

**Abundance and Population Structure of
Walleye in Pigeon and Buck Lakes,
Alberta, 2010**

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Abundance and Population Structure of Walleye in
Pigeon and Buck Lakes, Alberta, 2010

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EXECUTIVE SUMMARY

Walleye (*Sander vitreus*) populations throughout Alberta are faced with high angling pressure, late-maturity, and slow-growth rates, resulting in many populations being susceptible to over-exploitation. In 1995, Alberta Sustainable Resource Development (ASRD) implemented the Alberta Walleye Management and Recovery Plan (AWMRP) to facilitate the protection and recovery of exploited walleye fisheries. As part of the AWMRP, the Alberta Conservation Association (ACA) conducted gill net surveys in Pigeon and Buck Lakes from 27 September to 1 October 2010 to examine population structure and growth characteristics of walleye.

Relative abundance of walleye in Pigeon Lake was 29.0 fish/100 m²/24 h (95% CI = 21.9 – 38.6, n = 7). Size of walleye ranged from 190 to 523 mm FL, with the majority of the population in the 400 to 500 mm FL size ranges. Fish age ranged from 1 to 13 y, with the population composed mainly of the 12 y age-class, which comprised 41% of the total catch. Based on the AWMRP criteria, the walleye population in Pigeon Lake exhibits a wide (>8 age-classes) and very stable (mean age >9 y) age-class distribution. Overall, growth rates were slow with the average fish hardly attaining the 500 mm FL AWMRP standard size. Males grew slower than females with estimated average maximum sizes (L_{∞}) of 432 and 472 mm FL, respectively. Walleye in Pigeon Lake mature early, with males reaching maturity at age 4 and females at age 5.

Relative abundance of walleye in Buck Lake was 27.6 fish/100 m²/24 h (95% CI = 23.6 – 32.0, n = 9). Size of walleye ranged from 165 to 492 mm FL, with the majority of the population (89%) in the 300 to 450 mm FL size ranges. Fish age ranged from 1 to 16 y, with the population composed mainly of 4 y and 5 y age-classes, which comprised 49% of the total catch. Based on the AWMRP criteria, the walleye population in Buck Lake exhibits a wide (>8 age-classes) and stable (mean age 6 - 9 y) age-class distribution. Similar to Pigeon Lake, growth rates were slow with the average fish hardly attaining the 500 mm FL AWMRP standard size. Males grew slower than females with estimated average maximum sizes (L_{∞}) of 437 and 485 mm FL, respectively. Walleye from Buck Lake mature early, with males reaching maturity by age 5 and females by age 6.

The information collected in these surveys will provide current data to ASRD, assisting managers in making accurate management decisions regarding the sport fishery and sustainability of walleye populations within these lakes.

Key words: Pigeon Lake, Buck Lake, walleye, Fall Walleye Index Netting, age, growth rate, maturity, length distribution.

ACKNOWLEDGEMENTS

Financial support for this study was provided by the Alberta Conservation Association (ACA). We thank all ACA staff for their hard work and willingness to work through arduous conditions. Staff included Brendan Ganton, Bill Patterson, Jamie Smithson, Jocelyn Beniuk, Mary Svendsen, and Troy Furukawa. In addition, we thank Alberta Sustainable Resources Development (ASRD), Fisheries Management Division (Red Deer) staff, specifically Vance Buchwald, Jason Cooper, and Michelle Wells for the generous in-kind support.

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1.0 INTRODUCTION

Walleye (*Sander vitreus*) populations in Alberta are susceptible to high fishing pressure resulting from the imbalance of a high angler population and limited fishing opportunities (Sullivan 2003). Historically high harvest rates, especially in the mid-1990s, have resulted in the over-harvest of many walleye populations (Sullivan 2003) and this trend is expected to continue given the increasing popularity of recreational fishing among Alberta residents. Consequently, to facilitate the protection and recovery of walleye fisheries in the province, Alberta Sustainable Resource Development (ASRD) implemented the Alberta Walleye Management and Recovery Plan (AWMRP) in 1995 (Berry 1995). Under the AWMRP, each lake was classified into one of four management status classifications (trophy, stable, vulnerable, and collapsed) based on the state of the walleye fishery (Berry 1995), and sport fishing regulations were developed accordingly. As part of the AWMRP, we conducted gill net surveys on Pigeon and Buck Lakes during the fall of 2010 to examine abundance, population structure and growth rates of walleye in these lakes. The information collected in these surveys will help ASRD determine the status of these walleye populations and revise management plans accordingly.

Based on the AWMRP criteria, the Pigeon Lake walleye population was classified as collapsed in 1995 and was managed with a zero catch limit. Between 1995 and 1999, the lake was stocked with 13,170,900 walleye (Johnston and Paul 2006), that resulted in enough recovery of the population to allow some limited harvest (Watkins 2005). Thus, since 2006, Pigeon Lake has been managed with a “special harvest license”, that allows anglers to harvest a quota of walleye determined annually (yearly quota range to date; 3668 - 8551) divided into 3 size ranges (Class A: 2 fish >50 cm, Class B: 3 fish between 43 – 50 cm, and Class C: 3 fish <43 cm). The walleye population in Buck Lake was initially classified as vulnerable in 1995 and was regulated with a catch limit of three walleye over 500 mm total length (TL). Harvest has since been reduced, and it is currently managed with a catch limit of one walleye over 430 mm TL.

2.0 STUDY AREA

2.1 Pigeon Lake

Pigeon Lake (53°1'N, 114°3'W) is located in the Battle River drainage, approximately 60 km southwest of the city of Edmonton (Figure 1), and has a surface area of 9732 ha (Government of Alberta 2010). Due to its close proximity to the provincial capital, the shoreline is extensively developed with both seasonal and permanent residences and is intensively used for recreational purposes; 10 summer villages and a few unnamed subdivisions border the lake. There are also two provincial parks (Pigeon Lake and Ma-Me-O Beach), one provincial recreational area (Zeiner Park) and several golf courses along the shores of the lake.

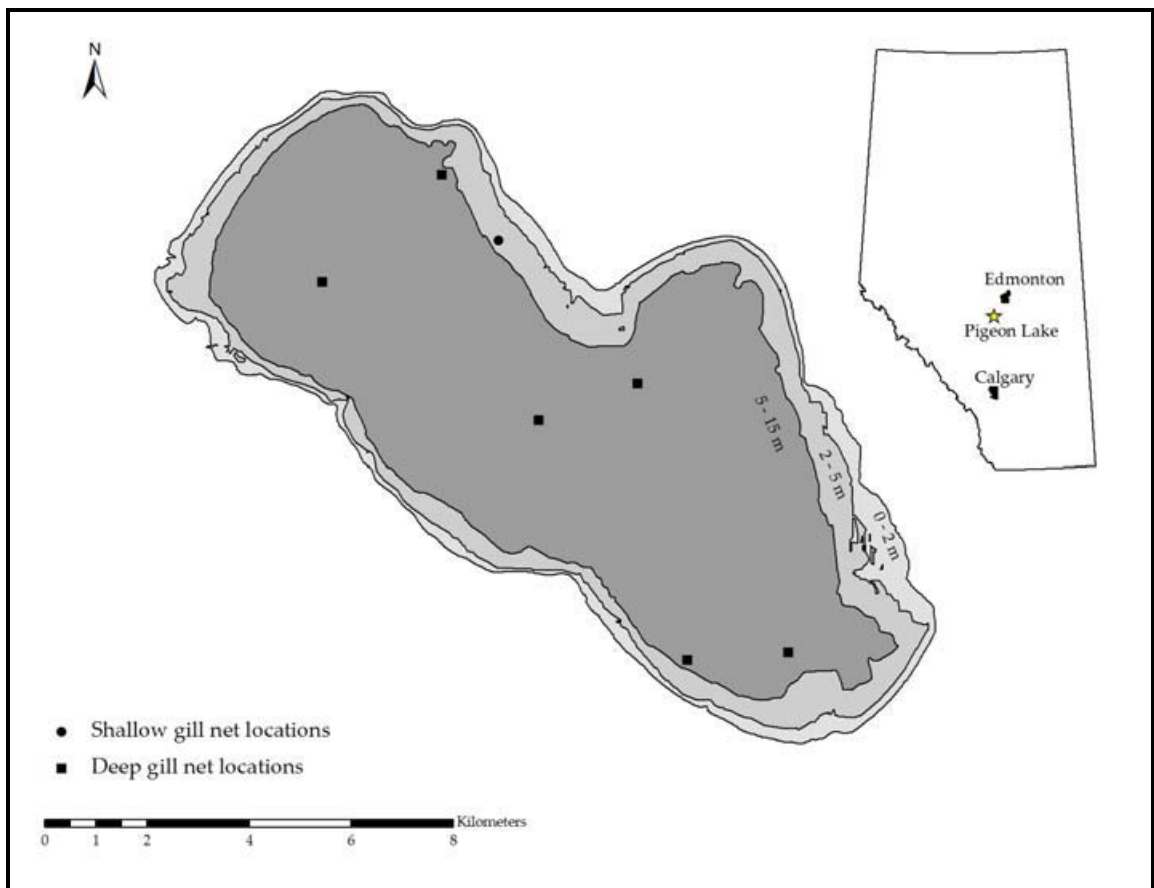


Figure 1. Bathymetric map of Pigeon Lake, Alberta showing gill net locations. Inset map shows study lake location within Alberta.

2.2 Buck Lake

Buck Lake (52°59'N, 114°45'W) is located in the North Saskatchewan River drainage, approximately 105 km southwest of the city of Edmonton (Figure 2), and has a surface area of 2527 ha (Government of Alberta 2010). Similar to Pigeon Lake, the shoreline of Buck Lake is extensively developed with cottages and recreational developments, including a small summer village located on the south end of the lake. Two parks located on the lake are Buck Creek and Calhoun Bay Provincial Parks.

