Science and Information Branch
Southern Science and Information

Aquatic Science Unit Report 2010 –3

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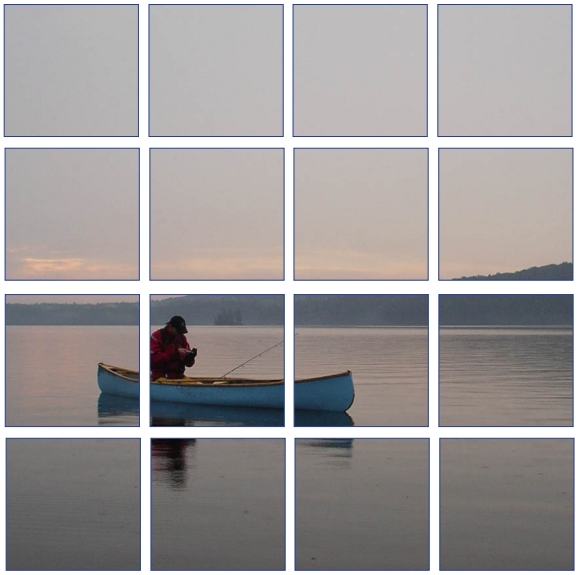
By Glenn Forward, Brian Monroe, Greg Betteridge, and Kris Vascotto



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A Cost-Effective Method to Estimate Total Angling Effort, Catch and Harvest within Ontario Provincial Parks

By Glenn Forward*, Brian Monroe, Greg Betteridge, and Kris Vascotto

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Abstract

Fishing is an important activity for many visitors to Ontario's provincial parks and many park management plans advocate the presence of healthy and sustainable fisheries within park boundaries. Estimates of total angling effort, catch and harvest are used to assess the health of a fishery. However, monitoring programs to obtain these estimates may not exist because they are too costly. We have developed a cost-effective method to estimate total angling effort, catch and harvest using data collected at an Algonquin Provincial Park permit office, voluntary surveys of visitors angling within the park and access information derived from the Ontario Parks camper registration system. We propose that this method is broadly applicable to monitoring fish populations and recreational fisheries in provincial parks and other areas requiring the registration of visitors.

Keywords:

fishing, fisheries, creel survey, monitoring, cost-effective, Ontario provincial parks

Résumé

La pêche est une activité importante pour les nombreux visiteurs des parcs provinciaux de l'Ontario et nombreux également sont les plans de gestion des parcs qui souhaitent voir des pêcheries saines et durables à l'intérieur des parcs. Les estimations des efforts de pêche, des captures et de la récolte servent à évaluer la santé d'une pêcherie. Toutefois, les programmes de surveillance nécessaires pour obtenir ces estimations peuvent ne pas être en place à cause d'un coût trop élevé. Nous avons créé une méthode économique pour estimer l'ensemble des efforts de pêche, des prises et de la récolte grâce aux données recueillies par le bureau des permis du parc provincial Algonquin, aux sondages à participation volontaire des pêcheurs du parc et aux données du système d'enregistrement des campeurs de Parcs Ontario. Nous sommes d'avis que cette méthode peut s'appliquer largement à la surveillance des populations de poisson et aux pêcheries sportives dans les parcs provinciaux et autres lieux où l'on procède à l'enregistrement des visiteurs.

Mots clés :

pêche, pêcheries, enquête par interrogation du pêcheur, surveillance, économique, parcs provinciaux de l'Ontario

Acknowledgements

We thank the staff of Algonquin Provincial Park for their help with the implementation of this program. In particular, the staff of the Lake Opeongo Access Point, including Tania Jermol, Rebecca Pearson, and Maggie Davies, were especially helpful registering parties, answering their questions about our work, and dispensing surveys. As well, we thank Adam Challice for drumming up angler participation, all the anglers that returned completed surveys and Nigel Lester, Brian Jackson, Tim Haxton, Cam Willox and Melissa Robillard for their excellent comments pertaining to this report. As well, we thank Lyn Thompson for her help publishing this report.

