ONTARIO
Ministry of Natural Resources

Sollman Lake
(a.k.a. Horn Lake)
Geographic Township of Chapman

2005 Spring Littoral Index Netting (SLIN) Survey Report

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Executive Summary:

In 2005, a *Spring Littoral Index Netting* (SLIN) survey was conducted on Sollman Lake to ascertain the status of the lake trout population, especially in light of stringent sport fishing regulations implemented in 2000. A SLIN survey had previously been conducted on Sollman Lake in 1998, affording us a fortuitous opportunity to assess the lake trout population 'before and after' regulation implementation.

The over-all *Catch-Per-Unit-Effort-by-weight* (CPUE-wt) for all species combined was 1.30 kg per set. This was equivalent to that observed in the 1998 survey, but below average relative to our reference Parry Sound SLIN dataset.

Lake trout abundance, as measured by *Catch-Per-Unit-Effort-by-number* (CPUE-no) was 0.4 ± 0.3 ($p<0.05$) lake trout per net set. This was slightly improved from that observed in the 1998 survey (0.3), but the two were not significantly different ($p<0.05$). This value was below the average (0.8) for our reference Parry Sound SLIN dataset. Because it ranked in the lower 25% of values in the reference Provincial SLIN dataset it is accorded a "low abundance" rating. Coregonid (lake whitefish and cisco) abundance was significantly lower in 2005 relative to the 1998 survey.

We detected a shift to smaller size classes as well as decreasing mean size of lake trout sampled in this survey relative to the 1998 survey. We believe these are possibly indicators of improved reproduction and recruitment in recent years. This is a tentative conclusion due to the small number of lake trout sampled in each survey.

We detected no significant increase in lake trout abundance correlated with new fishing regulations implemented in 2000. This is probably due to insufficient time lag for the population to increase in response to these regulations. Nonetheless, we are guardedly encouraged by evidence of successful recruitment and some improvement in lake trout CPUE-no relative to the previous survey.

Table of Contents

Page

1.0 Introduction …… 3

2.0 Methods
2.1 Field Operations …….. 4
2.2 Data Analysis ……... 4

3.0 Results
3.1 Catch Composition ……. 6
3.2 Lake Trout – Abundance …… 7
3.3 Lake Trout – Biosampling Data …… 7
3.4 Coregonids (Lake Whitefish and Cisco) …… 8
3.5 Other Species ……. 9
3.6 Lake Trout Regulations Assessment …….. 9

4.0 Acknowledgements ……. 9

5.0 Literature Cited ……. 10

Appendices

A. Catch Summary for 2005 Sollman Lake SLIN Survey ……. 11

B. Lake Trout Biosampling Data …….. 12

C. Biosampling Data for Other Species Captured ……. 12

D. Parry Sound Area Reference SLIN Dataset Summary …… 13

E. Filtered Provincial SLIN Reference SLIN Dataset …… 14

1.0 Introduction

"Horn Lake" is the official name given to this lake in the Gazetteer of Canada. It is located in Geographic Township of Chapman, now part of the Municipality of Magnetawan. It is also locally known as "Sollman Lake". Parry Sound Area fisheries staff generally use the local name – Sollman Lake, to minimize confusion with another Horn Lake located in Monteith Township. In this report we maintain this convention and refer to the lake as "Sollman Lake".

Sollman Lake is a medium size (478 ha) lake with lake morphology and water quality parameters that are highly suitable for the resident natural lake trout population (McIntyre, 1998). The fish community consists of lake trout, lake whitefish, cisco, common white sucker, burbot, smallmouth bass, yellow perch and creek chub. In 2000, walleye were first observed in the lake (McIntyre, 2000) and continue to appear in low abundance.

The lake is readily accessible by road. With close to 200 private lots and one tourist resort, it is considered moderately developed. To maintain the exceptionally high standard of water quality necessary for natural lake trout populations, a moratorium on lakeshore development was implemented in the early 1990s.

Lake trout population assessment surveys conducted from the mid-1970s to late-1990s (Thurston, 1976; Thurston, 1977, Deary, 1990 and McIntyre, 1998) indicated low relative abundance index values. However, interpretation of results was difficult as early surveys used an 'ad-hoc' (non-standardized) survey design. In 1998, McIntyre employed the provincially standard *Spring Littoral Index Netting (SLIN)* methodology for assessing the lake trout population, which we duplicate in this survey.

