

**Alberta Conservation Association  
2009/10 Project Summary Report**

**Project Name:** *Walleye Stock Assessment Program 2009/10*

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**Partnerships**

Alberta Sustainable Resources Development

**Key Findings**

- Walleye density was high in Graham Lake, with a catch rate of 27.2 fish/100 m<sup>2</sup>/24 h, but low in Gods Lake, with a catch rate of 8.7 fish/100 m<sup>2</sup>/24 h.
- No Walleye were captured in Buffalo Lake.
- Size of Walleye were 104 – 651 mm FL in Gods and 105 – 718 mm FL in Graham Lake.
- Walleye population in Gods Lake was dominated by large fish (> 500 mm FL), while both medium (> 375 mm FL) and large-sized fish were well represented in Graham Lake.
- Walleye populations in both Gods and Graham lakes displayed wide age-class distributions, moderate growth rates and early maturing fish.
- Age ranges were 0 – 19 years for Gods Lake and 2 – 22 years for Graham Lake.

**Introduction**

Walleye (*Sander vitreus*) populations throughout Alberta experience considerable fishing pressure, resulting from an imbalance of high angler population and limited fishing opportunities (Sullivan 2003). This high angling pressure coupled with late-maturity and slow growth rates, results in many Walleye populations being susceptible to overharvest and increases the need for an active management strategy. In 1995, Alberta Sustainable Resource Development (ASRD) implemented the Alberta Walleye Management and Recovery Plan (AWMRP) to facilitate the protection and recovery of exploited Walleye fisheries (Berry 1995). Based on the AWMRP criteria, Walleye populations in both Gods and Graham lakes were classified as vulnerable and managed with a catch limit of three and five fish over 500 mm total length, respectively. To evaluate the effectiveness of these management strategies, we conducted gill net surveys on these two lakes from September 21 to 29, 2010 to examine population structure and growth of

Walleye. A third lake, Buffalo Lake, was not previously classified as a Walleye fishery but was included in our survey to verify recent anecdotal reports of local anglers catching Walleye in the lake (Vance Buchwald – ASRD, pers. comm.). The information collected in these surveys will help ASRD determine the current status of these Walleye populations and, if needed, inform revision of sport fishing regulations.

## 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 to 152 mm (stretched mesh), and was set for 21 to 27 h. 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 number and location of sampling sites. We recorded species, fork length (FL, mm), total length (TL, mm), total weight (g), sex and state of maturity of each fish. We also collected otoliths for determining age of Walleye.

We used bootstrap techniques 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

Contrary to the anecdotal information, we did not capture any Walleye from Buffalo Lake during our survey. We captured 109 Walleye from Gods Lake and 306 from Graham Lake. Corresponding estimated mean catch rates were 8.7 fish/100 m<sup>2</sup>/24 h (95% CI = 5.0 – 12.5) for Gods Lake and 27.2 fish/100 m<sup>2</sup>/24 h (95% CI = 21.7 – 32.4) for Graham Lake. Walleye ranged in size between 104 – 651 mm FL in Gods Lake and 105 – 718 mm FL in Graham Lake (Figure 1). The population in Gods Lake was dominated primarily by fish >500 mm FL; smaller fish were poorly represented. In contrast, the population in Graham Lake was dominated by medium-sized fish (375 – 500 mm FL); larger fish (>500 mm FL) were also well represented, but smaller fish were generally poorly represented. Based on AWMRP criteria, the Walleye populations in both lakes demonstrated wide age-class distributions (i.e., >8 year-classes). Age ranges were 0 – 19 y for Gods Lake and 2 – 22 y for Graham Lake. Corresponding mean ( $\pm$  SE) ages were 9.8  $\pm$  0.5 y (n = 105) for Gods Lake and 8.7  $\pm$  0.6 y (n = 90) for Graham Lake. Both lakes showed moderate growth rates with Walleye estimated to reach 500 mm FL by age 8 in Gods Lake and by age 9 in Graham Lake. The age-at-maturity (when 50% of the age-class is sexuality mature) of female Walleye in both lakes was age 7. Males matured at age 5 in Graham Lake and age 3 in Gods Lake. All males captured in Gods Lake were sexually mature.

