Muriel Lake Fall Index Netting Summary, 2022

Background

A healthy fish population and fish community means we can all enjoy the benefits of sustainable fisheries and healthy ecosystems. A common question biologists receive is “how are the fish in my lake doing?” This is an important question to answer to set appropriate fishing regulations, understand and correct any problems with fish habitat, and guard against invasive species.

Fall Index Netting (FIN)

Environment and Protected Areas (EPA) uses an accepted standard of index netting for assessing walleye and Northern pike in lake fisheries (Morgan, 2002). This method provides the necessary data on fish abundance, biological data, and species diversity to assess the sustainability of these fish and fisheries. It also allows for comparisons at a lake over time and to other lakes.

Fall index netting occurs during late summer and fall when water temperatures are 10-15 °C. Standardized multi-mesh gill nets are set at random locations between two and 15 metres deep, set for 21-27 hours (i.e., a net-night), and then reset in new random locations. At Muriel Lake, in 2022, a half-length variation of the standard index net was used to balance precision of the catch rates with reduced sampling effort.

Information from yellow perch, lake whitefish, burbot, minnow, and sucker species are also collected. The information collected from each fish includes length, weight, age, gender, and maturity. After sampling, if fish are appropriate for human consumption, EPA provides the fish to local Indigenous peoples or to persons on approved subsistence lists. Typically, a very small proportion of the lake’s fish population (less than 1 or 2%) are killed in this sampling.

How is this information used?

Catch rates (i.e., number of fish captured per net-night) of walleye and Northern pike are an index of the populations’ abundance, with higher catch rates meaning there are more fish in the lake. The abundance of adult fish is compared to the standardized thresholds for 5 broad categories of risk to the long-term sustainability of the fish population, with higher densities of fish having lower risk (Table 1). The sizes and age of fish also tell us if problems with overharvest (e.g., too few large and old fish) or habitat (e.g., poor spawning success results in too few small and young fish) are a concern. Biologists use this information, as well as a variety data on water quality, access, development, and habitat threats as part of Alberta’s Fish Sustainability Index (FSI).

The management goal for most Alberta fisheries is long-term sustainability, shown by the red lines on the graphs below. In support of achieving this goal netting data is collected to determine the FSI, which helps determine the most appropriate regulations for a lake. This landscape-level assessment allows for consistent, broad temporal comparisons of fish sustainability and status. For more information, please see Alberta’s Fall Index Netting website and Fish Sustainability Index website.

Table 1 - Alberta’s Fish Sustainability Index risk thresholds for walleye and Northern pike using the standardized Fall Index Net (FIN) method. Note: Thresholds align with species management frameworks.

Mature Walleyes/ ½ net	Mature Pike/ ½ net	Risk to Sustainability
>14.5	>10.9	Very Low
10.2-14.5	7.7-10.9	Low
7.3-10.1	5.5-7.6	Moderate
2.9-7.2	2.2-5.4	High
<2.9	<2.2	Very High

Results

Muriel Lake (6902 ha) is located 70 kilometres northeast from the town of St. Paul. From September 13 to 14, 2022, eight half-length nets captured 95 longnose suckers, three Northern pike, and 198 yellow perch.

Walleye

No walleye were expected to be captured during this FIN assessment. Walleye have been **functionally extirpated** from Muriel Lake for several decades; the 2012 FIN assessment only captured longnose suckers and brook stickleback.

Northern Pike

The mean catch rate of mature Northern pike was 0.4/ half-length net-night (Figure 1). The corresponding FSI score for the mature density of Northern pike was assessed at **very high risk**.

The length distribution indicated no recent recruitment and the 3 Northern pike captured ranged in size from 613 to 623 mm (Figure 2).

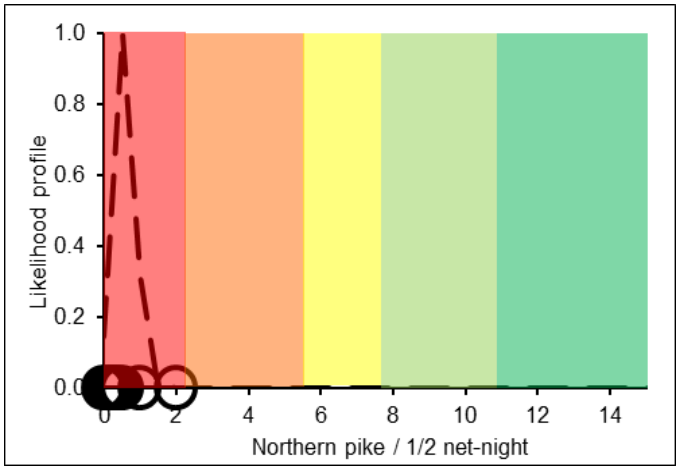

Figure 1 - The FIN catch rate of mature Northern pike from Muriel Lake, 2022. Dashed line is the mean catch rate (0.4 fish/ half-length net-night), with individual net data as hollow circles (n=8 nets).

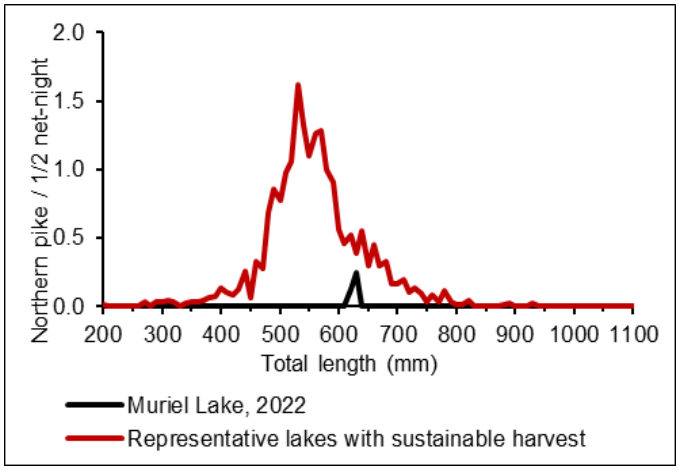

Figure 2 - FIN sample showing size of Northern pike from Muriel Lake, 2022. The red line indicates the average length distribution of Northern pike from 6 Alberta lakes supporting long-term sustainable harvests of Northern pike.

The 2022 FIN sample represented approximately 0.05% of the estimated Northern pike population size.

Summary

During the 2012 FIN assessment of Muriel Lake, no walleye or Northern Pike were captured and were believed to be extirpated from the lake. The only fish captured during the 2012 assessment were three longnose suckers and 126 brook stickleback.

The 2022 assessment confirmed a **very high risk** status of the Northern pike population, and strict conservation-based management is required to support their recovery.

Literature

Morgan, G.E. 2002. Manual of Instructions-Fall Walleye Index Netting. Percid Community Synthesis, Diagnostics and Sampling Standards Working Group. Laurentian University, Sudbury Ontario.