ONTARIO
Ministry of Natural Resources

Blackstone Lake

2005 Spring Littoral Index Netting (SLIN) Survey Report

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Executive Summary:

In April of 2005, a *Spring Littoral Index Netting* (SLIN) survey was conducted on Blackstone Lake in the Geographic Township of Conger, now the Municipality of The Archipelago. The primary purpose of the survey was to assess the status of the stocked lake trout population in the lake. A secondary purpose was to contribute to the Parry Sound Area and Provincial SLIN reference datasets, which track the long-term trends of lake trout population status on a broad-scale or landscape basis.

We captured 23 lake trout for a *Catch-Per-Unit-Effort-by-number* (CPUE-no) of 0.77 ± 0.52 ($p<0.05$) trout per net set. This was similar to the average observed in the Parry Sound reference dataset (0.83) and the Provincial reference dataset (1.20). Consequently, we consider Blackstone Lake to have an "average" or moderate abundance of lake trout. We consider such abundance to be indicative of good survival of planted lake trout. All but one of the 23 lake trout captured were from the 1999 and 2001 plantings. We believe past and future plantings are indeed providing additional angling opportunities for this species.

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1.0 Introduction

Blackstone Lake is a moderate size (516 hectare) lake with a maximum depth of 58 meters (190') and a mean depth of 20.1 meters (66') (OMNR, 1969). It is part of the small Blackstone River watershed with its headwaters in the Geographic Township of Christie. The Blackstone River drains westward into Georgian Bay at Blackstone Harbour. The water level is indirectly controlled by the down-steam Crane Lake Dam, operated by the Ministry of Natural Resources. The lake is readily accessible by road and is well developed. In 1999, there were 102 cottages, 20 resort units and 42 undeveloped (vacant) lots (Scheifer, 2001). Two private resorts on the lake also function as public access points. Approximately 60% of the shoreline is in private ownership.

The lake is oligotrophic in nature, with a total phosphorus level of 2 µg/l (MOE, 2000), secchi readings in excess of 5 meters and total dissolved solids (TDS) of 19 mg/l (Scheifer, 2001). This in conjunction with the deep nature of the lake (mean depth 20.1 m) makes Blackstone Lake highly suited to lake trout, notwithstanding the population is wholly sustained by MNR plantings.

With at least 19 fish species present, Blackstone Lake has a very diverse fish community (OMNR, 2005). McIntyre (2005) reviewed the history of fisheries management on the lake including species introductions. The particular species of interest for this survey was lake trout. Lake trout were first planted in 1956 and regular bi-annual plantings have continued to the present (OMNR, undated). Despite five-decades of lake trout plantings, there is no record of any successful reproduction. Present day plantings continue on a P-G-T (Put-Grow-Take) basis to provide artificial angling opportunities.

Extensive fisheries work has been conducted on the lake (McIntyre, 2005), but almost all of it has been directed toward the near-shore fish community and walleye in particular. The only survey work that relates to lake trout is a 1994 creel survey in which 79 trout were estimated caught from 1,190 angler hours of estimated effort (OMNR, 1994).

In 1999, as part of a Regional review of lake trout regulations, Blackstone Lake was opened to year-round lake trout fishing. The rationale behind this was to maximize angler opportunities and harvest of an artificial population for which there were no sustainability concerns.

The primary purpose of this survey was one of lake trout stocking assessment. A secondary purpose of the survey was to contribute to the Parry Sound Area and Provincial SLIN reference datasets, which track the long-term trends of lake trout population status on a broad-scale or landscape basis.

2.0 Methods:

2.1 Field Operations:

The net setting and sampling protocols used for this survey were according to the "*Manual of Instructions – Spring Littoral Index Netting (SLIN)*" (Hicks, 1999). Netting operations commenced April 20th when the water temperature was 6.5º Celsius, and terminated April 26th when water temperature had actually decreased to 5º C. A total of 30 net sets were made (Figure 1).

