Sherburne Lake Fall Walleye Index Netting (FWIN) Survey 2011

Fisheries Management

July, 2012

Sherburne Lake Fall Walleye (*Sander vitreus*) Index Netting Survey, 2011

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ABSTRACT

The 2011 FWIN Survey of Sherburne Lake was conducted from September 19, 2011 to September 22, 2011. The objectives of this survey included estimation of the catch per unit effort and a variety of population demographics such as age, growth rate, and reproductive status in order to monitor the effects of management and ensure the stability and sustainability of the Walleye population at this location. In total 210 Walleye were caught in 2011, corresponding to a catch per unit effort of 16.3 Walleye/100m^2/24h (95% CI: 10.8 – 22.4 Walleye/100m^2/24h, n=12). The average fork length for this species was 408 mm (range: 120 mm to 675 mm), while weight ranged from 17 g to 3749 g, with an average of 85 g. Walleye sampled in 2011 had reached 500 mm in total length by age 5, and the mean age for this species was 4.8 years. A broad range of ages were represented in the FWIN Walleye sample for 2011, ranging from young of the year (age 0) to fish 22 years of age. Fish aged 4 and 5 years predominated, however. Both genders had attained maturity by age 6, and mature spawning female Walleye could be distinguished from immature fish by a gonadosomatic index exceeding 1.25 %. The growth observed for Walleye from Sherburne Lake can be characterized as "normal" for the species (i.e. exhibiting and asymptotic pattern, with female fish growing progressively more rapidly than males following maturity). As a result the Walleye population in Sherburne Lake can be classified as vulnerable in 2011 under the criteria established under *Alberta's Walleye Management and Recovery Plan* (Berry 1995).

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1.0 INTRODUCION

Historically Walleye (*Sander vitreus*) were managed on a province wide basis. This proved to be ineffective in protecting and maintaining populations of this popular sport fish, which declined or collapsed in locations which received high levels of angling pressure. In order to address this problem Alberta Sustainable Resource Development established *Alberta's Walleye Management and Recovery Plan* (Berry 1995). Under this plan individual Walleye populations are assessed using a variety of biological criteria. Based on this assessment populations are classified as trophy, stable, vulnerable, or collapsed, and are managed accordingly.

While Sherburne Lake has sustained both commercial and recreational angling, it has never previously been assessed under the Fall Walleye Index Netting (FWIN) methodology. A FWIN survey was conducted in 2011 to assess the overall population status of Walleye at this location, and to determine whether any natural recruitment was occurring. The results of this survey will be used to improve future management of the Sherburne Lake Walleye population.

2.0 METHODS

   2.1 Study Area

Sherburne Lake (Township 9, Range 13 and 14, West of the 4th Meridian) is an reservoir situated equidistant between the two largest local populations centers (84 km east of Lethbridge and 86 km west of Medicine Hat) in the mixed grass ecoregion of Alberta. Sherburne Lake (also called Grassy Lake) is a long, narrow reservoir, with a surface area of 449 ha. The mean lake depth is 7.6 m, and the maximum depth is 15.2 m.

Sherburne Lake was constructed as an irrigation storage reservoir and is owned and operated by the St. Mary River Irrigation District (SMRID). Consequently water enters the lake at the west end from two lateral canals off the main SMRID canal, and exits via another canal in the northeast corner, passing on to Unnamed (Burdett) Lake. Reservoir water levels fluctuate 1.0 – 2.0 m annually depending on irrigation demand (Hills 1993).

There are 10 species of fish recorded as occurring in Sherburne Lake, including Walleye, Lake Whitefish (*Coregonus clupeaformis*), Northern Pike (*Esox lucius*), Yellow Perch (*Perca flavescens*), Burbot (*Lota lota*), White Sucker (*Catostomus commersoni*), Longnose Sucker (*Catostomus catostomus*), Emerald Shiner (*Notropis atherinoides*), Spottail Shiner (*Notropis hudsonius*), and Brook Stickleback (*Culaea inconstans*) (Council and Clayton 1999).

This location supports both a recreational fishery and a commercial fishery. Principle sport species are Northern Pike and Walleye, angled under the general provincial regulations of a limit of three (3) Walleye over 50 cm, and three (3) Northern Pike over 63 cm. Public access to Sherburne Lake (including random camping) occurs on leased land on the northeast and southwest portions of the reservoir. A boat launch is situated in the northeast, but boats can also be launched from the southwest (Hills 1993). The commercial fishery targets Lake Whitefish, with a quota of 44,000 kilograms.
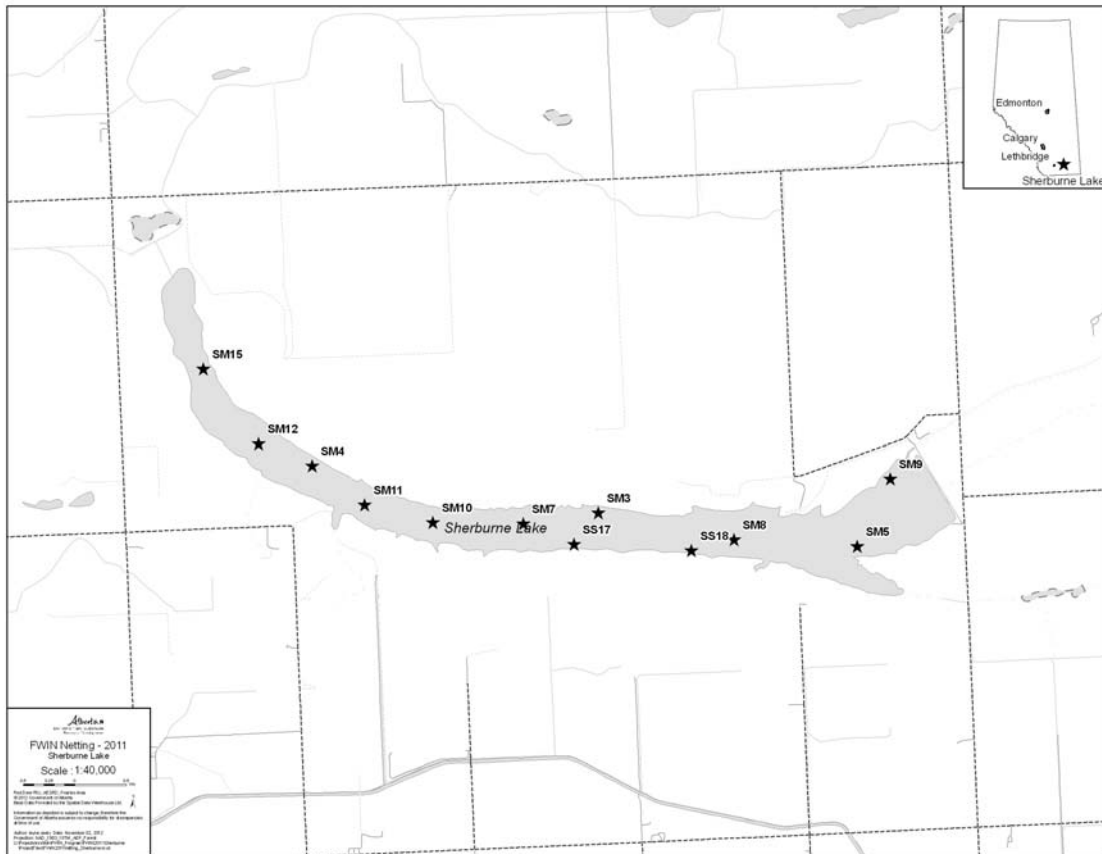
Figure 1. Map of Sherburne Lake including 2011 netting sites and location in Alberta.

