Winter Sports Fishery at Gull Lake, Alberta, 2009

Alberta Conservation Association

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Winter Sport Fishery at Gull Lake, Alberta, 2009

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EXECUTIVE SUMMARY

Gull Lake is known for its winter sport fisheries of Lake Whitefish, Northern Pike and Yellow Perch. Motivated by the concerns of Alberta Sustainable Resource Development (ASRD) regarding overharvest, the Alberta Conservation Association conducted a creel survey during the winter of 2009. The survey generated data on angler effort, yield and biological descriptors of the Lake Whitefish, Northern Pike and Yellow Perch populations for comparison with similar data from angler surveys conducted during the winters of 1992 and 2003 by ASRD.

Approximately, 28,796 anglers fished the lake in 2009 for 111,032 h which resulted in an angling pressure of 13.5 angling-h/ha. Angling pressure has declined substantially since the 1992 and 2003 surveys.

Overall, the Gull Lake winter sport fishery in 2009 was dominated by Lake Whitefish. During the 2009 survey, anglers harvested approximately 20,974 Lake Whitefish corresponding to a yield of 2.5 kg/ha. The total catch for Lake Whitefish has declined by 49% and 72%, respectively, since 1992 and 2003. This change is primarily seen in the harvest rates, as the release rates from all three surveys were consistently very low.

The lengths of Lake Whitefish harvested during the 2003 and 2009 surveys were similar and fish condition did not differ between these two years. However, Lake Whitefish harvest and yield has declined since the 1992 and 2003 surveys by 2.7 and 9.3 times, respectively. The decrease in catch rates and the absence of both small and large fish in the harvest may indicate decreased recruitment and a recruitment-overfished state.

The catch rates for Northern Pike increased in 2009, however, the rates remain very low according to ranges of catch rate and associated population classifications listed in Alberta's Northern Pike Management and Recovery Plan. The harvest and yield of Northern Pike has declined significantly since 1992, possibly caused by the imposition of minimum size limits, however, large fish (>600 mm fork length) were not common in the 2009 harvest. These data indicate the Northern Pike sport fishery may also be in a recruitment-overfished state.

The harvest rate for Yellow Perch was similar in the 2003 and 2009 surveys, however, the release rate increased by six times. The yield associated with caught and released fish decreased substantially. Anglers harvested larger numbers of smaller fish in 2009 than during the 2003 survey. This demographic change may be indicative of a growth-overfished Yellow Perch population where overexploitation of large mature fish adults is compensated for by successful recruitment of younger fish.

Key words: Gull Lake, Lake Whitefish, Northern Pike, Yellow Perch, creel survey, harvest, yield, recruitment-overfished, growth-overfished.

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The Alberta Conservation Association funded this angler survey. I thank Stefanie Van Huystee for conducting the survey. Special thanks are extended to Vance Buchwald and Jason Cooper (Alberta Sustainable Resources Development) for their assistance with survey design. I also thank Logan Van Imschoot of Alberta Tourism, Parks, and Recreation, for arranging accommodation for Stefanie at Aspen Beach Provincial Park, Gull Lake.

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1.0 INTRODUCTION

Prior to 1995, high fishing pressure, combined with high fish harvests resulted in the over-harvest of many of Alberta's sport fish populations, including Lake Whitefish (*Coregonus clupeaformis*) and Northern Pike (*Esox lucius*) (Sullivan 2003a). To aid in the recovery of Northern Pike (NRPK) populations throughout the province, Alberta Sustainable Resource Development (ASRD) developed the Northern Pike Management and Recovery Plan (NPMRP) (Berry 1999). Using strategies identified in the NPMRP, a province-wide NRPK sport fishing regulation was implemented in 1999. As a result, the majority of NRPK populations, including Gull Lake, were classified as stable-recreational fisheries (Berry 1999). This classification allowed anglers a daily possession of three NRPK >63 cm total length (TL).

No province-wide management plan was developed for Lake Whitefish (LKWH), although this species is the target of commercial and winter sport fisheries throughout Alberta. Based on angler use and LKWH harvest, the Gull Lake winter sport fishery is one of Alberta's most important sport fisheries (V. Buchwald, ASRD, pers. comm.). Due to several factors including, 1) high angling pressure and catch rates resulting in over-harvest and 2) declining NRPK population due to high sport harvest, ASRD had concerns regarding the sustainability of the Gull Lake sport fishery. Consequently, Alberta Conservation Association (ACA) conducted a creel survey during the winter of 2009 to reassess the sport fishery.

2.0 STUDY AREA

Gull Lake is located in the Red Deer River drainage and is approximately 130 km south of Edmonton, Alberta (Figure 1). It has a surface area of approximately 8,202 ha and mean and maximum depths of 5.4 and 8.0 m, respectively (Mitchell and Prepas 1990). The trophic status of the lake is mesotrophic (Mitchell and Prepas 1990). There are no permanently flowing inlet streams, and the lake's natural outlet is dependent on water level. Several small creeks around the lake provide intermittent inflow from the surrounding drainage basin (Mitchell and Prepas 1990).

Gull Lake has a moderate level of residential development. Several summer villages and private campgrounds are located around the lake. Aspen Beach Provincial Park is located on the southern shore and the town of Bentley is located 5 km west of the lake on Hwy 12 (Figure 1). Winter vehicle and foot access is provided through all summer villages and numerous road allowances. Aspen Beach Provincial Park is closed during the winter months. A detailed description of Gull Lake can be found in Mitchell and Prepas (1990).

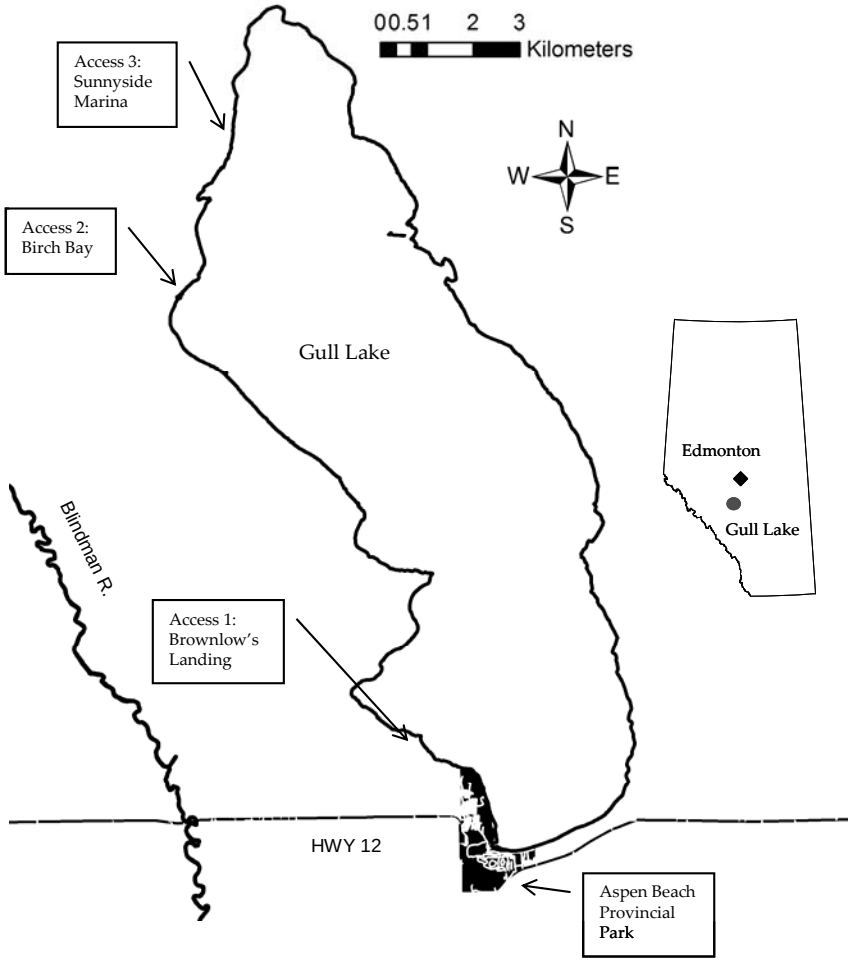

Figure 1. Map of Gull Lake, Alberta showing access sites used during the winter angler survey: Brownlow's Landing, Birch Bay and Sunnyside Marina. (indicated in text boxes). The inset map of Alberta indicates the location of Gull Lake and Edmonton.

3.0 MATERIALS AND METHODS

3.1 Survey design

From 6 January to 29 March, 2009, I conducted an access-type creel survey combined with instantaneous counts (Pollock et al. 1994) to collect data on the sports fishery at Gull Lake. Biological data (e.g., species, length, weight) were collected from fish harvested by anglers.

