

Ideas on the Edge



DR. BRIAN FRYER

Whispers in a Fish's Ear

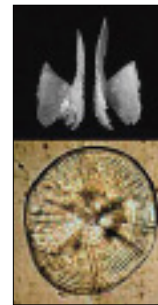
HOW IS THE GREAT LAKES ENVIRONMENT CHANGING? DR. BRIAN FRYER OF THE UNIVERSITY OF WINDSOR IS FINDING HINTS IN THE EARS OF FISHES.

RESEARCH THAT MATTERS REAL-WORLD BENEFITS FOR ONTARIANS:

- Improvement of water quality for people living along the Great Lakes
- Healthier shoreline environments
- Better strategies against invading aquatic species
- Strengthened Ontario fishery

Who knew that fish had ears? Or that those ears could hold subtle hints about the state of the environment?

It's certainly no surprise to Dr. Brian Fryer at the University of Windsor. Dr.



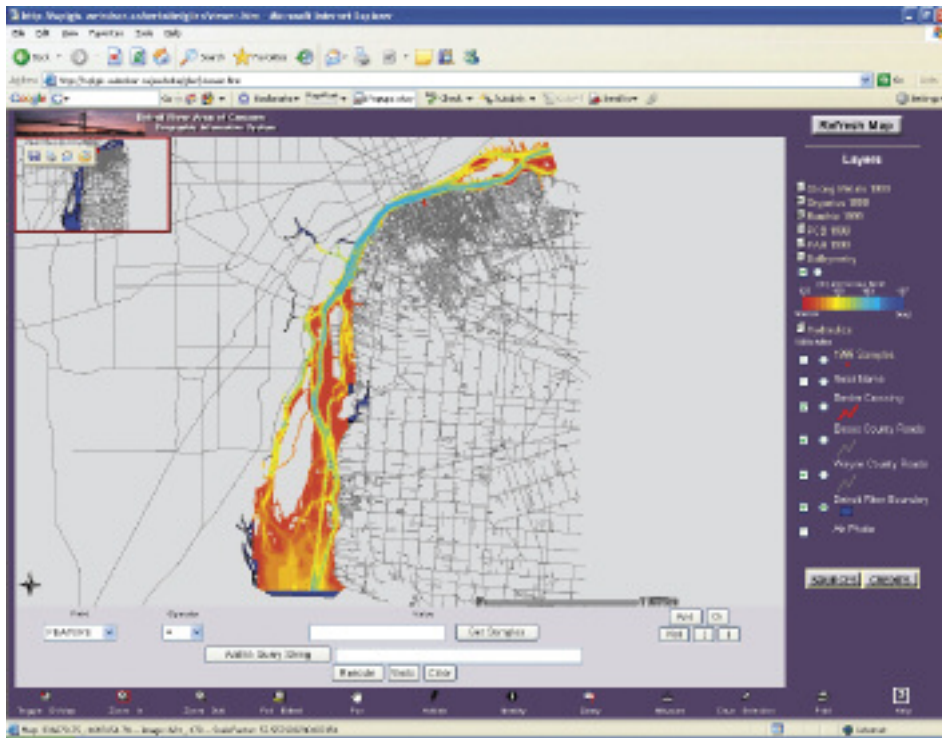
Fryer is a specialist in the analysis of otolith—the bony material in the ear of a fish.

“The basic analogy is to tree rings,” explains Dr. Fryer. “As a tree grows, it lays down rings. The ear

bones in fish do the same thing. The composition of each ring reflects the environment the fish was in at the time.”

Using a precision laser, Dr. Fryer can vapourize a sample from a single layer of otolith as thin as three millionths of a metre—the equivalent of one day's growth in a young fish. It's no more than a whisper of material, but analyzed in a mass spectrometer, it can reveal tell-tale traces of the chemical environment surrounding the fish on that particular day. Analyze a series of samples from a range of otolith layers, and you get a chemical chronicle of a fish's entire life.

From there, a little scientific detective work can lead to important environmental insights. By combining information from a fish's daily otolith “diary” with knowledge of a species' migration patterns, Dr. Fryer can deduce chemical conditions at various points along the route a fish has followed—and pick up the first faint hints of contamination.



part by the Ontario Innovation Trust, they bring a wide range of disciplines to bear on the Great Lakes environment, from micro-chemistry—Dr. Fryer’s field—to genetic analysis, and earth sciences like seismology.

“We’ve got physicists playing with lasers right next to gene jocks doing DNA analysis,” Dr. Fryer laughs. “It’s the kind of environment that exposes you to things you’ve never studied, and you start recognizing what kinds of

Dr. Fryer pursues his research in the remarkable context of the Great Lakes Institute for Environmental Research—GLIER—where he is also Director. The institute takes a determinedly cross-disciplinary

approach to understanding the Great Lakes environment.

“There’s a recognition now that environmental issues aren’t one-dimensional,” says Dr. Fryer. As a result, all kinds of scientists work together under one roof at the facility. Using a suite of tools funded in

skills you need to move forward.”

Asked about the ultimate importance of the research going on at GLIER, his tone becomes a little more sombre. “Globally, fresh water is probably the most important resource we have. And when decisions have to be made about that resource, we’ll need a body of scientific knowledge and understanding to make sure those decisions are good ones.”

Project: Large Lake Ecosystems: A Facility to Quantify and Model the Impact of Multiple Stressors
Institution: University of Windsor
Research Sector: Environment
Principal Investigator: Brian Fryer
Trust Investment: \$1,355,060
CFI Investment: \$1,966,420
ORF Investment: \$611,360
Total research investment from all sources: \$5,048,079



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Infrastructure for Innovation About the Ontario Innovation Trust

The Ontario Innovation Trust was created in 1999 by the Government of Ontario to invest in research equipment and facilities at Ontario’s universities, colleges, hospitals and other non-profit research institutions. The Trust is governed by a volunteer Board of Directors, according to the terms of a Trust agreement established by the Ontario government. A small permanent staff looks after day-to-day operations.

Since its inception, the Trust has committed almost \$843 million to strengthen Ontario’s position in the global marketplace of ideas. This represents more than a third of the \$2.44 billion in total funding that has been invested in Trust-supported projects.