

Gull Lake FIN Summary

2020

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,

- <https://www.alberta.ca/fall-index-netting.aspx>
- <https://www.alberta.ca/fish-sustainability-index-overview.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 2020 FIN at Gull Lake

Gull Lake (8,202 ha) is located approximately 20 km northwest from the city of Red Deer. From September 28 to 30, 2020, 10 gill nets captured 185 Lake Whitefish, 3 Spottail Shiners, 48 Northern Pike, 159 Walleyes, 29 White Suckers, and 19 Yellow Perch.

Walleye

The mean catch rate of Walleyes was 15.9 fish /net-night. The catch rates of mature (Figure 1) and immature Walleyes were 9.3 fish /net-night and 6.6 fish /net-night, respectively. The corresponding FSI score for the current mature density of Walleyes was assessed at **high** risk.

The length distribution shows evidence of minimal recruitment, a high abundance of fish between 370 mm to 510 mm, and low abundance of Walleyes larger than 510 mm (Figure 2).

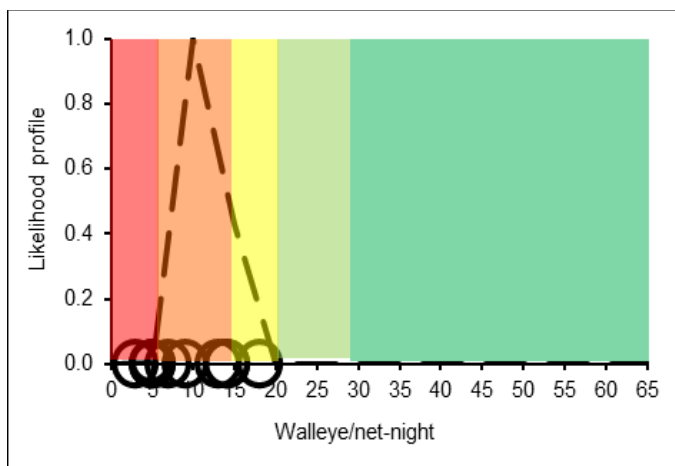


Figure 1 - The FIN catch rate of mature Walleyes from Gull Lake, 2020. Dashed line is the mean catch rate (9.3 fish/ net-night), with individual net data as hollow circles (n=10 nets).

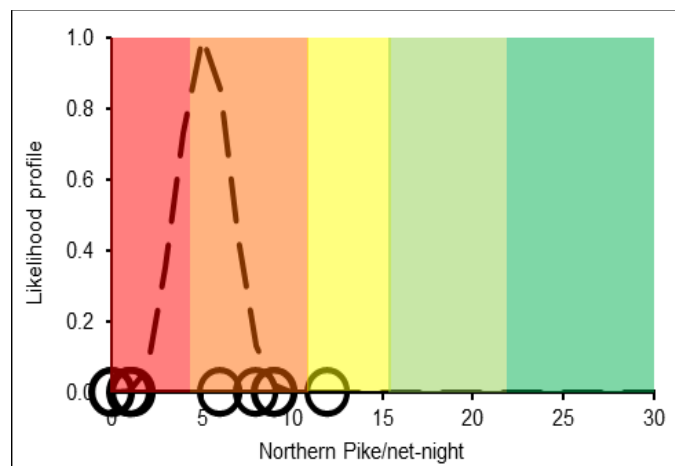


Figure 3 - The FIN catch rate of mature Northern Pike from Gull Lake, 2020. Dashed line is the mean catch rate (4.7 fish/ net-night), with individual net data as hollow circles (n=10 nets).

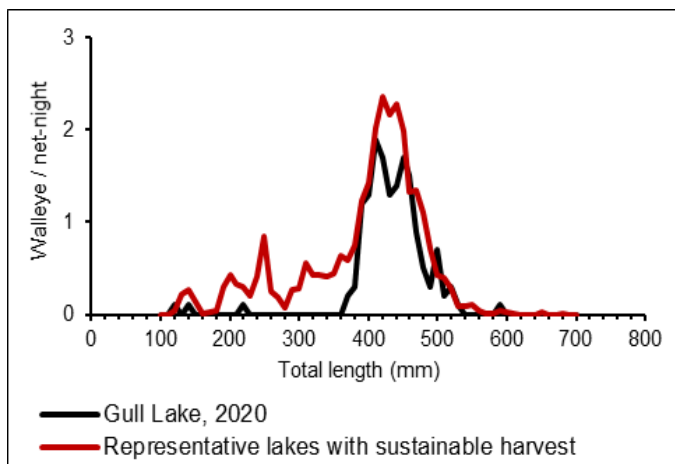


Figure 2 – FIN sample showing size of Walleyes from Gull Lake, 2020. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

The 2020 FIN sample represented approximately 0.2% of the estimated mature Walleye population size.

Northern Pike

The mean catch rate of Northern Pike was 4.8 fish /net-night. The catch rates of mature (Figure 3) and immature Northern

Pike were 4.7 fish /net-night and 0.1 fish /net-night, respectively. The corresponding FSI score for the mature density of Northern Pike was assessed at **high** risk.

The pike length distribution exhibits little evidence of recruitment, with a moderate abundance of pike between 490 mm to 650 mm. Pike larger than 650 mm are in low abundance in Gull Lake (Figure 4).

The 2020 FIN sample represented approximately 0.05% of the estimated Northern Pike population size.

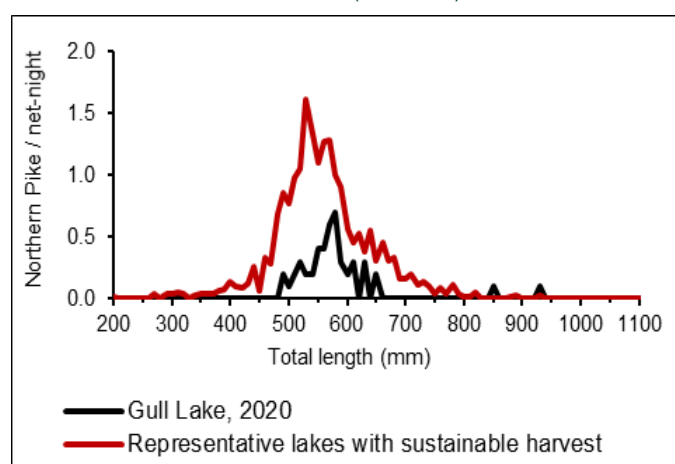


Figure 4 – FIN sample showing size of Northern Pike from Gull Lake, 2020. The red line indicates the average length distribution of pike from 6 Alberta lakes supporting long-term sustainable harvests of pike.

Summary

The FSI status for the mature Walleye population in Gull Lake has degraded from **moderate** risk (2017) to **high** risk (2020). Low levels of recruitment and absence of larger spawning individuals is concerning for this fishery.

The FSI status of Northern Pike has remained unchanged from the 2017 assessment wherein the population was also assessed at **high** risk.

A slot harvest regulation is being evaluated for Walleyes at Gull Lake. Alberta Fish and Wildlife will report on its performance as survey results are available.

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.