3.2 Angler survey

3.2.1 Angler interviews

At pre-selected access points, creel staff interviewed anglers who had completed their fishing trips and were either driving or walking off Gull Lake. All members of fishing parties were interviewed. Using a standard survey form (Appendix 1), anglers were asked a series of questions regarding their angling trip including, number of hours fished, number of fishing lines used, target species, number and species of fish kept and/or released. The number of anglers per vehicle was also recorded. I used this information to calculate estimates of angling effort, number of fish harvested, number of fish released, and yield. I calculated catch rate (i.e., fish/h) as total ratio estimator (Malvestuto 1983) using line-hours which I assumed to be comparable to angler-hour catch rates obtained from open-water angler surveys.

3.2.2 Spatial extent of survey

Brownlow's landing (Figure 1) is the most popular access point on Gull Lake (V. Buchwald, ASRD, pers. comm.), therefore, I collected the majority of catch data from this location. However, additional trip data was collected at Birch Bay and Sunnyside Marina as instantaneous angler counts were conducted at these locations (see Section 3.3).

3.2.3 Temporal extent of sampling

The angler survey was stratified into weekdays (Monday and Tuesday) and weekend days (Saturday, Sunday and statutory holidays). Each survey period lasted three or four days and each survey day was approximately 9.4 h long. This schedule was repeated 14 times throughout the survey period (total of 43 days). Survey dates and summary information are listed in Appendix 2.

3.3 Instantaneous angler counts

Instantaneous angler counts were conducted by counting the total number of vehicles on the lake from three vantage points that provided views of different sections of the lake (Figure 1). To avoid double counting vehicles, landmarks were used to delineate the area seen from each vantage point. A typical instantaneous count lasted approximately 30 min and three counts were conducted on each survey day. In order to quantify the variation in angling effort, I stratified instantaneous counts by weekday and weekend day, and time of day. Instantaneous counts were evenly distributed in each stratum. The distribution of the number of vehicles counted during instantaneous counts by date and time of day are presented in Appendices 3 and 4. For the purpose of calculating angling effort, I assumed fishing took place in the 11 hour period between the hours of 0800-1900.

3.4 Biological fish data

When time permitted, creel staff collected biological data, including fork length (FL, ±1.0 mm) and weight (±10 g) from fish that were harvested by anglers.

3.5 Data management and analysis

Data recorded on field survey forms were transcribed into Microsoft Excel files by a professional data entry service using double entry verification. Prior to analysis, I calculated frequency distributions of each angler survey parameter and used the original data sheets and daily journals to investigate and verify outliers. I generated scatter plots of weight-length to identify outliers which I omitted from analyses if measurement or recording error was suspected.

I used a bootstrap technique to estimate means and confidence intervals for number of anglers, number of angling hours, fishing pressure (h/ha), harvest (number of fish) and yield (kg/ha) of fish. Bootstrap samples are assumed to approximate the distribution of values that would have arisen from repeatedly sampling the original population (Haddon 2001). This simulated group of means has the same scale of variation as observed in the original data set. Empirical confidence intervals (95% CI) were calculated following Haddon (2001). The final proportions of the distribution of possible means (i.e., probability densities) were standardized (i.e., standardized likelihood) to range between 0 and 1 (Paul et al. 2003).

I extrapolated each survey parameter to include temporal strata that were not surveyed. Using the simulation procedure described above, I calculated estimates of means (including 95% confidence intervals) as likelihood profiles and combined estimates using multiplication or addition. A flow chart describing the steps for this analysis is presented in Appendix 5.

Incidental hooking mortality of angled fish contributes to the overall yield of a sport fishery (Muoneke and Childress 1994). I estimated hooking mortality to be 10% for LKWH, NRPK, and Yellow Perch (*Perca flavescens*, YLPR) given the cumulative stress of being angled, pulled through a hole in the ice, exposed to winter weather, and released through the ice hole.

I performed analyses using Microsoft Excel 2003 SP3, with confidence intervals (CI) set at 95%. All data were stored in the Fish and Wildlife Management Information System (FWMIS) of ASRD. Data collected during equivalent creel surveys at Gull Lake by ASRD during the winter months of 1992 and 2003 were compared to data collected during the current survey.

To determine if fish condition of LKWH differed between the 2003 and 2009 surveys, I used an ANCOVA to compare length-weight relationships between the two years. As fish condition varies with maturity, season, age, and size (Aku and Tonn 1997), data analysis was restricted to samples collected during similar months and to fish within the same size ranges (i.e., 300-440 mm FL).

4.0 RESULTS AND DISCUSSION

4.1 Angler survey

A total of 43 days were surveyed from 6 January to 29 March, 2009. Of the 1,119 anglers interviewed, the majority (66%) indicated they targeted LKWH, 24% targeted "Anything", 5% targeted NRPK, 4% targeted YLPR, and <1% targeted Burbot (*Lota lota*, BRBT). Overall, anglers fished with one line (77%) and the mean (±SE) number of fishing lines per angler was 1.22 ± 0.01 (n=1,119).

The survey period contained 58 weekdays and 25 weekend days. With the angling day assumed to be 11 hours long, there were 913 angling-hour strata. During the survey period, 105 instantaneous counts were conducted and 7,912 vehicles were counted. Table 1 lists a summary of data collected during the winter angler survey at Gull Lake, 2009.

Approximately half (51/105) of the instantaneous counts were conducted on weekdays and the other half (54/105) on weekends. Mean number of vehicles were 38.7 ± 3.7 (n=51) and 110.2 ± 10.7 (n=54) during weekdays and weekend days, respectively. However, angling effort was generally the same for weekdays and weekends (Appendix 6). In general, March was the busiest month, 42% busier than January and 35% busier than February (Table 2).

Estimated total number of angling trips and angling hours during the survey period were 28,796 (95% CI=25,122-32,610, n=1,119) and 111,032 (95% CI=96,726–125,592, n=4,389.5), respectively. Associated angling pressure was 13.5 angling-h/ha (95% CI=11.8–15.3). Estimated angling effort for the lake during previous winter surveys were 37,100 trips and 151,784 angling-h in 1992 and 56,557 trips and 275,944 angling-h in 2003 (Buchwald 1995 and Winkel Unpublished). Angling pressure (angling-h/ha) during the 2009 survey was approximately 22% and 50% lower than the angling pressure during the winters of 1992 and 2003, respectively.

Table 1. Summary of data collected during the winter angler survey at Gull Lake, 2009. Associated with mean values is ±SE.

Month	Total number of instantaneous Counts	Total number of vehicles	Mean number of vehicles per instantaneous count	Mean number of anglers per vehicle	Mean angling trip length (hours)	Mean number of fishing lines
January	34	1,993	58.6 ± 9.5	1.7 ± 0.06	3.4 ± 0.08	1.3 ± 0.04
February	37	3,196	86.4 ± 11.5	1.5 ± 0.05	4.5 ± 0.09	1.1 ± 0.02
March	34	2,723	80.1 ± 13.6	1.8 ± 0.06	3.9 ± 0.09	1.3 ± 0.02
Total	105	7,912	75.3 ± 6.7	1.7 ± 0.03	4.0 ± 0.05	1.2 ± 0.01

Table 2. Summary of estimated angler survey parameters from the winter angler survey at Gull Lake, 2009. In brackets are 95% CI.

Month	Angling hours		Angling line hours	Angling pressure (angling-h/ha)	Number of angling trips
	Weekdays	Weekend			
January	9,181 (6,319-12,490)	13,270 (9,037–17,667)	29,187 (22,384-36,129)	3.6 (2.7-4.4)	8,584 (6,583-10,626)
February	15,234 (10,924-19,606)	14,474 (8,902–20,365)	32,679 (24,972-40,705)	4.0 (3.0-4.9)	7,262 (5,549-9,046)
March	20,302 (14,288–26,804)	18,548 (13,855–23,203)	50,505 (40,284-60,747	6.2 (4.9-7.4)	12,950 (10,329-15,576)
Total	44,718 (36,612–53,361)	46,293 (37,663–54,915)	111,032 (96,726-125,592)	13.5 (11.8-15.3)	28,796 (25,122-32,610)

4.2 Lake Whitefish

No Provincial management plan exists for Lake Whitefish (LKWH), hence the following subsections are based on evaluations of parameters commonly used in management plans for other species such as Northern Pike. Biological data collected during this survey is located in Appendix 7.

