

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,

- <http://aep.alberta.ca/fish-wildlife/fisheries-management/fall-index-netting/default.aspx>
- <http://aep.alberta.ca/fish-wildlife/fisheries-management/fish-sustainability-index/default.aspx>

Table 1 – Alberta’s Fish Sustainability Index risk thresholds for Walleye and 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 2013 FIN at Pigeon Lake

Pigeon Lake (9731 ha) is located 100 km north of the city of Red Deer. From September 22-25, 2013, eight gill nets captured 94 Lake Whitefish, 5 Northern Pike, 381 Walleye, and 30 Yellow Perch, from Pigeon Lake.

Walleye

The mean catch rate of Walleyes was 47.6/net-night. The catch rates of mature (Figure 1) and immature Walleye were 39.8/net-night and 7.1/net-night, respectively. The corresponding FSI score for the current mature density of Walleye was assessed at **very low risk**.

The size distribution of Walleye shows unstable yet abundant recruitment, and very abundant size-classes of fish larger than 300 mm (Figure 2).

The 2013 FIN sample represented approximately 0.2% of the estimated Walleye population size.

Northern Pike

The mean catch rate of mature Northern pike was 0.6/net-night (Figure 3). The corresponding FSI score for the mature density of Northern Pike was assessed at **very high risk**.

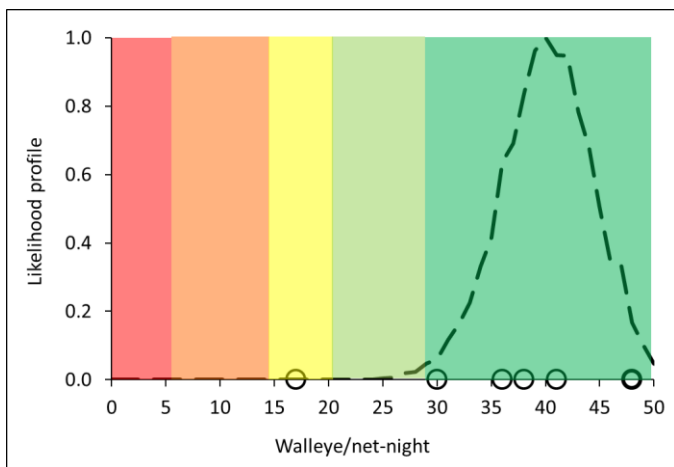


Figure 1 - The FIN catch rate of mature Walleyes from Pigeon Lake, 2013. Dashed line is the mean likelihood catch rate (39.8/fish/net-night), with net individual data as hollow circles (n=8 nets).

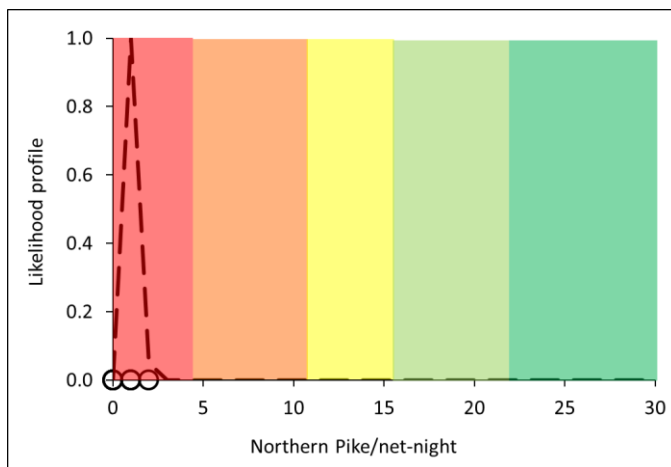


Figure 3 - The FIN catch rate of Northern Pike from Pigeon Lake, 2013. Dashed line is the mean likelihood catch rate (0.6 fish/net-night), with individual net data as hollow circles (n=8 nets).

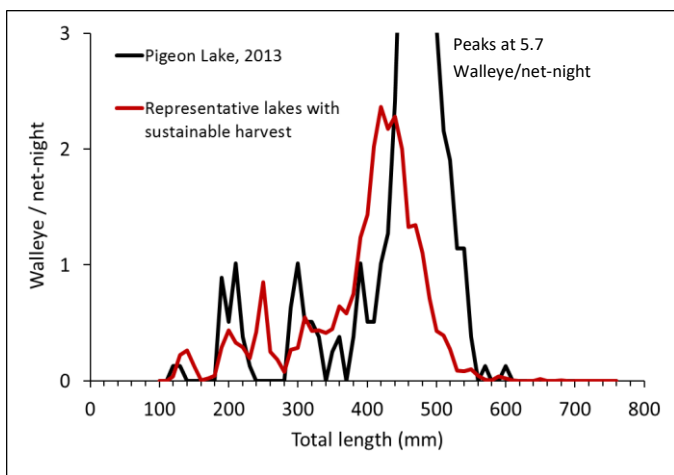


Figure 2 – FIN sample of showing size of Walleyes from Pigeon Lake, 2013. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

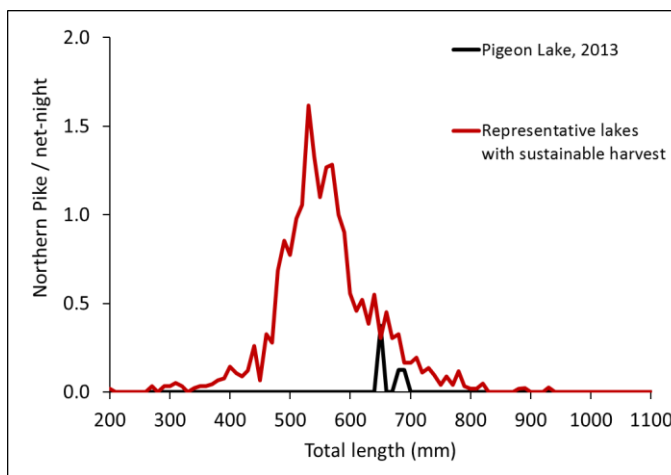


Figure 4 – FIN sample showing size of Northern Pike from Pigeon Lake, 2013. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

The length distribution shows no measurable recruitment, and extremely low abundance of Northern Pike (Figure 4).

The 2013 FIN sample represented approximately 0.03% of the estimated Northern Pike population size.

Summary

FIN surveys have been conducted on Pigeon Lake yearly since 2003. Over the last ten years, the corresponding FSI status of the abundance of mature Walleye has been assessed as **low risk** or **very low risk**. The objective of long-term sustainability is being achieved, and anglers continue to enjoy an excellent walleye fishery.

The FSI status of Northern Pike in Pigeon Lake has been assessed at **very high risk** for the last ten years. Strict

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.