Alberta Conservation Association
2009/10 Project Summary Report

Project Name: *Wabasca Lakes Walleye Movement Study*

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Project Leader: Clayton James

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Partnerships

Alberta Sustainable Resource Development

Key Findings

- The closure period of April 1 to June 1 was useful in protecting the majority of spawning Walleye from harvest in South Wabasca Lake, but less so for North Wabasca Lake.
- On average, our fish detection rate using radio telemetry was 54%.
- Two fish tagged in North Wabasca Lake were found in South Wabasca Lake suggesting movement of fish between the two basins.

Introduction

Previous studies of North and South Wabasca lakes suggest Walleye (*Sander vitreus*) spawn in the Willow River, an inlet on the southwest corner of North Wabasca Lake, and in Drowned-horse Creek, an inlet on the south side of South Wabasca Lake. Domestic and recreational harvest of Walleye from these sites is a potential threat to the sustainability of populations in both lakes. In response to a petition by the Bigstone Cree Nation and the public to protect Walleye during their spawning season, Alberta Sustainable Resource Development (ASRD) implemented fishing closure zones on both lakes from April 1 – June 1 (Figure 1). Overall, the objective of this study was to determine if the closure zones effectively protect spawning Walleye from over-harvest by determining Walleye locations before, during and after the spring closure period.

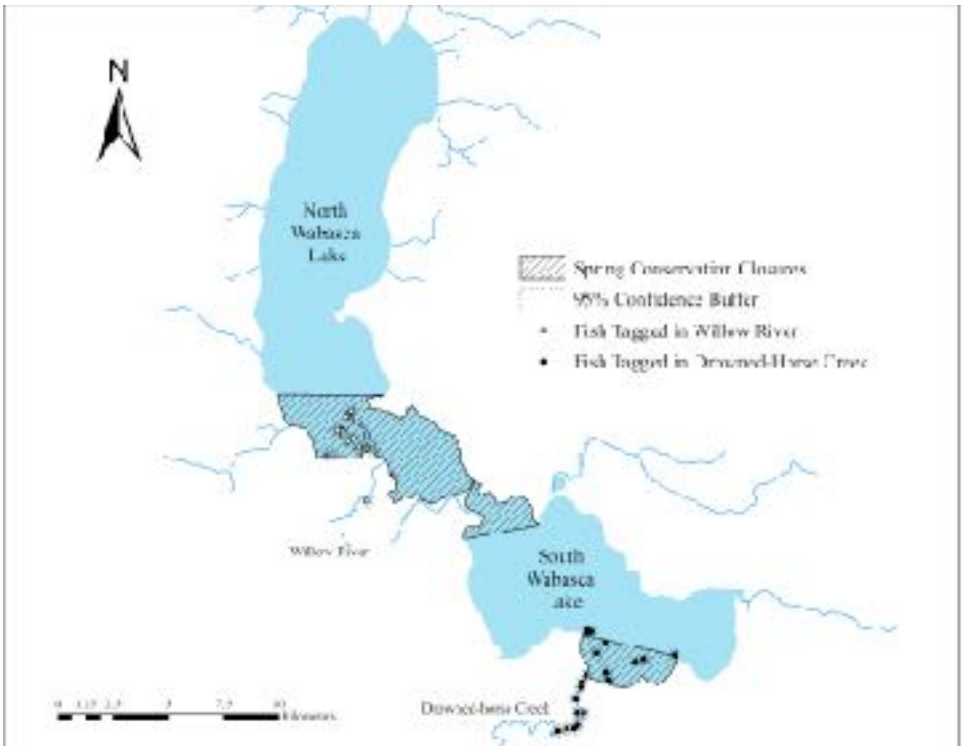


Figure 1. Example of map showing geographic locations of tagged Walleye and associated 95% confidence distance buffers in North and South Wabasca lakes (May 10 – May 16), in relation to the spring closure zones.

Methods

We used radio telemetry to monitor fish movements. In 2008, we surgically implanted 35 Walleye with LOTEK MCFT-3L high-frequency radio transmitters. In total, 15 fish were from Willow River, 15 from Drowned-horse Creek, and five from North Wabasca Lake. In 2009, we increased sample sizes by implanting an additional 30 fish with transmitters; nine from Drowned-horse Creek (8 May), 10 from Willow River (13 May), and 11 from North Wabasca Lake (June 2 – June 30). Suitable mature Walleye were chosen and surgeries were completed following the protocols of Osokin and Tchir (2006).

We tracked Walleye weekly from April 19 to June 20, using helicopters and/or a boat fitted with a uni-directional Yagi antennae/radio receiver combination. Each flight lasted approximately four hours and covered the entirety of both North and South Wabasca lakes by following the shoreline (~100 m out from shore and 20 – 200 m above the water's surface. During each flight, we covered both Drowned-horse Creek and Willow River at least twice, extending roughly 5 km upstream. We supplemented aerial tracking with boat tracking during ice-free periods, and tracking ceased when greater than 50% of located fish were found outside of the closure zones following spawning.