4.2.1 Harvest and yield

Anglers reported harvesting 996 LKWH and releasing only 48 fish in 5,513 line-h of fishing. The total catch rate for LKWH reported by anglers was 0.189 fish/h (Table 3) with associated harvest and release rates of 0.181 fish/h and 0.009 fish/h, respectively. Total catch rates reported in 1995 and 2003 for the same survey period were approximately 0.367 fish/h and 0.650 fish/h, respectively, suggesting the total catch rates for LKWH decreased considerably.

Estimated total LKWH harvested during the survey period was 20,974 (Table 3). Angler catch (harvest + release) was lowest in January and highest in March. Similarly, mean weight (g) of a harvested LKWH decreased during the survey from 1,070 ± 32 (n=71) in January, to 1,031 ± 18 (n=131) in February to 958 ± 21 (n=118) in March.

Anglers released 1,152 LKWH (95% CI=954-1,349) during the survey period. Since the majority of LKWH caught were harvested and not released (18:1), the incidental yield related to release mortality was 0.014 kg/ha (95% CI=0.011-0.016). Therefore, total yield of LKWH during the 2009 survey was estimated to be 2.51 kg/ha (95% CI=2.15–2.91).

Both the harvest and yield of LKWH during the 1992 and 2003 surveys were approximately 2.7 and 9.3 times higher, respectively, than the 2009 harvest and yield. Approximately, 55,772 and 194,640 LKWH were harvested in 1992 and 2003, respectively, compared to 20,974 in 2009.

Table 3. Summary of catch statistics for Lake Whitefish during the winter angler survey at Gull Lake, 2009. In brackets are 95% CI.

Month	Number of fish harvested	Number of fish released	Harvest rate (fish/h)	Release rate (fish/h)	Yield (kg/ha)
January	1,868 (1,433-2,312)	29 (22-36)	0.064	0.001	0.23 (0.18-0.29)
February	6,732 (5,144-8,385)	163 (125-204)	0.206	0.005	0.84 (0.64-1.06)
March	12,374 (9,870-14,883)	960 (765-1,154)	0.245	0.019	1.45 (1.14-1.76)
Total	20,974 (17,939-23,979)	1,152 (954-1,349)	0.181	0.009	2.52 (2.15-2.91)

4.2.2 Length-class distribution

The length-class distribution of LKWH harvested by anglers was wide, ranging from 300 to 623 mm FL, with a mean of 408 ± 1.9 mm (n=318) (Figure 2). Compared to data on LKWH from the 2003 survey, the most notable differences were 1) an overall lower catch rate of LKWH in 2009, 2) a considerable decrease in the catch rate of larger LKWH (i.e., >440 mm), and 3) the absence of smaller LKWH (i.e., <350 mm). These demographic changes (i.e., low catch rate, decreased size of the adult population, and absence of young fish) may be indicative of high fishing pressure leading to over-exploitation of adults and consequent reduction in recruitment of young fish (i.e., a recruitment-overfished population). These demographic changes can have negative consequences for the sustainability of the LKWH sports fishery.

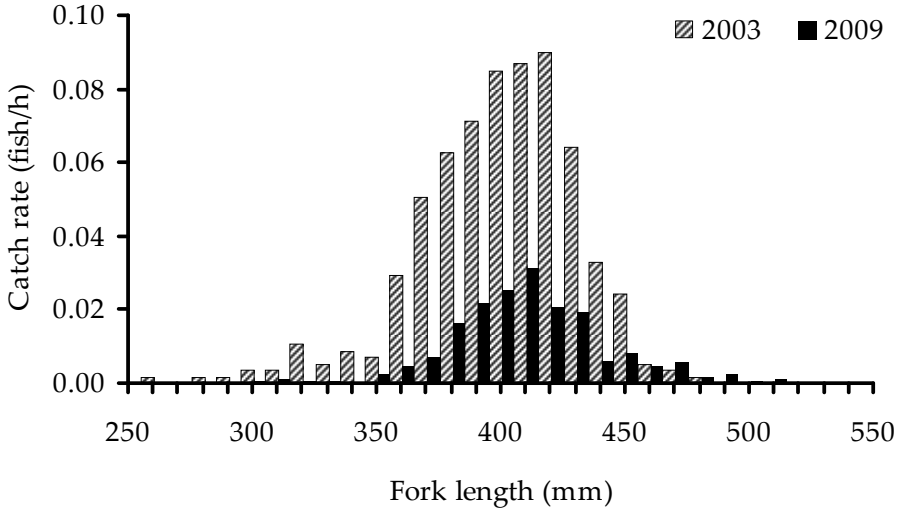

Figure 2. Length-frequency distributions of angler-harvested Lake Whitefish from Gull Lake, during January-March, 2003 versus 2009.

4.2.3 Length-weight relationship

The slopes of length-weight relationships for LKWH harvested during the 2003 and 2009 surveys were not significantly different (ANCOVA, P>0.05, Figure 3). This indicates that the LKWH condition (wellness) was similar in both years; specifically, for a given length, fish were of comparable weights in both years.

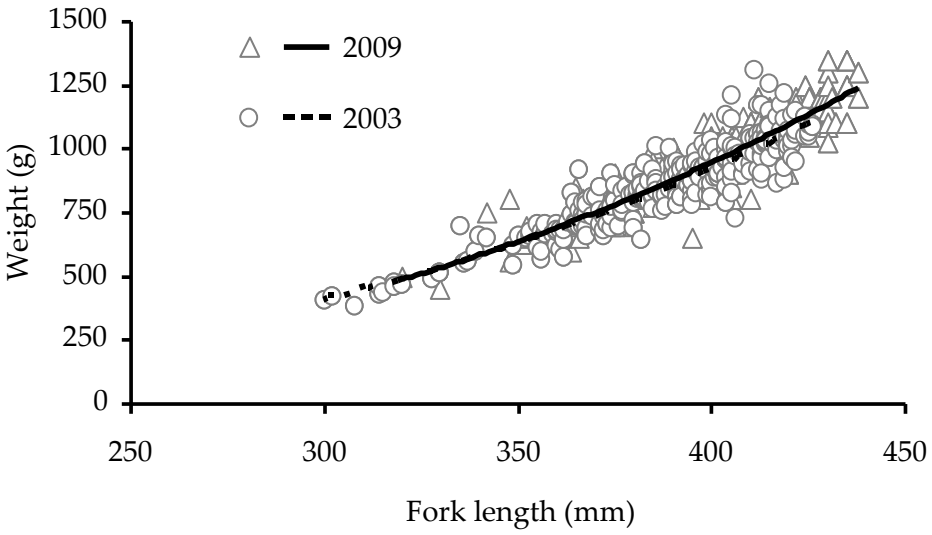

Figure 3. Length-weight relationships of angler-harvested Lake Whitefish from Gull Lake, during January-March, 2003 versus 2009. The equations for the length-weight linear regressions for the 2003 and 2009 data were log W = 2.86 log L - 4.48 (R^2=0.865, n=318) (dashed line) and log W = 2.97 log L - 4.76 (R^2=0.817, n=305) (solid line), respectively.

4.3 Northern Pike

The Northern Pike (NRPK) sport fishery assessment herein corresponds to the classification parameters described by the NPMRP (Berry 1999) and Sullivan (1998). Biological data collected during this survey is located in Appendix 7.

4.3.1 Harvest and yield

The total catch rate for NRPK during the winter survey was 0.035 fish/h, consisting of harvest and release rates of 0.006 fish/h and 0.029 fish/h, respectively. Based on the NPMRP guideline, the harvest and the release rates are low and typical of catch rates characteristic of a collapsed NRPK sport fishery (Berry 1999). Given that low catch rates reported by anglers are often exaggerated (Sullivan 2003b), the actual NRPK release rate is likely lower than reported.

The total catch rates for NRPK reported in the 1992 and 2003 surveys (Buchwald 1995 and L. Winkel, ASRD, pers. comm.) for the same period were 0.029 fish/h and 0.012 fish/h, respectively suggesting that catch rates for NRPK have increased since the 2003 winter angler survey. The harvest + release rates in 1995 and 2003 were 0.021 fish/h + 0.008 fish/h, and 0.005 fish/h + 0.007 fish/h, respectively.

Overall, the 2009 sport fishery harvested 667 NRPK (95% CI=580–754) with a mean weight of 1,340 g/fish (95% CI=1,083–1,664 g, n=15), and associated yield of 0.16 kg/ha (95% CI=0.13–0.20). In contrast, the harvest and yield of NRPK during the 1992 survey was approximately 3.5 times higher (i.e., 2,456 fish and 0.55 kg/ha).