2.2 Survey Methods

The FWIN protocol developed by the Ontario Ministry of Natural Resources in 2000 was employed to survey Sherburn Lake in 2011 (Morgan 2000). According to this method, nets are composed of eight ascending panels of different mesh sizes (25 mm, 38 mm, 51mm, 64mm, 76mm, 102mm, 127mm, and 152mm, respectively) without spacers. As a result, the standard FWIN net measures 61.0m long by 1.8 m deep, spanning an area of 109.8m^2.

Nets were placed in a spatial distribution determined by assigning random locations within depth and distance strata according to the methodology described in Morgan (2000). While this methodology allows for the selection of an alternate location if an inappropriate spot is initially chosen (too shallow, heavily vegetated, or a very steep bottom gradient), all of the randomly generated locations were used in 2011. Three (3) nets were set in the shallow stratum, and 9 in the deep stratum, for a total of 12 nets set for 2011 (Figure 1). In accordance with protocol, nets were set perpendicular to shore for approximately 24 hours.

The catches for individual panels were bagged separately and identified with grid location numbers and mesh sizes. Five species were caught in 2011, including Walleye, Northern Pike, Lake Whitefish, Yellow Perch, and White Sucker. Sport species were visually examined to catalogue hooking injuries and illnesses and subjectively assess general physical condition (normal weight versus exceptionally fat or thin individuals). Fork length (mm), total length (mm), and weight (g) were measured, and species specific aging structures were collected. (otoliths for Walleye, lake whitefish and yellow perch, and cleithra for northern pike) Gender and sexual maturity for were determined by examination of the gonads, (which for Walleye included weighing the female gonads to the nearest grams). If the gonads were considered to be sufficiently developed for spawning during the following spring fish were classified as mature. Non spawning females were identified by the absence of developing eggs despite the presence of mature gonadal development.

For some of the analysis and comparisons in this report a weighted CUE (catch per unit effort) was used. The weighted CUE is the number of fish caught per net per twenty-four hours. The weighted CUE is calculated using the formula:

$$Weighted\_CUE = \left(\frac{\left(\frac{Number\_of\_fishx24h}{Number\_of\_hours\_net\_was\_set} \right) x100m^2}{109.8m^2} \right)$$

Walleye ages were assigned by a modified methodology from that described in MacKay et al. (1990). The first annulus tightly surrounding the focus (indicating one year of age) was identified using the following formula:

$$1^{st} \text{ annulus} = \frac{rL \text{ (age-0 L)}}{L}$$

where:

rL = radius length (distance from the center of the focus to the furthest edge)

Age-0 L = hypothesized length of age-0 Walleye at time sampled

L = length of the sampled Walleye

The von Bertalanffy growth equation was used to calculate growth parameters. The following equation was used:

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

where:

L_∞ = maximum theoretical length (fork length infinity) that can be obtained;

k = growth coefficient;

t = time of age in years;

t_0 = is the time in years when length would theoretically be equal to zero and;

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e = exponent for natural logarithms.

L_∞, t_0, and k were calculated using the Fishery Analysis and Simulation Tools ver. 2.1 (Slipke and Maceina 2001). The length-at-age data were fitted to the growth model by applying the equation independently to each sample.

All data were analysed and reported on Microsoft Office 2000 Professional (9.0.7616 SP-3) (MSAccess, MSExcel, MSWord). The data set for this study is stored in the Alberta Sustainable Resource Development *Fisheries and Wildlife Management Information System* database (FWMIS) under project number 15761.

3.0 RESULTS AND DISCUSSION

3.1 Water Temperatures and Netting Effort

The 2011 FWIN survey was conducted between September 19 and September 22 at Sherburne Lake. Twelve (12) nets were set with a mean soak time of 23.3 hours (95% CI: 22.2 – 24.6 h, n=12) (Appendix 1).

3.2 Catch Results

In total 795 fish representing five species were caught during the 2011 FWIN survey of Sherburne Lake. The resulting mean catch was 63.2 fish/100m^2/24h (95% CI: 41.8 – 87.7 fish/100m^2/24h, n=795) (Appendix 1). The species caught in 2012 in order of descending frequency were Yellow Perch (n=478, 60.1%), Walleye (n=210, 26.4%), Lake Whitefish (n=81, 10.2%), Northern Pike (n=22, 2.8%), and White sucker (n=4, 0.5%), respectively.

3.3 Walleye Catch Per Unit Effort

Walleye were caught in all nets and mesh sizes in 2011 at Sherburne Lake (Appendix 1). The highest catch was observed in the 76 mm mesh, with a CUE of 5.3 Walleye/100m^2/24h (95% CI: 3.6 – 7.3 Walleye/100m^2/24h, n=12).

The shallow sets caught a mean of 8.9 Walleye/100m^2/24h (95% CI: 4.0 – 11.4 Walleye/100m^2/24h, n=12) in 2011, while the deep sets caught a mean of 18.7 Walleye/100m^2/24h (95% CI: 12.0 – 25.8 Walleye/100m^2/24h, n=12). The weighted CUE for Sherburne Lake was therefore 16.3 Walleye/100m^2/24h (95% CI: 10.8 – 22.4 Walleye/100m^2/24h, n=12) in 2011 (Figure 2). The observed catch was normally distributed.
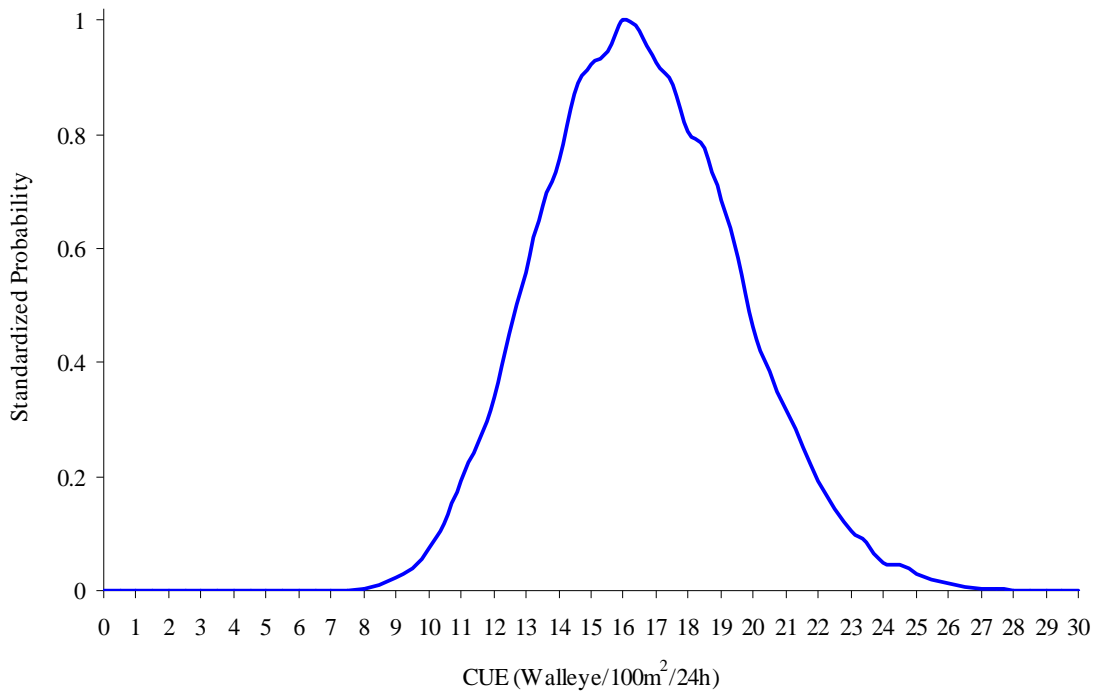
Figure 2. Walleye catch frequency distribution, Sherburne Lake 2011. Standardized probability function of the number of Walleye caught (2011 MLE=16.3 Walleye/100m^2/24h, 95% CI: 10.8 – 22.4 Walleye/100m^2/24h, n=12).

