Results of the Winter Creel Survey Conducted on Bernard Lake in 2011

File Report

Stephen Scholten

Ontario Ministry of Natural Resources
Bracebridge

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Bernard Lake is a large (2090 ha), deep (Z_{max}: 49 m, Z_{mean}: 15 m), oligotrophic (Spring P: 6.9ug/l, Secchi depth: 4.7 m; MOE Lake Partner Program 2008), lake located in the heart of Ontario's Almaguin region in the north east part of MNR's Parry Sound District (Figure 1). It is the largest lake in the area, has extensive private and commercial shoreline development, the Village of Sundridge is situated on the northwest end and Highway 11 passes closely by the western shore.

The cold water fish community of the lake is dominated by lake whitefish and lake trout. Lake trout were stocked regularly until 1996. Stocking was suspended to allow the naturally reproduced component of the population to achieve its full potential. The lack of stocking has been unpopular with anglers and the local business community. The cold water community also supports burbot, a remnant population of native book trout, a naturalized population of rainbow trout and introduced rainbow smelt.

The warm water community is dominated by introduced smallmouth bass and rock bass as well as yellow perch and white sucker (Broad-scale Monitoring (BsM) unpubl. data 2009).

The current division-wide regulations for FMZ 15 apply to Bernard Lake; there are no lake-specific exceptions. Pertinent to this report, lake whitefish may be angled all year with a daily catch and possession limit of 12 for a sport fishing licence (6 for a conservation licence). Lake trout may be angled from January 1 to September 30 with a daily limit of two fish of any size (conservation licence: 1). A sanctuary is in place on part of the largest tributary from April 1 to May 31 to provide protection to spawning rainbow trout. Ice fishing huts must be removed from the lake by March 31.

Numerous projects have been conducted on the lake focusing primarily on lake trout including stocking, population assessments, creel surveys, spawning observations, spawning habitat improvement and water quality monitoring.

A creel survey was conducted during the winter of 2011. The purpose was to collect standard information on angling effort, catch, harvest and angler demographics applicable to long-term monitoring of the fishery. This report presents the results of the 2011 survey and makes comparisons to similar surveys conducted in 1993 and 2001.

Methods

The details of the 2011 survey design are shown in Table 1. The whole lake was surveyed each day. Activity counts were done progressively, at the same time as interviews. In hut dominated fisheries, activity counts for hut-based anglers are derived from the ratio of the number of huts checked to the number of interviews done (i.e. instantaneous activity counts can't be easily done for ice hut anglers). The lake was divided into four sectors, each containing roughly the same number of huts (Figure 2). The sectors were created to ensure activity counting effort was spread evenly throughout the survey period. The sector in which surveying began each day was randomly chosen. Two day type (week day and weekend day) and two fishing mode (hut[1] and open ice) strata were defined. The survey day (8 am to 5 pm) was divided into two sample periods (8:00-12:30 and 12:30-17:00); one being surveyed each day.

The standard Creel Log Form and Creel Interview Form were used but some modifications were made to the code definitions (Appendix).

Harvested fish were measured for fork length and lake trout were checked for hatchery fin clips and a tissue sample was collected for potential genetic analysis. Detailed sampling was not done as adequate samples should be available through other monitoring programs.

[1] In this report 'huts' refers to shelters used for fishing that are normally constructed of solid material and left on the ice for an extended period. They are distinguished from 'portable shelters' which are made of fabric and usually removed from the ice at the end of each fishing trip. Parties using portable shelters are considered 'open ice' anglers.

Results are archived in the FISHNET2 project SC11_BER.

The locations and registration numbers of huts were recorded once each month.

The details of the design of the earlier surveys were generally similar. The survey periods differed slightly between years. The temporal distribution of interviews was reviewed to examine the implications (Figure 3). The 1993 and 2011 surveys had interviews well distributed over roughly the same time period. In 2001, interviews were skewed to the early afternoon period and no interviews were conducted after about 4 pm, even though the defined day length went to 6 pm. The 2001 survey was re-analyzed using the same period as in 2011 (8 am to 5 pm). This adjustment should improve the comparability between surveys.

Results

Ice and weather conditions were generally good through the duration of the survey. Approximately 15 cm of clear ice were present on the lake at the time of the first survey day and increased to the minimum required for snowmobile travel by the next week. Snow depth built up gradually resulting in slush forming by the end of January and increasing to severe levels by mid February. A major thaw with rain occurred from February 13 to 17 and subsequent re-freezing improved conditions again. Above seasonal temperatures in early March threatened an early end to the season, but the last 10 days were cool and good ice conditions persisted until the end of the month.

Sampling effort was similar to past surveys (Table 2). A total of 27 days were surveyed and 416 interviews conducted documenting 2,449 ang-hrs of effort. The sample of measured lake trout (n=21) was small compared to previous surveys, but a large number of lake whitefish were measured (n=247).

The mean activity count was 14.6 parties which had an average of 1.9 anglers who fished with an average of 1.5 rods each (Table 3). These observations generated an estimated total effort of 21,179 (S.E.: 1798) ang-hrs (Table 4). Lake whitefish were targeted most frequently, receiving 19,532 (S.E: 1823) ang-hrs of effort, or 92% of all parties. Lake trout were targeted by 53% of parties, for an effort of 10,532 (S.E.: 1310) ang-hrs. Relatively small amounts of effort were directed at secondary species; smelt, perch, burbot and brook trout.

Compared to previous years, total effort has stayed relatively constant (Figure 4); however the species being targeted has shifted considerably from lake trout to whitefish.

Whitefish was the most commonly caught species. It is estimated that 2,823 (S.E.: 481) were caught (Figure 5). Virtually all were harvested (2785, S.E.:462). The catch was substantially higher than in previous years. The increase was due to a combination of higher targeted effort and a higher catch per unit effort (CUE, Figure 6).

The estimated catch and harvest of lake trout were 263 fish (S.E.: 93). The lake trout catch has declined steadily over the time series as stocked fish have decreased in abundance. No fin clipped lake trout, indicating they were stocked, were encountered in 2011. The estimated number of naturally reproduced fish has increased over time, but not in direct proportion to the decrease in stocked lake trout (Figure 7).

The catch of smelt was higher than estimated in previous surveys. A total of 926 (S.E.: 295) were estimated to be caught, most of which were harvested.

The amount of effort directed at yellow perch has increased over the time series; although it is still a small percentage of the total effort. In 2011, 537 (S.E.:199) angler hours were expended and 415 (S.E.:244) were estimated to be harvested.

The whitefish ranged from 230 to 560 mm FL and averaged 435 mm (S.E.:2.3, Table 5). There was a small but significant increase in the mean fork length of whitefish from 2001 to 2011 (Table 6, Figure 8). The sample size in 1993 was very limited and no comparisons were made.

The lake trout ranged from 230 to 630 mm FL and averaged 484 mm (S.E.:20.0). The small sample size of measured natural lake trout in previous surveys precludes any useful comparison. A range of sizes, and presumably ages, is present in the population indicating that reproduction and recruitment of young fish into the adult population is ongoing.

The fishery was dominated by hut anglers. An estimated 75% of effort was expended by parties based in permanent huts (Table 7). Most (89%) hut based parties used private huts. About 11% of parties rented huts.

On the first survey day, January 6, 19 huts were already deployed. The number increased quickly to near the peak number of 104 and stayed close to that number until a thaw in mid February resulted in about a dozen huts being removed. The number stayed relatively constant until mid March, after which the number decreased quickly (Table 8). On the last survey day, March 29, 11 huts were still present. Open ice angling continued at a low level past the end of the survey until about the second weekend of April (9^{th}-10^{th}).

Huts were generally deployed close to major access points. Most were clustered in three main locations (Figure 2). Some minor movement of huts occurred through the winter but no major shifts occurred. Most huts were located over water depths of 10 to 20 m.

Approximately 112 different huts were observed on the lake; only slightly more than the maximum instantaneous count of 104; indicating there was little movement of huts to or from other locations over the winter (Appendix).

