Spencer Lake FIN Summary, 2015

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. At Spencer Lake in 2015, a half-length variation of the standard index net was used, balancing precision of the catch rates with reduced sampling effort. 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 / 1/2 net	Mature Pike / 1/2 net	Risk to Sustainability
>14.5	>10.9	Very Low
10.2-14.5	7.7-10.9	Low
7.3-10.1	5.5-7.6	Moderate
2.9-7.2	2.2-5.4	High
<2.9	<2.2	Very High

Results of the 2015 FIN at Spencer Lake

Spencer Lake (1821 ha) is located approximately 45 km east from the town of Lac La Biche. From September 14 to 16, 2015, 11 ½ length nets captured 27 Lake Whitefish, 33 Northern Pike, 257 Walleye, 5 White Suckers, and 28 Yellow Perch.

Walleye

The mean catch rate of Walleyes was 23.4/ ½ net-night. The catch rates of mature (Figure 1) and immature Walleye were 16.6/ ½ net-night and 6.7/ ½ net-night, respectively. The corresponding FSI score for the current mature density of Walleye at this remote and road-less lake was assessed at **very low risk.**

The length distribution shows strong recruitment, and healthy densities of mature Walleye (Figure 2). The population seems supported by a several strong year-classes.

The 2015 FIN sample represented approximately 0.6% of the estimated mature Walleye population size.

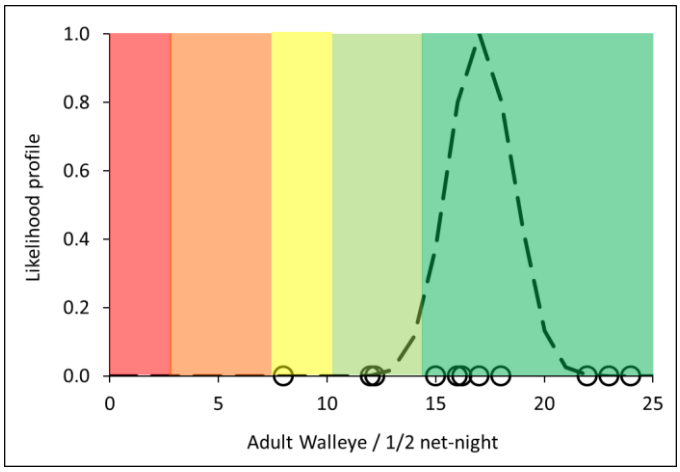

Figure 1 - The FIN catch rate of mature Walleyes from Spencer Lake, 2015. Dashed line is the mean likelihood catch rate (16.6 fish/ ½ net-night), with individual net data as hollow circles (n=11 nets).

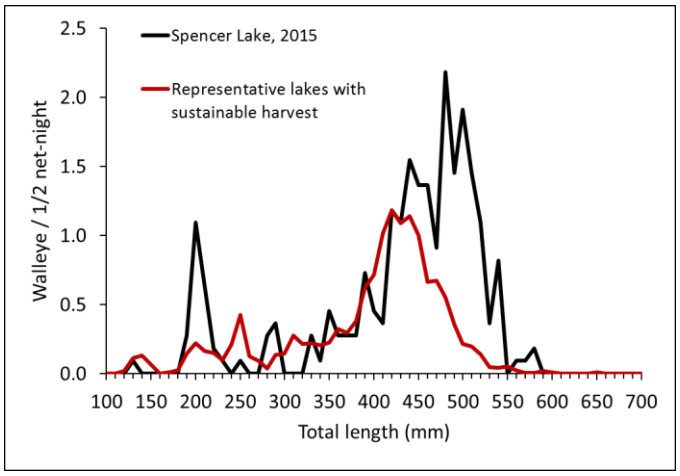

Figure 2 - FIN sample of showing size of Walleyes from Spencer Lake, 2015. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

Northern Pike

The mean catch rate of mature Northern Pike was 3.0/ ½ net-night (Figure 3). The corresponding FSI score for the current mature density of Northern Pike was assessed at high risk.

The length distribution shows poor recent recruitment of Northern Pike and a good density of moderate-sized adults (Figure 4). The lack of small adults is of concern.

The 2015 FIN sample represented approximately 0.1% of the estimated mature Northern Pike population size.

Summary

The 2004, 2009, and 2015 FIN assessments on Spencer Lake indicate a density of mature Walleye that correspond to a FSI status of **very low risk**.

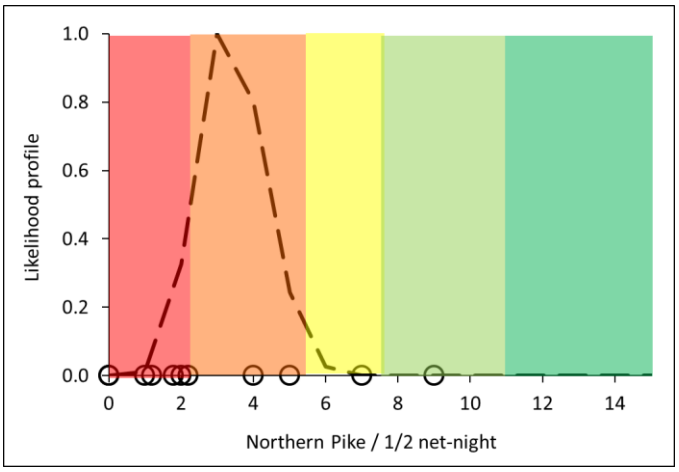

Figure 3 - The FIN catch rate of mature Northern Pike from Spencer Lake, 2015. Dashed line is the mean likelihood catch rate (3.0 fish/ ½ net-night), with individual net data as hollow circles (n=11 nets).

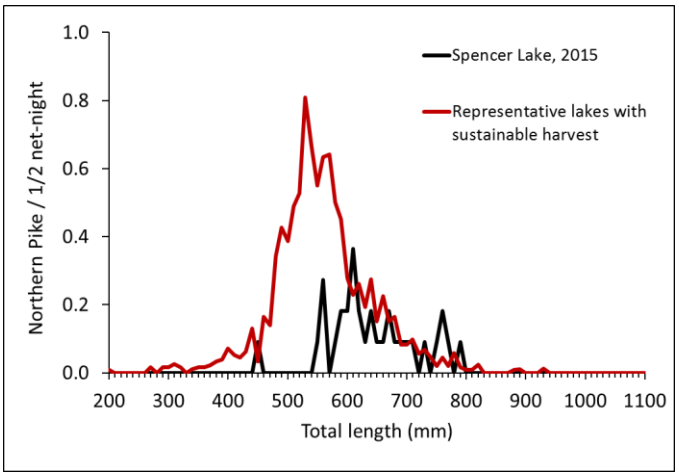

Figure 4 - FIN sample showing size of Northern Pike from Spencer Lake, 2015. The red line indicates the average length distribution of Pike from 6 Alberta lakes supporting long-term sustainable harvests of Pike.

The low fishing pressure at this remote lake provides opportunities for carefully managed harvests such as minimum size limits or Special Harvest Licences, dependant on the management objectives.

The FIN assessments (2004, 2009, 2015) all indicate a Pike population at **very high risk** or high risk. To improve this fishery to a long-term sustainability objective will require conservation-oriented management.

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.