3.4 Catch Rate Comparison

The Walleye catch per unit effort (CUE) for Sherburne Lake in 2011 was comparable to catch rates in other locations in southern Alberta (Figure 3).
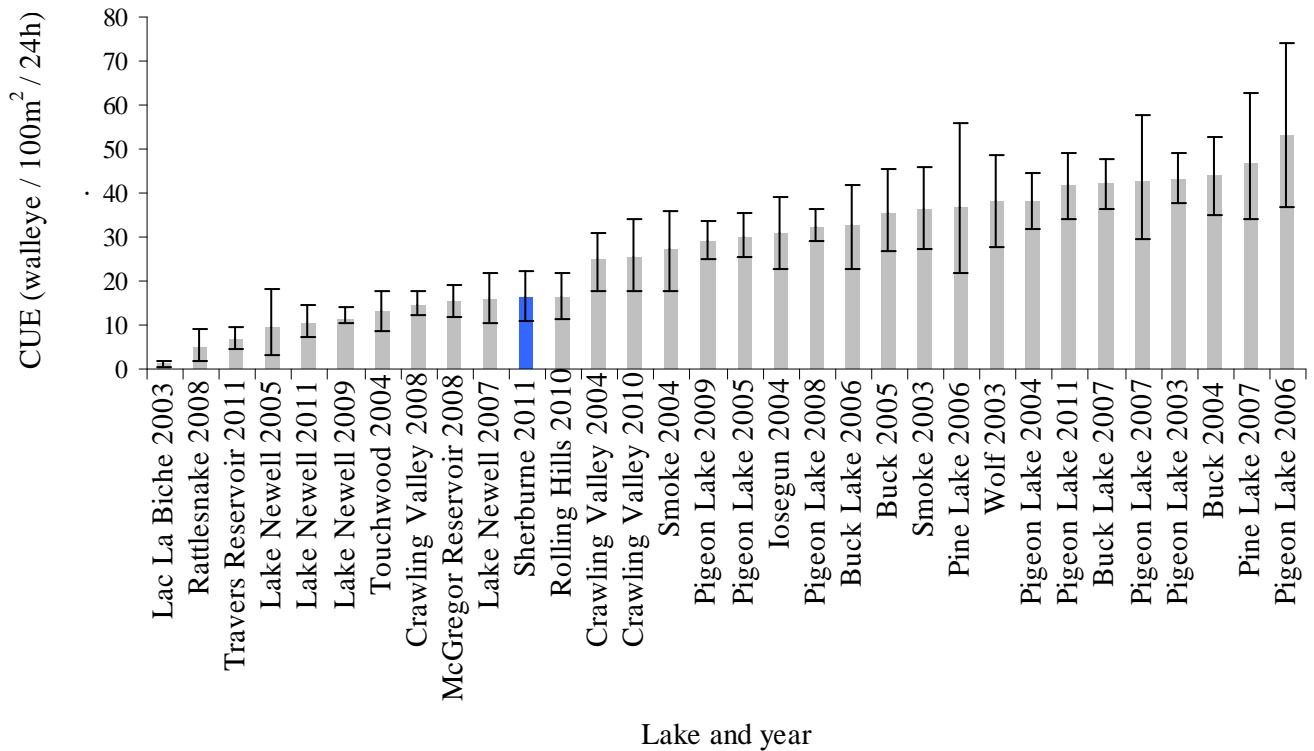
Figure 3. FWIN catches of Walleye from 32 Alberta Lakes from 2003-2011. Error bars depict 95% confidence intervals.

3.5 Fork Length Frequency Distribution

The Walleye fork length frequency distribution ranged from 120 mm to 675 mm (mean: 408 mm, n = 210). Fish 370 mm to 470 mm in length predominated in the sample (Figure 4). The catch rate for this size class was 10.3 Walleye/100m^2/24h, representing 63.3% of the sample.
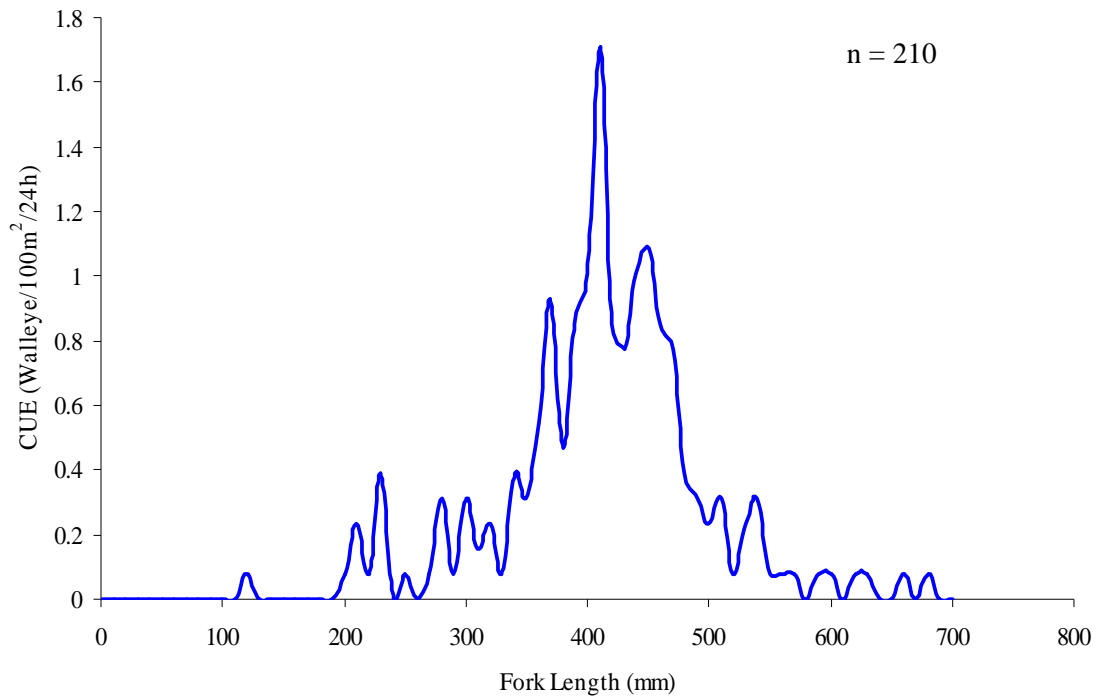
Figure 4. Walleye Fork Length Frequency Distribution, Sherburne Lake 2011; (mean fork length = 408 mm).