Overall about 1/3 of parties originated from the village of Sundridge or Strong Township, 1/3 from the other parts of the Almaguin area and most of the remainder from areas of Ontario outside of Parry Sound District (Table 9). The proportions differed somewhat for hut and open ice anglers, with a greater proportion of the later originating outside of the District. The definition of what constituted a local angler differed in the two previous surveys and was not recorded; therefore it is not known whether or how much this demographic of the fishery has shifted over time.

Similarly the definition of a permanent resident has differed. In 2011, permanent residents (live on the lake shore or in the Village of Sundridge) comprised 14% of parties. Most parties (68%) made day trips from a home not located directly around the lake. Only 6% of parties paid for some sort of local accommodation.

Anglers have occasionally expressed concerns regarding the uncontrolled use of chum; in particular the potential for ingestion to cause physical harm to whitefish. Overall, 45% of parties reported using some type of chum, most of whom were hut users. Pasta was by far most commonly reported (28% of parties), followed by fish (9%). Corn, which many concerns have focused on, appears not be commonly used.

Discussion

Overall, survey conditions in 2011 were good and very few problems were encountered. A plot of the relative standard error (RSE) of the estimates for major parameters on a bi-weekly basis indicates that the level of precision of the effort estimates had essentially flat lined, indicating that increasing the number of survey days would not have resulted in significant improvements in the precision of estimates (Figure 9). The RSE for the estimate of lake trout harvest remained

relatively high because of the low catch rate. Many more sample days would have been required to improve the precision below the desirable 20% RSE level.

Total angling effort has remained relatively constant over the time series. However, the species being targetted has shifted away from lake trout and toward whitefish as the abundance of stocked lake trout has declined. The shift may be greater than the results indicate as many anglers reported fishing for both species but appeared to be using techniques that are more suited to catching whitefish.

The creel clerk reported that anglers commonly suggested that the catch and possession limit for whitefish should be lower than the current limit of 12. Indeed, the current limit does not appear to control harvest significantly. When interviewed, few parties had more than five whitefish harvested (Figure 10). Assuming parties were interviewed on average at the mid point of their fishing trip and using the mean party size of about two anglers, the total harvest per angler would be similar to the observed harvest per party. If these assumptions are correct, a daily limit of six would reduce harvest by about 15%; a limit of four, 25%. As the rate of harvest does not appear to be a conservation concern, it is unlikely that we could justify establishing a lake specific regulation exception for Bernard Lake.

Many anglers expressed that they supported resuming the stocking of lake trout. The data presented here show that there has been an inverse relationship between the catch of lake trout and whitefish; as lake trout abundance has decreased the catch of whitefish has increased. The whitefish catch has increased largely due to a higher catch rate. The higher catch rate could result from a higher abundance of whitefish due to lower predation by lake trout on whitefish or reduced competition at early life stages. The higher catch rate could also be due to a change in angler methods and skills as they shifted away from focusing on lake trout.

The total number and biomass of whitefish and trout harvested is now higher than it was when stocking occurred. Also, the proportion of parties that had harvested at least one whitefish or lake trout at the time of sampling has increased (Figure 11). Seemingly paradoxically, the overall fishery has improved since stocking was suspended.

As predicted, the decline in stocked lake trout has resulted in an increase in naturally reproduced lake trout; again, presumably due to reduced intra-specific competition. It appears that the population is capable of sustaining itself, and a modest fishery. It is widely recommended that supplemental stocking not be done when a viable, self-sustaining population is present (Olver et al. 1991, OMNR 2002).

Tissue samples were collected from lake trout in 2011. It would be of interest to have genetic analysis done to try to determine if the current lake trout population is a native strain and how much stocked fish have contributed to the genotype.

Rainbow smelt are not native to Bernard Lake. They are capable of having large impacts on the plankton and fish communities through different trophic interactions (Rooney and Paterson 2009). Their presence has been associated with reduced recruitment of lake whitefish and lake trout in some lakes; though the mechanisms and contributing factors which combine to create an impact are not clear (Loftus and Hulsman 1986). Smelt currently appear to be very abundant (BsM unpubl. data). Whether they are more or less abundant than in the past when lake trout abundance was higher is not known. The increased levels of effort for and catch of smelt in 2011 and some reports by anglers indicate that abundance is higher. The abundance of adult whitefish is currently very high (BsM unpubl. data) indicating that if recruitment is being affected it is not manifested in the fishery yet.

Whitefish don’t enter the fishery in substantial numbers until they are about 400 mm and five years old; therefore the fishery would not be a good indicator of recent recruitment. In the 2000 Spring Littoral Index Netting (SLIN) survey, which used nets of 1.5, 2.0 and 2.5 inch, a large

proportion of whitefish were less than 400 mm long indicating that recruitment was occurring at that time (Figure 12). In 2009, BsM large mesh nets (1.5 to 5.0 in mesh) caught relatively few smaller whitefish; however, the selectivity of the BsM mesh nets for larger fish will result in proportionally fewer small fish being caught compared to the SLIN nets. The catch of some small whitefish shows that at least some recruitment is currently occurring. Consideration should be given to supplementing regular assessments with a gear capable of yielding a better indication of the abundance of small, young whitefish.

Overall, based on currently available information, supplemental stocking of lake trout is not recommended. The lake trout population appears to be self-sustaining at a level that does provide a modest fishery and the overall winter fishery (all species) is arguably better (more fish and more biomass being caught) in the absence of stocking. However, there is a risk that a higher smelt density, resulting from lower predation by lake trout could affect the recruitment of whitefish. The current high density of whitefish despite the presence of smelt for many years suggests the risk is low.

Supplemental stocking of lake trout or another piscivorous species may be an effective way to reduce the smelt density. Stocking on a proactive basis to increase the predator population and reduce smelt abundance, before a problem is detected may be a reasonable strategy if managing to maintain the whitefish population is the primary objective for the fishery. There would be a lag time between a clear sign of recruitment failure and being able to increase the predator population through stocking that proactive stocking might prevent. As the risk of an impact appears to be low, stocking of predators to suppress smelt does not seem to be warranted at this time. The population should be monitored for indications of reduced recruitment.

The proportion of hut anglers observed in 2011 was lower than in previous years (Table). Portable shelters are now commonly used and were recorded for 39% of open ice parties. The long term impact of the use of portable shelters isn't known but could include reduction in use of regular huts, reduction in the rental business for regular huts and increased effort or a change in the effectiveness of fishing effort. The total number of huts on Bernard Lake has remained similar so we speculate that portable shelters have not replaced huts significantly to date, but have been adopted by some of those who would have fished on the open ice regardless and possibly contribute to the observed higher effort by open ice anglers.

Point-in-time counts of the peak number of huts on the lake can be used as an indicator of the total amount of effort. The proportion of effort that is expended by hut, versus open ice anglers has changed and should be taken into account when interpreting hut count results.

In summary, total winter fishing effort on Bernard Lake has been relatively stable since at least 1993. The fishery has shifted to targeting more on whitefish and less on lake trout as the abundance of stocked lake trout has declined. As stocked lake trout abundance declined the harvest of naturally reproduced lake trout has increased, though not in direct proportion. The harvest of whitefish has increased substantially through a combination of higher targeted effort and increased catch rate. The total number of whitefish and trout harvested and the proportion of parties that were successful at harvesting at least one trout or whitefish, is higher now than when stocked lake trout were common in the fishery. Supplemental stocking of lake trout for the purpose of increasing the lake trout fishery does not appear to be advisable. The recruitment of lake whitefish may be at risk from high abundance of smelt; though there is no evidence of an impact to date. Monitoring of whitefish recruitment should be done and consideration given to stocking of a smelt predator to control smelt abundance if an impact is detected.

Acknowledgements

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References

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Table 1 Summary of creel survey designs, Bernard Lake. Results from 2001 were standardized to a day length of 9 hours (8:00-17:00); see text for details.

