

Polish scientists put electrical barrier invention to the test on the Ocqueoc

Research could lead to cost-effective way to fight lamprey

by Peter Jakey
Managing Editor

Scientists along the shores of the Ocqueoc River are experimenting with new, cost-effective ways to reduce sea lamprey numbers using mobile electrical barriers that lure the parasites into traps.

Researchers from Poland will be here until July 15 working with Hammond Bay Biological Station staff to investigate the feasibility of using low voltage DC (direct current) to block sea lamprey migration and guide them into waiting nets.

"In looking back through the records here at Hammond Bay, the concept of using electricity to control sea lamprey is not new," said Nick Johnson, research ecologist. "It was one of the first strategies when Vernon Applegate was here in the 1950s."

Applegate was one of the first researchers at the facility and helped establish groundbreaking methods of controlling them, including the first barriers on rivers.

"They used alternating current, and it was very high voltage," said Johnson. There's still an example of this technology in the Ocqueoc River near the Ocqueoc Outdoor Center, which blocks lampreys' path to Millersburg.

"The disadvantage of those type of systems was that you need to pour a concrete slab, put in a lot



ABOVE, NICK Johnson, research ecologist from Hammond Bay Biological Station works with recent Rogers City High School graduate Melissa Pomranke, who is working this summer as a technician. The site of the research work is on property owned by her grandfather, Gene Brege. (Photos by Peter Jakey)

random patterns of pulsed-DC to elicit a behavioral avoidance without using an electrical field strong enough to incapacitate or potentially damage fish.

The effectiveness of NEPTUN in Poland has been better than expected and 20 new installations are planned in Polish rivers in 2012.

Mariusz Malinowski and Sabina Ziota are overseeing the progress of their invention they developed

tion of some type of fish protection.

The aim of the current project in northern Michigan is to reduce or rid waters of an eel-like menace.

The system consists of two parallel cables anchored to the bottom of the river bed with electrodes rising to surface floats at intervals governed by pulsator design, water conductivity and the desired strength of field.