Winter creel surveys conducted in 1985 (Brown, 1985) and 1993 (Janoki, 1993) seemed to corroborate the conclusion of low lake trout abundance in the lake.

A number of short and long-term measures have been taken to assist in the rehabilitation of the natural lake trout population, these include:

- Shoreline development moratorium (early 1990s)
- Lake trout spawning bed enhancement in 1993 under the Ministry's Community Fisheries Involvement Program (CFIP)
- Assessment of the above project (OMNR, 1994)
- Bioassay of lake trout incubation survival (McIntyre, 2000)
- Attempted stocking of native lake trout by Dave Stewart Jr. in 1999, 2000 and 2001. (Due to poor lake trout catches the program was unsuccessful.) (McIntyre, 2000 and 2001.)
- Implementation of restrictive lake trout angling regulations in 2000, and
- Year 2000 planting of 500 marked lake trout to coincide with new regulations for assessment purposes.

This survey was conducted with two objectives in mind:

1. To ascertain the status of the lake trout population relative to that observed in the 1998 SLIN survey as well as comparing results to the Parry Sound reference SLIN dataset and the Provincial reference SLIN dataset.
2. To assess the impact of new lake trout fishing regulations implemented in 2000.

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 May 2nd when the water temperature was 6º Celsius, and terminated May 12th when water temperature had warmed to 9.5º 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").

We essentially duplicated netting sites used in the 1998 SLIN survey (McIntyre, 1998) in which sites were randomly selected. There were a couple of instances in which we deemed a previous netting location to be inappropriate due to obstructions, navigational or social concerns. In these instances we simply selected a near-by appropriate netting site. Net sets were of 90-minute duration with a general 90º orientation to the shoreline.

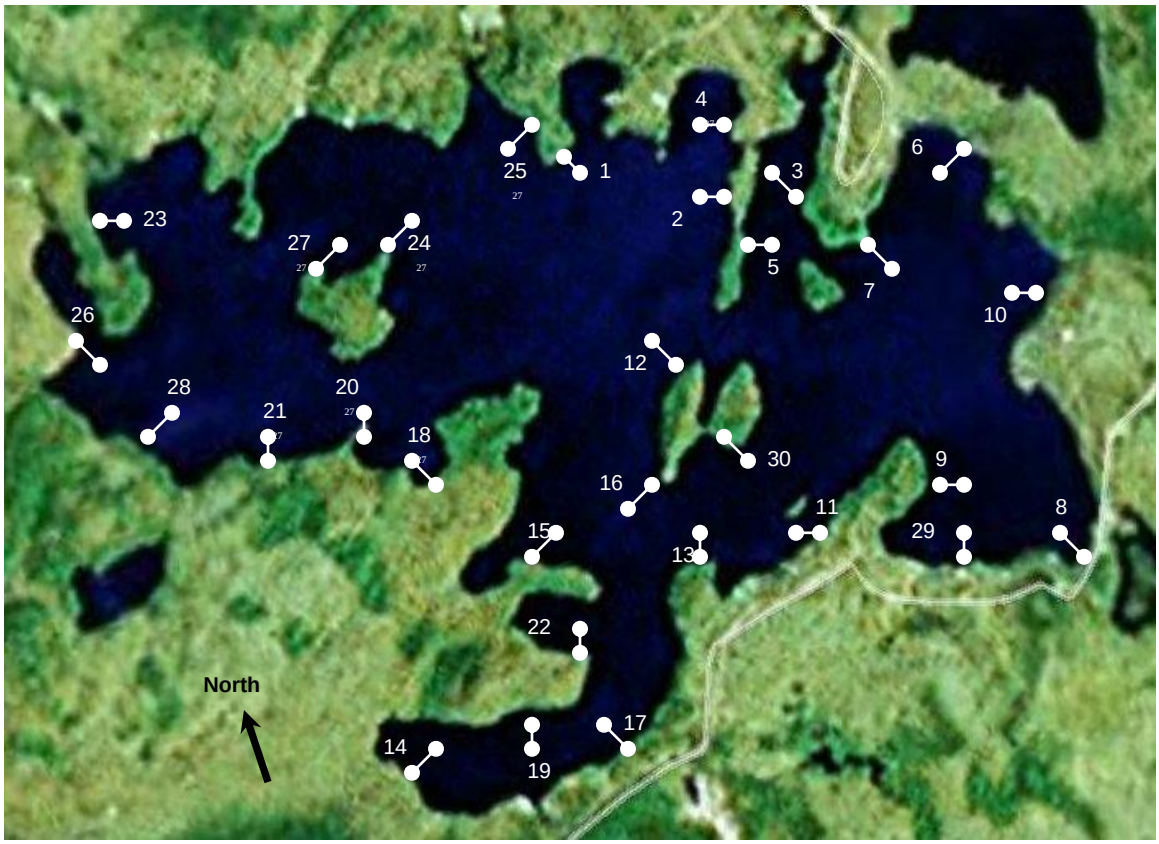
Complete catch enumeration and biosampling (size determination) was conducted for all fish captured (Appendixes A – C).

