Yellow Perch
Winter Angling Survey
in the Northwest Boreal Region

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Prepared by:

Brian Lucko
and
Kevin Potter
Fisheries Technicians

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Abstract

A roving creel survey with simple random sampling was implemented on nine lakes in the Northwest Boreal Region of Alberta. Information was gathered regarding the characteristics of the yellow perch (*Perca flavescens*) sportfishery, and to a lesser extent, walleye (*Stizostedion vitreum*), and northern pike (*Esox lucius*). Survey data from four of the nine lakes were also compared to a 1993 winter angling survey. The estimated total harvest for yellow perch varied from 0 to 2187 ± 1465 individuals (95% C.I.). The estimated total effort varied from 37 ± 66 to 8272 ± 7238 angler/hours. Estimated total fishing pressure varied from 0.03 ± 0.01 to 10.18 ± 2.31 angler-hrs/hectare. In total, 907 anglers were interviewed with 76% harvesting no perch while 0.55% harvested a limit of 15. Overall, 53% of anglers were dissatisfied with their fishing experience and 59% stated that perch fishing has declined from the past. In comparing the 1993 and 1998 creel data, the perch catch and harvest was higher in 1993. Poor angling experiences increased from 24% in 1993 to 55% in 1998. Due to a low yellow perch harvest at three of the four lakes, an accurate comparison of the population dynamics could not be made. Further studies should be conducted to gather long-term trend data on yellow perch densities and population structures to help in the decision of management strategies.

Acknowledgements

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1.0 INTRODUCTION

Yellow perch (*Perca flavescens*), like other sportfish, are declining in size and numbers in many populations throughout Alberta (Berry 1995). Overharvest in the sportfishery is the main concern. In 1974, a daily limit of 30 perch was introduced. For 20 years the fishing regulations for perch did not change. During this time, angling pressure steadily increased and perch numbers decreased in some Northwest Boreal Region lakes. In an effort to reduce the perch harvest and allow the larger size component of perch populations to recover, a daily catch limit reduction from 30 to 15 perch was implemented on McMillan Lake in 1990 and on Mink Lake in 1991. Perch angling effort and harvest information was collected from January to April 1993 by Environmental Protection – Natural Resources Service on four of the most popular perch producing lakes (Lesser Slave , Sturgeon , Mink and McMillan lakes) in the Northwest Boreal Region.

Growing concerns of overharvest and declining perch populations were brought forward by sportfishing organizations and individuals in the Northeast Region of the province (March 1995). This prompted a review of the yellow perch status in Alberta. An interim regulation change reducing the daily catch limit to 15 was implemented in 1996. This would identify the need for conservation and provide additional protection for perch during the time required to develop a detailed management plan. In order to develop a province-wide yellow perch management plan, perch populations (especially those with high angler harvest and/or angling pressure) must be examined.

To evaluate the effectiveness in the regulation change and provide additional information relating to the perch sportfishery, a winter creel survey was conducted between January 31 and April 12, 1998 on nine perch producing lakes in the Northwest Boreal Region. This survey was funded by the Alberta Conservation Association, Fisheries Management Enhancement Program. The purpose of this survey was to gather information on perch sportfishery characteristics for individual lakes. Data on recreational angling effort, harvest rates, angler attitudes and opinions, along with perch population dynamics were collected and is presented in this report. A comparison of present survey data to the 1993 winter angling survey was also conducted. The information collected in this survey will contribute to the development of the Provincial Yellow Perch Management Plan.

2.0 STUDY AREA

The nine lakes chosen for this survey are Lesser Slave, Utikuma, Winagami, Sturgeon, Mink, McMillan, Mistehae, Joker, and Goosegrass. They are distributed throughout the Northwest Boreal Region (Figure 1). Presently, most of the nine lakes are popular fishing destinations for perch fishermen, while McMillan and Mistehae have supported healthy perch populations in the past. Vehicle access was available to all of the lakes during this study. complete

2.1 Lesser Slave Lake

One of the premier walleye fisheries in Alberta, Lesser Slave Lake is located approximately 250 km northwest of Edmonton. The lake is comprised of two basins (east & west) with a total surface area of 118,659 hectares. Mean depth of the lake is 11.4 meters, with the west basin substantially shallower than the east basin. Game fish species found in this lake include walleye (*Stizostedion vitreum*), yellow perch, northern pike (*Esox lucius*), lake whitefish (*Coregonus clupeaformis*) and burbot (*Lota lota*). In past years the most productive perch fishing is in March and April (M. Brilling – pers. comm.). A portion of the west basin with historically high winter fishing activity was sampled for creel information during this survey.

2.2 Utikuma Lake

Utikuma Lake is situated approximately 70 km northwest of Slave Lake, Alberta. It is a large, shallow, productive lake with a surface area of 27,557 hectares and a mean depth of 2.7 meters. In March 1989, oxygen levels became critically low and a major winterkill occurred. Results from a survey that was conducted in May 1989 (Lucko 1989) indicate that while pike were still quite numerous, most other species were extremely low in abundance. Ice fishing for yellow perch on Utikuma Lake has steadily increased in popularity since the winterkill (M. Brilling – pers. comm.). Utikuma Lake supports an important, high quality lake whitefish commercial fishery, along with other sportfish populations of northern pike, walleye and yellow perch and burbot.

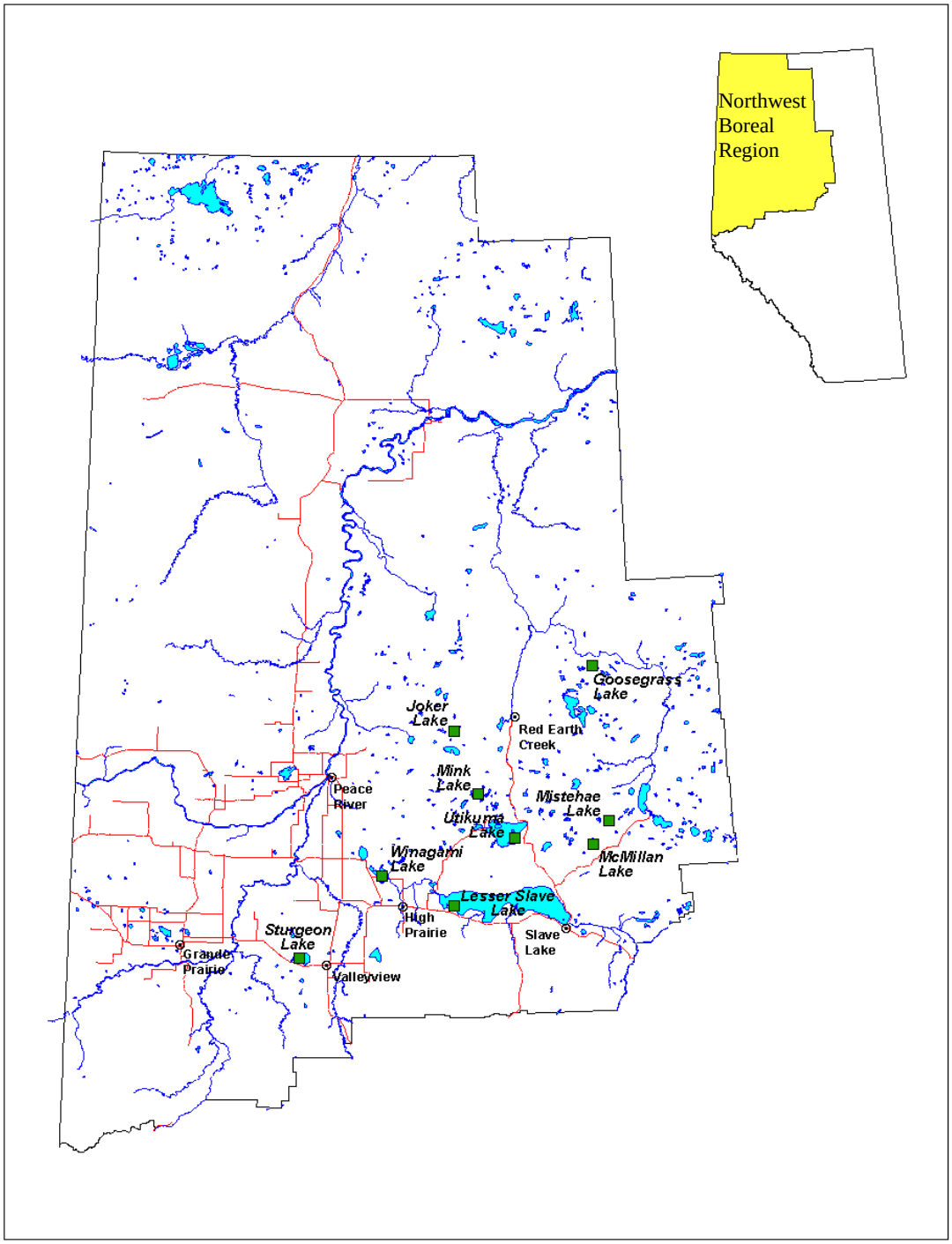

Figure 1. Map of study area showing locations of nine surveyed lakes within the Northwest Boreal Region

2.3 Winagami Lake

Winagami Lake, located approximately 29 km northwest of High Prairie, has a surface area of 4403 hectares and a mean depth of 2.2 meters. This highly productive (eutrophic) lake suffered a major winterkill during 1986-87 resulting in significant mortality of lake whitefish, yellow perch and northern pike (Rosin 1996). To improve recreational fishing opportunities in Winagami Lake, approximately one million walleye fingerlings (in total) were introduced in 1991, 1994, 1995 and 1996. To date, low numbers of walleye have been caught by anglers (interviewed anglers – pers. comm.) and in subsequent testnettings conducted by Natural Resources Service (NRS- Peace River files). Furthermore, evidence of successful walleye spawning has not been determined. Angling for perch is most productive during the winter months on Winagami Lake. Angler success rates for yellow perch varies from year to year. Ice fishing for perch was fair during the winter of 1994-95, very good in 1995-96 and fair in 1996-97 (pers. comm. - anglers). Winagami Lake supports yellow perch, northern pike, walleye and lake whitefish.