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Introduction

Fishing is important for many visitors to Ontario provincial parks. A survey of 176 visitors to the interior of Quetico Provincial Park found that the most satisfying aspect of the trip was fishing (Ontario Parks, 2006). Algonquin Provincial Park contains approximately 240 brook trout lakes and approximately 149 lake trout lakes (Ontario Ministry of Natural Resources, 1998). Consequently, it is an important destination for trout anglers. In 2007, during the first six weeks of brook and lake trout (*Salvelinus fontinalis* and *S. namaycush*, respectively) seasons, 95% of 231 parties of visitors accessing the interior of Algonquin Provincial Park from the Lake Opeongo Access Point were comprised of at least one visitor planning to fish for trout. A survey in 2005 of camping visitors at 71 Ontario provincial parks showed 21.5% of those surveyed reported fishing during their visit (Ontario Parks, 2005).

Sustained high rates of angling effort and harvest may ultimately lower the quality of fishing. High rates can result in a decrease in the number of mature fish and the weight of fish that can be harvested over time (Evans et al., 1991a). High rates of fishing effort also result in decreased harvest per unit of time fished (Lester et al., 1991).

Although angling is important to park visitors, estimates of total angling effort and harvest within Ontario Parks are rarely determined. The infrequency with which angling is monitored may be due to the high cost of deriving estimates of activity. We describe a cost-effective method to estimate total angling effort, catch and harvest within Ontario Parks. We demonstrate the method using information collected from visitors registering to camp in the interior of Algonquin Provincial Park (Figures 1 and 2).

Figure 1. Map of Ontario showing Algonquin Provincial Park.