Three, 300' standard SLIN monofilament gillnets were used. Although all nets were 300 feet in length – consisting of 6 – 50 foot panels, each had unique mesh sizes: 38-mm (1 ½"), 51-mm (2") and 64-mm (2 ½").

Netting sites were randomly selected. The shoreline of the lake and islands was segmented into 266 units of approximately equal length. Netting sites were then selected from a table of random numbers. In those instances where specified segments of shoreline were inappropriate due to obstructions, navigational or social concerns, we simply adopted the nearest appropriate segment of shoreline. Net sets were of 90-minute duration with a general 90º orientation to the shoreline.

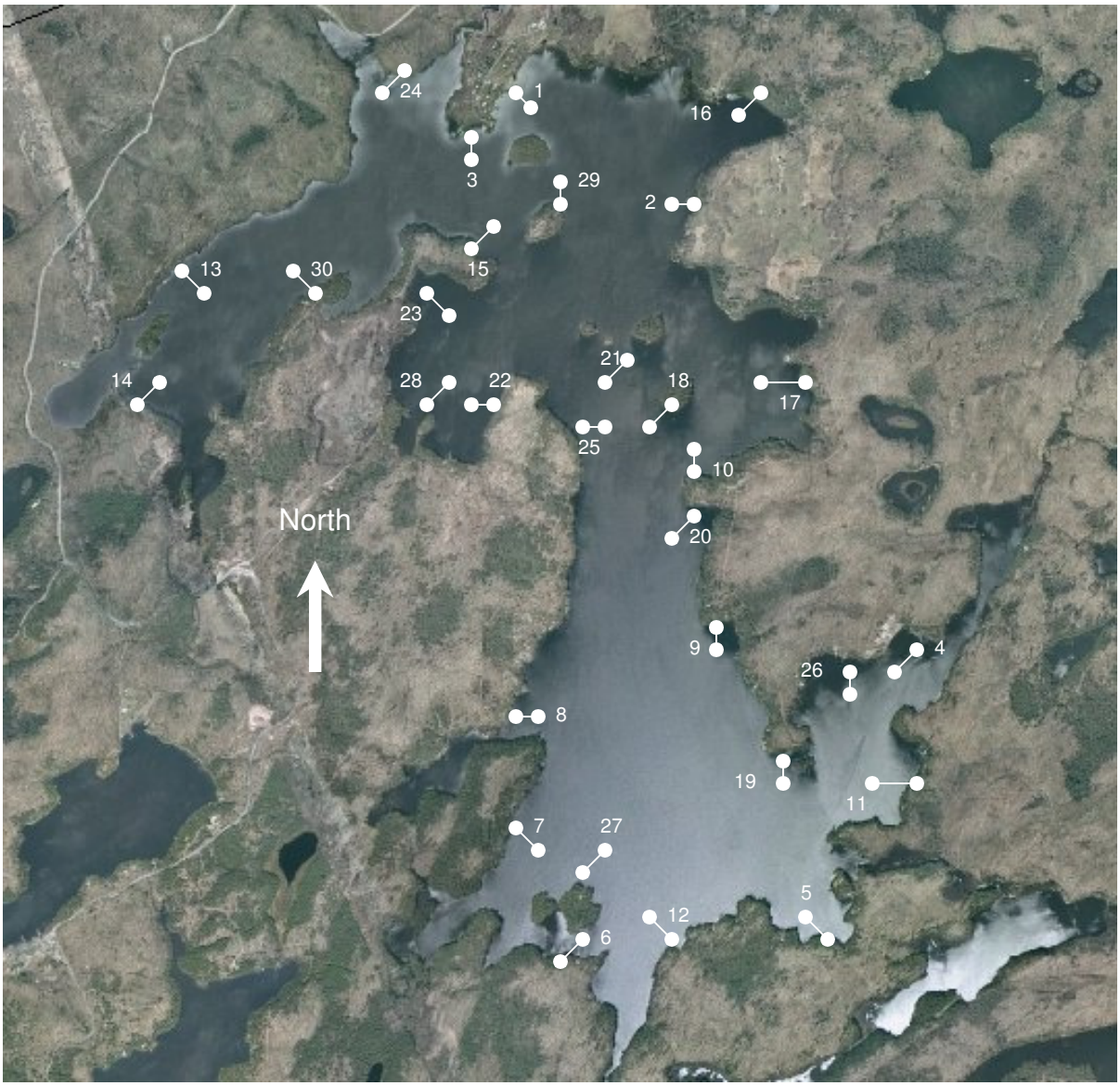
Complete catch enumeration and biosampling (size determination) was conducted for all fish captured (Appendixes A – C).