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.

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 employed 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 Sollman Lake.



Note: Netting sites number 14, 15, 22, 27 and 28, are minor deviations from netting locations used in 1998.

3.0 Results

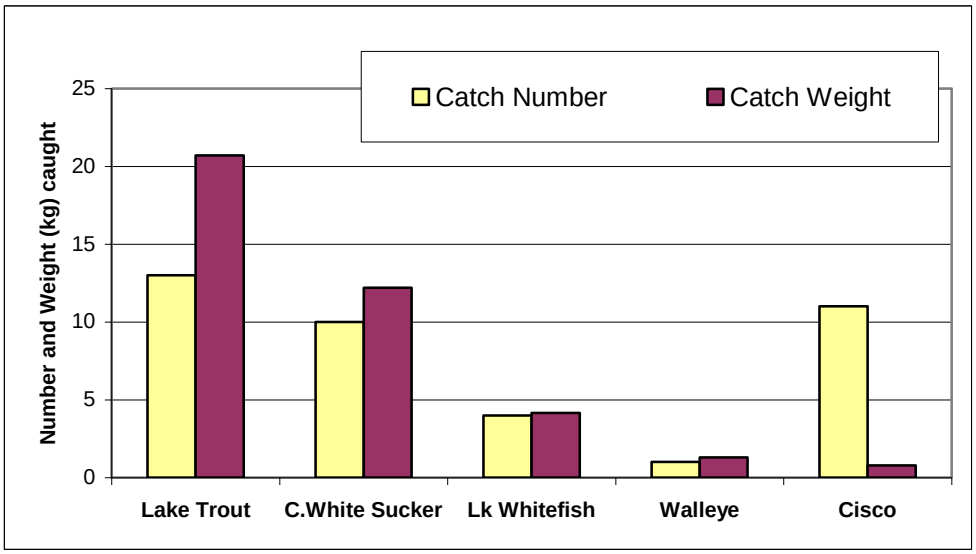
3.1 Catch Composition:

From our standard sampling effort of 30, 90-minute gillnet sets, we captured: 13 lake trout, 11 cisco, 10 common white sucker, 4 lake whitefish and 1 walleye (Appendix A and Figure 2).

Catch composition by weight was: 20.700 kg lake trout, 12.200 kg common white sucker, 4.150 kg lake whitefish, 1.300 kg walleye and 0.775 kg cisco (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)