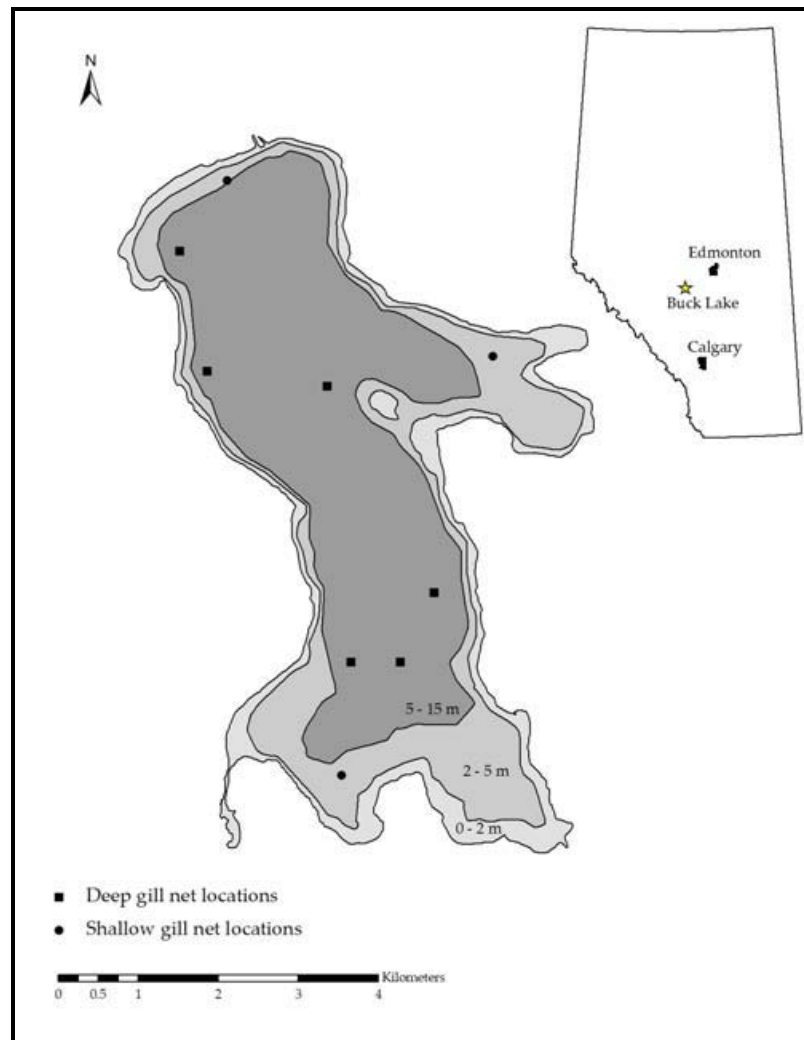


Figure 2. Bathymetric map of Buck Lake, Alberta showing gill net locations. Inset map shows study lake location within Alberta.

3.0 MATERIALS AND METHODS

We captured walleye in Pigeon and Buck Lakes between 27 September and 1 October 2010, following the Fall Walleye Index Netting (FWIN) protocols (Morgan 2002). Surveys for each lake were conducted over a short period (3 - 5 days) when lake surface temperatures ranged from 10 - 15°C. By ensuring that surveys are completed within a short time period, and under moderate water temperatures, the FWIN approach provides a snapshot of the population structure that minimizes the complications associated with long-term or seasonal variations in growth and age of fish (Morgan 2002).

We captured fish using 61 m x 1.8 m multi-panel monofilament FWIN gill nets that were set for approximately 24 h (range 22 - 25 h). Each net was composed of eight 7.6 m x 1.8 m panels of different mesh sizes (stretched mesh): 25, 38, 51, 64, 76, 102, 127 and 152 mm. Following Morgan (2002), we used a stratified-random sampling design based on surface area and depth zones (shallow: 2 – 5 m and deep: 5 – 15 m), to determine the number and location of sampling sites.

We divided the surface area of each lake into 1-km² sampling units using a Universal Transverse Mercator (UTM) grid. Each 1-km² sampling unit was further divided into four 500-m² quadrats that were assigned a numeric value. Sampling sites were randomly chosen from these quadrats. Nets were set in the center of each randomly selected quadrat, if possible, or within 250 m of the center. If the desired depth or suitable topography was not available within 250 m of the selected quadrat, that quadrat was replaced with the next randomly selected quadrat in the sequence. To reduce sampling bias due to variations in habitat, areas with steep gradients, drop-offs, or heavy vegetation were avoided. We used bathymetric data to calculate a ratio of surface area between the two depth strata (shallow: 2 - 5 m and deep: 5 - 15 m) following procedures in Morgan (2002). Sampling effort was allocated in proportion to the area within each depth zone. Following this procedure, we set seven nets (1 shallow, 6 deep) at Pigeon Lake (Appendix 1) and nine nets (3 shallow, 6 deep) at Buck Lake (Appendix 2).

For all sport fish captured, we recorded species, fork length (FL, mm), total length (TL, mm), total weight (g), sex and state of maturity. Fish were considered sexually mature

if they appeared able to spawn the following spring (Duffy et al. 2000). Otoliths and the first three rays of the left pelvic fin were collected from walleye for age determination following Mackay et al. (1990). For non-sport fish species such as spottail shiners (*Notropis hudsonius*) and white suckers (*Catostomus commersoni*), the only measurement taken was FL.

We used a bootstrap technique to estimate relative abundance of walleye, expressed as catch-per-unit-effort (CUE, fish/100 m²/24 h), and associated 95% confidence intervals (95% CI) following procedures in Haddon (2001) and Sullivan (2004). Following the guidelines of the AWMRP, evaluation of demographic attributes (e.g., growth rate, age-at-maturity, age-class stability) was based on 500 mm FL fish. We used weight-length and length-age plots to identify and investigate outliers. Outliers were omitted if measurement or recording error was suspected. Age-at-maturity was described as the age at which ≥50% of the fish were mature.

We described growth rate of fish using the von Bertalanffy (1938) growth model:

$$L_t = L_\infty (1 - e^{-K(t-t_0)})$$

where,

L_t = length at age t ,

L_∞ = maximum theoretical length that can be attained,

K = coefficient of growth,

t = age, in years (y), and

t_0 = theoretical time (y), when the fish was size zero

L_∞ , K , and t_0 were calculated using the Fishery Analysis Simulation Tools version 3.0 (Slipke and Maceina 2006).

All data were entered into the ASRD Fish and Wildlife Management Information System.

4.0 RESULTS

4.1 Capture data

4.1.1 Pigeon Lake

We captured 215 walleye at Pigeon Lake with an estimated CUE of 29.0 fish/100 m²/24 h (95% CI = 21.9 – 38.6, n = 7; Appendix 3). Other species captured included 6 northern pike (*Esox lucius*), 5 yellow perch (*Perca flavescens*), 106 lake whitefish (*Coregonus clupeaformis*), 2 white suckers, and 2 spottail shiners (Appendix 4). Biological data collected from these fish are provided in Appendix 5.

4.1.2 Buck Lake

We captured 251 walleye at Buck Lake with an estimated CUE of 27.6 fish/100 m²/24 h (95% CI = 23.6 – 32.0, n = 9; Appendix 6). Other species captured included 44 northern pike, 42 yellow perch, 10 lake whitefish, 2 white suckers, and 3 spottail shiners (Appendix 7). Biological data collected from these fish are provided in Appendix 8.

4.2 Walleye population structure

4.2.1 Pigeon Lake

The size of walleye in Pigeon Lake ranged from 190 to 523 mm FL, with the majority of the population in the 400 to 500 mm size ranges (Figure 3). The strongest size range was 450 - 475 mm FL, which made up 36% (n = 78) of the total catch. Walleye >500 mm FL (AWMRP standard size) and <325 mm FL were poorly represented. Fish age ranged from 1 to 13 y, with a mean (\pm SE) age of 9.2 ± 0.2 y (n = 215) (Figure 4). The fishery was composed mainly of the 12 y age-class, which made up 41% (n = 88) of the total catch. Other strong age-classes were 3, 4, 7, 9, and 11 y. Walleye ages 1, 2, 5, and 8 y were poorly represented. Based on the AWMRP criteria, the walleye population in Pigeon Lake exhibits a wide (>8 age-classes) and very stable (mean age >9 y) age-class distribution.

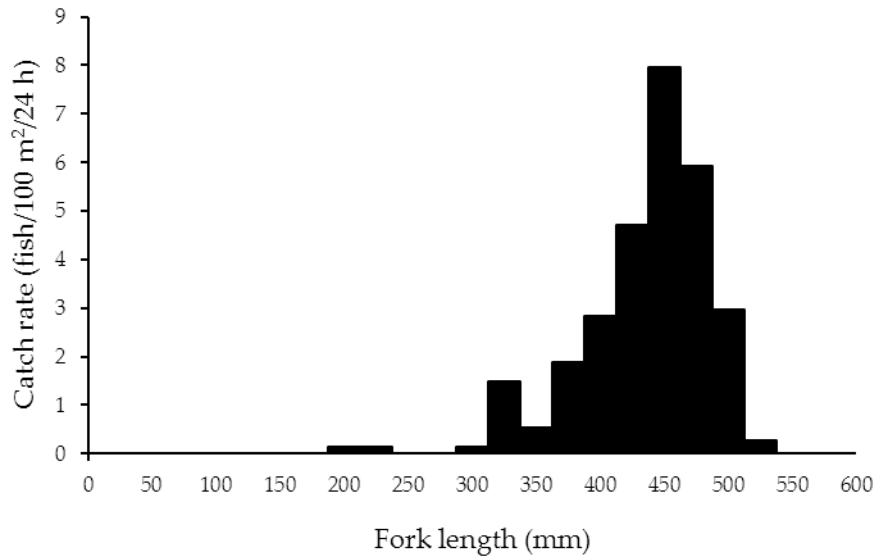


Figure 3. Length distribution of walleye captured from Pigeon Lake, Alberta, 2010. Mean (\pm SE) fork length of walleye was 424 ± 3 mm ($n = 215$).