THE SITE, at the intersection

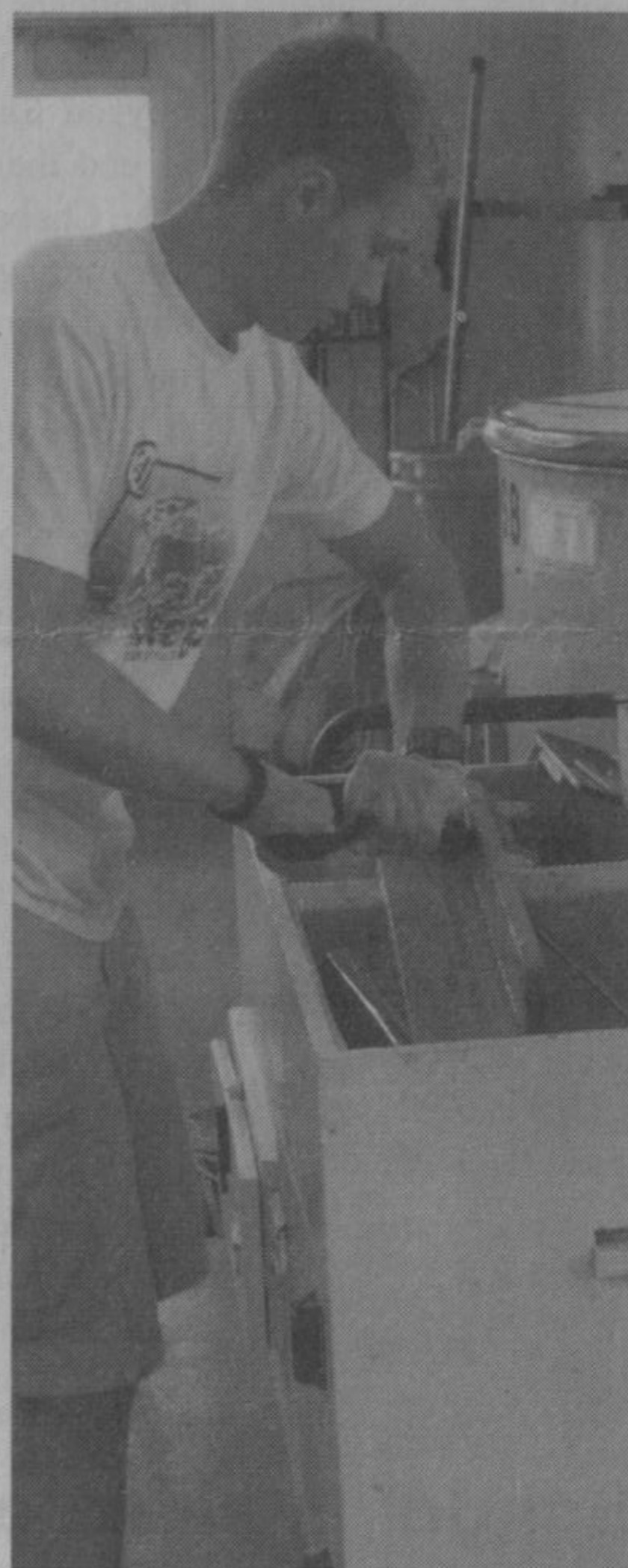


table and does not require installation of permanent concrete structures, a single NEPTUN could be installed in different streams from year to year and the overall cost would be much lower than permanent electrical barriers such as those used on the Pere Marquette or Ocqueoc rivers.

The benefits of a portable low-voltage lamprey barrier can be found in places like the Cheboygan River, where lampreys presumably bypass the dam through a lock.

Blocking lamprey movement through the lock with NEPTUN could eliminate the need to apply lampricide to the upper river at an average cost of \$600,000 for treatment.

If the experiments are successful, a proposal would be drafted to

LEFT, Michigan State University graduate Hugh McMath measures a lamprey at the station. Below, engineer Sabina Ziota of Poland checks some of cables spanning Ocqueoc River.



ABOVE, SUMMER technicians Hayley O'Meara (left) and Linnea Brege insert a tracking chip in the abdomen of a sea lamprey. Linnea is the granddaughter of Gene Brege, who owns the property scientist are using to access the Ocqueoc River.

of steel, and it's very high voltage, and it would kill any fish that came through," said Johnson. "And it would be a potential hazard to boaters or fishermen."

IN RESEARCHING international studies, local scientists came across a fish guidance system named NEPTUN developed by Procom Systems in Poland, which has shown to be effective in using an array of vertical electrodes and

seven years ago.

"In our laboratory in Poland, we succeeded an efficiency of 94, to 95 percent," said Malinowski. "In the field, we succeeded with efficiency of 90 to 94 percent." He said they have been installed near Polish hydroelectric power plants to protect the fish population from turbines.

Now, any construction of new plants in Poland requires construc-

tion of Silver Creek and the Ocqueoc, is on the property of Gene Brege in Ocqueoc Township.

Johnson is extremely pleased with the cooperation they've received in accessing the remote location. Scientists and technicians have to pass along the edge of Brege's sprouting cornfield to get there.

"It's a very useful site for conducting this type of research," said Johnson.

Twenty five percent of the lamprey swim up Silver Creek at this location, while the rest continue up stream in the Ocqueoc. Researchers use PIT (passive integrated transponders) tags to monitor their movements. A chip is inserted in the lamprey abdomen at the station so they can be released and studied.

The experiments started in May with an attempt at completely blocking Silver Creek.

"We demonstrated that with the systems, all the lamprey continued to move up stream (Ocqueoc River)," said Johnson. "If you are trying to control sea lamprey, this could be advantageous. If you can set up an electrical guidance system here, you wouldn't need to treat

Silver Creek with pesticides."

However, another control option would be to block the Ocqueoc and treat Silver Creek. Less chemicals would mean a considerable savings.

Lampricides help to eliminate or reduce the populations of sea lamprey larvae.

Currently, the lampricide TFM is the primary method used in the Great Lakes to control lamprey populations. TFM is a very efficient control method because it kills sea lamprey

larvae in water without hurting or affecting other populations. However, TFM is costly, which is why the other methods are used as well.

Another experiment in June involved blocking both the Ocqueoc and Silver Creek. "We were able to do that too," said Johnson. "Right now, what we're working on is trying to use the system, not as a complete block, but as a guidance system to get them into a trap."

Additionally, NEPTUN would only need to be activated at night using a small generator because lamprey are nocturnal, allowing nontargeted species to pass during the day.

BECAUSE NEPTUN is por-



use the system throughout Great Lakes sites.

Trapping of migrating adult sea lampreys is an integral part of the Great Lakes Fishery Commission's Integrated Sea Lamprey Management Program, with trapping success affecting several important parts of that program.

"Our goal is to demonstrate that the system can work in a controlled stream environment now, before deploying to a true sea lamprey control management application," said Johnson.

Johnson added that they have a joint permit with the Department of Environment Quality and the U.S. Army Core to conduct the work.



POLISH RESEARCHER/development manager, Mariusz Malinowski, observes some of the readings on equipment he's developed over the last seven years.