



Lac Ste. Anne Fall Walleye Index Netting (FWIN) Survey 2011

*Fisheries Management
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Abstract

From September 26 – 28, 2011, we conducted a Fall Walleye Index Netting (FWIN) assessment on Lac Ste. Anne. Multi-mesh gill nets captured a total of 297 fish during the period, comprised of 159 walleyes (*Sander vitreous*), 98 lake whitefish (*Coregonus clupeaformis*), 16 northern pike (*Esox lucius*), 14 yellow perch (*Perca flavescens*), 10 white sucker (*Catostomus commersoni*) and 1 spottail shiner (*Notropius hudsonius*). The mean catch rate (CPUE) for walleyes was 25.4 fish/100m²/24hr, with a range of 16.7 to 34.0 in 6 nets. Walleyes were represented by age classes from 1 to 15 years, with the exception of the 0 and 9 year old age classes. Mean age of the walleyes captured was 8.6 years, but the catch was dominated by the 12 and 13 year age classes. Female walleyes reached maturity by age 7 and male walleyes by age 6. Growth of Lac Ste. Anne walleyes is very slow, reaching 50 cm total length in approximately 12 years. The stock classification of the Lac Ste. Anne walleye population in 2011 is similar to that observed in 2008 and varies from Trophy status (wide age class distribution, very slow growth) to Vulnerable status (moderate CUE, unstable age class distribution and late age of maturity).

Introduction

Lac Ste. Anne, Alberta (Sec 32, Twp 55, Rge 3, W5M; FWMIS waterbody ID 5896) is located approximately 75 km northwest of Edmonton, Alberta, approximately 35 km northwest of the town of Stony Plain, Alberta (Figure 1). The lake has a surface area of 54.7 km² (Mitchell and Prepas 1990), and supports a diverse fish community including walleyes (*Sander vitreous*), lake whitefish (*Coregonus clupeaformis*), northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), white sucker (*Catostomus commersoni*), burbot (*Lota lota*) and spottail shiner (*Notropius hudsonius*). Access to the lake is via Highway 16 to Highway 43 and west on Secondary Road 633. The Sturgeon River, flows into Lac Ste. Anne via its south west corner from nearby Lake Isle and outlets the lake from the east side, flowing into Big Lake and eventually downstream into the North Saskatchewan River. Alberta Environment and Sustainable Resource Development implements strategies to manage sport fisheries for sustainable harvest. Monitoring is required to evaluate the effectiveness of these strategies and to recommend alternate strategies where evidence supports change. During FWIN our objective is to estimate relative abundance, population structure and growth of walleye, but we also collect data for northern pike, yellow perch and lake whitefish. These data are essential to provide sustainable harvest allocations for sport fish.

Methods

We captured walleyes using gill nets following the Fall Walleye Index Netting (FWIN) protocol described by Morgan (2000). A total of 6 nets were deployed for overnight sets from September 26 – 28, 2011. Captured fish were measured (Fork Length - mm), weighed (+/- 10 gm) and assessed for sexual maturity. Walleyes, northern pike, yellow perch and lake whitefish had an ageing structure removed for later analysis (otoliths for walleyes, yellow perch and lake whitefish; cleithra for northern pike). Relative abundance of each species captured was expressed as CPUE (fish/100 m²/24 h). Growth of walleyes was described using the von Bertalanffy growth model in FAST. Interpretations of walleye stock classification status are based on criteria limits defined in the Alberta Walleye Management Recovery Plan.

Results

The Lac Ste. Anne 2011 FWIN resulted in the capture of 297 fish (Table 1).

Table 1. Lac Ste. Anne 2011 FWIN results (Watkins 2011)

Species	No. Captured	Size Distribution (Total Length - mm)	Age Class Distribution
Walleyes	159	197 - 524	0 - 15; mean age = 8.6
Lake whitefish	98	116 - 595	0 - 22 ; mean age = 9.2
Northern pike	16	285 - 976	1 - 13; mean age = 4.5
Yellow perch	13	94 - 168	1 - 2; mean age = 1.4
White sucker	10	415 - 503 (FL)	N/A
Spottail shiner	1	100 (FL)	N/A

Captured fish in edible condition following sampling were distributed to representatives from members of the Alexis First Nations Band. Inedible fish were disposed of at the O.S. Longman incineration facility.

