

Pigeon Lake FIN Summary

2020

Background

“How are the fish in my lake doing?” We need this answer to set appropriate fishing regulations, to understand and correct any problems with fish habitat, and to guard against invasive species. A healthy fish population and fish community means we can all enjoy the benefits of sustainable fisheries and healthy ecosystems. A standard method of assessing the status of fish populations is necessary to allow comparisons of fish sustainability across the years at a lake, and to compare to other lakes. In Alberta, we use an accepted standard of index netting for lake fisheries assessment. This method provides the necessary data on fish abundance, biological data (such as age and sex), and species diversity to assess sustainability.

Fall Index Netting (FIN)

Alberta Environment and Parks monitor Walleye and Northern Pike populations using standardized index netting (Morgan, 2002). 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, Alberta biologists provide the fish to local Indigenous peoples or to persons on approved subsistence lists. Typically, a tiny proportion of the lake's fish population (usually 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 fish living to old age) or habitat (e.g., poor spawning success) 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. Achieving this goal uses the netting data and the FSI to determine the most appropriate sport fishing 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 FIN and FSI websites,

- <https://www.alberta.ca/fall-index-netting.aspx>
- <https://www.alberta.ca/fish-sustainability-index-overview.aspx>

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 of the 2020 FIN at Pigeon Lake

Pigeon Lake (9,731 ha) is located 66 km southwest from the city of Edmonton. From a severely collapsed status in the late 1990s, this lake has recovered to become one of Alberta's premier walleye fisheries. From September 21st to 23rd, 2020, six nets captured 81 Lake Whitefish, 2 Spottail Shiners, 8 Yellow Perch, 3 Northern Pike, and 171 Walleyes, from Pigeon Lake.

Walleye

The mean catch rate of Walleyes was 28.5 fish/net-night. The catch rates of mature (Figure 1) and immature Walleyes were 26.7 fish/net-night and 1.8 fish/net-night, respectively. The corresponding FSI score for the current mature density of Walleyes was assessed at **low** risk.

The length distribution exhibits signs of unstable recruitment and low abundance of fish under 400 mm, exceptional densities of fish between 400 mm to 550 mm, and severe truncation of Walleyes greater than 560 mm (Figure 2).

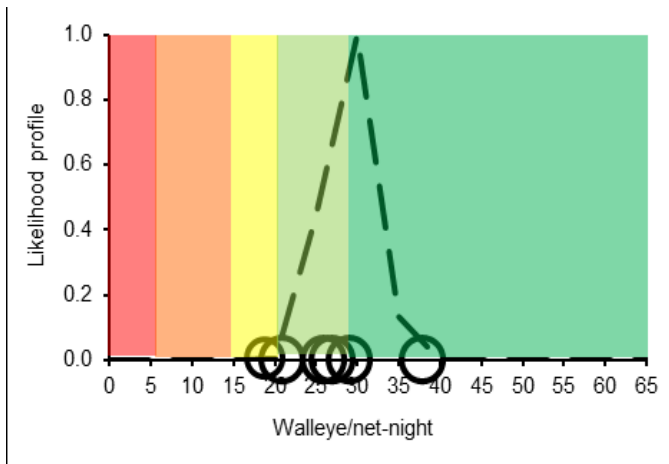


Figure 1 - The FIN catch rate of mature Walleyes from Pigeon Lake, 2020. Dashed line is the mean catch rate (26.7 fish/net-night), with individual net data as hollow circles (n = 6 nets).

