Travers Reservoir Fall Walleye Index Netting (FWIN) Survey 2011

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Travers Reservoir Walleye (*Sander vitreus*) Index Netting Survey, 2011

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ABSTRACT

The 2011 FWIN Survey of Travers Reservoir was conducted from September 23, 2011 to September 26, 2011. Survey objectives included estimating catch per unit effort, as well as various population demographics (including age, growth rate, and reproductive status) in order to assess the status of the Walleye population in this location, and monitor the effects of management. In total 133 Walleye were caught in 2011, resulting in a catch per unit effort of 7.5 Walleye/100 m^2/24 h (95% CI: 5.1 – 10.0 Walleye/100 m^2/24 h). Walleye fork length averaged 354 mm (range: 129 – 753 mm). Walleye sampled in 2011 reached 500 mm of length by seven years of age. The mean age for this species was 4.7 years. While a diversity of ages (ranging from 0 to 19 years) were present in the sample, fish aged 5 years predominated. Walleye at Travers matured relatively quickly, with males attaining complete maturity by age 6, while females matured completely by age 7. A gonadosomatic index of 1.5% distinguished mature spawning females from immature females. No mature non-spawning female Walleye were observed in 2011. Overall, growth for this species was observed to be “normal”. As a result of these metrices, the Walleye population in Travers Reservoir is classified as vulnerable in 2011.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCION

Walleye (*Sander vitreus*) are a highly regarded and much sought after sport fish in Alberta. As a result Walleye populations have been subjected to high levels of angling pressure and harvest, particularly in areas in proximity to larger population centers and in locations which are easily accessible. Historically Walleye management was conducted on a provincial basis (i.e. with a single regulation governing all water bodies). This proved ineffective for managing locations which receive high levels of angling pressure, where populations declined or collapsed as a result of overharvest. In response to this issue Alberta Environment and Sustainable Resource Development formulated *Alberta's Walleye Management and Recovery Plan* (Berry 1995). Under this plan Walleye populations are individually surveyed to assess a variety of biological criteria and classified as trophy, stable, vulnerable, or collapsed. Management is subsequently tailored to prevent decline and/or restore diminishing populations according to the unique requirements at a given location.

The Fall Walleye Index Netting (FWIN) survey conducted at Travers Reservoir in 2011 is the first study of this type conducted at this location. As a result, it will serve as a base line for continued monitoring and management of the Walleye population.

2.0 METHODS

2.1 Study Area

Travers Reservoir (TWP14, 15 – R21 – W4M) is located in the mixed grass ecoregion of Alberta, situated between Secondary Highways 522 and 529, approximately 35 km southeast of the town of Vulcan (Mitchell and Prepas 1990). The reservoir was built on the Little Bow River in 1954 to store water for irrigation purposes. While it is part of the Oldman River drainage, the majority of water in Travers Reservoir originates from the Bow River, where it is diverted at Carseland to flow into McGregor Lake. There is additional input from the Highwood River, via the Little Bow River.

Travers Reservoir is owned and operated by Alberta Environment as part of the Carseland-Bow River Headworks System. The main purpose is to store water for

irrigation and multi-purpose use. This also functions as flow control for the Little Bow River. Travers is an large, deep, oligotrophic reservoir, with a surface are of 2,307 ha. The maximum depth is 39.6 m, while the average depth is 18.3 m. The reservoir is elongated and oriented east-west. Since the sides are steep, and there are large annual water fluctuations and strong winds, there is a great deal of shoreline erosion and a very narrow littoral zone at this location. The majority of the shoreline is barren gravel. The Crown land around Travers Reservoir is primarily leased for dry land crop cultivation and cattle grazing. The closest villages are Champion and Carmangay.

Access to this location is via two campgrounds. The first, Little Bow Provincial Park, is situated on the north shore of the west arm of the reservoir. This is a year round campground with 193 camp sites, tap water, a boat launch, a dock, a sandy beach, picnic tables and shelters, a playground, and a concession. Travers Dam Campground (operated by Alberta Tourism Parks and Recreation) is located on the north shore of the east arm of the reservoir. This campground is also open year round, with 100 random camp sites, picnic tables and shelters, pumped water, and a boat launch. There is also a cottage development on the east side of the north arm of the reservoir.

Activities at Travers Reservoir include: fishing, power boating, wind surfing, sailing, and swimming. All boats are prohibited from certain areas and power boats are restricted to 12 km/h (maximum speed) in the Provincial park.

Fourteen (14) species of fish are known to inhabit Travers Reservoir. These include Walleye, Northern Pike (*Esox lucius*), Lake Whitefish (*Coregonus clupeaformis*), Yellow Perch (*Perca flavescens*), Burbot (*Lota lota*), Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), Longnose Sucker (*Catostomus catostomus*), White Sucker (*Catostomus commersoni*), Emerald Shiner (*Notropis atherinoides*), Spottail Shiner (*Notropis hudonius*), Fathead Minnow (*Pimephales promelas*), Trout-perch (*Percopsis omiscomaycus*), Lake Chub (*Couesius plumbeus*), Northern Dace (*Chrosomus eos*) and Shorthead Redhorse (*Moxostoma macrolepidotum*)(Mitchell and Prepas 1990, Alberta

Environment and Sustainable Resource Development Fisheries and Wildlife Management and Information System).

Provincial sportfishing regulations apply at this location. (i.e. Walleye limit 3 over 50 cm; Northern Pike limit 3 over 63 cm; Yellow Perch limit 15; Lake Whitefish limit 10; Burbot limit 10. Closed March 16 – May 7. No fishing is permitted within 22.9 m of the canal inlet structure.) Travers Reservoir supports a commercial fishery for Lake Whitefish.