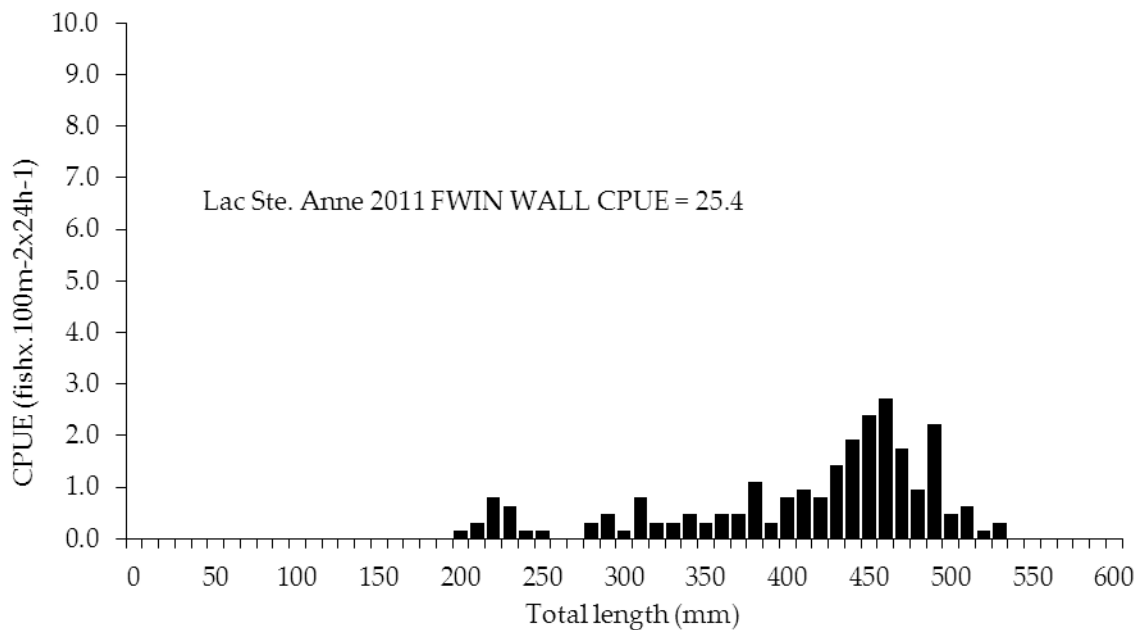


Figure 1. Length-frequency distribution of walleyes, Lac Ste. Anne 2011 FWIN

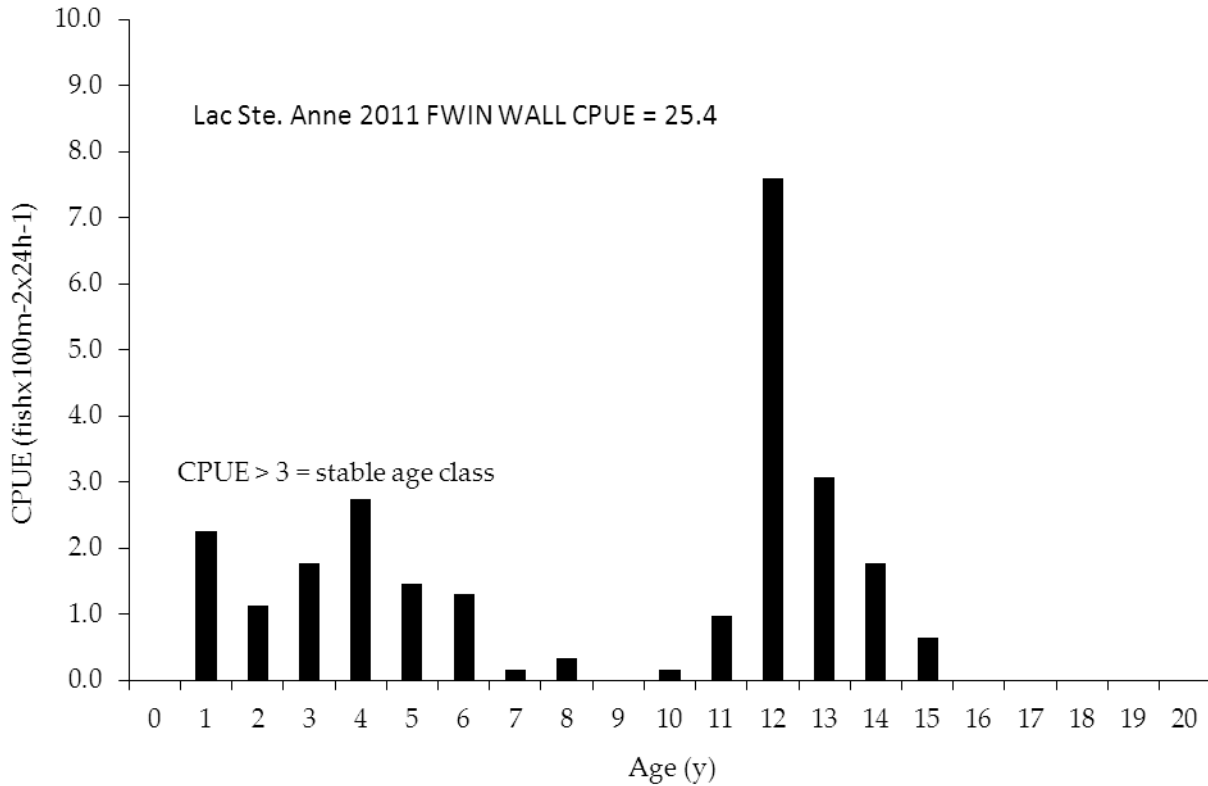


Figure 2. Age class distribution of walleyes, Lac Ste. Anne 2011 FWIN

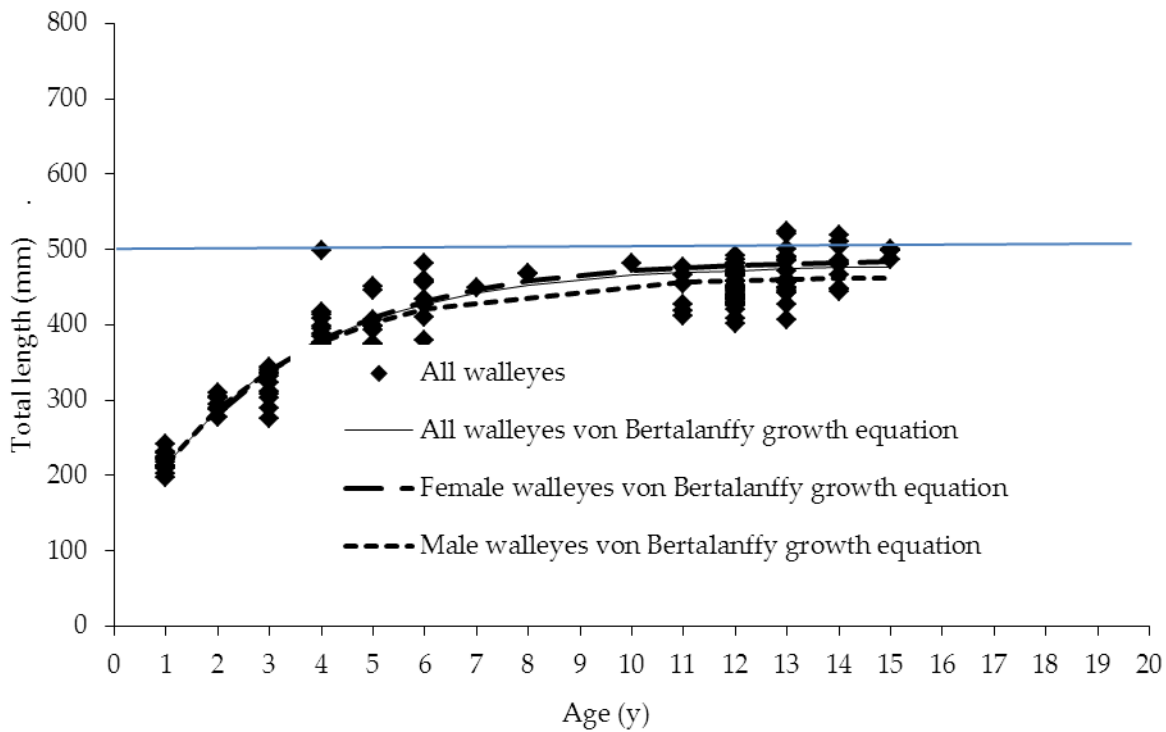


Figure 3. Growth of walleyes, Lac Ste. Anne 2011 FWIN

Table 2. Length-at-maturity for walleyes, Lac Ste. Anne 2011 FWIN

Size Class (TL - mm)	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0 - 50	0	0	0	0	0
51 - 100	0	0	0	0	0
101 - 150	0	0	0	0	0
151 - 200	1	0	0	0	0
201 - 250	11	2	0	0	0
251 - 300	1	1	1	3	0
301 - 350	1	4	0	9	0
351 - 400	0	2	9	8	1
401 - 450	0	2	30	4	11
451 - 500	1	1	18	0	32
501 - 550	0	0	2	0	4

Table 3. Age-at-maturity for walleyes, Lac Ste. Anne 2011 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	0	0	0	0	0
1	12	2	0	0	0
2	1	0	1	5	0
3	0	5	0	6	0
4	0	3	4	9	0
5	0	2	3	3	1
6	0	0	4	1	3
7	0	0	0	0	1
8	0	0	0	0	2
9	0	0	0	0	0
10	0	0	0	0	1
11	0	0	3	0	3
12	0	0	26	0	21
13	1	0	9	0	9
14	0	0	6	0	5
15	0	0	2	0	2