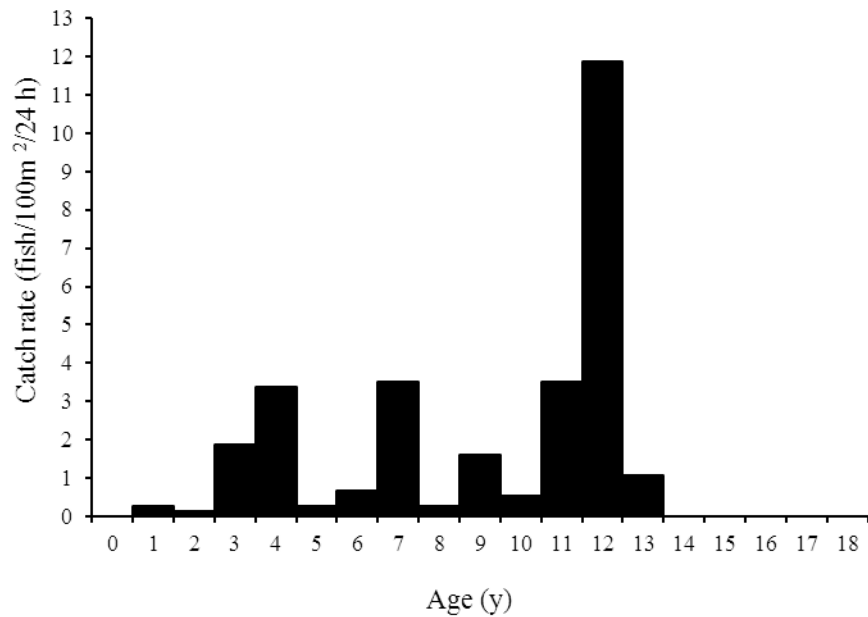


Figure 4. Age-class distribution of walleye captured from Pigeon Lake, Alberta, 2010. Mean (\pm SE) age of walleye was 9.2 ± 0.2 y ($n = 215$).

Overall growth rates were slow and male walleye from Pigeon Lake grew at a slower rate than females (Figure 5). Estimated (von Bertalanffy growth model) average maximum size (L_{∞}) was 432 mm FL for males and 472 mm FL for females, with corresponding growth coefficients (K) of 0.39 and 0.31, respectively. Thus, based on the von Bertalanffy growth parameters, the average walleye in Pigeon Lake does not reach the 500 mm FL AWMRP standard size; however two individuals in the catch were >500 mm FL.

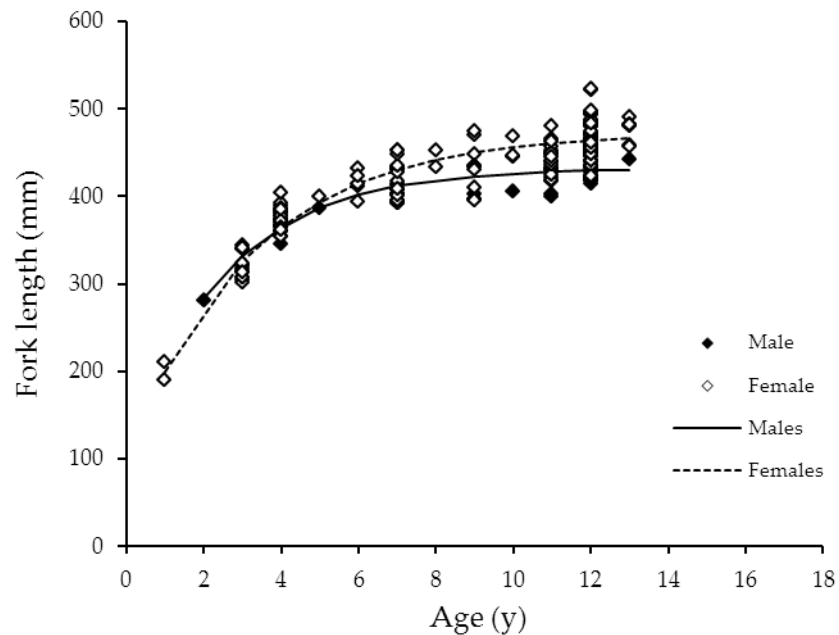


Figure 5. von Bertalanffy growth curves for male and female walleye captured from Pigeon Lake, Alberta, 2010. von Bertalanffy growth parameters; males: L_{∞} = 432, K = 0.39, t_0 = -0.7, n = 90; females: L_{∞} = 472, K = 0.31, t_0 = -0.77, n = 125.

Walleye from Pigeon Lake matured early, with males reaching maturity by age 4 and females by age 5 (Figures 6 and 7). Of the 215 walleye captured, 39% were mature males (n = 84) and 40% were mature females (n = 86).

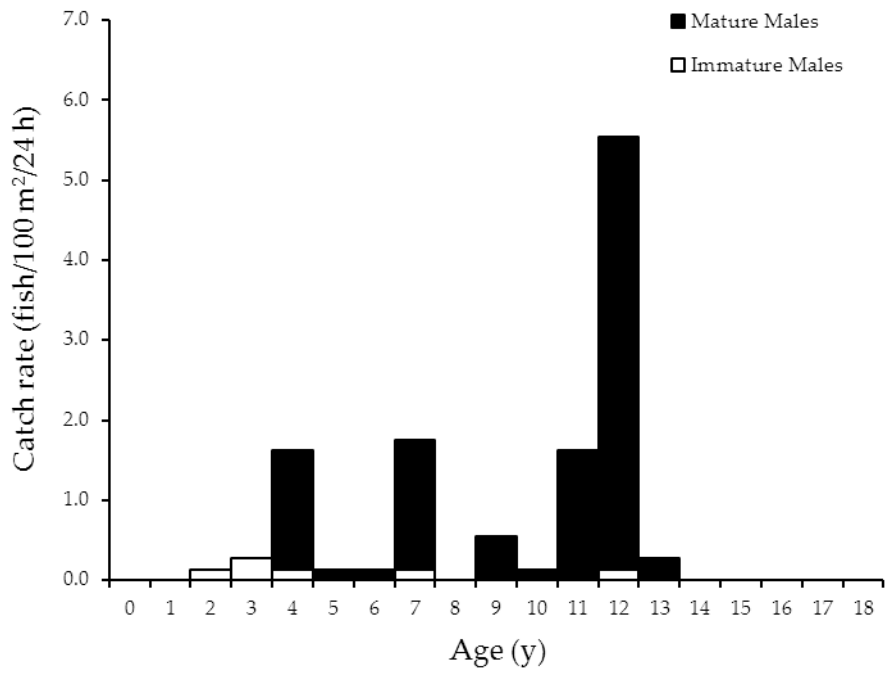


Figure 6. Age-at-maturity of male walleye from Pigeon Lake, Alberta, 2010 (n = 90).

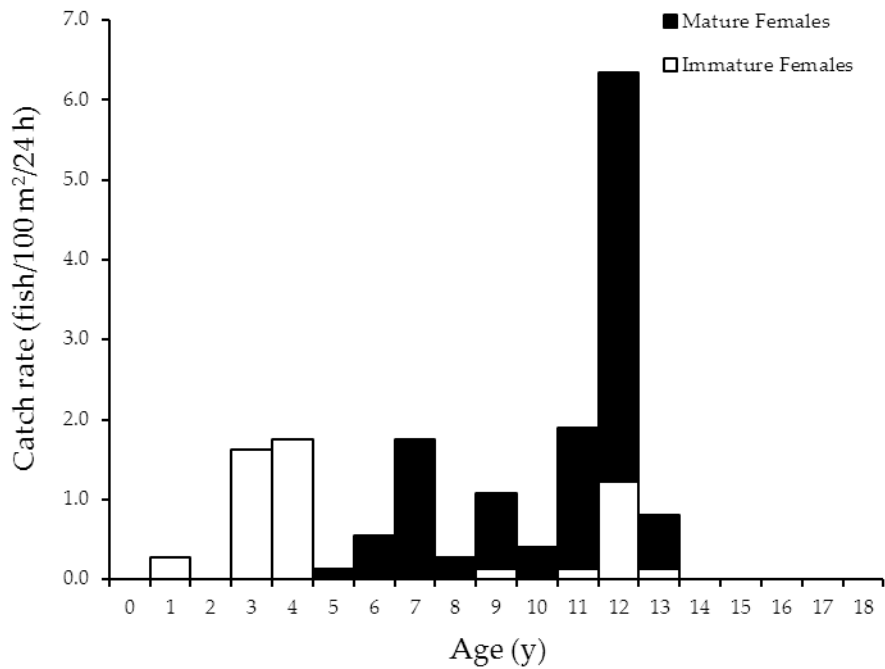


Figure 7. Age-at-maturity of female walleye from Pigeon Lake, Alberta, 2010 (n = 125).

4.2.2 Buck Lake

The size of walleye in Buck Lake ranged from 165 to 492 mm FL with the majority of the population (89%, n = 222) in the 300 to 450 mm FL size ranges (Figure 8); fish >500 mm FL were absent from the catch. Fish age ranged from 1 to 16 y, with a mean (\pm SE) age of 6.4 ± 0.2 y (n = 247) (Figure 9). The fishery was composed mainly of 4 y and 5 y age-classes, which made up 49% (n = 120) of the total catch. Other strong age-classes were 3, 7, 12, and 13 y. Walleye ages 8 - 11, and >13 y were poorly represented. Based on the AWMRP criteria, the walleye population in Buck Lake exhibits a wide (>8 age-classes) and stable (mean age 6 - 9 y) age-class distribution.

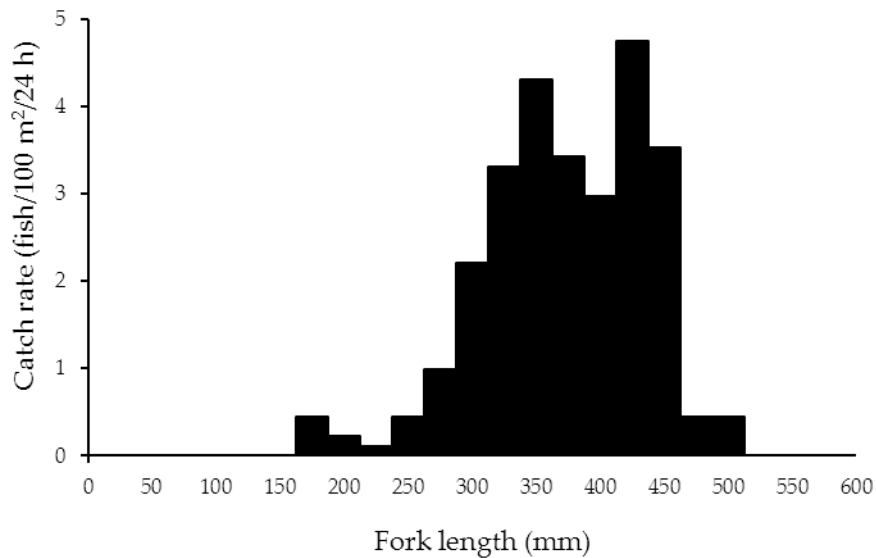


Figure 8. Length distribution of walleye captured from Buck Lake, Alberta, 2010. Mean (\pm SE) fork length of walleye was 361 ± 4 mm (n = 250).