2.4 Sturgeon Lake

Sturgeon Lake is located 16 km west of Valleyview. It has a surface area of 4048.6 hectares and a mean depth of 6.1 meters. Approximately 40% of the lakeshore is privately owned and much of this has been developed for private cottages, resorts or agriculture. The remaining lakeshore area is 35% crown land and 25% Indian reserve land (Schroeder 1998). Sturgeon Lake has supported a lake whitefish commercial fishery since the 1940’s. Sportfishing is also popular in summer and winter for walleye, northern pike, yellow perch and lake whitefish.

2.5 Mink Lake

Mink Lake is situated approximately 115 km east of Peace River. The lake is typical of many located in muskeg habitat, with organic shorelines and brown colored water. It has supported a sporadic commercial fishery since the 1960’s and recently, an alternate year fishery has been scheduled (Schroeder 1997). The primary target species in the commercial fishery is northern pike. Mink Lake also supports a popular winter sportfishery for perch and pike, with perch being the preferred species. Summer angling pressure is low and there is a primitive campsite at the access point for the lake.

2.6 McMillan Lake

McMillan Lake is located approximately 60 km north of Slave Lake. The surface area is 414 hectares and mean depth is 3.5 meters. It supports an occasional commercial fishery for northern pike. Ice fishing for perch was excellent from 1988-1992 (M. Brilling - pers. comm.) with high numbers of large perch harvested. Since 1993, the perch sportfishery has declined substantially. Gamefish species present in McMillan Lake are northern pike and yellow perch. Access is via an unmaintained old logging road, therefore winter access is by snowmobile or truck and summer access is by ATV.

2.7 Mistehae Lake

Mistehae Lake is situated approximately 80 km north of Slave Lake. The surface area is 777 hectares with a mean depth of 3.9 meters. Mistehae Lake supports a commercial fishery primarily targeted for northern pike. A winter perch sportfishery produced large perch before 1992 but has declined since the perch quota (200kg) was exceeded by 67% (334kg) in the 1992 commercial fishery (NRS – Peace River files). Access to Mistehae Lake is good in the winter.

2.8 Joker Lake

Joker Lake is located approximately 100 km northeast of Peace River. It is the smallest of the lakes surveyed in this study, having a surface area of 162 hectares and a maximum depth of 7.5 meters. Northern pike and yellow perch are the gamefish species present in Joker Lake. While northern pike are indigenous to the lake, yellow perch were introduced in 1983 and 1984 stockings. Since the introduction of perch, the mean weight of the northern pike population has gradually increased (Schroeder 1996). The perch population has increased rapidly and now appears to be showing signs of stunting (Schroeder 1996). Access to Joker Lake is good all year, however, no campground has been established.

2.9 Goosegrass Lake

Goosegrass Lake is located approximately 68 km northeast of Red Earth. It has a surface area of 238.7 hectares and a mean depth of 3.8 meters. Commercial fishing has occurred intermittently, with the last

fishery in January, 1997. Goosegrass Lake supports a healthy population of northern pike and yellow perch. It is a remote lake, therefore angling pressure is low for both summer and winter. Access is via a cutline (good in the winter and dry-weather only in the summer). There is a small undeveloped camping site at the lake.

3.0 METHODS

3.1 Scheduling

A simple random sample technique as described by Malvestuto (1983) was used for this roving creel survey. Nine perch producing lakes were sampled from February 1 to April 12, 1998. This period has consistently produced higher catches of yellow perch than any other time of year (NRS Regional Staff - pers. comm.). Provincial angling frequency for yellow perch increases in winter months (Graham et al. 1995). Survey design incorporated sampling on weekends only, since the vast majority of ice fishing in northwestern Alberta takes place on weekends (NRS Regional Staff– pers. comm.).

In total, 22 primary sampling units (weekend days) were allocated for the study period, with each lake sampled a minimum of 4 days. Each weekend day was sampled using two survey clerks (i.e. two lakes sampled each day). Each survey clerk was responsible for sampling 4 lakes each. Lesser Slave Lake was sampled by both clerks. One survey clerk sampled Sturgeon, Winagami, Joker, Goosegrass and Lesser Slave (west basin-1/2 time) lakes, while the second survey clerk sampled Utikuma, Mink, Mistehae, McMillan and Lesser Slave (west basin-1/2 time). When sufficient manpower was available, extra sampling days were allocated for Sturgeon and Lesser Slave Lakes (historically, higher usage). All days were selected from random number tables. The sampling day started at approximately 1000 hrs. and continued until nightfall or the last angler was off the lake (to increase the number of completed trips and eventually increase sampling precision).

3.2 Angler Counts

Counts of anglers were conducted by the survey clerk twice per day, at 1000 hrs. and 1400 hrs. At each of these specified times, the creel clerk would complete his interview and count the number of anglers

and non-anglers in each party. If the count could not be made from a single vantage point, a traverse of the lake (progressive count) was completed. Neuhold and Lu (1957) showed that progressive counts taken over a one-hour sampling period were similar to instantaneous counts taken from a vantage point. At the beginning of each progressive count, the direction of travel was chosen randomly with a coin toss. The creel clerk then traveled (truck or ATV) in that direction at a constant speed and recorded the number of angler parties, anglers and non-anglers. Weather observations were noted, including temperature, relative wind velocity and cloud cover. After completing the progressive count, an attempt was made to visit each ice-fishing party and obtain angler interviews. Information collected was recorded on a progressive count form (Appendix A, Form 1)

3.3 Angler Interviews

Survey clerks interviewed as many angling parties as time permitted. Quite often, every fishermen at the lake on that survey day was interviewed. Information gathered from each angler included 1) age group (under 16, 16-65, 65+), 2) location of residence, 3) number of lines utilized for fishing (1, 2, or 3), 4) time the angler commenced fishing, 5) interview time, 6) complete or incomplete fishing trip, 7) fish species the angler was targeting, 8) the number of each fish species kept and released, and 9) the number of days spent ice-fishing on that lake this winter. The location of each angling party was recorded using a hand-held GPS receiver (Global Positioning System).

Angler attitudes, values and opinions were also collected. Questions included 1) overall angling experience or satisfaction, 2) if they have ever been interviewed previously for the perch creel (in order to avoid biasing the results for the following two questions), 3) have they ice-fished the survey lake in the past, and 4) compared to the past is the perch fishing declining, similar or improving. All information was recorded on standardized data forms (Appendix A, Form 2). A perch education pamphlet that was originally developed in 1993 was updated, revised and re-designed. The pamphlet was handed out to all anglers to convey important educational information. A copy of the pamphlet is included in Appendix B.

3.4 Data Analysis

Estimates for angler effort, angler harvest and a measure of the precision of the estimate (95% confidence interval) were calculated using methods described by Malvestuto et al. (1978) and Pollock et al. (1994). Effort from a roving creel survey can be measured in two variations: with an instantaneous count or with a progressive count (Hoenig et al. 1993). This survey utilized the progressive count method. In a roving creel survey two key assumptions underlying harvest and catch rate estimation from incomplete fishing trips are: 1) that the catch rate (fish/hour) at time of an interview will equal the rate for the entire trip, and 2) that the catch rate of the interviewed anglers is equal to that of non-interviewed anglers (Malvestuto 1983).

For this survey, the entire fishing day was sampled. Most of the winter fishing activity in the Northwest Boreal Region takes place between 0800 and 1800 hours. Therefore, the fishing period for any given sampling day was set at 10 hours.

In Alberta, ice fishermen are allowed to fish with a maximum of three lines. This must be taken into account when calculating CPUE (catch per unit effort) and HPUE (harvest per unit effort). Individual effort was calculated for each line, and combined for total rod hours. Daily CPUE and HPUE were then calculated. The calculations are shown in detail in Appendix C. Total catch and harvest was calculated as the product of angler effort and catch rate (angler-hours x fish/hour) (Pollock et al. 1994).

3.5 Biological Sampling of Perch

To determine the biological characteristics of perch populations harvested by the sportfishery, creel clerks collected fork length, weight, and maturity data from perch samples during the survey period. Pelvic fin rays were removed for age determination and placed in standardized sample envelopes. These were sectioned using a flex-shaft dremmel tool and aged in the laboratory. The data was analyzed and then entered into the Fisheries Management Information System (FMIS) provincial database.

4.0 RESULTS and DISCUSSION

Discussions of angler effort, harvest, angler characteristics, opinions and attitudes are presented on an individual lake basis. The reported catch by anglers interviewed is shown in Table 1. Yellow perch, walleye and northern pike effort and harvest calculation sheet is summarized in Appendix D. A detailed angler residency summary is presented in Appendix E. Angler harvest and frequency of occurrence for yellow perch at all nine lakes is presented in Appendix F.

Table 1. Reported catch by anglers interviewed during the winter angling survey, 1998.

