Fall Walleye Index Netting at Lac la Nonne, 2012

Fisheries Management
Woodlands Area

February 21, 2012

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Abstract
From September 26 – 28, 2012, we conducted a Fall Walleye Index Netting (FWIN) assessment on Lac la Nonne. Multi-mesh gill nets captured a total of 201 fish during the period, comprised of 118 walleyes (*Sander vitreous*), 42 lake whitefish (*Coregonus clupeaformis*), 21 northern pike (*Esox lucius*), 10 tullibee (*Coregonus artedii*), 8 yellow perch (*Perca flavescens*) and 2 white suckers (*Catostomus commersoni*). The mean catch rate (CPUE) for walleyes was 23.2 fish/100m^2/24hr, with a range of 6.3 to 37.5 in 7 nets. Walleyes were represented by age classes from 1 to 24 years, with the exception of the 2, 19 and 23 year old age classes. Mean age of the walleyes captured was 11.2 years, but the catch was dominated by the 6 and 14 year age classes. Female walleyes reached maturity by age 7 and male walleyes by age 6. Growth of Lac la Nonne walleyes is very slow, with occasional females reaching 500 mm Total Length walleyes in Lac la Nonne by age 14, and males unable to achieve that length over twenty plus years. The stock classification of the Lac la Nonne walleye population in 2012 is similar to that observed in 2008 and varies from Trophy status (wide age class distribution, very slow growth) to Vulnerable status (moderate CPUE, unstable age class distribution and late age of maturity).

Introduction

Lac la Nonne (11 U E 675500, N 5980000) is located approximately 55 km northwest of the City of Edmonton in Township 57, Range 3, West of the Fifth Meridian in the boreal mixedwood forest zone of central Alberta (Figure 1). The hyper-eutrophic lake has a surface area of 1,180 ha, a mean depth of 7.8 m and a maximum depth of 19.8 meters (Mitchell and Prepas 1990). Lac la Nonne supports a diverse fish community including walleyes (*Sander vitreous*), northern pike, (*Esox lucius*), yellow perch (*Perca flavescens*), lake whitefish (*Coregonus clupeaformis*), tullibee (*Coregonus artedii*), burbot (*Lota lota*)
and white sucker (*Catostomus commersoni*) (Mitchell and Prepas 1990).

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, lake whitefish and tullibee. 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 7 nets were deployed for overnight sets from September 26 – 28, 2012. Captured fish were measured (Fork Length - mm), weighed (+/ 10 gm), assessed for sexual maturity and had an ageing structure removed for later analysis (otoliths for walleyes, yellow perch, lake whitefish and tullibee; cleithra for northern pike). Relative abundance of each species captured was expressed as CPUE (fish/100 m^2/24 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 la Nonne 2012 FWIN resulted in the capture of 201 fish (Table 1).

Table 1. Lac la Nonne 2012 FWIN results (Hildebrandt 2012)

Species	No. Captured	Size Distribution (Fork Length - mm)	Age Class Distribution
Walleyes	118	172 - 576	1 - 24 (mean age = 11.2)
Lake whitefish	42	98 - 575	0 - 24 (mean age = 14.7)
Northern pike	21	416 - 591	3 - 7 (mean age = 5.5)
Tullibee	10	95 - 444	0 - 16 (mean age = 8.8)
Yellow perch	8	140 - 230	3 - 5 (mean age = 4.1)
White sucker	2	415 - 499	N/A