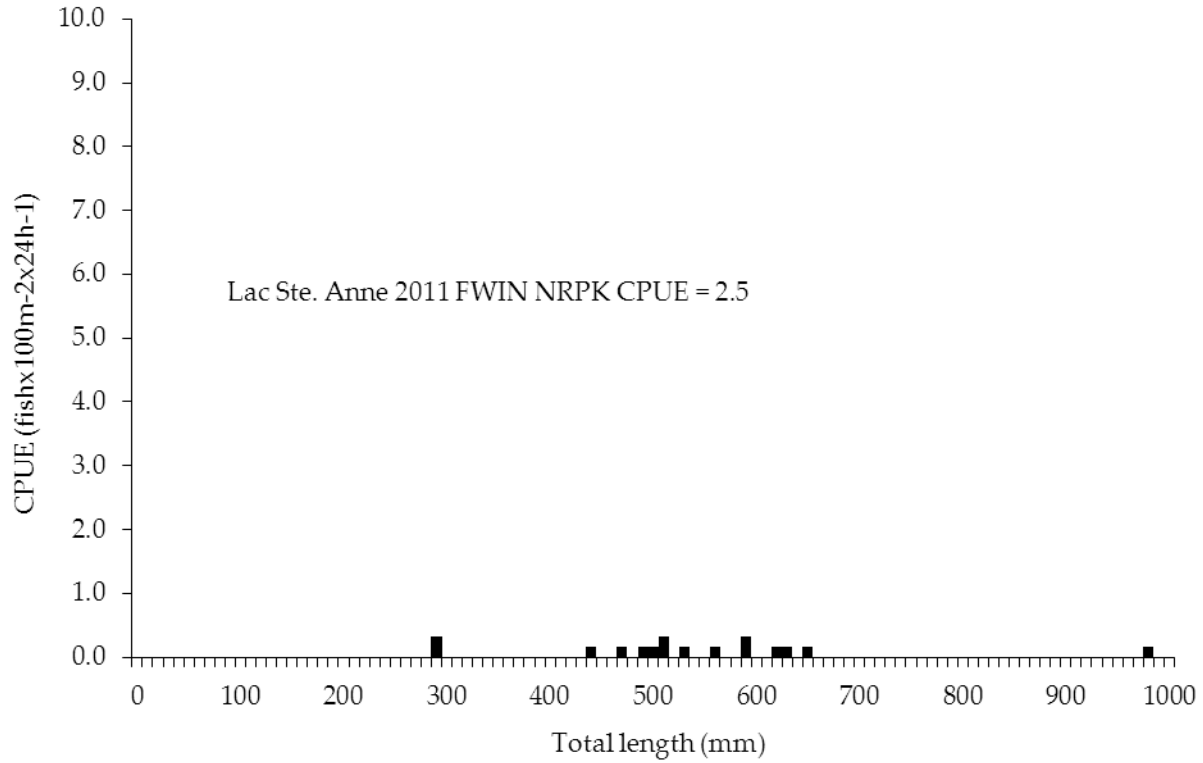


Figure 4. Length-frequency distribution of northern pike, Lac Ste. Anne 2011 FWIN

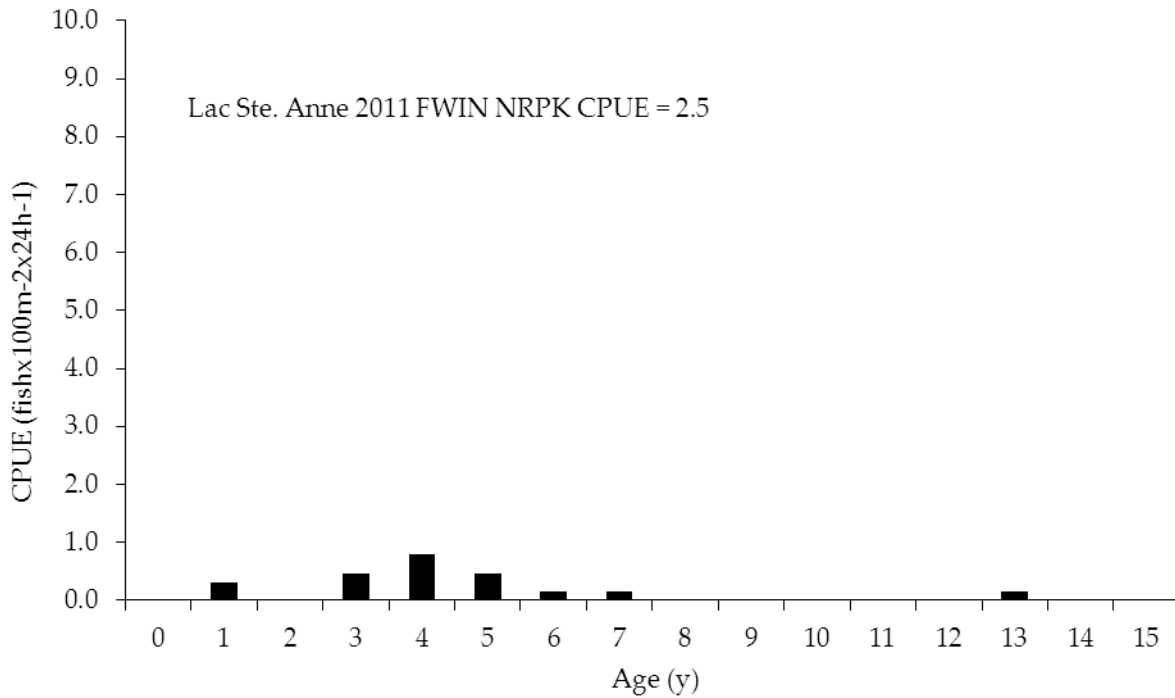


Figure 5. Age class frequency distribution of northern pike, Lac Ste. Anne 2011 FWIN

