Results of the Winter Creel Survey Conducted on Kawagama Lake in 2008

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File Report

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Kawagama Lake is a large (3,150 ha), deep (Z_{mean}: 22 m), clear (secchi depth ~ 7 m), oligotrophic lake located in Haliburton County within the Bracebridge administrative area of the Ministry of Natural Resources. Lake trout are the primary sport fish species present. Smallmouth bass are introduced and self-sustaining. Lake whitefish and brook trout occur in low abundance.

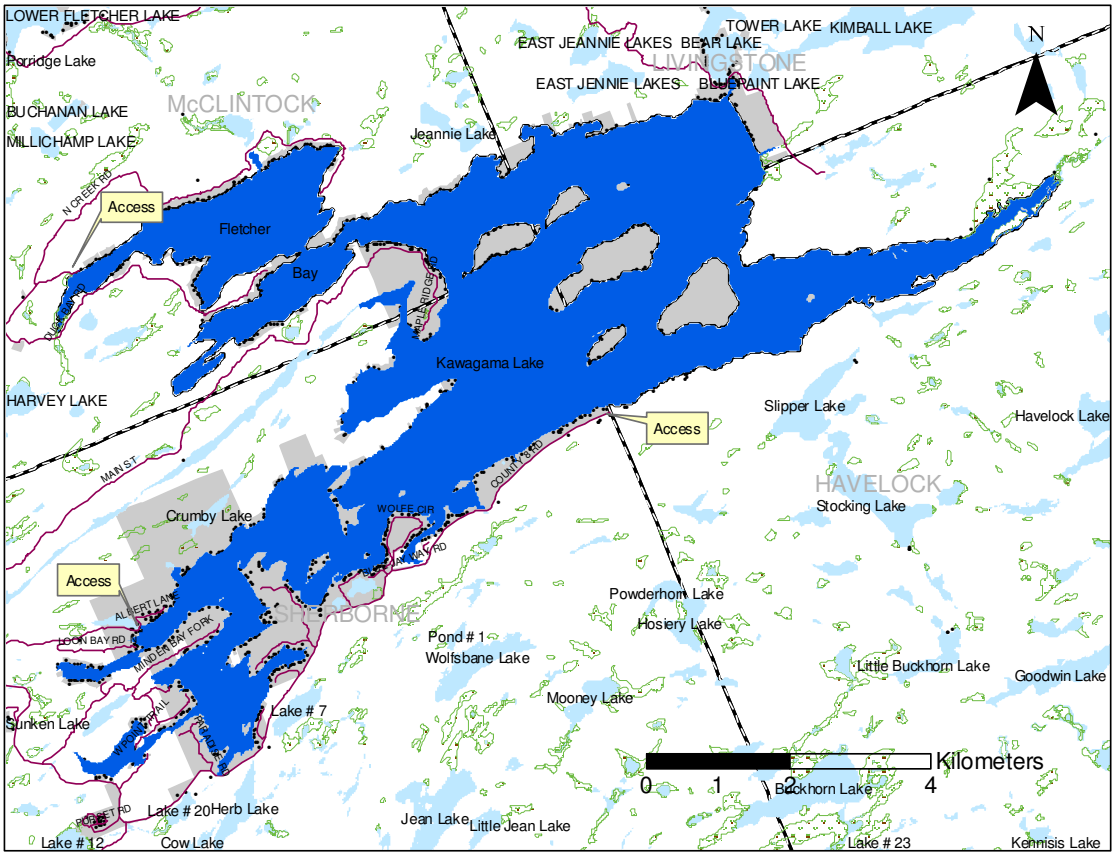


Figure 1 Kawagama Lake location map.

Lake trout are managed as a naturally reproducing population. Supplemental stocking has not occurred since 1977. A slot size regulation was implemented in the mid-1990's as part of the South-central Region Natural Trout Strategy. Trout between 40-55 cm total length must be released. Only one line is allowed in winter to reduce the mortality of released fish.

Water levels on the lake are managed through an MNR-owned dam. The operation is regulated through the Muskoka River Water Management Plan. Kawagama Lake was chosen to evaluate some of the effectiveness monitoring objectives of the plan. As such, a considerable amount of assessment work has been done on the lake in the past several years. Projects conducted include studies of egg deposition and survival under different drawdown regimes (Acres 2004, Azimuth 2007) and Summer Profundal Index Netting (SPIN) surveys in 2005, 2006 and 2007 (Muskoka Lakes FAU unpublished data) to measure lake trout population abundance.

Creel surveys have been conducted regularly in the winter. Previous surveys were done in 1989, 1994 and 2001. Summer effort was quantified for the first time in 2007; effort counts were conducted by volunteers from the Kawagama Lake Cottage Association (Scholten 2008).