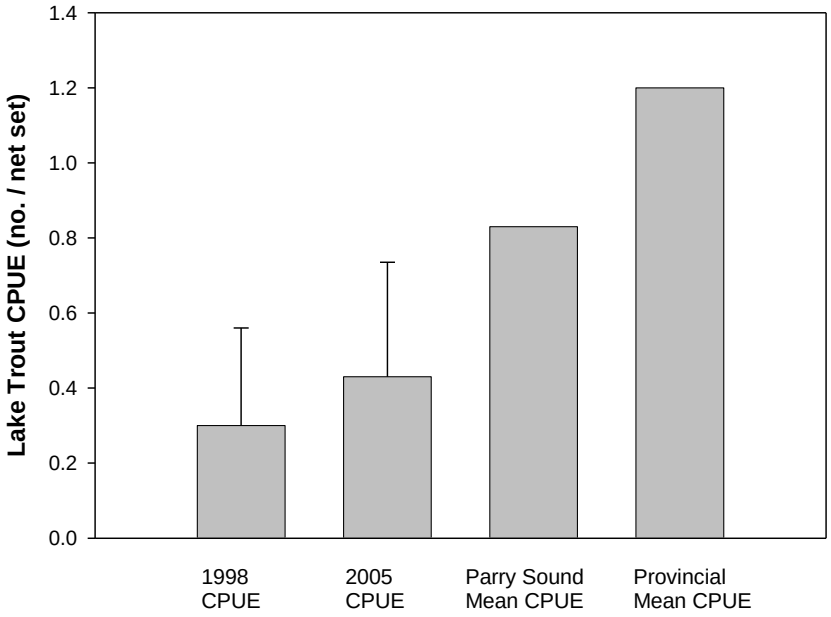


Cumulatively, we captured a grand total of 39.13 kg of fish for an over-all *Catch-Per-Unit-Effort-by weight* (CPUE-wt) of 1.30 kg per net set (Appendix A). This catch rate is below the average of 2.46 kg / set in the Parry Sound SLIN reference dataset (Appendix D). It is however approximately equivalent to that observe in the 1998 SLIN survey on Sollman Lake, when the over-all CPUE-wt was 1.71 kg per set (McIntyre, 1998).

3.2 Lake Trout – Abundance

We captured 13 lake trout for a *Catch-Per-Unit-Effort-by-number* (CPUE-no) of 0.43 ± 0.31 ($p<0.05$) lake trout per net set (Appendix A). Although this is slightly better than the CPUE-no of 0.30 observed in the 1998 survey, there is no statistical difference between the two values (t-test $p<0.05$) (Figure 3). It is also below the Parry Sound SLIN dataset average of 0.83 (Appendix D) and the filtered provincial dataset average of 1.2 (Appendix E). Because it ranks in lower 25% of values in the provincial dataset (Appendix E), we consider Sollman Lake to have a low abundance of lake trout.

Figure 3. A Comparison of Lake Trout CPUE-no Values Observed on Sollman Lake with Reference Datasets. (Error bars shown on 1998 and 2005 Sollman Lake surveys are 95% confidence interval. For Parry Sound reference SLIN data – see Appendix D; for Provincial reference SLIN data – See Appendix E.)



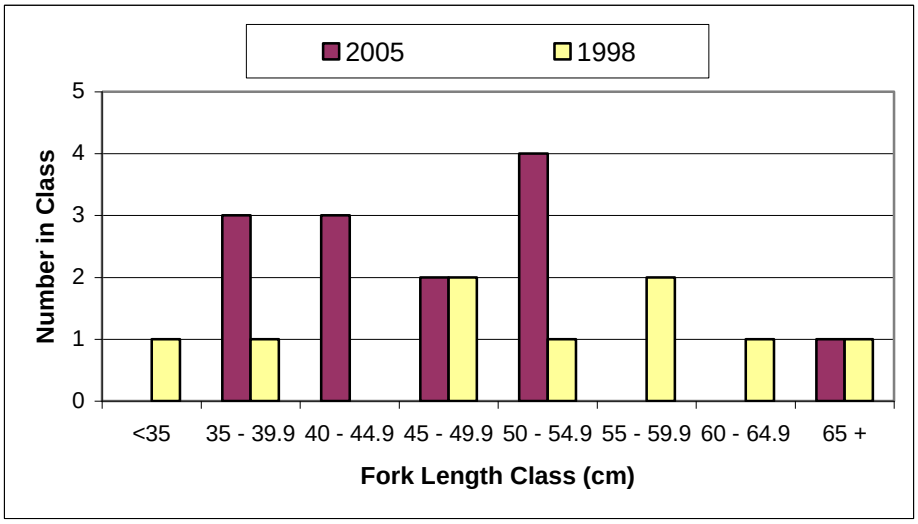
3.3 Lake Trout – Biosampling Data:

From our small sample of 13 captured lake trout we determined a mean fork length of 47.8 cm and mean weight of 1.592 kg (Appendix B). This mean size falls within the median 50% of values within our filtered Provincial dataset (Appendix E). Consequently, the mean size of lake trout seen in this survey is approximately equivalent to the Provincial average. Likewise, this mean size is also very similar to the average in the Parry Sound Area dataset (Appendix D).

The mean size of lake trout observed in 2005 was slightly smaller than the 1998 survey which had a mean fork length of 50.4 cm and mean weight of 1.813 kg (Appendix D). We further compared the size class distribution of lake trout observed in this survey with the 1998 survey on Sollman Lake (Figure 4) and noted a greater frequency of lake trout

in the smaller size classes in 2005 relative to 1998. We believe this could be an indication of mildly better reproduction and recruitment in recent years. This is a tentative conclusion due to the small sample size in each survey.