Lake	Yellow Perch			Walleye			Northern Pike		Burbot	
	Total Caught	Kept	Released	Kept	Released <430mm (TL)	Released >430mm (TL)	Kept	Released	Kept	Released
Winagami	352	258	94		5	2	18	23		
Sturgeon	184	164	20	11	250	5	104	121	12	1
Joker	1317	143	1174				9	36		
Goosegrass	118	10	108				16	26		
Lesser Slave	5	5		26	3		61	25	31	4
Mink	217	48	169				4	7		
Mistehae	0									
Utikuma	158	152	6	3	1	4	89	71	18	44
McMillan	15	5	10							
Totals	2376	785	1581	40	259	11	301	310	61	49

The highest yellow perch harvest came from Winagami Lake with an estimated 2187 ± 1465 individuals. Estimated angler effort was greatest on Utikuma Lake with 8272 ± 7238 angler/hrs. Both McMillan and Mistehae had extremely low angler effort. A summary of the catch and effort comparison of yellow perch at the nine lakes is presented in Table 2.

Table 2. Angler effort and harvest comparison of yellow perch at nine lakes in the Northwest Boreal Region, winter angling survey, 1998. (± 95% confidence interval)

Lake	Mean Daily Estimated Effort (angler/hrs.)	Mean Daily Estimated Harvest (no. of perch)	HPUE (fish/hr/angler)	CPUE (fish/hr/angler)	Total Estimated Effort		Total Estimated Harvest	
					angler/hrs	angler-hrs/ha	no. of perch	kg/ha
Winagami	314.00 ± 133.00	99.40 ± 67.00	0.30 ± 0.14	0.42 ± 0.20	6908.00 ± 2926.00	1.56 ± 0.66	2187.00 ± 1465.00	0.15 ± 0.98
Utikuma	376.00 ± 329.00	86.90 ± 116.00	0.15 ± 0.12	0.16 ± 0.12	8272.00 ± 7238.00	0.30 ± 0.26	1912.00 ± 2552.00	0.04 ± 0.06
Sturgeon	218.00 ± 94.00	27.20 ± 11.00	0.17 ± 0.10	0.18 ± 0.12	4796.00 ± 2068.00	1.18 ± 0.51	598.00 ± 242.00	0.05 ± 0.19
Mink	44.00 ± 22.00	13.20 ± 9.00	0.30 ± 0.10	1.41 ± 0.77	968.00 ± 484.00	0.97 ± 0.49	290.00 ± 198.00	0.07 ± 0.05
Joker	75.00 ± 17.00	41.00 ± 39.00	0.48 ± 0.35	4.54 ± 2.31	1650.00 ± 374.00	10.18 ± 2.31	902.00 ± 858.00	1.15 ± 1.10
Lesser Slave	186.00 ± 63.00	0.80 ± 1.00	0.01 ± 0.01	0.01 ± 0.01	4092.00 ± 1386.00	0.03 ± 0.01	19.00 ± 22.00	< 0.0001
Goosegrass	25.00 ± 11.00	2.50 ± 1.70	0.17 ± 0.22	1.04 ± 0.49	550.00 ± 242.00	2.30 ± 1.01	55.00 ± 37.00	0.05 ± 0.03
McMillan	1.70 ± 3.00	0.50 ± 1.00	0.313*	0.938*	37.00 ± 66.00	0.08 ± 0.16	11.00 ± 22.00	no data
Mistehae	3.10 ± 5.00	0.00	0.00	0.00	68.00 ± 110.00	0.09 + 0.14	0.00	no data

* Standard deviation and confidence intervals were not calculated due to single angling event recorded during the survey period.

Fishing pressure on the nine surveyed lakes is described by angler-hrs per hectare. Joker Lake received the highest fishing pressure (10.18 ± 2.31 angler-hrs/ha), while Lesser Slave Lake received the lowest (0.03 ± 0.01 angler-hrs/ha) (Table 2).

The total estimated harvest of yellow perch for Joker Lake was calculated at 1.15 ± 1.10 kg/ha (see Table 2). The average provincial production capability for yellow perch is 2.5 kg/ha (D.Walty – pers. comm.). These data show that almost 50% of the annual perch harvest capability for Joker Lake was removed during this survey (22 weekend days). Total estimated perch harvest in the remaining lakes showed very little or no effect on their respective production capabilities.

Joker Lake recorded the highest harvest per unit effort (HPUE), 0.482 ± 0.353 fish/hr/angler, and catch per unit effort (CPUE), 4.539 ± 2.312 fish/hr/ angler (see Figure 2). The HPUE and CPUE for McMillan Lake was 0.313 and 0.938 fish/hr/angler respectively, however, they were based on a single angling event in which 2 anglers caught 15 perch in 10 hours. Mistehae Lake recorded the lowest HPUE and CPUE, 0 fish/hr/angler.

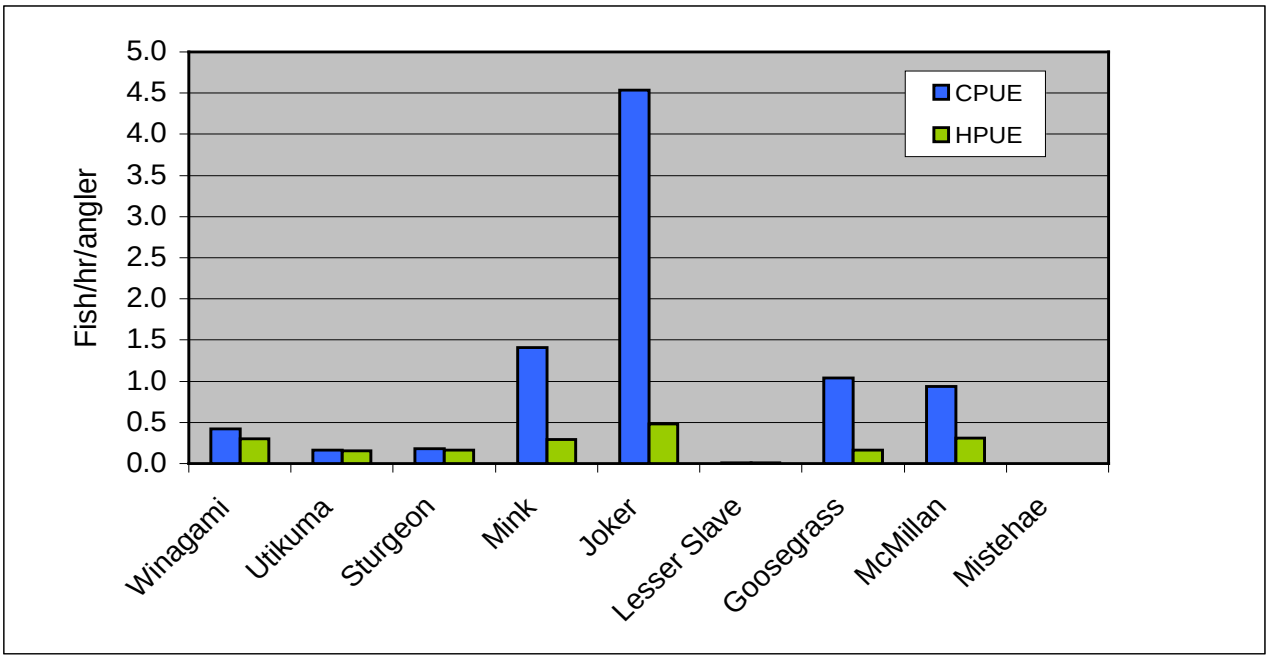

Figure 2. CPUE and HPUE comparison of yellow perch for nine lakes in Northwest Boreal Region, winter angling survey, 1998

A summary of the catch and effort comparison of walleye and northern pike at the nine lakes is presented in Tables 3 and 4 respectively. The walleye catch was low during the survey period, even for the fishermen who were targeting walleye at Sturgeon and Lesser Slave Lake. Observations by the survey clerks and comments from the fishermen stated that the majority of walleye caught at Sturgeon Lake were in the 30 to 38 cm. length group.

Utikuma Lake produced the highest HPUE for northern pike, 0.109 ± 0.020 fish/hr/angler. The total estimated harvest of northern pike from Utikuma Lake was 831 ± 616 individuals. By comparison, Sturgeon anglers harvested 301 ± 154 northern pike. Goosegrass Lake, which recorded the highest pike CPUE at 0.265 ± 0.222, had a total estimated northern pike harvest of only 68 ± 57 individuals.

Table 3. Angler effort and harvest comparison of walleye at four lakes in the Northwest Boreal Region. Winter angling survey, 1998. (± 95% confidence interval)

Lake	Mean Daily Estimated Effort (angler/hrs.)	Mean Daily Estimated Harvest (no. of walleye)	HPUE (fish/hr/angler)	CPUE (fish/hr/angler)	Total Estimated Effort (angler/hrs)	Total Estimated Harvest (no. of walleye)
Winagami	314.00 ± 133.00	0.00	0.00 ± 0.00	0.01± 0.01	6908.00 ± 2926.00	0.00
Utikuma	376.00 ± 329.00	1.00 ± 1.00	0.01 ± 0.01	0.01 ± 0.01	8272.00 ± 7238.00	20.00 ± 22.00
Sturgeon	218.00 ± 94.00	2.00 ± 2.00	0.01 ± 0.01	0.22± 0.13	4796.00 ± 2068.00	33.00 ± 44.00
Lesser Slave	186.00 ± 63.00	5.00 ± 4.00	0.02 ± 0.02	0.03 ± 0.02	4092.00 ± 1386.00	109.00 ± 88.00

Table 4. Angler effort and harvest comparison of northern pike at nine lakes in the Northwest Boreal Region, winter angling survey, 1998. (± 95%confidence interval).

