Darlington Lake

(Town of Parry Sound)

Winter 2001 Creel Survey Report

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Executive Summary:

An intensive creel survey was conducted on Darlington Lake (Town of Parry Sound) during the winter of 2001.

Total fishing effort was estimated to be 381 angler hours. However, due to the exceptionally small size of the lake (19.4 hectares), fishing pressure was intense at 19.6 angler hours per hectare. We estimate a total lake trout catch of 42 and harvest of 24. For all months combined, the observed effort to catch a lake trout was 8.8 hours (EUC) and 16.4 hours to harvest one (EUH). The observed release rate for lake trout was a remarkably high 57%.

Only 9 lake trout were observed during the survey. They were all planted fish. As one might expect from a small lake, the size of observed lake trout was also small, averaging 32.4 cm. in total length and 358 grams. Undoubtedly the small size of lake trout caught contributed significantly to the high release rate.

We estimate that approximately 10% of lake trout planted are caught and 5% harvested, solely by the winter fishery. We recommend a reduced stocking rate of 300 lake trout on a biannual basis.

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1.0 Introduction:

Darlington Lake in the Town of Parry Sound is a small (19.4 ha) lake trout lake (OMNR, 1970). Lake trout are not indigenous to the lake (Robson, 1981), but have been consistently planted by the Ministry of Natural Resources since 1956 to create an artificial fishery. In recent years (since 1995), the lake has received annual plantings of 500 yearling lake trout. Although Darlington Lake is surrounded by private land, public access is 'permitted'. Shoreline development is 'light'.

Despite its small size, the lake provides good lake trout habitat. Maximum depth is 30 meters (98') and mean depth 15 metres (49'). Dissolved oxygen and temperature data collected during the late summer of 2000 indicated 36% of lake volume provided excellent lake trout habitat (temp. <10° and D.O. > 6 ppm) and 54% provided useable habitat (temp. <15° and D.O. > 4 ppm) (OMNR, 2000). Notwithstanding the excellent habitat afforded lake trout in this lake, due to its very small size and water volume, only a small population of lake trout can be artificially sustained in this lake.

The lake has a simple fish community consisting of planted lake trout, smallmouth bass that appear to have been introduced in 1956 (OMNR, 1956), cisco, rock bass and yellow perch (OMNR, 1956).

A search of Ministry files indicates that almost no data exists with respect to stocking assessment on Darlington Lake. In a lake trout assessment report, Thurston (1977) placed Darlington Lake in what he called a "Category 1" lake – meaning that it had an ample population of lake trout and would continue to be managed for this species. We were unable to determine the basis for this classification however. Cumulatively, file data indicates that the lake has been visited on 11 occasions by Ministry staff between 1970 and 2000. Only on two occasions were anglers present – once each in 1970 and 1973. On the 1970 occasion, one angler had 3 lake trout and none on the 1973 occasion.

In an effort to determine the nature of the winter lake trout fishery (effort, catch and harvest, fishing quality) and to assess the success of recent artificial lake trout plantings, an intensive creel survey was conducted during the winter of 2001.

2.0 Methods:

Darlington Lake was one of a set of four lakes included in an intensive, roving creel survey conducted from January 1st to March 31st, 2001. Other lakes surveyed included Corfe (McDougall Twp.), Trout Lake (McDougall Twp.) and Lorimer Lake (Ferguson and Hagerman Twps.). Separate reports have been prepared for each lake surveyed.

2.1 Creel Day Scheduling:

Creel days were randomly selected. Overall, 12 weekend days were sampled and 23 weekdays. Scheduled creel days are shown in Appendix 1-A.