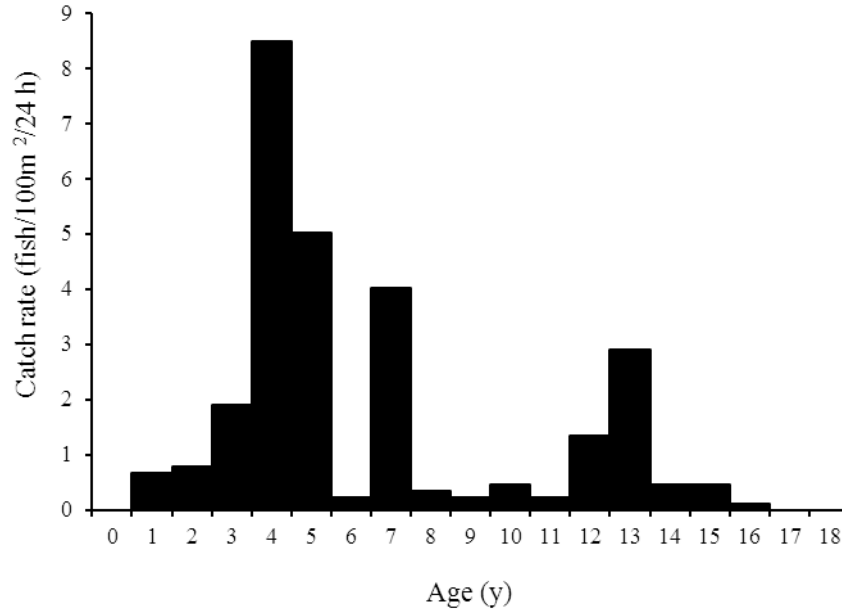


Figure 9. Age-class distribution of walleye captured from Buck Lake, Alberta, 2010. Mean (\pm SE) age of walleye was 6.4 ± 0.2 y ($n = 247$).

The walleye population in Buck Lake exhibited slow growth rates, with males growing at a slower rate than females (Figure 10). Estimated (von Bertalanffy growth model) average maximum size (L_{∞}) was 437 mm FL for males and 485 mm FL for females, with corresponding growth coefficients (K) of 0.33 and 0.27, respectively. Thus, based on these growth parameters, the average fish in Buck Lake does not attain the 500 mm FL AWMRP standard size.

Walleye from Buck Lake appeared to mature early, with males reaching maturity by age 5 and females by age 6 (Figures 11 and 12). Of the 251 walleye captured, 42% were mature males ($n = 106$) and 15% were mature females ($n = 38$).

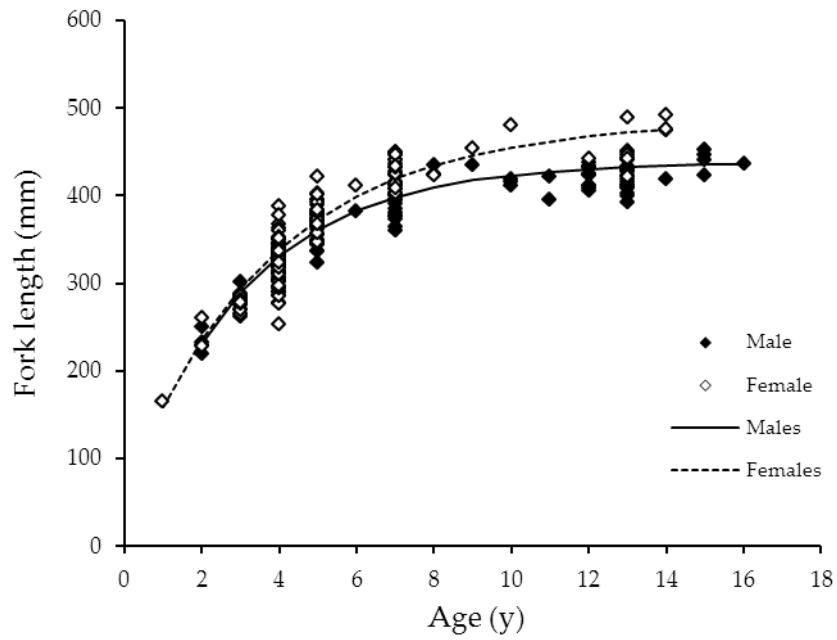


Figure 10. von Bertalanffy growth curves for male and female walleye captured from Buck Lake, Alberta, 2010. von Bertalanffy growth parameters; males: $L_{\infty} = 437$, $K = 0.33$, $t_0 = -0.27$, $n = 130$; females: $L_{\infty} = 485$, $K = 0.27$, $t_0 = -0.48$, $n = 110$.

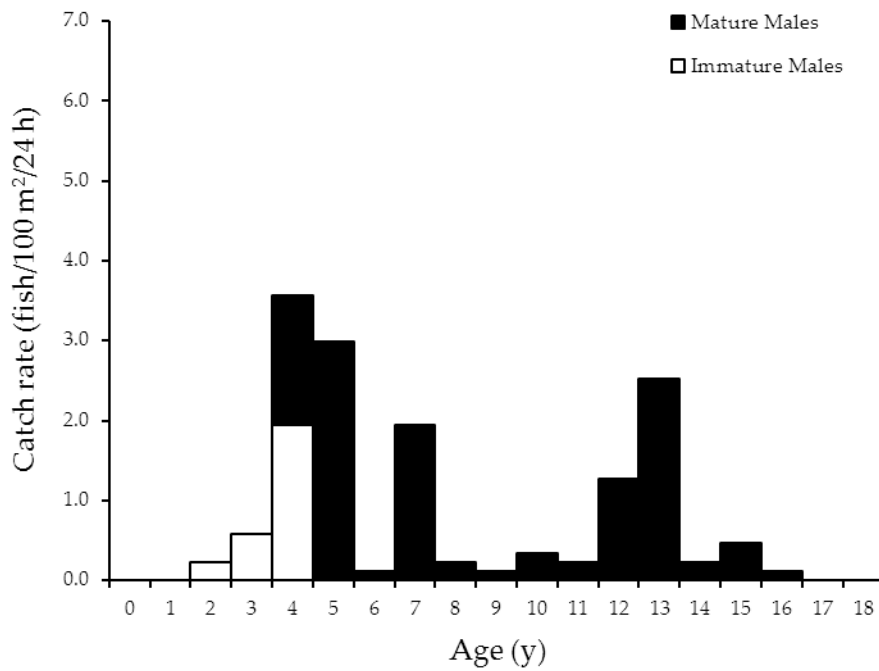


Figure 11. Age-at-maturity of male walleye from Buck Lake, Alberta, 2010 ($n = 130$).

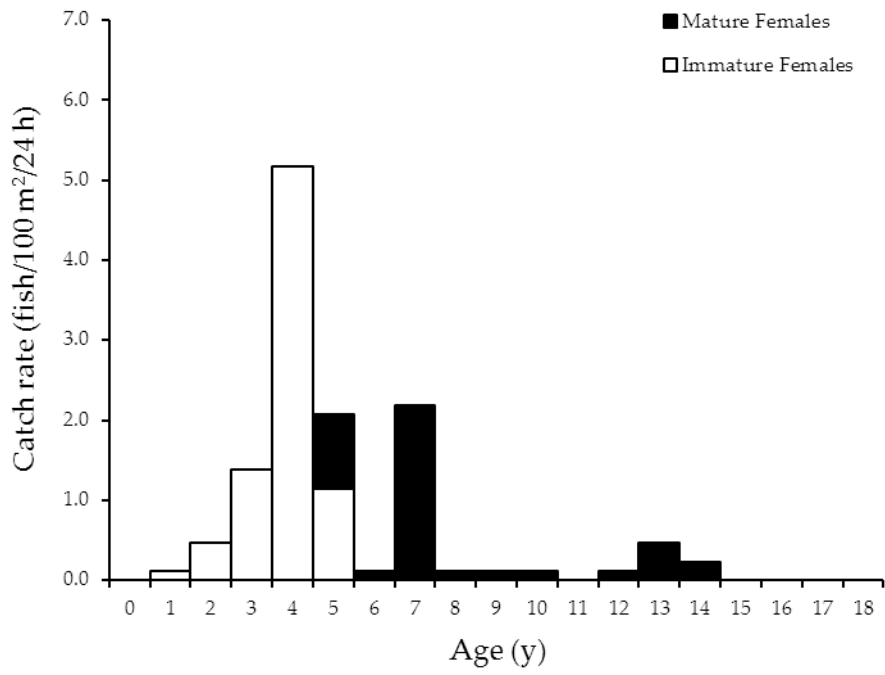


Figure 12. Age-at-maturity of female walleye from Buck Lake, Alberta, 2010 (n = 110).

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6.0 APPENDICES

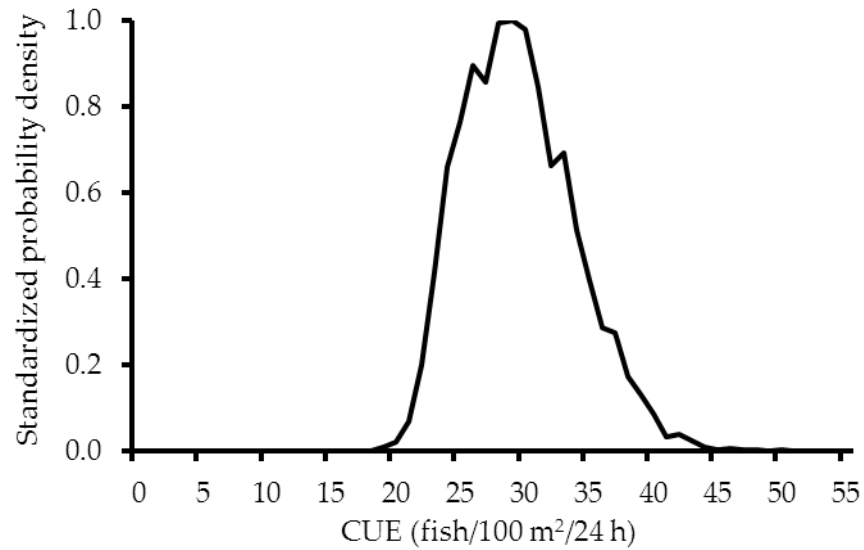
Appendix 1. Summary of gill net locations and set dates during the 2010 Fall Walleye Index Netting survey at Pigeon Lake, Alberta.