Lake	Mean Daily Estimated Effort (angler/hrs.)	Mean Daily Estimated Harvest (no. of pike)	HPUE (fish/hr/angler)	CPUE (fish/hr/angler)	Total Estimated Effort (angler/hrs)	Total Estimated Harvest (no. of pike)
Winagami	314.00 ± 133.00	7.00 ± 9.00	0.02 ± 0.03	0.05 ± 0.04	6908.00 ± 2926.00	158.00 ± 198.00
Utikuma	376.00 ± 329.00	38.00 ± 28.00	0.11 ± 0.02	0.18 ± 0.04	8272.00 ± 7238.00	831.00 ± 616.00
Sturgeon	218.00 ± 94.00	14.00 ± 7.00	0.08 ± 0.07	0.17 ± 0.06	4796.00 ± 2068.00	301.00 ± 154.00
Mink	44.00 ± 22.00	2.00 ± 2.00	0.04 ± 0.05	0.09 ± 0.08	968.00 ± 484.00	37.00 ± 44.00
Joker	75.00 ± 17.00	3.00 ± 4.00	0.04 ± 0.05	0.20 ± 0.16	1650.00 ± 374.00	77.00 ± 88.00
Lesser Slave	186.00 ± 63.00	12.00 ± 5.00	0.07 ± 0.03	0.10 ± 0.04	4092.00 ± 1386.00	264.00 ± 110.00
Goosegrass	25.00 ± 11.00	3.00 ± 3.00	0.10 ± 0.08	0.27 ± 0.22	550.00 ± 242.00	68.00 ± 57.00
McMillan	2.00 ± 3.00	0.00	0.00	0.06	37.00 ± 66.00	0.00
Mistehae	3.00 ± 5.00	0.00	0.00	0.00	68.00 ± 110.00	0.00

A summary of angler characteristics and angler attitudes is presented in Tables 5 and 6 respectively. In total, 907 ice-fishermen were interviewed during this study. Sturgeon Lake received the highest number of anglers (306) and fishing groups (118). Only a few fishermen were present at McMillan Lake (2) and Mistehae Lake (6). Eighty-three percent (83%) of the anglers were between the ages of 16 and 64, 8.5% were 16 years or younger and 8.5% were 65 years or older. Yellow perch were targeted by 39% of the anglers, walleye by 18%, and northern pike by 7%. In those lakes where walleye and yellow perch were available for harvest (Sturgeon, Lesser Slave, and Utikuma), 12% of the fishermen sought both species. On the nine surveyed lakes, individual anglers averaged 4.88 days of ice-fishing.

Table 5. Angler characteristics for nine lakes surveyed during the winter angling survey, 1998.

Lake	# Sample Days	# Parties	# Anglers	Angler Age			Target Species							Mean # Days On Lake	95% CI
				<16	16 - 64	65+	WALL	NRPK	YLPR	ALL	WN[1]	WP[2]	NP[3]		
Winagami	5	73	171	5	144	22		8	142			3	18	4.97	0.90
Sturgeon	7	118	306	41	251	14	61	40	68	59	23	54	1	6.09	0.64
Joker	4	19	47	2	44	1		2	31				14	4.53	1.13
Goosegrass	4	11	22	3	19			6	13				3	2.14	0.69
LSL[a]	5	66	155	4	135	16	85	2	15	28	8	17		5.35	1.06
Mink	5	13	30	1	27	2			24				6	2.77	0.93
Mistehae	8	3	6		2	4		1	5					2.67	0.41
Utikuma	5	57	168	21	129	18	13	4	55	53		41	2	3.48	0.50
McMillan	6	1	2		2				2					2.00	
Combined	49	361	907	77	753	77	159	63	355	140	31	115	44	4.88	0.35

[1]WN = walleye + northern pike [2]WP = walleye + yellow perch [3]NP = northern pike + yellow perch

[a] Lesser Slave Lake

Table 6. Angler attitudes for nine lakes surveyed during the winter angling survey, 1998

Lake	# Anglers	Overall Trip Experience (%)			Angled Lake in the Past		Compared to the Past (%)		
		Good	Fair	Poor	Yes	No	Improving	Same	Declining
Winagami	171	15	42	43	120	21	2	55	43
Sturgeon	306	20	32	48	215	50	10	27	63
Joker	47	21	60	19	28	15	7	68	25
Goosegrass	22	23	54	23	8	13	0	63	37
L. Slave	155	10	22	68	132	13	2	35	63
Mink	30		40	60	14	15	0	0	100
Mistehae	6		17	83	5	1	0	0	100
Utikuma	168	3	31	66	145	17	3	31	66
McMillan	2			100	2	0	0	0	100
Total	907				669	145			
% of Total		13%	34%	53%			5%	36%	59%

All of the nine lakes documented poor yellow perch fishing in varying degrees. Overall, 53% of anglers were dissatisfied with their fishing experience, 34% rated it as fair and 13% had a good fishing trip. Interestingly, most anglers based their answers on their fishing success for that day (i.e. few fish caught equals a poor fishing experience). Joker and Goosegrass anglers were the most satisfied. When fishermen were asked how the present day perch fishing is compared to the past, 59% stated that it was declining, 36% said it has stayed the same and 5% replied that it has improved. One-hundred percent (100%) of anglers that have fished Mink, Mistehae and McMillan lakes in the past, stated that perch fishing has declined.

Length-weight comparisons of female yellow perch harvested from 5 lakes are presented in Figure 3. Yellow perch biological data from Goosegrass, Lesser Slave, Mistehae, and McMillan lakes, were not included due to the low sample size. Yellow perch from Utikuma Lake are heavier at a given length than perch from Winagami, Joker, Mink and Sturgeon lakes. Mink Lake perch weighed the least at a given length. The competition for limited food resources could explain the differences in the length-weight relationships.

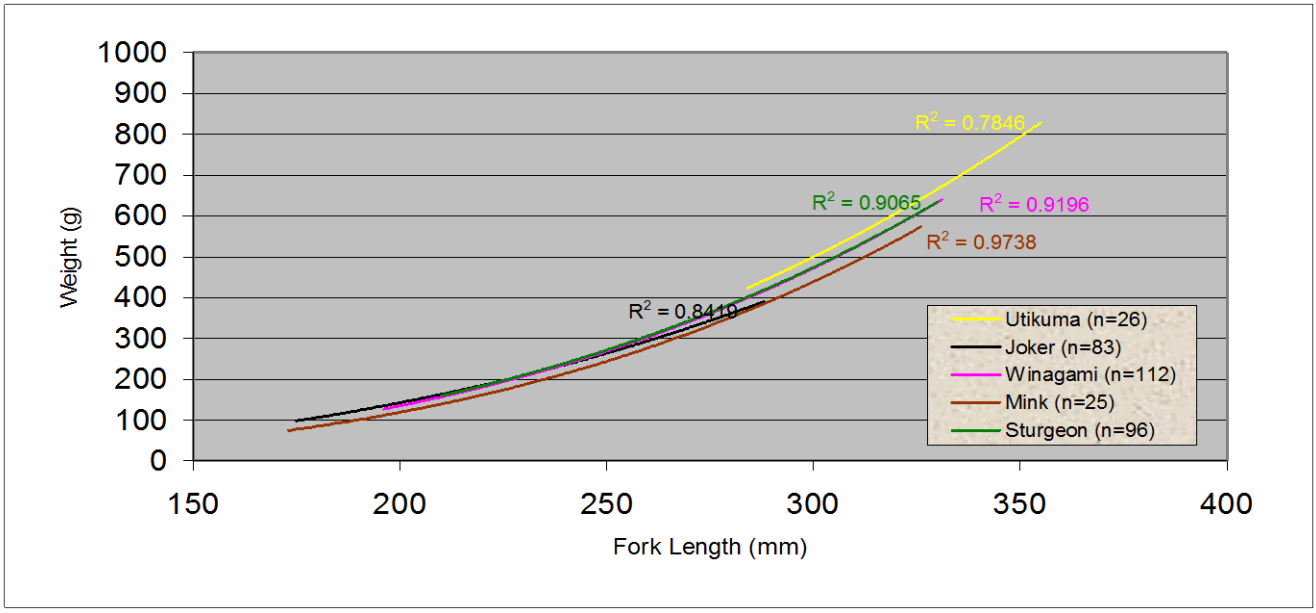

Figure 3. Length-weight relationship of female yellow perch harvested from five lakes in the Northwest Boreal Region. Winter angling survey, 1998

4.1 Lesser Slave Lake

4.1.1 Angler Effort and Harvest

Total angling effort expended at Lesser Slave Lake (west basin) during this study was estimated at 4092 ± 1386 angler-hours. Anglers harvested an estimated 19 ± 22 perch during this survey. In total, 155 anglers were interviewed, fished for 990.75 rod-hours and caught a total of 5 yellow perch, 29 walleye, 86 northern pike and 35 burbot. The HPUE and CPUE for yellow perch was 0.005 ± 0.006 fish/hr/angler.

Lesser Slave Lake experienced low angler use on most sampling days. Fishing pressure increased near the end of March, mainly due to angler expectation of a higher walleye harvest. Traditionally, Lesser Slave is angled for walleye with incidental catches of yellow perch, northern pike and burbot. Angler effort during the late winter normally increases, and it is at this time when the highest winter catches of walleye and perch are recorded. Angling success was extremely poor throughout this survey, however, with low catch rates reported for all species.

4.1.2 Angler Characteristics

Of the 155 anglers interviewed during this survey, 40 % resided more than 200 km away with the majority coming from the Edmonton area. Most anglers (87%) were between the ages of 16 to 64. Only 3% were less than 16 years-of-age, with 10% aged 65 years or older. Walleye was the primary species sought by 55% of the anglers that fished Lesser Slave Lake. Another 18% of anglers indicated they were angling for any species, while 11% indicated they were targeting walleye and perch. Approximately 10% of anglers targeted perch exclusively.

