

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 Northern 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 2017 FIN at North Wabasca Lake

North Wabasca Lake (11273 ha) is located approximately 100 km northeast from the town of Slave Lake. From September 20-22, 2017, ten gill nets captured 238 Cisco, 13 Lake Whitefish, 68 Northern Pike, 3 Spottail Shiners, 1 Trout-Perch, 134 Walleyes, 18 White Suckers and 68 Yellow Perch.

Walleye

The mean catch rate of Walleyes was 13.4/net-night. The catch rates of mature (Figure 1) and immature Walleyes were 9.4/net-night and 3.7/net-night, respectively. The corresponding FSI score for the current mature density of Walleyes is assessed at **high risk**.

The length distribution indicates variable recruitment, moderately abundant fish in the 300 to 500 mm size classes and high abundances of Walleyes over 500 mm (Figure 2). The fishery is supported by a several strong adult year classes.

The 2017 FIN sample represented approximately 0.2% of the estimated mature Walleye population size.

Northern Pike

The mean catch rate of mature Northern Pike was 6.4/net-

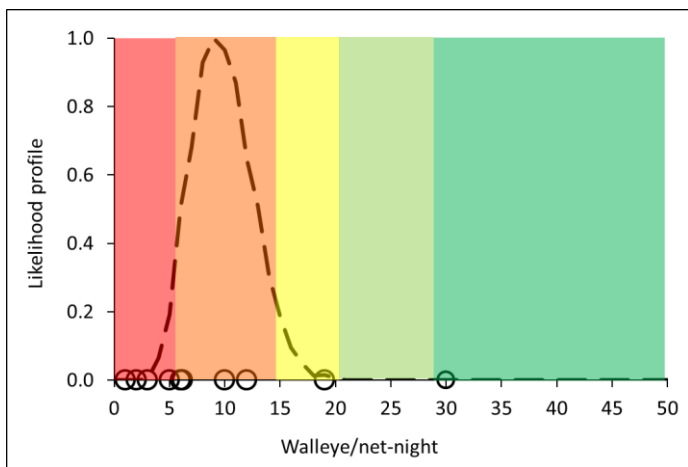


Figure 1 - The FIN catch rate of mature Walleyes from North Wabasca Lake, 2017. Dashed line is the mean likelihood catch rate (9.4 fish/net-night), with individual net data as hollow circles (n=10 nets).

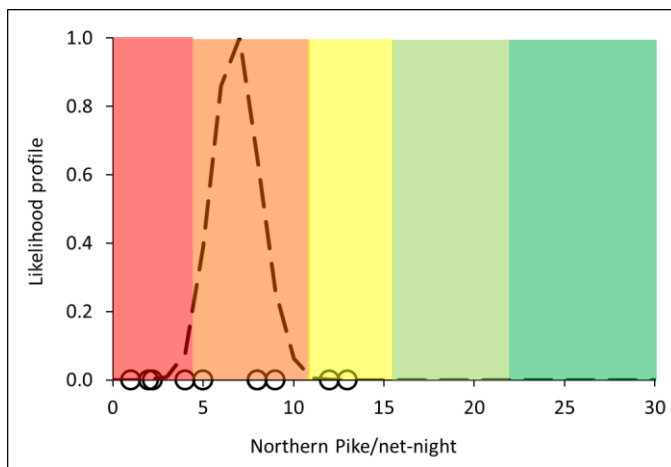


Figure 3 - The FIN catch rate of mature Northern Pike from North Wabasca Lake, 2017. Dashed line is the mean likelihood catch rate (6.4 fish/net-night), with individual net data as hollow circles (n=10 nets).

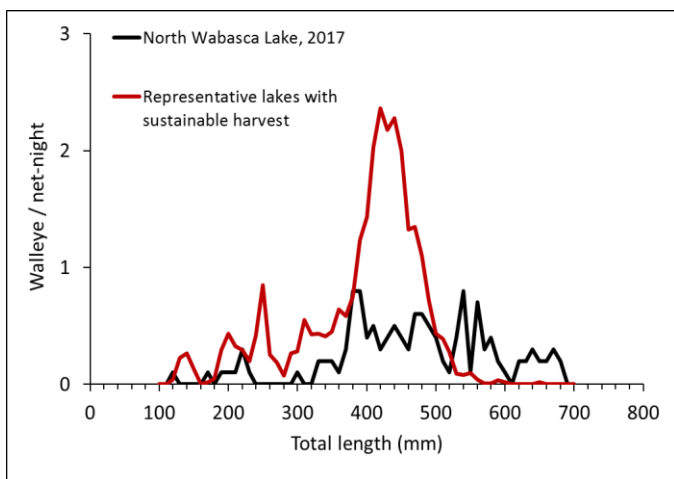


Figure 2 – FIN sample of showing size of Walleyes from North Wabasca Lake, 2017. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

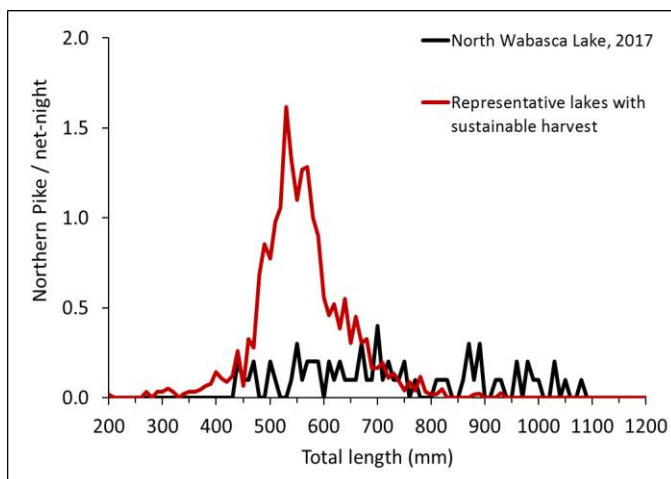


Figure 4 – FIN sample showing size of Northern Pike from North Wabasca Lake, 2017. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

night (Figure 3). The corresponding FSI score for the mature density of Northern Pike is assessed at **high risk**.

The length distribution shows no detectable recruitment, low abundances of fish between 500 to 700 mm, and abundant Northern Pike over 800 mm (Figure 4). These are often characteristics of an overfished population.

The 2017 FIN sample represented approximately 0.04% of the estimated mature Northern Pike population size.

Summary

The abundance of mature Walleyes in North Wabasca Lake has increased from an FSI status of **very high risk** in 2006, 2010 and 2013 FINs to **high risk** in 2017. Although high variability in net catches leads to some uncertainty in our

assessment. Management actions decreasing harvest since 2009 have likely increased Walleye abundances. Continued recovery actions and conservation-based management are necessary to recover and sustain this population.

North Wabasca Lake has remained at an FSI status of **high risk** for mature Northern Pike since 2006. Conservation-focused management for pike should be implemented to recovery this population to a long-term sustainable state.

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.