

## Alberta Conservation Association 2010/11 Project Summary Report

**Project Name:** *Walleye Stock Assessment 2010/11 – Pigeon and Buck Lakes*

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### Partnerships

Alberta Sustainable Resource Development

### Key Findings

- Catch rate of walleye was high and similar in Pigeon (29 fish/100 m<sup>2</sup>/24 h) and Buck (28 fish/100 m<sup>2</sup>/24 h) lakes.
- Size of walleye in Pigeon Lake ranged from 190 – 523 mm fork length, with the majority in the 400 – 500 mm size range; associated age ranged from 1 – 13 y with the population dominated by the age 12 year-class.
- Size of walleye in Buck Lake ranged from 165 – 492 mm, with the majority in the 300 – 450 mm size range; associated age ranged from 1 – 16 y with the population dominated by the ages 4 – 5 year-classes.
- Growth rate was slow in both lakes and average fish hardly attained the 500 mm provincial standard size.
- Walleye populations in both lakes exhibited wide (>8 year-classes) and stable (mean age 6 – 9 y) age-class distributions.

### Introduction

Walleye (*Sander vitreus*) populations in Alberta are susceptible to over-harvest due to an interplay of high fishing pressures, late-maturity and slow growth rates (Sullivan 2003). 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 which lake-specific sport fishing regulations were developed. Thus, under the AWMRP, the walleye fishery in Pigeon Lake is currently managed with a ‘special harvest license’ that allows anglers to harvest a pre-determined quota of the population annually. Similarly, the fishery in Buck Lake is managed with a catch limit of one walleye over 430 mm total length (TL). To evaluate the effectiveness of these management strategies, we conducted gill net surveys on these two lakes during the fall of 2010 to examine

population structure and growth of walleye. The information collected will help ASRD determine the status of these walleye populations and will aid in future management decisions.

## Methods

We captured walleye using gill nets following the Fall Walleye Index Netting (FWIN) protocol described in Morgan (2000). Each net consisted of eight 7.6 x 1.8 m panels of different mesh sizes, ranging from 25 – 152 mm (stretched mesh), and was set for 22 – 25 hours. We used a stratified-random sampling design based on surface area and depth stratum (i.e., shallow 2 – 5 m and deep 5 – 15 m) to determine the location of sampling sites. We recorded species, fork length (FL, mm), TL (mm), weight (g), gender and determined age-at-maturity (when 50% of the age-class is sexuality mature) of each fish. We also collected otoliths for age determination.

We used a bootstrap technique to estimate mean catch rate (fish/100 m<sup>2</sup>/24 h) and associated 95% confidence intervals (95% CI) following Haddon (2001). We examined growth rate with the von Bertalanffy growth model (von Bertalanffy 1938) and interpreted population descriptors (age-class distribution, age-class stability, age-at-maturity, and length-at-age) using the AWMRP criteria.

## Results

We captured 215 walleye from Pigeon Lake and 251 from Buck Lake. Corresponding estimated mean catch rates were 29 fish/100 m<sup>2</sup>/24 h (95% CI = 21.9 – 38.6, n = 7) for Pigeon Lake and 28 fish/100 m<sup>2</sup>/24 h (95% CI = 23.6 – 32.0, n = 9) for Buck Lake. Size of walleye in Pigeon Lake ranged from 190 – 523 mm FL, with the majority of the population in the 400 – 500 mm size range; fish >500 mm were poorly represented (Figure 1). Fish size in Buck Lake ranged from 165 – 492 mm, with the majority in the 300 – 450 mm size range; fish >500 mm were absent (Figure 1). Populations in both lakes exhibited multi-modal age-class distributions, with ages ranging from 1 – 13 (mean ± SE = 9.2 ± 0.2 y, n = 215) for Pigeon Lake and 1 – 16 (mean ± SE = 6.4 ± 0.2 y, n = 247) for Buck Lake. The dominant age-class was 12 y in Pigeon Lake and 4 – 5 y in Buck Lake. Based on AWMRP criteria, walleye in both lakes exhibited wide (>8 year-classes) and stable (mean age 6 – 9 y) age-class distributions. Growth rate was slow in both lakes with average fish hardly attaining the 500 mm FL AWMRP standard size. Female walleye matured at ages 5 and 6 for Pigeon and Buck lakes, respectively, while males matured at ages 4 and 5 in Pigeon and Buck lakes, respectively.