2.2 Data Analysis:

We compare our lake trout abundance (i.e. *Catch-Per-Unit-Effort-by-number*; [CPUE-no]) and biosampling data with two reference datasets: the Parry Sound Area SLIN dataset and the Provincial SLIN dataset (Appendices D and E).

Using the Ministry's FINBrowser (Version 0.999), we selected comparison lakes in the Provincial SLIN data base that were 100 – 1000 hectares in size and were similarly surveyed using the "6 panel – 90 minute set duration" unit of effort used in this survey. We came up with 53 surveys that met the foregoing criteria. *CPUE-no* and *mean size* data for this filtered dataset is presented in Appendix E.

Figure 1. Net Set Location for the 2005 Spring Littoral Index Netting (SLIN) Survey on Blackstone Lake. *(Note: Orientation of some sets may be slightly skewed due to graphic limitations.)*



3.0 Results

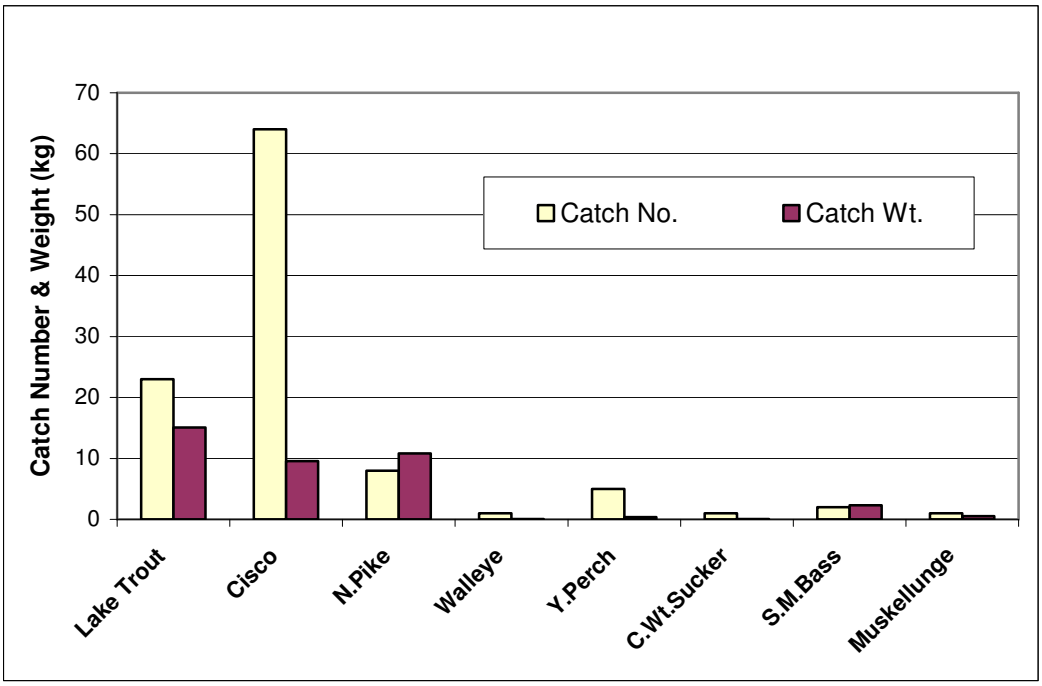
3.1 Catch Composition:

From our standard sampling effort of 30, 90-minute gillnet sets, we captured: 23 lake trout, 64 cisco, 8 northern pike, 5 yellow perch, 2 smallmouth bass, 1 walleye, 1 common white sucker and 1 muskellunge (Appendix A and Figure 2).