Anglers spent an average of 5.35 ± 1.06 days fishing on Lesser Slave Lake this winter. Approximately 85% of anglers interviewed have fished on Lesser Slave in the past, with 63% stating that perch fishing quality has declined. The majority (68%) of anglers indicated that their overall trip experience was poor.

4.1.3 Perch Population Dynamics

Due to the low number (n=5) of perch harvested by anglers, no biological analysis was reported.

4.2 Sturgeon Lake

4.2.1 Angler Effort and Harvest

Total angling effort expended on Sturgeon Lake during this study was estimated at 4796 ± 2068 angler-hours. Anglers harvested an estimated 598 ± 242 yellow perch during this survey. In total, 306 anglers were interviewed, fishing a total of 1402.75 rod-hours and catching 184 yellow perch, 265 walleye, 225 northern pike and 13 burbot. The HPUE for yellow perch was 0.166 ± 0.103 fish/hr/angler. The CPUE for yellow perch was calculated at 0.184 ± 0.115 fish/hr/angler.

On February 15, 1998, a fishing derby was held on Sturgeon Lake. The derby had strict regulations (i.e. use only one line, participants could not fish outside of the set boundary). The fishing boundaries were placed in a poor location for catching fish. Fishing derbies attract many fishermen, many of which would not normally be fishing, especially on that day. Ultimately, fishing pressure was much

higher than normal. To avoid biasing the results of the perch study, the data collected on February 15 was omitted from the catch and effort calculations. However, derby angler data was included in the angler characteristics summary.

Estimated daily effort on Sturgeon Lake varied from 70 to 365 angler hours, with a mean of 218 angler hours. The low effort on March 8 was due to inclement weather.

4.2.2 Angler Characteristics

Of the 306 anglers interviewed during this survey, 65% resided within a 50-100 km radius of Sturgeon Lake. One half (50%) of all anglers that fished Sturgeon Lake were from the city of Grande Prairie. Sturgeon Lake is the only quality perch and walleye fishery situated within 100 km of Grande Prairie.

Most anglers (82%) were between the ages of 16 to 64. Of the remaining 18% of anglers who did not require a license, 13% were less than 16 years-of-age and 5% were 65 years-of-age or older. Yellow perch was the primary species sought by 22% of the anglers that fished Sturgeon Lake. Anglers spent an average of 6.09 ± 0.64 days fishing on Sturgeon Lake this winter. Approximately 81% of the anglers have fished Sturgeon Lake in the past, with 63% indicating that the fishing has declined. Forty-eight percent (48%) of anglers stated that their overall trip experience was poor.

4.2.3 Perch Population Dynamics

Biological data were collected from 152 yellow perch (96 females and 56 males) angled during this survey. A detailed growth summary for female and male perch is included in Tables 7 and 8. Female perch averaged 271mm (210 mm – 330 mm) fork length and 360 g (150 g – 645 g) in weight. They ranged in age from 4 to 13 years with a mean age of 7 years. All female perch sampled were sexually mature. Male perch averaged 245mm (200 mm – 292 mm) fork length and 241 g (110 g – 400 g) in weight. They ranged in age from 4 to 15 years with a mean age of 7 years. All male perch sampled were sexually mature.

Table 7. Sturgeon Lake Yellow perch (female) growth summary Produced table in Lotus. Microsoft Word cannot import table successfully without losing design and information

Table 8. Sturgeon Lake Yellow perch (male) growth summary Produced table in Lotus. Microsoft Word cannot import table successfully without losing design and information

As indicated by the length distribution data for both males and females, it appears that the harvestable size for perch starts at 235 mm (9.5 inches). The sex ratio for angler-caught Sturgeon Lake perch was 1.7 females for every male.

4.3 Winagami Lake

4.3.1 Angler Effort and Harvest

Total angling effort expended on Winagami Lake during this study was estimated at 6908 ± 2926 angler-hours. Anglers harvested an estimated 2187 ± 1465 yellow perch. In total, 171 anglers were interviewed, fished a total of 895.5 rod-hours and caught 352 yellow perch, 7 walleye (all released) and 41 northern pike. The HPUE for perch was 0.301 ± 0.144 fish/hr/angler. The CPUE for perch was calculated at 0.422 ± 0.203 fish/hr/angler.

Estimated daily effort ranged from 135 to 475 angler-hours with a mean of 314 angler-hours. The greatest harvest occurred on January 31, with 118 yellow perch caught and 102 kept.

4.3.2 Angler Characteristics

Of the 171 anglers interviewed during this survey, 51.5% resided within a 50 km radius and 36.2% within a 50-100 km radius of the lake. Approximately 30% of Winagami anglers were High Prairie residents. The majority (84%) of anglers were between the ages of 16-64. Only 3% were less than 16 years-of-age and 13% were 65 years-of-age or older. Yellow perch was the primary species sought by 83% of Winagami Lake anglers. Anglers averaged 4.97 ± 0.90 days fishing on Winagami Lake this winter. Approximately 85% of the anglers have previously ice-fished Winagami Lake in the past with 55% indicating that the fishing has stayed the same. Another 43% have also indicated that perch fishing has declined from the past. Anglers rated their overall trip experience as poor (43.5%), fair (41.5%) and good (15%).

4.3.3 Perch Population Dynamics

Biological data were collected from 126 yellow perch (112 females and 14 males) that were harvested during this survey. A detailed growth summary for female perch is included in Table 9. Female perch averaged 255mm (196 mm – 331 mm) fork length and 294 g (100 g – 690 g) in weight. They ranged in age from 4 to 9 years, with a mean age of 5 years. All female perch sampled were sexually mature. The dominant age class for females was 5 years, comprising 71% of the total female perch sample. The sex ratio for angler-caught Winagami Lake perch was 8 females for every male.

4.4 Utikuma Lake

4.4.1 Angler Effort and Harvest

Total angling effort expended on Utikuma Lake during this study was estimated at 8272 ± 7238 angler-hours. Anglers harvested an estimated 1912 ± 2552 yellow perch. In total, 168 anglers were interviewed, fished a total of 800 rod-hours and caught 158 yellow perch, 8 walleye, 160 northern pike and 62 burbot. The HPUE for perch was 0.154 ± 0.117 fish/hr/angler. The CPUE for perch was calculated at 0.159 ± 0.124 fish/hr/angler. Almost every yellow perch that anglers caught were retained.

Estimated daily effort ranged from 120 to 1030 angler-hours, with a mean of 376 angler-hours. Fishing pressure was extremely high on February 14, 1998, when there were 1030 angler-hours recorded.

4.4.2 Angler Characteristics

Of the 168 anglers interviewed during this survey, 72% resided outside a 200 km radius of Utikuma Lake. Approximately 35% of Utikuma anglers were Edmonton residents and 14% were Slave Lake residents. The majority (77%) of anglers were between the ages of 16 and 64. Of the remaining 23% of anglers who did not require a license, 13% were less than 16 years-of-age and 11% were 65 or older. Yellow perch was the primary species sought by 33% of the anglers that fished Utikuma Lake. Another 32% indicated they did not have a specific preference, while 24% sought walleye and perch. Surveyed anglers spent an average of 3.48 ± 0.50 days fishing on Utikuma Lake this winter. Approximately 90% of the anglers interviewed have fished on Utikuma Lake in the past, with 66% indicating that perch fishing had declined.

Table 9. Winagami Lake Yellow perch (female) growth summary

Produced table in Lotus. Microsoft Word cannot import table successfully without losing design and information

The majority (66%) of anglers stated that their overall trip experience was poor.

4.4.3 Perch Population Dynamics

Biological data were collected from 29 yellow perch (26 females and 3 males) that were harvested during this survey. A detailed growth summary for female perch is included in Table 10. Female perch averaged 327 mm (284 mm – 355 mm) fork length and 652 g (400 g – 900 g) in weight. The sample consisted of 9 and 10 year-olds with a mean age of 9.5 years. All female perch sampled were sexually mature. Male perch were not analyzed due to the small (3) sample size. No young age-classes were captured during this creel survey. Further test-netting efforts are required to give accurate descriptions of the yellow perch population structure.

4.5 Mink Lake

4.5.1 Angler Effort and Harvest

Total angling effort expended on Mink Lake during this study was estimated at 968 ± 484 angler-hours. Anglers harvested an estimated 290 ± 198 yellow perch. In total, 30 anglers were interviewed, fishing a total of 161.5 rod-hours and capturing 217 yellow perch and 11 northern pike. The HPUE for perch was 0.290 ± 0.097 fish/hr/angler. The CPUE for perch was calculated at 1.408 ± 0.768 fish/hr/angler.

Estimated daily effort ranged from 0 to 65 angler-hours with a mean of 44 angler-hours. Fishing effort was 0 (zero) angler hours on April 12 due to unsafe ice conditions on the lake.

4.5.2 Angler Characteristics

Of the 30 anglers interviewed during this survey, 60% resided outside a 200 km radius of Mink Lake. Approximately 40% of Mink Lake anglers were Edmonton residents. Many anglers reported combining fishing trips to Mink and Utikuma. The majority (90%) of anglers were between the ages of

Table 10. Utikuma Lake Yellow perch (female) growth summary Produced table in Lotus. Microsoft Word cannot import table successfully without losing design and information

16 and 64, 3% were less than 16 years-of-age and 7% were 65 or older. Yellow perch was the primary species sought by 80% of the anglers, while the other 20% sought perch and northern pike. Individual anglers spent an average of 2.77 ± 0.93 days fishing on Mink Lake this winter. Approximately 48% of interviewed anglers have fished Mink Lake in the past, with 100% stating that the fishing has declined. Both size and catch rate of yellow perch have decreased from the past. The majority (60%) of anglers indicated that their overall trip experience was poor.

