

**The Lake Trout (*Salvelinus namaycush*) Fishery of Smoke Lake, Algonquin Provincial Park, Ontario: 13 years after Major Changes in Fishery Regulations**

Brian Monroe and Glenn Forward

Algonquin Fisheries Assessment Unit  
OMNR, P.O. Box 219, Whitney, ON, K0J 2M0  
[brian.monroe@mnr.gov.on.ca](mailto:brian.monroe@mnr.gov.on.ca)  
[glen.forward@mnr.gov.on.ca](mailto:glen.forward@mnr.gov.on.ca)  
(613) 637-2780 ext. 274 and 270

Smoke Lake, Algonquin Provincial Park, Ontario has a surface area of 607 hectares and mean and maximum depths of 16.4 and 56.5 meters. Development includes 89 shoreline leases, a public boat launch and parking area, and a hangar and docks operated by the OMNR. In 1989 the following regulations were implemented: (1) daily and possession limit of 2 lake trout (*Salvelinus namaycush*) (from 3); (2) lake herring (*Coregonus artedii*) was banned as bait; (3) closure of the lake trout (*Salvelinus namaycush*) season on September 30 (from October 10); and, (4) lake trout between 40 to 56 cm in length must be released. Long-term (1978-2001) trends of targeted angling effort, harvest and catch, estimated from creel surveys (n=10), and corresponding trends of population size, mean length, and growth rates of spawning lake trout, estimated from mark-recapture studies (n=15), were presented. Effort was very high (>5 rod-hrs/ha/yr) for 6 of 7 years surveyed before 1989 and it declined from 1980 (8.8 rod-hrs/ha/yr) to 2001 (3.1 rod-hrs/ha/yr). Harvest from 1978-1980 exceeded a conservative estimate of sustainable yield (0.73 kg/ha/yr) based on the number of fish species in Smoke Lake (n=17) (Marshall 1996). However, harvest did not exceed sustainable yield between 1981 and 2001. The average number of lake trout caught and kilograms harvested per rod-hour (CUE and HUE, respectively) declined from 1978 (0.13 and 0.2) to 1982 (0.08 and 0.07) and then increased to 2001 levels (0.3 and 0.29). An estimate of the number of spawning lake trout increased from 1978 (168) to 1989 (251) through to 2000 (1026). Conversely, mean fork length (mm) of spawning trout decreased from 1978 (643) to 1989 (633) through to 2001 (574). Length increments were used to model growth rates (Ricker 1975). Prior to 1990, a lake trout with a fork length of 450 mm grew an average of 282 mm in 10 years. However, from 1990 to 1995 and 1996 to 2001 the same fish grew an average of 237 and 216 mm respectively, over 10 years.

Since implementation of the regulations in 1989, the estimated number of spawning lake trout has increased rapidly, coinciding with a decrease in mean length and growth. In 2001, annual effort targeted toward catching lake trout and average time require to catch lake trout was lower than in any other year. Also, average harvest of lake trout per hour was heavier than in any other year and , harvest was at a sustainable level. The impact of the slot-size regulation may be determined by comparing long-term trends with those from Lake Opeongo, Algonquin Provincial Park.

### References

- Marshall, T.R. 1996. A hierarchical approach to assessing habitat suitability and yield potential of lake trout (*Salvelinus namaycush*) . *Canadian Journal of Fisheries and Aquatic Science*, 53(Supp. 1): 332-341.
- Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. *Bulletin of the Fishery Resource Board of Canada*, 191: 382 p. Ottawa