

To Stock ... Or Not



New Process Helps Biologists Identify Stocked vs. Naturally Produced Fish

Story and Photos by Craig Bihrlé

In a perfect world, every North Dakota fishing water would have a perfectly balanced, naturally produced fish population so the need for stocking would not exist. Big fish that died of old age or succumbed to an angler's bait would be replaced by an up-and-coming crop of young fish to take over the annual rituals of spawning and avoiding fishing lures.

While North Dakota fisheries and fishing are generally in good shape, few would fit the description of "perfect," or even "almost perfect." And so, many state waters need an occasional or annual boost from hatchery raised fish to keep things interesting for the

more than 160,000 anglers who have been purchasing licenses the past several years.

North Dakota is fortunate to have two federal fish hatcheries, one at Garrison Dam and the other at Valley City, that provide the capacity for the State Game and Fish Department to stock more walleye and northern pike fingerlings than any other state in the country in most years.

(**Note:** almost all walleye and northern pike stocked in North Dakota are **fingerlings** – young fish that are nearly 2 inches long and roughly two months old. In many other states, a much greater percentage of walleye and pike stocked are **fry**, which are only a

Randy Hiltner (left) and Phil Miller extract fish from a net used in a survey to gauge fish reproduction success at Devils Lake. All across the state each summer, biologists study fish reproduction, or survival of stocked fish.

few days old and a half-inch long. Since the survival rate for fry is very low, they are stocked in large quantities often reported in the millions for larger waters.)

Hatchery capacity and successful past stocking efforts have served to create the impression that any ills that may come upon a fishery are curable by either starting a stocking program, or adding to the number of fish stocked. In most cases that's not necessarily true. Anglers must realize that stocking can also produce a neutral result that doesn't help or hurt the fishery, but wastes resources that could have been better used elsewhere.

In other cases, stocking can have a negative influence on a lake's fish population structure.

"Fisheries biologists' stocking requests vary depending on the species and the lake to be stocked," says Greg Power, the Game and Fish Department's fisheries chief. "The existing fishery and environmental conditions factor into the decision."

If environmental conditions are not supportive of a particular year-class, Power said, "We could stock hundreds of thousands of fingerlings and have the same eventual return as we would if we had not stocked any fish."

In addition, there may be times that district supervisors do not want to stock a particular lake due to strong year-classes already present, Power added. "Stocking walleye into a lake is nothing more than a tool in the tool chest we use to effectively manage a fishery," he said. "Sometimes it's needed, sometimes it's not."

The process for determining when stocking is needed and when it's not has been enhanced in recent years since biologists began exposing hatchery fish to oxytetracycline – OTC for short – an antibiotic that in North Dakota is used simply as a way of marking fish.

OTC creates a chemical mark or stain, similar to what occurs with tetracycline staining of human teeth. When the fish is later caught in a survey net, or by an angler, a look under a microscope will reveal the stain of a stocked fish.

"We have been marking every walleye stocked in North Dakota the last six years," Power said. "This effort has documented many cases where stocking helps tremendously, as well as many cases where few if any stocked fish made a contribution."

A Case Study at Devils Lake

Every year in late summer and early fall, fisheries biologists attempt to evaluate the success of fish reproduction efforts the previous spring. Most larger lakes in the state, like Devils Lake, are surveyed every year.

Nets are set in generally the same locations, and they are checked at consistent intervals. The number and size of young fish caught is compared to previous years. With the advent of OTC marking, biologists can determine which fish were stocked and which were produced naturally.

At Devils Lake, North Dakota's largest natural lake at about 106,000 acres of water, an OTC marking study in 1999 and 2000 gave biologists the data they needed to support a

decision to discontinue stocking. Prior to that, Devils Lake had been stocked in all but one year since the mid-1970s, because of limited spawning habitat and the lake's salinity (salt concentration in the water) was thought to be too high to allow for natural walleye reproduction. Also, prior to OTC marking, there was no way to distinguish between stocked and naturally reproduced walleye. Biologists did not know the origin of the small walleyes, so the lake was stocked annually.

Basically, without stocking for all those years, Devils Lake would have had no walleye fishery. While fingerlings to adult walleyes can live in water with much higher salinity than was typical at Devils Lake in the 1980s and early 1990s, fertilized eggs are sensitive and do not hatch in water that is too salty.

(**Note:** Much of Devils Lake would currently qualify as saline (although it was much more saline 15 years ago), with a salt content of roughly 1,000 to 3,400 parts per million. Water in the western end of the lake is fresher, and water on the far eastern side has higher salinity. As a comparison, ocean water salinity is about 35,000 parts per million.)

When the water level at Devils Lake rose 5 feet in 1993, and then continued rising after that, salt concentrations in the water became diluted and eventually dropped to a level that allowed walleye eggs to hatch.