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)
1993	3-Jan-93	31-Mar-93	roving	3	2	4	1	2	48	08:00	16:00	8
2001	7-Jan-01	31-Mar-01	roving	1	2	1	1	2	4	08:00	18:00	10
2011	1-Jan-01	31-Mar-11	roving	1	2	1	1	2	4	08:00	17:00	9

Table 2 Summary of sampling intensity, Bernard Lake winter creel surveys, 1993, 2001 and 2011.

Year	Sample Days	Activity Counts	Interviews	Interviews/ Day	Lake Trout Sampled	Lake Whitefish Sampled	Observed Effort (ang-hrs)
1993	31	116	528	17	39	8	1827
2001	24	52	406	17	23	61	1721
2011	27	54	416	15	21	247	2449

Table 3 Activity summary, Bernard Lake winter creel surveys, 1993, 2001 and 2011.

Year	Mean Activity Count (party) (S.E.)	Anglers/ Party	Rods/ Angler	Max. Hut Count
1993	16.9 (6.1)	1.6	1.5	112
2001	14.6 (1.9)	1.7	1.6	100
2011	14.6 (2.1)	1.9	1.5	104

Table 4 Estimates of angling effort, catch, harvest and catch-per-unit-effort (CUE), by species, Bernard Lake, 1993, 2001 and 2011.

Year		Effort (ang-hr)	S.E.	Catch (#)	S.E.	Harvest (#)	S.E.	Harvest (kg)*	CUE (all anglers)	CUE (targetted)
1993	All	18362	1373							
	lake trout	16494	1282	1169	177	1093	172	2022	0.06	0.07
	lake whitefish	13637	1167	359	95	354	95	294	0.02	0.02
	burbot	254	166	84	45	37	18		0.00	0.00
	rainbow trout	85	47	0		0				
	brook trout	54	28	0		0				
	rainbow smelt	149	78	209	69	200	69		0.01	0.36
	yellow perch	0		0		0				
2001	All	17816	1379							
	lake trout	13633	1326	566	132	493	124	720	0.03	0.04
	lake whitefish	13320	1221	1384	262	1198	249	1294	0.08	0.10
	burbot	1602	357	239	66	198	58		0.01	0.04
	rainbow trout	648	262	0		0				
	brook trout	822	224	42	28	30	25		0.00	0.05
	rainbow smelt	0		0		0				
	yellow perch	50	50	193	89	138	81		0.01	1.25
2011	All	21179	1798							
	lake trout	10832	1310	263	93	263	93	355	0.01	0.02
	lake whitefish	19532	1823	2823	481	2785	462	3370	0.13	0.14
	burbot	315	154	56	27	56	27		<0.01	0.01
	rainbow trout	13	13	0		0			0.00	0.00
	brook trout	0	0	9	9	9	9		<0.01	0
	rainbow smelt	623	141	926	295	922	295		0.04	1.30
	yellow perch	537	199	415	244	415	244		0.02	0.72

notes: estimates for 2001 were adjusted to a 9 hour day length
weights were derived using fork length-weight conversions:
whitefish: logRWT=logFL*3.229-5.438, lake trout: : logRWT=logFL*3.296-5.72

Table 5 Descriptive statistics of fork length for harvested fish, by species, Bernard Lake 2011.

	brook trout	lake trout	lake whitefish	rainbow smelt	burbot	yellow perch
n	1	21	247	50	6	25
mean	275	484	435	176	558	224
min		230	230	100	510	180
max		630	560	260	700	290
standard error		20.0	2.3	5.5	29.4	5.0

Table 6 Estimated harvest, by weight, of lake trout and lake whitefish, Bernard Lake Creel surveys, 1993, 2001, 2011.

	lake trout			lake whitefish			Total
	observed mean FL (mm)	estimated mean wt (kg)	estimated harvest (kg)	observed mean FL (mm)	estimated mean wt (kg)	estimated harvest (kg)	(kg)
1993	533	1.85	2022	387	0.83	294	2316
2001	496	1.46	720	420	1.08	1294	2014
2011	484	1.35	355	435	1.21	3370	3725

Table 7 Estimated effort (ang-hrs) by angling mode, Bernard Lake, 1993, 2001 and 2011. Open ice anglers include those using portable shelters.

	1993	2001	2011
hut	15808	15346	15847
open ice	2554	2471	5332
% hut	86	86	75

Table 8 Maximum number of huts observed on Bernard Lake, by week (Sun-Sat.), 1993, 2001 and 2011.

week	1993	2001	2011
1			
2	40	65	40
3	65	86	72
4	93	89	80
5	101	98	94
6	102	94	102
7	110	96	104
8	112	100	102
9	112	93	102
10	108	91	92
11	104	88	91
12	93	83	80
13	48	34	34
14	10		11

Table 9 Demographic and behavioural characteristics (proportion of fishing parties) of anglers on Bernard Lake, 1993, 2001 and 2011.

		1993	2001	2011		
		total	total	hut	open ice	total
Guide	Yes	0.01	<0.01		0.02	
	Private Hut			0.89		
	Rented Hut			0.11		
Angler Origin	local	0.89	0.58			
	Ontario	0.11	0.42			
	Sundridge/Strong			0.31	0.27	0.30
	Almaguin			0.36	0.23	0.33
	Parry Sound/Muskoka			0.06	0.09	0.07
	Ontario			0.27	0.41	0.30
Angler Visit Type*	permanent resident	0.58	0.58	0.16	0.09	0.14
	non-perm. resident	0.05	0.00	0.02	0.01	0.02
	day trip	0.34	0.33	0.67	0.72	0.68
	other-paid	0.01	0.03	0.06	0.06	0.06
	other- non-paid	0.02	0.06	0.10	0.12	0.10
Portable Shelter Used?	Yes				0.39	
Chum Used?	No			0.44	0.91	0.55
	Fish			0.11	0.01	0.09
	Corn			0.02	0.00	0.01
	Rice			0.02	0.00	0.02
	Pasta			0.35	0.03	0.28
	Barley			0.01	0.03	0.02
	Fish Food Pellets			0.02	0.01	0.01
	Salmon eggs			0.03	0.00	0.02
	Sago cereal			<0.01	<0.01	<0.01

* Definitions of angler visit type varied, but were not recorded prior to 2011; therefore values can not be compared across years

