A Summary of Winter Creel Surveys Conducted on Skeleton Lake in 1988, 1994 and 2004

File Report

Stephen Scholten

Ontario Ministry of Natural Resources

Bracebridge

2011

Skeleton Lake is a large (2075 ha), deep (mean depth: 32 m), oligotrophic (spring total phosphorus : 4 ug/l, Secchi Depth: 9 m) lake located in the Muskoka District of Ontario within MNR's Parry Sound District. The lake provides high quality habitat for lake trout, and has historically supported a significant fishery. Beginning in 1996 a lake-specific regulation was implemented for lake trout: only one line may be used when angling through the ice and no lake trout may be kept between 40-55 cm total length. The standard open season of January 1 to September 30 and daily catch limit of two lake trout for a sport fishing licence remained in effect. Prior to the new regulation lake trout of any size could be kept and two lines were allowed while angling through the ice.

Supplemental stocking of lake trout occurred regularly between the 1940's and 1993. Stocking was discontinued as it was believed that the habitat provided by the lake was capable of supporting a productive lake trout population without supplemental stocking.

Traditionally, a large proportion of annual lake trout angling effort occurs in the winter. Accordingly, four creel surveys have been conducted to measure this effort. No open water surveys have been completed.

This report presents a summary of the results of the winter creel surveys conducted in 1988, 1994 and 2004. The 1972 survey collected only limited data; the results are not presented here. When the project databases were reviewed it was found that the 1988 and 1994 surveys had design and data recording issues that necessitated a re-analysis of both projects. Previous summaries of or references to the results of the 1988 and 1994 surveys should be disregarded.

Methods

Some details of the survey designs are shown in Table 1. Other than the survey season length, the updated surveys all had similar sampling designs. The 1988 survey did not begin until Feb 19. The reason for this is not recorded but was probably a result of logistic constraints. It is also possible that weather or ice conditions limited access and/or fishing activity before that date. Results are shown for the original survey season and extrapolated to the same survey season as the other two surveys (mid-January to the end of March).

All surveys were stratified by day type (weekday, weekend), space (north and south sectors, Figure 1) and fishing mode (hut, open ice). The day length used in 2004 (9 hours) was one hour longer than the other two surveys (8 hours). As effort is generally very low after 5 pm in the winter, the effect on the estimates is probably low.

In 1994 and 2004, within-day sampling periods overlapped, resulting in a disproportionate number of activity counts occurring during the period of overlap (mid-day), also typically the period of highest activity. The result would be slight over-estimates of effort, catch and harvest relative to the 1988 survey. No effort was made to correct for this bias; but recognize that it exists.

Results and Discussion

Sampling effort

The short survey season of 1988 resulted in many fewer sample days, activity counts and interviews than in 1994 (Table 2). Also, a number of activity counts and interviews were omitted from the updated analyses due to re-stratification and data irregularities. The number of sampling days and activity counts were similar in 1994 and 2004 but far fewer interviews were done in 2004 because of the much reduced observed activity.

Observed Activity

In 1988, an average of 9.4 fishing parties was on the ice at a given time (Table 3). The average party size was just under 2 people and they fished with an average of 1.6 rods/person. The maximum number of huts observed on the lake was 37.

Similar activity was observed in 1994; 8.4 parties with an average size of 1.7 people and 1.7 rods/person. The maximum number of huts was virtually the same (38).

Activity was much reduced in 2004. Only 1.7 parties were present on average and they used only 1.0 rod/person, as required by the regulation implemented in 1996. The greatest number of huts present at one time was 13.

Estimated Effort, Catch and Harvest

Fishing effort in 1988 (extrapolated to Jan 15 to Mar. 31) and 1994 were similar; averaging about 10,000 angler-hours (Table 4). Effort was considerably lower in 2004; estimated at 2370 (S.E.: 389) angler-hours. As a large proportion of effort was directed at lake trout in all years, a similar pattern was seen as in the total effort. The pattern for effort targeted at whitefish was different; increasing from 1988 to 1994 then decreasing in 2004. The main driver for this appears to be that a lower proportion of the total effort was directed at whitefish in 1988 (21%) than in 1994 (51%) or 2004 (54%). It seems unlikely that the actual proportion changed drastically between 1988 and 1994, before the regulation was changed. The difference may be an artefact of the relatively small sample size in 1988 and differences in how the clerk determined which species were targetted.

The estimated catch and harvest of lake trout were similar between 1988 and 1994 then declined greatly in 2004. The average catch of lake trout in the first two surveys was close to 1,000 fish, but only 143 (S.E.: 49) were estimated to be caught in 2004. The harvest declined even more dramatically from between 533 to 749 fish to 34 fish.

The catch and harvest of lake whitefish showed an inconsistent pattern relative to effort. Effort increased in 1994 then decreased, but catch and harvest decreased from 1998 to 1994 and again in 2004. A large driver of the difference was the much higher catch rate (CUE) observed in 1988 than the other two years. The small sample sizes in 1988 and 2004, particularly for anglers specifically targetting whitefish may also be a reason for the discrepancy.