Catch composition by weight was: 15.050 kg lake trout, 10.825 kg northern pike, 9.550 kg cisco, 2.300 kg smallmouth bass, 0.550 kg muskellunge, 0.345 kg yellow perch, 0.060 kg common white sucker and 0.050 kg walleye (Appendix A and Figure 2).

> *We emphasize this netting methodology is conducted at a specific time of year (springtime with water temperature <13º C) and with gear intended to target lake trout. Consequently, our catch composition is not representative of the fish community as a whole.*

Figure 2. Catch Composition by Number and Weight (kg)



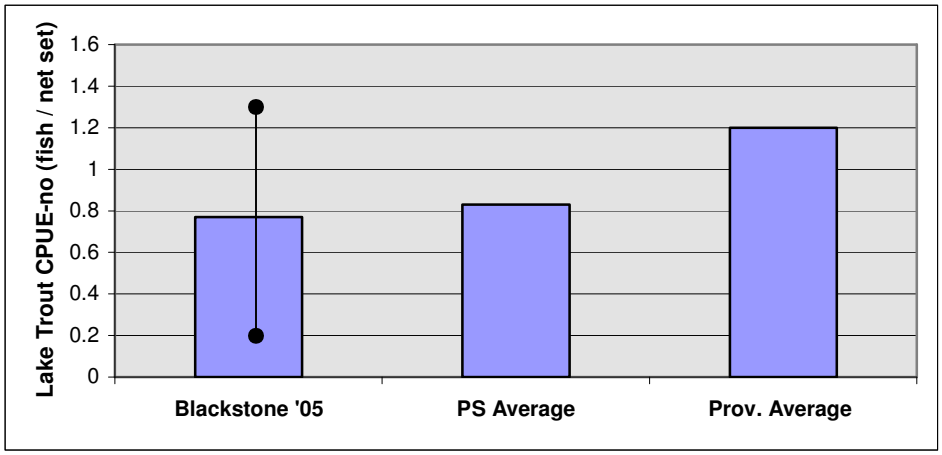
Cumulatively, we captured a grand total of 38.730 kg of fish for an over-all *Catch-Per-Unit-Effort-by weight* (CPUE-wt) of 1.29 kg per net set (Appendix A). This catch rate is well below the average of 2.46 kg / set in the Parry Sound SLIN reference dataset (Appendix D).

3.2 Lake Trout

3.2.1 Abundance

We captured 23 lake trout for a *Catch-Per-Unit-Effort-by-number* (CPUE-no) of 0.77 ± 0.52 ($p<0.05$) lake trout per net set (Appendix A and Figure 3). This is very similar to the Parry Sound SLIN dataset average of 0.83 (Appendix D) and the filtered provincial dataset average of 1.2 (Figure 3). Because it ranks in the median 50% of values in the provincial dataset (Appendix E), we consider Blackstone Lake to have an "average" or moderate abundance of lake trout.