Figure 4. Size Class Distribution of Lake Trout Captured in the 1998 and 2005 SLIN Surveys on Sollman Lake. (Note: 2005 sample size: 13; 1998 sample size: 9)



3.4 Coregonids (Lake Whitefish and Cisco):

Although SLIN surveys are designed to target lake trout, the method also has some utility in assessing coregonid populations.

We noted a significant reduction in the catch of lake whitefish and cisco between this and the 1998 survey. In 1998, 24 lake whitefish and 67 cisco were caught (McIntyre, 1998). In this survey, we captured only 4 lake whitefish and 11 cisco.

3.5 Other Species:

Ten (10) common white sucker were caught in this survey, approximately equivalent to the 14 captured in 1998 (McIntyre, 1998).

We also captured one walleye in this survey. By unknown means, this species has found its way into Sollman Lake (McIntyre, 2000) and was not present when the 1998 survey was conducted.

In 1998, four yellow perch and one burbot were captured; none were caught in this survey.

3.6 Lake Trout Regulation Assessment

In 2000 the Ministry planted 500 yearling lake trout with an LP (left pectoral) fin clip. These fish were intended to be a marked cohort that coincided with new, restrictive fishing regulations being imposed on lake trout in 2000. These new regulations included:

- Prohibited slot size of 40 – 55 cm
- Winter closure for lake trout angling
- One line only for winter angling of other species.

Two of these marked lake trout were captured in this survey (Appendix B). Based on their size, we can be very comfortable with assuming that lake trout 45 cm or less in fork length originate from year-classes that post-dated the year 2000 new lake trout regulations. Indeed, six of the thirteen lake trout captured were less than 45 cm in fork length (Appendix B). This provides positive evidence of a modest degree of successful natural reproduction and recruitment to this population subsequent to the implementation of the new fishing regulations.

To date, the new regulations have not resulted in an appreciable increase in lake trout abundance. However, it would be unduly optimistic to expect an immediate increase in population number in response to the new regulations. It will probably take many year-classes of successful reproduction and recruitment to sufficiently increase the population to the point where it can be statistically demonstrated. We are guardedly encouraged by the current demonstration of successful recruitment and some improvement in the lake trout *Catch-Per-Unit-Effort-by-number.*

4.0 Acknowledgements:

Field work was supervised by Jim Palmer with assistance from Eric McIntyre and Bart Brown.

We wish to thank Messrs. Dave Stewart Senior and Junior of Birch Crest Resort for use of their launching, docking and parking facilities.

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

Set Number	Catch (Number)					Over-all Total
	Lake Trout	Lk Whitefish	Cisco	Walleye	C.White Sucker	
1	0	0	0	0	1	
2	2	0	0	0	1	
3	0	0	0	0	3	
4	1	0	0	0	0	
5	0	0	0	0	5	
6	3	0	0	0	0	
7	0	2	0	0	0	
8	0	0	1	0	0	
9	0	0	0	0	0	
10	0	0	0	0	0	
11	0	0	0	0	0	
12	2	0	0	0	0	
13	1	0	0	0	0	
14	0	0	0	0	0	
15	0	0	0	0	0	
16	2	0	0	1	0	
17	0	0	1	0	0	
18	0	0	0	0	0	
19	0	0	0	0	0	
20	0	0	0	0	0	
21	0	1	0	0	0	
22	0	0	0	0	0	
23	0	0	0	0	0	
24	0	0	8	0	0	
25	0	0	0	0	0	
26	0	0	0	0	0	
27	1	0	0	0	0	
28	0	0	0	0	0	
29	0	0	1	0	0	
30	1	1	0	0	0	
Total	13	4	11	1	10	39
Catch-Per-Unit-Effort (no.)	0.43	0.13	0.37	0.03	0.33	
Standard Error	0.149	0.079	0.269	0.033	0.194	
Standard Deviation	0.817	0.434	1.474	0.183	1.061	
Confidence Level(95.0%)	0.305	0.162	0.550	0.068	0.396	
Count	30	30	30	30	30	
Probability of Capture	0.267	0.133	0.133	0.033	0.133	
Total Catch Weight (gr)	20700	4150	775	1300	12200	39125
Catch-Per-Unit-Effort (wt) (grams / net set)	690	138	26	43	406	1304