2.2 Activity Counts and Effort Estimation:

Activity counts were not scheduled, but taken at the creel operators discretion within the following guidelines:

- Over the course a month, activity counts were to be taken such that all time periods were represented (see Appendix 1A).
- Where activity counts were taken at a time when there was a very high degree of certainly that no anglers had left the lake, activity counts could be 'back calculated' from interview data.
- Activity counts were intended to be "instantaneous counts".
- The creel operator should remain on the lake for a minimum of two consecutive activity counts.
- Activity counts could be supplemented by having anglers fishing on the lake record counts in the creel clerks absence.

Mean activity counts were calculated by the hour to eliminate biases associated with counts being concentrated at particular times of the day. Mean hourly activity counts were then summed to determine an estimate of total daily fishing pressure for each month (Appendix 1-A). This daily effort estimate was then multiplied by the number of days in the month to determine estimates of monthly fishing effort (Appendix 1-B).

2.3 Fishing Quality; Harvest and Catch Estimation:

It was quite acceptable for the operator himself to fish, but his activity was not included in the activity count. (This was because his activity was not representative of a typical angler; i.e. – he wouldn't normally be fishing if he weren't working.) However, his 'fishing quality data' was included in the creel interview data (Appendix 2A) with the 'source' of the data noted.

Fishing quality was measured by observed effort, catch and harvest data collected in creel interviews (Appendix 2-A). Effort per unit catch and harvest (E.U.C and E.U.H.) were used to measure fishing quality (Appendix 2-B).

Fishing effort, catch and harvest data was pooled for all anglers. All anglers were fishing for lake trout.

Estimated catch and harvest were determined on a monthly basis by multiplying the observed C.U.E. or H.U.E. by the estimated effort (Appendix 3).

2.4 Biosampling Data:

Fish attribute data was collected for all lake trout encountered by the creel clerk (Appendix 4).

3.0 Results:

3.1 Fishing Effort:

Angling activity counts (Appendix 1A) indicated total daily fishing effort averaged 7.1 angler hours during January, 3.1 in February and 2.4 in March of 2001.

Estimated monthly fishing effort was 219.5 angler hours in January, 87.4 in February and 74.1 in March (Appendix 1B).

With a surface area of only 19.4 hectares, and total winter fishing effort of 381 angler hours, winter angling pressure on Trout Lake was high at 19.6 angler hours per hectare.

3.2 Fishing Quality:

Observed fishing effort was light for all months (Appendix 2B) making accurate interpretation of fishing quality very suspect. Fishing quality was best in January when the *Effort-per-Unit-Catch* (EUC) was 7.3 hours (Appendix 2B). Overall (all months combined), EUC was 8.8 hours and *Effort-per-Unit-Harvest* (EUH) was 16.4 hours (Appendix 2B).

Implicit in 'fishing quality data' is the notion that the better the fishing quality indexes are (i.e. low EUC and EUH values), the more abundant are the sought after fish. We note however that fishing quality is an unreliable indicator of fish abundance because *Effort –Per-Unit-Catch* and *Harvest* (EUC and EUH) may vary greatly depending on individual anglers. This bias becomes more pronounced when a small amount of angling activity is surveyed, which was the case in this creel.

3.3 Estimated Catch and Harvest:

An estimated total of 42 lake trout were caught on Trout Lake during the winter of 2001 of which 24 were estimated harvested (Appendix 3). This represents an extremely high release rate of 57%. Most if not all fish were released due to small size.

Lake trout was the only sought after species in the creel. One angler also reported incidentally catching a smallmouth bass that was subsequently released.

3.4 Biosampling Data:

A total of nine lake trout were observed in the creel, two of which were subsequently released (Appendix 4). Mean length was 32.4 cm. and mean weight 358 grams (0.8 lbs.).

All lake trout observed were planted fish for which an accurate age could be determined. Mean age was 4.0 years (Appendix 4).

4.0 Discussion

4.1 Stocking Assessment:

Since the mid-1980's, Darlington Lake has received annual plantings of yearling lake trout numbering between 350 and 500 fish. Since 1995, that number has been 500.