Set number	Depth strata	UTM Easting	UTM Northing	Net set date	Net pull date	Net soak time (h)
119B	Deep	699569	5874129	27-Sep-10	28-Sep-10	23.05
121B	Deep	701544	5874273	27-Sep-10	28-Sep-10	23.98
15A	Deep	694763	5883629	27-Sep-10	28-Sep-10	23.67
24C	Shallow	695864	5882334	27-Sep-10	28-Sep-10	22.40
33A	Deep	692409	5881524	28-Sep-10	29-Sep-10	23.08
64C	Deep	698597	5879534	28-Sep-10	29-Sep-10	23.25
73B	Deep	696661	5878817	28-Sep-10	29-Sep-10	23.43

Appendix 2. Summary of gill net locations and set dates during the 2010 Fall Walleye Index Netting survey at Buck Lake, Alberta.

Set number	Depth strata	UTM Easting	UTM Northing	Net set date	Net pull date	Net soak time (h)
12C	Shallow	651750	5874750	29-Sep-10	30-Sep-10	23.40
14B	Deep	648205	5874169	29-Sep-10	30-Sep-10	23.45
16A	Deep	649712	5874204	29-Sep-10	30-Sep-10	23.00
27D	Deep	651260	5871750	29-Sep-10	30-Sep-10	23.38
29C	Deep	650910	5870851	30-Sep-10	1-Oct-10	22.33
29D	Deep	650302	5870748	30-Sep-10	1-Oct-10	23.13
2D	Shallow	648252	5876661	30-Sep-10	1-Oct-10	23.75
37B	Shallow	650300	5869379	30-Sep-10	1-Oct-10	22.88
4C	Deep	647738	5875735	30-Sep-10	1-Oct-10	24.45

Appendix 3. Standardized probability density function of walleye catch rate from Pigeon Lake, Alberta, 2010. Catch-per-unit-effort (CUE) was 29.0 fish/100 m²/24 h (95% CI = 21.9 - 38.6, n = 7).



Appendix 4. Catch summary from the 2010 Fall Walleye Index Netting survey at Pigeon Lake, Alberta.

Set number	Walleye	Northern Pike	Yellow Perch	Lake Whitefish	Non-sport fish
119B	25	1	0	26	2
121B	27	0	2	21	2
15A	32	3	0	7	1
24C	56	0	0	17	2
33A	21	0	0	15	0
64C	35	2	2	11	0
73B	19	0	1	9	0

Appendix 5. Biological data collected from fish captured during the 2010 Fall Walleye Index Netting survey at Pigeon Lake, Alberta. Codes: M = male, F = female, U = unknown, WALL = walleye, NRPK = northern pike, YLPR = yellow perch, LKWH = lake whitefish, SPSH = spottail shiner, WHSC = white sucker.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	5	397	422	710	M	Mature	9
WALL	6	345	368	482	M	Mature	4
WALL	7	305	327	310	F	Immature	3
WALL	12	434	460	872	F	Mature	8
WALL	13	419	454	746	F	Mature	11
WALL	14	402	430	638	M	Mature	7
WALL	15	344	362	427	M	Immature	3
WALL	16	439	465	909	M	Mature	12
WALL	20	449	476	950	F	Mature	11
WALL	21	435	458	660	F	Immature	12
WALL	22	432	462	875	F	Mature	6
WALL	23	450	474	900	F	Immature	11
WALL	24	400	437	650	M	Mature	11
WALL	25	393	420	625	F	Immature	4
WALL	26	396	424	625	F	Immature	9
WALL	27	462	487	1000	F	Mature	11
WALL	28	340	364	425	F	Immature	3
WALL	29	466	490	975	F	Mature	12
WALL	30	457	482	950	F	Immature	12
WALL	31	395	422	700	F	Mature	7
WALL	35	473	512	916	F	Mature	12
WALL	36	485	510	1046	F	Mature	12
WALL	37	459	482	976	F	Mature	12
WALL	38	448	475	1002	F	Mature	9
WALL	39	457	488	847	F	Mature	13
WALL	55	395	420	700	M	Mature	7
WALL	60	486	517	1300	F	Mature	12
WALL	64	404	430	625	F	Immature	4
WALL	65	430	457	775	F	Mature	7
WALL	68	390	411	600	M	Mature	4

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	69	302	319	350	F	Immature	3
WALL	70	454	480	1000	F	Mature	12
WALL	71	433	462	875	F	Mature	7
WALL	72	381	402	600	M	Mature	4
WALL	73	470	500	1150	F	Mature	12
WALL	74	393	414	700	M	Mature	7
WALL	75	421	448	850	M	Mature	12
WALL	77	360	383	550	M	Mature	4
WALL	78	440	461	975	M	Mature	12
WALL	79	373	396	600	M	Mature	4
WALL	80	490	521	1100	F	Mature	13
WALL	81	450	475	900	F	Immature	12
WALL	82	446	469	850	M	Mature	12
WALL	83	430	456	850	F	Mature	7
WALL	84	445	471	950	F	Mature	10
WALL	85	435	457	850	F	Mature	9
WALL	86	417	446	800	F	Mature	7
WALL	88	445	475	1000	F	Mature	11
WALL	89	456	484	900	F	Mature	12
WALL	90	470	501	975	F	Mature	12
WALL	91	482	510	1250	F	Mature	12
WALL	97	522	548	1500	F	Mature	12
WALL	106	377	403	582	M	Mature	4
WALL	112	320	342	374	F	Immature	3
WALL	113	308	327	300	F	Immature	3
WALL	114	313	334	328	F	Immature	3
WALL	115	366	389	520	F	Immature	4
WALL	116	384	404	597	F	Immature	4
WALL	117	433	456	810	M	Mature	12
WALL	118	314	334	354	F	Immature	3

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	119	424	450	711	M	Mature	12
WALL	120	393	416	665	M	Mature	7
WALL	121	403	431	704	M	Mature	7
WALL	122	374	396	533	F	Immature	4
WALL	123	450	479	1003	M	Mature	12
WALL	124	437	467	818	M	Mature	12
WALL	125	460	487	804	F	Immature	12
WALL	126	413	435	756	M	Mature	7
WALL	127	317	336	335	M	Immature	3
WALL	128	371	394	578	M	Immature	4
WALL	129	447	476	1159	M	Mature	12
WALL	130	322	341	325	F	Immature	3
WALL	131	407	434	777	M	Immature	7
WALL	132	307	327	315	F	Immature	3
WALL	133	423	447	757	F	Immature	12
WALL	134	423	450	864	M	Mature	12
WALL	135	480	508	1017	F	Mature	13
WALL	136	392	416	636	M	Mature	7
WALL	137	434	462	822	M	Mature	12
WALL	138	439	463	953	M	Mature	11
WALL	139	445	476	911	M	Mature	12
WALL	141	453	483	1011	M	Mature	12
WALL	142	419	443	892	M	Mature	12
WALL	143	403	431	735	M	Mature	11
WALL	144	454	482	959	M	Mature	12
WALL	145	414	443	736	M	Immature	12
WALL	146	440	465	891	M	Mature	12
WALL	147	449	477	919	M	Mature	12
WALL	148	441	470	796	F	Mature	12
WALL	149	446	470	864	M	Mature	12

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	150	424	460	765	F	Mature	11
WALL	151	452	483	978	M	Mature	11
WALL	152	482	504	925	F	Mature	12
WALL	153	470	502	1050	F	Mature	12
WALL	154	459	486	1041	M	Mature	12
WALL	155	387	413	578	M	Mature	5
WALL	157	472	498	1038	F	Mature	12
WALL	158	422	466	900	M	Mature	12
WALL	159	450	478	966	F	Mature	12
WALL	160	434	459	832	M	Mature	12
WALL	161	457	484	935	F	Mature	11
WALL	162	448	475	910	F	Mature	11
WALL	163	435	465	911	M	Mature	9
WALL	164	496	522	1104	F	Mature	12
WALL	165	432	458	868	M	Mature	7
WALL	166	428	454	811	M	Mature	12
WALL	173	450	475	923	F	Mature	12
WALL	179	434	462	817	M	Mature	12
WALL	181	493	524	1063	F	Immature	12
WALL	183	421	448	769	M	Mature	11
WALL	185	417	438	740	M	Mature	12
WALL	186	341	363	406	F	Immature	3
WALL	187	360	382	378	M	Mature	4
WALL	188	482	517	1091	F	Mature	13
WALL	189	415	442	812	M	Mature	7
WALL	191	378	403	549	F	Mature	4
WALL	192	412	437	709	M	Mature	6
WALL	193	433	458	869	M	Mature	12
WALL	194	451	482	890	M	Mature	12
WALL	195	394	417	676	F	Mature	6

