



Reel in Michigan's Fisheries

Michigan Department of Natural Resources, Fisheries Division
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This publication is an outreach to Michigan anglers to describe what the DNR's Fisheries Division does and why we do it. Specifically it highlights the work Fisheries Division employees are accomplishing on inland lakes and streams. *Reel in Michigan's Fisheries* will often showcase waters that are actively managed and provide the public with enhanced knowledge and the opportunity to access the wealth of information contained in survey reviews and management reports.

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The Michigan Department of Natural Resources is committed to the conservation, protection, management, use and enjoyment of the state's natural and cultural resources for current and future generations. For more information, go to www.michigan.gov/dnr.

Cover photo features DNR fisheries biologist Randy Espinoza at Thompson State Fish Hatchery in Manistique preparing walleye eggs in April 2013.

Tracking Walleyes & Other Species in Houghton Lake

[Houghton Lake](#) in Roscommon County is not only Michigan's largest inland body of water, it is also among the most heavily fished - and heavily studied - of Michigan's lakes.

Houghton Lake has changed mightily over the decades. The 20,075 acre lake (the largest in Michigan) has been heavily altered by development. The lake level has risen 3.7 feet above its natural level because of a water-control structure located just downstream on the Muskegon River. In response to the higher water level, the lake is now surrounded by hardened seawalls in most places.

The sea walls, as well as dredge-and-fill operations, have significantly altered the character of the lake and have impacted the fishery. Although it was historically known for its northern pike fishing, that fishery declined in the early part of the century. Anglers once suspected the decrease was caused by spearing pike through the ice, though biologists believe the loss of spawning habitat - a result of shoreline manipulation - is the cause of the decline. Spearing through the ice, which was once banned, is now legal again.

"We don't know what the historic growth rate for northern pike was here, but we know it's below state average now," said fisheries biologist Rich O'Neal of the [Central Lake](#)



DNR Fisheries Division tech supervisor Scott Heintzelman surveys a bluegill on Houghton Lake.

[Michigan Management Unit](#).

Although known primarily for its panfish populations these days - which include bluegills, pumpkinseeds, yellow perch and black crappie - much of the discussion among anglers centers around walleyes, which have been supported periodically by supplemental stocking over the decades.

Because of recent surveys studying both walleye populations and recruitment, biologists say stocking walleyes is not only unnecessary but pointless.

Houghton Lake was surveyed in both June and October of 2011, by trap nets and electrofishing, using index sites established in 1972. The walleyes collected in the June trap net survey were shorter in average length than in surveys from 1972 to 2007, though the number of fish measuring 15 inches or greater was similar to previous surveys, indicating the number of smaller walleyes in the lake had increased.

Most of the fish collected were from year-classes from 2006 to 2009 - a period of time when walleyes were not stocked in the lake, because there was a moratorium on walleye stocking as a precaution against spreading disease ([Viral Hemorrhagic Septicemia](#)).

Overall, the growth of walleyes was well below the state average, something that has been noted at Houghton Lake in the past, during periods of both stocking and no stocking. This indicates the slow-growth rate of walleyes at Houghton Lake is a natural condition on the lake, likely caused by available forage or habitat conditions.

The 2011 fall electro-fishing survey showed only seven percent of the young-of-the-year walleyes

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collected were stocked fish. Studies show walleye stocking is most effective where natural reproduction is low and contributes little to the fishery in lakes with good natural reproduction. Surveys conducted over the last 20 years on Houghton Lake indicate this is the case.

Houghton Lake's walleye fishery was sustained by natural reproduction for many years, including 1945 to 1978, when the lake was not stocked with walleyes. The lake had been stocked with walleye fry from 1908 to 1944 and with walleye fingerlings from 1979 to 2005 and again in 2011, when they were marked with oxytetracycline to help evaluate the effect of the stocking.

The presence of an excellent panfish fishery has lead biologists to conclude there is a large enough group of predators to make stocking additional walleyes unnecessary, especially considering growth rates of walleyes is low.

[Michigan's fish stocking guidelines](#) state that stocking walleyes should only occur if natural reproduction and survival are inadequate to maintain the fishery, if there is a reasonable doubt the fishing would be diminished by a lack of stocking, and if the fishery would justify the costs of the stocking program. In each case, the DNR concluded, stocking walleyes in Houghton Lake would not be justified.