   3.6 Age Class Frequency Distribution

Walleye caught in Sherburne Lake ranged from 0 to 22 years of age in 2011 (Figure 5). Fish aged 4 and 5 years (representing the 2006 and 2007 year classes) predominated, comprising 54.8% of the sample. This corresponds to a CUE of 8.9 Walleye/100m^2/24h. As a result, the Walleye population in Sherburne Lake is primarily supported by a single age class (5 year old fish).
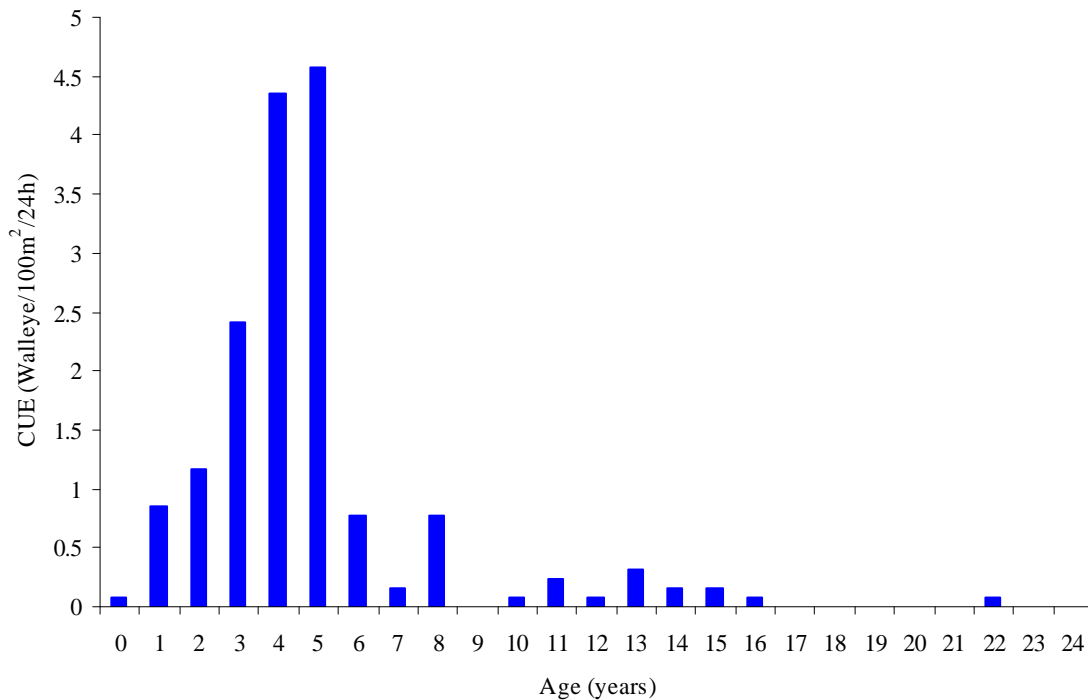
Figure 5. Walleye age-class frequency distribution, Sherburne Lake 2011.

3.7 Age Class Stability

The age class structure of Walleye population in Sherburne Lake exhibited a wide distribution in 2011, with fish ranging from 0 to 22 years of age, and a mean age of 4.8 years. The presence of young of the year (age 0) fish in the sample indicates that natural recruitment is occurring at this location. In addition, the presence of fish under the age of 8 in all age categories indicates that no recruitment failures have occurred since 2003. Based on these criteria the age class distribution for Sherburne Lake would be categorized as overlapping both collapsed and vulnerable classifications (Berry 1995) (Table 3), while the age class stability is indicative of a vulnerable population.

Table 3. Criteria for classifying status of Walleye fisheries, modified for FWIN analysis (from Sullivan 2003).

STATUS OF STOCK	TROPHY	STABLE	VULNERABLE	COLLAPSED
Age-class Distribution	Wide 8 or more age classes mean age >9	Wide 8 or more age classes mean age = 6-9	Narrow 1-3 age classes mean age = 4 - 6 few old (>10 years) fish	Wide or Narrow Mean age = 6 - 10
Sherburne Lake 2011			**mean age 4.8**	**17 age-classes**
Age-class Stability	Very Stable 1 - 2 age classes out of smooth catch curve	Relatively Stable 2 - 3 age classes out of smooth catch curve	Unstable 1 - 3 age classes support fishery	Stable or Unstable Recruitment failures
Sherburne Lake 2011			**1 age-class**	
Age-At-Maturity	Females 10 - 20 Males 10 - 16	Females 8 - 10 Males 7 - 9	Females 7 - 8 Males 5 - 7	Females 4 - 7 Males 3 - 6 Ages will vary with age class distribution
Sherburne Lake 2011			**Males at 6.9**	**Females at 5.9**
Length-at-age	Very slow 50 cm (FL) in 12 - 15 years	Slow 50 cm (FL) in 9 - 12 years	Moderate 50 cm (FL) in 7 - 9 years	Fast 50 cm (FL) in 4 - 7 years
Sherburne Lake 2011				**50 cm FL** **in 5 years**
Catch Rate **FWIN**		High >30 walleye / net	Moderate 5 - 25 walleye / net	Low <5 walleye / net
Sherburne Lake 2011			**16.3 walleye/net**	