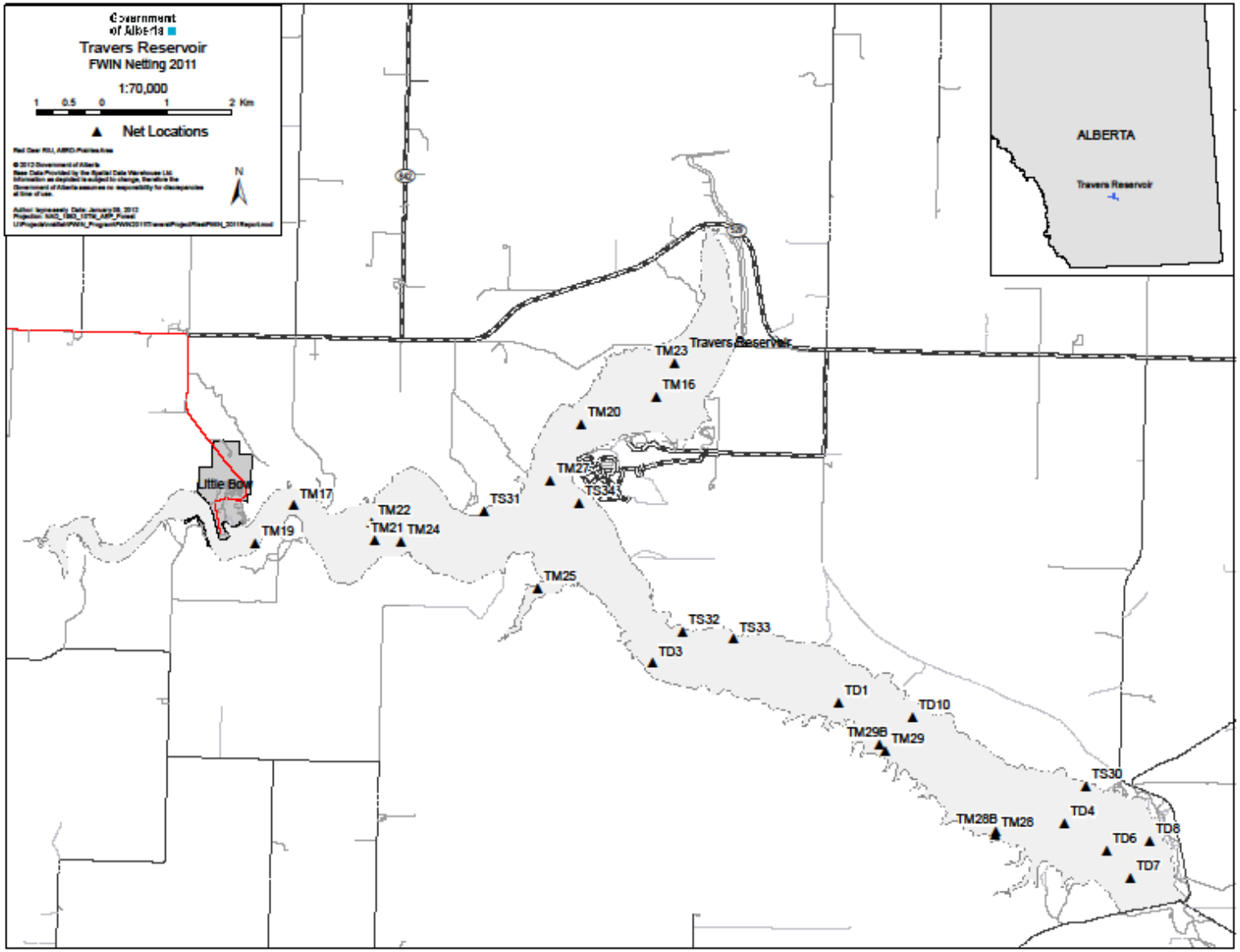

Figure 1. Map of Travers Reservoir including 2011 netting locations.

2.2 Survey Methods

The FWIN protocol developed by the Ontario Ministry of Natural Resources in 2000 was employed to survey Travers Reservoir 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 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. The 2011 survey was designed to set a total of 26 nets in three strata. In accordance with protocol, nets were set perpendicular to shore for approximately 24 hours. Due to the discovery that the deep stratum was likely anoxic (yielding no fish in any net, so results were removed from the FWIN), nets were set into the medium stratum instead on the second day. Two nets were accidentally reset in previously fished locations, and were subsequently removed from the analysis.

The catches for individual panels were bagged separately and identified with grid location numbers and mesh sizes. Eight species were collected in 2011, including Walleye, Northern Pike, Lake Whitefish, and Yellow Perch, Longnose Sucker, White Sucker, Shorthead Redhorse, and Burbot. 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 (mm) were measured, and species specific aging structures were collected. Gender and maturity for Walleye were determined by examination of the gonads (including measurement of the weight of female gonads, in 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 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:

$$Weighted\_CUE = \left(\frac{\left(\frac{Number\_of\_fish x 24h}{Number\_of\_hours\_net\_was\_set} \right) x 100m^2}{109.8m^2} \right)$$

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:

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

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:

$$L_t = L_\infty(1 - e^{-k\,(t-t0)})$$

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;

e = exponent for natural logarithms.

L_∞, t0, and k were calculated using the Fisheries Analysis and Modeling Simulator ver. 1.0 (Slipke 2010). The length-at-age data were fitted to the growth model by applying the equation independently to each sample.

All data were analysed and written using Microsoft Office 2000 Professional (9.0.7616 SP-3) (MSAccess, MSExcel, MSWord). The data set for this study is stored in the Alberta Environment and Sustainable Resource Development *Fisheries and Wildlife Management Information System* database (FMIS).

3.0 RESULTS AND DISCUSSION

3.1 Water Temperatures and Netting Effort

The 2011 FWIN survey of Travers Reservoir was conducted between September 23, 2011 and September 26, 2011. Water temperatures ranged from 13.8°C to 15.8°C. Seventeen (17) nets were set for an average of 23.4 hours (95% CI: 22.8 – 23.9 hours) (Appendix 1). Five (5) nets were set in the shallow stratum, 12 in the medium stratum. (Originally a total of 26 nets were set, 7 in the deep stratum (excluded from analysis), 14 in the medium stratum (2 resets excluded), and 5 in the deep stratum.)

3.2 Catch Results

In total 406 fish were caught during the 2011 FWIN, representing eight species, with a mean catch of 22.6 fish/100m^2/24h (95%CI: 18.3 – 26.9 fish/100m^2/24h) (Appendix 1). The shallow sets caught an average of 23.5 fish/100m^2/24h (95%CI: 16.6 – 32.4 fish/100m^2/24h), while the medium sets caught and average of 22.2 fish/100m^2/24h (95%CI: 17.1 – 27.2 fish/100m^2/24h). Lake whitefish was the most common species

caught (n=232, 57.1%) in 2011, followed by Walleye (n=133, 32.8%), Northern Pike (n=22, 5.4%), Yellow Perch (n=7, 1.7%), Longnose Sucker (n=5, 1.2%), White Sucker (n=5, 1.2%), Shorthead Redhorse (n=1, 0.2%), and Burbot (n=1, 0.2%).

3.3 Walleye Catch Per Unit Effort

Walleye were caught in all mesh sizes in 2011 (Appendix 1), with the highest catch in the 64 mm mesh (Average = 2.4 Walleye/100m^2/24h (95%CI: 1.7 – 3.3 Walleye/100m^2/24h). An average of 5.2 Walleye/100m^2/24h (95%CI: 1.5 – 11.7 Walleye/100m^2/24h) were caught in the shallow sets, while the medium sets caught an average of 8.4 Walleye/100m^2/24h (95%CI: 6.0 – 10.8 Walleye/100m^2/24h).

The weighted catch per unit effort for Walleye was 7.5 Walleye/100m^2/24h (95%CI: 5.1 – 10.0 Walleye/100m^2/24h) in 2011, and the catch was normally distributed (Figure 2). This catch rate is low for Alberta, but is within the range for other locations from southern Alberta (Figure 3). Walleye of 500mm or greater total length had a CUE of 0.6 Walleye/100m^2/24h (95%CI: 0.4 – 0.8 Walleye/100m^2/24h).

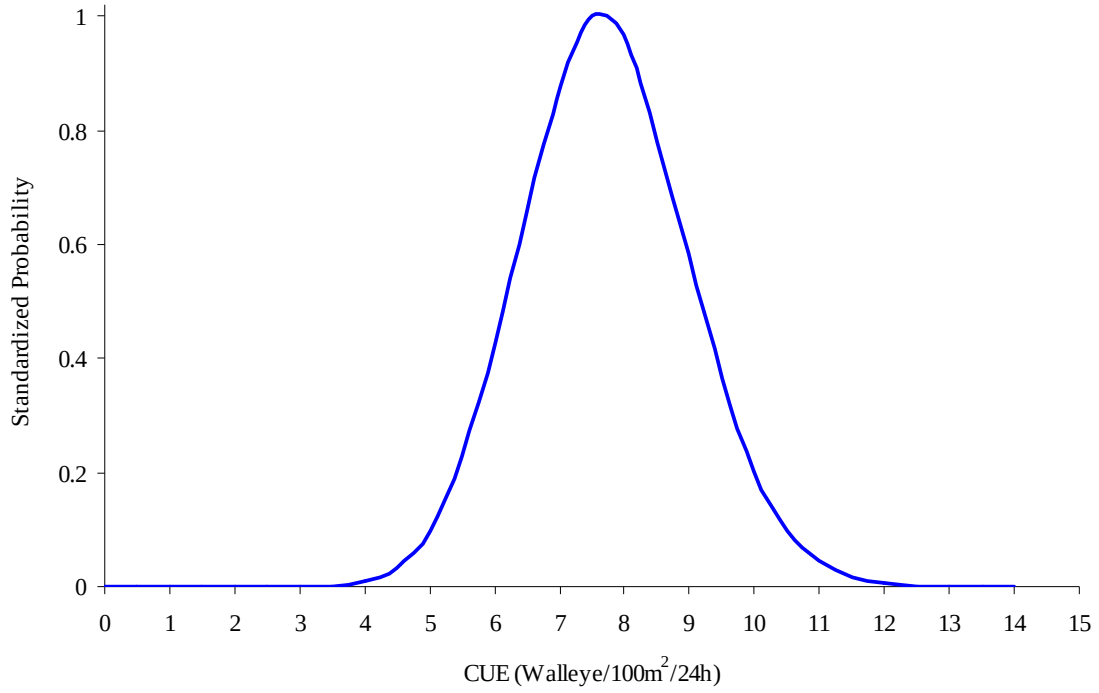

Figure 2. Walleye catch frequency distribution, Travers Reservoir 2011 (CUE = 7.5 Walleye/100m^2/24h (95% CI: 5.1 – 10.0 Walleye/100m^2/24h)).