A creel survey was conducted in the winter of 2008 to continue to monitor lake trout angler effort and harvest.

Methods

It was expected, based on the 2001 winter survey, that effort would be low; therefore the survey design was modified considerably from that of previous surveys. The number of survey days was reduced, only weekend days were sampled, lakes sectors were amalgamated and the day length was shortened to concentrate on periods of higher activity. Further, poor ice conditions early in January resulted in a change in the planned start date.

The survey period was January 19 to March 31, 2008 (Table 1). The survey was designed to be roving, but early in the survey the lake was viewed from three major access points and travel on ice was avoided. The only stratification used was fishing mode: open ice and ice hut anglers. The day length was six hours, 10 am to 4 pm. Sample days were dived into three, two-hour periods, with only one period being sampled each day. The periods were assigned systematically, resulting in sampling with equal probability.

Table 1. Survey design summary, Kawagama Lake winter creels, 1989-2008.

Year	Start Date	End Date	Contact Method	Seasons	Daytypes	Day Periods	Spaces	Fishing Modes	Stratum Count	Day Start Time	Day end Time	Day Length
1989	Jan. 04	Mar. 31	roving	3	2	2	3	2	72	08:00	18:00	10.00
1994	Jan. 07	Mar. 31	roving	1	2	1	2	2	8	08:00	18:00	10.00
2001	Jan. 06	Mar. 28	roving	1	2	1	2	2	8	08:00	18:00	10.00
2008	Jan. 19	Mar. 31	roving	1	1	1	1	2	2	10:00	16:00	6.00

During each day one progressive activity count was done, concurrently with interviews. Standard creel log and interview forms were used.

It was expected that few fish would be encountered because of the low effort and a large proportion of lake trout must be released because they are in the protected slot; therefore no fish sampling was planned

Data was entered into FISHNET2 as project IA08_KAW.

Results

A total of only 10 weekend days were sampled (Table 2, Appendix). Two activity counts were done each day, one for each mode, for a total of twenty. Ten parties, with an average of 2.3 members, were interviewed, representing 87 hours of observed effort.

The estimated total angling effort was 364 ang-hr (S.E.=161). All anglers were targetting lake trout. It was estimated that 68 (S.E.=51) were caught and 61 (S.E.=44) were harvested. The targeted CUE was 0.19/ang-hr. One party reported the incidental catch of two perch.

The survey design used in 2008 differed from previous years; therefore, the 2008 results were adjusted to allow more direct comparison. Only weekend days were sampled in 2008. Over the previous three survey weekend effort accounted for about 60% of the total effort. The day length used in 2008 was shorter than in previous years. On the Muskoka Lakes, effort from 10 am – 4 pm accounts for about 88 % of the effort from the 8 am - 6 pm period (S. Sandstrom pers.

comm.). Using these data, 2008 results for estimated effort, catch and harvest for lake trout were adjusted as follows:

Yadj = Y*1.67*1.13

The adjusted values for lake trout effort, catch and harvest were 683 ang-hr, 127 fish and 115 fish, respectively.

Table 2 Sampling summary, Kawagama Lake winter creel surveys, 1989-2008.

Year	Number of Interviews	Estimaed Number of Angler Trips	Mean Activity Count	Anglers/party	Rods/angler	Observed Effort	Number of Activity Counts
1989	448	440	4.9	2.1	1.7	2271	668
1994	271	508	4.9	2.2	1.6	1608	146
2001	28	88	2.4	1.7	1.0	87	36
2008	10	24	1.1	2.3	1.0	76	20