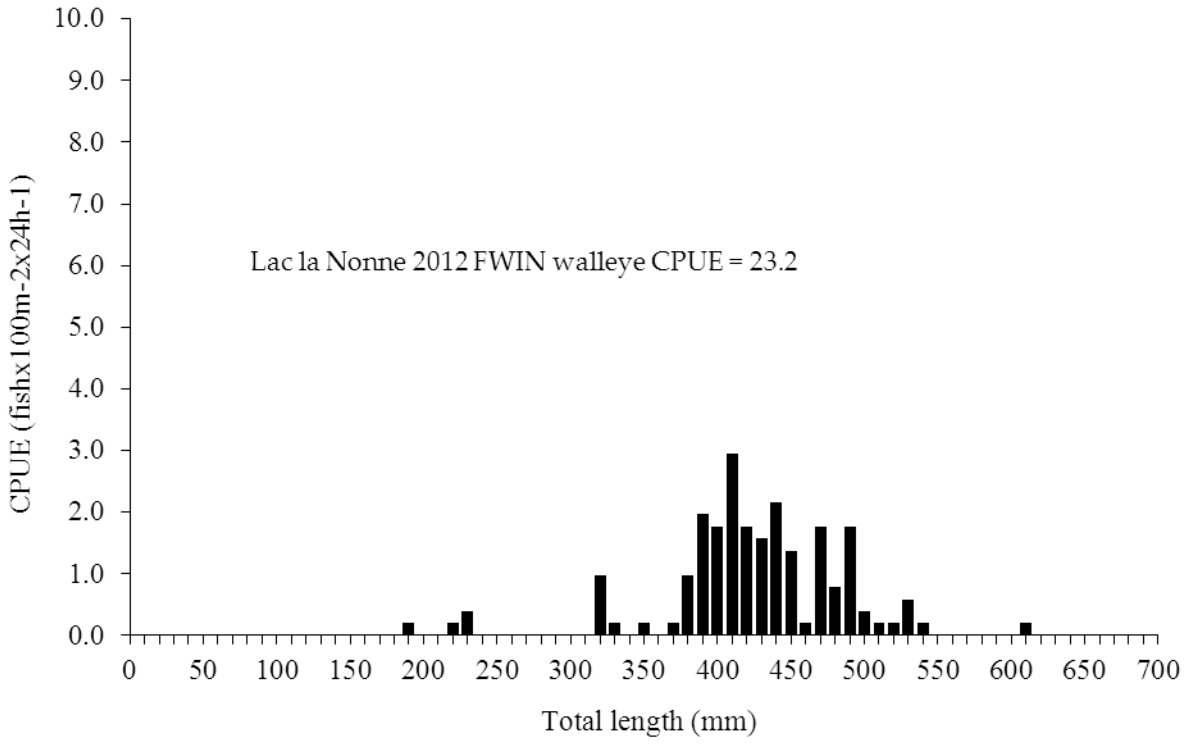

Figure 1. Length-frequency distribution of walleyes, Lac la Nonne 2012 FWIN

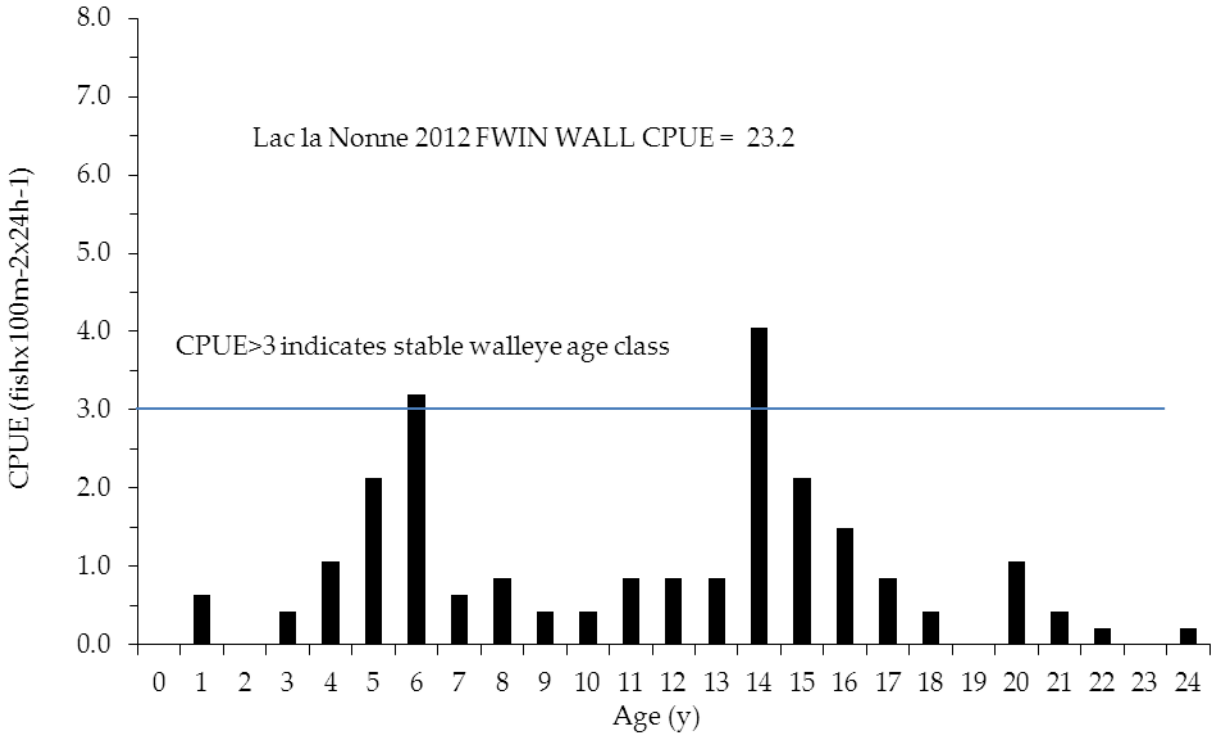

Figure 2. Age class distribution of walleyes, Lac la Nonne 2012 FWIN

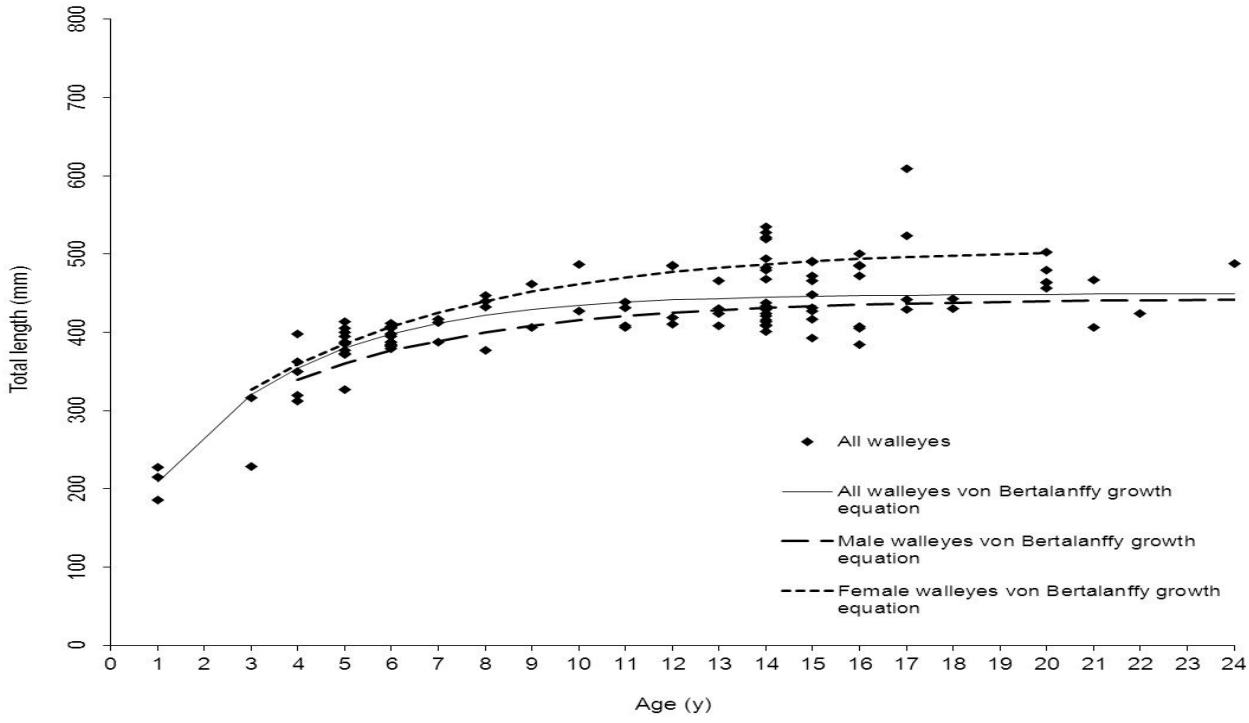

Figure 3. Growth of walleyes, Lac la Nonne 2012 FWIN

Table 2. Age-at-maturity for walleyes, Lac la Nonne FWIN 2012

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	0	0	0	0	0
1	4	0	0	0	0
2	0	0	0	0	0
3	1	0	0	1	0
4	1	1	0	3	0
5	0	0	7	3	0
6	1	0	11	2	1
7	0	0	0	0	3
8	0	0	2	0	2
9	0	0	1	0	1
10	0	0	1	0	1
11	0	0	3	0	1
12	0	0	2	0	2
13	0	0	3	0	1
14	0	0	10	0	9
15	1	0	6	0	3
16	0	0	3	0	4
17	0	0	2	0	2
18	0	0	2	0	0
19	0	0	0	0	0
20	0	0	0	2	1
21	0	0	2	0	0
22	0	1	0	0	0
23	0	0	0	0	0
24	0	0	1	0	0

Table 3. Length-at-maturity for walleyes, Lac la Nonne FWIN 2012

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	3	0	0	0	0
251 - 300	0	1	0	0	0
301 - 350	2	0	0	3	0
351 - 400	1	0	19	4	1
401 - 450	0	0	37	3	8
451 - 500	0	1	4	2	16
501 - 550	0	0	0	0	6
551 - 600	0	0	0	0	0
600 - 650	0	0	0	0	1