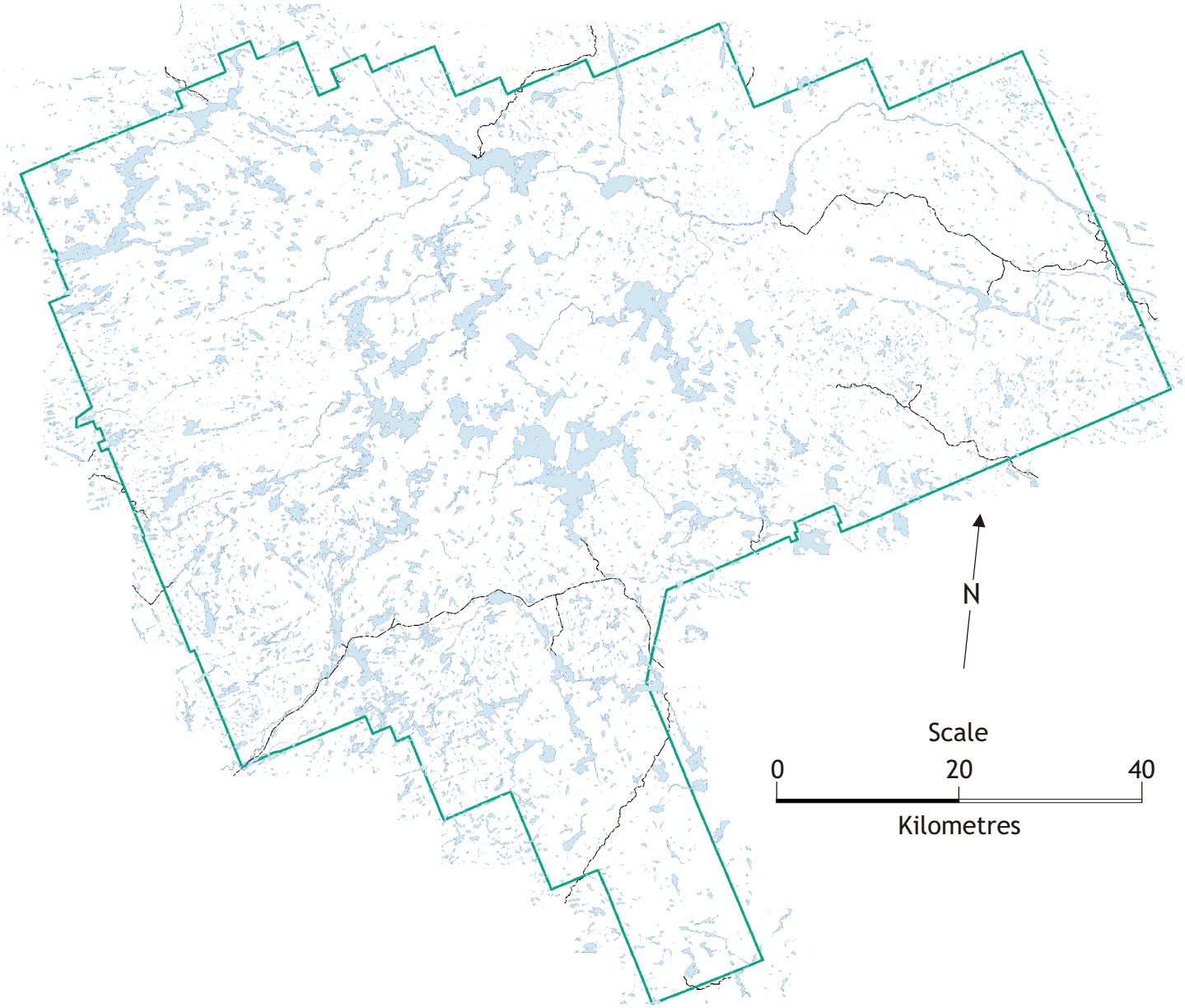

Figure 2. Map of Algonquin Provincial Park.

Methods

The method is comprised of four steps:

(1) obtain daily records of the number of parties of visitors camped in the area of interest
(2) determine the proportion of parties of visitors comprised of at least one visitor planning to fish
(3) obtain daily effort, catch and harvest data from a sample of parties of visitors comprised of at least one visitor who angled during the trip
(4) estimate total fishing effort, catch and harvest using data from the preceding steps

The following description of a survey conducted in Algonquin Provincial Park in the spring of 2007 describes the methods associated with the four steps.

Ontario Parks staff at the Algonquin Provincial Park, Lake Opeongo Access Point, register all parties of visitors using this access point to camp in the park (Figure 3). During registration of a party, park staff record on a permit the number of people in a visiting party, the lakes they will camp on and the dates they will camp on those lakes. Copies of the permit are retained by staff and all permit data are entered into an electronic database that was maintained by CAMIS Incorporated (Guelph, Ontario). We used copies of the permits to obtain daily records of the number of visiting parties camped in the area of interest.

