Snipe Lake FIN Summary, 2017

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 Snipe Lake

Snipe Lake (4211 ha) is located approximately 280 km northeast from the city of Edmonton. From September 11-15, 2017, twelve gill nets captured 326 Lake Whitefish, 44 Northern Pike, 278 Spottail Shiner, 303 Walleyes, 10 White Suckers and 30 Yellow Perch.

Walleye

The mean catch rate of Walleyes was 25.3/net-night. The catch rates of mature (Figure 1) and immature Walleyes were 16.7/net-night and 8.2/net-night, respectively. The corresponding FSI score for the current mature density of Walleyes was assessed at moderate risk.

The length distribution shows strong but variable recruitment, and moderate to high abundances of Walleye in most size classes (Figure 2). Walleye in Snipe Lake are a stocked naturalized population. Previously, the poor abundance and variable recruitment appeared to be a result of poor habitat conditions and a failed stocking effort. After the closure of the commercial fishery on Snipe Lake, recruitment and abundance of Walleye has steadily increased. It is possible that continuous commercial fishing prevented the Walleye population from stabilizing earlier.

The 2017 FIN sample represented approximately 0.5% of the estimated mature Walleye population size.

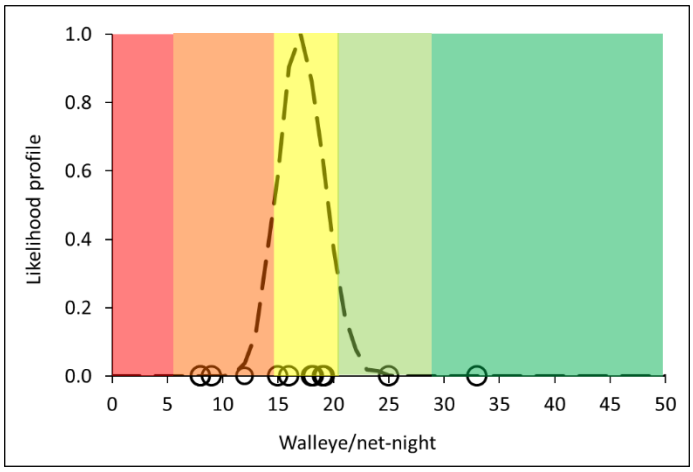

Figure 1 - The FIN catch rate of mature Walleyes from Snipe Lake, 2017. Dashed line is the mean likelihood catch rate (16.7 fish/net-night), with individual net data as hollow circles (n=12 nets).

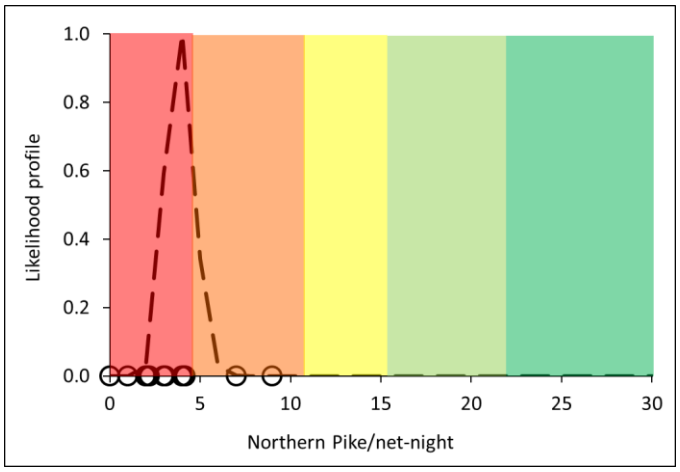

Figure 3 - The FIN catch rate of mature Northern Pike from Rattlesnake Lake, 2017. Dashed line is the mean likelihood catch rate (3.4 fish/net-night), with individual net data as hollow circles (n=12 nets).

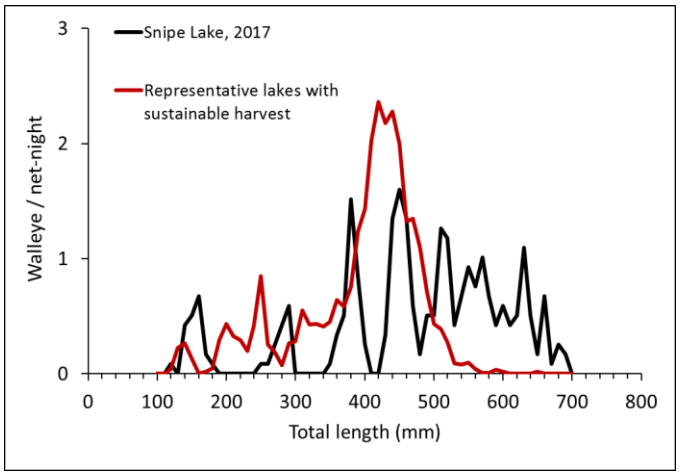

Figure 2 – FIN sample of showing size of Walleyes from Snipe Lake, 2017. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

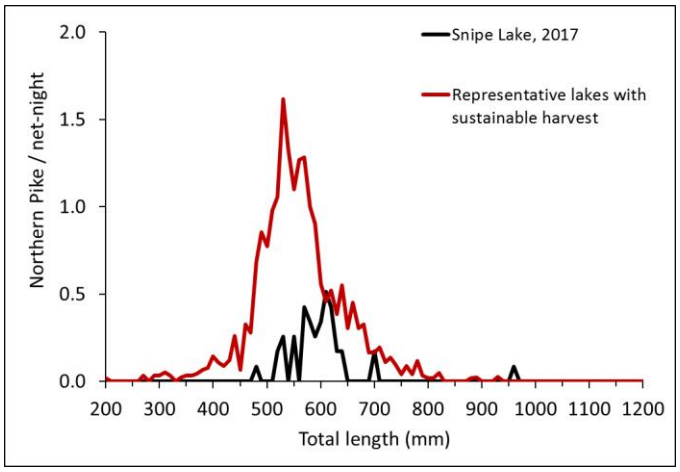

Figure 4 – FIN sample showing size of Northern Pike from Snipe Lake, 2017. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

Northern Pike

The mean catch rate of mature Northern Pike was 3.4/net-night (Figure 3). The corresponding FSI score for the mature density of Northern Pike was assessed at **very high risk**.

The length distribution shows no apparent recent recruitment, no pike smaller than 480 mm, and low abundances of the larger fish (Figure 4). This fishery is supported by a few weak adult year classes, with very few adult fish protected by the maximum size limit.

The 2017 FIN sample represented approximately 0.1% of the estimated mature Northern Pike population size.

Summary

The abundance of mature Walleyes in Snipe Lake has increased from an FSI status of **very high risk** in 2010 and 2014 to moderate risk in 2017. Continued monitoring and active management are necessary to maintain a sustainable harvest objective for this fishery.

Since 2010 and 2014, Snipe Lake has declined from an FSI status for mature Northern Pike of high risk to **very high risk** in 2017. Recovery actions and conservation-based management are necessary to recover and sustain this population.

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.