The estimated number of NRPK released was 3,220 (95% CI=2,805–3,642). Applying an assumed incidental mortality rate of 10% and an estimated mean weight (g) of 1,011 ± 55.4, the incidental yield of NRPK was 0.040 kg/ha (95% CI=0.033–0.047). Therefore, the total yield of NRPK during the 2009 survey was estimated to be 0.20 kg/ha (95% CI=0.17-0.25).

4.3.2 Length-class distribution

The length-class distribution of NRPK harvested during the 2009 winter sport fishery ranged from 587 to 835 mm FL with a mean of 657 ± 15.3 mm (n=15) (Figure 4). The distribution of harvestable length-classes was broad, although the density was extremely low (i.e., a catch rate of 0.006 fish/h). Comparing the 2003 and 2009 length distributions, the 2009 distribution indicated much lower densities of 600-690 mm fish and very few large fish (>690 mm). The mean length, from 2003, was slightly larger at 672 ± 11.6 mm (n=16) to that in 2009.

The mean weight (g) of NRPK >630 mm observed during the 2003 and 2009 winter angler surveys were 2,420 ± 158 (n=16) and 2,012 ± 187 (n=15), respectively. Based on the NPMRP guidelines, specifically the very low catch rate and the high mean weight, this corresponds to the characteristics of a recruitment-overfished NRPK sport fishery (Berry 1999).

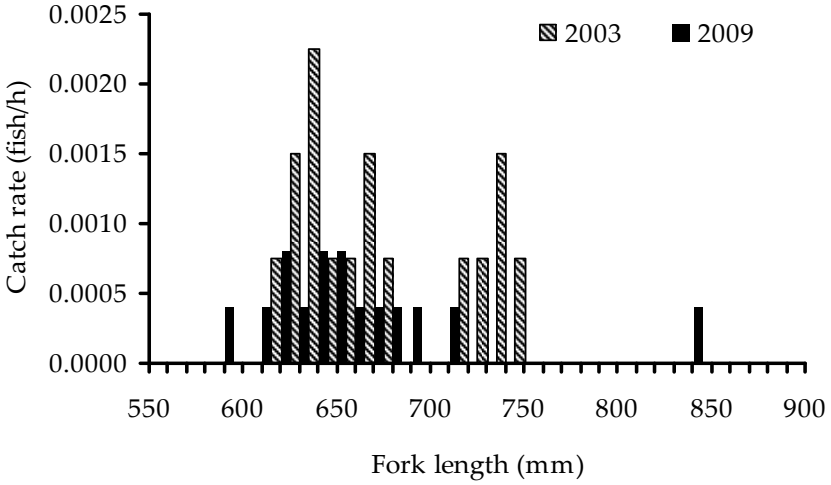

Figure 4. Length-frequency distributions of angler-harvested Northern Pike from Gull Lake during January-March, 2003 versus 2009.

4.4 Yellow Perch

As no Provincial management plan exists for Yellow Perch (YLPR) in Alberta, the following subsections are based on evaluations of parameters commonly used in management plans for other species. Biological data collected during this survey is located in Appendix 7.

4.4.1 Harvest and yield

In 2009, anglers harvested and released 688 and 297 YLPR, respectively, with corresponding harvest and release rates of 0.054 fish/h and 0.125 fish/h, respectively, resulting in a total catch rate of 0.179 fish/h. Harvest and release rates reported during the 2003 survey (L. Winkel, ASRD, pers. comm.) were 0.051 fish/h and 0.021 fish/h, respectively. Thus, while harvest rates were similar between 2003 and 2009, the release rate in 2003 was six times lower than that in 2009.

Estimated YLPR harvested during the survey was 5,996 (95% CI=5,223-6,782), with a mean weight (g) of 200 ± 13.5 (n=64) and associated yield of 0.15 kg/ha (95% CI=0.12 – 0.18). Over the same period, an estimated 13,879 (95% CI=12,091-15,699) YLPR were released. Assuming a 10% incidental hooking mortality, the incidental yield resulting

from released fish was 0.034 kg/ha (95% CI=0.027-0.041). Therefore, the total yield of YLPR during the 2009 survey was 0.18 kg/ha (95% CI=0.15-0.22).

During the 2003 survey, approximately 19,061 YLPR were harvested and 8,351 released (Winkel Unpublished). The mean weight (g) of a harvested YLPR was 236 ± 5.9 (n=192). The harvest and incidental yields were approximately 0.55 and 0.024 kg/ha, respectively. These numbers indicate a 72% decline in both harvest and yield of YLPR in 2009 compared to 2003.

4.4.2 Length-class distribution

The length-class distribution of YLPR harvested during the 2009 survey was broad, ranging from 165 to 318 mm FL with a mean of 227 ± 4.8 mm (n=64) (Figure 5). The length-class distribution from the 2003 angler survey ranged from 201 to 326 mm with a mean of 246 ± 1.8 mm (n=192). The decline in the mean length of YLPR from 2003 to 2009 is significant (t-Test, α=0.05, P=0.006). In addition, angler harvest of <210 mm FL YLPR increased from 2003 to 2009. This demographic change may indicate a growth-overfished (Cushing 1981) YLPR population at Gull Lake caused by overexploitation where a decrease in large mature fish adults is compensated by successful recruitment of young fish.

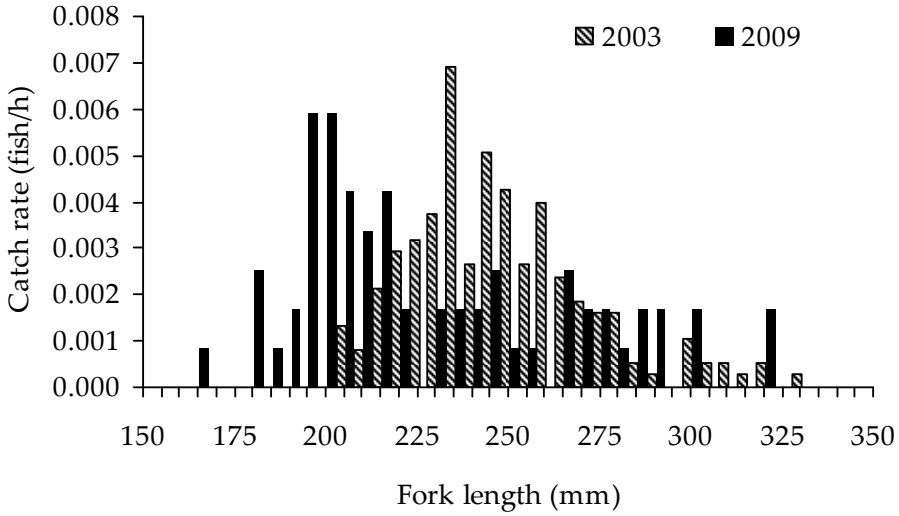

Figure 5. Length-frequency distributions of angler-harvested Yellow Perch from Gull Lake, during January-March, 2003 versus 2009.

4.5 Other sport fish

In addition to the sport fish species previously discussed, anglers also harvested 11 Burbot and two White Sucker (*Catostomus commersoni*) during this survey.

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6.0 APPENDICES

Appendix 1. Angler survey field form, Gull Lake, 6 January – 29 March, 2009.

GULL LAKE WINTER CREEL 2008-2009

Alberta Conservation Association

Page ______

Date	Day	Time			Angling parties											Species Caught							
MM / DD / YY	Day Code	Time of day (24 hr clock)	Time of day (1/4 hrs = 0, 25, 5, 75)	Access point	Complete trip= 1, Incomplete trip= 2	100s column	Daily interview # e.g. 017 10s column	1s column	# of angler in party	# Anglers per vehicle (ONLY one number per party)	Number of fishing lines used per angler	Hours fishing 10s	Hours fishing 1s	1/4 hours fishing (1/4 hrs = 0, 25, 5, 75)	Target	# LKWH kept	# LKWH released	# NRPK kept	# NRPK released	# YLPR kept	# YLPR released	# BRBT kept	# BRBT released
	20 interviews/page			SUMS for Daily Summary>>>																			

SHEET RULES
- NO blank spaces
- ALL spaces must have #s
- NO french 7s
- NO closed 4s
- BE LEGIBLE

