

**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 Bourque Lake in 2016, 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 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 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 2016 FIN at Bourque Lake**

Bourque Lake (521 ha) is located approximately 30 km northwest of the city of Cold Lake. From September 12 to 15, 2016, twelve ½ length nets captured 58 Cisco, 20 Lake Whitefish, 14 Northern Pike, 143 Walleye, 8 White Suckers and 80 Yellow Perch.

**Walleye**

The mean catch rate of Walleyes was 11.9/ ½ net-night. The catch rates of mature (Figure 1) and immature Walleye were 8.8/ ½ net-night and 3.1/ ½ net-night, respectively. The corresponding FSI score for the current mature density of Walleye was assessed at **moderate risk**.

The broad length distribution shows unstable recruitment, moderate abundance of 320-500 mm Walleye, and very abundant fish larger than 500 mm (Figure 2).

The 2016 FIN sample represented approximately 2.1% of the estimated mature Walleye population size.

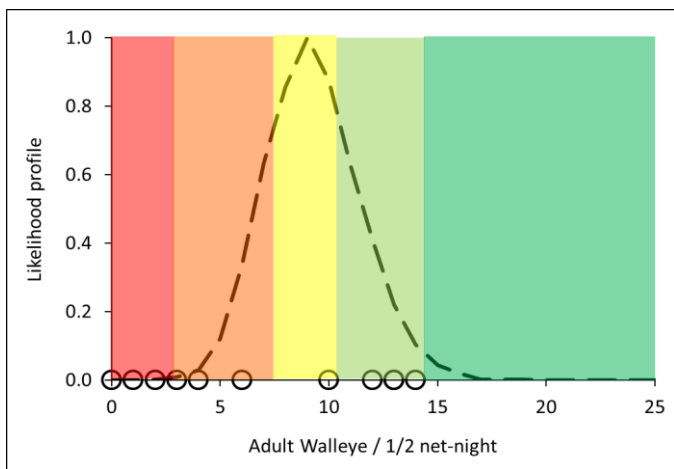


Figure 1 - The FIN catch rate of mature Walleyes from Bourque Lake, 2016. Dashed line is the mean catch rate (8.8 fish/ ½ net-night), with individual net data as hollow circles (n=12 nets).

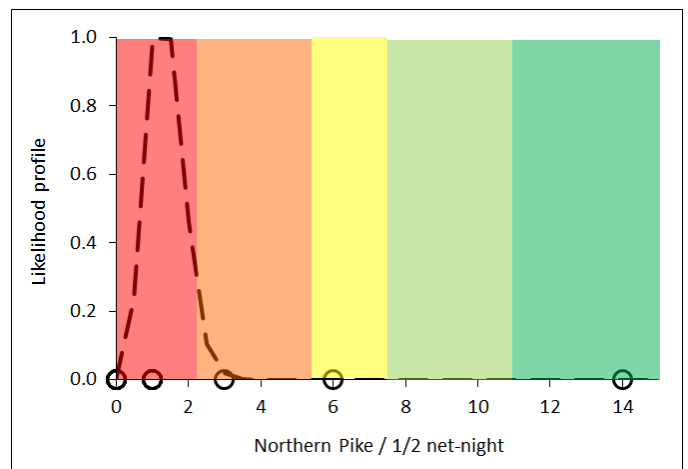


Figure 3 - The FIN catch rate of mature Northern Pike from Bourque Lake, 2016. Dashed line is the mean catch rate (1.2 fish/ ½ net-night), with individual net data as hollow circles (n=12 nets).

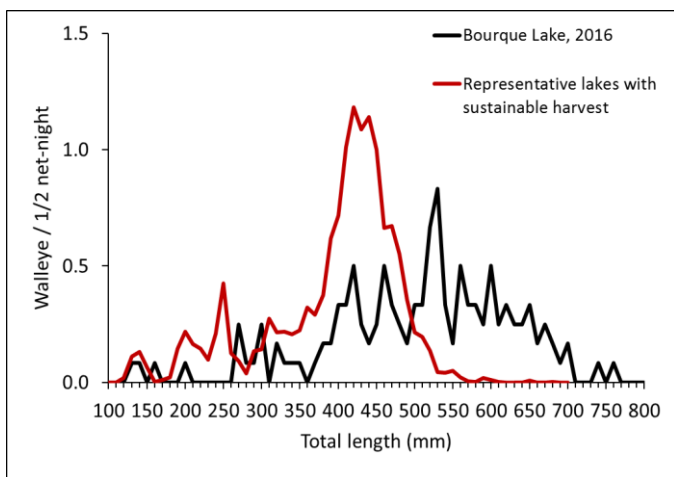


Figure 2 – FIN sample of showing size of Walleyes from Bourque Lake, 2016. The red line indicates the average length distribution of Walleye from 5 Alberta lakes supporting long-term sustainable harvests of Walleye.

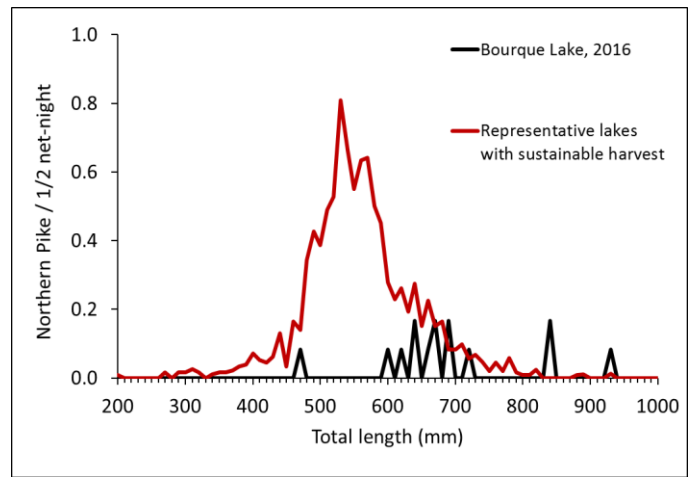


Figure 4 – FIN sample showing size of Northern Pike from Bourque Lake, 2016. The red line indicates the average length distribution of Pike from 6 Alberta lakes supporting long-term sustainable harvests of Pike.

### Northern Pike

The mean catch rate of mature Northern Pike was 1.2/ ½ net-night (Figure 3). The corresponding FSI score for the current mature density of Northern Pike was assessed at **very high risk**.

The length distribution shows no recruitment, with a very low abundance of Pike larger than 470 mm (Figure 4). This length distribution may indicate issues with low water level (i.e., reduced spawning habitat), and possibly recruitment overfishing.

The 2016 FIN sample represented approximately 0.5% of the estimated mature Northern Pike population size.

### Summary

Since the FINs on Bourque Lake in 2006 and 2011, the density

of mature Walleye has increased from a corresponding FSI status of **very high risk** to **moderate risk**. Dependent on management objectives, carefully managed harvest opportunities are currently being utilized.

From the results of the 2006, 2011 and 2016 FINs the density of mature Northern Pike in Bourque Lake has remained at corresponding FSI statuses of **high risk** and the current **very high risk**. Dependent on management objectives, conservation-focused efforts are required to recover this stock to a lower risk and for long-term sustainability.

### 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.