We are unaware of how representative results from this creel survey are for other winters on Darlington Lake. However, we have no reason to suspect there is a significant difference between winters other than 'natural variation' in the catch between years. Based on our creel results, we believe that annual winter catch of lake trout is around 50 fish and harvest around 25. Based on the recent annual planting rate of 500 fish per year, this translates into approximately 10% of planted lake trout being caught and 5% being harvested annually from the winter fishery.

A personal conversation with Dean Harris, a year-round resident on the lake indicates that there is very little angling for lake trout during the open-water months. Dean says that most open-water anglers fish for smallmouth bass in the lake.

Stocking success, in terms of % of stocked fish caught and harvested, was slightly lower on Darlington Lake than Trout Lake (McDougall Twp.) and Lorimer Lake, which were also surveyed during the winter of 2001 (Table 1).

Table 1. Comparison of stocking success for three lakes surveyed in the Parry Sound Area during the winter of 2001.

	% of stocked fish caught	% of stocked fish harvested	Data Source
Darlington Lake	10	5	This report
Trout Lake	20	10	McIntyre, 2002
Lorimer Lake	10	10	McIntyre, 2001

We suspect that the slightly poorer stocking success determined for Darlington Lake may be directly attributable to the likelihood that the lake is over-stocked. We believe that if the stocking rate were reduced, the catch and harvest numbers would remain essentially the same, and consequently the calculation of 'stocking success' would increase accordingly.

Lake trout have been planted in Darlington Lake based on a 1987 formula in which a basic stocking rate (20 fish / ha. for waters > 12m) is multiplied by an MEI (productivity) factor as well as an exploitation (fishing intensity) factor to determined a recommended stocking number. More recent stocking guidelines (OMNR, 2001), recommend stocking rates in the order of 8-10 yearlings per surface area on a 2-3 year rotational basis. This translates to only 200 lake trout being planted on Darlington Lake on a biannual basis.

Due to the high fishing pressure we observed in this creel survey (approx. 20 angler hrs. / ha.), we recommend a slightly higher stocking rate than that proposed by the new stocking guidelines. We recommend 300 lake trout be planted into Darlington Lake on a biannual basis.

5.0 Acknowledgements:

Wayne Dewart, under service contract with the Ministry of Natural Resources very ably collected field data. Special thanks to Mr. and Mrs. Dean Harris who provided access to the lake over their private land as well as collecting supplemental activity data for us.

6.0 Literature Cited:

McIntyre, E. 2001. Lorimer Lake (Hagerman and Ferguson Geographic Townships) winter 2001 creel survey. OMNR Parry Sound District Office fisheries file report. 17 p.

McIntyre, E. 2002. Trout Lake (McDougall Twp.) winter creel survey report. OMNR Parry Sound District Office fisheries file report. 17 p.

OMNR, 1956. Lake Survey Report. Parry Sound District Office fisheries file – Darlington Lake.

OMNR, 1970. Aquatic Habitat Inventory (Lake Survey) Report. Parry Sound District Office fisheries files. 2 p.

OMNR, 2000. Calculation of Mean Volume Weighted Hypolimnetic Dissolved Oxygen and Optimal lake trout habitat for Darlington Lake in the year 2000. Parry Sound District Office fisheries file – Darlington Lake. 1 p.

OMNR, 2001. Guidelines for stocking fish in inland waters in Ontario (Draft).

Robson, K. 1981. Historical information on lake trout lakes in the Parry Sound District. OMNR Parry Sound District fisheries file report.

Thurston, L. 1977. Summary of two years (1976-77) of lake trout assessment work – Parry Sound District. OMNR Parry Sound District fisheries file report. 9 p.

