

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 2015 FIN at Pine Lake

Pine Lake (747 ha) is located 32 km southeast from the city of Red Deer. From September 23 to 25, 2015, eight gill nets captured 95 Northern Pike, 19 White Suckers, and 1 Yellow Perch from Pine Lake.

Walleye

The mean catch rate of Walleyes was 2.8/net-night. The catch rates of mature (Figure 1) and immature Walleye were 1.5/net-night and 1.3/net-night, respectively. The corresponding FSI score for the current mature density of Walleye was assessed at **very high risk**.

The length distribution seems unstable with weak recruitment, and very low densities of Walleye (Figure 2). The fishery appears to be supported by few, very weak year-classes.

The 2015 FIN sample represented approximately 1.1% of the estimated Walleye population size.

Northern Pike

The mean catch rate of mature Northern pike was 10.9/net-night (Figure 3). The corresponding FSI score for the mature density of Northern Pike was assessed at **moderate risk**.

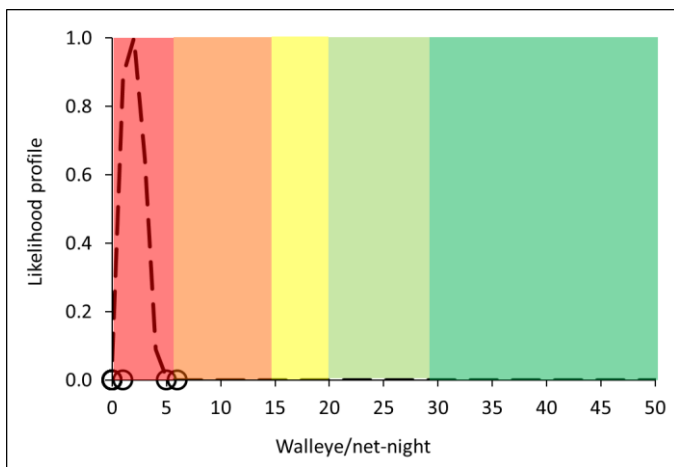


Figure 1 - The FIN catch rate of mature Walleyes from Pine Lake, 2015. Dashed line is the mean likelihood catch rate (1.5 fish/net-night), with individual net data as hollow circles (n=8 nets).

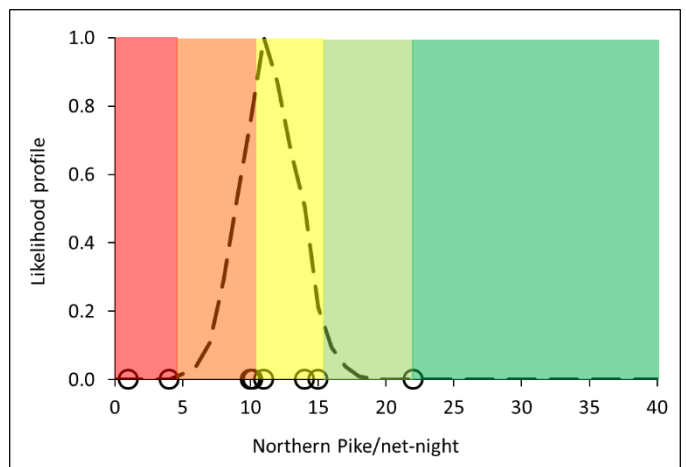


Figure 3 - The FIN catch rate of Northern Pike from Pine Lake, 2015. Dashed line is the mean likelihood catch rate (10.9/net-night), with individual net data as hollow circles (n=8 nets).

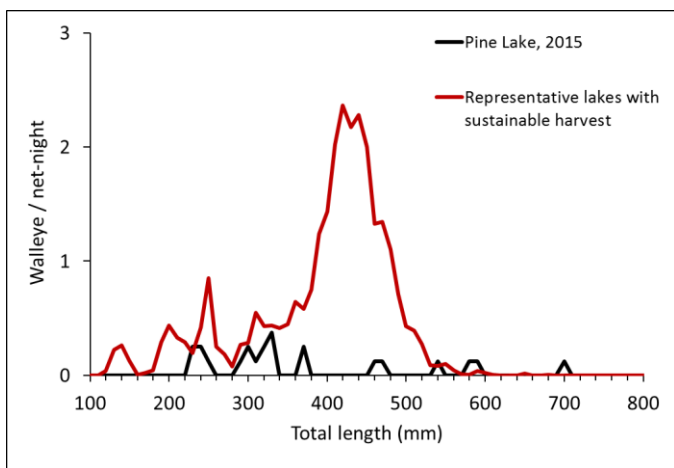


Figure 2 – FIN sample of showing size of Walleyes from Pine Lake, 2015. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

The length distribution shows healthy recruitment and densities of Northern Pike up to 500 mm with a substantial truncation of fish larger than 500 mm (Figure 4).

The 2015 FIN sample represented approximately 0.5% of the estimated Northern Pike population size.

Summary

The FIN surveys of Pine Lake (2007, 2008, 2012, and 2015) show the decrease in the status of the Walleye population from **very low risk** to **very high risk**. Strong pulses of fish during the 2000s suggested a long-term sustainable fishery might be developing, but 2015 FIN showed a collapsing fishery. Heavy fishing pressure, as well as habitat issues (for

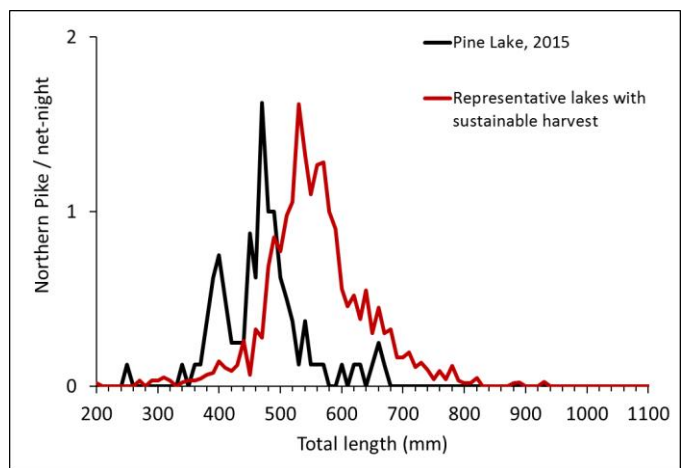


Figure 4 – FIN sample showing size of Northern Pike from Pine Lake, 2015. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

example anoxia) make the long-term sustainability objective challenging to attain.

FIN assessments suggest the density of Northern Pike may be improving from the previous status of **high risk** and **very high risk** to **moderate risk** (2015). The truncated length distribution indicates heavy fishing pressure, however, and strict conservation-based management remains necessary.

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.