Growth Modelling and Catch Curve Analysis of Lake Trout in Yukon's Southern Lakes System

Overview

This study looked at how lake trout have grown and reproduced over the long term, across four lakes in the Yukon's Southern Lakes System—Lake Laberge, Marsh Lake, Tagish Lake and Bennett Lake. The work is part of ongoing efforts to monitor fish health in connection with the Whitehorse Rapids Generating Station. Our central question was simple: Have lake trout populations changed over time?

What we did

We looked at age and length measurements from lake trout collected through Government of Yukon monitoring programs between 1991 and 2024, over 30 years of data. Two approaches were used to make sense of this information:

GROWTH TRACKING

We used a standard fisheries method to describe how lake trout grow throughout their lives, mapping out how long they typically are at different ages. This let us compare growth patterns across different lakes and different time periods to see if anything has shifted.

YEAR-CLASS ANALYSIS

We examined which birth years produced more or fewer fish than expected. By looking at how many fish from each birth year were caught in our samples, we could tell whether certain years were particularly good or bad for young trout surviving to adulthood. Years with more survivors than expected are called "strong" years; those with fewer are "weak" years.

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Key findings

LAKE TROUT GROWTH HAS STAYED THE SAME OVER TIME

When we compared the size of lake trout at different ages across surveys, we found very similar results from the 1990s to today. In simple terms, lake trout are growing at about the same rate now as they were 30 years ago.

Small differences between years were mostly due to which fish happened to be caught. Some years we caught more older, larger fish, while other years we didn't. Because older fish strongly influence growth estimates, these differences can make growth appear to change even when it hasn't. **Overall, there is no evidence of a real change in growth over time**.

ADULT SURVIVAL RATES ARE CONSISTENTLY HEALTHY

Across all four lakes and throughout the study period, adult lake trout are surviving well. We did not see signs of unusually high mortality.

This matters because when adult survival stays high, fish populations are not being steadily lost from year to year. **Strong adult survival is a positive sign for the long-term health and stability of the fishery.**

SOME BIRTH YEARS ARE STRONGER THAN OTHERS, BUT THERE'S NO LONG-TERM TREND

Not every year produces the same number of young lake trout that survive to adulthood. Some years are more successful, while others are less so. This kind of year-to-year variation is normal in natural systems.

What's important is the overall pattern. **Over the 30-year monitoring period, there is no consistent increase or decrease in successful years**. Instead, the ups and downs appear irregular, suggesting they are driven by changing environmental conditions, such as temperature, water levels, or food availability, rather than a long-term decline or improvement in the population.

For more information, please see the full report on Yukon.ca or contact **Fisheries@yukon.ca**.