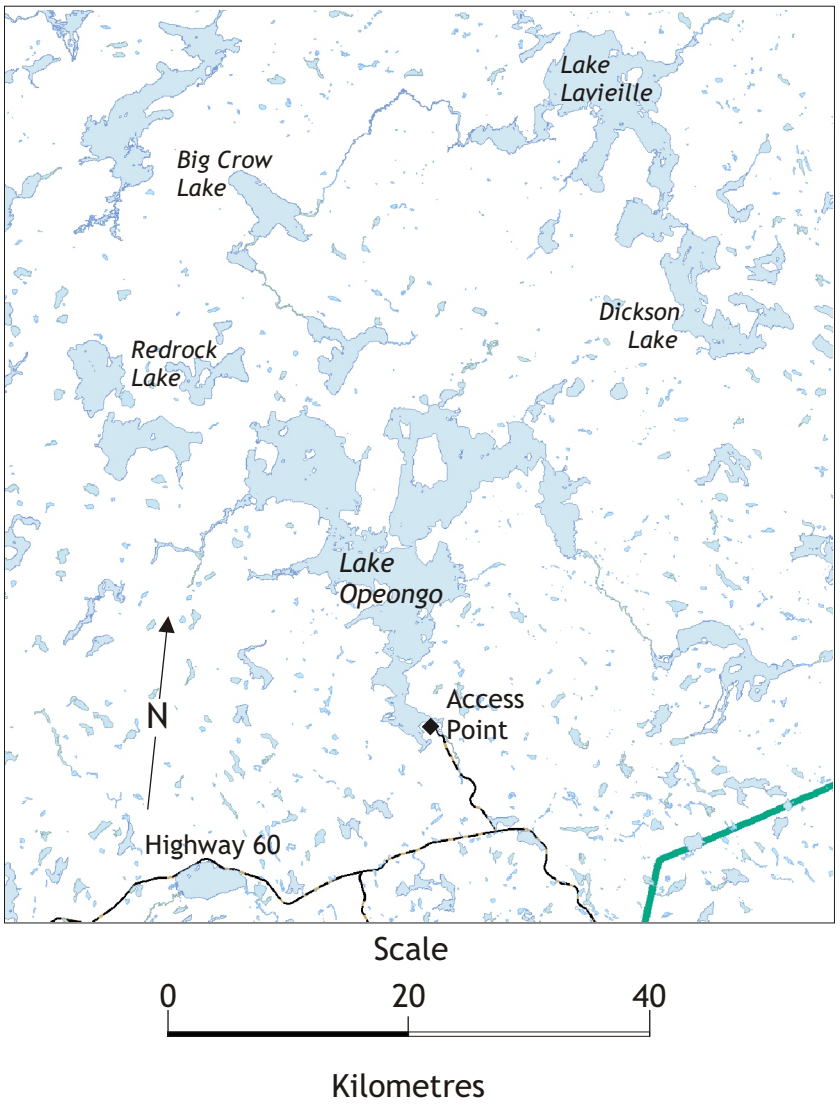

Figure 3. Map of central Algonquin Provincial Park showing the Lake Opeongo access point and study lakes.

At the time of registration, staff asked registering visitors if anyone in their party was planning to fish for trout during their trip. The number of parties comprised of at least one angler planning to fish for trout and the number of parties without anyone planning to fish for trout were recorded. Visitors planning to camp on Lake Opeongo were not asked about their angling plans because anglers fishing Lake Opeongo are interviewed about their angling activity by staff of the Harkness Laboratory of Fisheries Research, Ontario Ministry of Natural Resources. Estimates of total effort, catch and harvest pertaining to Lake Opeongo are derived by Harkness Labs.

Parties of visitors comprised of at least one member planning to fish for trout were asked to take a survey package. The package contained a survey form, instructions, results from a survey of visitors who angled for trout during their visit to the park in 2006 (Appendix 1), pencils, and a plastic bag. Survey participants were instructed to have a party member complete the form for all angling members, after each day fished, and deposit completed surveys in permit boxes, mail them to the Algonquin Fisheries Assessment Unit (AFAU) or submit them to any park office within Algonquin Provincial Park. Participants were asked to include contact information with the completed survey if they wished to receive a summary of the preliminary results in June and a summary of the complete results in November. Additionally, their name was entered into a draw to receive the unidentified lure used to capture a large brook trout shown in the survey package (Appendix 1). An information sheet about the survey was posted at the registration desk and AFAU staff were

frequently at the access point to explain the purpose of the survey and to answer questions.

Fishing activity estimates were derived using the one-stage estimation method for access creels (Lester and Korver, 1996). The number of nights camped was summed for the first six weeks of trout season, across all parties of visitors, for the geographical region of interest. The sum for the area was multiplied by the proportion of parties with at least one angler. The product is an estimate of the total number of angling trips during the first six weeks of trout season. The arithmetic mean of the number of rod-hours each party fished per day was multiplied by the estimate of the total number of trips to provide an estimate of total effort. Similarly, the arithmetic mean of the daily catch and harvest for a party was multiplied by the estimate of the total number of trips to provide estimates of total catch and harvest, respectively. Confidence intervals (95%) for arithmetic means were calculated.

Results

Estimates of angler activity pertaining to brook and lake trout fishing are shown for four lakes (Table 1). The four lakes are located north of the Lake Opeongo Access Point (Figure 3).

Table 1. Mean and total angler effort estimates, and catch and harvest estimates for brook and lake trout during the first six weeks of trout season for anglers accessing four lakes in Algonquin Provincial Park via the Lake Opeongo Access Point. Upper and lower boundaries of the 95% confidence interval are provided in parentheses.

Overall	Lake	Big Crow	Lavieille	Dickson	Redrock
	Total number of nights camped by all parties	150	186	124	37
	Estimate of number of nights camped by angling parties	142	176	117	35
	Number of angling days reported	51	89	77	26
	Mean effort/party/day (hr)	13.5 (10.4, 16.6)	15.4 (12.7, 18.1)	11.7 (9.4, 14.0)	8.6 (5.8, 11.4)
	Total effort estimate (hr)	1924.0	2710.4	1368.9	381.0
Brook Trout	Mean catch/party/day	2.8 (1.9, 3.7)	4.3 (2.9, 5.7)	3.4 (2.6, 4.2)	4.3 (2.3, 6.3)
	Total catch estimate	397.6	756.8	397.8	150.5
	Mean harvest/party/day	1.8 (1.1, 2.5)	2.3 (1.4, 3.2)	1.9 (1.4, 2.4)	2.2 (1.2, 3.2)
	Total harvest estimate	255.6	404.8	222.3	77
Lake Trout	Mean catch/party/day	0.6 (0.2, 1.0)	1.4 (1.0, 1.8)	0.04 (0, 0.08)	none caught
	Total catch estimate	86.3	255.1	4.7	
	Mean harvest/party/day	0.5 (0.2, 0.8)	0.6 (0.3, 0.9)	0.01 (0, 0.03)	
	Total harvest estimate	72.4	105.6	1.2	