Without OTC marking as an indicator, no one knows for sure when the first batch of walleye eggs hatched within Devils Lake. What is known, according to Randy Hiltner, northeast district fisheries supervisor, is that the first documented natural walleye reproduction occurred in 1996, when young walleyes were discovered in trap nets before the stocking truck arrived.

Fish like this young walleye are measured in centimeters, and scales are removed for later evaluation under a microscope to determine age. Older, larger walleyes are aged by examining a thin section of the dorsal or pelvic fin.



The next year, the late summer survey for young-of-the-year game fish indicated the highest catch rate ever for walleyes. While OTC marking had not yet started then, Hiltner said, "The likelihood is that most of the fish we caught in the net that fall were from natural reproduction."

That Devils Lake started to produce walleyes on its own is not necessarily surprising. "As the lake has risen," Hiltner said, "the water scours off the new shoreline, and underneath that shoreline there's a lot of rock and gravel, so it produced more widespread walleye spawning habitat."

With improved habitat and water quality conditions enabling high recruitment of young fish, Department fisheries biologists started thinking that Devils Lake might be able to thrive without stocking. Before going forward with such a major shift in strategy, however, the lake's managers needed more information.

In 1999 and 2000 all walleye fingerlings stocked in Devils Lake (about 800,000 each year) were OTC marked. In both years, Hiltner said, "The vast majority of the fish we recovered for our sample were unmarked or naturally reproduced fish."

Even with conclusive supporting data, Hiltner says it was still a difficult decision to have the stocking truck bypass Devils Lake, and it wasn't necessarily popular with some anglers who feared a decline in the lake's walleye fishery.

From 2000 through 2004, Hiltner said, "We had some of our highest catch rates in our fall reproduction nets. Obviously, without stocking, we still produced strong year classes of walleye in that period."

Those early 2000s fish are now adult walleyes ranging from 14 up to 20 inches, a solid foundation for a fishery that yielded nearly 250,000 walleyes to anglers in 2004. "There are some big fish out there, but I'm way more comfortable with the current size structure," Hiltner stated. "We've got fish coming up ... in a healthy fishery, there should be many more small walleye than larger fish."

The current program at Devils Lake is certainly not set in stone. Last year, some walleye fingerlings were stocked in the far eastern part of Devils Lake where salinity is higher and natural reproduction has been limited. Biologists are keeping a close watch on the rest of the lake to identify any changes

Jeff Merchant weighs a young-of-the-year walleye. Small fish require small scales for accurate measurements in grams (inset).



in conditions that might hurt natural reproduction potential in the long term.

In 2005, OTC results showed that about three out of four young-of-the-year walleye were from stocking, which is the opposite of what happens when there is a strong natural hatch. This shows that the natural hatch is variable and stocking may be needed after two or three weak year-classes in succession.

“The past three years we have seen weaker walleye year-classes and have resumed some stocking,” Hiltner explained. “We will continue to monitor the young-of-the-year net catch rates as our primary information source on stocking decisions.”

One strong year-class every three years, Hiltner said, “is enough to carry the fishery.” With steady to declining lake levels, spawning habitat and water quality will continue to decline, necessitating stocking more frequently and at higher rates.

Even with increased stocking, it will likely mean a downturn in the lake’s fishing fortunes. “Obviously, stocking is not going to put out near the fingerlings of even a moderate walleye hatch on Devils Lake,” Hiltner noted. “The amount of eggs and fingerlings

that all those naturally reproducing brood fish can put out, cannot be duplicated with stocking, not on a hundred thousand acre lake.”

When Stocking Works

Many fishing opportunities would not exist without an aggressive fisheries management plan that includes liberal stocking strategies. The state’s salmon and trout fisheries totally depend on stocking because these fish are not able to naturally reproduce in North Dakota’s waters.

Some other lakes and reservoirs don’t have quite the right habitat conditions for successful spawning. Some waters need fish introductions to get a population started. And some lakes that have thrived with only natural reproduction might need a boost if recruitment lags for several years in a row.

“Anglers put actually more importance than they should on stocking in certain situations,” Hiltner emphasized.

“Stocking isn’t magical and sometimes it’s totally unnecessary. As an example, northern pike have not been stocked into Devils Lake since 1993 and yet they are thriving.”

On the other hand, Hiltner added, on many smaller lakes and reservoirs in some years 100 percent of the walleyes caught in fall reproduction surveys are stocked fish. “We do need to provide walleye (and other species) fishing in some lakes that can only be kept up by stocking,” Hiltner said, “but that’s generally not the case with Devils Lake, at least during high water conditions.”

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Young-of-the-year walleyes of similar sizes are counted and then packaged (inset) for shipping to a lab where checking for OTC marking will determine if they are stocked or naturally reproduced.