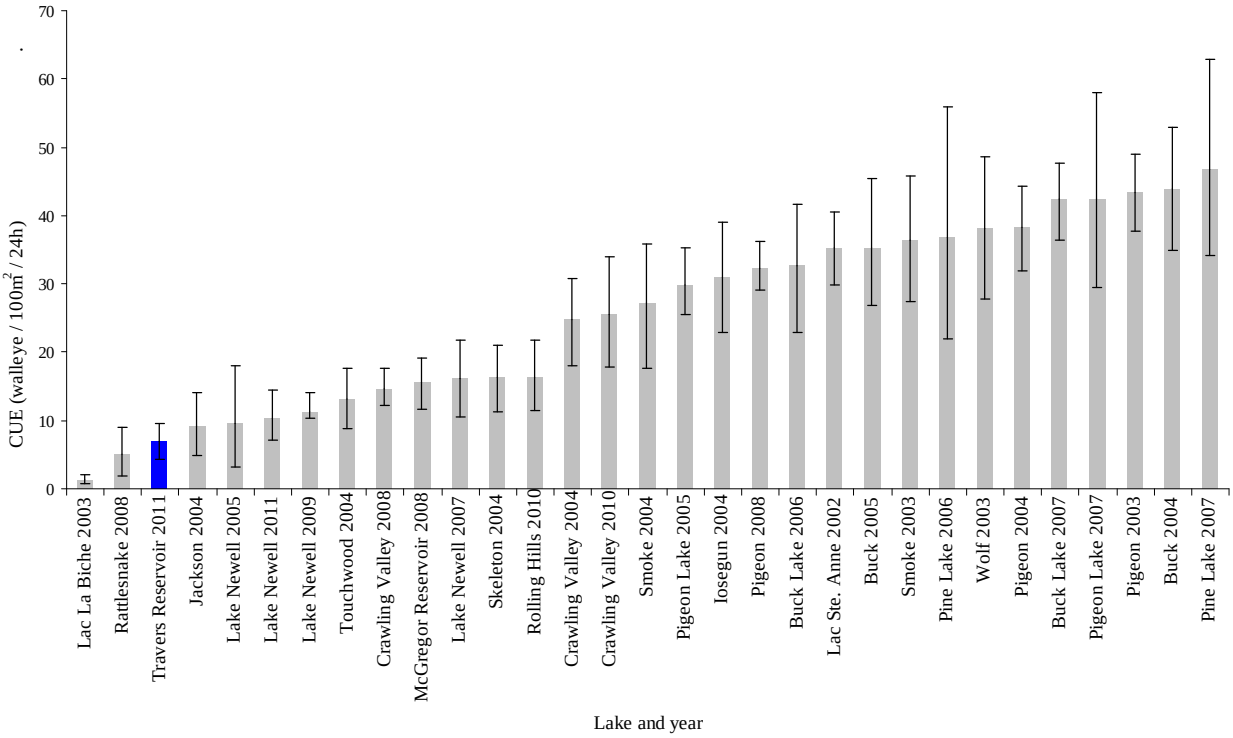

Figure 3. FWIN catches from 32 Alberta lakes from 2002-2011. Error bars depict 95% confidence intervals.

3.4 Fork Length Frequency Distribution

The fork length frequency distribution of Walleye sampled from Travers Reservoir in 2011 ranged from 129 – 753 mm (Figure 4). Fish ranging from 290 to 380 mm predominated in the sample, comprising 52.9% of the total catch per unit effort.

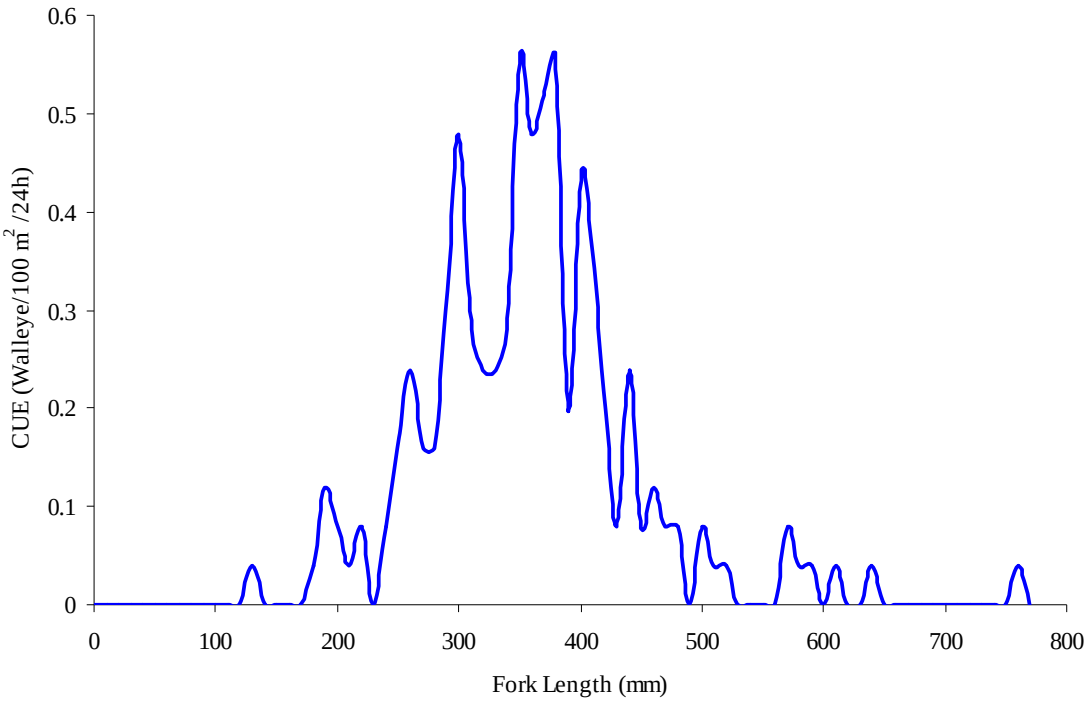

Figure 4. Walleye fork length frequency distribution, Travers Reservoir 2011 (mean fork length = 354 mm, n = 187).

3.5 Age Class Frequency Distribution

The year class distribution for Walleye ranged from fish aged 0 to 19 in 2011 (Figure 5). Fish aged 5 years predominated in the sample, with a CUE of 3.8 Walleye/100m^2/24h, comprising 50.8% of the Walleye caught from Travers Reservoir. Walleye aged 4 years were also relatively common, with a CUE of 1.7 Walleye/100m^2/24h, representing 22.5% of the fish caught. The average age of Walleye from Travers Reservoir was 4.7 years in 2011. Since the average age is low and the since the population is supported by a single year class, it is characterized as vulnerable under the criteria established in the Stock Classification Matrix (Table 1).