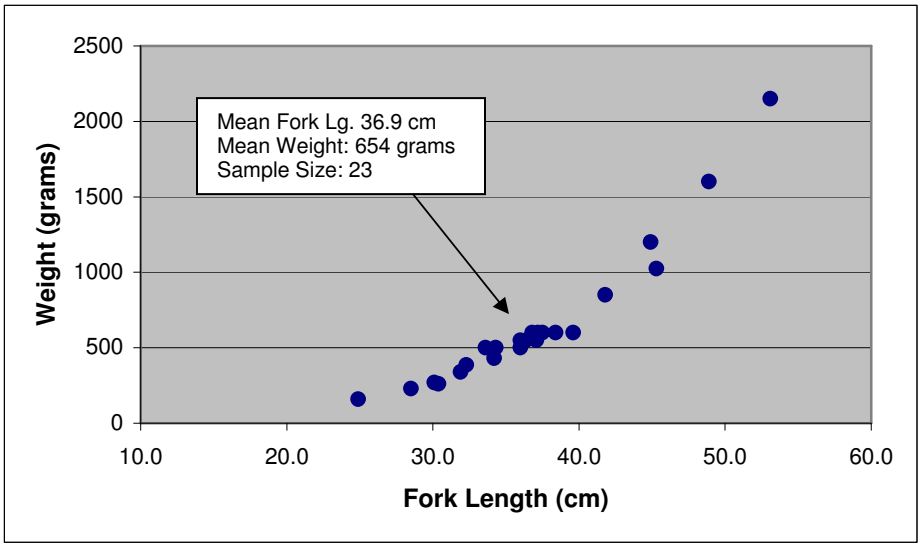
Figure 3. A Comparison of Lake Trout CPUE-no Values Observed on Blackstsone Lake with Reference Datasets. (Error bars shown on Blackstone Lake survey represents 95% confidence interval. For Parry Sound reference SLIN data – see Appendix D; for Provincial reference SLIN data – See Appendix E.)



3.2.2 Biosampling Data:

The mean size of 23 lake trout captured on Blackstone Lake was relatively small: mean fork length was 36.9 cm and mean weight was 0.654 kg (Appendix B and Figure 4). Relative to the Provincial reference SLIN data set, this mean size is well below average and amongst the lowest 25% of values (Appendix E). The presence of small lake trout is understandable considering there is consistent recruitment of planted fish. The scarcity of larger fish in our sample may be indicative of high mortality associated with intense fishing pressure. Unfortunately we do no have supporting creel data to substantiate this hypothesis.

Figure 4. Size Distribution of Lake Trout Sampled During the 2005 Blackstone Lake SLIN Survey.



Because the lake trout population is entirely comprised of stocked fish, we have little concern related to recruitment. We captured 11 lake trout with an LV (left ventral) fin clip. These fish were 7+ years of age and originate from the 1999 planting. We also captured 11 lake trout with an RP (right pelvic) fin clip. These were 5+ year old fish and originate from the 2001 planting. Both these planting events show good recruitment to the adult population. We also caught 1 lake trout with an Ad (adipose) clip, which originated from the 2003 planting. Fish from this stocking event were not yet vulnerable to our fishing gear and are therefore under-represented in the catch. We strongly suspect there are older and larger lake trout present in Blackstone Lake than what our sample indicates. These fish are simply not very abundant and we failed to catch any.

3.2.3 Stocking Assessment:

By virtue of planted lake trout being moderately abundant, or within the median 50% of values in the Provincial SLIN dataset (Appendix E), we consider this an indicator of good survival for planted fish. Although we are unaware at what rate these fish are being captured by anglers, we can certainly attest to the fact that they are available to be caught. We consider this a very positive endorsement of Ministry lake trout stocking efforts and consequently plan to continue bi-annual plantings.

3.3 Cisco (Lake Herring):

Although SLIN surveys are designed to target lake trout, the method also has some utility in assessing cisco populations. Typically, this species is caught in the deep-water portions of the nets.

We caught a total of 64 cisco for a CPUE-no of 2.13 ± 1.23 ($p<0.05$) fish per net set (Appendix A). This is almost identical to the mean value of 2.15 in the Parry Sound Area

SLIN dataset (Appendix D). Consequently, we consider cisco abundance on Blackstone Lake to be “average” or moderate.

3.4 Other Species:

Other species captured in this survey include northern pike, walleye, yellow perch, common white sucker, smallmouth bass and muskellunge. The SLIN methodology generally results in very low catches of the above species. The survey methodology is not intended to measure the relative abundance of these species and it would be invalid to do so.