4.5.3 Perch Population Dynamics

Biological data were collected from 41 yellow perch (25 females and 16 males) that were harvested during this survey. A detailed growth summary for female perch is included in Table 11. Female perch averaged 245mm (173 mm – 326 mm) fork length and 255 g (80 g – 610 g) in weight. They ranged in age from 4 to 11 years with a mean of 6 years. Female perch in the 4 year-old class were 50% mature, with 100% of females 5 years-of-age or older sexually mature. Two age-classes, 4 and 6, dominated the angler-caught sample. Male perch were not analyzed due to the small (16) sample size. The sex ratio of angler-caught perch was 1.5 females for every male. The high number of released perch(169) to kept perch (48) suggests the perch population is dominated by small individuals.

4.6 Joker Lake

4.6.1 Angler Effort and Harvest

Total angling effort expended on Joker Lake during this study was estimated at 1650 ± 374 angler-hours. Anglers harvested an estimated 902 ± 858 yellow perch. In total, 47 anglers were interviewed, fished a total of 283.75 rod-hours and caught 1317 yellow perch and 45 northern pike. The catch rate and harvest rate were the highest out of the nine lakes surveyed. The HPUE for perch was 0.482 ± 0.353 fish/hr/angler. The CPUE for perch was calculated at 4.539 ± 2.312 fish/hr/angler. The harvest rate represents only 11% of the catch rate indicating that there is a very small portion of the abundant yellow perch population available for harvest. This is also supported by test netting data collected by Schroeder (1996). Schroeder found the mean weights and lengths of yellow perch have declined

Mink Lake Perch Stats

significantly since 1993 and the catch per unit effort for the larger meshed nets has declined. He also suggested that there might be a stunting problem within the perch population.

Estimated daily effort ranged from 60 to 100 angler-hours with a mean of 75 angler-hours. On February 14, a total of 621 yellow perch were caught, 78 were kept and the CPUE was 7.9 fish/hr/angler.

4.6.2 Angler Characteristics

Of the 47 anglers interviewed during this survey, 62% resided within a 50-100 km radius of Joker Lake. Approximately 55% were Peace River residents. The majority (93.6%) of anglers were between the ages of 16 and 64, 4% were less than 16 years-of-age and 2% were 65 years-of-age or older. Yellow perch was the primary species sought by 66% of the anglers, with 30% seeking perch and northern pike. Individual anglers spent an average of 4.53 ± 1.13 days fishing on Joker Lake. Approximately 65% of the anglers interviewed have fished Joker Lake in the past, with 68% indicating that fishing has stayed the same and 25% indicating that it is declining. Most anglers (60%) rated their trip experience as fair, and 19% rated as poor.

4.6.3 Perch Population Dynamics

Biological data were collected from 100 yellow perch (83 females and 17 males) that were harvested during this survey. A detailed growth summary for female perch is included in Table 12. Female perch averaged 228 mm (175 mm – 288 mm) fork length and 213 g (90 – 385) in weight. They ranged in age from 4 to 8 years with a mean of 6 years. Approximately 12% of female perch sampled were immature. Two age classes, 5 and 6 dominate the angler-caught sample. Male perch were not analyzed due to the small (17) sample size. The sex ratio for angler-caught Joker Lake perch was 4.8 females to every one male. Similar to Mink Lake, the extremely high number of released perch (1174) to kept perch (143) suggests the perch population is dominated by small individuals, generally not harvested by recreational anglers.

4.7 Goosegrass Lake

Table 12

Joker Perch Stats

4.7.1 Angler Effort and Harvest

Total angling effort expended on Goosegrass Lake during this study was estimated at 550 ± 242 angler-hours. Anglers harvested an estimated 55 ± 37 yellow perch. In total, 22 anglers were interviewed, fished a total of 139 rod-hours and caught 118 yellow perch and 42 northern pike. The HPUE for yellow perch was 0.167 ± 0.218 fish/hr/angler. The CPUE for perch was calculated at 1.038 ± 0.495 fish/hr/angler. Many of the angled perch were too small to keep as indicated by the harvest data.

Estimated daily effort ranged from 10 to 30 angler-hours with a mean of 25 angler-hours. Because of the remote location of Goosegrass Lake, fishing pressure was low.

4.7.2 Angler Characteristics

Of the 22 anglers interviewed during this survey, 46% resided within a 100-200 km radius of Goosegrass Lake. Approximately 41% were Peace River residents. The majority (86%) of anglers were between the ages of 16 and 64 and the remaining 14% were less than 16 years-of-age. Yellow perch was the primary species sought by 59% of the anglers. Anglers spent an average of 2.14 ± 0.69 days fishing on Goosegrass Lake. Approximately 36% of the anglers interviewed fished Goosegrass Lake in the past with 63% indicating that fishing has not changed. Most anglers (54%) rated their fishing trip experience as fair.

4.7.3 Perch Population Dynamics

Due to the low number of perch (10) harvested by anglers, no biological analysis data was reported

4.8 Mistehae Lake

Total angling effort expended on Mistehae Lake during this study was estimated at 68 ± 110 angler-hours. Six anglers were interviewed, fishing a total of 7.75 rod-hours. There were no fish species captured during this survey. The lack of fishing activity suggests that the yellow perch population in

Mistehae Lake has not recovered from the commercial fishery overharvest in 1992. There were no perch captured or observed during the February 1998 commercial fishery. No other data analysis was conducted. Further studies need to be conducted to determine the status of the yellow perch population in Mistehae Lake

4.9 McMillan Lake

Total angling effort expended on McMillan Lake during this study was estimated at 37 ± 66 angler-hours. Anglers harvested an estimated 11 ± 22 yellow perch. Two anglers were interviewed, fishing a total of 16 rod hours. They captured 15 yellow perch (kept 5, released 10) and 1 northern pike during this survey. Due to the low number (5) of perch harvested by anglers, biological data was not analyzed. No other data analysis was conducted. As mentioned earlier, McMillan Lake supported a excellent winter perch fishery from 1988-1992. The low numbers of ice-fishermen in 1998 suggests that the perch population was excessively harvested in past years. Further studies need to be conducted to determine the status of the yellow perch population in McMillan Lake.

4.10 Theoretical Perch Limits

During this survey, 77% (696) of the anglers did not harvest a perch, while 0.55% (5) harvested a limit of 15. Approximately 98% (893) of the anglers harvested 10 or fewer perch. The calculations and explanations for the theoretical perch limits are based on information provided by Walker (1993).

If the daily limit was reduced to 10 perch, the number of perch available for re-distribution would be 6.1%. The number of anglers affected by this change would be 1.5%. The number of perch available for re-distribution is the portion of the angler catch that is over the limit of 10. This is shown in Table 13. The number of perch kept at each catch level over 10 is the number of anglers at each catch level multiplied by the 10 perch limit. The number of perch available for re-distribution is then the difference between the number of perch kept under the present 15 limit and the number of perch kept under the theoretical 10 limit. The anglers affected are those that caught more than 10 perch under the present 15 limit.

Table 13. Angler harvest of yellow perch for a limit of 10 versus a limit of 15. Data from nine Northwest Boreal lakes. Winter angling survey, 1998.

Present Limit of 15 Perch

# of Perch kept/angler	# of NW Anglers	# of Perch Kept
0	696	0
1	68	68
2	40	80
3	28	84
4	18	72
5	18	90
6	7	42
7	4	28
8	3	24
9	1	9
10	10	100
11	2	22
12	3	36
13	1	13
14	3	42
15	5	75
Total	907	785

Theoretical Limit of 10 Perch

# of Perch kept/angler	# of NW Anglers	# of Perch Kept	# of Perch Re-distributed	# of Anglers Affected
0	696	0	0	0
1	68	68	0	0
2	40	80	0	0
3	28	84	0	0
4	18	72	0	0
5	18	90	0	0
6	7	42	0	0
7	4	28	0	0
8	3	24	0	0
9	1	9	0	0
10	10	100	0	0
10	2	20	2	2
10	3	30	6	3
10	1	10	3	1
10	3	30	12	3
10	5	50	25	5
Total	907	737	48	14

% original harvest available

for re-distribution = 48/785 x 100 = 6.1%

% anglers affected = 14/907 x 100 = 1.5%

This series of calculations must be made for each theoretical limit of perch (0 to 15) that might be considered. Table 14 summarizes these calculations for all of the possible limit choices. Figure 4 illustrates the cumulative percent of the harvest in relation to the daily catch limit of yellow perch.

Table 14. Effects on harvest and anglers to various theoretical yellow perch limits. Data from nine Northwest Boreal lakes. Winter angling survey, 1998.