Appendix 1A. Activity Count Raw Data and Summary

Jan.	Day	8-9 am	9-10 am	10-11 am	11- 12 pm	12-1 pm	1-2 pm	2-3 pm	3-4pm	4-5pm	5-6 pm	Total
3	Wed.	0	0	0	0	0	0	0	0	0	0	
4	Thur.	0	0	0	0	0	0	0	0	0	0	
5	Fri.	0	0	0	0	0	0	0	0	0	0	
7	Sun.	0	0	0	0	2	2	2	2	2	0	
9	Tue.	0	0	0	0	0	0	0	0	0	0	
10	Wed.	0	0	0	0	0	1	1	1	1	0	
11	Thur.	0	0	0	0	0	0	0	0	0	0	
13	Sat.	0	3	3								
16	Tue.	0	0							0	0	
18	Thur.	0	2	2	2	2	2					
19	Fri.	0	0	0	2	2	4					
21	Sun.	0	2	4	4	4	4	2	2	0	0	
24	Wed.	0	0	0	4	4	4	4	0	0	0	
25	Thur.	0	0	0	0	0	0					
26	Fri.	0	0	0	0	2	2	2	2	2	2	
27	Sat.	0	2							0	0	
29	Mon.	0	0			1	1			0	0	
Mean		0	0.53	0.64	0.92	1.21	1.43	1.10	0.70	0.38	0.15	7.08
Standard Error		0	0.244	0.357	0.431	0.395	0.429	0.433	0.300	0.213	0.154	
Standard Deviation		0	1.007	1.336	1.553	1.477	1.604	1.370	0.949	0.768	0.555	
Sum		0	9	9	12	17	20	11	7	5	2	
Count		17	17	14	13	14	14	10	10	13	13	135

Feb.	Day	8-9 am	9-10 am	10-11 am	11- 12 pm	12-1 pm	1-2 pm	2-3 pm	3-4pm	4-5pm	5-6 pm	Total
1	Thur.	0	0	0	0	0	4	4	4	0	0	
2	Fri.	0	0							0	0	
4	Sun.	0	0	0	0	2				0	0	
5	Mon.					0	0					
6	Tue.	0	1	1				1	1	0		
9	Fri.	0	0						0	0	0	
13	Tue.	0	0							0	0	
14	Wed.	0	0	0	0	2	2		0	0		
17	Sat.	0	0	0	0	0	0	0	0	0	0	
18	Sun.	0	0	0								
19	Mon.							0	0	0	0	
22	Thur.	0	0	0								
23	Fri.	0	0	0	0	0	0	0	0	0	0	
24	Sat.	0	0	0								
26	Mon.	0	0	0	0	0	1					
28	Wed.	0	0	0	0	0	0	0	0	0	0	
Mean		0.00	0.07	0.09	0.00	0.50	1.00	0.83	0.63	0.00	0.00	3.12
Standard Error		0.000	0.071	0.091	0.000	0.327	0.577	0.654	0.498	0.000	0.000	
Standard Deviation		0.000	0.267	0.302	0.000	0.926	1.528	1.602	1.408	0.000	0.000	
Sum		0	1	1	0	4	7	5	5	0	0	
Count		14	14	11	7	8	7	6	8	11	9	95

Mar.	Day	8-9 am	9-10 am	10-11 am	11- 12 pm	12-1 pm	1-2 pm	2-3 pm	3-4pm	4-5pm	5-6 pm	Total
1	Thur.	0	0	0	0	0	0	0	0	0	0	
4	Sun.	0	0	0							0	
6	Tue.	0	0	0	0	0	0	0	0	0	0	
7	Wed.	0	0	0	0	0	0	1	1	1	1	
9	Fri.	0	0	0	0	0	0	0	0	0	0	
10	Sat.	0	0	0	0	0	0	0	0	0		
12	Mon.	0	0	0	0	0	0	0	0	0	0	
15	Thur.	0	0	0	0	0	0	0	0	0	0	
18	Sun.	0	0	0								
20	Tue.	0	0	0	0	2	2	2	2	2	0	
21	Wed.	0	0	0	3	3	3	3				
22	Thur.	0	0	0								
24	Sat.	0	0	0	0	0	0					
26	Mon.	0	1	1	0	0	0	0	0	0	0	
27	Tues	0	0	0	0	0	0	0	0	0	0	
28	Wed.	0	0	0	0	0	1	1	1	1	0	
29	Thur.	0	0	0	0	0	0	0	0	0		
Mean		0.00	0.06	0.06	0.21	0.36	0.43	0.54	0.33	0.33	0.09	2.41
Standard Error		0.000	0.059	0.059	0.214	0.248	0.251	0.268	0.188	0.188	0.091	
Standard Deviation		0.000	0.243	0.243	0.802	0.929	0.938	0.967	0.651	0.651	0.302	
Sum		0	1	1	3	5	6	7	4	4	1	
Count		17	17	17	14	14	14	13	12	12	11	141