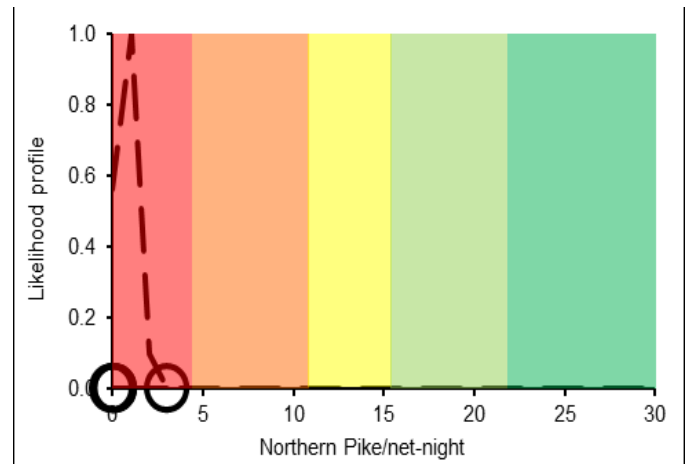


Figure 3 - The FIN catch rate of mature Northern Pike from Pigeon Lake, 2020. Dashed line is the mean catch rate (0.5 fish/net-night), with individual net data as hollow circles (n = 6 nets).

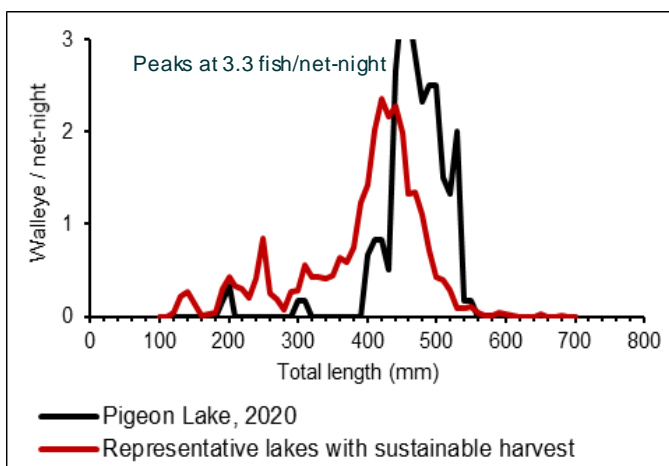


Figure 2 – FIN sample showing size of Walleyes from Pigeon Lake, 2020. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

The 2020 FIN sample represented approximately 0.1% of the estimated mature Walleye population size.

Northern Pike

With so few Northern Pike caught in this survey (i.e., three fish) interpretation of the FSI score (Figure 3) and the length distribution (Figure 4) should be done with caution. The mean catch rate of mature Northern Pike was 0.5 fish/net-night which likely corresponds to a **very high** risk FSI score.

The 2020 FIN sample represented approximately 0.02% of the estimated Northern Pike population size.

Summary

Since 2010, FSI status of the Walleye population in Pigeon Lake has been assessed at **very low** risk. In 2020 this status degraded to **low** risk. A strong cohort between 400 mm to 500 mm suggests that long-term sustainability objectives are being met and anglers can continue to enjoy an exceptional fishery.

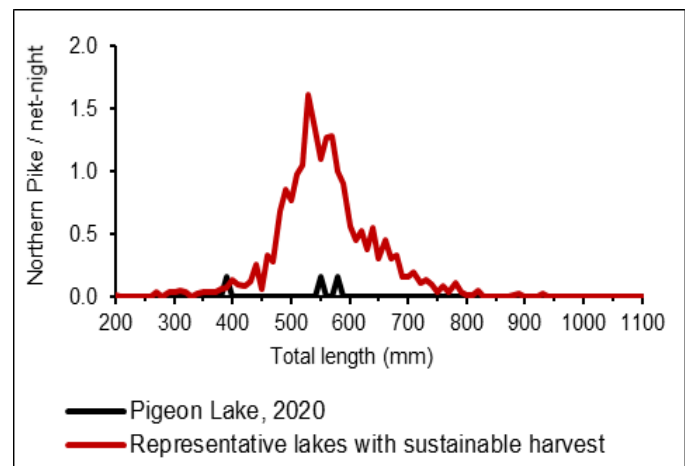


Figure 4 – FIN sample showing size of Northern Pike from Pigeon Lake, 2020. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

Since the 2015 FIN assessment, Northern Pike have been at **very high** risk. Stringent conservation-based management is required to support the recovery of this collapsed population.

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.