

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 Fisheries Management Objective for most Alberta fisheries is **long-term sustainability**, shown by the red lines on the graphs below. Achieving this objective 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 Sturgeon Lake

Sturgeon Lake (4850 ha) is located approximately 75 km east of the city of Grande Prairie. From September 30-October 2, 2013, eight gill nets captured 1 Burbot, 31 Lake Whitefish, 51 Northern Pike, 2 Spottail Shiners, 345 Walleye, 26 White Suckers, and 16 Yellow Perch, from Sturgeon Lake.

Walleye

The mean catch rate of Walleyes was 43.1/net-night. The catch rates of mature (Figure 1) and immature Walleye were 32.4/net-night and 10.4/net-night, respectively. The corresponding FSI score for the current mature density of Walleye was assessed at **very low risk**.

The length distribution shows strong and somewhat unstable recruitment, very abundant Walleye from 380-490 mm, and no Walleye >560 mm (Figure 2).

The 2013 FIN sample represented approximately 0.3% of the estimated Walleye population size.

Northern Pike

The mean catch rate of mature Northern Pike was 6.4/net-night (Figure 3). The corresponding FSI score for the mature density of Northern Pike was assessed at **high risk**.

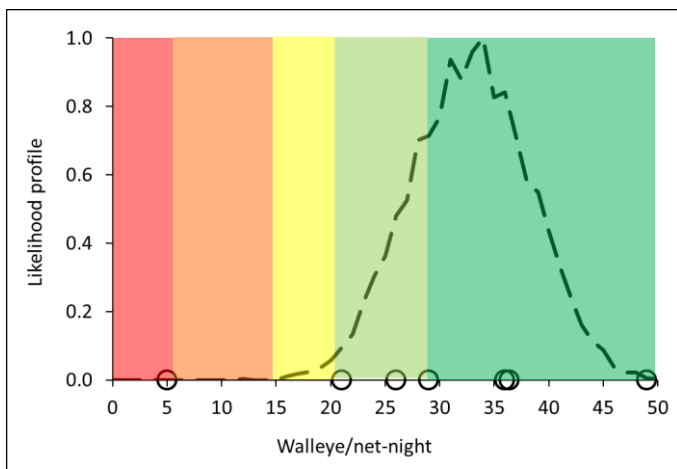


Figure 1 - The FIN catch rate of mature Walleyes from Sturgeon Lake, 2013. Dashed line is the mean likelihood catch rate (32.4/fish/net-night), with net individual data as hollow circles (n=8 nets).

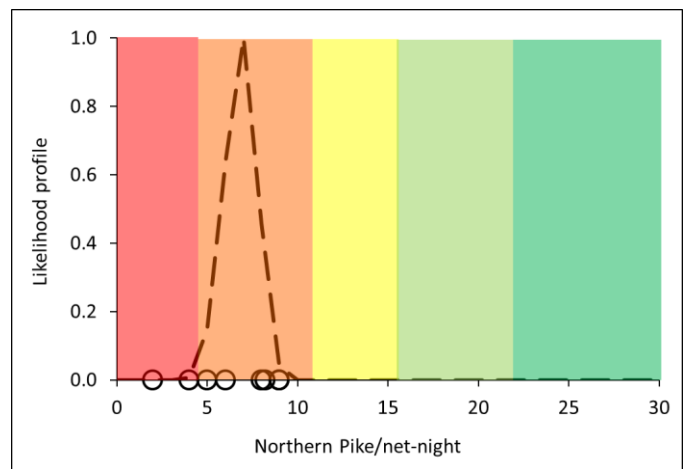


Figure 3 - The FIN catch rate of Northern Pike from Sturgeon Lake, 2013. Dashed line is the mean likelihood catch rate (6.4 fish/net-night), with individual net data as hollow circles (n=8 nets).

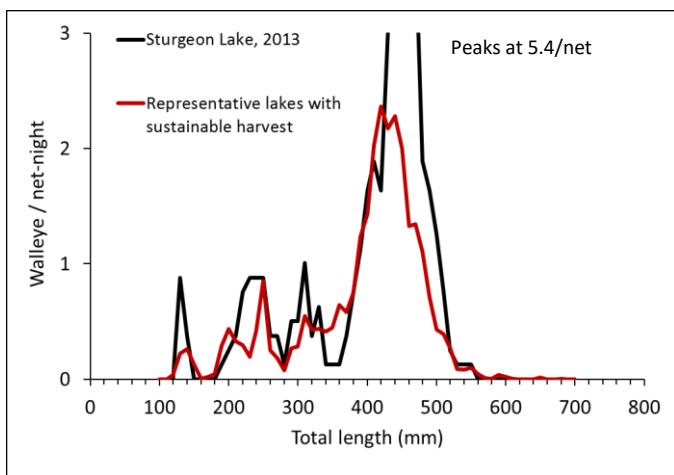


Figure 2 – FIN sample of showing size of Walleyes from Sturgeon Lake, 2013. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

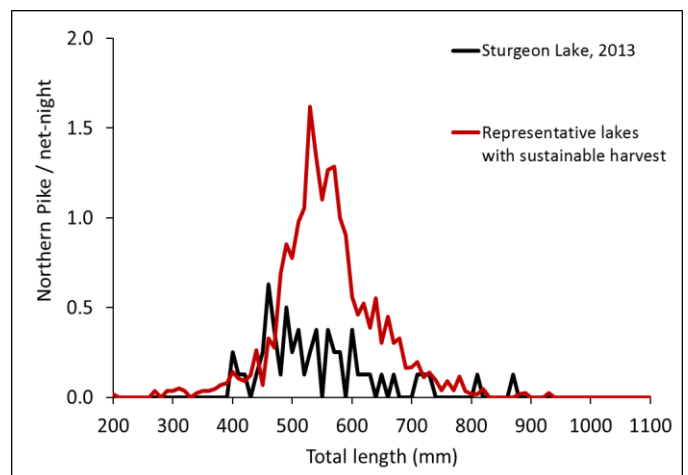


Figure 4 – FIN sample showing size of Northern Pike from Sturgeon Lake, 2013. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

The length distribution shows very poor recruitment, low to moderately abundant pike in most size classes, and only a few fish larger than 800 mm (Figure 4).

The 2013 FIN sample represented approximately 0.1% of the estimated Northern Pike population size.

Summary

In the 2005, 2007, 2009 and 2011 FINs, the density of mature Walleye varied between a FSI status of **moderate risk** to **low risk**. The current FSI status is **very low risk**. The Walleye population is largely supported by very abundant fish in the 380-490 mm size classes.

To ensure the long-term sustainability of this population and

fishery, continued conservation-focused management is required.

In the 2005 and 2007 FINs, the density of mature Northern Pike was a FSI status **very high risk**. The status increased to **high risk** in 2009, 2011 and 2013. Stringent conservation efforts are likely necessary to ensure the continued sustainability of the pike population and fishery.

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.