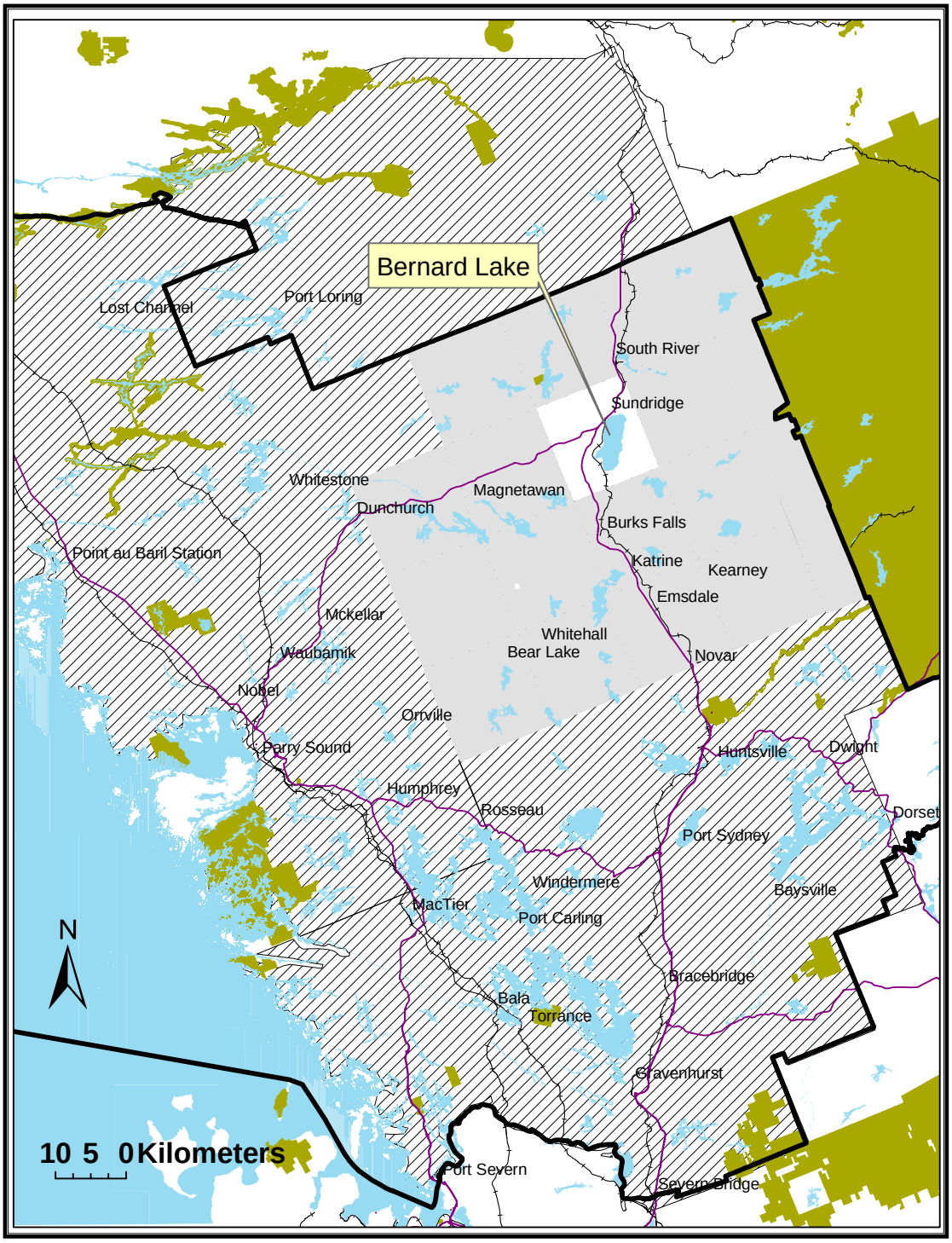


Figure 1 Location of Bernard Lake within MNR's Parry Sound District (heavy black border). Area of no hatching is geographic origin of 'local' anglers; solid grey denotes 'Almaguin' area and diagonal hatch remainder of Territorial Districts of Parry Sound and Muskoka.

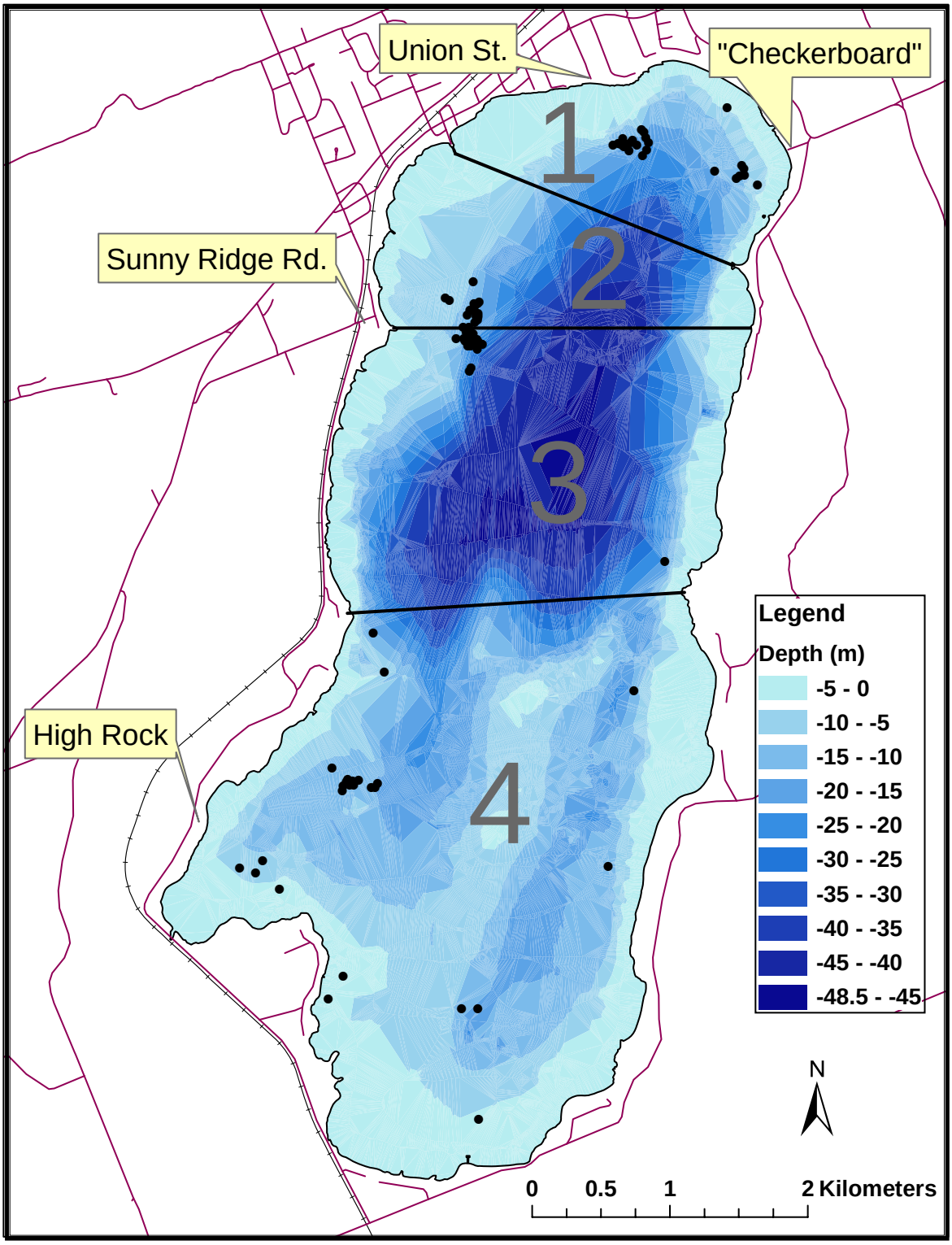


Figure 2 Map of Bernard Lake showing depth contours, location of major access points, survey sectors used in 2011 survey and location of ice fishing huts on Feb. 9, 2011 (black dots).

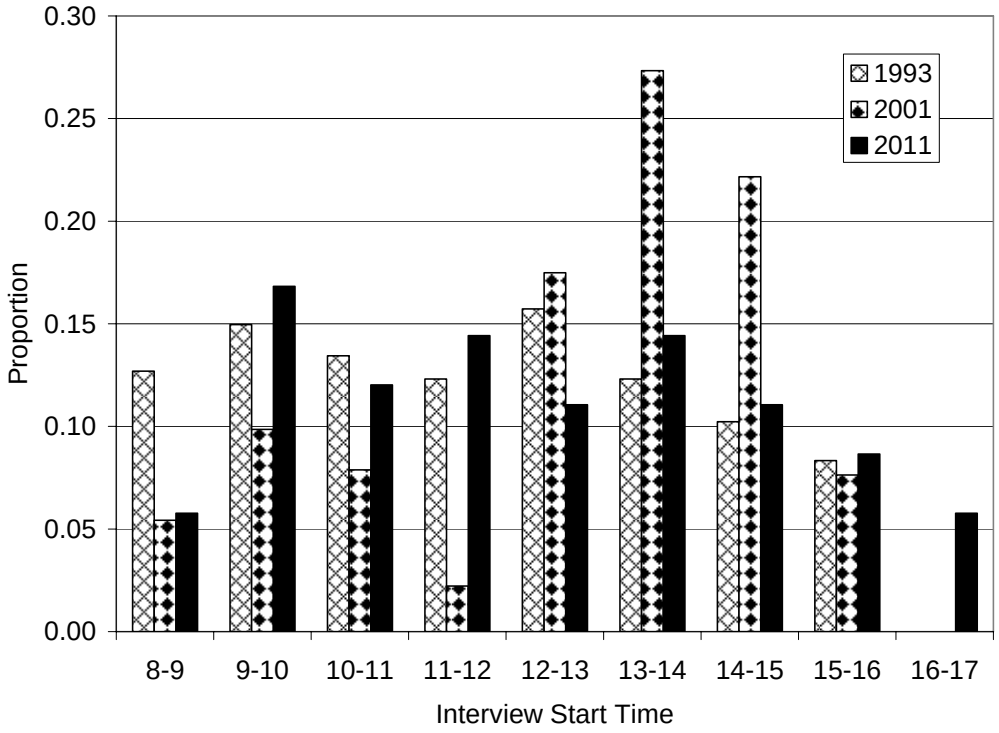


Figure 3 Distribution of interview start times throughout the creel day, by year, Bernard Lake.