One noteworthy catch however was that of a single yearling* walleye (Appendix C). It is noteworthy by virtue of the fact it indicates some degree of successful reproduction is occurring in the lake. Chronic reproductive and / or recruitment failure is a concern for this walleye population (McIntyre, 2005a; and McIntyre, 2005b).

* We assumed it was a yearling walleye based on the fork length of 17.6 cm.

4.0 Acknowledgements:

Field work was conducted by Jim Palmer and Eric McIntyre.

We wish to thank Mrs. Sylvia Morwald of Angler's Inn Resort, for launching, docking and parking privileges.

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Appendix A. Catch Summary for the 2005 Blackstone Lake SLIN Survey

Set Number	Catch (Number)								
	Lake Trout	Cisco	N.Pike	Walleye	Y.Perch	C.Wt.Sucker	S.M.Bass	Muskellunge	
1	0	0	0	0	0	0	0	0	
2	2	7	1	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	
4	0	0	0	1	0	0	0	0	
5	0	0	0	0	0	0	0	0	
6	0	0	0	0	1	0	0	0	
7	3	0	1	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	
9	0	1	1	0	0	0	0	0	
10	1	2	0	0	0	0	0	0	
11	0	10	0	0	0	1	0	0	
12	0	1	0	0	0	0	0	0	
13	1	3	0	0	0	0	0	0	
14	0	0	0	0	2	0	0	0	
15	0	1	0	0	0	0	0	0	
16	0	0	0	0	0	0	0	0	
17	0	5	0	0	0	0	0	0	
18	3	3	0	0	0	0	0	0	
19	1	1	0	0	0	0	0	0	
20	1	5	0	0	0	0	0	0	
21	0	1	0	0	0	0	0	0	
22	6	0	0	0	0	0	1	0	
23	0	0	0	0	2	0	0	1	
24	0	2	3	0	0	0	0	0	
25	2	1	0	0	0	0	0	0	
26	3	10	1	0	0	0	0	0	
27	0	0	0	0	0	0	0	0	
28	0	0	1	0	0	0	0	0	
29	0	11	0	0	0	0	1	0	Grand
30	0	0	0	0	0	0	0	0	Totals
Total	23	64	8	1	5	1	2	1	105
CPUE-no (fish per net set)	0.77	2.13	0.27	0.03	0.17	0.03	0.07	0.03	
Standard Error	0.257	0.602	0.117	0.033	0.097	0.033	0.046	0.033	
Standard Deviation	1.406	3.298	0.640	0.183	0.531	0.183	0.254	0.183	
Confidence Level(95.0%)	0.525	1.232	0.239	0.068	0.198	0.068	0.095	0.068	
Sample Size	30	30	30	30	30	30	30	30	
Probability of Capture	0.333	0.533	0.200	0.033	0.100	0.033	0.066	0.033	
Total Catch Weight (kg)	15.050	9.550	10.825	0.050	0.345	0.060	2.300	0.550	38.730
CPUE-wt (gr / net set)	502	318	361	2	12	2	77	18	
% of over-all catch wt.	38.85	24.66	27.95	0.13	0.89	0.15	5.94	1.42	99.99