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	196	466	491	1023	M	Mature	11
WALL	197	467	495	1007	F	Mature	12
WALL	198	442	470	829	M	Mature	13
WALL	199	433	454	869	M	Mature	11
WALL	201	523	555	1815	F	Mature	12
WALL	202	482	508	1084	F	Mature	12
WALL	203	465	496	952	F	Mature	12
WALL	204	480	510	1074	F	Mature	11
WALL	205	367	391	554	M	Mature	4
WALL	206	428	452	810	F	Mature	7
WALL	207	435	461	894	M	Mature	12
WALL	208	481	509	1196	F	Mature	12
WALL	209	382	404	591	M	Mature	4
WALL	210	386	407	635	F	Immature	4
WALL	211	354	378	463	F	Immature	4
WALL	213	430	455	825	M	Mature	11
WALL	214	480	509	1200	F	Mature	12
WALL	215	405	429	800	M	Mature	10
WALL	217	430	456	900	M	Mature	11
WALL	218	470	508	1050	F	Immature	12
WALL	223	403	432	757	F	Mature	7
WALL	224	482	509	899	F	Immature	13
WALL	225	401	424	685	F	Mature	7
WALL	229	450	478	921	F	Mature	11
WALL	230	452	478	975	F	Mature	7
WALL	231	401	424	698	M	Mature	7
WALL	232	462	490	1015	F	Mature	11
WALL	233	354	380	448	F	Immature	4
WALL	234	409	440	740	F	Mature	7
WALL	235	480	506	980	F	Immature	12

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	236	372	396	509	F	Immature	4
WALL	237	493	522	978	F	Immature	12
WALL	242	452	475	977	F	Mature	8
WALL	243	482	511	1103	F	Mature	13
WALL	244	459	486	1077	F	Mature	12
WALL	245	397	423	754	M	Mature	9
WALL	246	428	455	884	M	Mature	11
WALL	247	468	498	1042	F	Mature	10
WALL	251	434	460	936	F	Mature	9
WALL	253	210	224	90	F	Immature	1
WALL	254	190	214	74	F	Immature	1
WALL	256	458	494	1000	M	Mature	12
WALL	257	434	471	925	M	Mature	12
WALL	258	410	437	975	F	Mature	9
WALL	259	281	300	250	M	Immature	2
WALL	260	464	487	775	F	Mature	12
WALL	261	436	460	800	F	Mature	11
WALL	262	400	420	675	F	Mature	5
WALL	264	324	347	350	F	Immature	3
WALL	265	422	449	850	M	Mature	12
WALL	266	432	458	800	M	Mature	11
WALL	267	460	491	950	F	Mature	12
WALL	268	433	458	825	M	Mature	12
WALL	269	480	503	1200	F	Mature	12
WALL	270	466	493	1050	F	Mature	12
WALL	271	419	441	850	M	Mature	12
WALL	273	365	389	525	F	Immature	4
WALL	274	385	408	650	F	Immature	4
WALL	275	448	475	875	F	Mature	12
WALL	276	446	470	925	F	Mature	10

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	277	417	444	800	M	Mature	11
WALL	278	415	441	700	F	Mature	6
WALL	279	441	466	975	M	Mature	12
WALL	280	435	463	925	F	Mature	7
WALL	281	455	478	850	M	Mature	12
WALL	285	420	450	750	M	Mature	12
WALL	286	431	457	900	F	Mature	9
WALL	287	464	489	925	F	Mature	12
WALL	288	487	516	1100	F	Mature	12
WALL	289	455	481	900	F	Mature	12
WALL	290	440	473	900	F	Mature	11
WALL	291	458	486	975	M	Mature	12
WALL	292	495	522	1125	F	Mature	12
WALL	294	429	452	850	M	Mature	12
WALL	302	362	385	529	F	Immature	4
WALL	303	402	429	652	M	Mature	7
WALL	304	434	465	864	M	Mature	12
WALL	305	474	505	1066	F	Mature	12
WALL	306	375	403	583	M	Mature	4
WALL	307	368	392	562	M	Mature	4
WALL	308	402	432	687	M	Mature	9
WALL	309	448	478	930	F	Mature	7
WALL	311	313	331	304	F	Immature	3
WALL	312	445	472	1038	F	Mature	11
WALL	313	423	450	890	F	Mature	6
WALL	314	470	497	952	F	Mature	9
WALL	315	483	511	1078	F	Mature	12
WALL	318	452	476	1040	F	Mature	7
WALL	319	475	500	1033	F	Mature	9
WALL	320	458	488	978	M	Mature	13

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	321	408	435	750	M	Mature	7
WALL	325	461	487	742	F	Mature	12
WALL	326	457	482	873	M	Mature	12
WALL	327	460	487	1010	M	Mature	12
WALL	328	498	527	1253	F	Mature	12
NRPK	45	919	963	6525	F	Mature	10
NRPK	184	596	632	1520	F	Mature	4
NRPK	200	562	602	1291	M	Mature	4
NRPK	219	770	817	3575	F	Mature	7
NRPK	282	642	682	1775	F	Mature	6
NRPK	283	544	576	1175	F	Mature	3
YLPR	56		125	20	M	Mature	
YLPR	57		126	20	F	Immature	
YLPR	228	192	202	98	F	Mature	
YLPR	252	110	117	20	M	Mature	
YLPR	255	179	186	69	F	Mature	
LKWH	1	452	507	1612	F	Mature	
LKWH	3	475	529	1650	M	Mature	
LKWH	4	464	515	1650	M	Mature	
LKWH	8	466	522	1519	M	Mature	
LKWH	9	460	512	1661	M	Mature	
LKWH	10	461	518	1592	M	Mature	
LKWH	11	444	501	1627	F	Mature	
LKWH	17	440	489	1118	M	Mature	
LKWH	18	491	551	1883	M	Mature	
LKWH	19	492	552	1901	M	Mature	
LKWH	32	470	520	1650	M	Mature	
LKWH	33	385	444	1000	M	Mature	
LKWH	34	470	523	1600	M	Mature	
LKWH	40	423	474	1225	M	Mature	

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
LKWH	41	469	525	1728	F	Mature	
LKWH	42	495	549	1736	F	Mature	
LKWH	43	465	524	1734	M	Mature	
LKWH	44	438	479	1816	M	Mature	
LKWH	46	497	550	1500	M	Mature	
LKWH	47	459	507	1500	M	Mature	
LKWH	48	496	542	1600	M	Mature	
LKWH	49	500	560	2000	F	Mature	
LKWH	51	480	536	1785	M	Mature	
LKWH	52	468	523	1532	M	Mature	
LKWH	53	508	559	1764	M	Mature	
LKWH	54	476	533	1758	M	Mature	
LKWH	61	459	510	1150	M	Mature	
LKWH	62	457	505	1525	M	Mature	
LKWH	63	448	498	1550	M	Mature	
LKWH	66	440	496	1450	M	Mature	
LKWH	67	480	540	1650	M	Mature	
LKWH	76	465	518	1650	M	Mature	
LKWH	87	485	550	1900	F	Mature	
LKWH	92	476	523	1900	M	Mature	
LKWH	93	432	483	1450	F	Mature	
LKWH	94	458	517	1900	F	Mature	
LKWH	95	479	534	1750	M	Mature	
LKWH	96	468	523	1600	F	Mature	
LKWH	98	474	531	1650	M	Mature	
LKWH	99	437	495	1450	F	Mature	
LKWH	100	478	534	1300	M	Mature	
LKWH	101	485	543	1800	M	Mature	
LKWH	102	450	497	1600	F	Mature	
LKWH	103	483	548	1800	M	Mature	

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
LKWH	104	500	557	1900	M	Mature	
LKWH	105	430	487	1400	M	Mature	
LKWH	107	491	542	1730	M	Mature	
LKWH	108	467	519	1683	M	Mature	
LKWH	109	485	538	1705	M	Mature	
LKWH	110	467	522	1531	M	Mature	
LKWH	140	476	535	1607	M	Mature	
LKWH	156	344	389	585	M	Immature	
LKWH	167	498	553	1782	M	Mature	
LKWH	168	473	524	1631	M	Mature	
LKWH	169	462	518	1432	M	Mature	
LKWH	170	462	526	1709	F	Mature	
LKWH	171	486	545	1869	M	Mature	
LKWH	174	459	516	1608	F	Mature	
LKWH	175	473	535	1677	M	Mature	
LKWH	176	434	493	1219	M	Mature	
LKWH	177	460	514	1745	M	Mature	
LKWH	178	463	518	1845	F	Mature	
LKWH	180	509	574	1937	M	Mature	
LKWH	182	485	542	1810	M	Mature	
LKWH	190	439	481	1315	M	Mature	
LKWH	212	458	513		F	Mature	
LKWH	216	470	527	1750	M	Mature	
LKWH	220	472	530	1625	M	Mature	
LKWH	221	495	557	1925	M	Mature	
LKWH	222	496	546	1700	M	Mature	
LKWH	226	468	521	1641	M	Mature	
LKWH	227	474	532	1774	M	Mature	
LKWH	238	467	509	1600	M	Mature	
LKWH	239	469	531	1773	F	Mature	

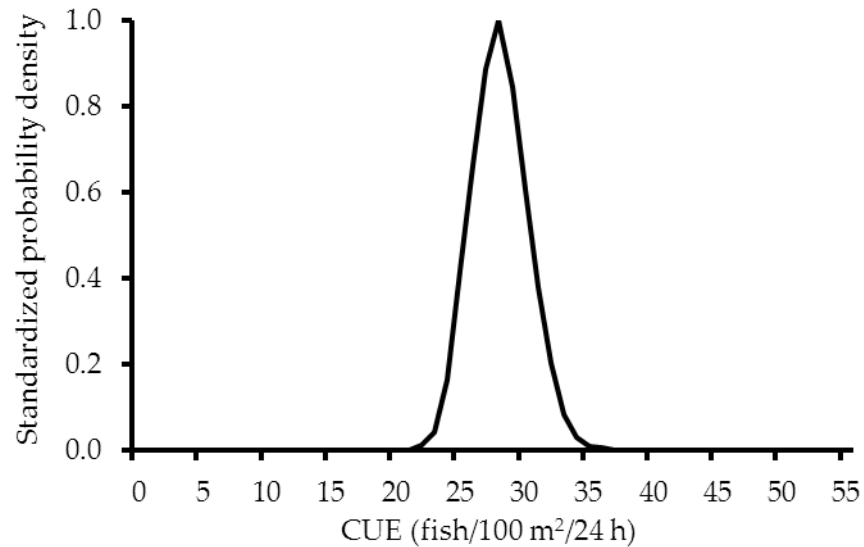
Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
LKWH	240	451	500	1653	M	Mature	
LKWH	241	474	527	1744	M	Mature	
LKWH	248	478	530	1742	M	Mature	
LKWH	249	462	517	1427	M	Mature	
LKWH	250	492	547	1668	M	Mature	
LKWH	263	465	509	1475	M	Mature	
LKWH	272	455	506	1275	M	Mature	
LKWH	284	298	330	400	F	Mature	
LKWH	293	473	525	1400	M	Mature	
LKWH	295	487	543	1900	F	Mature	
LKWH	296	468	520	1750	F	Mature	
LKWH	297	475	553	1500	F	Mature	
LKWH	298	458	511	1700	M	Mature	
LKWH	299	481	539	1875	M	Mature	
LKWH	300	481	532	1800	F	Mature	
LKWH	301	481	543	1775	M	Mature	
LKWH	310	456	506	1596	M	Mature	
LKWH	316	472	525	1574	M	Mature	
LKWH	317	443	497	1390	F	Mature	
LKWH	322	486	543	1617	M	Mature	
LKWH	323	485	544	2028	M	Mature	
LKWH	324	452	500	1541	M	Mature	
LKWH	329	426	476	1260	M	Mature	
LKWH	330	452	505	1537	M	Mature	
LKWH	331	431	483	1409	M	Mature	
LKWH	332	463	517	796	F	Mature	
LKWH	333	504	564	1967	F	Mature	
LKWH	334	456	510	1576	M	Mature	
LKWH	335	455	495	1731	F	Mature	
LKWH	336	502	565	1885	M	Mature	