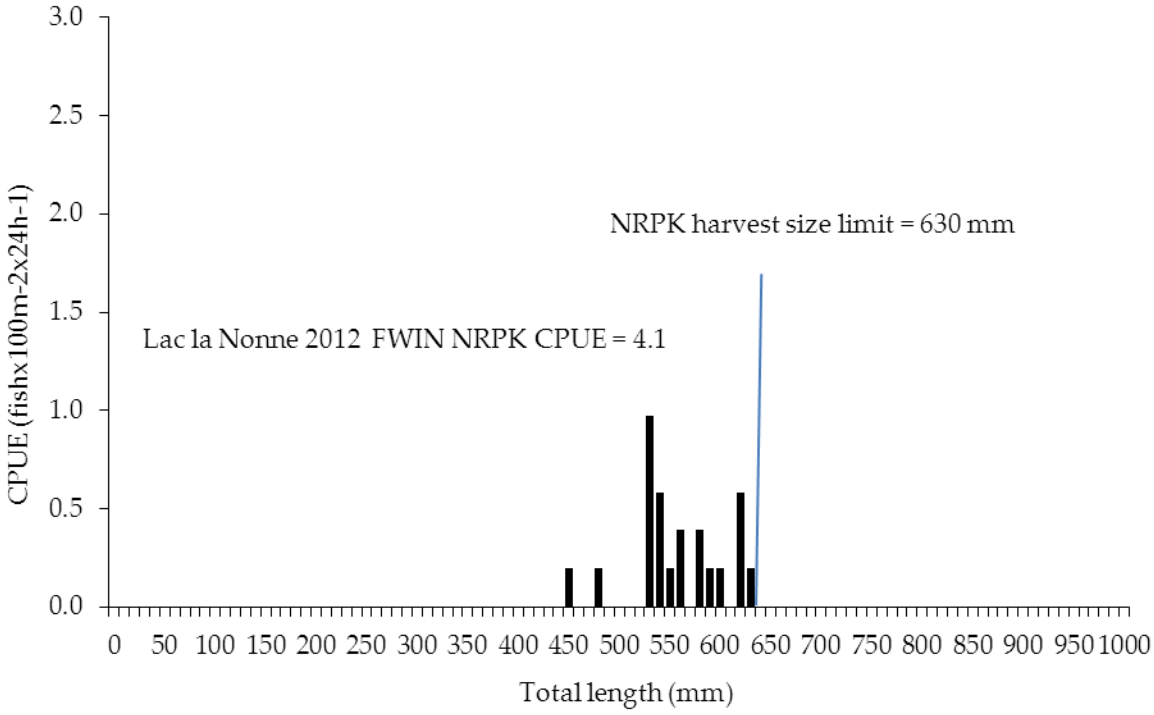

Figure 4. Length-frequency distribution of northern pike, Lac la Nonne 2012 FWIN

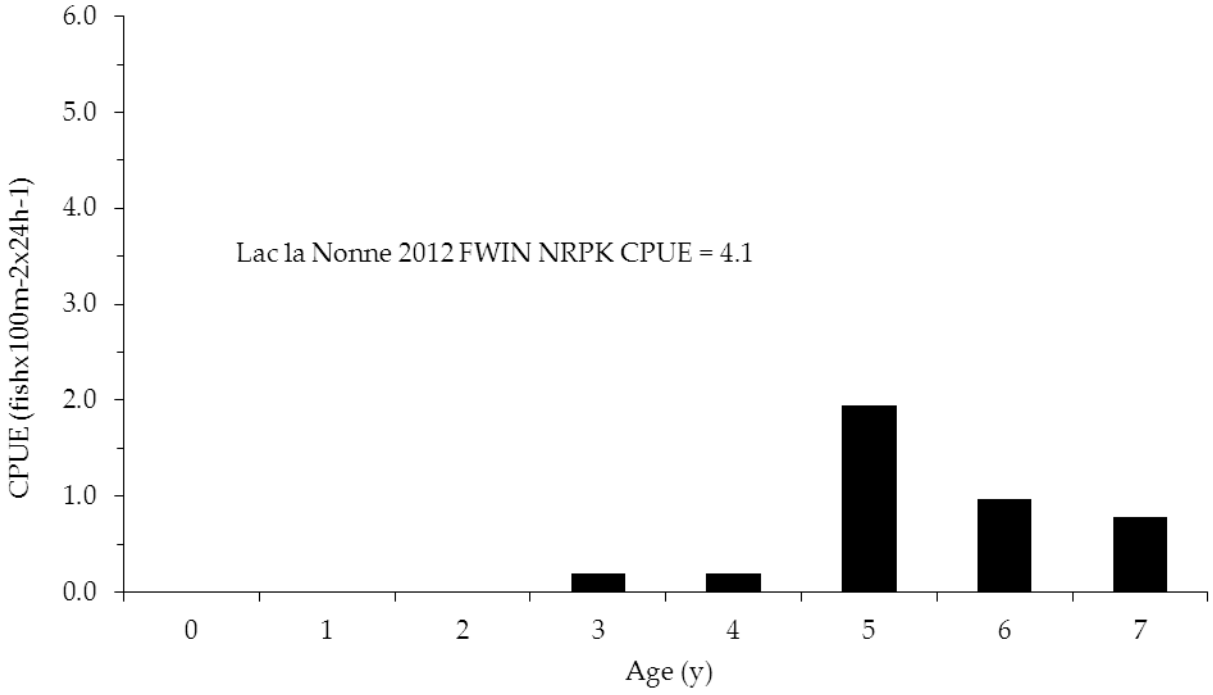

Figure 5. Age class frequency distribution of northern pike, Lac la Nonne 2012 FWIN

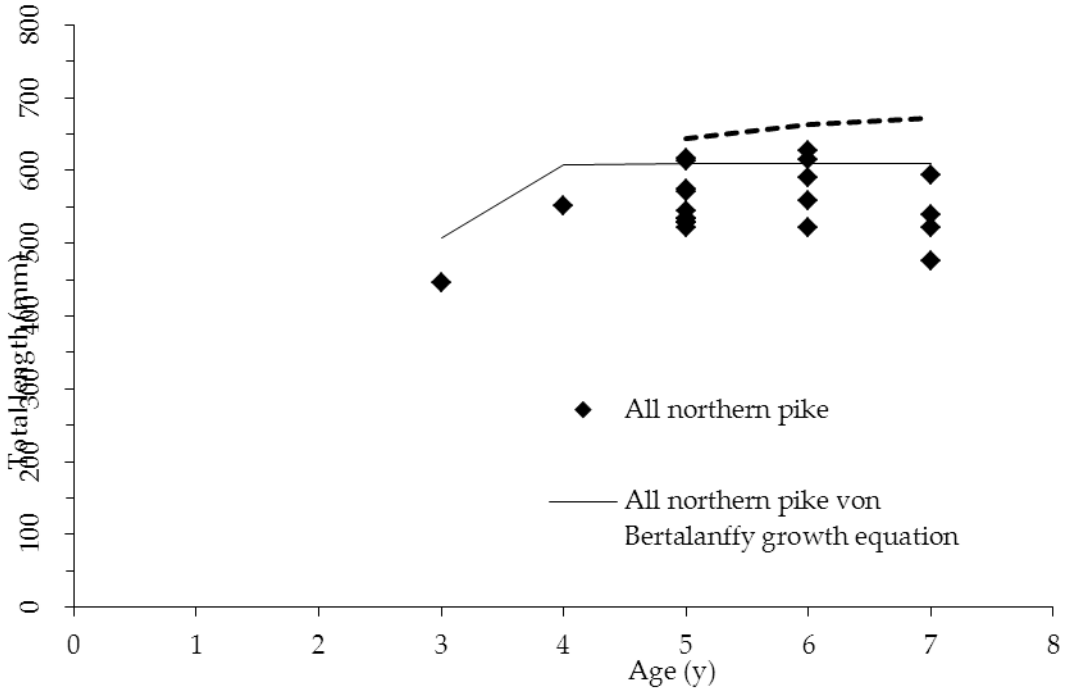

Figure 6. Growth of northern pike, Lac la Nonne 2012 FWIN

Table 4. Age-at-maturity for northern pike, Lac la Nonne 2012 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	0	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	1
4	1	0	0	0	0
5	0	0	3	0	7
6	0	0	1	0	4
7	0	0	3	0	1

Table 5. Length-at-maturity for northern pike, Lac la Nonne 2012 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	0	0
301 - 350	0	0	0	0	0
351 - 400	0	0	0	0	0
401 - 450	0	0	0	0	1
451 - 500	0	0	1	0	0
501 - 550	0	0	6	0	3
551 - 600	1	0	0	0	5
600 - 650	0	0	0	0	4