3.8 Age at Maturity

The sex ratio of Walleye sampled at Sherburne Lake in 2011 was 1.37 females : 1 male. While 80.0% of the male Walleye sampled were mature by the age of 4, all were mature by the age of 7 (Figure 6). While female Walleye began maturing as early as age 4 (16.1%), immature fish were still present in the sample until 13 years of age (Figure 7).
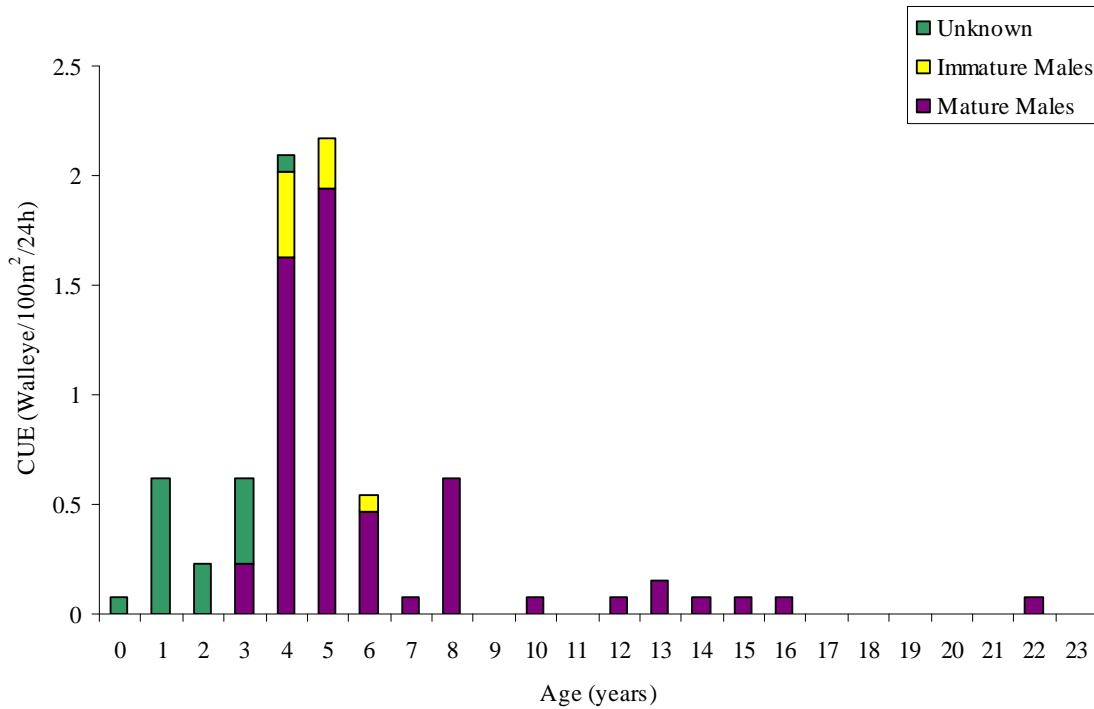
Figure 6. Age at maturity of male Walleye, Sherburne Lake 2011.
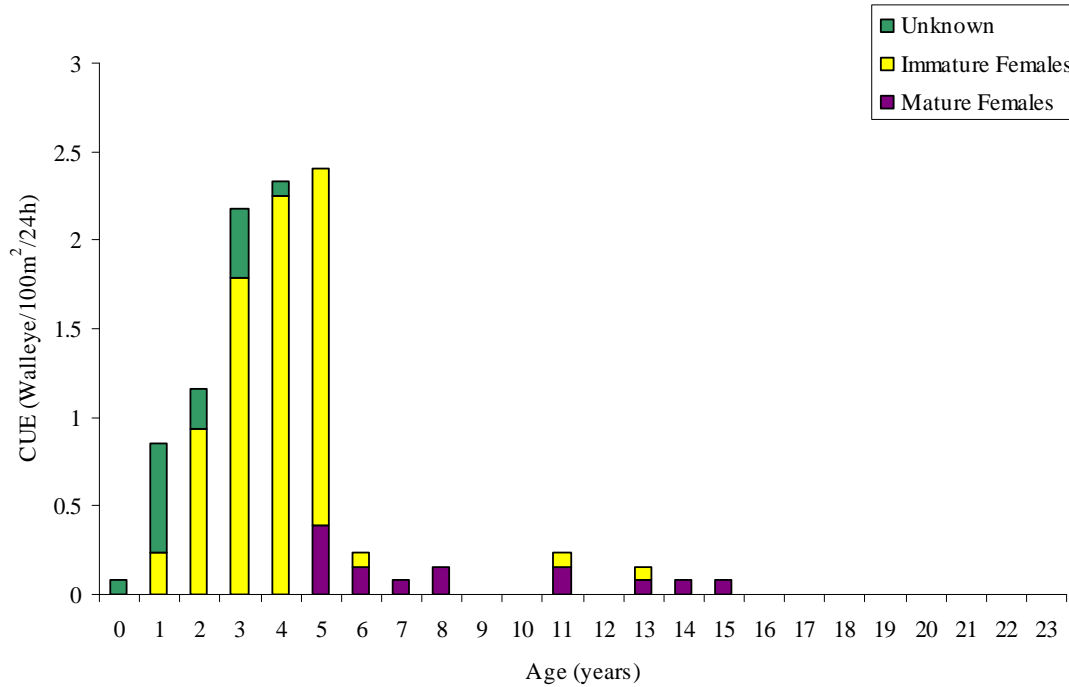
Figure 7. Age at maturity of female Walleye, Sherburne Lake 2011.

3.9 Length at Age

Male and female walleye grew at comparable rates in Sherburne Lake (Figure 8). The expected growth pattern of females progressively growing faster than males over time was observed at this location.
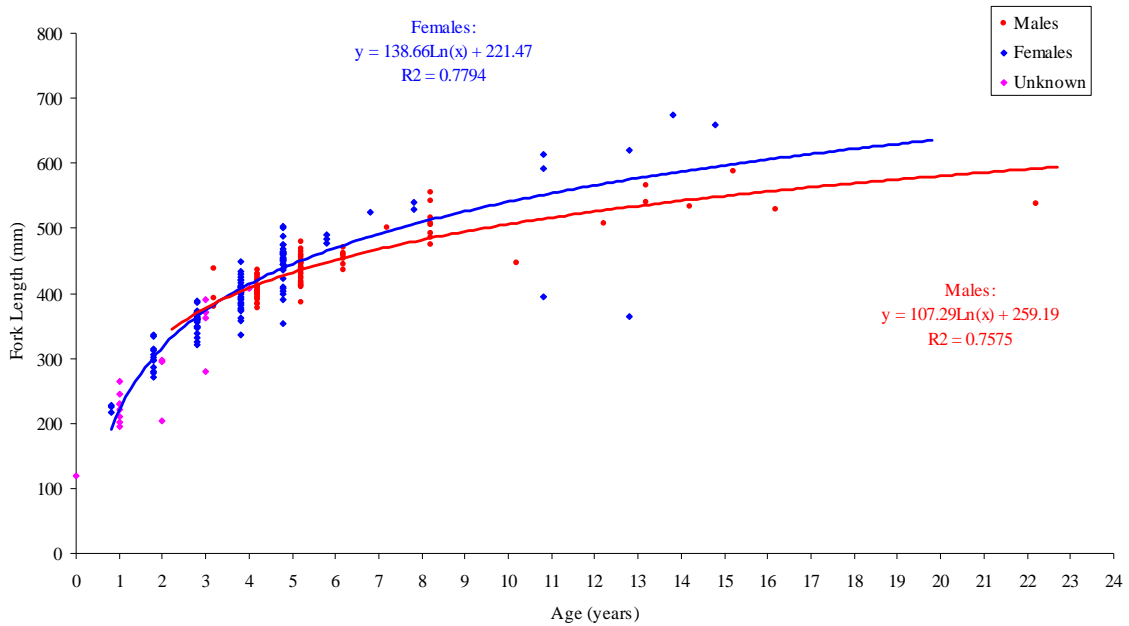
Figure 8. Length-at-age (logarithmic line of best fit) of male and female Walleye, Sherburne Lake 2011.

