Jack Fish Lake FIN Summary, 2021

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 in order to set appropriate fishing regulations, understand and correct any problems with fish habitat, and guard against invasive species.

Fall Index Netting (FIN)

Alberta Environment and Parks (AEP) 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, AEP 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, 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/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

Jack Fish Lake (281 ha) is located approximately 45 km west of the city of Edmonton. From September 20 to 22, 2021, 10 gill nets captured 232 walleyes, 94 Northern pike, and 48 yellow perch, from Jack Fish Lake.

Walleye

The mean catch rate of walleyes was 23.2/net-night. The catch rates of mature (Figure 1) and immature walleyes were 20.5/net-night and 2.7/net-night, respectively. The corresponding FSI score for the current mature density of walleyes was assessed at **low risk**.

The length distribution shows strong recruitment, high abundances of 250 to 450 mm walleye, and very high abundances of fish larger than 450 mm (Figure 2).

The 2021 FIN sample represented approximately 6.6% of the estimated mature walleye population size.

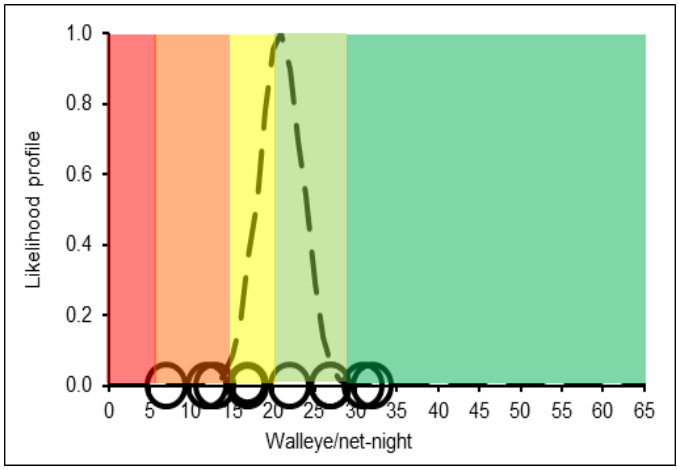

FIGURE 1 - The FIN catch rate of mature walleyes from Jack Fish Lake, 2021. Dashed line is the mean catch rate (20.5 fish/ net-night), with individual net data as hollow circles (n = 10 nets).

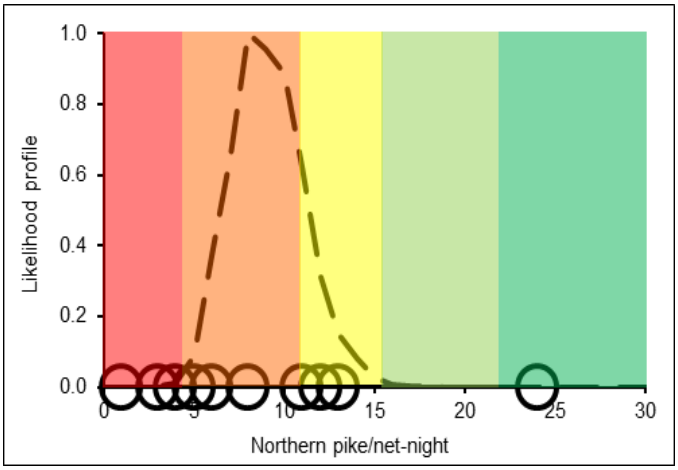

FIGURE 3 - The FIN catch rate of mature Northern pike from Jack Fish Lake, 2021. Dashed line is the mean catch rate (8.7 fish/ net-night), with individual net data as hollow circles (n = 10 nets).

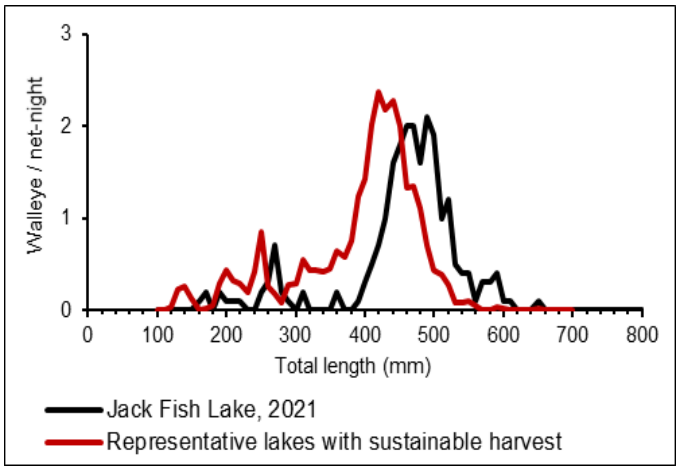

FIGURE 2 - FIN sample showing sizes of walleyes from Jack Fish Lake, 2021. The red line indicates the average length distribution of walleye from 5 Alberta lakes supporting long-term sustainable harvests of walleye.

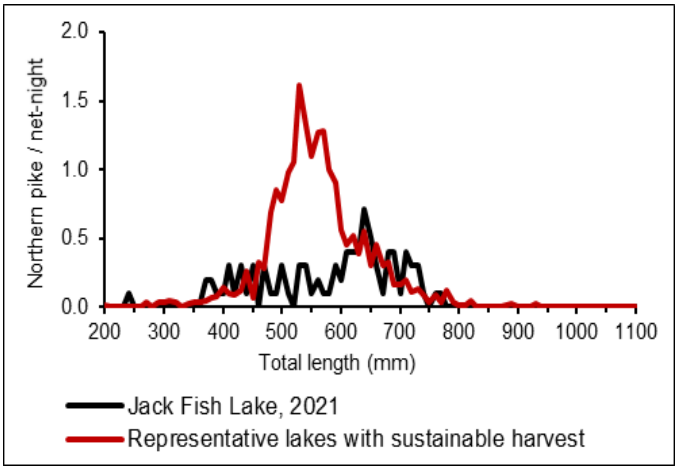

FIGURE 4 - FIN sample showing size of Northern pike from Jack Fish Lake, 2021. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

Northern Pike

The mean catch rate of mature Northern pike was 8.7/net-night (Figure 3), which corresponds to a FSI score of **high risk**.

The pike length distribution exhibits strong but somewhat sporadic recruitment from 250 to 450 mm, low abundances of 470 to 600 mm, and moderate abundances of fish larger than 700 mm fish (Figure 4).

The 2021 FIN sample represented approximately 1.4% of the estimated Northern pike population size.

Summary

This is the first FIN assessment of Jack Fish Lake. The abundance of mature walleyes was relatively high and has a corresponding FSI status of **low risk**. The length distribution indicated strong recruitment and a wide range of sizes of fish.

Though the walleye population was at **low risk**, the lake is very small, is near to a large human population, and its popularity make it extremely vulnerable to overfishing. Therefore, strict conservation-based management remains necessary to conserve this walleye population and fishery.

The Northern pike, have modest adult abundances yet sporadic recruitment, may be showing signs of limited shoreline habitat. The corresponding FSI status is **high risk** and with the same stressors as walleye, conservation-based management is necessary.

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.