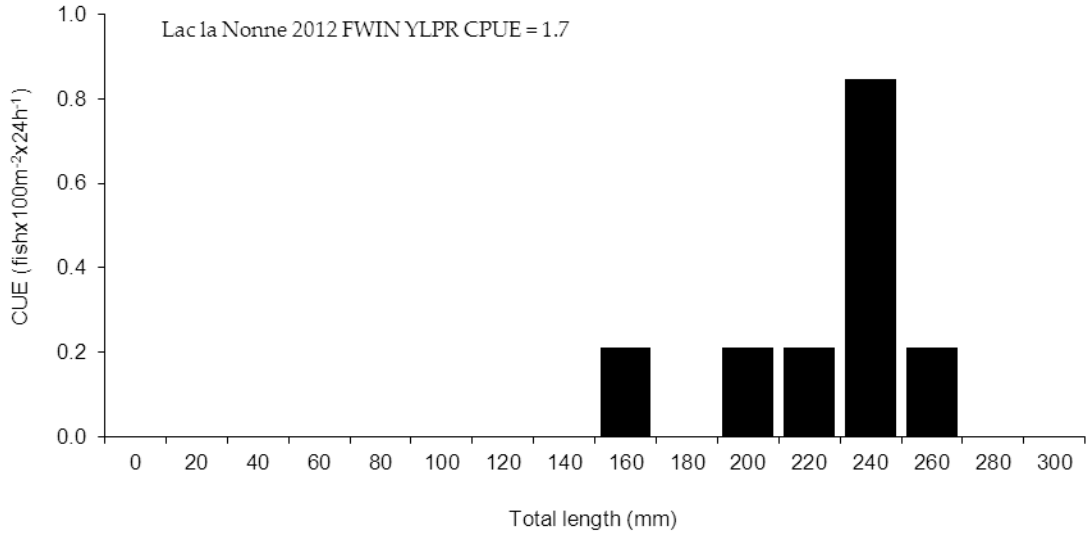

Figure 7. Length-frequency distribution of yellow perch, Lac la Nonne 2012 FWIN

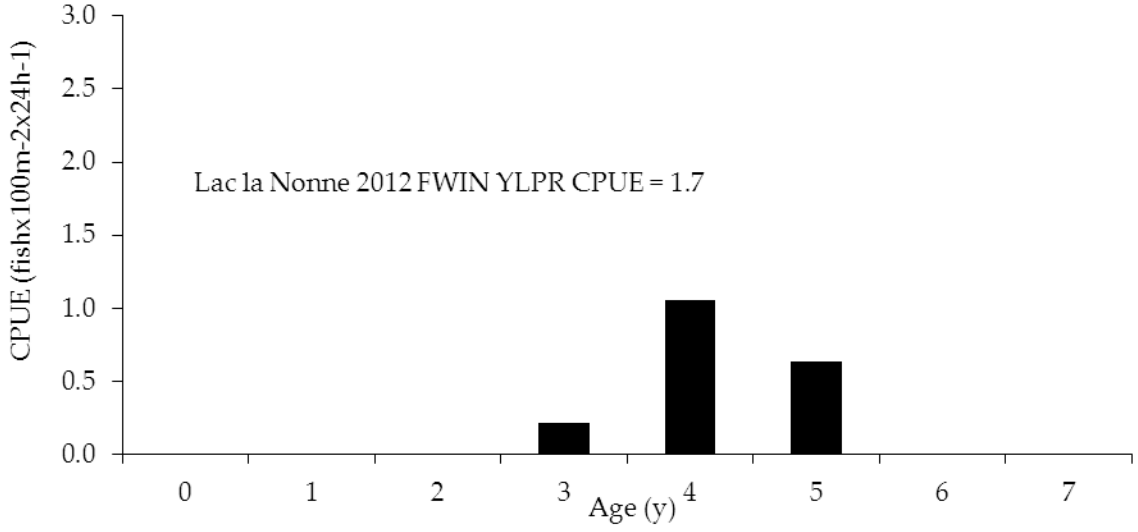

Figure 8. Age class-frequency distribution of yellow perch, Lac la Nonne 2012 FWIN

Table 6. Age-at-maturity for yellow perch, Lac la Nonne 2012 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	0	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	1	0	0
4	0	0	1	0	4
5	0	0	1	0	1

Table 7. Length-at-maturity for yellow perch, Lac la Nonne 2012 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	1	0	0
151 - 200	0	0	1	0	0
201 - 250	0	0	1	0	5

