

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 2016 FIN at Lac Ste. Anne

Lac Ste. Anne (5659 ha) is located 58 km west from the city of Edmonton. From September 12-13, 2016, six gill nets captured 45 Lake Whitefish, 47 Northern Pike, 1 Spottail Shiner, 232 Walleye, 3 White Suckers, and 37 Yellow Perch, from Lac Ste. Anne.

Walleye

The mean catch rate of Walleyes was 38.7/net-night. The catch rates of mature (Figure 1) and immature Walleye were 32.3/net-night and 6.2/net-night, respectively. The corresponding FSI score for the current mature density of Walleye was assessed at **very low risk**.

The length distribution indicates somewhat unstable yet abundant recruitment, abundant 320 to 420 mm fish, and very abundant fish from 420 to 560 mm (Figure 2).

The 2016 FIN sample represented approximately 0.2% of the estimated Walleye population size.

Northern Pike

The mean catch rate of mature Northern pike was 7.8/net-night (Figure 3). The corresponding FSI score for the mature density of Northern Pike was assessed at **high risk**.

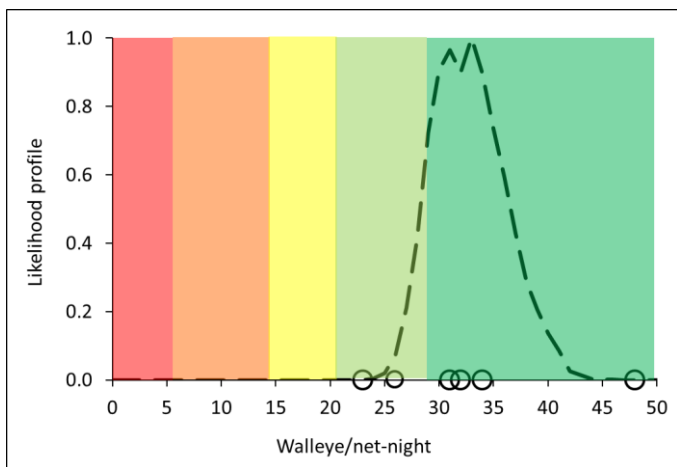


Figure 1 - The FIN catch rate of mature Walleyes from Lac Ste. Anne, 2016. Dashed line is the mean likelihood catch rate (32.3/fish/net-night), with net individual data as hollow circles (n=6 nets).

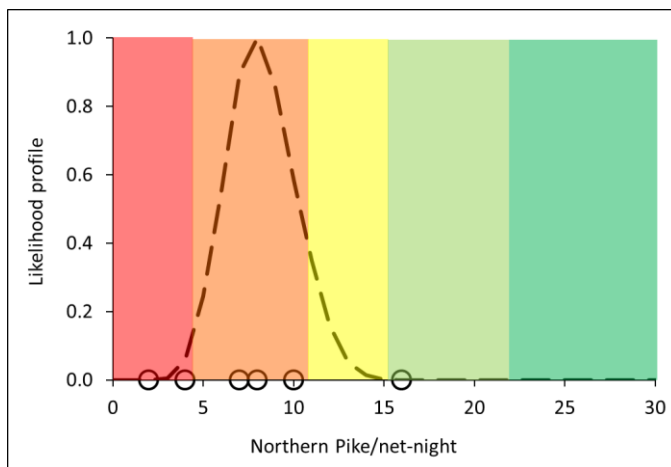


Figure 3 - The FIN catch rate of mature Northern Pike from Lac Ste. Anne, 2016. Dashed line is the mean likelihood catch rate (7.8 fish/net-night), with individual net data as hollow circles (n=6 nets).

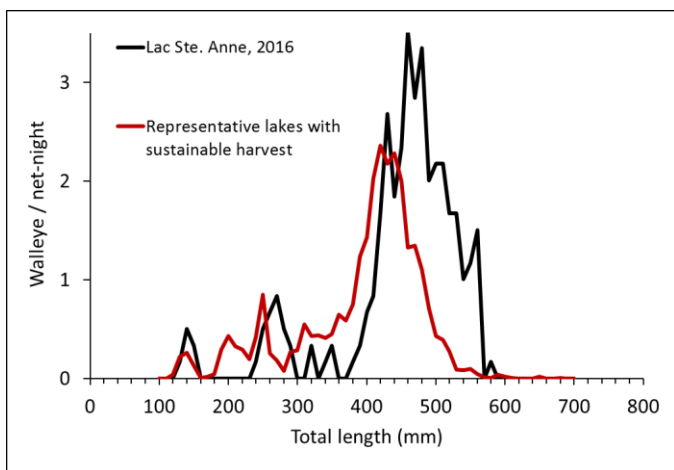


Figure 2 – FIN sample of showing size of Walleyes from Lac Ste. Anne, 2016. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

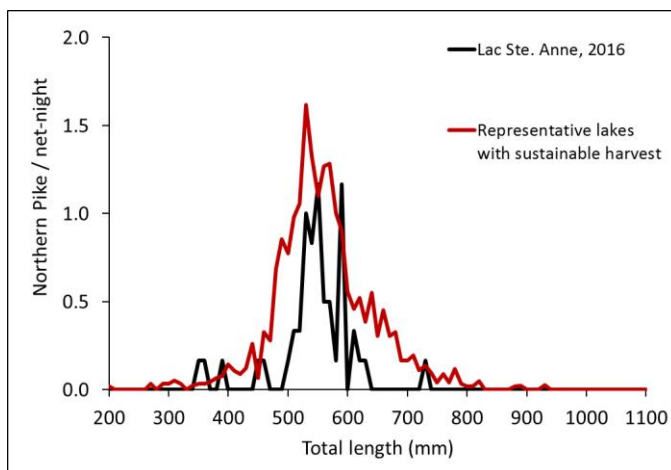


Figure 4 – FIN sample showing size of Northern Pike from Lac Ste. Anne, 2016. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

The length distribution indicates intermittent recruitment, a moderate density of Pike from 510 to 630 mm, and a very low abundance of fish larger than 630 mm (Figure 4). The truncation of Pike larger than 630 mm indicates high angling pressure.

The 2016 FIN sample represented approximately 0.04% of the estimated Northern Pike population size.

Summary

Since the FIN assessments in 2008, 2011 to those in 2014 and 2016, the abundance of mature Walleye has increased from a corresponding status of **moderate risk** to **very low risk**. As the Walleye stock provides opportunities for carefully managed harvests with Special Harvest Licences, conservation-based management is still necessary, and

dependant on the management objective.

The 2008 and 2011 assessments indicated the mature Northern Pike was a corresponding FSI status of **very high risk**. The 2014 and 2016 assessments indicated the Pike

population has improved to a **high risk** status. For long-term sustainability of this stock, conservation-based management is necessary, and dependant on the management objective.

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.