



Grayling in Michigan: A New Hope

by Nicole Watson*

The Michigan grayling, the iconic fish of the days of old, is trying to make a comeback, again. We have heard this before. We have tried to reintroduce the species with no success... yet. So why try again? Science and innovation. We have learned from the past and now are able to see a future that includes grayling.

Grayling were once the dominant stream salmonid in the lower peninsula of Michigan. Imagine a time in which our streams (any "north of the knuckles") held large populations of these beautiful salmonids. Their large dorsal fins, unique spotting patterns, pelvic fin patterns, and various body colorations make this fish a truly beautiful fish. Body colorations can vary from silver, gold, blues, violets, and rose. Dorsal fins and spotting patterns are unique to each individual. Not only were these fish beautiful, but they also had a delicately mild, delicious flavor. These attributes may have contributed to their demise.

Historically, overfishing, habitat destruction primarily due to logging, and competition with other species resulted in the extirpation of the species by 1936. What was the extent of overfishing? Think railroad boxcars filled with salted fish being shipped to big cities, fishing parties catching riverboat loads of fish, and individuals piling up grayling on the bank until shoulder height to select a few for harvest while leaving the rest to rot.

Logging? Think clear-cutting. Grayling are spring spawners. Logs were floated during high water – the spring. Logs were slid from the banks into the rivers causing erosion and increased sediment loads into the rivers. Running logs down the river likely resulted in scouring of in-stream habitat and flushing of early age classes, including eggs and fry. Other salmonids, namely brook and brown trout, were introduced to the systems. Competition for habitat and other resources resulted in additional stress on the species.

Could grayling have survived one of the three threats and remained? We do not know. Certainly, the combination of all three: habitat destruction, overfishing, and competition were too much. The species was pushed to extirpation and Michigan lost an

icon that we have been trying to return since.

There are several reasons that may have contributed to past attempts being unsuccessful. These include outmigration and disease among others. Outmigration prevented the establishment of residency. Efforts were made to increase grayling numbers in Montana, and through the use of remote site incubation units (RSIs), stream residency was established. By building on the success of Montana and further research and knowledge, a successful reintroduction may be within reach. But there are several unknowns that need to be addressed first. That is where my Ph.D. research at Michigan State University comes into play.

The overarching goal of my research is to gain insight into the potential impediments to successful reintroduction of grayling to Michigan streams. I have two primary objectives: 1) assess potential effects of predation and competition between grayling and resident brook and brown trout; and 2) evaluate early life imprinting to establish residency in streams. My study consists of three core parts: predation rates by age-1 brook and brown trout on grayling fry; competition between age-0 grayling and age-0 brook and brown trout; and early life imprinting through hormone analysis and water choice trials.

Predation by resident trout may be one of the most significant hurdles to establishing resident grayling populations. I am focused on the effects of younger (age-1) year classes of resident brook and brown trout on the survival of newly hatched grayling survival. Younger, smaller trout are often found in higher densities in streams with eggs and fry providing a nutrient-rich diet item to these smaller fish. It is critical to have insight on the predation rates by these young year classes to inform managers on expected predation rates corresponding to stream resident trout populations. Knowing this information allows for adjusting the number of eggs stocked in RSIs that will allow for viable populations of young grayling.

Competition between age-0 resident trout has the potential to adversely affect grayling survival. This may

be due to the distinct size advantage of brook and brown early in the growing season. Aggressive interactions between the populations may push grayling into poorer microhabitats. I focus on changes in growth, behavioral interactions, and habitat use of age-0 resident trout and grayling in artificial streams.

Based on very preliminary results (one season of experiments), grayling appear to receive a "double whammy" in the presence of brown trout through higher predation rates that potentially occur over a broader period of time and a high competition influence. However, brook trout provide a different story. While age-1 brook trout did prey upon grayling fry, it was at a lower rate than brown trout. The competition trials between age-0 grayling and brook trout showed that growth may not be suppressed by the presence of brookies of the same age class.

These initial trials provide critical insight and demonstrate the feasibility of the reintroduction. This research will provide guidance in the targeting of suitable fish communities in which grayling can not only simply survive but thrive in the presence of resident trout. But I do not yet have the whole story. This will be obtained through additional years of research. As I head into my second season of research, I am optimistic that we will see this fish thriving in our waters again. The combination of all three seasons of research will help to answer the uncertainty.

Right now, as you are reading this, I have 10,000 grayling fry swimming in my lab. These 10,000 fry do not realize the hope they provide. The majority of these fish will serve as the first cohort of Michigan's grayling broodstock. Once these fish mature, they will provide the initial offspring that will serve as the first eggs stocked into RSIs on Michigan streams. While we are still several years off from eggs in RSIs on Michigan streams, the fact that there are grayling swimming in my lab at Michigan State makes me smile. These little grayling fry provide me with a New Hope (yes, that is a Star Wars Episode IV reference). No longer do we only have to dream of catching grayling in Michigan, we merely have to look to the future. This is a future in which you can catch grayling, brook, brown, and rainbow all in the same state. The Grand Slam!

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Grayling fingerlings on display at the Wolf Lake Fish Hatchery

for the reintroduction of Arctic grayling into Northern Michigan streams. The Michigan DNR and Little River Band of Ottawa Indians are foundational partners of the Michigan Arctic grayling initiative, which is made up of more than forty-five entities.

For more information on how to nominate streams for reintroduction (the key is community support) and to read the reintroduction action plan, please visit www.migrayling.org.

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Cleaning tank and caring for 10,000 grayling fry.