

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 Iosegun Lake

Iosegun Lake (1337 ha) is located approximately 276 km northwest from the city of Edmonton. From September 23 to 25, 2013, seven FIN nets captured 54 Cisco, 8 Lake Whitefish, 29 Northern Pike, 179 Walleye, and 1 White Sucker.

Walleye

The mean catch rate of Walleyes was 25.6/net-night. The catch rates of mature (Figure 1) and immature Walleye were 20.7/net-night and 4.7/net-night, respectively. The corresponding FSI score for the current mature density of Walleye was assessed at **low risk**.

The length distribution shows moderate and stable recruitment, a high abundance of Walleye 330 to 460 mm, and no fish larger than 460 mm (Figure 2). This truncation is likely a result of overexploitation.

The 2013 FIN sample represented approximately 1.0% of the estimated mature Walleye population size.

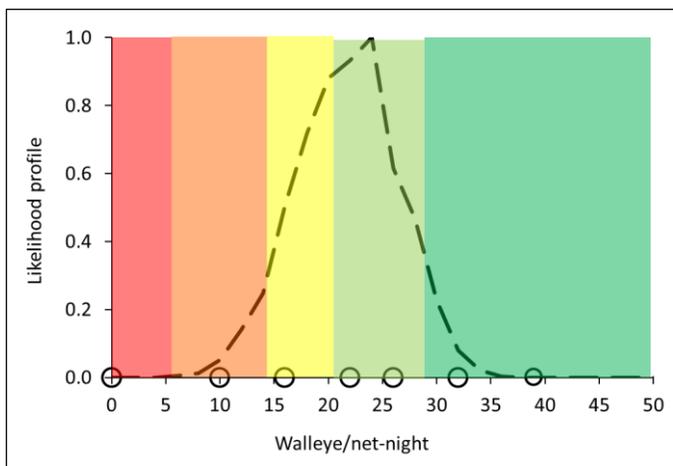


Figure 1 - The FIN catch rate of mature Walleyes from Iosegun Lake, 2013. Dashed line is the mean catch rate (20.7 fish/net-night), with net data as hollow circles (n=7 nets).

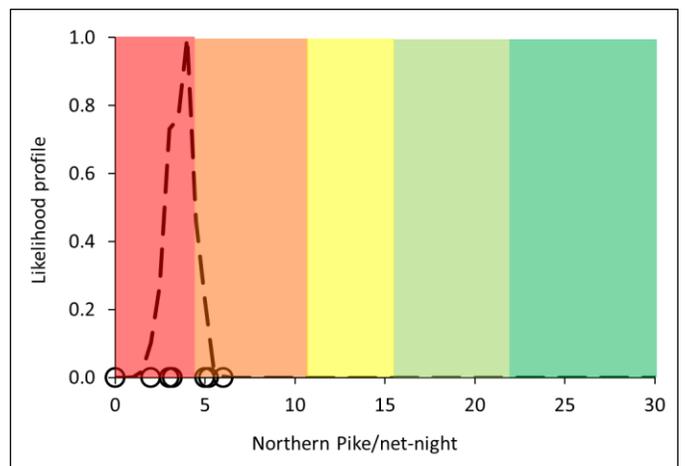


Figure 3 - The FIN catch rate of Northern Pike from Iosegun Lake, 2013. Dashed line is the mean catch rate (3.4/net-night), with net data as hollow circles (n=7 nets).

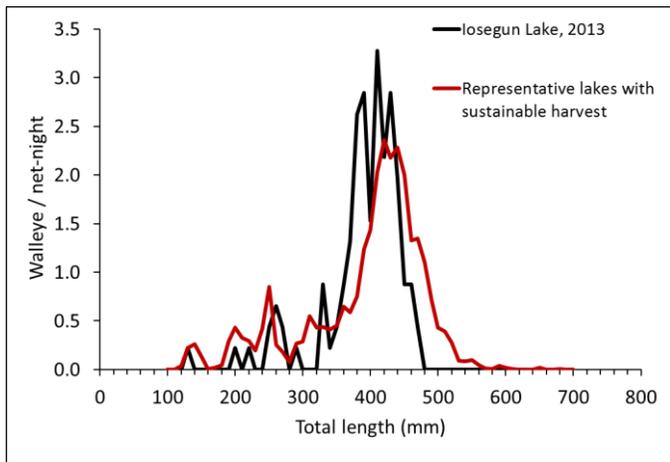


Figure 2 – FIN sample of showing size of Walleyes from Iosegun Lake, 2013. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

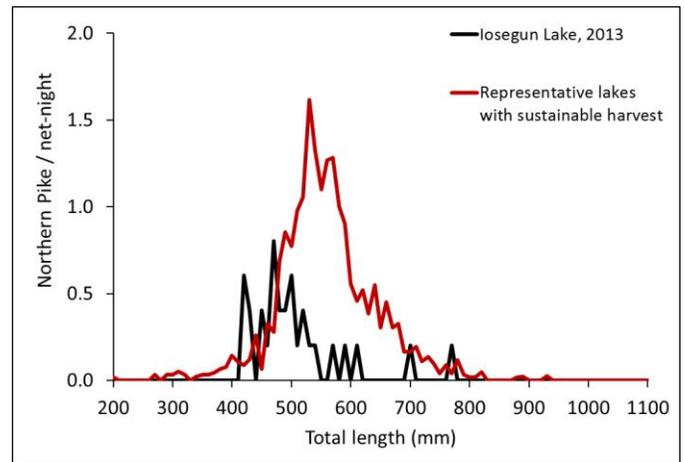


Figure 4 – FIN sample showing size of Northern Pike from Iosegun Lake, 2013. The red line indicates the average length distribution of Pike from 6 Alberta lakes supporting long-term sustainable harvests of Pike.

Northern Pike

The mean catch rate of mature Northern Pike was 3.4/net-night (Figure 3). The corresponding FSI score for the current mature density of Northern Pike was assessed at **very high risk**.

The length distribution of Northern Pike shows no recruitment of fish smaller than 420 mm, and a moderate abundance of Pike 420-540 mm, and very low abundance of fish 540 mm (Figure 4), indicating a growth overfished population.

The 2013 FIN sample represented approximately 0.2% of the estimated mature Northern Pike population size.

Summary

Since the FINs on Iosegun Lake in 2003, 2004, 2005, 2011 and

2013, the corresponding FSI score for mature Walleye has remained at **low risk**. Dependant on the management objective, there is an opportunity for long-term sustainability.

In the last ten years, the FSI status of mature Northern Pike has remained at **very high risk**, likely due to heavy fishing pressure. Given current FSI status and the weak and unstable recruitment, and dependant on the management objective, strict conservation-focused management is necessary to recover to long-term sustainability.

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.