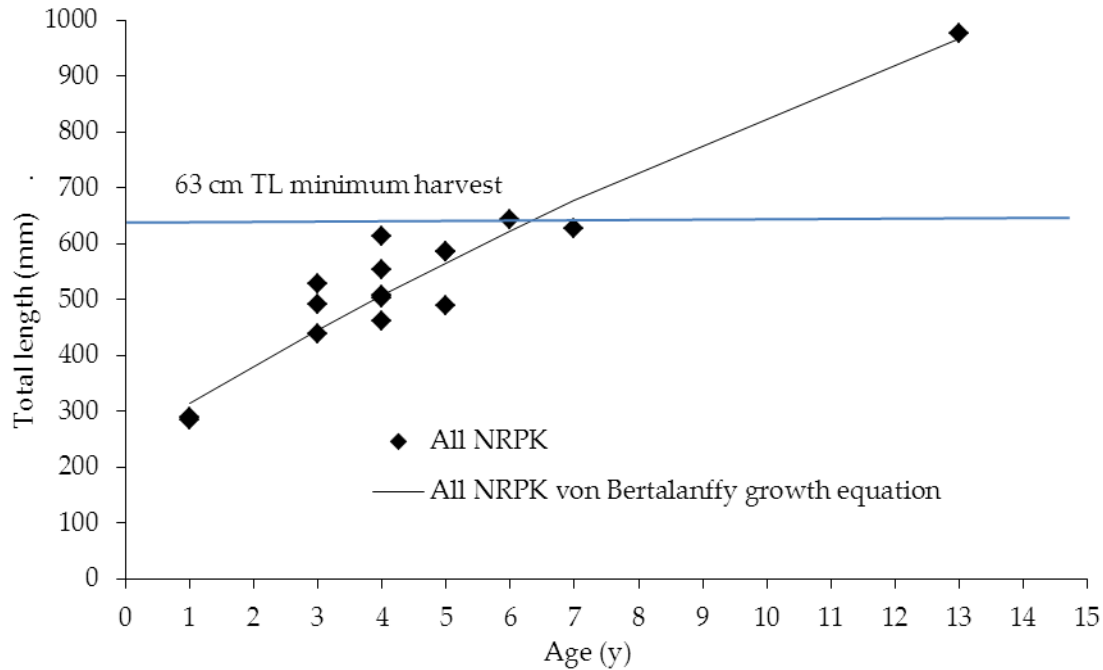


Figure 6. Growth of northern pike, Lac Ste. Anne 2011 FWIN

Table 4. Length-at-maturity for northern pike, Lac Ste. Anne 2011 FWIN

Size Class (TL - mm)	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0 - 50	0	0	0	0	0
51 - 100	0	0	0	0	0
101 - 150	0	0	0	0	0
151 - 200	0	0	0	0	0
201 - 250	0	0	0	0	0
251 - 300	0	0	0	2	0
301 - 350	0	0	0	0	0
351 - 400	0	0	0	0	0
401 - 450	0	0	1	0	0
451 - 500	0	0	2	0	1
501 - 550	0	0	1	0	2
551 - 600	0	0	0	0	3
601 - 650	0	0	0	0	3
651 - 700	0	0	0	0	0
701 - 750	0	0	0	0	0
751 - 800	0	0	0	0	0
801 - 850	0	0	0	0	0
851 - 900	0	0	0	0	0
901 - 950	0	0	0	0	0
951 - 1000	0	0	0	0	1

Table 5. Age-at-maturity for northern pike, Lac Ste. Anne 2011 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	0	0	0	0	0
1	0	0	0	2	0
2	0	0	0	0	0
3	0	0	2	0	1
4	0	0	1	0	4
5	0	0	1	0	2
6	0	0	0	0	1
7	0	0	0	0	1
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	0	1