Appendix 1B. Effort Estimate Calculations – 2001 Darlington Lake Winter Creel Survey

Month	Average Daily Effort (Angler Hours) (from Appendix 1A)	X	Number of Days In Month	=	Effort Estimate (Angler Hours)
January	7.08		31		219.48
February	3.12		28		87.36
March	2.41		31		74.71
All					381.55

Appendix 2A. Creel Interview Raw Data and Summary

Date 2001	Angler Origin	Target Species	Method	Effort (Angler Hours)	Data Source	Catch Lake Trout	Harvest Lake Trout
Jan. 7	PS Area	LT	Still	10.00		0	0
Jan. 10	PS Area	LT	Still	3.50		0	0
Jan. 10	PS Area	LT	Jig	0.75	*	0	0
Jan. 11	PS Area	LT	Jig	0.50	*	1	1
Jan. 13	PS Area	LT	Both	2.25		0	0
Jan. 18	PS Area	LT	Jig	7.00		2	2
Jan. 19	PS Area	LT	Jig	4.50		0	0
Jan. 19	PS Area	Lt	Still	0.50		1	0
Jan. 19	PS Area	LT	Both	0.50		0	0
Jan. 21	PS Area	LT	Jig	10.00		0	0
Jan. 21	PS Area	LT	Jig	12.00		1	1
Jan. 21	PS Area	LT	Jig	0.50	*	0	0
Jan. 24	PS Area	LT	Jig	0.50	*	0	0
Jan. 25	PS Area	LT	Jig	0.75	*	0	0
Jan. 26	PS Area	LT	Jig	0.35	*	0	0
Jan. 26	PS Area	LT	Still	9.00		1	1
Jan. 27	PS Area	LT	Still	1.50		2	1
Jan. 27	PS Area	LT	Jig	0.25	*	1	0
Jan. 29	PS Area	LT	Jig	0.75		0	0
Jan. 29	PS Area	LT	Jig	0.35	*	0	0
	Totals			65.45		9	6
	Effort per unit catch (E.U.C.)					7.27	
	Effort per unit harvest (E.U.H)						10.91
	Indicates data from creel clerk fishing				*		

Date 2001	Angler Origin	Target Species	Method	Effort (Angler Hours)	Data Source	Catch Lake Trout	Harvest Lake Trout
Feb. 1	PS Area	LT	Still	6.75		0	0
Feb. 1	PS Area	LT	Both	2.00		1	1
Feb. 4	PS Area	LT	Still	1.00		0	0
Feb. 5	PS Area	LT	Jig	0.50	*	0	0
Feb. 6	PS Area	LT	Jig	1.25		0	0
Feb. 6	PS Area	LT	Jig	1.50		0	0
Feb. 13	PS Area	LT	Jig	0.50	*	0	0
Feb. 14	PS Area	LT	Still	1.50		0	0
Feb. 14	PS Area	LT	Jig	0.50	*	0	0
Feb. 17	PS Area	LT	Jig	1.00	*	0	0
Feb. 18	PS Area	LT	Jig	0.75	*	0	0
Feb. 19	PS Area	LT	Jig	0.50	*	0	0
Feb. 22	PS Area	LT	Jig	0.75	*	0	0
Feb. 23	PS Area	LT	Jig	0.50	*	0	0
Feb. 26	PS Area	LT	Both	0.65		0	0
Feb. 26	PS Area	LT	Jig	0.50	*	0	0
Feb. 28	PS Area	LT	Jig	0.50	*	0	0

