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Scientists probe mystery of missing algae

By Candace Page
Free Press Staff Writer

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SOUTH BURLINGTON -- Scientists reported Tuesday on the first clues they have found in the mystery of the missing algae in Missisquoi Bay. The solution is likely to be complicated, they said, but they fingered nitrogen as at least an accomplice in the case.

Lakeshore residents -- and researchers -- were startled last summer when the thick, noxious blue-green algae blooms that have plagued the bay for a decade failed to occur. Water quality remained excellent all summer.

Eric Smeltzer, the state government's lead lake scientist, analyzed changes in water temperature, transparency, phosphorus concentration and rainfall in his search for an explanation. None seemed strongly correlated with the sudden decline in algae. He did find that concentrations of nitrogen -- a plant fertilizer -- in the water were at nearly their lowest levels in a decade.

"We're left with low nitrogen as the beginning of the answer to the mystery," he told the audience at "Lake Champlain: Our Lake, Our Future," a two-day gathering of scientists convened by the Lake Champlain Research Consortium and the Lake Champlain Basin Program.

Researchers in the audience seconded Smeltzer's caution that the mystery is far from solved. Missisquoi Bay is a complicated ecosystem, and it is likely that the interplay of many variables created the gift of swimmable water last summer.

"One thing alone is not the answer," said biologist Mary Watzin, who heads lake research at the University of Vermont. "We'd like to think that understanding 2007 would give us a silver bullet to fix Missisquoi Bay. It's not that easy."

Until now, phosphorus -- a plant nutrient found in manure and synthetic fertilizer -- has borne the brunt of the blame for sometimes toxic algae blooms that keep swimmers out of the water and suppress business in lakeside communities.

Nitrogen, like phosphorus, is found in fertilizers, particularly in those used on annual crops such as corn. Rain also washes nitrogen out of the atmosphere and deposits it in the lake. If nitrogen is found to be one of the factors limiting algae blooms, that could lead to changes in efforts by Vermont, New York and Quebec to reduce pollution.

"I've been dragged kicking and screaming to the position that we're going to have to manage nitrogen inputs to the lake," Smeltzer said. He said no one has examined why nitrogen levels in Missisquoi Bay plummeted last summer.

In a separate presentation, Watzin lined up evidence about other factors that might help drive the rise and fall of blue-green algae. They include warmer water temperatures and an explosion of invasive white perch that eat the microscopic crustaceans that feed on algae.

Smeltzer and Watzin emphasized that nitrogen's possible role in algae blooms should not deflect the states from efforts to reduce phosphorus pollution.

"To me, all this raises more questions than it answers," Watzin said.

RESEARCH BULLETINS: Among the new research findings reported Tuesday by scientists at a conference on Lake Champlain:

Concentrations of phosphorus -- a lake pollutant -- dropped 25 percent in a tributary of Quebec's Pike River after farmers installed riverbank buffers and runoff catch basins in fields most susceptible to runoff.

As part of a pilot program, 10 managers of nonresidential properties in the Englesby Brook watershed of Burlington agreed to change their lawn care practices to reduce phosphorus use. Overall they cut phosphorus fertilizer use by one-half to almost a ton in 2005.

Whitefish, once a commercially important fish in Lake Champlain, appears to have declined substantially. Researchers found numbers of the fish only along the Grand Isle shore. No sign of whitefish was found in Missisquoi Bay, one of its historic spawning grounds.

Professional bass anglers surveyed at a tournament in Plattsburgh, N.Y., showed unexpectedly low levels of knowledge about invasive species that can be introduced to the lake when boats are moved from one water body to another.

In a separate survey, stewards at boat ramps in New York and Vermont documented numerous occurrences of water weeds on boats' being taken out or put in the lake -- without any attempt to remove the potentially invasive weeds.

"Lake Champlain is slightly caffeinated," U.S. Geological Survey researcher Patrick Phillips reported. Phillips analyzed samples of wastewater effluent, combined sewer overflows and urban streams around Burlington and found traces of a number of substances used and excreted by humans, including caffeine, aspirin and codeine. The substances were present in low levels not dangerous to humans, he said.

Contact Candace Page at 660-1865 or at cpage@bfp.burlingtonfreepress.com