Appendix B. Lake Trout Biosampling Data

Set No.	Fork Lg. (cm)	Weight (grams)	Calculated Age	Fin Clip	Year Stocked	Fate
2	45.3	1025	7	LV	1999	Released
2	34.2	430	5	RP	2001	Dead
7	39.6	600	7	LV	1999	Released
7	33.6	500	5	RP	2001	Released
7	36.0	500	5	RP	2001	Dead
10	38.4	600	7	LV	1999	Released
13	53.1	2150	7	LV	1999	Released
18	24.9	160	3	AD	2003	Released
18	28.5	230	5	RP	2001	Released
18	48.9	1600	7	LV	1999	Released
19	36.0	550	7	LV	1999	Dead
20	37.2	600	7	LV	1999	Released
22	31.9	340	5	RP	2001	Released
22	32.3	385	5	RP	2001	Released
22	30.4	260	5	RP	2001	Released
22	41.8	850	7	LV	1999	Released
22	44.9	1200	7	LV	1999	Released
22	37.1	550	7	LV	1999	Released
25	37.5	600	5	RP	2001	Released
25	36.4	550	5	RP	2001	Dead
26	36.8	600	7	LV	1999	Released
26	34.3	500	5	RP	2001	Dead
26	30.1	270	5	RP	2001	Released
Mean	36.9	654	5.9			
Standard Error	1.371	96.099	0.246			
Standard Deviation	6.575	460.874	1.180			
Confidence Level(95.0%)	2.843	199.297	0.510			
Sum		15050				
Sample Size	23	23	23			

Appendix C. Biosampling Data for Other Species Captured

Species	Fork Lg.	Weight
Northern Pike	59.6	1375
Northern Pike	70.8	3250
Northern Pike	61.5	1700
Northern Pike	42.5	500
Northern Pike	44.7	650
Northern Pike	54.6	1250
Northern Pike	55.0	1300
Northern Pike	46.3	800
Mean	54.4	1353
Sum		10825
Yellow Perch	20.8	130
Yellow Perch	15.7	65
Yellow Perch	16.2	75
Yellow Perch	13.4	35
Yellow Perch	14.3	40
Mean	16.1	69
Sum		345
Smallmouth Bass	40.0	1150
Smallmouth Bass	41.0	1150
Mean	40.5	1150
Sum		2300
Common Wt. Sucker	16.8	60
Muskellunge	42.7	550
Walleye	17.6	50

Appendix D. Parry Sound Area SLIN Reference Dataset Summary.

	Lk. Trout CUE (no./set)	Lk. Trout CUE (kg./set)	Prob. of Capture	Mean Fk. Lg. (cm)	Mean Wt. (gr.)	Total Lt Biomass Caught (kg.)	Other sp. Biomass Caught (kg.)	All Sp. biomass Caught (kg.)	All Sp. CUE (kg./set)	N. Pike CUE	Lake Whitefish CUE	Cisco CUE
Trout Lk (McDougal) (1996)	0.43	0.47	0.400	43.3	1092	14.20	21.00	35.20	1.17			1.00
Wawaksh Lk (S. Basin) (1997)	0.80	2.48	0.470	59.9	3102	74.40	132.80	207.20	6.91	0.770	0.43	0.73
Miskokway Lk (1997)	1.50	1.59	0.770	41.1	1043	47.99	30.00	77.99	2.60			6.07
Trout Lk (Burpee) (1998)	4.87	4.88	0.930	43.7	1003	146.42	11.07	157.49	5.25			0.03
Sollman Lk (1998)	0.30	0.54	0.170	50.4	1813	16.32	35.00	51.32	1.71		0.80	2.23
Three Legged Lk (1998)	0.36	0.23	0.330	37.7	620	6.82	3.83	10.65	0.04			0.27
Flaxman Lk (1999)	0.13	0.18	0.100	41.4	1380	5.52	10.70	16.22	0.54			0.26
Otter Lk (1999)	0.33	0.61	0.270	49.1	1845	18.45	91.38	109.83	3.66	1.030		11.13
Wawaksk Lk (N. Basin) (2000)	0.03	0.19	0.030	75.9	5600	5.60	65.67	71.27	2.38	0.900	0.27	2.53
Lorimer Lake (2000)	0.80	1.658	0.470	51.7	2073	49.74	12.34	62.08	2.10	0.300		
Little Seguin Lake (2001)	0.10	0.069	0.100	32.4	695	2.08	41.75	43.83	1.46	0.667		0.13
Wawaksh Lk (South) (2004)	0.77	2.57	0.500	62.2	3347	76.98	44.04	121.02	4.03		0.23	1.07
Blackstone Lake (2005)	0.77	0.502	0.333	36.9	654	15.05	23.68	38.73	1.29	0.270		2.13
Sollman Lk (2005)	0.43	0.690	0.267	47.8	1592	20.70	18.43	39.13	1.30		0.13	0.37
Mean	0.830	1.190	0.367	48.107	1847	35.734	38.692	74.426	2.460	0.661	0.372	2.150
Standard Error	0.327	0.361	0.068	3.098	366	10.838	9.634	15.030	0.509	0.129	0.117	0.875
Median	0.430	0.575	0.332	45.750	1486	17.385	26.840	56.700	1.905	0.734	0.270	1.000
Standard Deviation	1.225	1.352	0.254	11.591	1371	40.551	36.047	56.236	1.904	0.315	0.263	3.156
Confidence Level(95.0%)	0.707	0.781	0.146	6.693	792	23.413	20.813	32.470	1.100	0.330	0.326	1.907
Count	14	14	14	14	14	14	14	14	14	6	5	13