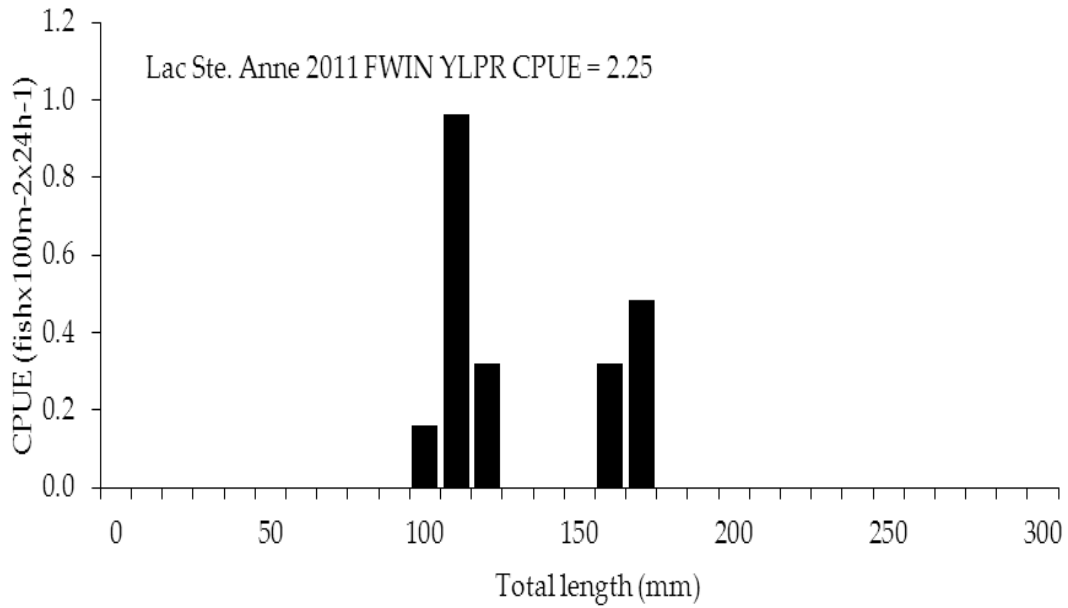


Figure 7. Length-frequency distribution of yellow perch, Lac Ste. Anne 2011 FWIN

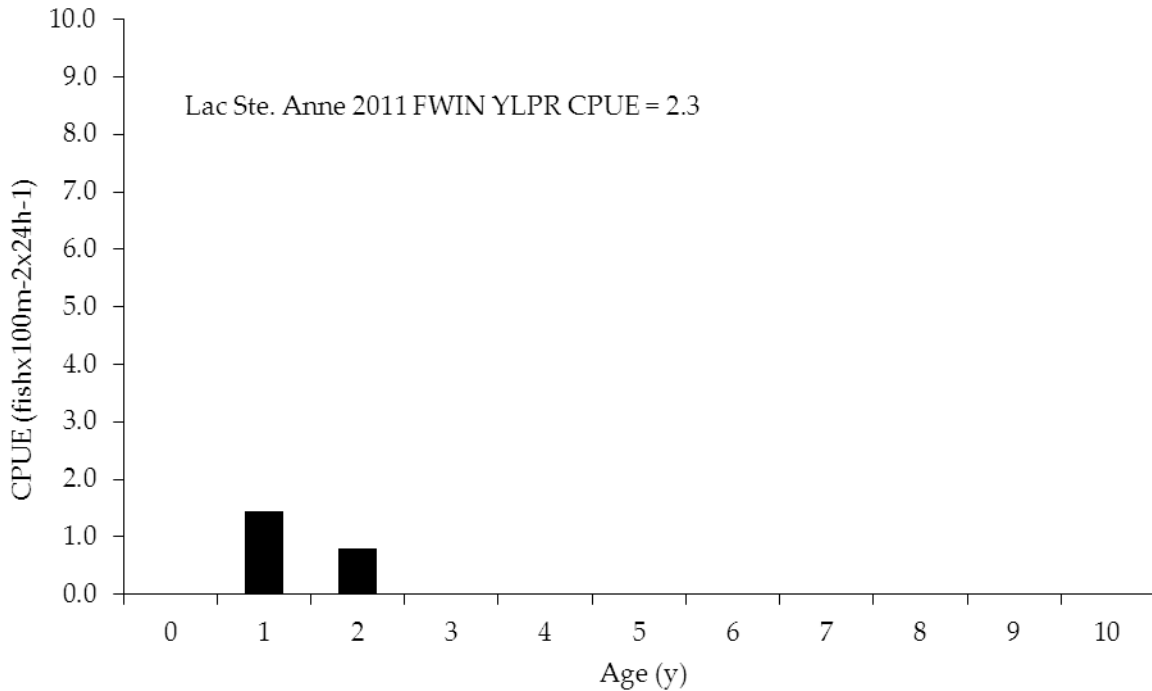


Figure 8. Age class-frequency distribution of yellow perch, Lac Ste. Anne 2011 FWIN

Table 6. Age-at-maturity for yellow perch, Lac Ste. Anne 2011 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	0	0	0	0	0
1	4	0	3	2	0
2	0	0	4	0	1

Table 7. Length-at-maturity for yellow perch, Lac Ste. Anne 2011 FWIN

Size Class (TL - mm)	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0 - 50	0	0	0	0	0
51 - 100	3	0	0	1	0
101 - 150	1	0	3	1	0
151 - 200	0	0	4	0	1