There were 34 Walleye equal to or greater than 500 mm in total length sampled in 2011, corresponding to a CUE of 2.6 Walleye//100m^2/24h (Figure 9). Walleye ranged in size from 500 mm to 700 mm (TL). Since Walleye reached 500 mm in total length by 5 years of age, growth for this species can be characterized as Fast under the stock classification matrix (Table 3).
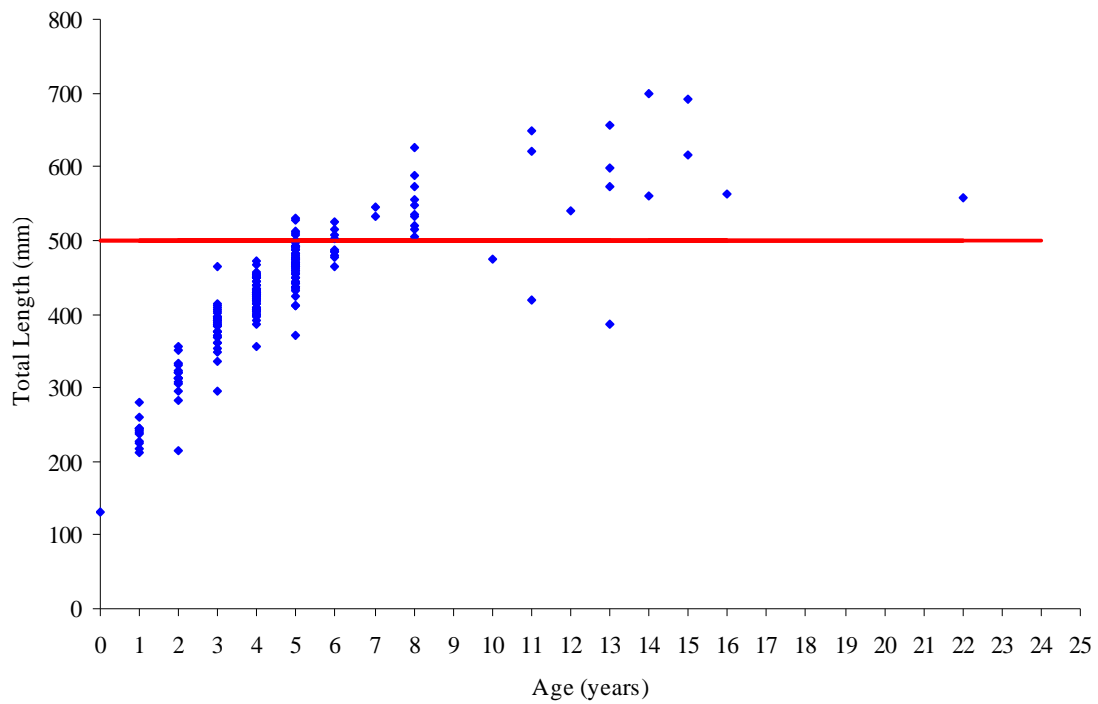
Figure 9. Walleye length-at-age for Sherburne Lake, 2011.

3.10   Length at Weight

Walleye sampled ranged in weight from 17 g to 3749 g in 2011, with a mean weight of 851 g (n=210) (Figure 10). The relationship of Fork Length to Weight observed exhibited the expected increase in weight relative to length over time, indicating that normal growth is occurring at Sherburne Lake.
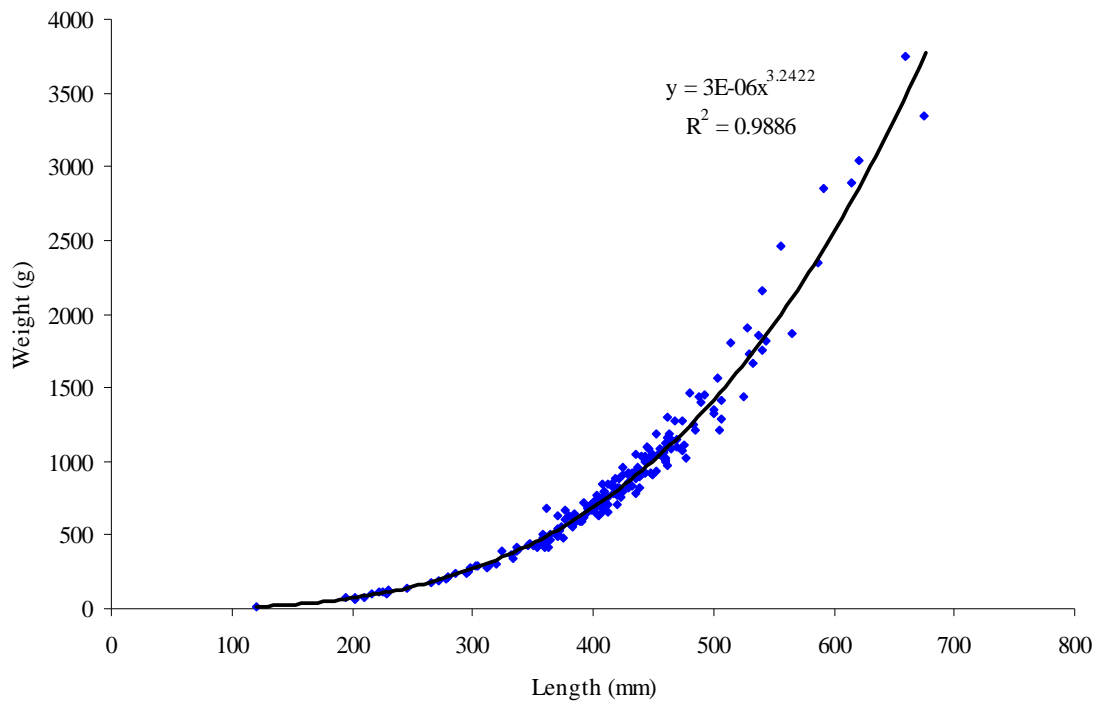
Figure 10. Walleye length-at-weight, Sherburne Lake 2011. (Mean weight=851, min=17g, max=3749g, n=210)

3.11   Gonadosomatic Index

The Gonadosomatic Index is the ratio of gonad weight to body weight which is used to establish the length and age at which female Walleye spawn. Female Walleye at Sherburne Lake with a GSI below 1.25% were immature (Figure 11).
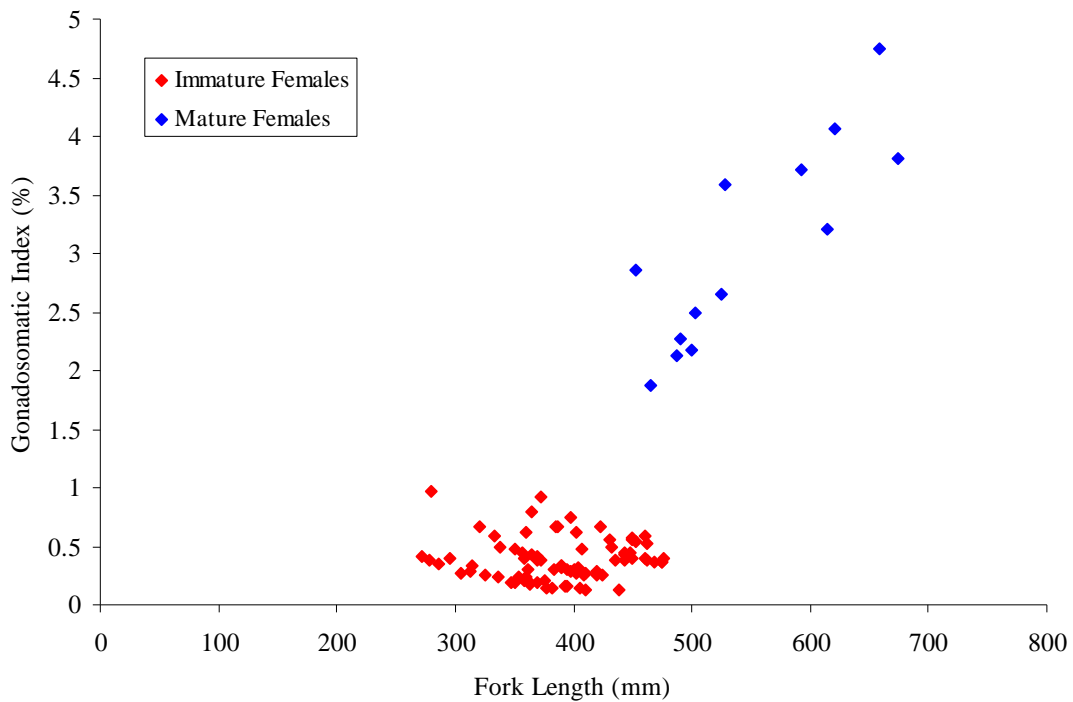
Figure 11. Gonadosomatic Index (%) for female Walleye, Sherburne Lake 2011.