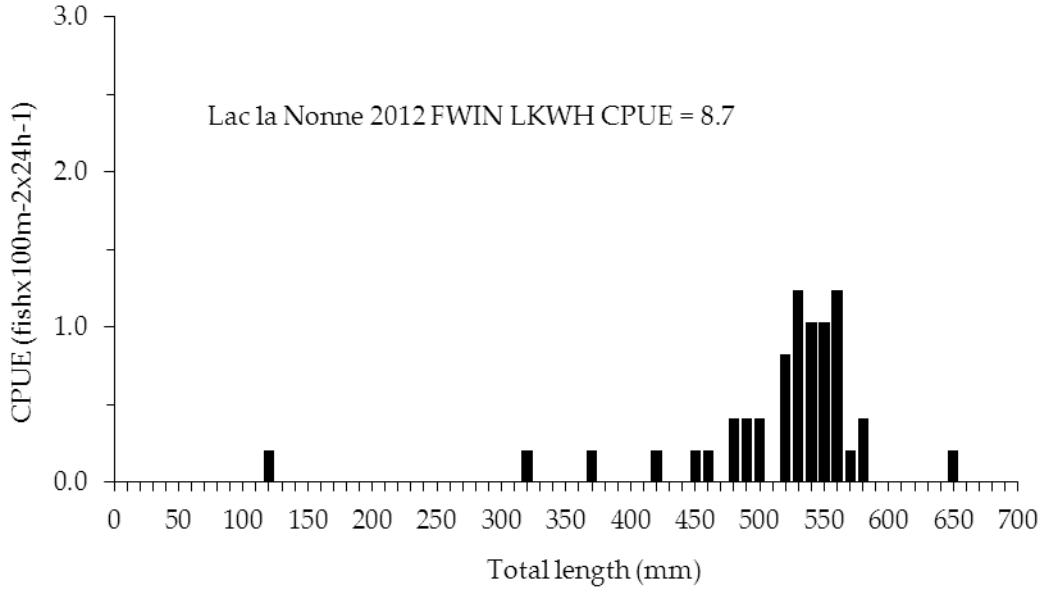

Figure 9. Length-frequency distribution of lake whitefish, Lac la Nonne 2012 FWIN