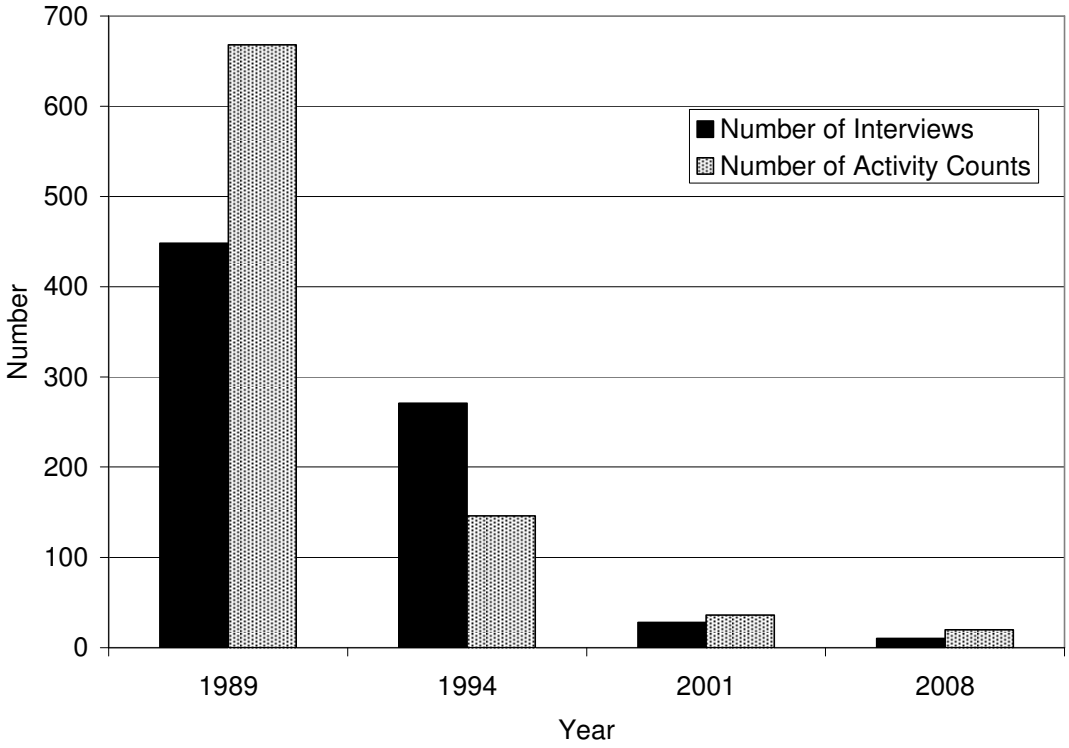


Figure 2 Number of activity counts and interviews conducted during winter creel surveys on Kawagama Lake, 1989-2008.

Table 3 Effort, catch, harvest and CUE estimates for winter creel surveys conducted on Kawagama Lake, 1989-2008. Estimates for '2008 adj' are corrected for the different survey design from previous years.

Year	Total Effort (ang-hr)	S.E.
1989	9079	469
1994	8649	824
2001	3171	837
2008	364	161
2008 (adj.)	683	

	Year	Targetted Effort (ang-hr)	S.E.	Number Caught	S.E.	Number Harvested	SE	Overall CUE (#/ang-hr)	Targetted CUE (#/ang-hr)
Lake trout	1989	8981	465	1218	118	1044	98	0.13	0.14
	1994	8605	822	2382	398	1470	240	0.28	0.28
	2001	3171	837	593	231	189	126	0.19	0.19
	2008	363	161	68	51	61	44	0.16	0.19
	2008 (adj.)	683		127		115			
Lake whitefish	1989								
	1994	35	28	0	0	0	0	0.00	0.00
	2001								
	2008								
Burbot	1989	0	0	8	6	5	5	0	0.00
	1994	9	9	0	0	0	0	0	0.00
	2001								
	2008								
Brook trout	1989	0	0	7	5	7	5	0.00	0.00
	1994	260	149	3	3	3	3	0.00	0.01
	2001								
	2008								
Smelt	1989								
	1994	0	0	151	138	151	138	0.02	0.00
	2001								
	2008								
Yellow perch	1989								
	1994	0	0	3	3	3	3	0.00	0.00
	2001								
	2008	0	0	9	10	0	0	0.02	0.00

One hut was located on the north part of Fletcher Bay for part of March. Three of the ten interviews were conducted on a party using this hut. The remaining seven interviews were of open ice anglers.