We marked fish locations with a GPS unit during surveys and compared the proportion of tagged fish that were in and out of the closure zones for each week. To determine the accuracy of our relocations, we conducted a calibration study in which five transmitters were distributed across the lakes with known Global Positioning System (GPS) locations and tracked using the same methods used to locate fish. Differences (distances) between actual transmitter locations and those recorded during relocating surveys were used to create 95% confidence intervals (distance buffers) for all survey-recorded GPS values following procedures in White and Garrott (1990).

Results

Between April 19 and June 20, an average (± standard error) of 54 ± 6% (range = 25.0 – 72.1%; n = 9) of fish were found on a weekly basis. Suspected mortalities or malfunctioning transmitters were removed from analysis. On South Wabasca Lake, more than 50% of the fish found during each week were located within the closure zones from April 26 until the week of June 7 – 13, after which locations were ceased (Table 1). Likewise, greater than 50% of fish were found weekly within the North Wabasca closure zone from April 19 until the week of June 14 – 20. During our study period, only two tagged fish migrated from one basin to the other. The peak of Walleye spawning activities occurred between May 3 – 9 on South Wabasca Lake and May 10 – 16 on North Wabasca Lake.

Table 1. Weekly distribution of tagged fish between closure and non-closure zones in South and North Wabasca lakes. Brackets represent proportions (%) of located tagged fish within the closure zones for each survey period.

Survey period	Total number of tagged fish	Tagged fish located in North Wabasca Lake		Tagged fish located in South Wabasca Lake	
		Closure zone	Non-closure zone	Closure zone	Non-closure zone
19 Apr – 25 Apr	24	0 (0)	2	4 (100)	0
26 Apr – 2 May	24	1 (100)	0	5 (100)	0
3 May – 9 May	24	4 (80)	1	8 (100)	0
10 May – 16 May	43	15 (100)	0	15 (94)	1
17 May – 23 May	42	12 (100)	0	7 (78)	2
24 May – 30 May	42	13 (100)	0	9 (60)	6
31 May – 6 June	42	8 (73)	3	10 (53)	9
7 June – 13 June	42	8 (67)	4	4 (27)	11
14 June – 20 June	42	4 (33)	8	-	-

Conclusions

Over the course of our study the majority (>50%) of tagged Walleye occupied the South Wabasca Lake and North Wabasca Lake closure zones from April 26 through June 6, indicating the current closure period was effective in protecting Walleye in 2009. However, >50% of tagged fish remained in the closure zone on North Wabasca Lake until June 13. Therefore, this year, Walleye were susceptible to overharvest within the North Wabasca closure zone for up to two weeks following the opening date. We found two fish tagged in North Wabasca Lake in South Wabasca Lake suggesting movement of fish between the two basins.

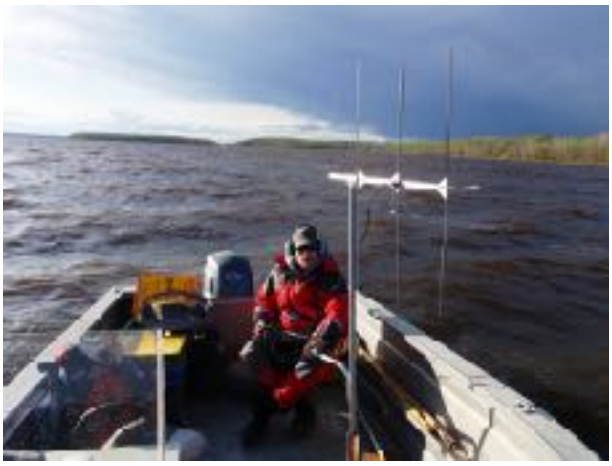
Communications

- ACA activity report.

Literature Cited

Osokin, L., and J. Tchir. 2006. South Heart River Walleye project 2004. Data Report, D-2006-018, produced by Alberta Conservation Association, Slave Lake, Alberta, Canada.

White, G., and R. Garrott. 1990. Analysis of radio-tracking data. Academic Press. San Diego, CA. 383 pp.



Alberta Conservation Association biologist, Clayton James, conducting radio telemetry on North Wabasca Lake. (Photo: Nathan Carruthers)

Alberta Conservation Association crew performing surgery on a Walleye from Willow River. Left to right: Clayton James, Nathan Carruthers. (Photo: Paul Hvenegaard)

Willow River inlet flowing into North Wabasca Lake. (Photo: Clayton James)

Drowned-horse Creek inlet flowing into South Wabasca Lake. (Photo: Nathan Carruthers)