Meanwhile, the growth rate of northern pike in Houghton Lake was identified to be relatively low as well and a large percentage of pike sampled in 2011 were smaller than the 24-inch minimum length limit. The catch rate in 2011 was at the lowest level ever. This leads to the conclusion that a different harvest regulation, other than the statewide 24-inch minimum size limit, may be more suitable for this water body.

Finally, fisheries managers concluded that restoration of fisheries habitat should be a long-term goal for managing Houghton Lake.

For more information on Houghton Lake please see the Status of the Fishery Resource Report available at: http://www.michigan.gov/documents/dnr/2012-141_388115_7.pdf.



DNR Fisheries Division biologists Rich O'Neal and Heather Hettinger show off some efforts from a recent Houghton Lake survey.

Fish Passage Courtesy of a Rock Ramp

In 2005, the Chesaning Dam on the Shiawassee River in Saginaw River failed and there were two immediate public concerns: the foundation of the M-57 bridge immediately upstream and the water level of the pool, where the village of Chesaning's main tourist attraction - the [Chesaning Showboat](#) - operates.

The [Michigan Department of Transportation](#) immediately installed a grade-control structure, just upstream from the breached

dam, to prevent sediment from washing out the foundation of the bridge. But the structure, which is below the water level, didn't solve the village's problem of maintaining the pool elevation and it soon became obvious the funding necessary to rebuild the dam was not readily available. The alternative? Build a rock ramp that would slow the flow and maintain the upstream river level high enough to float the boat.

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Fish Passage Courtesy of a Rock Ramp
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The idea of a rock ramp, which would allow fish passage upstream, had immediate appeal to all natural resources agencies. The Shiawassee River supports a run of walleyes so the idea of allowing further upstream passage for those fish - and others - drew support from the DNR.

The village, which had some funds available, sought additional funding for the rock ramp. It found support from the [U.S. Fish and Wildlife Service](#) and the [Saginaw Bay Watershed Initiative](#) in the form of grants. But the lion's share of funding came from the [Clean Michigan Initiative](#) and the DNR was able to provide technical assistance on designing the rock ramp. A contractor hired to build the stair-step rock ramp finished the work in 2009 and in 2010, the DNR began assessing the efficacy of the rock ramp for fish passage. [Central Michigan University](#) (CMU) signed up to help with the evaluation.

DNR fisheries biologist Joe Leonardi of the [Southern Lake Huron Management Unit](#) studied past evaluations of Shiawassee River fish populations upstream of the Chesaning Dam and found four species - walleye, quillback, gizzard shad and freshwater drum - that had never been noted in that stretch of water upstream from the old dam site. So Leonardi decided to use those species as indicators of fish passage from the rock ramp.

In 2010, DNR electro-shocking sampling efforts showed all four species upstream of the dam site, though far fewer than downstream. The DNR found a total of three walleyes in spring and summer surveys in 2010. In 2011, they found five. Leonardi, in consultation with Dr. Sandy Verry, an authority on rock ramps, concluded the new structure was providing fish passage, at least in a limited capacity. The pair suggested some modification to the rock ramp might enhance its fish-passage capability.

“In August of 2011, the contractor came back and opened up the gaps on the upper four

weirs,” he said. “In spring of 2012, we found 15 walleyes upstream. And this year we got 29 walleyes upstream. So I have a feeling the modifications that were made in 2011 might have helped.”

Meanwhile, CMU began [tagging fish](#) of various species downstream in 2012. That year, sampling turned up three redhorse suckers that had been tagged.

“We figured the suckers might have an easier time getting upstream than the walleyes,” Leonardi said.

In 2013, CMU captured two walleyes upstream from the rock ramp that had been tagged earlier in the year downstream. Coupled with the capture of nine walleyes during an upstream summer survey in 2012, Leonardi said it appears a resident population is building in the upstream portion of the river.

“The densities of indicator species - primarily walleye and quillback - remain much higher downstream compared to upstream suggesting a reluctance to pass the rock ramp. We have asked ourselves why? Is it our sampling methods or is it flow conditions or something else? It could just take time.”

“It may not be passing fish [as] freely as some anticipated, but it is passing fish including walleye, and even in low flow.”

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DNR Fisheries Division technicians Chris Schleb (left) and Joe Leonardi survey a quillback carpsucker on the Shiawassee River this winter.