Totals	20.65		1	1
Effort per unit catch (E.U.C.)			20.65	
Effort per unit harvest (E.U.H)				20.65

Indicates data from creel clerk fishing *

Date 2001	Angler Origin	Target Species	Method	Effort (Angler Hours)	Data Source	Catch Lake Trout	Harvest Lake Trout
Mar. 1	PS Area	LT	Jig	0.50	*	0	0
Mar. 7	PS Area	LT	Still	3.25		0	0
Mar. 10	PS Area	LT	Jig	0.50	*	0	0
Mar. 15	PS Area	LT	Jig	0.50	*	0	0
Mar. 18	PS Area	LT	Jig	0.50	*	0	0
Mar. 20	PS Area	LT	Jig	0.50	*	0	0
Mar. 20	PS Area	LT	Both	10.00		0	0
Mar. 21	PS Area	LT	Both	8.25		1	0
Mar. 22	PS Area	LT	Jig	0.50	*	0	0
Mar. 26	PS Area	LT	Jig	1.00		0	0
Mar. 28	PS Area	LT	Both	3.00		2	0
Totals				28.50		3	0
Effort per unit catch (E.U.C.)						9.5	
Effort per unit harvest (E.U.H)							###

Indicates data from creel clerk fishing *

Appendix 2B. Fishing Quality Analysis Summary

	January	February	March	All
Observed Fishing Effort (angler hours)	65.5	20.7	28.5	114.6
Number of Interviews * (from Appendix 2A)	20	17	11	48
Lake Trout				
Effort-per-Unit-Catch (EUC)	7.27	20.65	9.50	8.81
Catch-per-Unit-Effort (CUE)	0.137	0.048	0.105	0.113
Lake Trout				
Effort-per-Unit-Harvest (EUH)	10.91	20.65	0.00	16.37
Harvest-per-Unit-Effort (HUE)	0.091	0.048	0.000	0.061

* Note: Number of Interviews includes supplemental data from creel clerk fishing

Note:
EUC and EUH statistic are from Appendix 2A
CUE and HUE are calculated reciprocals from EUC and EUH

Appendix 3.
Estimated Catch and Harvest Calculations

Species	Month	Estimated Effort (Appendix 1B)	C.U.E (Appendix 2B)	Estimated Catch	H.U.E. (Appendix 2B)	Estimated Harvest
	January	219.5	0.137	30	0.091	20
Lake Trout	February	87.4	0.048	4	0.048	4
	March	74.1	0.105	8	0	0
	Total	**381**		**42**		**24**

Formula: Estimated Effort X CUE = Estimated Catch
Estimated Effort X HUE = Estimated Harvest

Note: CUE and HUE are reciprocals of EUC and EUH derived from Appendix C

Appendix 4.
Harvested Lake Trout Biosampling Data and Summary

Total Lg. (cm.)	Weight (grams)	Fate	Fin Clip	Year Stocked	Calculated Age
54.0	1225	Kept	LV	1994	8
29.1	125	Kept	LV	1999	3
41.0	500	Kept	RP	1996	6
30.5	175	Kept	RV	1997	5
34.2	300	Kept	Ad	1998	4
35.8	475	Kept	Ad	1998	4
22.0	125	Released	LP	2000	2
20.5	100	Released	LP	2000	2
24.3	200	Kept	LP	2000	2
291.4	3225		Sum		36
32.4	358		Mean		4.0
9	9		Sample Size		9