Keho Lake Fall Index Netting Summary, 2023

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)

The Government of Alberta 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 2 and 15 metres deep, set for 21-27 hours (i.e., a net-night), and then reset in new random locations.

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 of 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. 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/net	Mature Pike/net	Risk to Sustainability
>29.0	>21.8	Very Low
20.3-29.0	15.3-21.8	Low
14.5-20.2	10.9-15.2	Moderate
5.8-14.4	4.4-10.8	High
<5.8	<4.4	Very High

Results

Keho Lake (1771 ha) is located 31 km northeast of the city of Lethbridge. From September 25 to 27, 2023, 9 nets captured 196 lake whitefish, 27 spottail shiners, 53 Northern pike, 177 walleyes, and 1 white sucker.

Walleye

The mean catch rate of walleyes was 19.7/ net-night. The catch rates of mature (Figure 1) and immature walleyes were 7.7/ net-night and 12.0/ net-night, respectively. The corresponding FSI score for the mature density of walleyes was assessed at **high risk**.

The length distribution shows strong recruitment, a moderate abundance of walleyes from 390 to 450 mm, and a moderate abundance of fish over 500 mm.

The 2023 FIN sample represented approximately 0.9% of the estimated mature walleye population size.

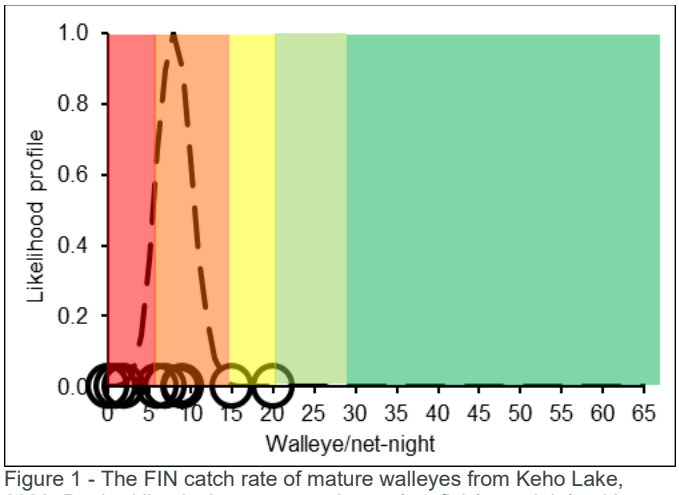

Figure 1 - The FIN catch rate of mature walleyes from Keho Lake, 2023. Dashed line is the mean catch rate (7.7 fish/ net-night), with individual net data as hollow circles (n=9 nets).

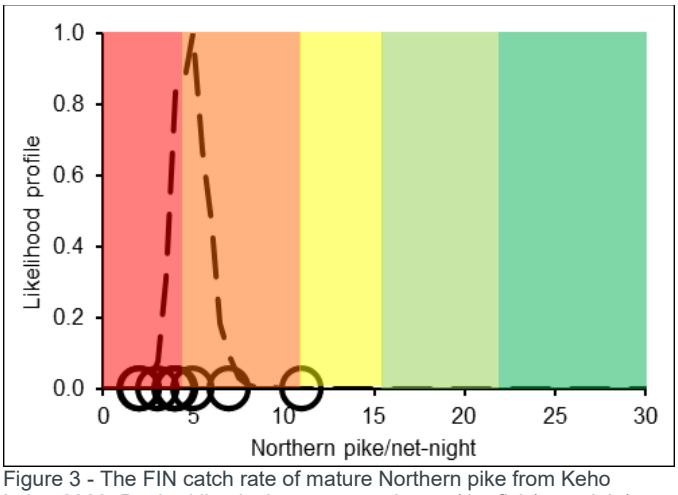

Figure 3 - The FIN catch rate of mature Northern pike from Keho Lake, 2023. Dashed line is the mean catch rate (4.7 fish/ net-night), with individual net data as hollow circles (n=9 nets).

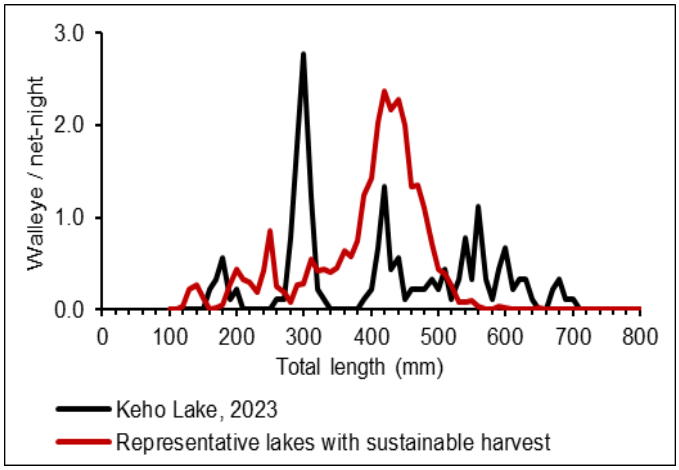

Figure 2 – FIN sample of showing size of walleyes from Keho Lake, 2023. The red line indicates the average length distribution of walleye from 5 Alberta lakes supporting long-term sustainable harvests of walleye.

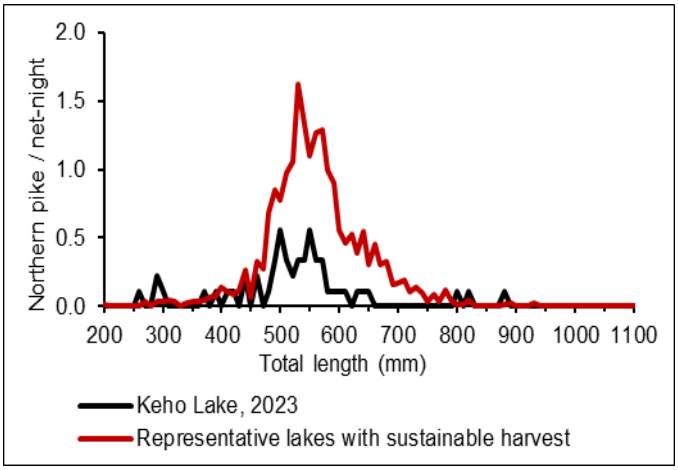

Figure 4 – FIN sample showing size of Northern pike from Keho Lake, 2023. The red line indicates the average length distribution of pike from 5 Alberta lakes supporting long-term sustainable harvests of pike.

Northern Pike

The mean catch rate of mature Northern pike was 4.7/ net-night (Figure 3). The corresponding FSI score for the mature density of Northern Pike was assessed at **high-very high risk.**

The length distribution of Northern pike shows consistent but weak recruitment, a low abundance of 370 to 660 mm fish, and a few pike larger than 800 mm (Figure 4).

The 2023 FIN sample represented approximately 0.3% of the estimated mature Northern pike population size.

Summary

Since the 2015 FIN assessment, the status of walleyes has improved from **very high risk** to **high risk** in 2023. Strong recruitment and a moderate abundance of mid to large-sized walleye support the population and fishery.

In the spring of 2022, the Government of Alberta stocked walleye fry into Keho Lake to supplement existing populations to provide sustainable angling opportunities. The success of this stocking event and its contribution to the Keho Lake walleye population will be assessed in coming years.

The assessment indicates a decline in the status of Northern pike since 2015 from **high risk** to **high-very high risk** in 2023. The truncation of fish larger than 650 mm suggests high harvest pressure. Conservation-based management is required to support and maintain this population and fishery.

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.