2013 Walleye Efforts Faced Obstacles

The Department of Natural Resources' walleye rearing program suffered a couple of setbacks this year and failed to achieve its goal for total walleye fry production. But there was some good news too as the DNR doubled production of fry - from 100,000 to 200,000 from the [Platte River State Fish Hatchery](#).

"That's an experimental program at Platte and it's beginning to come around," said DNR fish production manager Gary Whelan. "Eventually we'll have this program dialed in. This is a new venture for staff and they are continuing to work out the kinks of hatching coolwater fry at a coldwater rearing facility. We're working on a new water supply system - to use surface water instead of ground water - and that should eventually pay dividends and help us raise more fry at Platte."

Fisheries Division walleye egg collections occur annually at the Muskegon River and Little Bay de Noc. Egg take at the Muskegon River went very well; in four days on the river over an eight-day period the crew successfully spawned 231 pairs of walleye. In all, fisheries staffers collected 50.3 million eggs from the Muskegon River stock.

Things however went a little south after the eggs reached Wolf Lake State Fish Hatchery where they are incubated. Eye-up, which normally approaches 70 percent, was only 48 percent this spring. Eye-up - when the larval fish begins to form, as indicated by the presence of its eyes in the egg - typically takes place about 20 days after fertilization. In this situation the cause of poor eye-up is unclear, but biologists believe it may be weather-related.

"It was an unusual weather year," Whelan said. "Photo period and water temperatures were out of sync. When the photo period was long enough for the fish to spawn, the water temperature was still very cold this year. Wild populations have poor production years similar to our experience and often the cause is exactly that - the photo period and water temperature don't match up."



Fisheries biologist Randy Espinoza collects walleye eggs on Little Bay de Noc.

"Last year (when water was warm early) we had excellent eye-up."

Because of the poor eye-up rate, the hatch rate for portions of the Muskegon River collection was low. Fisheries Division managed to ship 8.5 million fry, which was around 10 percent (900,000) short of the division's goal. Still, fry were shipped to 22 of the 23 rearing ponds that requested fry this year.

That's when a second set-back occurred. Some 3.4 million fry, which were treated with the broad-spectrum antibiotic oxytetracycline (OTC), which leaves a mark on the fish's bones for future identification of fish origin by fisheries staff, died in transit to two of the ponds.

The remainder of the fry were not treated with OTC and appeared to be healthy when they were stocked in the ponds.

The staff at [Wolf Lake State Fish Hatchery](#) investigated the cause of the mortality associated with OTC marking and originally thought the problem had to do with buffering the OTC. Upon further review, however, it now appears it was an oxygen problem; the fry

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suffered from low oxygen in the bags when they were transferred, which might have to do with stress from the OTC marking. But Fisheries Division believes that problem can be overcome by reducing the number of fry per bag when shipped.

At Little Bay de Noc, it only took one day to collect and spawn 100 pairs of walleye, which produced almost 17 million eggs. Of those, 14.7 million were sent to [Thompson State Fish Hatchery](#) and a little more than 1.2 million were provided to the [Chippewa-Ottawa Resource Authority](#) (CORA), the umbrella group for the tribes in the 1836 Treaty.

Eye-up was very poor in the Upper Peninsula, too - 10 to 20 percent instead of the usual 50 to 70 percent. The eggs experienced 55 to 65 percent mortality within the first 24 hours; something biologists originally theorized was caused by either disinfection procedures or fungicide treatments. The investigation into the cause is still being pursued as the eggs shipped

to CORA - which were not disinfected - had high (though not as high) early mortality, too.

Despite the mortality, the DNR was able to meet its goal in the Upper Peninsula. In May, 125,000 fry were sent to two ponds and in early June, another 2.5 million were sent to four additional ponds, with some left over for direct fry planting into bodies of water where the biologists requested them.

In addition, CORA supplied the DNR with 900,000 fry that were stocked in three ponds. CORA also planted 1.1 million fry directly into Big Bay de Noc from eggs they took at the St. Marys River.

In summation, Upper Peninsula stocking was on target, but stocking in the Lower Peninsula was less than the Fisheries Division's goal.

"It was OK," Whelan said. "It wasn't a great year, but it was a good year."

For more information on walleye rearing in Michigan check out the DNR's walleye management report: http://www.michigan.gov/documents/dnr/Sr41_199659_7.pdf.