3.12 Von Bertalanffy Growth Equation

Fish typically exhibit asymptotic growth where length increases at a rapid rate early in life. This rate declines progressively as age and size maxima are attained. Age and growth data for Sherburne Lake in 2011 indicate that the Walleye population is growing normally at this location (Figure 12).
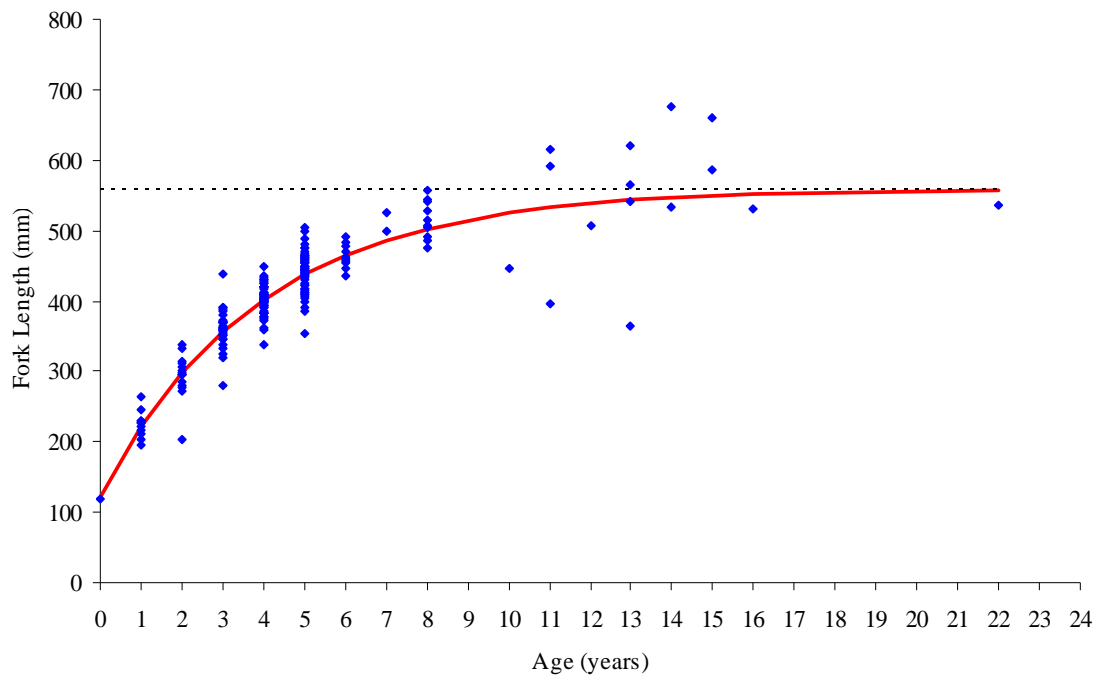
Figure 12. Von Bertalanffy growth curve and parameters fitted to observed fork length-at-age data for Sherburne Lake, 2011 (k = 0.257, t_0 = -0.966, L_∞ = 558 mmFL).

4.0 SUMMARY

The management status of Walleye was classified as vulnerable for Sherburne Lake in 2011 according to the criteria established in the ASRD *Walleye Management and Recovery Plan* (Berry, 1995). The majority of the biological criteria measured fell within the vulnerable category, with some overlap with the collapsed category.

The presence of young fish in all age categories under 5 years indicates that natural recruitment is occurring at Sherburne Lake. In addition, no year class failures have occurred since 2003 since Walleye ages 8 years and under are present in the sample. These criteria fall within the vulnerable category of the stock classification matrix.

While Walleye are present in a wide diversity of ages in Sherburne Lake, the population is only sustained by a single age class (5 years old). These criteria variously fall within

the collapsed and vulnerable population categorizations, respectively. Otherwise the relatively rapid growth observed is typical for Walleye populations from Southern Alberta (though it falls within the collapsed categorization).

In general it can be concluded that the Walleye population in Sherburne Lake is capable of successful propagation and therefore has potential for growth as well as increasing the stability of the population through increasing numbers of older, mature fish. Ongoing monitoring and management is required to preserve and potentially improve the status of this species at this location.

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6.0 APPENDICES
6.1 Catch Composition for FWIN nets, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	Species YLPR	WALL	LKWH	NRPK	WHSC	Total
SM10	(14.6 - 14.8)	21.7	55	9	5	1	0	70
SM11	(11.1 - 11.8)	21.2	46	9	0	2	0	57
SM12	(5.0 - 5.2)	21.1	64	7	18	2	0	91
SM3	(8.0 - 14.0)	27.1	14	37	0	0	0	51
SM4	(8.6 - 16.0)	23.0	16	21	10	2	0	49
SM5	(7.7 - 14.8)	22.5	117	40	2	1	2	162
SM7	(15.0 - 15.0)	23.4	33	9	10	1	0	53
SM8	(15.5 - 15.5)	24.7	108	20	9	0	0	137
SM9	(5.0 - 7.0)	23.5	17	30	10	5	0	62
SS15	(2.0 - 2.0)	21.0	6	11	9	5	2	33
SS17	(3.0 - 3.0)	27.6	0	5	5	2	0	12
SS18	(2.0 - 3.8)	23.2	2	12	3	1	0	18
Total			478	210	81	22	4	795
Mean		23.3		17.5				66.3

6.1.1 Catch composition from shallow sets, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	Species YLPR	WALL	LKWH	NRPK	WHSC	Total
SS15	(2.0 - 2.0)	21.0	6	11	9	5	2	33
SS17	(3.0 - 3.0)	27.6	0	5	5	2	0	12
SS18	(2.0 - 3.8)	23.2	2	12	3	1	0	18
Total			8	28	17	8	2	63
Mean		23.9		9.3				21.0

6.1.2 Catch composition from medium and deep sets, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	YLPR	WALL	LKWH	NRPK	WHSC	Total
					Species			
SM10	(14.6 - 14.8)	21.7	55	9	5	1	0	70
SM11	(11.1 - 11.8)	21.2	46	9	0	2	0	57
SM12	(5.0 - 5.2)	21.1	64	7	18	2	0	91
SM3	(8.0 - 14.0)	27.1	14	37	0	0	0	51
SM4	(8.6 - 16.0)	23.0	16	21	10	2	0	49
SM5	(7.7 - 14.8)	22.5	117	40	2	1	2	162
SM7	(15.0 - 15.0)	23.4	33	9	10	1	0	53
SM8	(15.5 - 15.5)	24.7	108	20	9	0	0	137
SM9	(5.0 - 7.0)	23.5	17	30	10	5	0	62
Total			470	182	64	14	2	732
Mean		23.1		20.2				81.3