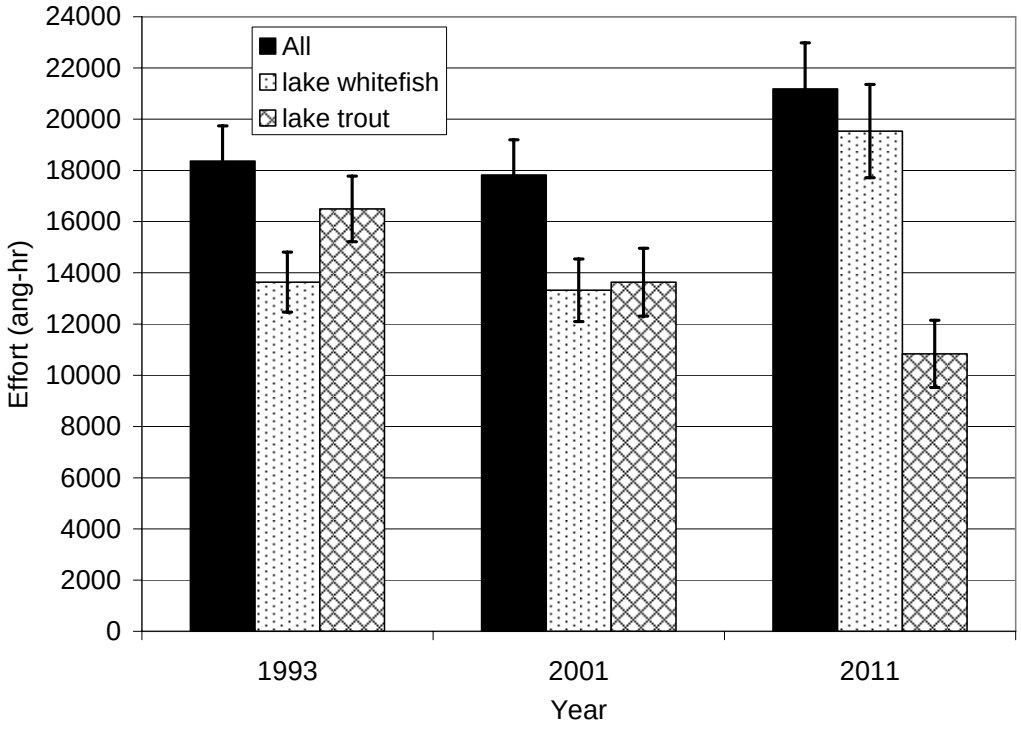


Figure 4 Estimated total and species-directed angling effort, Bernard Lake, 1993, 2001 and 2011. Error bars $\pm$ 1 S.E.

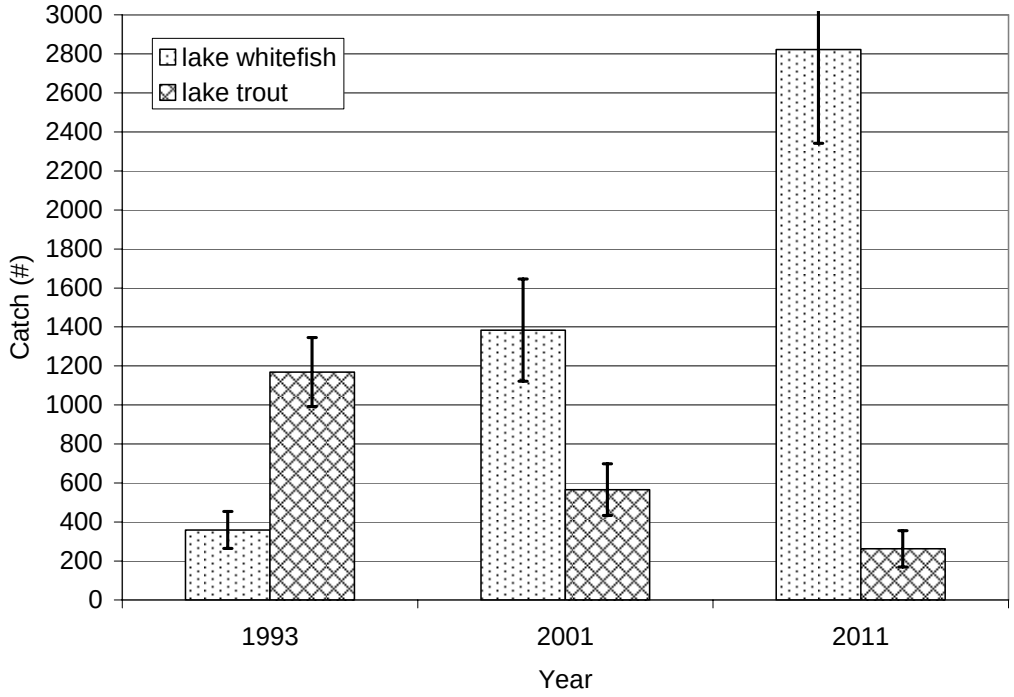


Figure 5 Estimated catch (number) of lake whitefish and lake trout, Bernard Lake, 1993, 2001 and 2011. Error bars ± 1 S.E.

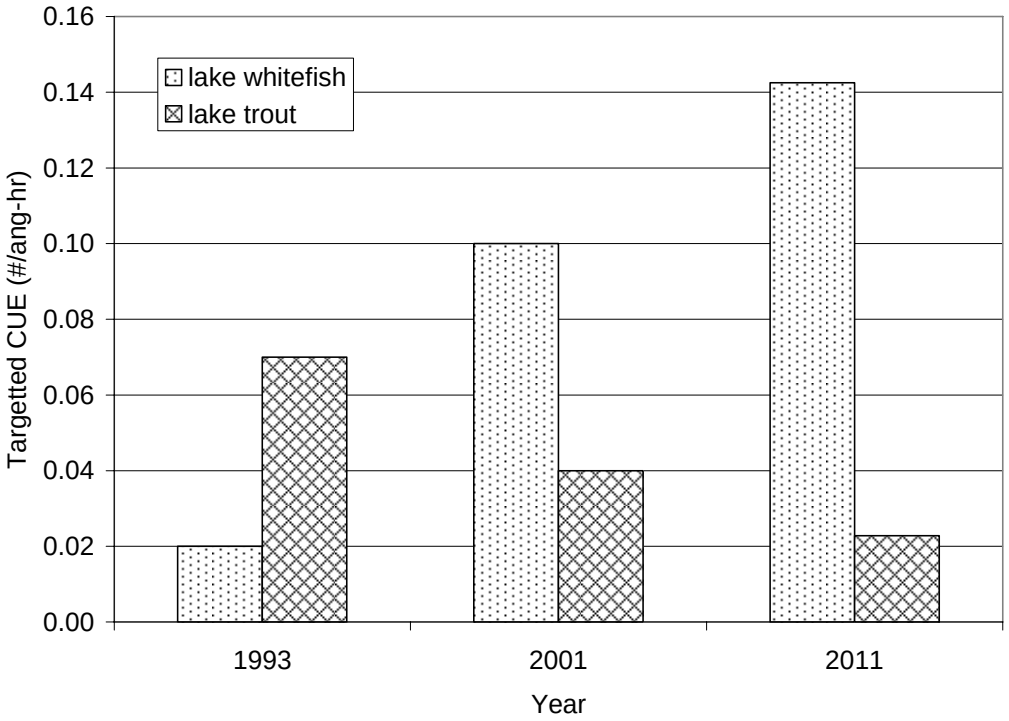


Figure 6 Estimated targeted catch-per-unit-effort (CUE) (number/ang-hr) of lake whitefish and lake trout, Bernard Lake, 1993, 2001 and 2011.