Theoretical Perch Limit	# of Anglers Affected	% Anglers Affected	# of Perch Kept	% Original Harvest	# of Perch Re-distributed	% Harvest Re-distributed
0	211	23.3	0	0	785	100.0
1	143	15.8	211	26.9	574	73.1
2	103	11.4	354	45.1	431	54.9
3	75	8.3	457	58.2	328	41.8
4	57	6.3	532	67.8	253	32.2
5	39	4.3	589	75.0	196	25.0
6	32	3.5	628	80.0	157	20.0
7	28	3.1	660	84.1	125	15.9
8	25	2.8	688	87.6	97	12.4
9	24	2.6	713	90.8	72	9.2
10	14	1.5	737	93.9	48	6.1
11	12	1.3	751	95.7	34	4.3
12	9	1.0	763	97.2	22	2.8
13	8	0.9	772	98.3	13	1.7
14	5	0.6	780	99.4	5	0.6
15	0	0.0	785	100.0	0	0.0

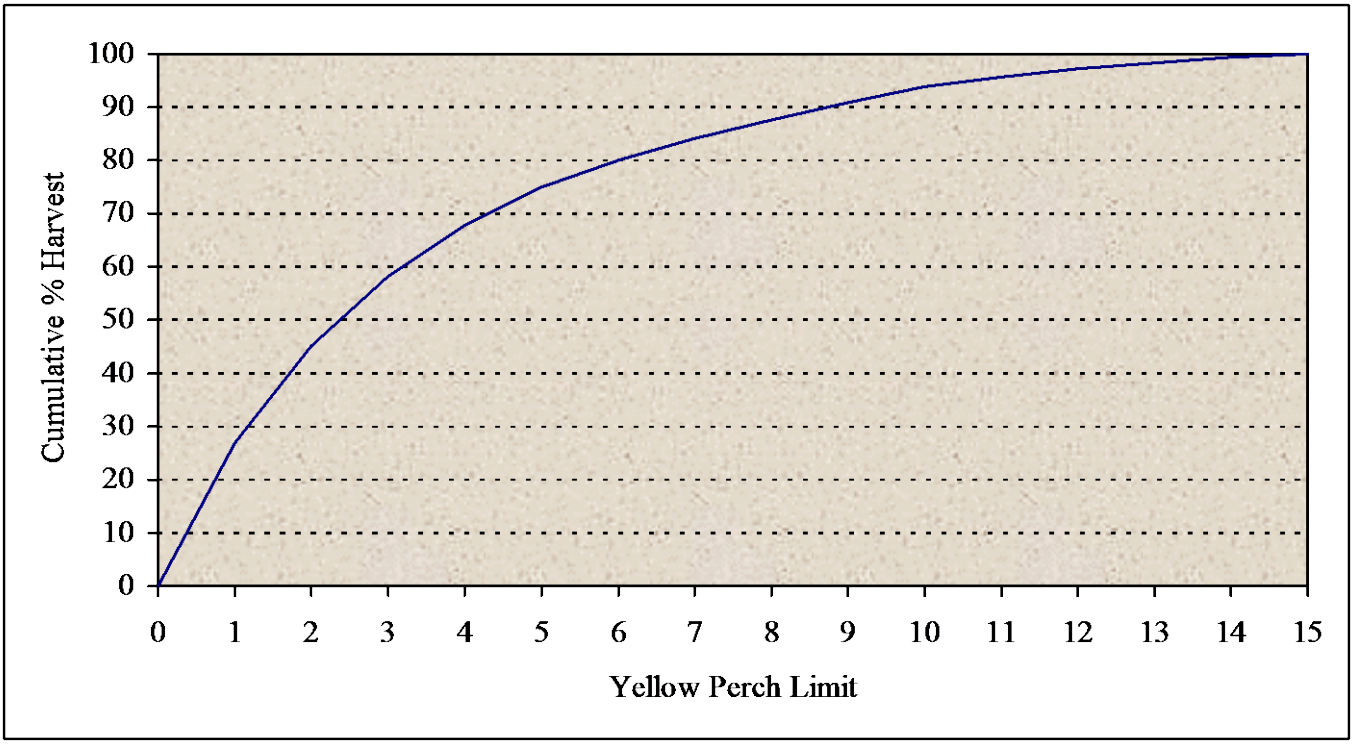

Figure 4. Cumulative percent of yellow perch harvest per daily catch level. Data from nine Northwest Boreal lakes. Winter angling survey, 1998.

The curve in Figure 4 shows that fishermen who angled fewer than 5 yellow perch daily caught 75% of the total perch harvested during this study.

4.11 Comparison to 1993

As previously mentioned, a winter angling survey was conducted on four popular perch producing lakes from January to April 1993. Sturgeon Lake, Lesser Slave Lake, McMillan Lake and Mink Lake were each surveyed on four separate occasions. Methodologies were similar to the 1998 angling survey. The data collected from the 1993 study were summarized (tables and graphs) but not incorporated into a written report.

4.11.1 Effort and Harvest Comparison

Angler effort and yellow perch harvest comparisons at Sturgeon, Lesser Slave, Mink, and McMillan lakes between 1993 and 1998 are presented in Table 15.

Table 15. Angler catch and effort comparison of yellow perch at four lakes in the Northwest Boreal Region. Winter angling surveys, 1993 and 1998

Lake	Year	No. of Anglers Interviewed	Perch Harvested	Perch Caught	Actual Effort (angler/hrs)*	HPUE (fish/hr/angler)	CPUE (fish/hr/angler)	Total Estimated Effort (angler/hrs) * *	Total Estimated Harvest (#)
Sturgeon	1993	140	166	201	481	0.350	0.418		
	1998	306	164	184	1403	0.166 ± 0.103	0.184 ± 0.115	4796 ± 2068	598 ± 242
Lesser Slave	1993	103	133	139	561	0.240	0.248		
	1998	155	5	5	991	0.005 ± 0.006	0.005 ± 0.006	4092 ± 1386	19 ± 22
McMillan	1993	21	113	493	183	0.620	2.695		
	1998	2	5	15	16	0.313	0.938	37 ± 66	11 ± 22
Mink	1993	42	216	334	217	1.000	1.543		
	1998	30	48	217	162	0.290 ± 0.097	1.408 ± 0.768	968 ± 484	290 ± 198
Total	1993	306	628	1167	1442				
	1998	493	222	421	2572				

*1998 effort based on actual rod hours (complete and incomplete angling trips)
1993 effort based on actual angler effort and did not consider the number of rods (lines) anglers used.
** Calculated by multiplying progressive counts x number of hours in a fishing period. Fishing period = 10 hrs.

Actual angling effort was difficult to compare between 1993 and 1998. The method in which effort was calculated differed significantly. In 1998, effort was based on the number of hours reported by the angler and the number of rods (lines) that he/she was using. Effort in 1993 was based solely on the number of hours reported by the angler. Consequently, one would expect angler effort to be much higher in 1998. Effort in 1998 was approximately 3 times higher on Sturgeon Lake and 2 times higher

on Lesser Slave than effort recorded in 1993. However, effort at Mink Lake was higher (216.5 angler/hrs.) in 1993 than in 1998 (161.5 angler/hrs.) McMillan Lake received only 16.0 angler/hrs. in 1998 compared to 182.9 angler/hrs. in 1993. The low number of yellow perch captured in McMillan Lake in 1998 was directly related to low angler use.

Harvest per unit effort (HPUE) and catch per unit effort (CPUE) was higher at all four lakes in 1993 than in 1998. The results were again influenced by the method in which angler effort was calculated. Total estimated harvest and total estimated effort for the entire survey period was not calculated in 1993, therefore no direct comparison can be made.

Based on actual angler interviews, the number of perch caught and kept was substantially higher at Mink, Lesser Slave, and McMillan lakes in 1993 than in 1998. Harvest levels at Mink Lake are decreasing. Data from 1993 shows that 65% of yellow perch caught were harvested. This percentage dropped to 22% in 1998. Ice-fishermen at Lesser Slave Lake and McMillan Lake harvested 5 yellow perch from each lake in 1998. These small samples make it difficult to compare with 1993 data. Historical catch data for yellow perch is limited for these lakes. Multi-mesh test-nettings have been conducted annually on Lesser Slave Lake since 1986 (M. Brilling – pers. comm.). According to Brilling, nets were primarily set for walleye, however, approximately 30 yellow perch are captured annually in this test-netting program. All live perch are immediately released. In January 1992, an experimental test-netting project for yellow perch was conducted in the west basin of Lesser Slave Lake (M. Brilling – pers. comm.). Gill nets were 76 mm (3”) stretched mesh size and set in 11.0 to 13.0 metres of water. Only 53 yellow perch were captured. Schroeder (1996) conducted a multi-mesh test-netting survey at Mink Lake. The perch population appeared healthy, with 60% of the perch having a fork length greater than 250 mm (10”). There have been no test-netting studies conducted to monitor the fish populations at McMillan Lake. Further studies need to be conducted on each of these lakes to gather long-term trend data on yellow perch density and population structure.

4.11.2 Angler Characteristics

Angler attitudes and residency at Sturgeon Lake, Lesser Slave Lake, Mink Lake and McMillan Lake between 1993 and 1998 is presented in Table 16.

Table 16. A comparison of angler residency and attitudes at four lakes in the Northwest Boreal Region. Yellow perch winter angling surveys, 1993 and 1998

		Sturgeon Lake		Lesser Slave Lake		Mink Lake		McMillan	
		1993	**1998**	**1993**	**1998**	**1993**	**1998**	**1993**	**1998***
Angler Residency (% of total)		G. Prairie (34) Spirit R. (10) Valleyview (9)	G. Prairie (50) Valleyview (9) Wembley (5)	H. Prairie (41) Edmonton (12) Grimshaw (9)	Edmonton (18) H. Prairie (17) Whitecourt (9)	Peace River (31) Falher (17) Grimshaw (10)	Edmonton (40) Hines Ck. (13) Peace R. (10)	Edmonton (57) St. Albert (24) Slave L. (14)	Slave L. (100)
Overall Trip Experience (% of anglers)	Good	38	20	27	10	38	0	0	0
	Fair	41	32	33	22	48	40	78	0
	Poor	21	48	40	68	14	60	22	100
Compared to the past (% of anglers)	Improving	7	10	7	2	5	0	0	0
	Same	44	27	40	35	45	0	0	0
	Declining	49	63	53	63	50	100	100	100

***** 2 anglers were interviewed during the study

The majority of Sturgeon Lake anglers reside in the Grande Prairie and Valleyview areas. This has not changed from the 1993 survey. Residency for Lesser Slave Lake anglers has shifted slightly from local fishermen to Edmonton and area fishermen (complete list of angler residency in Appendix D). A summer creel on Lesser Slave Lake in 1994 also found an increase of Edmonton resident anglers (Potter and Rhodes, 1997). The majority of Mink Lake anglers in 1998 are also from Edmonton. This shift in angler residency can be explained by the distressed state of the fisheries resource in the Northeast Region. Anglers are experiencing a serious decline in sportfish size and numbers in the Northeast Region and appear to be searching for less exploited lakes. Edmonton area fishermen who have traditionally angled in the Bonnyville, St. Paul and Lac La Biche region are now shifting their efforts to the Slave Lake area.