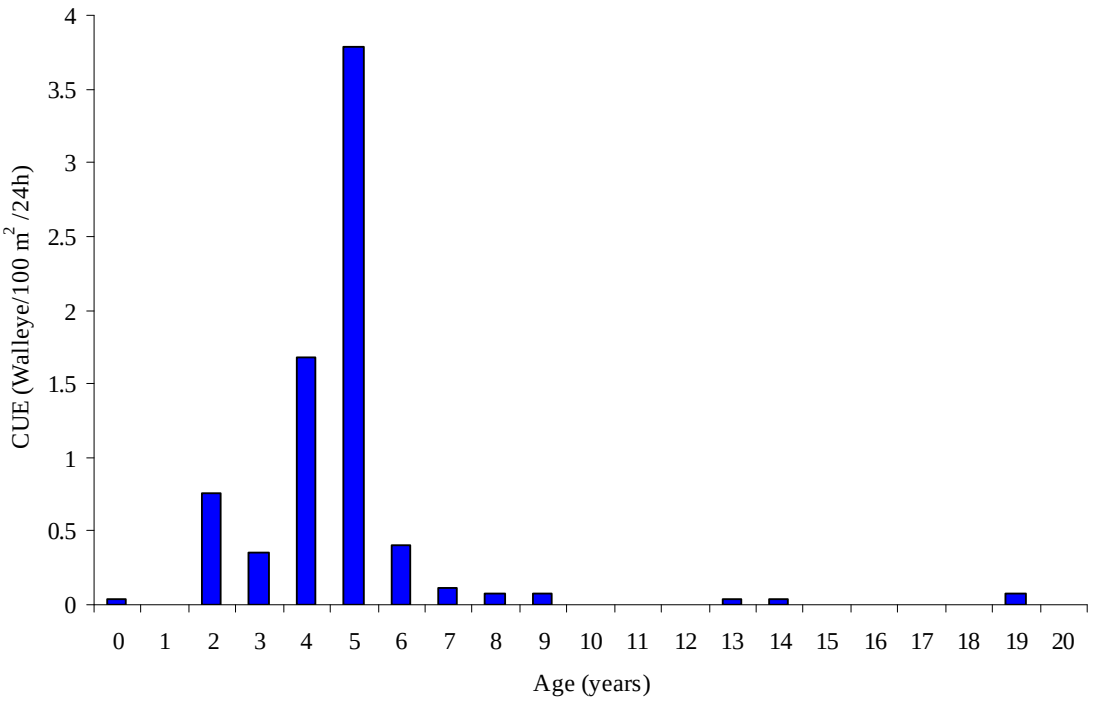

Figure 5. Age frequency distribution, Travers Reservoir 2011 (mean age = 4.7 years).

Table 1. 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
Travers Reservoir 2011			**mean age 4.7**	**12 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
Travers Reservoir 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
Travers Reservoir 2011				**Females at 7** **Males at 6**
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
Travers Reservoir 2011			**50 cm FL in 7 years**	
Catch Rate FWIN		High >30 walleye / net	Moderate 5 - 25 walleye / net	Low <5 walleye / net
Travers Reservoir 2011			**6.9 walleye/net**	

3.6 Age Class Stability

The Walleye age class structure observed in 2011 is indicative of a vulnerable population (Table 1). Only a single strong age class of adult fish was present in the sample, and older fish were only present in very low numbers (Figure 5). The presence of higher numbers of young fish (aged 0 to 4) indicates that recruitment is successfully occurring at Travers Reservoir. The truncated age distribution for older fish can therefore be attributed to removal of this portion of the population via harvest or emigration. As a result, the age class distribution could stabilize with increased survival amongst the older Walleye age classes.

3.7 Age at Maturity

The sex ratio observed for Walleye from Travers Reservoir was 1.37 females : 1.0 male in 2011. Males started to mature at age 2, and were completely mature by age 6 (Figure 6). Females started to mature at age 5 and were completely mature at age 7 (Figure 7). The onset of maturity observed is comparatively rapid (i.e. at a low age), which is indicative of a collapsed Walleye population under the Stock Classification Matrix (Table 1).

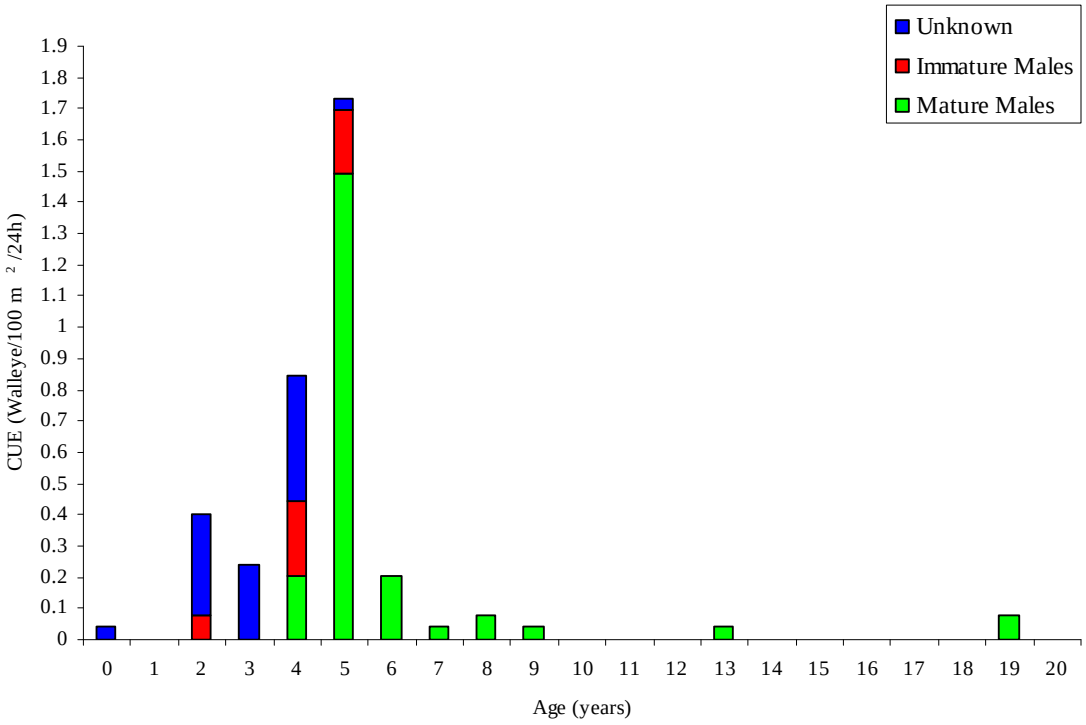

Figure 6. Age-at-maturity of male Walleye, Travers Reservoir 2011.