The large decreases in all estimates of effort, catch and harvest of lake trout are largely due to the regulation change implemented in 1996. Effort and catch declined presumably because anglers chose to fish elsewhere, or not at all. Those that remained could only fish with one line in the winter. Further, the disproportionate decline in harvest, relative to effort and catch, is due to the slot size limit; a large proportion of lake trout must now be released. This is reflected in the mean size of harvested fish which increased from between 485 to 522 mm FL in 1988 and 1994 to 592 mm FL in 2004 (Table 5).

A secondary factor that may have changed fishing activity on Skeleton Lake was the change to the opening date for lake trout on Lake Joseph. The delayed opening date of February 15 was implemented in 1989. It may have had the impact of increasing effort on Skeleton Lake as anglers who had normally fished on Lake Joseph sought alternate places to fish, at least early in the winter. The quality of the surveys in 1988 and 1994 is not good enough to detect if that may have happened. Regardless, such a change has since been masked by the overwhelming influence of the regulation on Skeleton Lake.

By 2004, it had been 11 years since supplemental stocking was done. Accordingly the occurrence of stocked fish in the catch fell to essentially none in 2004. The decline in occurrence

of stocked fish coincided with a lower estimated catch rate (CUE-targetted) for lake trout for 2004. As we do not have independent assessment data from the same period it is not clear how much influence the cessation of stocking had on the abundance of lake trout. The quality of the lake trout habitat is very good and we expect that natural recruitment would not be limiting in this population.

The observed decline in whitefish harvest is supported by notes made by the creel survey clerk in 2004; anglers felt that whitefish were not being caught as commonly as they had been in the past. Unfortunately, we do not have historic assessment data to show the long term trend in whitefish abundance. Whitefish have been fairly abundant in index netting catches since 2001; the low catch observed in the 2004 creel does not appear to be a result of a large decline in the population.

Angler Demographics

Most anglers in all surveys were of local origin (Table 6). The proportion of local anglers decreased somewhat in 2004, relative to the first two surveys. Unfortunately the geographic extent of what constitutes a local resident was not recorded for any survey. The apparent decrease in the proportion of anglers who were local in 2004 could be partly an artefact of changing definition.

The observed change in the visit type between years was partly a result of inconsistent use of this code. In 1988 and 2004, most anglers were day trippers, typically meaning they had to use a vehicle to get from their home to an access point on the lake. The 'permanent resident' code is typically used to denote an angler who lives directly on the lake shore or back lot area. This interpretation was apparently not used in 1994; the 89% recorded can probably be taken to include day trippers as well. The higher proportion of permanent and non-permanent residents recorded in 2004 was probably a true reflection that the anglers who continued to the fish lake were to some extent those who had ties to the lake (i.e. property owners) and were less likely to fish elsewhere, regardless of the regulation.

Overall, the fishery had less day trip anglers from the local area, discouraged by the regulation, in 2004 than in earlier years and therefore a greater proportion of remaining anglers were permanent residents and cottagers.

Summary

In conclusion, the current regulations on Skeleton Lake have caused a large proportion of anglers to seek opportunities elsewhere. Further the slot size limit results in most lake trout having to be released. Lake trout fishing effort and harvest are currently low. The lake trout population in Skeleton Lake is currently relatively healthy (MLFAU unpubl. data). Consideration should be given to changing the regulation to something more palatable to anglers while keeping harvest at a sustainable level. Annual counts of the maximum numbers of huts deployed should be done as an index of winter fishing effort.

Table 1 Details of the design of creel surveys conducted on Skeleton Lake in 1988, 1994 and 2004.

Year	Start Date	End Date	Contact Method	Seasons	Daytypes	Periods	Space	Fishing Mode	Number of Strata	Period Start Time	Period End Time	Period Duration (hr)
1988	19-Feb-88	25-Mar-88	roving	1	2	1	2	2	8	08:00	17:00	9
1994	15-Jan-94	31-Mar-94	roving	1	2	1	2	2	8	08:00	17:00	9
2004	19-Jan-04	31-Mar-04	roving	1	2	1	2	2	8	08:00	18:00	10

Table 2 Details of the sampling effort expended on the creel surveys conducted on Skeleton Lake in 1988, 1994 and 2004.

Year	Sample Days	Activity Counts	Interviews	Interviews/ Day	Lake Trout Sampled	Observed Effort (ang-hrs)
1988	12	39	87	7	17	377
1994	33	132	298	9	52	1631
2004	36	145	63	2	5	409

Table 3 Summary of observed angling activity during the creel surveys conducted on Skeleton Lake in 1988, 1994 and 2004.

Year	Mean Activity Count (party)	Anglers/ Party	Rods/ Angler	Max. Hut Count
1988	9.4	1.8	1.6	37
1994	8.4	1.8	1.7	38
2004	1.7	2.1	1.0	13

Table 4 Effort and catch summary for the creel surveys conducted on Skeleton Lake in 1988, 1994 and 2004. Results from 1988 are portrayed for original season length and extrapolated to same season length as other years; it is not known if weather and ice conditions in 1988 permitted angling for the extended season.