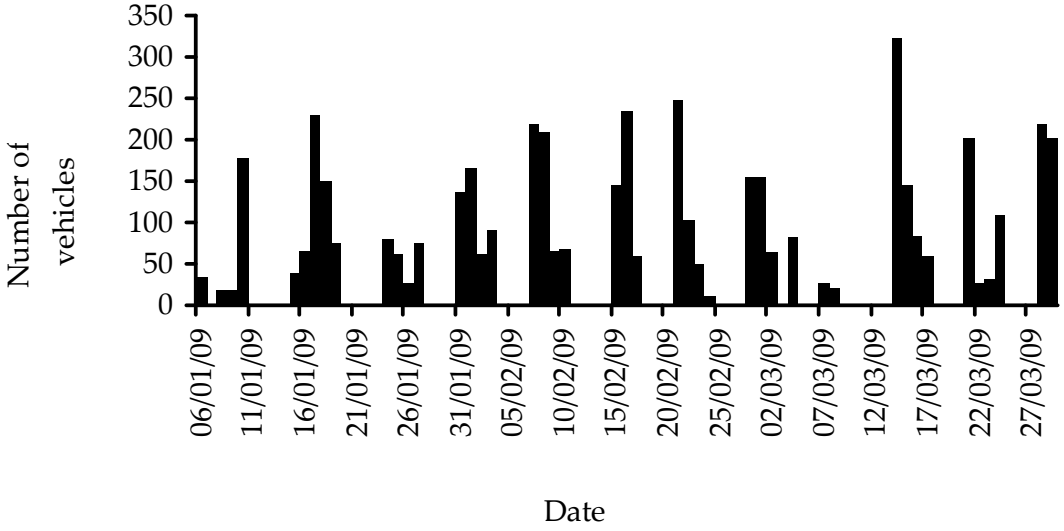
DAY CODE
1 = Monday
2 = Tuesday
3 = Wednesday
4 = Thursday
5 = Friday
6 = Saturday
7 = Sunday
8 = Holiday

TARGET
1 = LKWH
2 = NRPK
3 = BRBT
4 = YLPR
5 = ANYTHING
6 = WALL

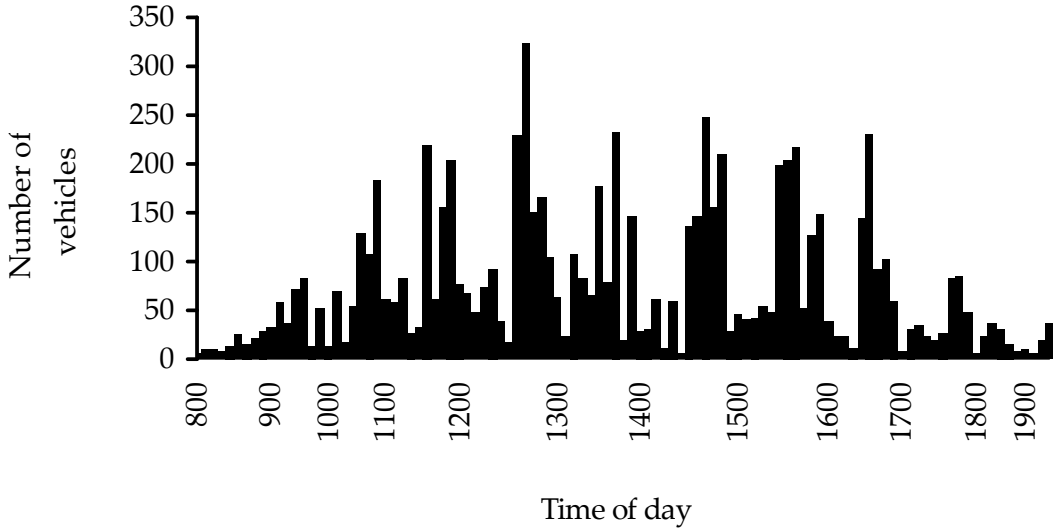
Appendix 2. Summary of daily angler effort and catch, Gull Lake, 6 January – 29 March, 2009. Codes are LKWH=Lake Whitefish, NRPK=Northern Pike, YLPR=Yellow Perch, BRBT=Burbot.

Date	Angling hours	Angling trips	LKWH kept	LKWH released	NRPK kept	NRPK released	YLPR Kept	YLPR released	BRBT kept	BRBT released
06-JAN-2009	33.25	13	6	0	0	0	0	0	0	0
08-JAN-2009	25.25	8	7	0	0	2	0	1	0	0
09-JAN-2009	67.00	17	16	0	0	0	6	13	1	0
10-JAN-2009	103.75	34	13	0	1	3	3	8	0	1
15-JAN-2009	74.25	22	7	0	0	1	25	41	3	0
16-JAN-2009	142.25	35	8	0	0	8	13	10	4	1
17-JAN-2009	160.25	45	13	0	4	9	10	6	1	0
18-JAN-2009	89.00	25	5	0	1	1	0	18	0	0
19-JAN-2009	56.50	20	0	1	1	21	16	18	3	20
24-JAN-2009	64.50	23	0	0	2	2	7	15	0	0
25-JAN-2009	159.75	40	2	0	1	9	16	7	1	2
26-JAN-2009	41.50	15	3	0	0	1	3	2	1	0
27-JAN-2009	26.50	8	3	0	0	1	0	2	0	0
31-JAN-2009	138.25	45	15	0	1	5	14	8	0	1
01-FEB-2009	112.00	31	7	0	0	9	9	14	1	2
02-FEB-2009	120.00	28	36	2	3	1	17	44	1	0
03-FEB-2009	61.50	20	12	0	1	1	1	3	0	0
07-FEB-2009	160.50	40	27	1	2	1	4	7	4	0
08-FEB-2009	70.00	20	20	0	3	3	3	2	2	0
09-FEB-2009	61.75	15	16	2	0	0	1	0	0	0
10-FEB-2009	38.00	10	28	0	0	1	0	8	0	0
15-FEB-2009	49.00	20	8	1	0	0	7	16	0	0
16-FEB-2009	185.50	53	38	0	1	3	16	48	0	2
17-FEB-2009	40.50	11	28	0	0	1	3	7	0	0
21-FEB-2009	163.50	38	53	0	1	6	19	94	5	0
22-FEB-2009	151.00	36	42	0	2	1	5	14	6	6
23-FEB-2009	35.00	9	19	1	0	3	11	57	0	0
24-FEB-2009	19.25	4	8	0	0	0	0	0	0	0
28-FEB-2009	157.00	31	56	2	3	2	0	6	9	41
01-MAR-2009	158.75	39	32	0	1	7	2	3	0	0
02-MAR-2009	81.00	20	45	6	0	3	8	3	0	1
07-MAR-2009	107.50	19	23	0	0	0	0	12	0	0
08-MAR-2009	29.00	11	5	0	0	0	0	0	1	9
14-MAR-2009	307.00	71	82	10	1	7	24	27	2	0
15-MAR-2009	158.50	43	37	8	0	1	5	9	0	0
16-MAR-2009	126.25	29	58	7	3	26	6	15	0	0
17-MAR-2009	57.50	13	21	0	0	0	5	5	1	0
21-MAR-2009	195.00	40	47	0	1	2	9	44	0	1
22-MAR-2009	44.00	9	14	0	0	0	3	1	0	0
23-MAR-2009	25.00	7	13	1	0	1	0	1	0	0
24-MAR-2009	87.00	22	21	0	0	1	4	10	0	1
28-MAR-2009	310.00	59	60	3	0	2	15	56	1	0
29-MAR-2009	96.50	21	17	2	0	2	1	3	0	0