Appendix B. Lake Trout Biosampling Data

Set No.	Fork Lg. (cm)	Weight (grams)	Calculated Age	Fin Clip	Year Stocked	Fate
2	50.5	1600		Nil		Released
2	53.1	1900	6+	LP	2000	Released
4	69.6	4700		Nil		Released
6	50.8	1800		Nil		Released
6	46.2	1300		Nil		Released
6	49.1	1800	6+	LP	2000	Released
12	37.6	800		Nil		Released
12	54.5	2000		Nil		Released
13	44.5	1050		Nil		Released
16	41.9	900		Nil		Released
16	39.8	850		Nil		Released
27	44.2	1200		Nil		Released
30	39.0	800		Nil		Released
Mean	47.8	1592				
Standard Error	2.365	286.717				
Standard Deviation	8.529	1033.773				
Confidence Level(95.0%)	5.154	624.703				
Sum		20700				
Sample Size	13	13				

Appendix C. Biosampling Data for Other Species Captured

Species	Fork Lg.	Weight
Common Wt. Sucker	47.1	1550
Common Wt. Sucker	46.4	1500
Common Wt. Sucker	45.3	1500
Common Wt. Sucker	41.4	1000
Common Wt. Sucker	39.3	1000
Common Wt. Sucker	40.0	1100
Common Wt. Sucker	43.0	1150
Common Wt. Sucker	44.4	1400
Common Wt. Sucker	40.2	900
Common Wt. Sucker	44.3	1100
Sum	431.4	12200
Mean	43.1	1220

Species	Fork Lg.	Weight
Cisco	17.2	60
Cisco	19.2	80
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.8	70
Cisco	18.3	75
Sum	205.1	775
Mean	18.6	70

Lake Whitefish	44.5	1200
Lake Whitefish	40.0	950
Lake Whitefish	41.2	1000
Lake Whitefish	40.5	1000
Sum	166.2	4150
Mean	41.6	1038

Walleye	46.4	1300

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)
Trout Lk (McD.) (1996)	0.43	0.47	0.400	43.3	1092	14.20	21.00	35.20	1.17
Wawaksh Lk (South) (1997)	0.80	2.48	0.470	59.9	3102	74.40	132.80	207.20	6.91
Miskokway Lk * (1997)	1.50	1.59	0.770	41.1	1043	47.99	30.00	77.99	2.60
Trout Lk (Burpee) * (1998)	4.87	4.88	0.930	43.7	1003	146.42	11.07	157.49	5.25
Sollman Lk (1998)	0.30	0.54	0.170	50.4	1813	16.32	35.00	51.32	1.71
Three Legged Lk (1998)	0.36	0.23	0.330	37.7	620	6.82	3.83	10.65	0.04
Flaxman Lk (1999)	0.13	0.18	0.100	41.4	1380	5.52	10.70	16.22	0.54
Otter Lk (1999)	0.33	0.61	0.270	49.1	1845	18.45	91.38	109.83	3.66
Wawaksk Lk (North) (2000)	0.03	0.19	0.030	75.9	5600	5.60	65.67	71.27	2.38
Lorimer Lake (2000)	0.80	1.658	0.470	51.7	2073	49.74	12.34	62.08	2.10
Little Seguin Lake (2001)	0.10	0.069	0.100	32.4	695	2.08	41.75	43.83	1.46
Wawaksh Lk (South) (2004)	0.77	2.57	0.500	62.2	3347	76.98	44.04	121.02	4.03
Blackstone Lake (2005)	0.77	0.502	0.333	36.9	654	15.05	23.68	38.73	1.29
Sollman Lk (2005)	0.43	0.690	0.267	47.8	1592	20.70	18.43	39.13	1.30
Mean	0.830	1.190	0.367	48.107	1847	35.734	38.692	74.426	2.460
Standard Error	0.327	0.361	0.068	3.098	366	10.838	9.634	15.030	0.509
Median	0.430	0.575	0.332	45.750	1486	17.385	26.840	56.700	1.905
Standard Deviation	1.225	1.352	0.254	11.591	1371	40.551	36.047	56.236	1.904
Confidence Level(95.0%)	0.707	0.781	0.146	6.693	792	23.413	20.813	32.470	1.100
Count	14	14	14	14	14	14	14	14	14

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