Appendix 5. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
LKWH	337	481	546	1697	M	Mature	
SPSH	2	99	110	12	U	Undetermined	
SPSH	58		112	12	U	Undetermined	
SPSH	59		107	10	U	Undetermined	
SPSH	111	103	113	14	U	Undetermined	
WHSC	50	496	520	1650	U	Undetermined	
WHSC	172	507	542	1843	U	Undetermined	

Appendix 6. Standardized probability density function of walleye catch rate from Buck Lake, Alberta, 2010. Catch-per-unit-effort (CUE) was 27.6 fish/100 m²/24 h (95% CI = 23.6 – 32.0, n = 9).



Appendix 7. Catch summary from the 2010 Fall Walleye Index Netting survey at Buck Lake, Alberta.

Set number	Walleye	Northern Pike	Yellow Perch	Lake Whitefish	Non-sport fish
12C	19	1	0	4	0
14B	24	2	6	1	1
16A	26	9	17	0	0
27D	32	9	3	0	1
29C	42	1	3	0	1
29D	24	4	4	1	1
2D	36	8	3	2	1
37B	24	4	0	2	0
4C	24	6	6	0	0

Appendix 8. Biological data collected from fish captured during the 2010 Fall Walleye Index Netting survey at Buck Lake, Alberta. Codes: M = male, F = female, U = unknown, WALL = walleye, NRPK = northern pike, YLPR = yellow perch, LKWH = lake whitefish, SPSH = spottail shiner, WHSC = white sucker.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	1	423	447	800	M	Mature	7
WALL	2	293	313	262	F	Immature	
WALL	3	253	273	165	F	Immature	4
WALL	4	304	325	305	M	Immature	4
WALL	5	304	325	305	F	Immature	4
WALL	6	336	361	377	M	Mature	5
WALL	7	368	390	514	F	Immature	5
WALL	8	423	449	800	M	Mature	13
WALL	9	332	353	388	F	Immature	4
WALL	10	366	392	600	M	Mature	5
WALL	11	489	521	1172	F	Mature	13
WALL	12	323	345	341	F	Immature	4
WALL	13	373	396	560	F	Immature	5
WALL	14	378	401	574	M	Mature	7
WALL	15	476	503	1102	F	Mature	14
WALL	16	341	363	449	M	Mature	4
WALL	17	345	370	417	M	Immature	4
WALL	18	375	402	584	F	Immature	5
WALL	19	323	345	315	F	Immature	4
WALL	25	396	421	674	M	Mature	7
WALL	26	453	480	922	M	Mature	15
WALL	27	220	234	104	M	Immature	2
WALL	31	399	425	728	M	Mature	13
WALL	32	327	350	361	F	Immature	4
WALL	41	406	429	738	M	Mature	12
WALL	42	365	386	538	M	Mature	7
WALL	43	356	380	473	M	Mature	5
WALL	44	371	395	583	F	Immature	5
WALL	45	350	378	449	F	Immature	4
WALL	46	291	306	238	F	Immature	4

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	47	312	335	324	F	Immature	4
WALL	48	284	303	224	F	Immature	3
WALL	53	374	398	558	M	Mature	5
WALL	54	480	510	1160	F	Mature	10
WALL	55	325	347	388	M	Mature	4
WALL	56	422	454	817	F	Mature	13
WALL	57	388	409	570	F	Immature	4
WALL	58	435	463	863	M	Mature	8
WALL	59	373	398	532	M	Mature	5
WALL	71	492	521	1251	F	Mature	14
WALL	72	411	435	760	M	Mature	10
WALL	73	432	458	876	M	Mature	13
WALL	74	408	434	850	M	Mature	13
WALL	75	440	465	901	F	Mature	7
WALL	76	431	459	861	M	Mature	13
WALL	78	179	192	51	U	Immature	1
WALL	79	173	187	46	U	Immature	1
WALL	80	170	181	42	U	Immature	1
WALL	81	165	175	38	F	Immature	1
WALL	82	320	343	363	F	Immature	4
WALL	83	322	345	343	F	Immature	4
WALL	84	367	393	526	F	Immature	4
WALL	85	364	391	558	M	Mature	5
WALL	86	402	428	721	F	Mature	5
WALL	87	412	438	786	M	Mature	13
WALL	88	451	478	954	M	Mature	13
WALL	89	348	369	423	M	Mature	5
WALL	90	416	444	837	F	Mature	7
WALL	92	381	406	587	M	Mature	5
WALL	93	308	332	293	F	Immature	4

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	94	336	357	396	M	Mature	4
WALL	95	355	377	510	M	Mature	5
WALL	96	395	421	742	F	Mature	5
WALL	101	374	398	553	M	Mature	5
WALL	102	396	424	593	M	Mature	7
WALL	103	327	350	384	F	Immature	4
WALL	104	413	443	818	M	Mature	13
WALL	105	454	481	951	F	Mature	9
WALL	109	429	458	820	M	Mature	13
WALL	112	290	309	257	F	Immature	4
WALL	113	276	295	220	F	Immature	4
WALL	114	408	436	804	M	Mature	12
WALL	117	416	443	875	M	Mature	13
WALL	118	416	444	761	M	Mature	10
WALL	119	418	452	793	M	Mature	10
WALL	120	401	430	775	F	Mature	7
WALL	121	320	352	400	F	Immature	4
WALL	122	332	353	358	F	Immature	4
WALL	123	322	341	329	F	Immature	4
WALL	124	334	361	394	F	Immature	4
WALL	125	233	249	133	F	Immature	2
WALL	126	262	279	168	F	Immature	3
WALL	127	423	450	838	M	Mature	15
WALL	128	412	440	800	F	Mature	7
WALL	129	356	381	527	F	Mature	5
WALL	130	382	405	625	M	Mature	6
WALL	131	320	342	338	M	Immature	4
WALL	132	278	301	229	M	Immature	4
WALL	137	285	308	279	F	Immature	4
WALL	138	338	360	383	F	Immature	4

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	139	425	455	822	M	Mature	8
WALL	140	380	406	559	M	Mature	7
WALL	141	400	425	690	M	Mature	7
WALL	142	393	418	709	M	Mature	13
WALL	143	410	436	753	M	Mature	13
WALL	144	332	355	378	M	Immature	4
WALL	150	413	442	786	F	Mature	7
WALL	151	415	442	826	F	Mature	7
WALL	152	474	503	1112	M	Mature	14
WALL	153	440	466	899	M	Mature	13
WALL	155	250	266	159	M	Immature	2
WALL	156	282	298	223	M	Immature	3
WALL	157	319	339	346	F	Immature	4
WALL	158	421	449	812	F	Mature	5
WALL	159	376	400	552	M	Mature	7
WALL	160	403	429	683	M	Mature	7
WALL	161	437	462	898	F	Mature	7
WALL	162	450	478	901	F	Mature	7
WALL	163	382	406	588	F	Immature	5
WALL	164	377	400	572	F	Mature	5
WALL	165	320	336	310	M	Mature	4
WALL	166	301	320	263	M	Immature	3
WALL	167	287	306	226	M	Immature	3
WALL	168	286	306	227	F	Immature	3
WALL	169	281	300	218	F	Immature	3
WALL	173	341	361	400	M	Immature	4
WALL	174	424	450	820	F	Mature	7
WALL	175	329	349	369	M	Immature	4
WALL	176	373	397	528	F	Immature	5
WALL	177	346	370	413	M	Mature	4

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	178	370	396	529	M	Mature	5
WALL	179	433	454	892	M	Mature	12
WALL	180	423	450	855	F	Mature	8
WALL	181	447	472	891	F	Mature	13
WALL	188	334	358	365	M	Immature	4
WALL	189	447	473	1009	F	Mature	7
WALL	190	440	465	949	M	Mature	15
WALL	191	390	412	636	M	Mature	5
WALL	192	301	321	267	F	Immature	4
WALL	193	277	295	203	F	Immature	3
WALL	194	296	317	263	M	Immature	4
WALL	195	253	269	140	U	Immature	2
WALL	197	288	306	246	M	Immature	3
WALL	198	434	462	882	M	Mature	12
WALL	199	321	343	331	M	Immature	4
WALL	200	287	306	244	M	Immature	4
WALL	201	321	342	323	F	Immature	4
WALL	202	436	452	836	M	Mature	16
WALL	203	418	443	799	M	Mature	14
WALL	208	402	428	646	F	Mature	7
WALL	209	330	350	397	M	Mature	4
WALL	210	330	352	360	F	Immature	4
WALL	211	345	367	370	M	Mature	5
WALL	212	391	417	823	M	Mature	7
WALL	213	396	425	681	M	Immature	11
WALL	214	381	406	824	F	Immature	5
WALL	221	428	453	840	M	Mature	13
WALL	222	423	452	867	M	Mature	12
WALL	225	442	465	929	F	Mature	12
WALL	226	172	185	45	U	Undetermined	1