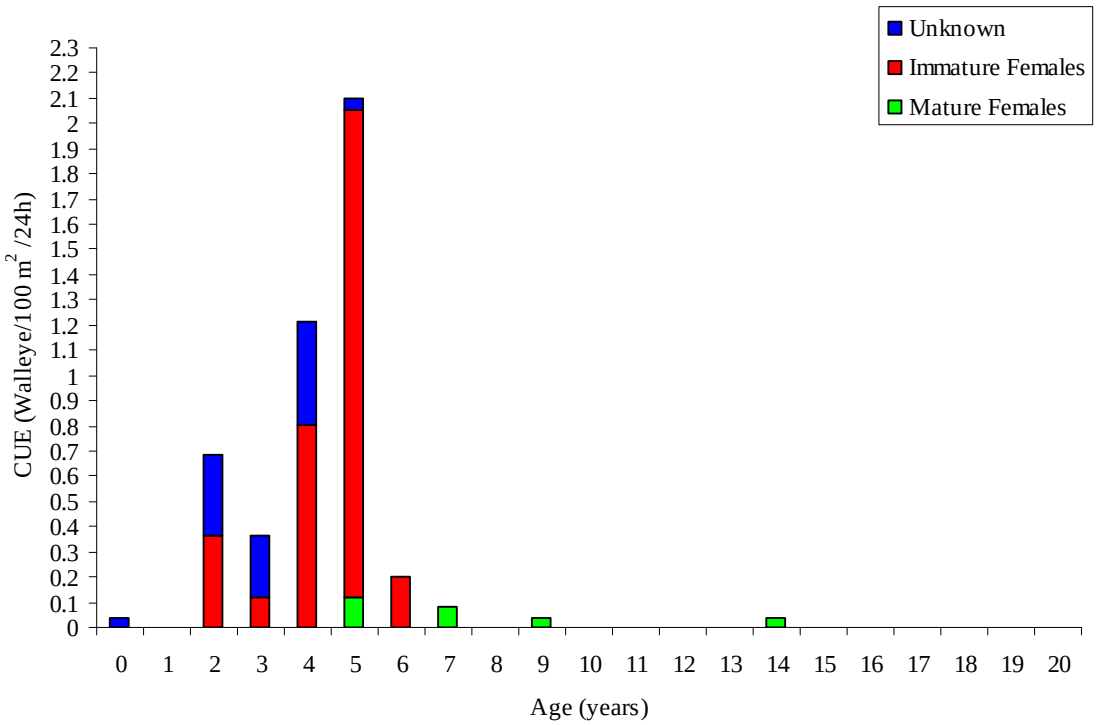

Figure 7. Age-at-maturity of female Walleye, Travers Reservoir 2011.

3.8 Length at Age

The growth observed for Walleye in 2011 was characteristic of the normal, asymptotic growth expected for the species; with females progressively outstripping male growth after maturation (5 years) (Figure 8). Overall growth at this location was moderate, with Walleye reaching 50 cm in 7 years (Figure 9). The latter criterion is characteristic of a vulnerable population according to the Stock Classification Matrix (Table 1).

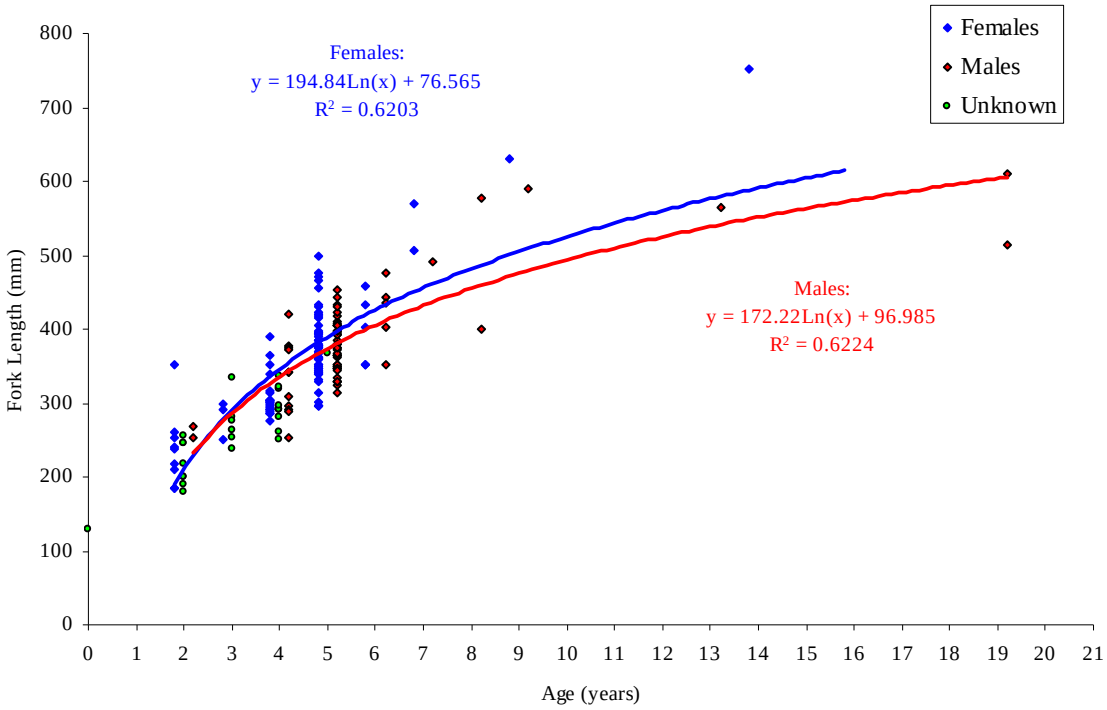

Figure 8. Length-at-at (logarithmic line of best fit) of Walleye, Travers Reservoir 2011.

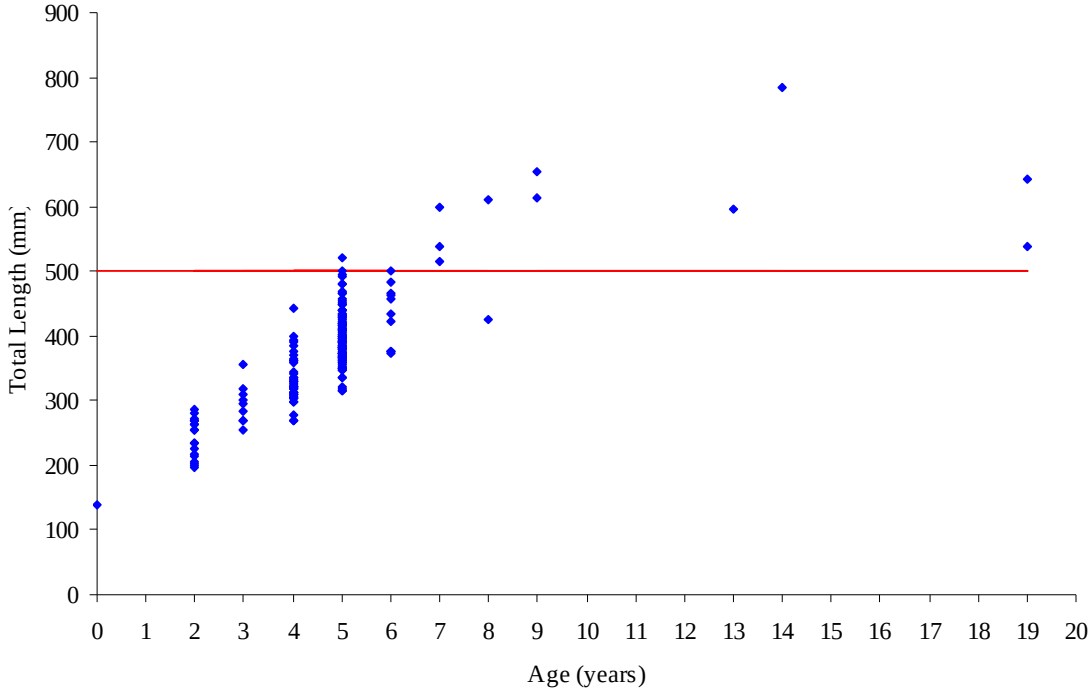

Figure 9. Walleye length-at-age compared to 50 cm total length for Travers Reservoir, 2011.

3.9 Length at Weight

The growth pattern of Walleye from Travers Reservoir was normal for the species, with weight increasing in proportion to length at progressively larger sizes (Figure 10). No exceptionally fat or thin individuals were observed in 2011, which is indicative of the presence of abundant resources (including food), and the absence of disease.