Discussion

Our method provides an estimate of total harvest on an individual lake basis, or within a group of lakes. It is important to measure total harvest to determine if fisheries objectives are being achieved. The harvest of sport fish in Ontario is an important stressor and has been identified as the most critical stress affecting Ontario's lake trout populations (Olver, 1988; Evans et al., 1991b). As well, Curry et al. (2003) recommend managing total mortality rates to ensure the sustainability of brook trout fisheries. Rates for the sustainable harvest of brook and lake trout have been proposed (Ontario Ministry of Natural Resources, 1982). The rates are measured as the mass of the species harvested from an area per unit time. Measures of harvest derived from our method are in numbers of fish; however, estimates of the mass harvested could be obtained by multiplying an estimate of the mean weight of fish harvested by the total number harvested.

Our method provides an estimate of total effort. Effort can serve as a relative measure of harvest of the species targeted by anglers (Goddard et al., 1987; Carl et al., 1990). As well, rates of targeted effort for a sustainable harvest have been proposed (Shuter et al., 1998; Lester et al., 1998). Our method does not record the species targeted by anglers; however, this is not problematic since the angling methods for lake and brook trout are similar on the lakes within Algonquin Park during the spring season. Anglers should be asked which species was targeted in more complex fisheries or during seasons when angling methods vary for species, to derive diagnostic measures.

The method that we have developed has substantial benefits compared to traditional creel or angler survey methods. Anglers can be surveyed using aircraft and boats, by conducting interviews at an access point, or on the water, or by a combination of these methods (Pollock et al., 1994). Access point creels have been shown to be a cost-effective means of obtaining measures of effort, catch and harvest of anglers (Pollock et al., 1994). Measures of effort, catch or harvest can also be obtained through on-water or roving surveys of anglers, this involves counting anglers and interviewing all or a sample of anglers to obtain information on their angling habits. The information from the interviews is used to translate counts into measures of total harvest and effort. These traditional methods tend to be costly because they require expensive equipment or a large investment of time. There is no additional cost associated with the interviews using our method since they are conducted as part of the registration process and the results may be digitally integrated into the registration database. As well, an interviewer is not required to obtain samples of angling activity: the form is filled in daily by the angler. Counts of anglers using our method are not costly either. These can be derived from the camper registration database as opposed to travelling to the lake to obtain a direct count. The registration database for an Ontario

provincial park is inexpensive. The 2007 camper registration database for Algonquin Provincial Park was not available at the time of our analysis; however, the 2006 electronic database for all 29 access points of Algonquin Provincial Park was purchased for less than $400 (Canadian). We suspect the cost of the 2007 camper registration database for Algonquin Provincial Park will be similar to that of the 2006 database.

There are at least four sources of uncertainty associated with our analyses. Acknowledging these can ensure our findings are interpreted appropriately and identify opportunities for future research. First, the described method is intended to capture all the effort, catch and harvest of anglers within an area of the park. All parties of visitors planning to camp within an Ontario provincial park are entered into the reservation database, thus the database can be used to expand the results from angling parties to derive estimates of total effort, catch and harvest. However, anglers using day passes to access lakes are not entered into the camper registration system and, therefore, cannot be incorporated in estimates of effort, catch and harvest. Therefore, estimates of angling activity should be restricted to lakes requiring at least one portage from an access point. This restriction may minimize the amount of effort expended on these lakes by day pass users. Second, our expansion of angler activity to derive total estimates of effort, catch and harvest infers anglers are only fishing the lakes they camp on. Therefore, effort, catch and harvest would not be captured from anglers fishing lakes other than the ones they camp on. This problem may be resolved by adjusting the angler activity estimates to account for forays into lakes that are not camped upon. The adjustments require an understanding of the relationship between lakes camped upon to those fished but not camped on. The relationship could be derived by asking anglers to record their permit number on the voluntary survey form and using the permit number in conjunction with the registration database to determine the party's camping and fishing itinerary. Third, anglers may access lakes within the area of interest through an access point other than those through which the survey is being conducted. The activity of these anglers would not be incorporated into the estimates. Incorporating these other access points into the study would alleviate this problem. Fourth, the results from our example only pertain to the first six weeks of trout season. The study could be extended to the entire season to estimate total effort, catch and harvest for the year.