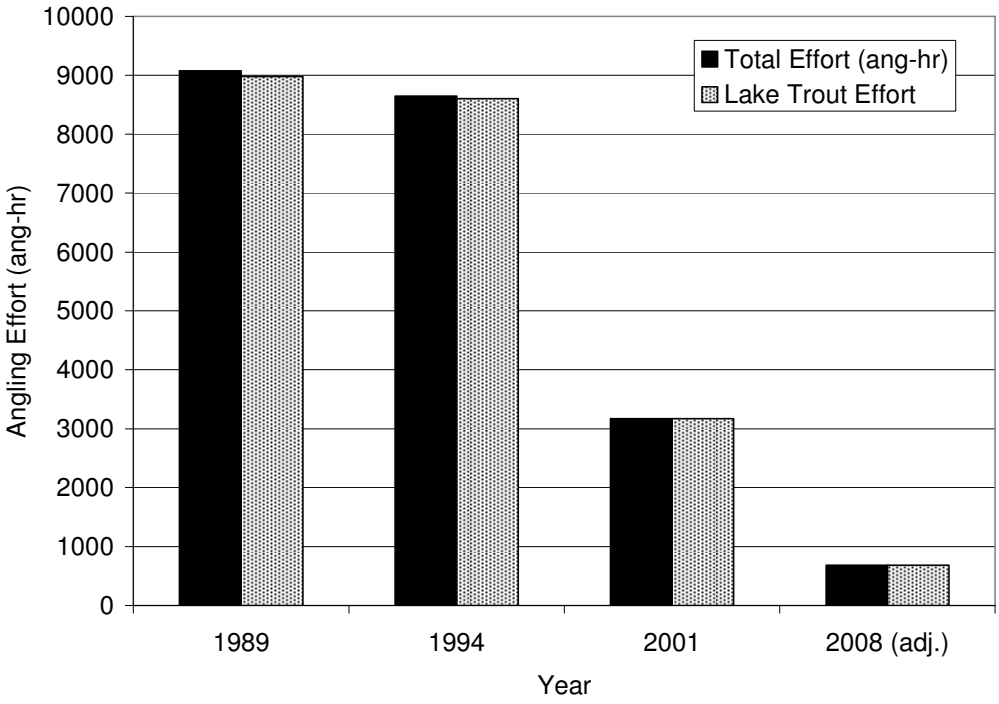


Figure 4 Estimated angling effort (total and targeted at lake trout). Kawagama Lake creel surveys, 1989-2008. Estimates for 2008 are corrected for the different survey design from previous years.

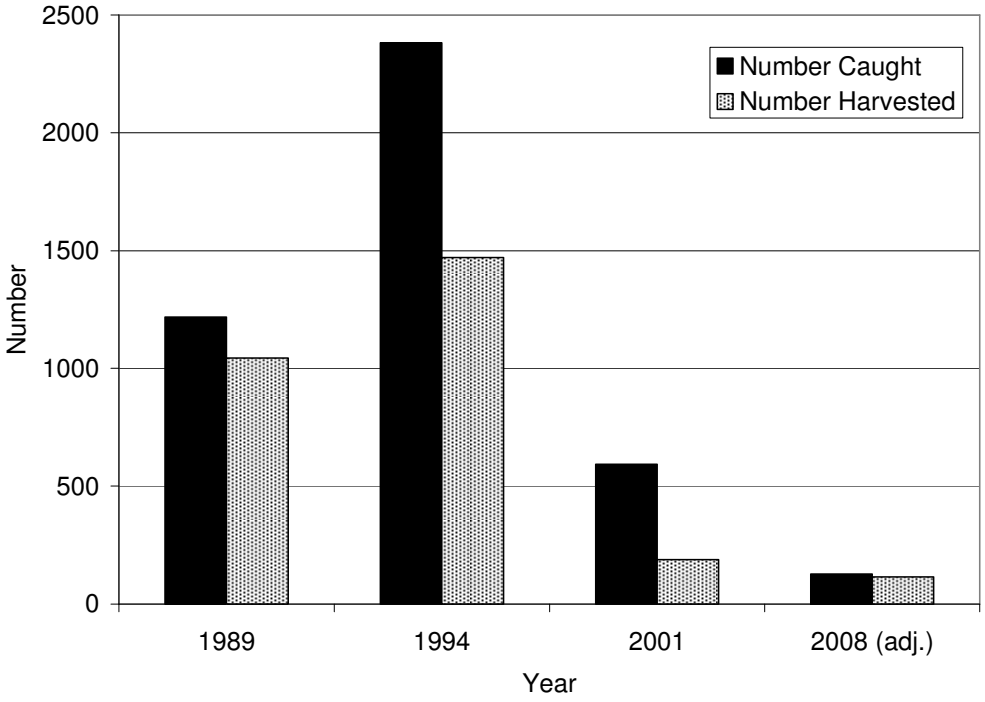


Figure 5 Estimated lake trout catch and harvest, Kawagama Lake creel surveys, 1989-2008. Estimates for 2008 are corrected for the different survey design from previous years.