Lake Antoine's Future with Walleye

Exactly what is going on with [Lake Antoine's](#) walleye population has been something of a mystery. The 748-acre shallow lake, partly located within the city limits of Iron Mountain in Dickinson County, is a popular fishing destination accessible to anglers through two public parks with boat ramps.

Walleyes have been stocked in Lake Antoine, on and off, since the 1930s (as have a number of other species, including northern pike and tiger muskies) and have been routinely stocked since the 1970s. From 1983 to 2003, they were stocked at least every other year and stocked again in both 2011 and 2012, mostly with spring fingerlings, though occasionally with fall fingerlings and adults.

During the 1980s, Lake Antoine was a popular

walleye fishery, thanks to aggressive stocking and the occasional transfer of adults from the Groveland Mine ponds, but the fishery subsequently declined. Surveys conducted since the 1950s documented relatively little natural reproduction by walleyes and poor survival of stocked walleyes. Meanwhile, smallmouth bass - which were not stocked - showed good survival for both young-of-the-year and year-old fish.

The most recent survey, conducted with fyke nets in 2007, turned up 174 walleyes all longer than the minimum 15-inch length limit. The fish ranged from three to 18-years-old, showed 12 age classes, a slightly better than state average growth rate, and much better than

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Lake Antoine's Future with Walleye (continued from page 6)

average growth rate for the Upper Peninsula. Though the population showed decline from a similar survey in 1996, there was some evidence of natural reproduction.

The DNR considered three future walleye management options for Lake Antoine: maintaining spring fingerling stockings of walleyes, initiating fall fingerling stockings instead of spring fingerlings, or discontinuing the walleye stocking program. Fisheries Division's [Northern Lake Michigan Management Unit](#) has decided that continuing spring fingerling stockings is the best approach at this time. All stocked spring fingerlings will be marked with oxytetracycline (OTC) to determine the contribution of stocked fish to the overall population. Spring fingerlings will be stocked at a rate of 50 per acre for three years beginning this year, and then will be stocked every other year.

The DNR plans fall recruitment surveys to evaluate the contribution of the stocked walleyes and recruitment of wild young-of-the-year walleyes. In addition, periodic spring/early summer surveys will be used to evaluate largemouth and smallmouth bass populations.

Creel surveys will further evaluate angler interest and success.

The DNR's [Fisheries Division](#) believes the lake



should be managed for a balanced fish community of rock bass, bluegill, yellow perch, largemouth and smallmouth bass and walleyes, with an emphasis on enhancing and protecting fish populations and habitats while providing diverse fishing opportunities.

Jessica Mistak, unit supervisor, acknowledges "Lake Antoine is one of the most important waterbodies we manage because of its significance to anglers and the nearby residents of Iron Mountain. We are committed to managing the fishery to the best of its potential."

For more information on Lake Antoine please see the Status of the Fishery Resource Report available at: http://www.michigan.gov/documents/dnr/LakeAntoine-SOFR_410405_7.pdf.

Fish Passage Courtesy of a Rock Ramp (continued from page 4)

"It may not be a big population," he said, "but it could be self-sustaining over time. Certainly, the spawning habitat is available up there and there is plenty of forage. We're not seeing lots of walleyes up there, but we have seen more than we did."

Meanwhile the rock ramp has helped stabilize the water level for the Chesaning Showboat, helped

restore river function, and opened up new habitat. So while the evaluation process may continue for some time into the future, Leonardi says the rock ramp is, so far, a qualified success.

To learn more about walleye, and other Michigan fish species, visit www.michigan.gov/fishing.



DNR Fisheries Division Library

The Fisheries Division Library, located at the [Institute for Fisheries Research](#) in Ann Arbor, was established in 1930 to serve the fisheries biologists of the Michigan Department of Conservation. The library now serves the fisheries biologists of the Michigan Department of Natural Resources; University of Michigan faculty, staff and students of the School of Natural Resources and Environment; and the Exhibit Museum of Natural History. The collection consists of more than 700 books; thousands of reports and reprints from around the world; and several journal, magazine and newsletter subscriptions.

Included in the library are Status of the Fishery Resource Reports written by the local field biologists, which contain the results of major fisheries surveys of Michigan lakes and rivers. These reports briefly describe the environment, the fishery resource, and the management direction for the water body. Tables summarize information on fish species found as well.

The library can be accessed online here:

http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056---,00.html.

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