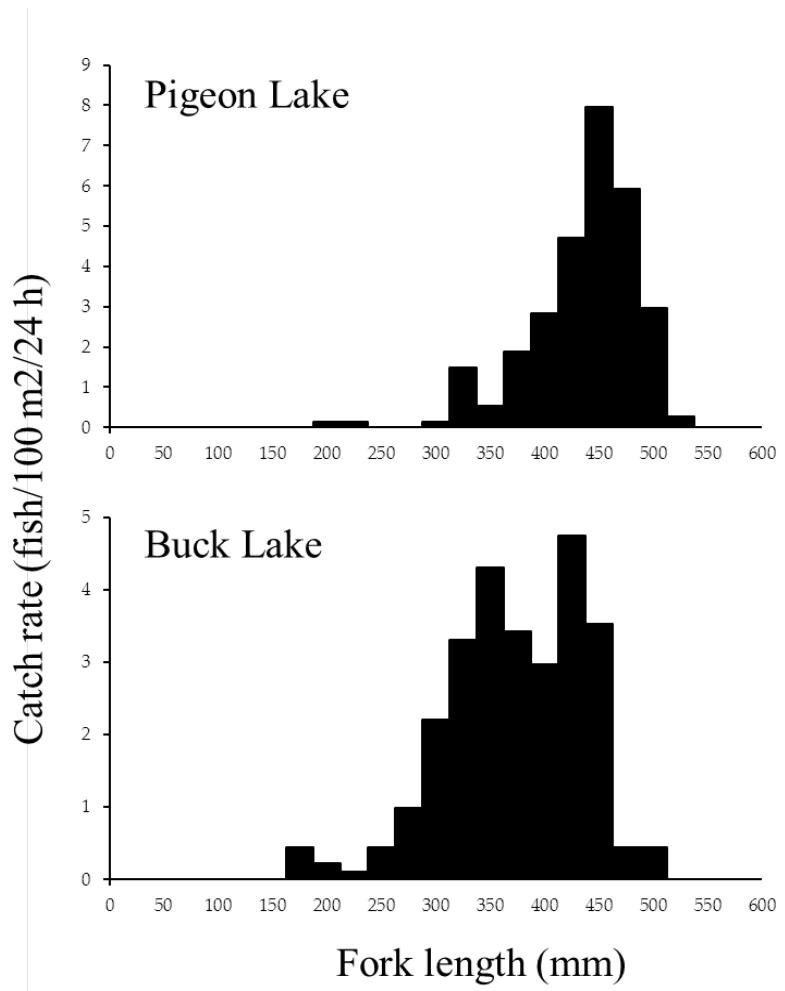


Figure 1. Length-frequency distributions of walleye from Pigeon and Buck lakes, Alberta, during the 2010 gill netting survey.

**Conclusions**

Walleye populations in both Pigeon and Buck lakes exhibited wide age-class distributions, slow growth rates and early maturity. This information will help provincial resource managers to determine the status of these walleye populations and will aid in future management decisions.

**Communications**

- ACA data report prepared to summarize project results: Abundance and population structure of walleye in Pigeon and Buck Lakes, Alberta, 2010.

**Literature Cited**

Berry, D. 1995. Alberta’s walleye management and recovery plan. Alberta Fish and Wildlife Division, Edmonton, Alberta, Canada. 32 pp.

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Sullivan, M.G. 2003. Active management of walleye fisheries in Alberta: dilemmas of managing recovering fisheries. North American Journal of Fisheries Management 23: 1343-1358.

von Bertalanffy, L. 1938. A quantitative theory of organic growth. Human Biology 10: 181-213.



Bill Patterson (left) from Alberta Conservation Association and Vance Buchwald (right) from Alberta Sustainable Resource Development setting gill nets. (Photo: Bill Patterson)



Alberta Conservation Association crew processing fish samples. Left to right: Mary Svendsen, Troy Furukawa and Shane Wood. (Photo: Bill Patterson)