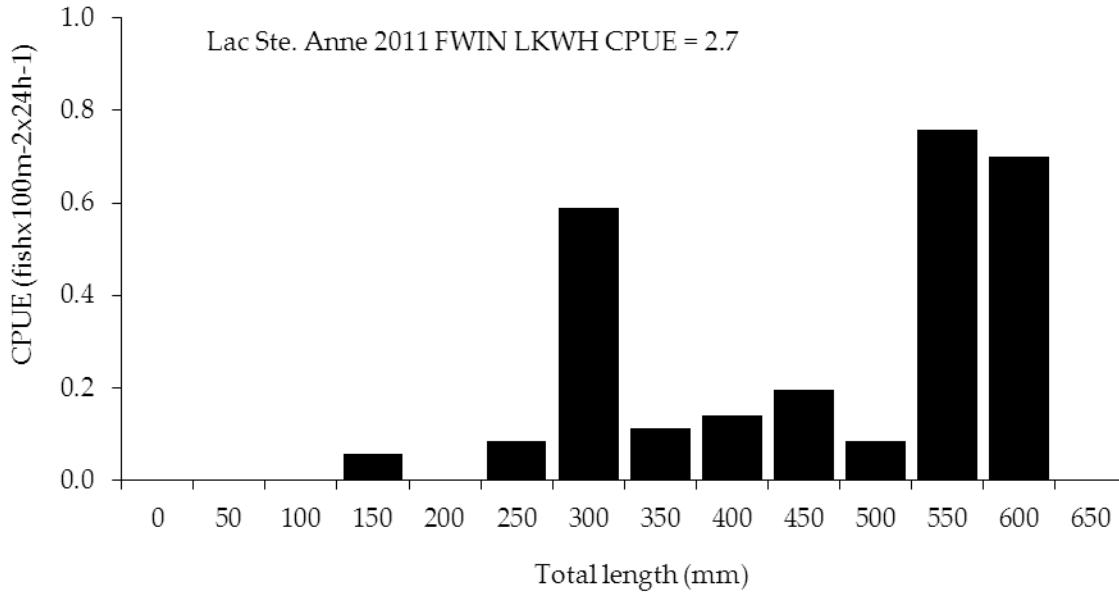


Figure 9. Length-frequency distribution of lake whitefish, Lac Ste. Anne 2011 FWIN