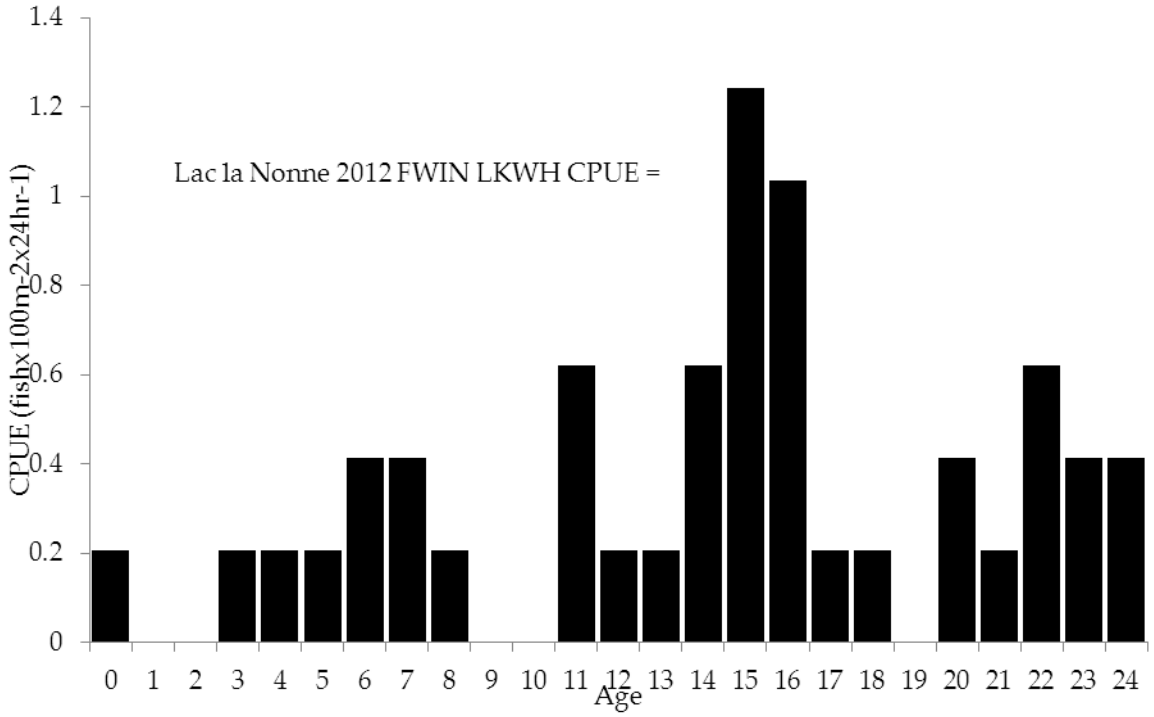

Figure 10. Age-frequency distribution of lake whitefish, Lac la Nonne 2012 FWIN

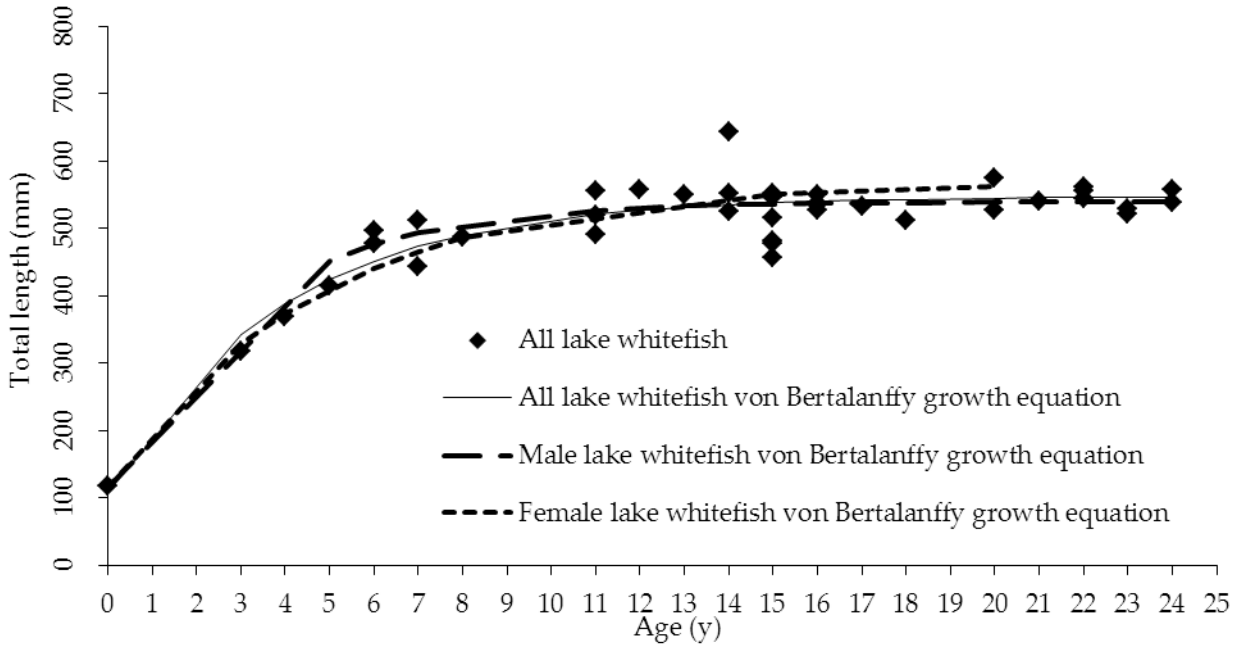

Figure 11. Growth of lake whitefish, Lac la Nonne 2012 FWIN

Table 8. Length-at-maturity for lake whitefish, Lac la Nonne 2012 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	1	0	0	0	0
151 - 200	0	0	0	0	0
201 - 250	0	0	0	0	0
251 - 300	0	0	0	0	0
301 - 350	0	0	0	1	0
351 - 400	0	0	0	1	0
401 - 450	0	1	0	0	1
451 - 500	0	0	4	0	2
501 - 550	0	0	19	0	1
551 - 600	0	0	7	0	2
600 - 650	0	0	1	0	0

Table 9. Age-at-maturity for lake whitefish, Lac la Nonne 2012 FWIN

Age Class	# Unknowns	# Imm Males	# Mat Males	# Imm Females	# Mat Females
0	1	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	1	0
4	0	0	0	1	0
5	0	1	0	0	0
6	0	0	1	0	1
7	0	0	1	0	1
8	0	0	0	0	1
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	3	0	0
12	0	0	1	0	0
13	0	0	1	0	0
14	0	0	2	0	0
15	0	0	4	0	2
16	0	0	5	0	0
17	0	0	1	0	0
18	0	0	1	0	0
19	0	0	0	0	0
20	0	0	1	0	1
21	0	0	1	0	0
22	0	0	3	0	0
23	0	0	2	0	0
24	0	0	2	0	0

