

Study suggests fish virus spread by fish, not boats

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A bowfin, top, and rock bass caught in the St. Lawrence River near Clayton, N.Y. Rock bass are known to be vulnerable to the virus. Image: Mohd Zafri Hassa

(PhysOrg.com) -- Viral hemorrhagic septicemia virus could be in a lake without killing fish, according to a new study on the deadly virus that threatens New York's billion dollar sport-fishing industry.

Ships may not have recently introduced a deadly [virus](#) that has killed large numbers of [fish](#) in several [Great Lakes](#) since 2005 as previously thought, reports a new Cornell study, but the virus may have been present for decades.

Its new finding is that "viral hemorrhagic septicemia virus (VHSV) could

be in a lake without killing fish," said Mark Bain, associate professor of natural resources and lead author of a paper published online in the journal *Public Library of Science One* (Vol. 5: 4).

"Healthy fish can carry this disease at low levels," said Bain. "That means the eruption of fish kills from VHSV does not signal its arrival."

After large numbers of fish inexplicably died in Lake Ontario in 2005, researchers at Cornell's College of Veterinary Medicine identified the culprit as VHSV, which causes [anemia](#) and hemorrhaging in fish but is harmless to humans. It was the first time the virus had been documented in a Great Lake. The researchers had assumed that ships had recently introduced the virus.

The new study, however, reports that VHSV is prevalent in the waters and fish everywhere they tested in Lakes Huron, Erie and Ontario, leading them to think the virus may have been living in fish undetected in the lakes for decades, casting doubt on the theory that ships introduced the virus.

Until now, researchers had only tested samples from dead fish. The new study involved analyzing samples, for the first time, from live fish and water from 30 locations across the three Great Lakes, including 10 harbors, 10 boating centers and 10 wild shorelines.

"We found it everywhere, not just around fishing harbors and boating centers," said Bain. "We have no evidence that this pathogen is concentrated around shipping."

The researchers do not know how the virus initially entered the Great Lakes, but VHSV has existed historically in the North Atlantic and in Europe.

Since 2005, large VHSV-related fish kills have occurred in Lakes Ontario, Huron and Erie, in the St. Lawrence and Niagara Rivers, and VHSV has been identified in Lake Superior and smaller lakes, including the western-most Finger Lake in New York, Conesus Lake. Researchers have detected the virus in more than 20 Great Lakes fish species, posing a potential threat to New York's \$1.2 billion sport-fishing industry. Authorities have responded with strict regulations on boats and ballast water and on moving fish and bait minnows between lakes.

One theory why VHSV started killing fish in large numbers in 2005 is that warmer springs led to rapid rises in water temperatures, which stresses fish during spawning periods and makes them more susceptible to the virus, said Bain. Another theory: that over the last 10 years, round goby -- known carriers of the virus -- has been spreading in the Great Lakes and may be shedding VHSV in the water.

"It's the most infected fish," said Bain. "It may be that higher populations of round goby brought the disease to more prominence."

Co-authors postdoctoral associate Geoffrey Groocock and professor Paul Bowser, both of Cornell's Aquatic Animal Health Program in Cornell's veterinary college, and James Casey, associate professor of microbiology and immunology, analyzed the samples using a rapid genetic technique they developed to detect the virus.

Provided by Cornell University

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