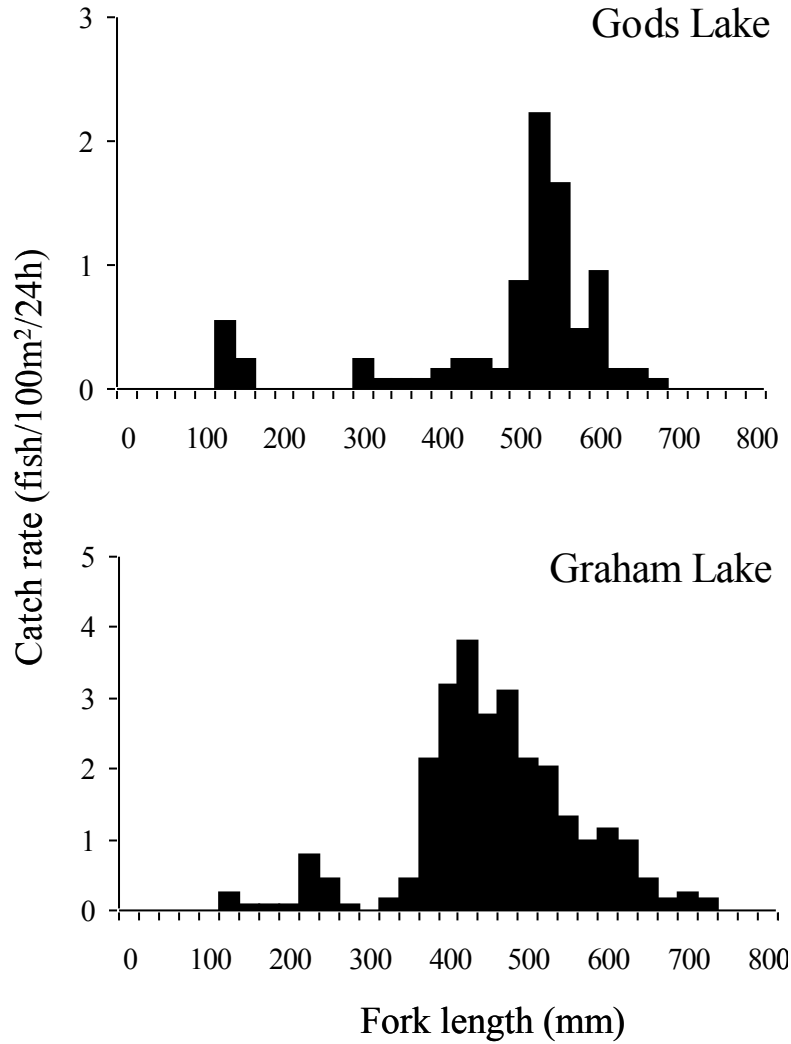


Figure 1. Length-frequency distributions of Walleye from Graham and Gods lakes, Alberta, during the 2009 gill netting survey.

## **Conclusion**

There was no evidence of occurrence of Walleye in Buffalo Lake. Walleye populations in both Gods and Graham lakes exhibited wide age-class distributions, moderate growth rates, and early maturity. This information will help provincial resource managers to determine the current status of these Walleye populations and will aid in future management decisions.

## **Communications**

- ACA data report prepared to summarize results: Population structure and growth of walleye in Buffalo, God's and Graham lakes, Alberta, 2009.

## **Literature Cited**

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

Haddon, M. 2001. Modeling and quantitative methods in fisheries. Chapman and Hall/CRC, Boca Raton, Florida, USA. 406 pp.

Morgan, G.E. 2000. Manual of instructions, fall walleye index netting (FWIN). Ontario Ministry of Natural Resources, Fish and Wildlife Branch, Peterborough, Ontario, Canada. 37 pp.

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.



Alberta Conservation Association and Alberta Sustainable Resource Development staff launching a boat at the Rochon Sands Provincial Park, Buffalo Lake. (Photo: Bill Patterson)



Mid-day sun off the bow of the boat on Buffalo Lake. (Photo: Bill Patterson)



Alberta Conservation Association staff removing White Suckers from a gill net at Buffalo Lake. Left to right: Shane Wood and Brendan Ganton. (Photo: Bill Patterson)