Appendix E. Filtered Provincial SLIN Reference Dataset.

(Note: Parry Sound Area lakes highlighted in grey.)

Lake	Mean Fk Lg.	CUE
Flack	371	2.844
Emerald	418	1.833
Manitou	501	0.567
Clearwater	382	1.966
L.Bass	371	1.933
Smyth	865	0.033
3-Legged	380	0.333
Trout	464	0.433
Horn	504	0.3
Island	502	0.367
Sucker	305	0.846
Young	379	0.324
Bigwind	381	1.111
Clinto	501	0.167
Smoke	503	1.183
Smoke	520	1.967
Oxbow	569	1.222
Kimbell	442	0.367
Livingston	466	2.2
Penninsula	461	0.869
Clear	499	0.733
Koshlong	498	2.7
Dickey	342	3.654
Dickey	338	1.4
Dickey	286	2.067
Dickey	261	1.385
St.Anthony	472	0.967
Kushog	650	0.091
Elmer	529	0.5
Dickson	747	0.367
Charlotte	537	1.367
Cross	615	0.4
Louisa	377	2.629
Brule	373	1.233
Mackie	289	1.267
Palmerston	464	0.742
Palmerston	470	2.133
Clarice	501	0.432
Thompson	540	1.877
Robinson	600	0.438
Squeers	361	1.235
Squeers	435	0.974
Crook	393	6.154
Rutter	488	2.076
Secret	452	1.117
Cedarborough	597	0.846
Otter	491	0.33
WWK (North)	759	0.03
WWK (S-'97)	599	0.8
WWK (S-'04)	622	0.77
Lorimer	517	0.8
Blackstone (2005)	369	0.77
Sollman Lk (2005)	478	0.43

Mean	476	1.200
Standard Error	16.505	0.147
Standard Deviation	120.155	1.068
Confidence Level(95.0%)	33.119	0.294
Count	53	53

	Sorted Ascending Mean Fk Lg.	CUE
	261	0.03
	286	0.033
	289	0.091
	305	0.167
	338	0.3
	342	0.324
	361	0.33
	369	0.333
	371	0.367
	371	0.367
	373	0.367
	377	0.4
25th percentile	379	0.43
	380	0.432
	381	0.433
	382	0.438
	393	0.5
	418	0.567
	435	0.733
	442	0.742
	452	0.77
	461	0.77
	464	0.8
	464	0.8
	466	0.846
	470	0.846
	472	0.869
	478	0.967
	488	0.974
	491	1.111
	498	1.117
	499	1.183
	501	1.222
	501	1.233
	501	1.235
	502	1.267
	503	1.367
	504	1.385
	517	1.4
75th percentile	520	1.833
	529	1.877
	537	1.933
	540	1.966
	569	1.967
	597	2.067
	599	2.076
	600	2.133
	615	2.2
	622	2.629
	650	2.7
	747	2.844
	759	3.654
	865	6.154