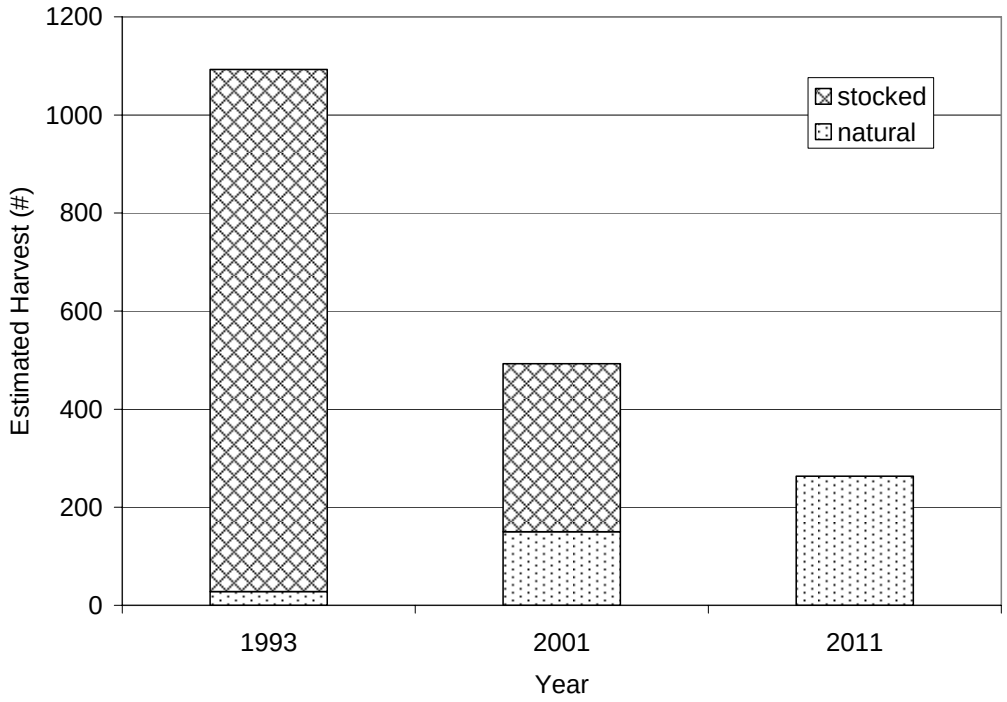


Figure 7 Estimated harvest of stocked and naturally reproduced lake trout, Bernard Lake, 1993, 2001. 2011.

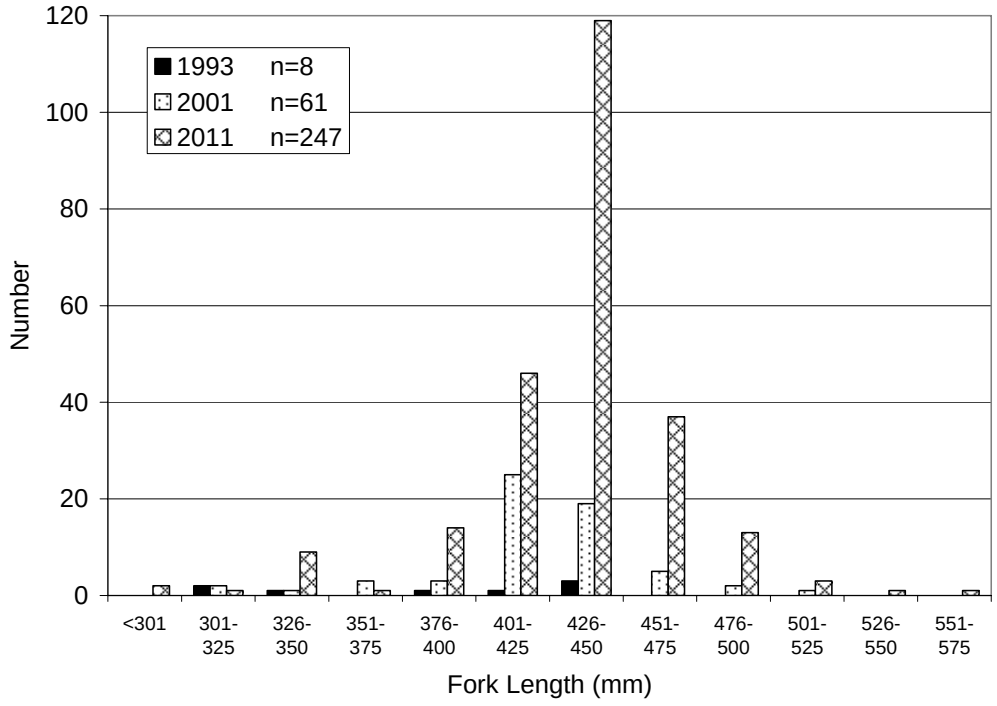


Figure 8 Fork length distribution of harvested lake whitefish, Bernard Lake, 1993, 2001, 2011.

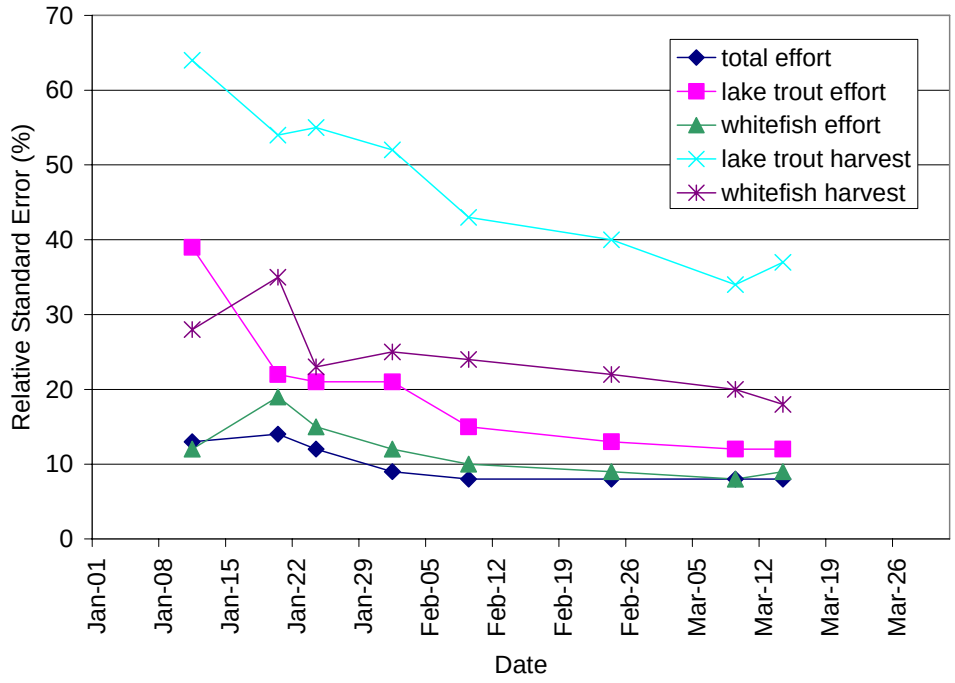


Figure 9 Relative standard error (%) of estimates of effort and harvest of lake whitefish and lake trout, calculated progressively over the duration of the winter creel survey on Bernard Lake, 2011.