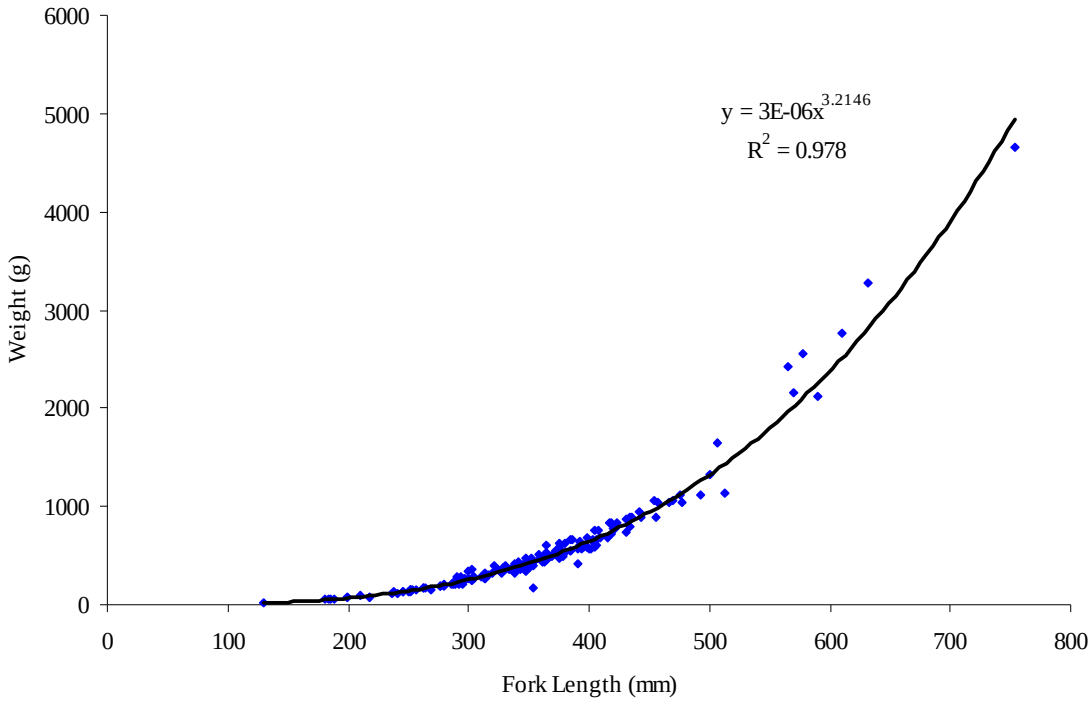

Figure 10. Growth of Walleye (expressed as Length vs. Weight) from Travers Reservoir, 2011.

3.10 Gonadosomatic Index

The Gonadosomatic Index (GSI) is the ratio of the gonad weight to total body weight for female Walleye. This metric is an indicator of reproductive status, since spawning females exhibit a far higher gonad weight in proportion to their body weight than non-spawning or immature fish. At Travers Reservoir in 2011 mature female Walleye were differentiated from immature females by exhibiting gonad weights in excess of 1.5% of their body weight (Figure 11).

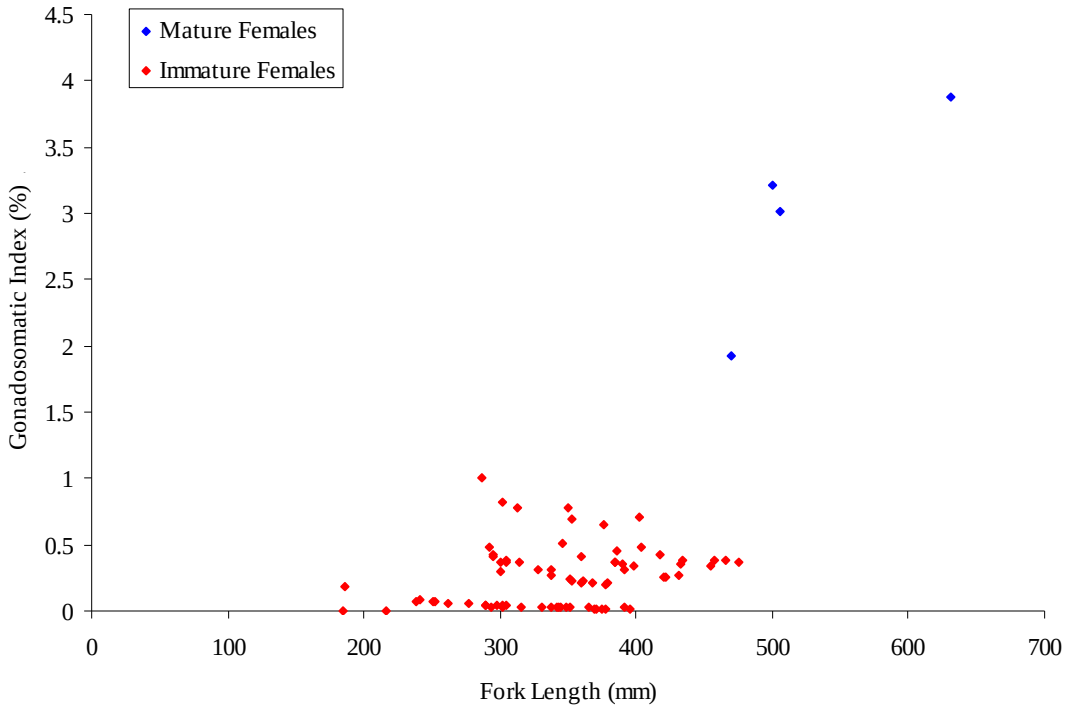

Figure 11. Walleye Gonadosomatic Index, Travers Reservoir 2011.

3.11 Von Bertalanffy Growth Equation

In general fish exhibit asymptotic growth, where length increases proportionately rapidly in early life, and growth decreases over time as age and size maxima are attained. The von Bertalanffy growth curve for Walleye from Travers Reservoir in 2011 exhibited this anticipated pattern (Figure 12).

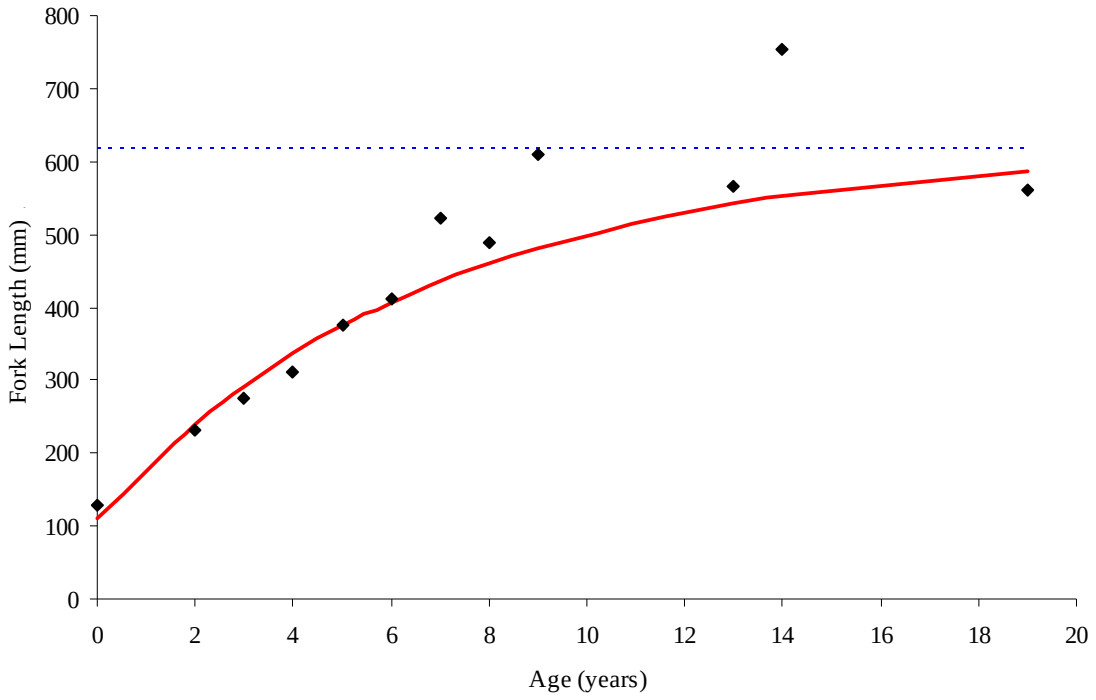

Figure 12. Von Bertalanffy growth curve and parameters fitted to observed fork-length-to-age data forTravers Reservoir, 2011 (k = 0.147, t_0 = -1.362, L_∞ = 617 mm).