Year	Season	Species	Catch (#)	S.E.	Harvest (#)	S.E.	Effort (ang-hr)	S.E.	CUE (all anglers)	CUE (targetted)
1988	Feb 19- Mar 25	All					5159	752		
		lake trout	409	132	350	126	3840	512	0.08	0.11
		lake whitefish	312	138	312	138	1056	447	0.06	0.30
1988	Jan 15 - Mar 31	All					11125	1603		
		lake trout	877	281	749	267	8282	1096	0.08	0.11
		lake whitefish	670	294	670	294	2280	955	0.06	0.29
1994	Jan 15 - Mar 31	All					9545	888		
		lake trout	1036	232	533	141	9443	870	0.11	0.11
		lake whitefish	95	56	95	56	4881	694	0.01	0.02
2004	Jan 19 - Mar 31	All					2370	389		
		lake trout	143	49	34	18	2370	389	0.06	0.06
		lake whitefish	0	0	0	0	1271	345	0.00	0.00

Table 5 Characteristics of sampled lake trout from the creel surveys conducted on Skeleton Lake in 1988, 1994 and 2004.

Year	n	mean FL	# natural	% natural
1988	17	522	12	71
1994	52	485	27	52
2004	5	592	5	100

Table 6 Angler demographics for the creel surveys conducted on Skeleton Lake in 1988, 1994 and 2004.

		1988	1994	2004
Angler Origin	local	0.86	0.88	0.67
	Ontario	0.14	0.10	0.33
Angler Visit Type	permanent resident	0.03	0.89	0.14
	non-permanent resident	0.08	0.05	0.16
	day tripper	0.89	0.02	0.60
	other- non-paid			0.10

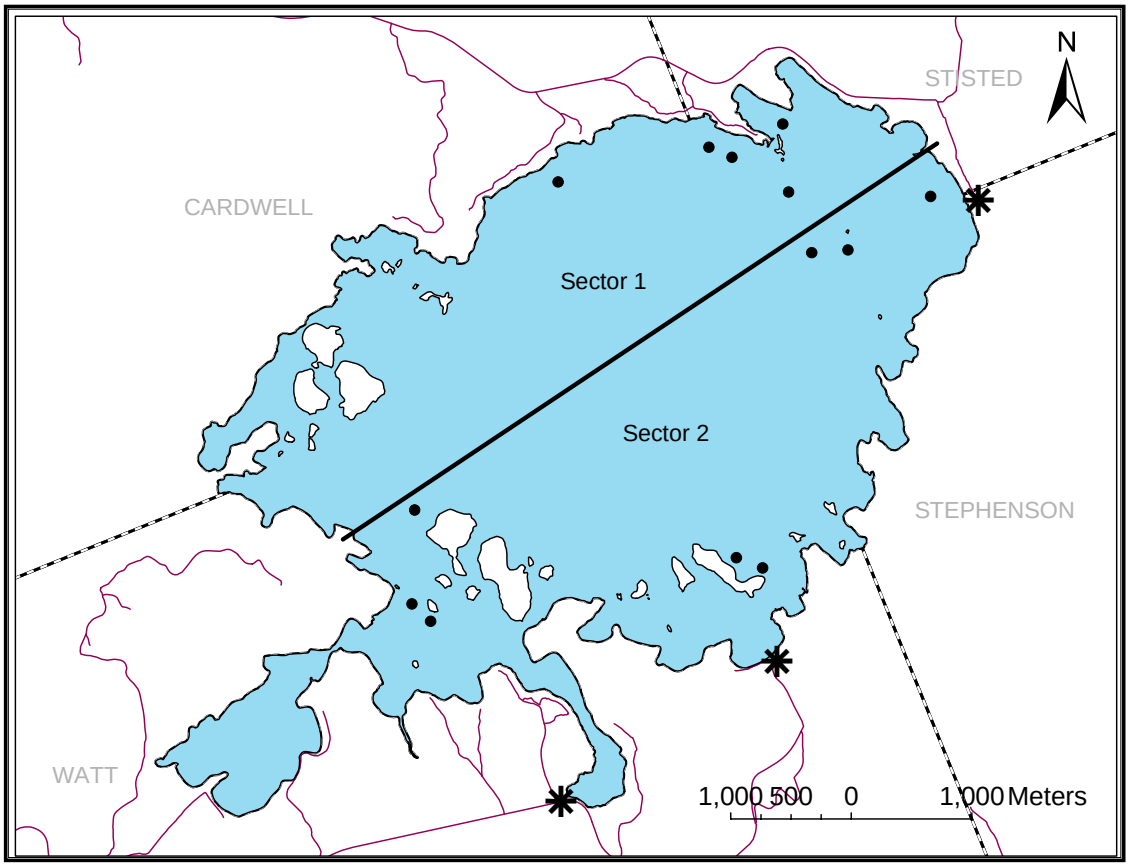


Figure 1 Map of Skeleton Lake showing lake sectors used for creel surveys in 1988, 1994 and 2004. Asterisks denote major public access points. Black dots are approximate locations of ice huts in late February, 2004.