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	227	229	245	114	F	Immature	2
WALL	228	228	244	114	F	Immature	2
WALL	229	183	196	51	U	Undetermined	1
WALL	230	357	382	546	U	Undetermined	5
WALL	231	336	362	400	F	Immature	4
WALL	232	432	461	878	M	Mature	12
WALL	233	340	361	432	F	Immature	4
WALL	234	345	367	427	M	Mature	4
WALL	235	363	390	490	F	Immature	4
WALL	236	275	295	231	F	Immature	3
WALL	237	270	286	192	F	Immature	3
WALL	239	433	457	886	M	Mature	13
WALL	240	408	434	741	F	Mature	7
WALL	241	362	381	506	M	Mature	5
WALL	242	372	397	522	M	Mature	
WALL	243	383	407	586	M	Mature	5
WALL	244	303	324	274	M	Immature	4
WALL	245	310	332	328	F	Immature	4
WALL	247	444	472	1025	M	Mature	13
WALL	248	305	325	310	M	Mature	4
WALL	249	438	445	831	M	Mature	12
WALL	250	360	385	600	M	Mature	7
WALL	251	392	417	636	F	Mature	5
WALL	252	449	475	977	M	Mature	13
WALL	253	365	390	536	M	Mature	5
WALL	254	345	370	455	M	Mature	4
WALL	255	412	438	662	F	Mature	6
WALL	256	407	434	748	M	Mature	7
WALL	257	427	456	835	F	Mature	7
WALL	263	418	443	853	M	Mature	13

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	264	421	449	824	M	Mature	11
WALL	265	378	402	566	M	Mature	5
WALL	269	424	450	842	M	Mature	12
WALL	270	435	463	861	M	Mature	9
WALL	274	315	337	358	M	Mature	4
WALL	275	334	357	420	M	Mature	4
WALL	276	334	360	457	F	Immature	4
WALL	278	350	372	449	M	Mature	4
WALL	279	379	401	588	M	Mature	5
WALL	280	377	400	535	F	Immature	4
WALL	281	350	373	500	M	Mature	5
WALL	282	337	360	447	M	Mature	5
WALL	283	335	358	404	M	Immature	4
WALL	284	279	297	221	F	Immature	3
WALL	285	383	409	366	F	Mature	5
WALL	286	344	367	463	M	Mature	5
WALL	287	372	405	578	M	Mature	5
WALL	288	347	368	458	F	Immature	5
WALL	289	340	363	426	F	Immature	4
WALL	290	411	438	787	M	Mature	13
WALL	291	350	372	432	M	Mature	4
WALL	294	395	422	721	M	Mature	5
WALL	295	430	458	910	M	Mature	13
WALL	296	360	383	461	F	Immature	4
WALL	297	357	380	510	F	Immature	5
WALL	298	344	367	397	M	Immature	4
WALL	299	353	374	421	F	Immature	4
WALL	300	323	342	360	M	Mature	5
WALL	304	425	451	817	M	Mature	12
WALL	305	402	430	712	M	Mature	13

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	307	320	341	335	M	Immature	4
WALL	308	318	336	319	F	Immature	4
WALL	309	261	279	181	F	Immature	2
WALL	310	265	285	184	F	Immature	3
WALL	311	313	335	315	M	Immature	4
WALL	312	337	361	387	F	Immature	
WALL	313	368	392	521	F	Immature	5
WALL	314	269	285	203	F	Immature	3
WALL	315	294	315	363	F	Immature	4
WALL	316	297	316	269	F	Immature	4
WALL	317	323	345	352	M	Immature	4
WALL	318	265	276	198	M	Immature	3
WALL	320	331	354	378	M	Mature	4
WALL	321	442	470	911	F	Mature	13
WALL	322	441	473	957	F	Mature	7
WALL	323	310	332	304	F	Immature	4
WALL	324	336	361	412	F	Immature	4
WALL	325	277	295	209	F	Immature	3
WALL	326	385	412	644	M	Mature	7
WALL	327	352	377	435	F	Immature	4
WALL	328	370	391	548	M	Mature	5
WALL	329	336	327	287	F	Immature	4
WALL	330	425	453	815	F	Mature	7
WALL	331	317	340	319	F	Immature	4
WALL	332	401	427	662	F	Mature	5
WALL	333	403	429	763	M	Mature	7
WALL	334	278	297	217	F	Immature	3
WALL	338	432	458	842	F	Mature	7
WALL	339	401	425	681	M	Mature	7
WALL	340	373	399	951	M	Mature	7

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
WALL	341	366	388	510	M	Mature	5
WALL	342	412	435	699	M	Mature	12
WALL	343	395	420	671	M	Mature	7
WALL	344	324	344	358	F	Immature	4
WALL	345	450	480	917	F	Mature	7
WALL	346	447	476	911	F	Mature	7
WALL	347	434	463	921	F	Mature	7
WALL	348	412	439	906	M	Mature	12
WALL	349	446	472	921	M	Mature	15
WALL	350	428	451	859	M	Mature	13
NRPK	23	663	696	1875	F	Mature	7
NRPK	29	550	582	1042	F	Mature	4
NRPK	30	610	647	1684	F	Mature	4
NRPK	38	549	586	950	F	Mature	4
NRPK	39	517	555	990	F	Mature	3
NRPK	40	427	456	493	F	Mature	2
NRPK	67	582	614	1120	F	Mature	4
NRPK	68	593	628	1235	F	Mature	4
NRPK	69	556	586	1064	F	Mature	3
NRPK	70	564	602	1078	F	Mature	3
NRPK	107	497	530	812	M	Mature	4
NRPK	108	626	660	1646	F	Mature	5
NRPK	116	544	576	962	F	Mature	3
NRPK	134	573	607	1098	F	Mature	5
NRPK	135	656	697	2075	F	Mature	5
NRPK	136	589	629	1525	F	Mature	5
NRPK	145	544	579	1056	F	Mature	5
NRPK	146	505	535	781	M	Mature	3
NRPK	147	495	527	862	M	Mature	3
NRPK	148	494	522	770	M	Mature	3

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
NRPK	149	552	588	968	M	Mature	4
NRPK	172	445	477	607	F	Mature	2
NRPK	183	524	558	933	M	Mature	4
NRPK	184	700	741	2500	F	Mature	7
NRPK	187	665	700	1923	F	Mature	10
NRPK	206	596	635	1454	F	Mature	5
NRPK	207	479	507	815	M	Mature	3
NRPK	218	643	681	1592	F	Mature	6
NRPK	219	465	497	726	M	Mature	3
NRPK	220	470	503	700	F	Mature	3
NRPK	223	472	504	751	F	Mature	2
NRPK	238	600	633	1245	F	Mature	4
NRPK	259	470	507	840	M	Mature	3
NRPK	260	576	614	1119	M	Mature	5
NRPK	261	481	513	794	M	Mature	3
NRPK	262	605	645	1521	F	Mature	4
NRPK	266	560	597	1289	F	Mature	4
NRPK	267	662	697	1785	F	Mature	7
NRPK	268	646	682	1161	F	Mature	6
NRPK	277	436	465	591	M	Mature	2
NRPK	292	420	450	501	F	Mature	2
NRPK	293	552	583	1118	M	Mature	5
NRPK	301	470	490	752	F	Mature	2
NRPK	337	532	568	987	F	Mature	3
YLPR	28	139	148	38	F	Immature	
YLPR	33	261	273	273	F	Mature	
YLPR	34	242	254	230	F	Mature	
YLPR	35	255	267	249	F	Mature	
YLPR	36	247	263	277	M	Mature	
YLPR	37	171	179	73	F	Immature	

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
YLPR	49	220	230	157	M	Mature	
YLPR	50	240	250	239	M	Mature	
YLPR	51	243	256	235	M	Mature	
YLPR	52	240	251	204	M	Mature	
YLPR	60	266	279	283	M	Mature	
YLPR	61	262	275	294	M	Mature	
YLPR	62	267	282	283	F	Mature	
YLPR	63	246	258	249	M	Mature	
YLPR	64	262	277	302	F	Mature	
YLPR	65	285	298	358	F	Mature	
YLPR	66	263	274	288	F	Mature	
YLPR	91	237	249	215	M	Mature	
YLPR	97	209	218	156	M	Mature	
YLPR	98	230	243	163	M	Mature	
YLPR	99	237	250	190	M	Mature	
YLPR	100	243	255	223	F	Mature	
YLPR	106	249	262	241	M	Mature	
YLPR	111	105	110	12	F	Immature	
YLPR	115	152	172	53	F	Immature	
YLPR	133	255	267	277	M	Mature	
YLPR	154	235	247	178	F	Immature	
YLPR	170	235	247	179	F	Immature	
YLPR	171	216	226	149	M	Mature	
YLPR	182	275	286	303	F	Mature	
YLPR	196	239	250	222	M	Mature	
YLPR	204	245	256	213	M	Mature	
YLPR	205	237	248	215	M	Mature	
YLPR	215	211	220	258	F	Mature	
YLPR	216	255	265	254	F	Mature	
YLPR	217	247	257	251	M	Mature	

Appendix 8. Continued.

Species	Sample number	Fork length (mm)	Total length (mm)	Weight (g)	Sex	Maturity	Age (y)
YLPR	224	96	102	11	U	Undetermined	
YLPR	246	311	324	469	M	Mature	
YLPR	258	253	265	239	F	Mature	
YLPR	319	256	267	236	F	Mature	
YLPR	335	250	261	237	M	Mature	
YLPR	336	260	289	241	F	Mature	
LKWH	20	336	380	571	M	Immature	
LKWH	21	386	440	900	M	Mature	
LKWH	22	463	518	1536	F	Mature	
LKWH	24	567	628	2434	F	Mature	
LKWH	110	523	592	2016	M	Mature	
LKWH	185	365	414	688	M	Immature	
LKWH	271	486	543	1952	M	Mature	
LKWH	273	520	583	2702	M	Mature	
LKWH	302	480	533	1832	F	Mature	
LKWH	303	542	591	2411	M	Mature	
SPSH	77	91	100	9	U	Undetermined	
SPSH	306	85	96	11	U	Undetermined	
WHSC	186	436	467	1269	U	Undetermined	
WHSC	272	510	544	1831	U	Undetermined	

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Government of Alberta ■
Sustainable Resource Development