4.0 SUMMARY

The management status of the Walleye population in Travers Reservoir is vulnerable in 2011 according to the criteria laid out in the ASRD *Walleye Management and Recovery Plan* (Berry 1995). Three out of the total five biological characteristics were categorized as vulnerable, while one was collapsed, and one was split between the collapsed and vulnerable categories (Table 1).

The presence of young Walleye -- young of the year (age 0) to five years of age – indicates that recruitment is occurring at this location. Overall the age class distribution is broad, with fish aged 0 to 19 in the sample. However, only a single adult age class (comprised of 5 year old fish) was well represented in the survey, consisting of 50.8% of the total sample. This distribution straddles the vulnerable and collapsed categories of

the Stock Assessment Matrix, and is indicative of a heavily harvested population (where almost all of the fish over the size limit have been removed).

The CUE for Walleye from Travers Reservoir in 2011 is moderate, and within the range for locations from southern Alberta. While the overall population classification was vulnerable, the normal growth and presence of regular recruitment which was observed indicates that the population could increase and stabilize in distribution over time. Ongoing monitoring and management is therefore critical to the preservation of this population.

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6.0 APPENDICES

6.1 Catch Composition for FWIN nets, Travers Reservoir 2011

Set	Stratum	Depth (m)	Temp (°C)	Soak Time (h)	Species								
					WALL	LKWH	NRPK	YLPR	LNSC	WHSC	SRSC	BURB	Total
TD1	deep	(25.9 - 25.9)	15.2	24.5	0	2	0	0	0	0	0	0	2
TD10	deep	(8.8 - 8.7)	15.3	20.7	0	2	0	0	0	0	0	0	2
TD3	deep	(6.1 - 6.1)	14.9	23.8	10	23	0	0	0	0	0	0	33
TD4	deep	(9.9 - 9.9)	14.9	23.3	0	1	0	0	0	0	0	0	1
TM16	medium	(6.6 - 6.6)	13.8	24.0	3	18	1	0	0	0	0	0	22
TM17	medium	(1.7 - 1.7)	14.9	22.1	8	13	0	0	0	2	0	0	23
TM19	medium	(1.5 - 1.9)	14.9	22.0	10	10	0	0	0	0	0	0	20
TM20	medium	(4.9 - 5.5)	14.1	23.3	7	20	4	0	0	0	0	0	31
TM21	medium	(3.0 - 3.0)	15.2	22.7	16	16	0	0	0	0	0	0	32
TM22	medium	(3.0 - 3.1)	15.0	21.9	11	24	0	0	3	0	0	0	38
TM23	medium	(6.4 - 6.5)	14.1	24.0	3	8	0	0	0	0	0	0	11
TM24	medium	(1.6 - 2.1)	14.9	24.8	4	4	0	0	0	0	0	0	8
TM25	medium	(2.1 - 2.1)	14.8	23.8	16	14	0	0	0	2	0	0	32
TM27	medium	(10.4 - 11.7)	14.2	24.8	7	7	0	0	0	0	1	0	15
TM28	medium	(9.1 - 21.3)	14.5	21.3	13	13	0	0	1	0	0	1	28
TM28B	medium	(1.5 - 4.9)	15.2	22.2	25	8	0	0	1	0	0	0	34
TM29	medium	(2.1 - 2.1)	15.2	23.4	7	10	1	0	0	0	0	0	18
TM29B	medium	(5.8 - 11.9)	14.3	22.8	19	15	2	0	0	0	0	0	36
TS30	shallow	(1.5 - 1.3)	14.9	23.8	2	16	0	0	0	0	0	0	18
TS31	shallow	(3.4 - 4.6)	14.9	22.5	2	12	6	0	1	1	0	0	22
TS32	shallow	(0.6 - 0.9)	14.9	24.8	1	5	5	5	0	0	0	0	16
TS33	shallow	(1.6 - 1.8)	14.3	23.0	19	21	1	1	0	0	0	0	42
TS34	shallow	(1.9 - 4.4)	14.4	25.5	4	21	4	1	0	0	0	0	30
TD7	deep		15.5	21.6	0	0	0	0	0	0	0	0	0
TD8	deep	(7.9 - 10.1)	15.2	20.8	0	0	0	0	0	0	0	0	0
TD6	deep	(9.8 - 9.8)	15.8	22.5	0	0	0	0	0	0	0	0	0
Total					187	283	24	7	6	5	1	1	514
Average				23.1	7.19	10.88	0.92	0.27	0.23	0.19	0.04	0.04	19.77

6.1.1 Catch composition from shallow sets, Travers Reservoir 2011

Set	Depth (m)	Soak Time (h)	Species								
			WALL	LKWH	NRPK	YLPR	LNSC	WHSC	SRSC	BURB	Total
TS30	(1.5 - 1.3)	23.8	2	16	0	0	0	0	0	0	18
TS31	(3.4 - 4.6)	22.5	2	12	6	0	1	1	0	0	22
TS32	(0.6 - 0.9)	24.8	1	5	5	5	0	0	0	0	16
TS33	(1.6 - 1.8)	23.0	19	21	1	1	0	0	0	0	42
TS34	(1.9 - 4.4)	25.5	4	21	4	1	0	0	0	0	30
Total			28	75	16	7	1	1	0	0	128
Average		23.9	5.6	15.0	3.2	1.4	0.2	0.2	0.0	0.0	25.6

6.1.2 Catch composition from medium sets, Travers Reservoir 2011

Set	Depth (m)	Soak Time (h)	Species								
			WALL	LKWH	NRPK	YLPR	LNSC	WHSC	SRSC	BURB	Total
TM16	(6.6 - 6.6)	24.0	3	18	1	0	0	0	0	0	22
TM17	(1.7 - 1.7)	22.1	8	13	0	0	0	2	0	0	23
TM19	(1.5 - 1.9)	22.0	10	10	0	0	0	0	0	0	20
TM20	(4.9 - 5.5)	23.3	7	20	4	0	0	0	0	0	31
TM21	(3.0 - 3.0)	22.7	16	16	0	0	0	0	0	0	32
TM22	(3.0 - 3.1)	21.9	11	24	0	0	3	0	0	0	38
TM23	(6.4 - 6.5)	24.0	3	8	0	0	0	0	0	0	11
TM24	(1.6 - 2.1)	24.8	4	4	0	0	0	0	0	0	8
TM25	(2.1 - 2.1)	23.8	16	14	0	0	0	2	0	0	32
TM27	(10.4 - 11.7)	24.8	7	7	0	0	0	0	1	0	15
TM28	(9.1 - 21.3)	21.3	13	13	0	0	1	0	0	1	28
TM28B	(1.5 - 4.9)	22.2	25	8	0	0	1	0	0	0	34
TM29	(2.1 - 2.1)	23.4	7	10	1	0	0	0	0	0	18
TM29B	(5.8 - 11.9)	22.8	19	15	2	0	0	0	0	0	36
Total			71	53	3	0	2	0	1	1	131
Average		23.1	14.7	15.5	0.7	0.0	0.5	0.3	0.1	0.1	31.9

6.1.3 Catch composition from deep sets, Travers Reservoir 2011

Set	Depth (m)	Soak Time (h)	Species								
			WALL	LKWH	NRPK	YLPR	LNSC	WHSC	SRSC	BURB	Total
TD1	(25.9 - 25.9)	24.5	0	2	0	0	0	0	0	0	2
TD10	(8.8 - 8.7)	20.7	0	2	0	0	0	0	0	0	2
TD3	(6.1 - 6.1)	23.8	10	23	0	0	0	0	0	0	33
TD4	(9.9 - 9.9)	23.3	0	1	0	0	0	0	0	0	1
TD7		21.6	0	0	0	0	0	0	0	0	0
TD8	(7.9 - 10.1)	20.8	0	0	0	0	0	0	0	0	0
TD6	(9.8 - 9.8)	22.5	0	0	0	0	0	0	0	0	0
Total			10	28	0	0	0	0	0	0	38
Average		22.4	1.4	4.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4