The overall trip experience or satisfaction of anglers decreased significantly from 1993. In 1993, 24% of the anglers were dissatisfied with the perch fishing. In 1998, 55% of the anglers experienced poor fishing. The majority of anglers at all four lakes indicated that perch fishing has declined when compared to the past. Mink Lake and McMillan Lake fishermen were particularly unsatisfied with the perch fishery in 1998 with 100% of interviewed anglers stated that fishing quality has declined.

4.11.3 Perch Population Dynamics

A comparison of the age-class distribution and length distribution for angler-caught yellow perch in Mink Lake and Sturgeon Lake in 1993 and 1998 is illustrated in Figures 5 and 6. Lesser Slave Lake and McMillan Lake perch data were not included in the comparison due to a small sample size collected in 1998. The 1998 Mink Lake female perch data may not accurately reflect the angler-caught perch population because of the relatively small (25) sample size.

In 1993, the Mink Lake female perch population consisted of four age-classes and was dominated by fish aged 4 years (> 80%). Perch older than 6 years were not present in the 1993 harvest. In 1998, the female perch population had expanded to seven age-classes and was dominated by 4 and 6 year-olds. The appearance of 8 to 11 year-old age-classes in 1998 indicate an aging and perhaps stable (i.e. not dependent on one age-class) perch population. The size of the harvested perch increased in 1998.

Figure 5. Age class distribution comparison for Mink and Sturgeon Lakes

Figure 6. Length distribution comparison for Mink and Sturgeon Lakes

The 1998 fork length distribution shows perch >250 mm represent a larger proportion of the sampled harvest as compared to 1993. There appears to be a high density of smaller perch in Mink Lake as indicated by the high incidence of released perch (see Table 15).

These data show that Sturgeon Lake angler-caught female perch age-class distribution and length distribution has not changed appreciably from 1993 to 1998 (Figures 5 and 6). In 1993, the dominant age-class of yellow perch was 6 year-olds (approx. 40%). The 1998 angler-caught perch population was not dominated by any single year-class. The 5, 6, 7 and 8 year-old age-classes represent 82% of the harvested perch population in 1998. The perch population in Sturgeon Lake appears to be stable.

5.0 CONCLUSIONS

Winagami Lake and Sturgeon Lake produced quality-sized (>250 mm) yellow perch. Data suggest perch populations at Winagami and Sturgeon are stable. Goosegrass Lake appears to have a stable perch population. However, the low numbers of perch caught, due to low angler effort, makes it difficult to assess the status of the perch population. Further test-netting efforts on Goosegrass Lake are required to determine the population structure.

The status of yellow perch in Mistehae, McMillan and Lesser Slave lakes are not known. Mistehae and McMillan lakes received very few anglers during this survey. However, fishermen that angled McMillan Lake during this survey were rewarded with a relatively good CPUE (0.94 fish/hr/angler) of yellow perch. Further efforts are required to determine the status of the perch populations in Lesser Slave, Mistehae and McMillan lakes.

An abundance of small (<250 mm) perch and lack of large-size (>250 mm) individuals were evident at Joker and Mink lakes. The high number of released perch compared to the low number of harvested perch indicates perch populations dominated by small individuals. This suggests that growth overfishing is a potential problem at Joker and Mink lakes.

Utikuma Lake is a popular ice-fishing destination for “jumbo” sized perch. The main concern at Utikuma Lake is the absence of the younger age-classes of yellow perch. Only 2 age-classes (9 and 10) were evident in the angler-caught perch samples.

The majority of anglers (77%) did not harvest a perch and most (53%) were dissatisfied with their angling experience. To achieve a better angling experience, catch rates and perch size would have to increase. To increase perch size, harvest levels would have to be reduced. This survey shows that fishermen who angled fewer than 5 yellow perch per day caught 75% of the total perch harvested. In order to have any impact on the perch harvest, the daily perch limit would have to be reduced to less than 5.

A comparison of Lesser Slave, Sturgeon, Mink and McMillan lakes between 1993 and 1998 was difficult. Methodology differed significantly in calculating angler effort, therefore, direct statistical comparisons were difficult to present. The angler-caught perch population dynamics for Lesser Slave and McMillan lakes could not be compared due to low numbers of perch harvested in 1998 (n = 5). The perch population at Sturgeon Lake appears to be stable with no change in the population structure. Harvest levels for yellow perch at Mink Lake are decreasing. However, the size of the harvested perch is increasing. With the relatively small sample size (n=25) collected at Mink Lake in 1998, these data may not accurately reflect the population structure. Lesser Slave Lake and Mink Lake are experiencing an increase in Edmonton area fishermen. This is most likely due to the serious decline of fish populations in the Northeast Boreal Region and anglers are shifting their efforts elsewhere. Angler satisfaction has decreased significantly from 1993.

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7.0 INFORMATION SOURCES

Mr. Martin Brilling: Fisheries Technician. Environmental Protection. Natural Resources Service. Fisheries Management Division. Slave Lake, Alberta

Mr. Dave Walty: Fisheries Biologist. Environmental Protection. Natural Resources Service. Fisheries Management Division. Peace River, Alberta

Regional Staff. Environmental Protection. Natural Resources Service. Fisheries Management Division. Peace River, Alberta

Appendix A

Progressive Count Form

and

Angler Interview Form

Perch Creel Survey - Winter 1998
Progressive Angler Count

Lake: _____ Date:_____

Weather: _____
_____
_____

Time: (circle one) 1000 hrs
1400 hrs

Party No.	No. of Anglers	No. of Non - Anglers

Party No.	No. of Anglers	No. of Non - Anglers

Comments: _____
_____
_____

YELLOW PERCH ANGLER SURVEY - Winter 1998

Date: ______________________ **Lake:** _____________________________ **Weather:** wind: ____________ precip: Y N **Recorder:** ______________

cloud: % temp: C

1 - <16
2 - 16-65
3 - >65

P-poor
F-fair
G-good

Party & Angler #	Age Group	Residence	# lines	Angling Start Time	Interview Time	Total Time (hrs)	Completed Trip	Target Species	PERCH		WALLEYE			PIKE		OTHER		# Days Icefishing This Winter	Overall Angling Experience
									# Kept	# Rel.	# Kept	# Rel. < 430	> 430	# Kept	# Rel.	# Kept	# Rel.		
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G
			1 2 3				Y N	W NP YP											P F G

COMMENTS: ____

____

____

Appendix B

Yellow Perch Education Pamphlet

Appendix C

Detailed Methods for Effort and Harvest Calculations

Methods, formulas, and calculations are based on Pollock, Jones, and Brown (1994)

Effort Calculations

Effort (e) for a fishing period is estimated by $e = I \times T$

I = instantaneous or progressive count of anglers
T = the length of the fishing period

Example: Winagami Lake

Progressive angler counts, daily effort and total effort calculations for Winagami Lake.
The fishing day is 10 hours long.

Date	Two counts	Average (I)	Daily Effort (e)
31-Jan-98	25, 70	47.5	47.5 x 10 = 475
01-Feb-98	26, 49	37.5	37.5 x 10 = 375
07-Mar-98	11, 16	13.5	13.5 x 10 = 135
15-Mar-98	24, 59	41.5	41.5 x 10 = 415
05-Apr-98	18, 16	17.0	17.0 x 10 = 170
		Mean (e_1)	314

Survey period = Jan. 31 to April 12
Total possible weekend days in survey period = 22

Total effort (E) for a survey period is $E = N \times e_1$

N = total weekend days
e_1 = mean daily effort

Therefore, E = 314 x 22
= 6908 angler-hours

Harvest Calculations

Harvest (C) = $e \times R_2$

e = total effort for a fishing period (daily)
R_2 = harvest rate from complete and incomplete trips

Date	Daily Effort (e)	Perch Harvested	Total rod hours	Daily harvest rate (HPUE) (R_2)	Daily Estimated Harvest (C) (No.)
31-Jan-98	475	102	225	0.453333	215.3
01-Feb-98	375	47	193.25	0.243	91.1
07-Mar-98	135	48	104.75	0.458	61.8
15-Mar-98	415	48	169	0.284	117.9
05-Apr-98	170	13	203.5	0.064	10.9
				Mean (c_1)	99.4

HPUE = no. of perch harvested / total rod hours
CPUE = no. of perch caught / total rod hours

total rod hours = reported angling hours of each fishermen x no. of lines used

Example:	angler	hours fished	No. of lines	Rod hours
	1	2.5	2	5
	2	3.25	3	9.75
	3	4.5	1	4.5
	etc.			
			Total	19.25

Appendix D

Effort and Harvest Calculation Summaries

For

Yellow Perch, Walleye and Northern Pike

Appendix E

Angler Residency Summary

Appendix F

Angler Harvest Summary and Frequency of Occurrence of Yellow Perch