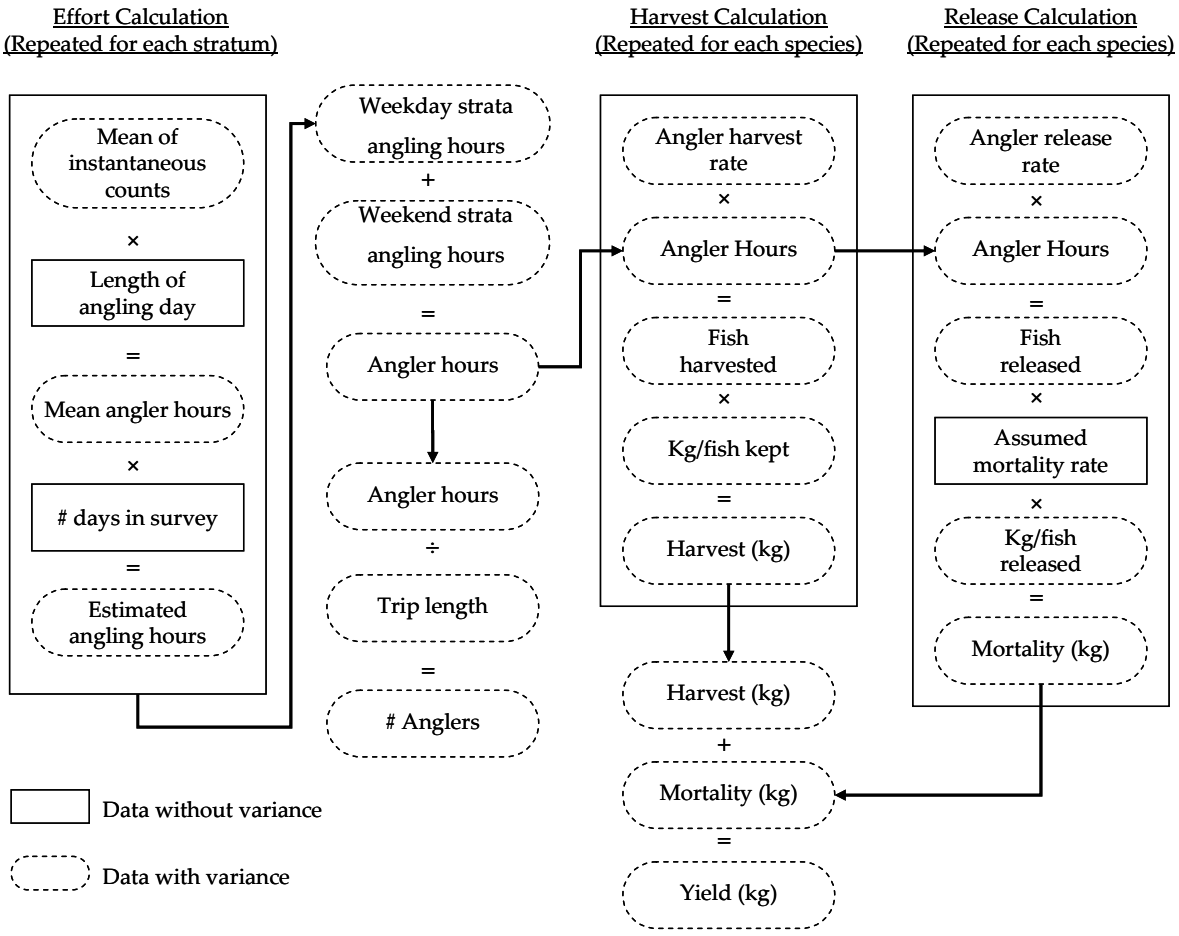
Appendix 3. Distribution of instantaneous counts of vehicles by date, Gull Lake, 6 January – 29 March, 2009.



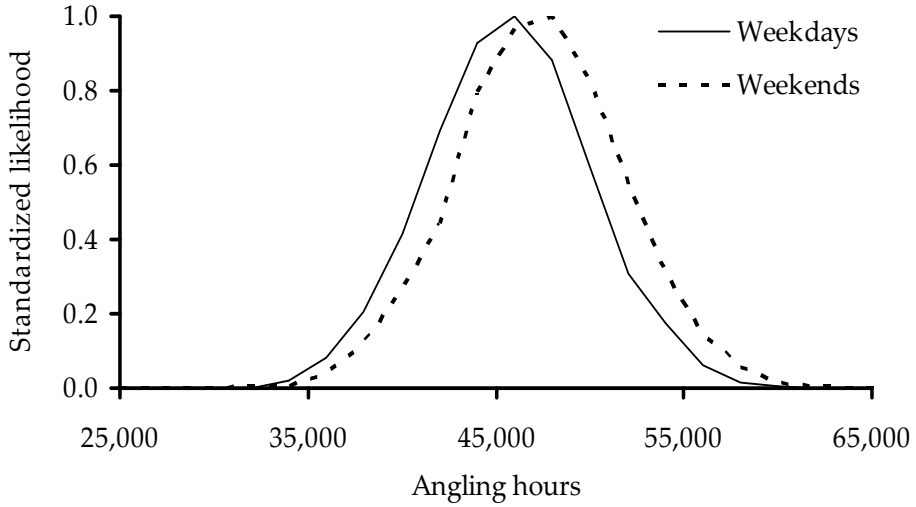
Appendix 4. Distribution of instantaneous counts of vehicles by time of day, Gull Lake, 6 January – 29 March, 2009.



Appendix 5. A flow chart outlining the process used for estimating parameters collected from the creel survey, Gull Lake, winter 2009. Rectangles represent values with no variance (i.e., observed data) and ovals represent data with variation (i.e., standardized likelihoods).



Appendix 6. Comparison of weekday versus weekend angling effort, Gull Lake, 6 January – 29 March, 2009.



Appendix 7. Summary of biological data collected from fish harvested by the sport fishery, Gull Lake, 6 January – 29 March, 2009. Codes are Jan=January, Feb=February, Mar=March, BRBT=Burbot, LKWH=Lake Whitefish, NRPK=Northern Pike, WHSC=White Sucker, YLPR=Yellow Perch.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
1	Jan	9	2009	BRBT	2500	685
2	Jan	15	2009	BRBT	2500	690
3	Jan	15	2009	BRBT	2350	670
4	Jan	15	2009	BRBT	1950	650
5	Jan	26	2009	BRBT	1350	525
6	Feb	1	2009	BRBT	3200	660
7	Feb	2	2009	BRBT	3150	692
8	Feb	21	2009	BRBT	2950	735
9	Feb	21	2009	BRBT	2700	690
10	Mar	8	2009	BRBT	2550	780
11	Mar	14	2009	BRBT	2400	625
1	Jan	6	2009	LKWH	950	456
2	Jan	6	2009	LKWH	1400	510
3	Jan	6	2009	LKWH	960	465
4	Jan	6	2009	LKWH	850	445
5	Jan	6	2009	LKWH	1100	479
6	Jan	6	2009	LKWH	1350	502
7	Jan	6	2009	LKWH	900	448
8	Jan	6	2009	LKWH	1200	488
9	Jan	8	2009	LKWH	100	426
10	Jan	8	2009	LKWH	900	400
11	Jan	8	2009	LKWH	1450	458
12	Jan	8	2009	LKWH	850	395
13	Jan	8	2009	LKWH	1150	430
14	Jan	8	2009	LKWH	500	320
15	Jan	8	2009	LKWH	950	400
16	Jan	9	2009	LKWH	1000	385
17	Jan	9	2009	LKWH	1100	410
18	Jan	9	2009	LKWH	1050	410
19	Jan	9	2009	LKWH	975	403
20	Jan	9	2009	LKWH	1400	447
21	Jan	9	2009	LKWH	950	390
22	Jan	9	2009	LKWH	950	402
23	Jan	9	2009	LKWH	1150	428
24	Jan	10	2009	LKWH	975	400
25	Jan	10	2009	LKWH	1350	450

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
26	Jan	10	2009	LKWH	1725	420
27	Jan	10	2009	LKWH	750	380
28	Jan	10	2009	LKWH	830	390
29	Jan	10	2009	LKWH	1050	415
30	Jan	10	2009	LKWH	1200	428
31	Jan	10	2009	LKWH	900	385
32	Jan	10	2009	LKWH	975	402
33	Jan	10	2009	LKWH	1325	442
34	Jan	15	2009	LKWH	1750	485
35	Jan	15	2009	LKWH	900	420
36	Jan	15	2009	LKWH	1300	395
37	Jan	15	2009	LKWH	1350	385
38	Jan	15	2009	LKWH	950	390
39	Jan	15	2009	LKWH	1150	415
40	Jan	15	2009	LKWH	925	395
41	Jan	16	2009	LKWH	850	365
42	Jan	16	2009	LKWH	900	384
43	Jan	16	2009	LKWH	1100	422
44	Jan	16	2009	LKWH	900	400
45	Jan	16	2009	LKWH	1000	400
46	Jan	16	2009	LKWH	975	413
47	Jan	16	2009	LKWH	1125	427
48	Jan	17	2009	LKWH	1050	410
49	Jan	17	2009	LKWH	1500	470
50	Jan	17	2009	LKWH	1025	408
51	Jan	17	2009	LKWH	875	380
52	Jan	17	2009	LKWH	1125	427
53	Jan	17	2009	LKWH	800	367
54	Jan	17	2009	LKWH	1350	447
55	Jan	17	2009	LKWH	1075	419
56	Jan	17	2009	LKWH	1225	450
57	Jan	17	2009	LKWH	1525	460
58	Jan	17	2009	LKWH	1200	425
59	Jan	17	2009	LKWH	1050	399
60	Jan	17	2009	LKWH	700	360
61	Jan	17	2009	LKWH	1775	623

