things are connected ... but to work toward, for lack of a better term, an early warning system," Kishbaugh said. "We want to make sure that we're protecting people but not alarming them."

# Sodus Bay a national test area for toxic algae prevention

**STEVE ORR**

Staff writer

Sodus Bay is becoming nationally known as a test bed for the study of blue-green algae and its toxins.

Researchers from five universities plan work related to algae problems on the popular Wayne County bay. The so-called Summer of Science on the bay was prompted by a major 2010 algal bloom that disrupted end-of-summer vacations.

Local government agencies and advocacy groups have attracted at least \$1 million in grant money to pay for studies and experiments, includ-



Boyer

ing a first-in-New York test of a chemical treatment to kill the aquatic organism. "Sodus Bay is becoming known as one of the premier test sites if you're working with blue-green algae," said Gregory Boyer, a blue-green algae expert who is chairman of the chemistry department at the State University College of Environmental Science and Forestry in Syracuse.

"There's so much going

on on the bay this summer that it's going to be ridiculous to try to keep track of it," he said.

Some of the efforts:

» A three-year test of whether hydrogen peroxide can short-circuit blue-green algae blooms is in its second year. This summer, floating enclosures that look like inflatable swimming pools will be used to test the concept. The work is being led by Boyer and funded by a \$400,000 federal grant. A boat will make broader application of the chemical next summer.

Hydrogen peroxide has shown "very encouraging" results on smaller

lakes in the Netherlands, Boyer said, though he noted the idea remains experimental. "Don't shoot me if it doesn't work," he joked at a recent Sodus Point meeting on the projects.

» Floating buoys will be anchored on the bay this summer to help determine when and where blooms begin and how long they last. Boyer and his group also will continue enhanced monitoring for algal blooms and toxins from shore and from a boat.

» Data collected by that group will be used in a computer model being constructed by Univer-

sity at Buffalo professor Joseph Atkinson, Boyer and others. The model is meant to predict when and where algae blooms may occur, and allow the study of ways to ameliorate them. University of Michigan researchers are assisting.

» A University of Tennessee, Knoxville, professor will be testing a "bio-filter" device that may be able to render the algal toxin harmless. The work is funded by a four-year, \$700,000 federal grant. "They wanted a place to try it out and I suggested Sodus Bay," Boyer said.

» Save our Sodus was given a \$15,000 grant from

the Healing Our Waters-Great Lakes Coalition to update information on sources of phosphorus entering the bay so that remedial work such as stream bank restoration can be better targeted. The College at Brockport professor Joseph Makarewicz is involved, as is the Wayne County Soil and Water Conservation Service.

Phosphorus, a nutrient found in human and animal waste, in fertilizer and in the soil, fuels the growth of blue-green algae and other algae and weeds.

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