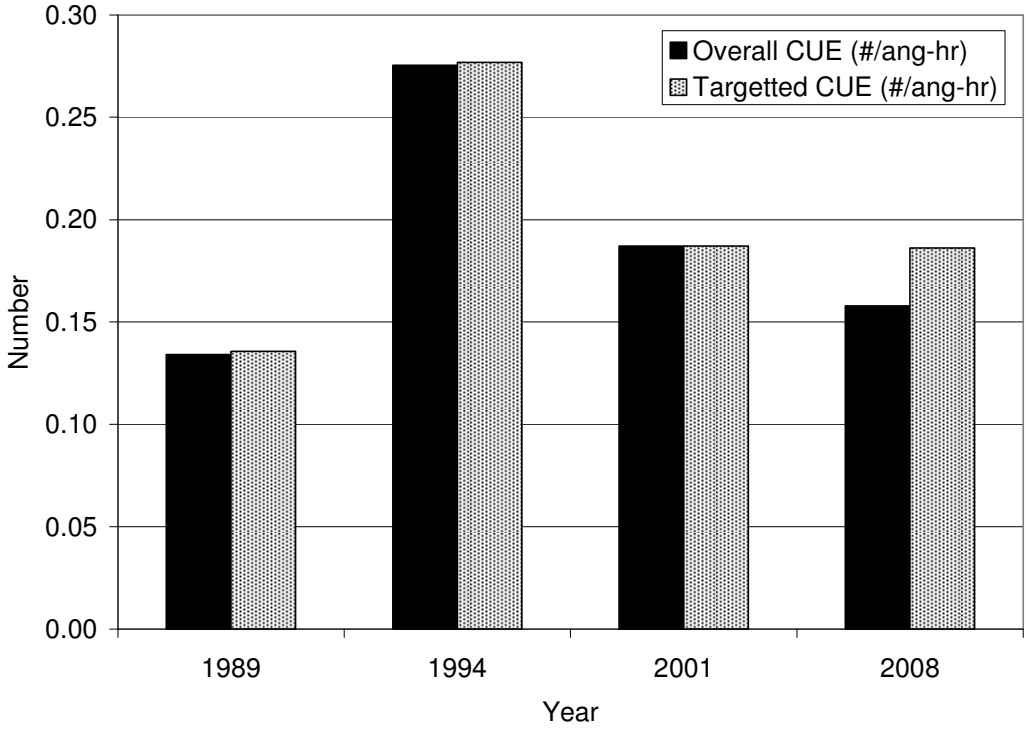


Figure 6 Overall and targeted catch-per-unit-effort for lake trout, Kawagama Lake winter creel surveys, 1989-2008.

About two-thirds of anglers reported they were of local origin; defined in this survey as living on the lakeshore or adjoining townships (Table 4). The remainder of anglers were Ontario residents. Most anglers were either permanent (39%) or non-permanent (57%) residents of the lakeshore. Only 4% were day-trippers from a residence that was not in the immediate area. Most parties were using a combination of still fishing and active jigging techniques.

Table 4 Angler demographics, Kawagama Lake creel surveys, 1989-2008.

	Angling Method			Angler Origin		Angling Trip Visit Type				
Year	Still	Jig	Combination	Local	Ontario	Permanent Resident	non-Permanent Resident	Day Tripper	Other-Paid	Other-non-Paid
1989	0.34	0.04	0.62	0.39	0.61	0.09	0.36	0.45	0.02	0.08
1994	0.39	0.12	0.49	0.18	0.82	0.14	0.28	0.51	0.02	0.04
2001	0.44	0.29	0.27	0.33	0.67	0.27	0.10	0.13		0.50
2008	0.04	0.13	0.83	0.61	0.39	0.39	0.57	0.04		

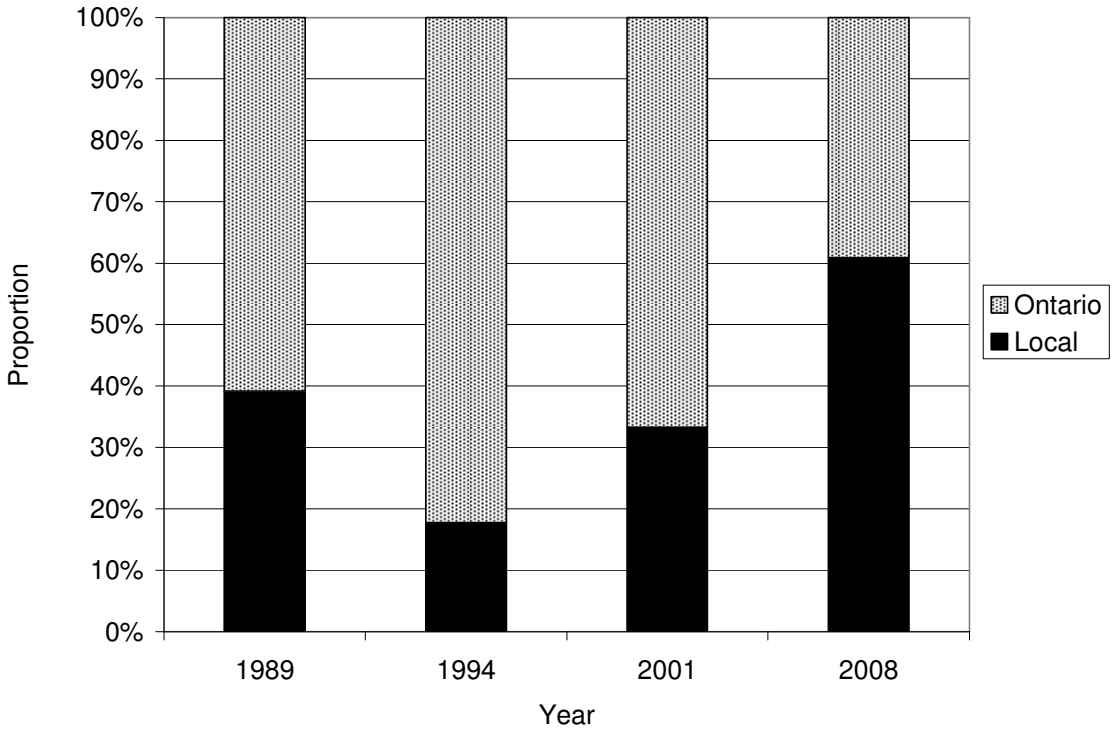


Figure 7 Angler origin, Kawagama Lake creel surveys, 1989-2008.