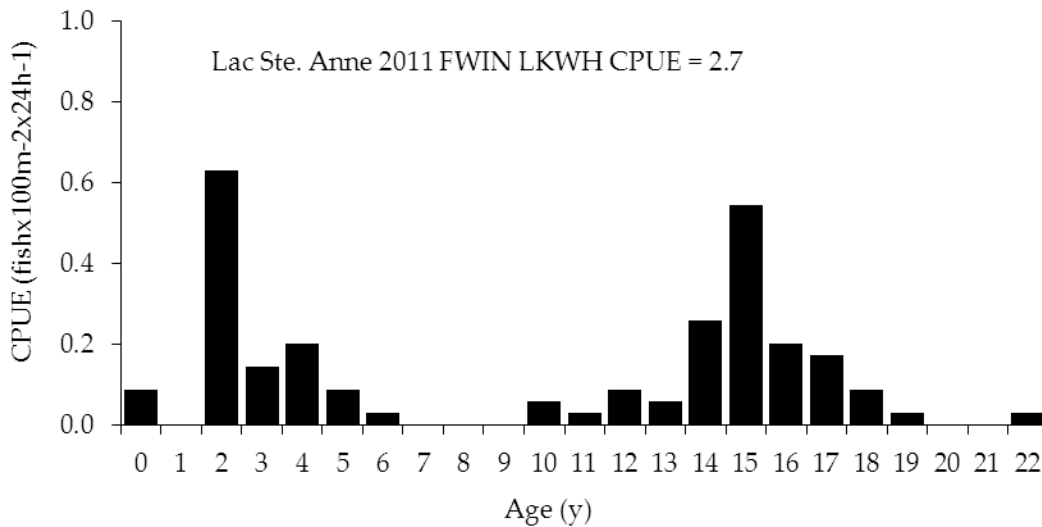


Figure 10. Age-frequency distribution of lake whitefish, Lac Ste. Anne 2011 FWIN

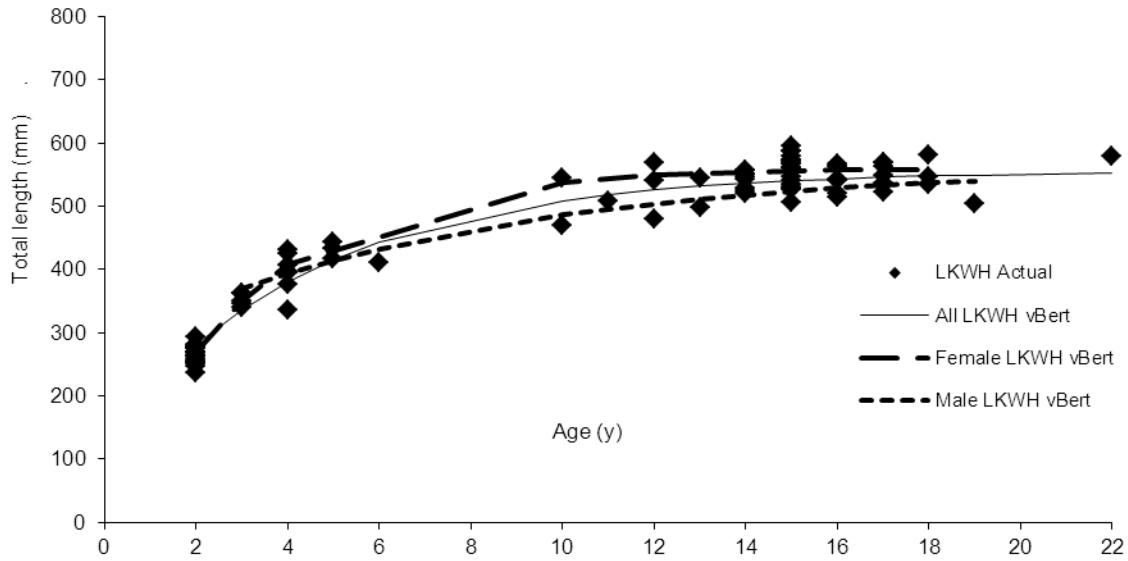


Figure 11. Growth of lake whitefish, Lac Ste. Anne 2011 FWIN

Table 8. Length-at-maturity for lake whitefish, Lac Ste. Anne 2011 FWIN

Size Class (TL - mm)	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0 - 50	0	0	0	0	0
51 - 100	0	0	0	0	0
101 - 150	2	0	0	0	0
151 - 200	0	0	0	0	0
201 - 250	2	0	0	2	0
251 - 300	14	0	0	7	0
301 - 350	2	0	1	1	0
351 - 400	0	1	0	4	0
401 - 450	0	1	5	1	0
451 - 500	0	0	3	0	0
501 - 550	1	0	18	0	8
551 - 600	1	0	14	0	10

Table 9. Age-at-maturity for lake whitefish, Lac Ste. Anne 2011 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	2	0	0	0	0
1	0	0	0	0	0
2	16	0	0	8	0
3	1	1	1	2	0
4	1	1	1	4	0
5	0	0	3	0	0
6	0	0	1	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	1	0	1
11	0	0	1	0	0
12	0	0	1	0	2
13	0	0	1	0	1
14	0	0	7	0	2
15	0	0	12	0	7
16	0	0	5	0	2
17	0	0	5	0	1
18	0	0	1	0	2
19	0	0	1	0	0
20	0	0	0	0	0
21	0	0	0	0	0
22	1	0	0	0	0

Interpretation

The status of the walleye population in Lac Ste. Anne in 2011 has changed a little since the last FWIN in 2008. Mean CPUE increased from 19.0 fish/100m²/24hr in 2008 to 25.4 fish/100m²/24hr in 2011, but the population continues to be characterized by a wide age class distribution with unstable year classes, late age-of maturity and very slow growth.

The 2011 CPUE for walleyes was 25.4 fish/100m²/24hr, with a range of 16.7 to 34.0 in 6 nets. Walleyes were represented by age classes from 1 to 15 years, with the exception of the 0 and 9 year old age classes (Figure 1 & 2). Mean age of the walleyes captured was 8.6 years, but the catch was dominated by the 12 and 13 year age classes. Female walleyes reached maturity by age 7 and male walleyes by age 6 (Table 2 & 3). Growth of Lac Ste. Anne walleyes is very slow, reaching 50 cm total length in approximately 12 years (Figure 3). The stock classification of the Lac Ste. Anne walleye population in 2011 is similar to that observed in 2008 and varies from Stable status (wide age class distribution, very slow growth) to Vulnerable status (moderate CUE, unstable age class distribution and late age of maturity).

Northern pike CPUE in 2011 rose to 2.5 fish/100m²/24hr from 0.6 fish/100m²/24hr in 2008. Growth continues to be relatively slow with the catch mostly dominated by smaller fish. Sampling in 2011 captured only 2 northern pike over the legal harvest size (>63 cm TL) in spite of the pike fishery being

ESRD/Fall Walleye Index Netting at Lac Ste. Anne, Alberta 2011

closed to sport harvest since 2007 (Figures 4 – 6; Tables 4 & 5). Yellow perch CPUE increased to 2.3 fish/100m²/24hr in 2011 from 0.8 fish/100m²/24hr in 2008 (Figures 7 & 8; Tables 6 & 7). The CPUE of lake whitefish in Lac Ste. Anne increased to 15.8 fish/100m²/24hr in 2011 from 8.0fish/100m²/24hr in 2008 (Figures 9 – 11; Tables 8 & 9).