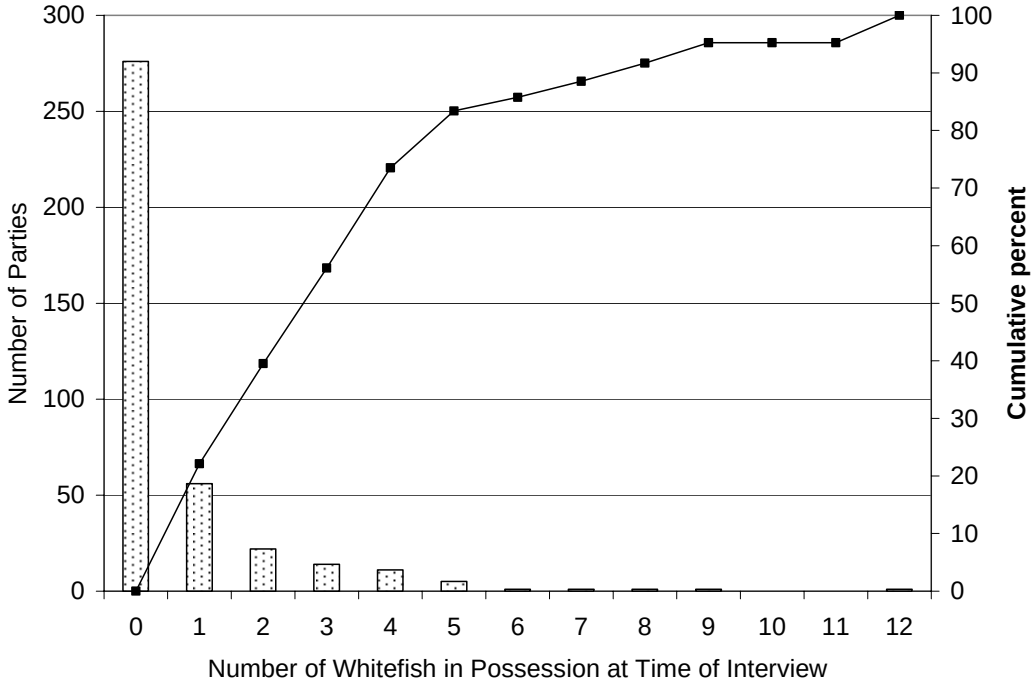


Figure 10 Frequency distribution of the number of whitefish possessed, by party, at the time of being interviewed, Bernard Lake winter creel survey, 2011.

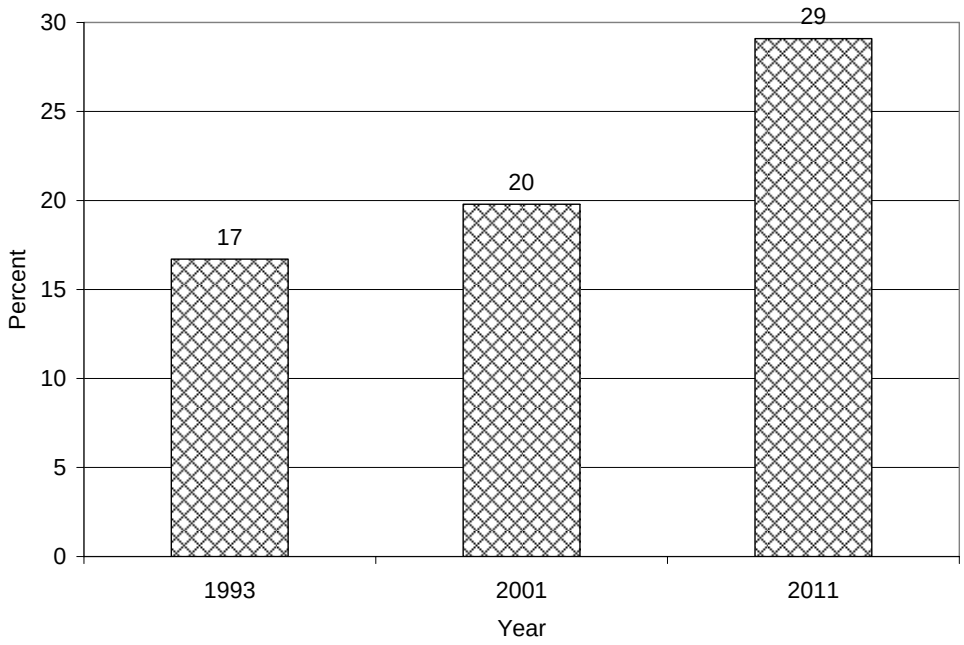


Figure 11 Percent of angling parties that had at least one whitefish or trout in possession at the time of being interviewed, Bernard Lake.

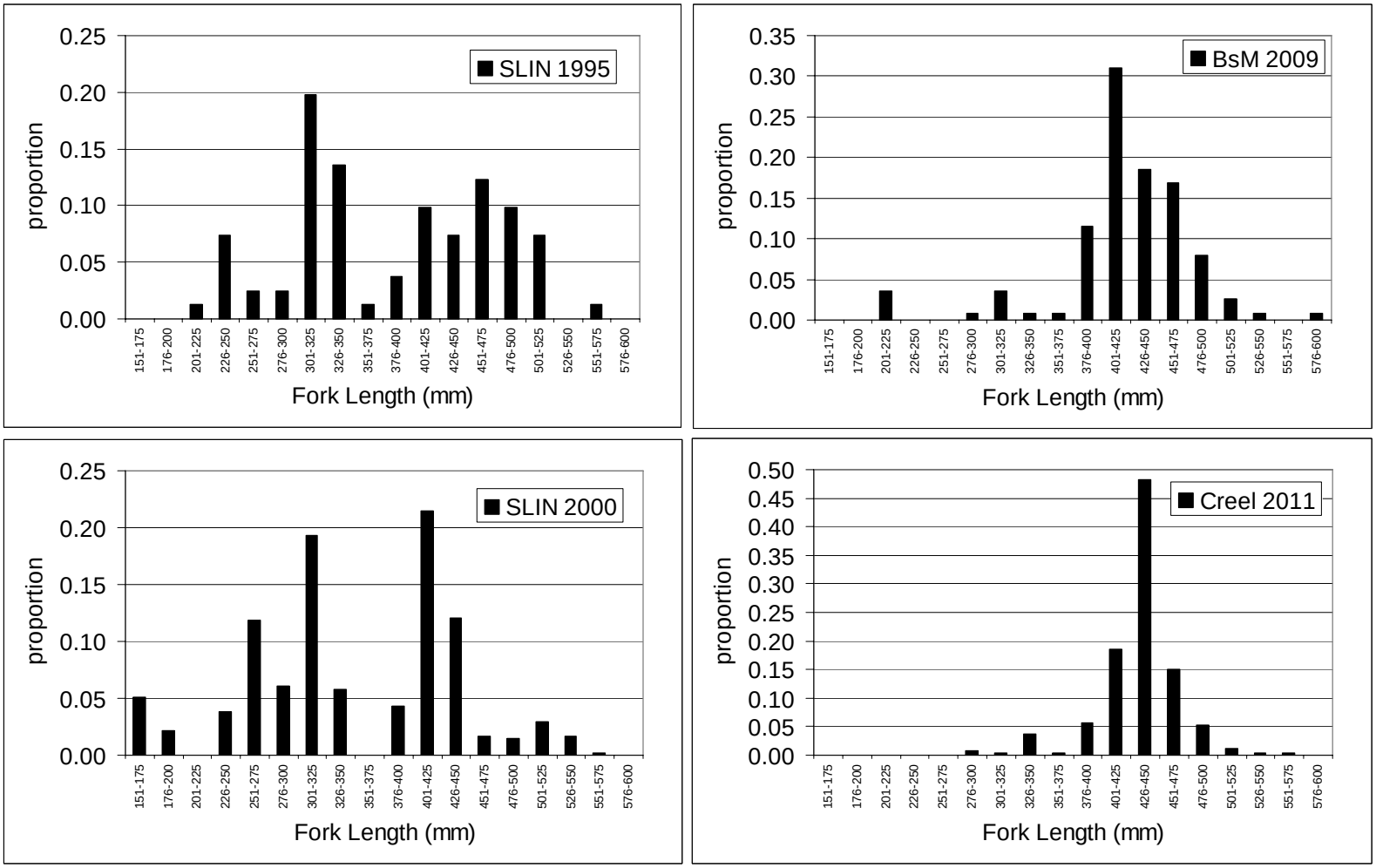


Figure 12 Fork length distributions of lake whitefish sampled during netting surveys on Bernard Lake, 1995, 2000 and 2009 and from the 2011 creel survey. Figures demonstrate the capability of SLIN nets to detect the presence of young whitefish. BsM large mesh nets and angling select for larger fish; therefore young whitefish are under-represented compared to SLIN catches. SLIN: Spring Littoral Index Netting; BsM: Broad-scale Monitoring large mesh nets

Appendix Modifications and clarifications of definition of the standard codes found on the Creel Interview Form, Bernard Lake, 2011.