In our example for Algonquin Provincial Park, extending the study for the entire angling seasons of brook and lake trout, incorporating all access points within the park into the study and deriving the relationship between fishing and camping itineraries could provide estimates of total effort, catch and harvest for all lakes that are not accessed by anglers using day passes. Thus, total estimates of angler activity could be cost-effectively derived for many of Algonquin Provincial Park's trout lakes.

Our method estimates the activity of anglers who have reserved their permits in advance of registration, as well as those who did not reserve. All anglers are entered into the registration database when they apply for a permit to camp in Ontario Parks regardless of whether the permit has been reserved. As well, cancellations, and permits reserved but not used are recorded in the database. Consequently activity estimates are not over-inflated by incorporating groups that do not arrive.

The survey methodology may provide relatively precise estimates because attempts are made to survey every angler. The standard error associated with estimates of means may be decreased by increasing the sample size (Sokal and Rohlf, 1969). This is an important consideration to increase the precision of estimates of means. We provided anglers with a survey that could be completed in a couple of minutes each day fished to maximize sample size. As well, we enticed anglers to return their surveys with the promise of receiving preliminary and final results and entry into a draw for a, "secret" brook trout lure. Also, we spent time talking with anglers prior to their departure from the access point about the objectives and ease of completion of the survey and we posted an information sheet at the registration counter outlining these aspects of the survey. Prizes that are more expensive or desirable than our, "secret" brook trout lure may increase the return rate of the surveys from anglers. Varying the types of prizes offered and measuring the corresponding rate of survey return may be done to determine the best means to increase sample size.

Bias may not strongly affect the accuracy of results obtained using our survey methodology. We attempted to minimize the effects of anglers exaggerating their catch or harvest through public education and by rewarding participants. We specified in the instructions the information recorded by anglers is not entered into a competition, will be used to help preserve the resource anglers cherish and a summary of the results will be available by a specified date. As well, we provided a summary of the results from a similar survey conducted in 2006. Pollock et al. (1994) state continual public education and reward incorporated into a survey may produce accurate information. We do not think species misidentification strongly biased our results. The fish communities of the summarized lakes are relatively simple with at most four sport fish species (lake and round whitefish and brook and lake trout) present per lake with only trout species targeted by anglers (AFAU, unpublished data). As well, identification of the trout species may have been facilitated by incorporating labelled pictures of both species of trout within the information package that accompanied the survey (Appendix 1). We recommend that a means of species identification accompany surveys that pertain to more complex fisheries. Our method may not be vulnerable to length-of-stay bias, which plagues roving creels, because we asked anglers to record their results at the end of each angling day (Pollock et al., 1994). Our survey method may be subject to bias associated with non-response if non-responding anglers differ in their

effort, catch and harvest relative to those of responding anglers. The relationship of angling attributes for responding and non-responding parties could be investigated if anglers are asked to record their permit numbers on the angling surveys. Surveys containing permit numbers may then be used in conjunction with the camper reservation database, containing contact information for all angling parties, to facilitate contact with angling parties that did not respond. Non-responding angling parties would be interviewed shortly after their trip and the results would be compared to those of angling parties that initially responded to the survey.

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Appendix 1

Contents of the survey package offered to parties of visitors, comprised of at least one individual planning to fish for trout, during their registration at the Lake Opeongo Access Point to camp within Algonquin Provincial Park.

Algonquin Park Interior Lakes Fishing Trip Survey - 2007

Ontario Ministry of Natural Resources - Algonquin Fisheries Assessment Unit & Ontario Parks

Please follow the instructions on this sheet.