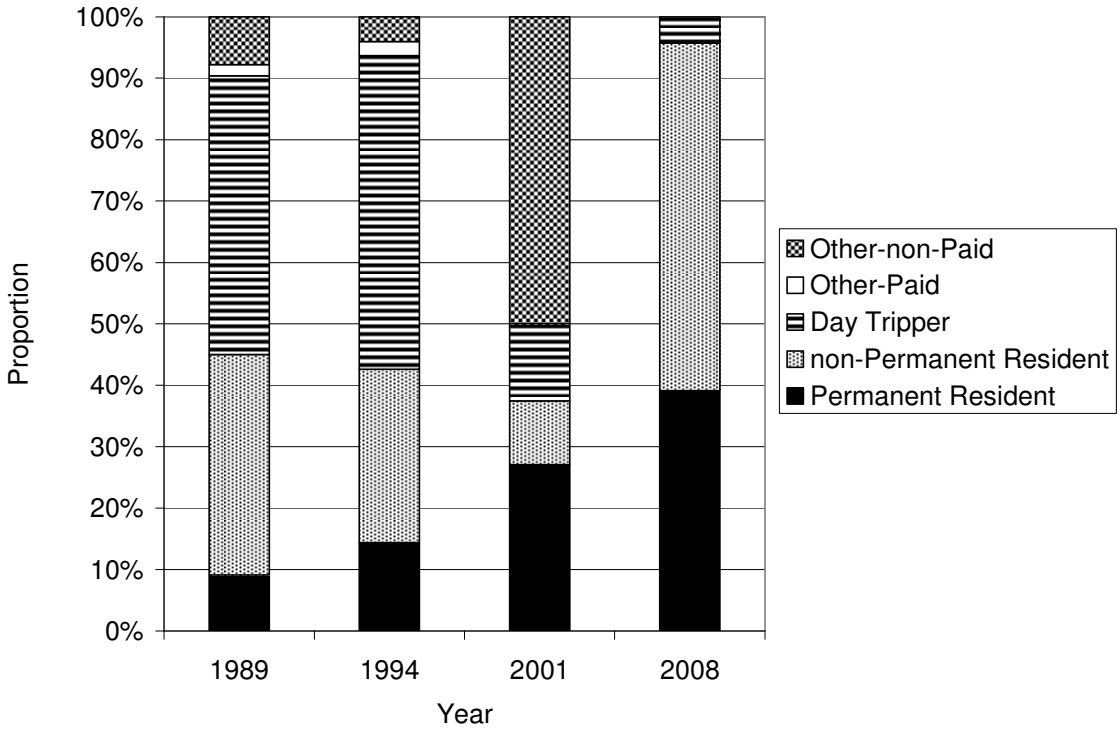


Figure 8 Angling trip visitor type, Kawagama Lake creel surveys, 1989-2008.

Discussion

The low intensity of the survey design resulted in high variability of the estimates. It was not possible to rationalize spending additional effort, and, therefore, money for the additional precision that would be obtained. Regardless, it is clear that effort, catch and harvest are still at, over even lower than the levels observed in 2001 and a small fraction of the effort observed in 1989 and 1994.

The restrictive slot-size limit is believed to be the primary reason for the decline. The growth trajectory and population size composition are such that lake trout grow into the slot fairly quickly, but only a small proportion grow large enough to become longer than the slot (Figure 9). This is supported by the change in angler demographics. Most anglers now either live on the lake shore or have cottages there. Very few day-trippers chose Kawagama Lake as their destination. They are either fishing elsewhere or choosing to not fish.