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
62	Jan	18	2009	LKWH	975	390
63	Jan	26	2009	LKWH	1050	420
64	Jan	26	2009	LKWH	1125	408
65	Jan	27	2009	LKWH	1150	425
66	Jan	31	2009	LKWH	900	402
67	Jan	31	2009	LKWH	1450	442
68	Jan	31	2009	LKWH	900	390
69	Jan	31	2009	LKWH	900	392
70	Jan	31	2009	LKWH	800	389
71	Jan	31	2009	LKWH	1050	405
72	Feb	1	2009	LKWH	1100	415
73	Feb	1	2009	LKWH	1400	460
74	Feb	1	2009	LKWH	1100	430
75	Feb	1	2009	LKWH	1100	410
76	Feb	1	2009	LKWH	700	375
77	Feb	1	2009	LKWH	925	408
78	Feb	2	2009	LKWH	1050	410
79	Feb	2	2009	LKWH	1600	480
80	Feb	2	2009	LKWH	650	360
81	Feb	2	2009	LKWH	950	390
82	Feb	2	2009	LKWH	1100	398
83	Feb	2	2009	LKWH	950	390
84	Feb	2	2009	LKWH	1200	422
85	Feb	2	2009	LKWH	860	388
86	Feb	2	2009	LKWH	1200	438
87	Feb	2	2009	LKWH	1350	435
88	Feb	2	2009	LKWH	800	348
89	Feb	2	2009	LKWH	1000	405
90	Feb	2	2009	LKWH	900	380
91	Feb	2	2009	LKWH	1125	415
92	Feb	2	2009	LKWH	975	410
93	Feb	2	2009	LKWH	1000	410
94	Feb	2	2009	LKWH	1250	435
95	Feb	3	2009	LKWH	1050	400
96	Feb	3	2009	LKWH	1050	405

Appendix 7. Continued

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
97	Feb	3	2009	LKWH	700	352
98	Feb	3	2009	LKWH	1000	402
99	Feb	3	2009	LKWH	1100	400
100	Feb	3	2009	LKWH	1200	428
101	Feb	3	2009	LKWH	1200	428
102	Feb	3	2009	LKWH	1200	412
103	Feb	3	2009	LKWH	1100	410
104	Feb	3	2009	LKWH	1350	450
105	Feb	3	2009	LKWH	1000	400
106	Feb	7	2009	LKWH	1100	419
107	Feb	7	2009	LKWH	750	372
108	Feb	7	2009	LKWH	975	412
109	Feb	7	2009	LKWH	1160	415
110	Feb	7	2009	LKWH	1050	413
111	Feb	7	2009	LKWH	925	390
112	Feb	7	2009	LKWH	1050	409
113	Feb	7	2009	LKWH	1175	422
114	Feb	7	2009	LKWH	1100	417
115	Feb	7	2009	LKWH	650	366
116	Feb	7	2009	LKWH	1150	419
117	Feb	7	2009	LKWH	1050	408
118	Feb	7	2009	LKWH	900	375
119	Feb	7	2009	LKWH	850	388
120	Feb	8	2009	LKWH	1100	415
121	Feb	8	2009	LKWH	850	405
122	Feb	8	2009	LKWH	1500	468
123	Feb	8	2009	LKWH	850	375
124	Feb	8	2009	LKWH	1450	458
125	Feb	8	2009	LKWH	1200	461
126	Feb	8	2009	LKWH	1100	415
127	Feb	8	2009	LKWH	1350	455
128	Feb	8	2009	LKWH	1200	430
129	Feb	9	2009	LKWH	1125	420
130	Feb	9	2009	LKWH	1150	428
131	Feb	9	2009	LKWH	1300	438

Appendix 7. Continued

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
132	Feb	9	2009	LKWH	1090	430
133	Feb	9	2009	LKWH	1200	452
134	Feb	9	2009	LKWH	950	405
135	Feb	9	2009	LKWH	940	395
136	Feb	10	2009	LKWH	560	348
137	Feb	10	2009	LKWH	950	395
138	Feb	10	2009	LKWH	800	397
139	Feb	10	2009	LKWH	800	410
140	Feb	10	2009	LKWH	850	391
141	Feb	15	2009	LKWH	900	390
142	Feb	15	2009	LKWH	1000	410
143	Feb	15	2009	LKWH	1025	404
144	Feb	15	2009	LKWH	875	402
145	Feb	15	2009	LKWH	800	380
146	Feb	15	2009	LKWH	850	380
147	Feb	16	2009	LKWH	1050	408
148	Feb	16	2009	LKWH	850	385
149	Feb	16	2009	LKWH	700	357
150	Feb	17	2009	LKWH	925	400
151	Feb	17	2009	LKWH	925	392
152	Feb	17	2009	LKWH	800	388
153	Feb	17	2009	LKWH	1160	425
154	Feb	17	2009	LKWH	1090	420
155	Feb	17	2009	LKWH	950	410
156	Feb	17	2009	LKWH	960	410
157	Feb	17	2009	LKWH	1000	405
158	Feb	17	2009	LKWH	975	402
159	Feb	17	2009	LKWH	1200	448
160	Feb	21	2009	LKWH	1175	420
161	Feb	21	2009	LKWH	950	411
162	Feb	21	2009	LKWH	1600	465
163	Feb	21	2009	LKWH	1325	444
164	Feb	21	2009	LKWH	700	361
165	Feb	21	2009	LKWH	1550	465
166	Feb	21	2009	LKWH	850	395

Appendix 7. Continued

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
167	Feb	21	2009	LKWH	975	410
168	Feb	21	2009	LKWH	940	406
169	Feb	21	2009	LKWH	1350	456
170	Feb	21	2009	LKWH	1000	418
171	Feb	21	2009	LKWH	1125	418
172	Feb	21	2009	LKWH	1100	421
173	Feb	22	2009	LKWH	800	380
174	Feb	22	2009	LKWH	1700	487
175	Feb	22	2009	LKWH	700	365
176	Feb	22	2009	LKWH	1100	430
177	Feb	22	2009	LKWH	875	395
178	Feb	22	2009	LKWH	1050	420
179	Feb	22	2009	LKWH	1050	405
180	Feb	22	2009	LKWH	750	380
181	Feb	22	2009	LKWH	1150	445
182	Feb	22	2009	LKWH	1050	400
183	Feb	23	2009	LKWH	900	400
184	Feb	23	2009	LKWH	800	380
185	Feb	23	2009	LKWH	1025	418
186	Feb	23	2009	LKWH	1450	468
187	Feb	23	2009	LKWH	1000	398
188	Feb	23	2009	LKWH	800	375
189	Feb	23	2009	LKWH	1000	390
190	Feb	23	2009	LKWH	950	395
191	Feb	23	2009	LKWH	1300	430
192	Feb	23	2009	LKWH	1000	400
193	Feb	23	2009	LKWH	1150	430
194	Feb	23	2009	LKWH	1000	402
195	Feb	23	2009	LKWH	900	392
196	Feb	28	2009	LKWH	950	412
197	Feb	28	2009	LKWH	1125	420
198	Feb	28	2009	LKWH	800	385
199	Feb	28	2009	LKWH	600	310
200	Feb	28	2009	LKWH	1100	420
201	Feb	28	2009	LKWH	900	300

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
202	Feb	28	2009	LKWH	1025	430
203	Mar	1	2009	LKWH	900	405
204	Mar	1	2009	LKWH	850	380
205	Mar	1	2009	LKWH	800	378
206	Mar	1	2009	LKWH	1000	390
207	Mar	1	2009	LKWH	850	385
208	Mar	1	2009	LKWH	1100	425
209	Mar	1	2009	LKWH	725	362
210	Mar	1	2009	LKWH	900	397
211	Mar	1	2009	LKWH	750	380
212	Mar	1	2009	LKWH	750	377
213	Mar	1	2009	LKWH	975	412
214	Mar	1	2009	LKWH	725	370
215	Mar	1	2009	LKWH	800	390
216	Mar	2	2009	LKWH	1100	427
217	Mar	2	2009	LKWH	750	380
218	Mar	2	2009	LKWH	800	374
219	Mar	2	2009	LKWH	850	390
220	Mar	2	2009	LKWH	950	395
221	Mar	2	2009	LKWH	1050	410
222	Mar	2	2009	LKWH	1050	406
223	Mar	2	2009	LKWH	900	406
224	Mar	2	2009	LKWH	850	389
225	Mar	2	2009	LKWH	625	351
226	Mar	2	2009	LKWH	700	375
227	Mar	2	2009	LKWH	1100	410
228	Mar	2	2009	LKWH	850	382
229	Mar	2	2009	LKWH	1250	430
230	Mar	2	2009	LKWH	1050	403
231	Mar	2	2009	LKWH	700	360
232	Mar	2	2009	LKWH	1050	425
233	Mar	2	2009	LKWH	900	404
234	Mar	2	2009	LKWH	850	381
235	Mar	2	2009	LKWH	850	--
236	Mar	2	2009	LKWH	1625	495