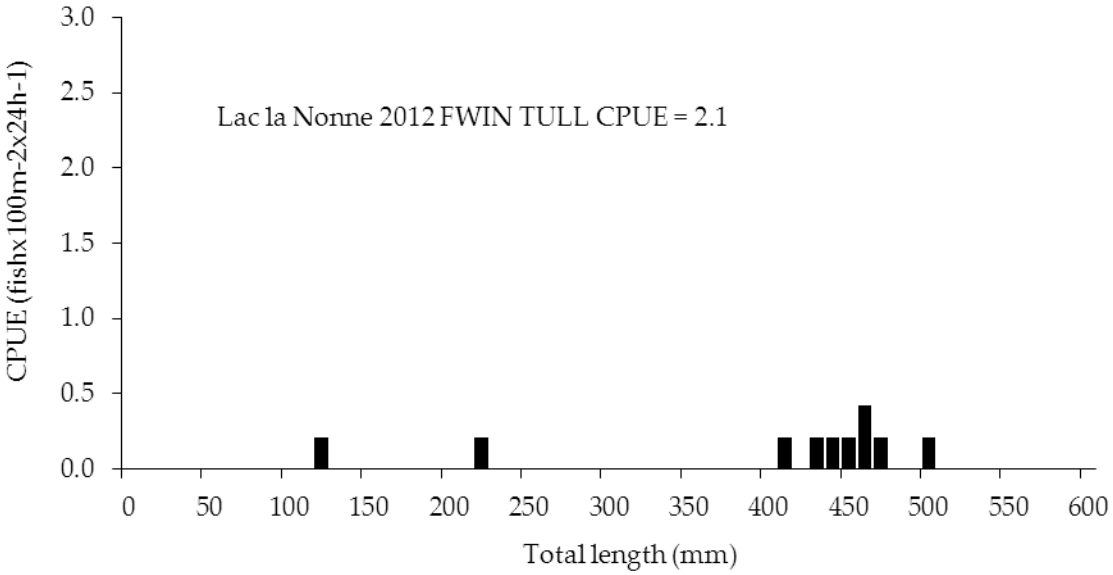

Figure 12. Length-frequency distribution of tullibee, Lac la Nonne 2012 FWIN

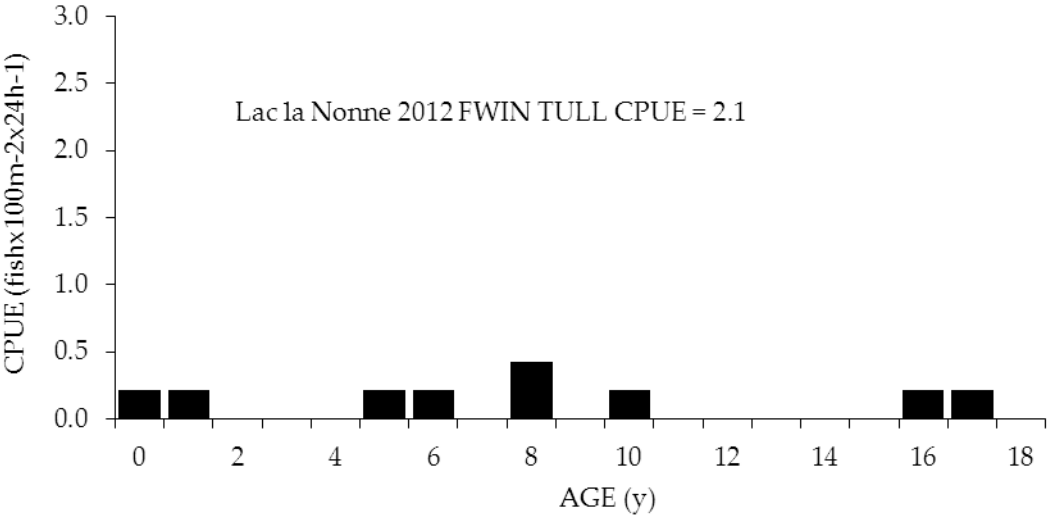

Figure 13. Age class-frequency distribution of tullibee, Lac la Nonne 2012 FWIN

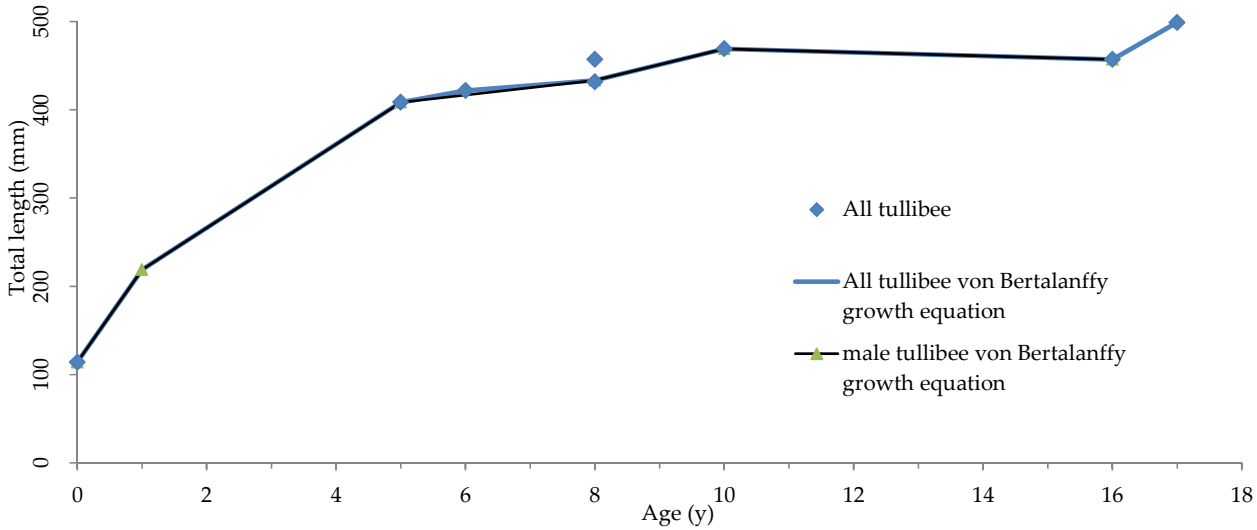

Figure 14. Growth of tullibee, Lac la Nonne 2012 FWIN

Table 10. Age-at-maturity for tullibee, Lac la Nonne 2012 FWIN

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

Table 11. Length-at-maturity of tullibee, Lac la Nonne 2012 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	1	0	0	0	0
151 - 200	0	0	0	0	0
201 - 250	1	0	0	0	0
251 - 300	0	0	0	0	0
301 - 350	0	0	0	0	0
351 - 400	0	0	0	0	0
401 - 450	0	0	3	0	1
450 - 500	0	0	3	0	1

Due to a blue-green algae bloom that occurred on Lac la Nonne in July 2012, a fish consumption advisory had been issued by Alberta Health for the lake. Consequently, captured fish were disposed of at a public landfill following the collection of biological information.

Interpretation

The mean catch rate (CPUE) for walleyes was 23.2 fish/100m^2/24hr, with a range of 6.3 to 37.5 in 7 nets. Walleyes were represented by age classes from 1 to 24 years, with the exception of the 2, 19 and 23 year old age classes (Figure 1 & 2). Mean age of the walleyes captured was 11.2 years, but the catch was dominated by the 6 and 14 year age classes. Female walleyes reached maturity by age 7 and male walleyes by age 6 Table 2 & 3). Growth of Lac la Nonne walleyes is very slow, with occasional females reaching 500 mm Total Length walleyes in Lac la Nonne by age 14, and males unable to achieve that length over twenty plus years (Figure 3). The stock classification of the Lac la Nonne walleye population in 2012 is similar to that observed in 2008 and varies from Trophy status (wide age class distribution, very slow growth) to Vulnerable status (moderate CPUE, unstable age class distribution and late age of maturity).

Northern pike CPUE in 2012 fell to 4.1 fish/100m ^{2}/24hr from 4.73 fish/100m ^{2}/24hr in 2008. Growth continues to be relatively slow with very few large, old fish in the population. The sample in 2012 did not include any pike of the 630 mm TL legal harvest size (Figure 4 – 6; Table 4 & 5). Yellow perch CPUE increased to 1.7 fish/100m ^{2}/24hr in 2012 from 0.56 fish/100m ^{2}/24hr in 2008 Figure 7 – 9; Table 6 & 7). This increase in observed frequency continues the apparent upward trajectory from the 0.17 fish/100m ^{2}/24hr observed in the 2005 FWIN. The CPUE of lake whitefish and tullibee in Lac la Nonne both declined in 2012 from levels observed in 2008. Lake whitefish CPUE fell from 10.4 fish/100m ^{2}/24hr in 2008 to 8.7 fish/100m ^{2}/24hr in 2012 (Figure 9 – 11; Table 8 & 9) and the tullibee CPUE fell from 6.5 fish/100m ^{2}/24hr in 2008 to 2.1 fish/100m ^{2}/24hr in 2008 (Figure 12 – 14; Table 10 & 11).