Guide Code:	Hut		Open Ice	
	0:	private hut	0:	no
	1:	rental hut	1:	yes (use outfitting service)
Origin Code:	1	Village of Sundridge, Township of Strong		
	4:	"Almaguin": Municipalities of South River, Machar, Joly, Kearney, Burks Falls, Armour, Perry, McMurrich/Montieth, Ryerson, Magnetawan		
	5:	remainder of Districts of Parry Sound or Muskoka		
Visitor Code:	1:	permanent resident of waterfront property or Village of Sundridge		
	2:	non-permanent resident of waterfront property or Village of Sundridge		
Option Code 1:	Portable shelter being used?		0: No	1: Yes
Option Code 2:	Chum being used?		0: No 1: fish: 2: corn 3: rice, 4: pasta 5: barley 6: oats 7: fish food pellets 8: salmon eggs 9: sago cereal	
Option Code 3:	Sector			

Appendix Locations of ice huts, Bernard Lake, 2011. Mid-winter location (Feb. 9, 2011) is given if available.

East	North	Date	East	North	Date	East	North	Date
627412	5069418	5-Mar-11	624403	5065046	9-Feb-11	625330	5068294	9-Feb-11
625323	5068506	9-Feb-11	625366	5068463	9-Feb-11	625355	5068531	9-Feb-11
626513	5065739	9-Feb-11	626603	5069676	5-Mar-11	625414	5068261	9-Feb-11
627295	5069558	9-Feb-11	624514	5065089	9-Feb-11	623768	5064412	9-Feb-11
627192	5069979	24-Jan-11	625352	5068552	9-Feb-11	624701	5065876	9-Feb-11
627190	5069978	9-Feb-11	625382	5068481	9-Feb-11	625304	5068471	9-Feb-11
624294	5063497	9-Feb-11	625345	5068303	9-Feb-11	625334	5068310	9-Feb-11
625348	5068332	9-Feb-11	625331	5068290	5-Mar-11	627100	5069520	9-Feb-11
625309	5068307	9-Feb-11	625316	5068382	9-Feb-11	625359	5068417	9-Feb-11
625357	5068291	5-Mar-11	626432	5069752	9-Feb-11	624471	5065081	9-Feb-11
625380	5063424	9-Feb-11	626605	5069670	9-Feb-11	623651	5064452	9-Feb-11
625319	5068299	9-Feb-11	626418	5069711	9-Feb-11	626738	5066677	9-Feb-11
625318	5068299	9-Feb-11	623941	5064297	9-Feb-11	625174	5068580	9-Feb-11
625329	5068306	9-Feb-11	626619	5069725	9-Feb-11	626577	5069630	9-Feb-11
625321	5068312	9-Feb-11	626601	5069763	9-Feb-11	626536	5069705	9-Feb-11
625342	5068323	9-Feb-11	626568	5069823	9-Feb-11	625317	5068271	9-Feb-11
624480	5065051	9-Feb-11	625145	5068594	9-Feb-11	624652	5065067	9-Feb-11
625313	5068279	9-Feb-11	624426	5065078	9-Feb-11	624635	5065037	9-Feb-11
627256	5069466	9-Feb-11	625383	5068464	9-Feb-11	625380	5068453	9-Feb-11
626503	5069746	9-Feb-11	625288	5068283	9-Feb-11	625319	5068064	9-Feb-11
627281	5069484	9-Feb-11	625314	5068288	9-Feb-11	625277	5068299	9-Feb-11
624622	5066158	9-Feb-11	625315	5068261	9-Feb-11	625307	5068248	9-Feb-11
626457	5069711	9-Feb-11	625274	5068381	9-Feb-11	625375	5068293	9-Feb-11
624435	5065094	9-Feb-11	625390	5068565	9-Feb-11	624323	5065174	9-Feb-11
624450	5065054	9-Feb-11	626399	5069717	9-Feb-11	625311	5068291	9-Feb-11
624397	5065011	9-Feb-11	626361	5069706	9-Feb-11	625327	5068274	9-Feb-11
625376	5068224	9-Feb-11	627316	5069487	9-Feb-11	625345	5068283	9-Feb-11
625303	5068282	9-Feb-11	625327	5068285	9-Feb-11	624401	5063665	9-Feb-11
623819	5064505	9-Feb-11	625332	5068088	9-Feb-11	625329	5068249	9-Feb-11
625346	5068713	9-Feb-11	626326	5064464	9-Feb-11	624608	5065037	9-Feb-11
625386	5062622	9-Feb-11	625382	5068258	9-Feb-11	625317	5063350	5-Mar-11
625346	5068312	5-Mar-11	626489	5069727	9-Feb-11	625378	5068555	9-Feb-11
627409	5069414	9-Feb-11	625340	5068286	9-Feb-11	625223	5068296	9-Feb-11
627311	5069536	9-Feb-11	626440	5069692	9-Feb-11	625354	5068503	9-Feb-11
625323	5068285	9-Feb-11	625263	5063426	9-Feb-11	625379	5068434	9-Feb-11
625296	5068345	9-Feb-11	625318	5068293	9-Feb-11	626478	5069665	9-Feb-11
624621	5066108	5-Mar-11	625391	5068272	9-Feb-11	627298	5069558	24-Jan-11
626587	5069804	9-Feb-11						

Appendix Angler origin, by fishing mode, winter creel survey, Bernard Lake, 2011.

Location	Hut	Open Ice	Total
Sundridge	88	31	119
Strong Twp.	63	13	76
South River	58	7	65
Toronto	21	40	61
Sprucedale	38	14	52
Magnetawan	44	1	45
Joly Twp.	18	6	24
Huntsville	15	8	23
Burks Falls	13	9	22
Corbeil	19	2	21
Misissauga	13	7	20
Orangeville	10	5	15
Chapman Twp.	13	1	14
Emsdale	10	2	12
Barrie	7	3	10
Guelph	8		8
Katrine	3	5	8
Novar	4	4	8
Hamilton	2	5	7
Hockley Valley	7		7
Burlington	5	1	6
Bracebridge		5	5
Brampton	3	2	5
Brantford	4	1	5
Lindsay	5		5
Powassan	5		5
Baysville	2	2	4
Durham	4		4
Innisfil	2	2	4
Laurier Twp.	4		4
North Bay	2	2	4
Parry Sound	4		4
Beaverton	3		3
Caledon	3		3
Collingwood		3	3
Keswick	3		3

Location	Hut	Open Ice	Total
Trout Creek	3		3
Ajax	2		2
Ayr	2		2
B.C.	2		2
Bobcaygeon	1	1	2
Buckhorn	1	1	2
Grand Valley	2		2
Hillsborough	2		2
Holland Landing	1	1	2
Kincardine	2		2
Minden		2	2
New Lowell	2		2
Port Colborne	2		2
Sturgeon Falls	2		2
Tottenham	2		2
Woodstock		2	2
Acton	1		1
Beeton		1	1
Dunchurch	1		1
Fordwich	1		1
Gravenhurst	1		1
Kearney		1	1
Lancaster	1		1
Markham		1	1
Mt. Albert	1		1
Newmarket	1		1
Niagara Falls	1		1
Orillia	1		1
Oshawa	1		1
Pickering	1		1
Shelburne	1		1
St. Thomas	1		1
Tiverton	1		1
Walkerton	1		1
Windsor	1		1