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
237	Mar	2	2009	LKWH	875	382
238	Mar	2	2009	LKWH	975	402
239	Mar	2	2009	LKWH	1100	410
240	Mar	2	2009	LKWH	1400	464
241	Mar	2	2009	LKWH	1700	470
242	Mar	2	2009	LKWH	775	375
243	Mar	2	2009	LKWH	950	408
244	Mar	2	2009	LKWH	825	374
245	Mar	8	2009	LKWH	750	373
246	Mar	8	2009	LKWH	450	330
247	Mar	8	2009	LKWH	1150	424
248	Mar	14	2009	LKWH	650	355
249	Mar	14	2009	LKWH	1100	415
250	Mar	14	2009	LKWH	960	397
251	Mar	14	2009	LKWH	975	397
252	Mar	14	2009	LKWH	1200	440
253	Mar	14	2009	LKWH	1000	401
254	Mar	14	2009	LKWH	875	392
255	Mar	14	2009	LKWH	725	366
256	Mar	14	2009	LKWH	860	400
257	Mar	14	2009	LKWH	775	385
258	Mar	14	2009	LKWH	650	352
259	Mar	14	2009	LKWH	925	387
260	Mar	14	2009	LKWH	1500	450
261	Mar	14	2009	LKWH	1075	420
262	Mar	14	2009	LKWH	850	390
263	Mar	14	2009	LKWH	800	380
264	Mar	14	2009	LKWH	625	350
265	Mar	15	2009	LKWH	1150	440
266	Mar	15	2009	LKWH	1125	413
267	Mar	15	2009	LKWH	1000	403
268	Mar	15	2009	LKWH	1000	390
269	Mar	15	2009	LKWH	950	410
270	Mar	15	2009	LKWH	850	395
271	Mar	15	2009	LKWH	800	405

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
272	Mar	16	2009	LKWH	1250	435
273	Mar	16	2009	LKWH	1200	425
274	Mar	16	2009	LKWH	900	309
275	Mar	16	2009	LKWH	800	370
276	Mar	16	2009	LKWH	825	388
277	Mar	16	2009	LKWH	1000	401
278	Mar	16	2009	LKWH	1200	431
279	Mar	16	2009	LKWH	900	394
280	Mar	16	2009	LKWH	1000	404
281	Mar	16	2009	LKWH	925	400
282	Mar	16	2009	LKWH	900	395
283	Mar	21	2009	LKWH	1050	420
284	Mar	21	2009	LKWH	1100	432
285	Mar	23	2009	LKWH	1025	419
286	Mar	23	2009	LKWH	650	395
287	Mar	23	2009	LKWH	1025	405
288	Mar	24	2009	LKWH	800	395
289	Mar	24	2009	LKWH	750	377
290	Mar	24	2009	LKWH	750	342
291	Mar	24	2009	LKWH	1200	419
292	Mar	24	2009	LKWH	900	396
293	Mar	24	2009	LKWH	900	390
294	Mar	24	2009	LKWH	950	390
295	Mar	24	2009	LKWH	710	365
296	Mar	24	2009	LKWH	950	385
297	Mar	28	2009	LKWH	800	396
298	Mar	28	2009	LKWH	850	398
299	Mar	28	2009	LKWH	800	384
300	Mar	28	2009	LKWH	875	401
301	Mar	28	2009	LKWH	840	385
302	Mar	28	2009	LKWH	975	--
303	Mar	28	2009	LKWH	1100	430
304	Mar	28	2009	LKWH	1500	450
305	Mar	28	2009	LKWH	1600	483
306	Mar	28	2009	LKWH	1350	435

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
307	Mar	28	2009	LKWH	1200	429
308	Mar	28	2009	LKWH	1250	475
309	Mar	29	2009	LKWH	1350	430
310	Mar	29	2009	LKWH	800	397
311	Mar	29	2009	LKWH	700	380
312	Mar	29	2009	LKWH	1200	425
313	Mar	29	2009	LKWH	850	375
314	Mar	29	2009	LKWH	700	368
315	Mar	29	2009	LKWH	1250	424
316	Mar	29	2009	LKWH	1100	435
317	Mar	29	2009	LKWH	1750	468
318	Mar	29	2009	LKWH	600	364
319	Mar	29	2009	LKWH	900	402
320	Mar	29	2009	LKWH	700	374
1	Jan	10	2009	NRPK	2150	655
2	Jan	17	2009	NRPK	1725	620
3	Jan	24	2009	NRPK	2200	685
4	Jan	24	2009	NRPK	1500	615
5	Jan	25	2009	NRPK	1450	640
6	Jan	31	2009	NRPK	2000	650
7	Feb	1	2009	NRPK	2250	680
8	Feb	1	2009	NRPK	2150	666
9	Feb	3	2009	NRPK	1460	602
10	Feb	21	2009	NRPK	2750	710
11	Feb	21	2009	NRPK	4200	835
12	Feb	21	2009	NRPK	1925	640
13	Mar	1	2009	NRPK	1450	587
14	Mar	14	2009	NRPK	1600	644
15	Mar	16	2009	NRPK	1375	622
1	Jan	24	2009	WHSC	850	405
2	Feb	22	2009	WHSC	1650	490
1	Jan	9	2009	YLPR	100	192
2	Jan	9	2009	YLPR	120	220
3	Jan	9	2009	YLPR	120	205
4	Jan	9	2009	YLPR	120	190

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
5	Jan	9	2009	YLPR	120	208
6	Jan	9	2009	YLPR	120	215
7	Jan	10	2009	YLPR	125	210
8	Jan	10	2009	YLPR	100	200
9	Jan	10	2009	YLPR	425	300
10	Jan	15	2009	YLPR	325	275
11	Jan	15	2009	YLPR	260	255
12	Jan	15	2009	YLPR	125	195
13	Jan	15	2009	YLPR	100	180
14	Jan	15	2009	YLPR	100	185
15	Jan	15	2009	YLPR	150	205
16	Jan	15	2009	YLPR	175	217
17	Jan	15	2009	YLPR	125	200
18	Jan	15	2009	YLPR	125	198
19	Jan	15	2009	YLPR	150	200
20	Jan	15	2009	YLPR	450	318
21	Jan	15	2009	YLPR	125	192
22	Jan	15	2009	YLPR	150	203
23	Jan	15	2009	YLPR	150	208
24	Jan	15	2009	YLPR	300	275
25	Jan	15	2009	YLPR	200	237
26	Jan	15	2009	YLPR	225	232
27	Jan	15	2009	YLPR	150	215
28	Jan	15	2009	YLPR	200	230
29	Jan	15	2009	YLPR	125	195
30	Jan	15	2009	YLPR	400	285
31	Jan	15	2009	YLPR	300	250
32	Jan	15	2009	YLPR	200	234
33	Jan	15	2009	YLPR	300	268
34	Jan	15	2009	YLPR	250	238
35	Jan	16	2009	YLPR	100	191
36	Jan	16	2009	YLPR	300	268
37	Jan	16	2009	YLPR	425	290
38	Jan	16	2009	YLPR	325	279
39	Jan	19	2009	YLPR	125	200

Appendix 7. Continued.

Sample # by species	Month	Date	Year	Species	Weight (g)	Fork length (mm)
40	Jan	19	2009	YLPR	150	212
41	Jan	24	2009	YLPR	150	210
42	Jan	24	2009	YLPR	250	265
43	Jan	24	2009	YLPR	150	205
44	Jan	24	2009	YLPR	200	230
45	Jan	24	2009	YLPR	300	265
46	Jan	25	2009	YLPR	100	188
47	Jan	25	2009	YLPR	150	205
48	Jan	25	2009	YLPR	150	200
49	Jan	25	2009	YLPR	150	215
50	Jan	25	2009	YLPR	75	180
51	Jan	25	2009	YLPR	100	192
52	Jan	25	2009	YLPR	100	192
53	Jan	25	2009	YLPR	240	242
54	Jan	25	2009	YLPR	50	165
55	Jan	26	2009	YLPR	100	180
56	Jan	26	2009	YLPR	100	200
57	Jan	26	2009	YLPR	280	242
58	Feb	1	2009	YLPR	200	242
59	Feb	2	2009	YLPR	400	290
60	Feb	7	2009	YLPR	150	212
61	Feb	8	2009	YLPR	450	318
62	Feb	8	2009	YLPR	275	264
63	Feb	8	2009	YLPR	375	285
64	Feb	8	2009	YLPR	425	300

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Government of Alberta
Sustainable Resource Development

Alberta Conservation Association