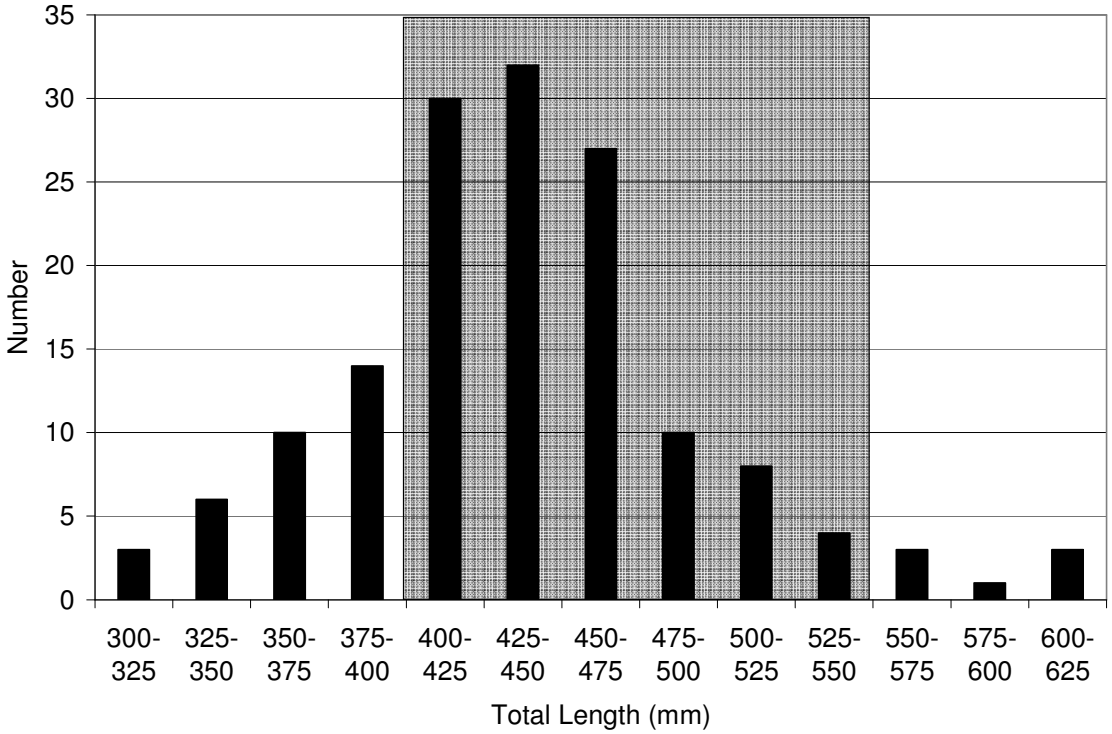


Figure 9 Total length distribution of lake trout caught during netting surveys on Kawagama Lake, 2004-2006. Shaded area is protected slot size.

The fish were not seen by the creel clerk in at least two of the five interviews where fish were reported to be harvested as they had been taken to the residence of the anglers. Coincident with that, the proportion of caught lake trout that were harvested was higher than in other years. That could be an artefact of the small sample or anglers may be becoming more successful at targeting fish that are outside of the protected slot size. However, it could be that at least some of the lake trout harvested were inside the protected slot size length.

The lake trout population in Kawagama Lake is healthy. Summer Profundal Index Netting surveys conducted by the MLFAU have yielded population estimates that average about 17,000 lake trout greater than 300 mm FL (Figure 10). The corresponding density compares favourably against other sampled lakes in the province (Figure 11).

The current regulation should be changed to something that would be more palatable to anglers. Consideration should be given to the impact of a regulation change on the distribution of angling effort in the area, given the large size of the lake.

	Density		Estimated Abundance		
Year	> 10m	whole lake	Mean	min	max
2004	16.72	7.44	20,969	12,081	30,099
2005	10.77	4.79	13,501	5,652	21,598
2006	17.4	7.74	21,814	12,809	31,060
avg	14.96	6.66	18,761	10,181	27,586

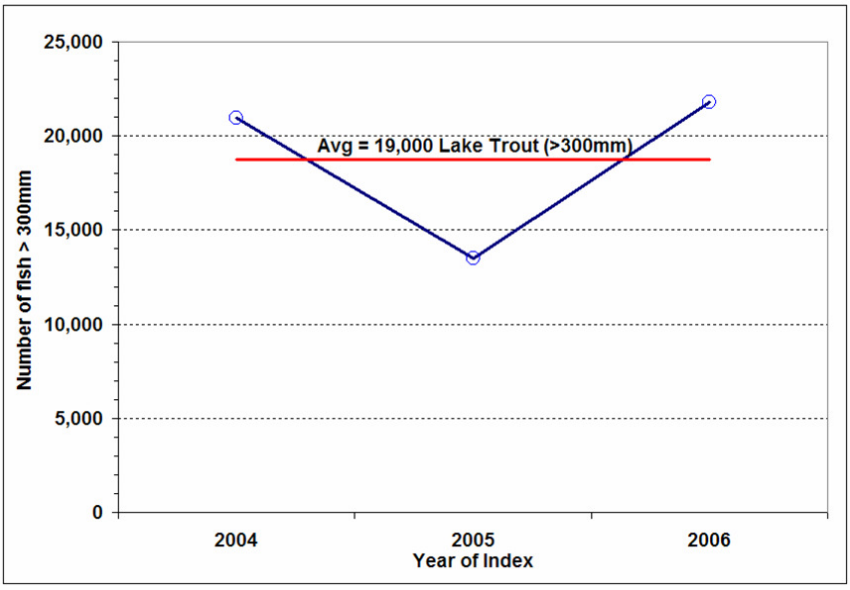


Figure 10 Lake trout populations estimates for Kawagama Lake, based on SPIN surveys conducted in 2004-2006. Source: S. Sandstrom, MLFAU.