6.2 Walleye catches by mesh size, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	25	38	51	63	76	102	127	152	Total
						Mesh					
SM10	(14.6 - 14.8)	21.7	0	0	0	2	4	2	0	1	9
SM11	(11.1 - 11.8)	21.2	0	1	0	1	4	3	0	0	9
SM12	(5.0 - 5.2)	21.1	0	0	0	4	3	0	0	0	7
SM3	(8.0 - 14.0)	27.1	3	1	6	5	14	7	1	0	37
SM4	(8.6 - 16.0)	23.0	2	0	2	2	9	5	1	0	21
SM5	(7.7 - 14.8)	22.5	0	0	8	1	12	9	6	4	40
SM7	(15.0 - 15.0)	23.4	0	3	0	2	2	2	0	0	9
SM8	(15.5 - 15.5)	24.7	0	2	4	0	7	4	2	1	20
SM9	(5.0 - 7.0)	23.5	3	1	6	5	5	8	2	0	30
SS15	(2.0 - 2.0)	21.0	1	0	3	3	2	2	0	0	11
SS17	(3.0 - 3.0)	27.6	0	1	0	0	3	1	0	0	5
SS18	(2.0 - 3.8)	23.2	0	2	1	3	4	2	0	0	12
Total			9	11	30	28	69	45	12	6	210

6.3 Yellow Perch catches by mesh size, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	Mesh								Total
			25	38	51	63	76	102	127	152	
SM10	(14.6 - 14.8)	21.7	5	9	25	12	4	0	0	0	55
SM11	(11.1 - 11.8)	21.2	13	9	12	8	4	0	0	0	46
SM12	(5.0 - 5.2)	21.1	14	17	23	9	1	0	0	0	64
SM3	(8.0 - 14.0)	27.1	0	0	0	5	9	0	0	0	14
SM4	(8.6 - 16.0)	23.0	5	1	10	0	0	0	0	0	16
SM5	(7.7 - 14.8)	22.5	10	20	23	46	13	5	0	0	117
SM7	(15.0 - 15.0)	23.4	7	6	10	5	5	0	0	0	33
SM8	(15.5 - 15.5)	24.7	6	14	38	37	13	0	0	0	108
SM9	(5.0 - 7.0)	23.5	5	1	0	8	3	0	0	0	17
SS15	(2.0 - 2.0)	21.0	2	2	2	0	0	0	0	0	6
SS17	(3.0 - 3.0)	27.6	0	0	0	0	0	0	0	0	0
SS18	(2.0 - 3.8)	23.2	2	0	0	0	0	0	0	0	2
Total			69	79	143	130	52	5	0	0	478

6.4 Lake whitefish catches by mesh size, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	Mesh								Total
			25	38	51	63	76	102	127	152	
SM10	(14.6 - 14.8)	21.7	0	0	2	1	2	0	0	0	5
SM11	(11.1 - 11.8)	21.2	0	0	0	0	0	0	0	0	0
SM12	(5.0 - 5.2)	21.1	0	0	1	3	3	5	2	4	18
SM3	(8.0 - 14.0)	27.1	0	0	0	0	0	0	0	0	0
SM4	(8.6 - 16.0)	23.0	0	0	1	0	2	1	3	3	10
SM5	(7.7 - 14.8)	22.5	0	0	0	1	1	0	0	0	2
SM7	(15.0 - 15.0)	23.4	0	0	3	3	3	0	0	1	10
SM8	(15.5 - 15.5)	24.7	0	0	2	5	2	0	0	0	9
SM9	(5.0 - 7.0)	23.5	1	0	1	1	1	3	1	2	10
SS15	(2.0 - 2.0)	21.0	0	0	0	2	1	1	2	3	9
SS17	(3.0 - 3.0)	27.6	0	0	0	0	1	1	1	2	5
SS18	(2.0 - 3.8)	23.2	0	0	0	0	0	0	1	2	3
Total			1	0	10	16	16	11	10	17	81

6.5 Northern pike catches by mesh size, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	25	38	51	63	76	102	127	152	Total
						Mesh					
SM10	(14.6 - 14.8)	21.7	0	0	0	1	0	0	0	0	1
SM11	(11.1 - 11.8)	21.2	0	0	0	0	0	1	1	0	2
SM12	(5.0 - 5.2)	21.1	0	1	1	0	0	0	0	0	2
SM3	(8.0 - 14.0)	27.1	0	0	0	0	0	0	0	0	0
SM4	(8.6 - 16.0)	23.0	0	0	0	0	1	1	0	0	2
SM5	(7.7 - 14.8)	22.5	0	0	0	0	0	1	0	0	1
SM7	(15.0 - 15.0)	23.4	0	0	0	0	0	1	0	0	1
SM8	(15.5 - 15.5)	24.7	0	0	0	0	0	0	0	0	0
SM9	(5.0 - 7.0)	23.5	2	2	0	0	0	1	0	0	5
SS15	(2.0 - 2.0)	21.0	0	0	0	1	3	1	0	0	5
SS17	(3.0 - 3.0)	27.6	0	0	0	0	0	0	1	1	2
SS18	(2.0 - 3.8)	23.2	0	0	0	0	1	0	0	0	1
Total			2	3	1	2	5	6	2	1	22

6.6 White sucker catches by mesh size, Sherburne Lake 2011

Set	Depth (m) (min-max)	Soak Time (h)	25	38	51	63	76	102	127	152	Total
						Mesh					
SM10	(14.6 - 14.8)	21.7	0	0	0	0	0	0	0	0	0
SM11	(11.1 - 11.8)	21.2	0	0	0	0	0	0	0	0	0
SM12	(5.0 - 5.2)	21.1	0	0	0	0	0	0	0	0	0
SM3	(8.0 - 14.0)	27.1	0	0	0	0	0	0	0	0	0
SM4	(8.6 - 16.0)	23.0	0	0	0	0	0	0	0	0	0
SM5	(7.7 - 14.8)	22.5	0	0	0	0	1	0	0	1	2
SM7	(15.0 - 15.0)	23.4	0	0	0	0	0	0	0	0	0
SM8	(15.5 - 15.5)	24.7	0	0	0	0	0	0	0	0	0
SM9	(5.0 - 7.0)	23.5	0	0	0	0	0	0	0	0	0
SS15	(2.0 - 2.0)	21.0	0	0	0	0	0	0	2	0	2
SS17	(3.0 - 3.0)	27.6	0	0	0	0	0	0	0	0	0
SS18	(2.0 - 3.8)	23.2	0	0	0	0	0	0	0	0	0
Total			0	0	0	0	1	0	2	1	4

6.7 Statistics of the catch distribution for game fish catches, Sherburne Lake 2011.

This data is for presentation of the statistical nature of the catch distribution and are based on the geometric mean values (unweighted)

	Yellow Perch	Walleye	Lake Whitefish	Northern Pike	White Sucker
Mean	39.8	17.5	6.8	1.8	0.3
Standard Error	11.5	3.5	1.5	0.5	0.2
Median	25	11.5	7	1.5	0
Mode		9	10	1	0
Standard Deviation	39.8	12.1	5.2	1.6	0.8
Sample Variance	1583.6	147	27.5	2.7	0.6
Kurtosis	0	-0.5	0.4	0.9	2.6
Skewness	1	0.9	0.6	1.2	2.1
Range	118	36	19	6	3
Minimum	0	5	0	0	0
Maximum	117	40	18	5	2
Sum	478	210	81	22	4
Count	12	12	12	12	12
Confidence Interval (95%)	22.5	6.9	3	0.9	0.4