Circle the dates of your trip:

Sat	Sun	Mon	Tue	Wed	Thu	Fri
Apr 28	29	30	May 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	June 1
2	3	4	5	6	7	8

Check the lakes that you fished:

Proulx (PR)___ **Big Crow** (BC)___
L. Crow (LC)___**Lavieille** (LA)___
Dickson (DI)___ **L. Crooked** (LI)___
L. Dickson (LD)___
Hogan (HO)___ **La Muir** (LM)___
Redrock (RE)____
Happy Isle (HA)___ **Merchant** (ME)___
Big Trout (BT)___ **Longer** (LO)___
Burntroot (BU)___
If you fished on any other lakes, please record them on the fishing effort / catch form.

Fishing Effort / Catch Form

Please record for your group each day.

Date	Lake fished (Name or code)	Number of people that fished	Average No. of hours that each person fished	Total Number of **BROOK TROUT**		Total Number of **LAKE TROUT**	
				Caught	**Kept**	**Caught**	**Kept**

Thank you for completing our fishing survey.
You may drop it off at the Lake Opeongo permit office, the Harkness Lab creel check station or any Algonquin Park office.
In case this form has slipped into the bottom of your pack, the Algonquin F.A.U. is located at the East Gate: P.O. Box 219 Whitney, Ontario K0J 2M0
or email: greg.betteridge@ontario.ca Phone: (613) 637-2780 Ext. 271

If you would like a copy of the survey results (available in late June), please print your **email address** (preferred): _____

or

Name: _____

Address: _____

_____ **Postal Code:** _____

We always appreciate your feedback and any comments you might have:

_____

_____

_____

_____

Optional *Please check the appropriate boxes.*

Overall and/or by lake, how would your group rate the this year's brook trout (BT) and lake trout (LT) fishing?

	Overall		Lake _____		Lake _____		Lake _____	
	BT	LT	BT	LT	BT	LT	BT	LT
Excellent								
Good								
Fair								
Poor								

Including 2006, how many years has the most experienced member of your group fished in Algonquin Park or on the lake(s) that you fished?

	Park	Lake _____	Lake _____	Lake _____
First year				
2 to 5 years				
6 to 10 years				
More than 10 years				

Side 1 Here's everything that you and your fellow anglers were good enough to share with us.

Summary of the Algonquin Provincial Park Interior Lakes Fishing Survey - 2006

In 2006, there were 57 fishing survey forms returned from groups that departed from Lake Opeongo to fish interior lakes in Algonquin Park. Everyone who requested one was either emailed or mailed a copy of the results by mid-July. The assistance and co-operation of anglers is sincerely appreciated, and we anticipate that our 2007 survey will be the best one ever.

Lake	No. of Groups	Brook trout Caught	Brook trout Kept	Pct Kept	Lake trout Caught	Lake trout Kept	Pct Kept	Total Rod Hr	Total C.U.E.[1]	Fishing Ratings[2] Brook trout E	G	F	P	Lake trout E	G	F	P	Average Yrs Exp.
Animoosh	1	0	0					8										
Big Crow	14	133	58	44%	16	9	56%	538.5	0.28		3	3	3			1	6	10+
Big Trout	2	13	13	100%	7	3	43%	62	0.32		1							10+
Chickaree	1	0	0		0	0		3										
Crow R.	2	21	19	90%				65	0.32									
Dickson	16	140	72	51%	5	1	20%	616	0.24		1	5	1	1		2	1	10+
Farncomb	2	8	1	13%				14	0.57									
Happy Isle	8				40	17	43%	71.3	0.56					3	2		2	7
Hogan	3	49	35	71%	18	15	83%	209.5	0.32	1								10+
Lavieille	19	511	238	47%	143	48	34%	1410	0.46	1	1	1	2	1	2		2	10+
L. Crooked	3	32	17	53%				106	0.30			1	1					6
L. Dickson	1	20	19	95%	3	3	100%	112	0.21		1					1		10+
La Muir	3	23	8	35%	227	48	21%	303	**0.83**			1			1			
Longer	1	29	14	48%	3	2	67%	39.3	**0.81**		1					1		10+
Merchant	11	2	2	100%	96	61	64%	291.5	0.34			3		2	2	1		10+
Nepawin	1	6	0	0%				15	0.40									
Proulx	4	26	25	96%				296	0.09			1				1		10+
Redrock	4	36	17	47%	4	3	75%	126.5	0.32		1					1		10+
Totals[3]	**57**	**1049**	**538**	**51%**	**562**	**210**	**37%**	**4278.6**	**0.38**									

Notes:

1 C.U.E. = Catch per Unit of Effort, or number of all trout caught per rod-hour fished.

2 The fishing quality ratings assigned to each lake; **E**xcellent, **G**ood, **F**air or **P**oor.

3 Some groups fished more than 1 lake; 57 was the total number of parties that returned surveys.

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Side 2 This is the fun stuff; we get to analyze the results.