6.2 Northern pike catches by mesh size, Travers Reservoir 2011

		Soak	Mesh Size								
Set	Stratum	Time (h)	25	38	51	64	76	102	127	152	Total
TD1	deep	24.5	0	0	0	0	0	0	0	0	0
TD10	deep	20.7	0	0	0	0	0	0	0	0	0
TD3	deep	23.8	0	0	0	0	0	0	0	0	0
TD4	deep	23.3	0	0	0	0	0	0	0	0	0
TM16	medium	24.0	0	0	0	1	0	0	0	0	1
TM17	medium	22.1	0	0	0	0	0	0	0	0	0
TM19	medium	22.0	0	0	0	0	0	0	0	0	0
TM20	medium	23.3	0	0	0	0	0	0	2	2	4
TM21	medium	22.7	0	0	0	0	0	0	0	0	0
TM22	medium	21.9	0	0	0	0	0	0	0	0	0
TM23	medium	24.0	0	0	0	0	0	0	0	0	0
TM24	medium	24.8	0	0	0	0	0	0	0	0	0
TM25	medium	23.8	0	0	0	0	0	0	0	0	0
TM27	medium	24.8	0	0	0	0	0	0	0	0	0
TM28	medium	21.3	0	0	0	0	0	0	0	0	0
TM28B	medium	22.2	0	0	0	0	1	0	0	0	1
TM29	medium	23.4	0	0	0	1	1	0	0	0	2
TM29B	medium	22.8	0	0	0	0	0	0	0	0	0
TS30	shallow	23.8	0	0	0	0	0	0	0	0	0
TS31	shallow	22.5	0	0	0	2	2	0	2	0	6
TS32	shallow	24.8	0	2	1	0	2	0	0	0	5
TS33	shallow	23.0	0	0	1	0	0	0	0	0	1
TS34	shallow	25.5	0	0	1	0	0	1	1	1	4
TD7	deep	21.6	0	0	0	0	0	0	0	0	0
TD8	deep	20.8	0	0	0	0	0	0	0	0	0
TD6	deep	22.5	0	0	0	0	0	0	0	0	0
Total			0	2	3	4	6	1	5	3	24

6.3 Lake whitefish catches by mesh size, Travers Reservoir 2011

		Soak	Mesh Size								
Set	Stratum	Time (h)	25	38	51	64	76	102	127	152	Total
TD1	deep	24.5	0	0	0	0	0	2	0	0	2
TD10	deep	20.7	0	0	0	0	0	2	0	0	2
TD3	deep	23.8	0	0	5	6	5	7	0	0	23
TD4	deep	23.3	0	0	0	0	1	0	0	0	1
TM16	medium	24.0	0	0	0	3	8	3	4	0	18
TM17	medium	22.1	0	0	0	3	3	5	2	0	13
TM19	medium	22.0	0	0	0	1	2	6	1	0	10
TM20	medium	23.3	0	1	0	4	6	6	3	0	20
TM21	medium	22.7	0	0	0	3	4	9	0	0	16
TM22	medium	21.9	0	4	1	4	10	5	0	0	24
TM23	medium	24.0	0	1	1	2	2	2	0	0	8
TM24	medium	24.8	0	0	0	0	4	0	0	0	4
TM25	medium	23.8	0	0	0	1	4	8	1	0	14
TM27	medium	24.8	0	0	0	1	2	4	0	0	7
TM28	medium	21.3	0	2	2	2	5	1	1	0	13
TM28B	medium	22.2	0	0	1	0	2	5	0	0	8
TM29	medium	23.4	0	0	1	1	4	4	0	0	10
TM29B	medium	22.8	1	1	1	3	2	7	0	0	15
TS30	shallow	23.8	1	0	0	2	5	8	0	0	16
TS31	shallow	22.5	0	0	0	1	4	4	3	0	12
TS32	shallow	24.8	0	0	0	2	2	0	1	0	5
TS33	shallow	23.0	0	4	0	3	6	6	1	1	21
TS34	shallow	25.5	0	1	1	2	8	8	1	0	21
TD7	deep	21.6	0	0	0	0	0	0	0	0	0
TD8	deep	20.8	0	0	0	0	0	0	0	0	0
TD6	deep	22.5	0	0	0	0	0	0	0	0	0
Total			2	14	13	44	89	102	18	1	283

6.4 Yellow Perch catches by mesh size, Travers Reservoir 2011

		Soak	Mesh Size								
Set	Stratum	Time (h)	25	38	51	64	76	102	127	152	Total
TD1	deep	24.5	0	0	0	0	0	0	0	0	0
TD10	deep	20.7	0	0	0	0	0	0	0	0	0
TD3	deep	23.8	0	0	0	0	0	0	0	0	0
TD4	deep	23.3	0	0	0	0	0	0	0	0	0
TM16	medium	24.0	0	0	0	0	0	0	0	0	0
TM17	medium	22.1	0	0	0	0	0	0	0	0	0
TM19	medium	22.0	0	0	0	0	0	0	0	0	0
TM20	medium	23.3	0	0	0	0	0	0	0	0	0
TM21	medium	22.7	0	0	0	0	0	0	0	0	0
TM22	medium	21.9	0	0	0	0	0	0	0	0	0
TM23	medium	24.0	0	0	0	0	0	0	0	0	0
TM24	medium	24.8	0	0	0	0	0	0	0	0	0
TM25	medium	23.8	0	0	0	0	0	0	0	0	0
TM27	medium	24.8	0	0	0	0	0	0	0	0	0
TM28	medium	21.3	0	0	0	0	0	0	0	0	0
TM28B	medium	22.2	0	0	0	0	0	0	0	0	0
TM29	medium	23.4	0	0	0	0	0	0	0	0	0
TM29B	medium	22.8	0	0	0	0	0	0	0	0	0
TS30	shallow	23.8	0	0	0	0	0	0	0	0	0
TS31	shallow	22.5	0	0	0	0	0	0	0	0	0
TS32	shallow	24.8	1	4	0	0	0	0	0	0	5
TS33	shallow	23.0	0	1	0	0	0	0	0	0	1
TS34	shallow	25.5	1	0	0	0	0	0	0	0	1
TD7	deep	21.6	0	0	0	0	0	0	0	0	0
TD8	deep	20.8	0	0	0	0	0	0	0	0	0
TD6	deep	22.5	0	0	0	0	0	0	0	0	0
Total			2	5	0	0	0	0	0	0	7

6.5 Statistics of the catch distribution for game fish catches, Travers Reservoir 2011. This data is for presentation of the statistical nature of the catch distribution and are based on the geometric mean values (unweighted)

	Walleye	Lake Whitefish	Northern Pike	Yellow Perch	Longnose Sucker	White Sucker	Shorthead Redhorse	Burbot
Mean	7.2	10.9	0.9	0.3	0.2	0.2	0.04	0.04
Standard Error	1.4	1.5	0.3	0.2	0.1	0.1	0.03	0.03
Median	5.5	11	0	0	0	0	0	0
Mode	0	0	0	0	0	0	0	0
Standard Deviation	7.1	7.7	1.8	1	0.7	0.6	0.2	0.2
Sample Variance	51	58.9	3.1	1	0.4	0.3	0	0
Kurtosis	0	-1.2	2.6	21.9	13.5	7.3	26	26
Skewness	0.9	0.1	1.9	4.6	3.5	2.9	5.1	5.1
Range	26	25	7	6	4	3	2	2
Minimum	0	0	0	0	0	0	0	0
Maximum	25	24	6	5	3	2	1	1
Sum	187	283	24	7	6	5	1	1
Count	26	26	26	26	26	26	26	26
Confidence Interval (95%)	2.7	3	0.7	0.4	0.3	0.2	0.1	0.1