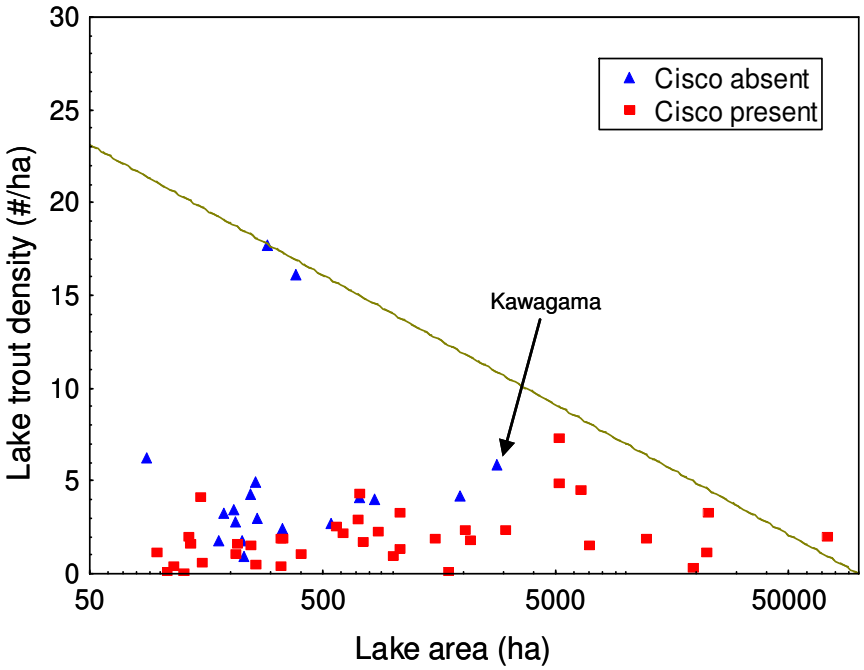


Figure 11 Estimated lake trout density in Kawagama Lake, compared to Ontario lakes sampled with the SPIN methodology. Source: S. Sandstrom, MLFAU.

Acknowledgements

Brett Thomas was the leader of the field component of the project.

References

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Azimuth Environmental Consulting, Inc. 2007. Lake trout spawning and egg deposition survey in Kawagama Lake. Azimuth Environmental Consulting, Inc, Barrie Ontario.

Scholten, S.J. 2008. Results of the Open Water Lake Trout Angling Effort Survey Conducted on Kawagama Lake in 2007. File Report, Ontario Ministry of Natural Resources, Bracebridge.

Appendix Sampling details, Kawagama Lake winter creel survey, 2008.

SAMA	AREA	MODE	DATE	SAMTM0	DOW	WEATHER	ATYTM0	ATYTM1	ATYCNT	CHKCNT	ITVCNT
1	1	3	26/01/2008	14:01	7	0	14:01	15:25	0	0	0
2	1	4	26/01/2008	14:01	7	0	14:01	15:25	0		0
3	1	3	27/01/2008	12:15	1	0	12:15	13:40	0	0	0
4	1	4	27/01/2008	12:15	1	0	12:15	13:40	0		0
5	1	3	02/02/2008	12:01	7	0	12:01	13:34	0	0	0
6	1	4	02/02/2008	12:01	7	0	12:01	13:34	0		0
7	1	3	03/02/2008	12:01	1	0	12:01	13:35	0	0	0
8	1	4	03/02/2008	12:01	1	0	12:01	13:35	0		0
9	1	3	24/02/2008	10:01	1	0	10:01	11:59	0	0	0
10	1	4	24/02/2008	10:01	1	0	10:01	11:59	0		0
11	1	3	01/03/2008	10:01	7	0	10:15	11:55	1	1	1
12	1	4	01/03/2008	10:01	7	0	10:15	11:55	1		1
13	1	3	09/03/2008	10:01	1	0	10:01	11:40	1	1	0
14	1	4	09/03/2008	10:01	1	0	10:01	11:40	0		0
15	1	3	16/03/2008	14:00	1	0	14:00	16:00	1	1	1
16	1	4	16/03/2008	14:00	1	0	14:00	16:00	3		2
17	1	3	29/03/2008	14:01	7	0	14:10	15:45	0	0	0
18	1	4	29/03/2008	14:01	7	0	14:10	15:45	3		3
19	1	3	30/03/2008	12:01	1	0	12:01	13:40	0	0	0
20	1	4	30/03/2008	12:01	1	0	12:01	13:40	2		2