Catching Trout

In 2006 the overall catch per unit of effort (C.U.E.) **for all lakes, both species**, was 0.38. What the heck does that mean? On average, it took one hour for each person to catch 0.38 trout, or more logically, about 2.5 hours to catch a trout. Not impressed? Outside of Algonquin Park and northern wilderness lakes, scientific papers indicate that a C.U.E. of 0.10 is about average for lake trout fishing. The rest of the world has to be content boating one lake trout every 10 hours.

Remember, the C.U.E. is just an average, that includes both first timers and the experts. Where else but on a fishing trip do we have the chance to be with good friends to eat, drink, laugh and share the moments to remember all year and for years to come? If fishing was simply a matter of catching fish to eat, we'd be better off buying pond-reared rainbow trout at the A&P. We work in the Park and like to chase after trout too (see photos) and know that catching fish is only half the fun.

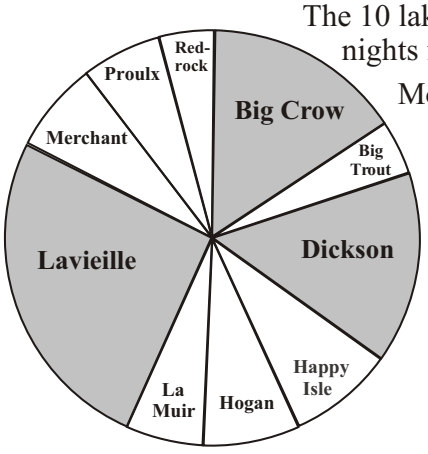
This 'trout hugger' gladly released his lake trout back into Lake X after a great battle in July, 2005.
There's enough in the background for those of you who've been there to figure out which lake it is.

Here's a 3 1/2 pound brook trout that was released (honest) on Lake X, August 2004.
When you return a completed survey, we PROMISE to reveal the identity of the lake and the lure and we will randomly select 10 WINNERS of the lure that's in the brook trout's jaw.

Releasing Trout

Overall, 63 percent of lake trout and about half of the brook trout caught in 2006 were released. That speaks volumes about how good the fishing is in the Algonquin Park interior. Hundreds of Ontario trout lakes have special regulations, reduced possession limits and 'slot sizes' in effect to preserve the few native trout stocks that remain. Innumerable lakes have been tainted by dumped bait fish buckets and the invasions of rock bass, cormorants, zebra mussels and spiny water fleas. To date, thanks to your conservation practices and sound management, the brook and lake trout lakes of Algonquin Park still provide excellent fishing and they become increasingly more valuable every year.

Quick Facts from the Lake Opeongo Access Point, 2006



The 10 lakes shown in the pie chart made up about **94 percent** of total camper nights for groups visiting interior lakes from April 28 to June 30.

More than **90 percent** of visitors who camped in the Algonquin Park interior during the first four weeks of trout season, when asked, indicated that they would be fishing.

A Final Note

We collect fishing survey data to benefit both you and the resource.
BUT... *What if I tell them the fishing on Lake Y is great? Everyone will go there and clean out the lake.*
That would take a lot of cleaning. The most popular interior trout lakes have recovered from much higher exploitation rates in the past.
OR ... *What if I say that fishing is poor? The MNR might sense a problem and reduce limits or restrict access.*
Current regulations are working fine, mostly because 'catch and release' is now a common practice.

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Cette publication hautement specialisée Une méthode économique pour estimer l'ensemble des efforts de pêche, de la capture et de la récolte dans les parcs provinciaux de l'Ontario n'est disponible qu'en anglais en vertu du Règlement 411/97 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez communiquer avec Southern Science and Information Section au ministère des Richesses naturelles au 1-800-667-1840 ou informationssi@mnr.gov.on.ca.

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