

Alberta Conservation Association 2010/11 Project Summary Report

Project Name: *Crowsnest Drainage Sport Fish Population Assessment – Phase 2*

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Partnerships

Alberta Sustainable Resource Development
Devon Canada Corporation

Key Findings

- Abundance of rainbow trout >74 mm total length in the Crowsnest River mainstem was 80,131 fish, of which approximately 10% were legal-harvest-size, 6% were quality size, and nearly 2% were above the legal size.
- Abundance of mountain whitefish >77 mm total length in the mainstem was 16,882 fish, with nearly equal proportions of legal-harvest-size, quality, and above slot size fish.
- Overall abundance of westslope cutthroat trout, rainbow trout and their hybrids in tributary streams was 60,637 fish, of which more than one third inhabit Blairmore Creek.
- Bull trout are restricted to below Lundbreck Falls and the Crowsnest River mainstem, whereas cutthroat trout remain primarily restricted to headwater tributaries above barriers.

Introduction

The Crowsnest River is considered one of the most popular trout fisheries in Alberta (Genereux and Bryski 2002). However, increased angling pressure, habitat degradation from recreational and industrial activities, and invasion of other, less popular, introduced species threaten the fishery. Native mountain whitefish (*Prosopium williamsoni*) and rainbow trout (*Oncorhynchus mykiss*) are considered the most numerous species in the sport fishery. The historical sport fish assemblage once included bull trout (*Salvelinus confluentus*) and westslope cutthroat trout (*Oncorhynchus clarkii lewisi*); however, cutthroat trout have been displaced and are now restricted to select tributaries (Taylor and Gow 2007, Alberta Sustainable Resource Development (ASRD) and Alberta Conservation Association (ACA) 2006). Similarly, the range of bull trout has been reduced to below Lundbreck Falls (ASRD and ACA 2009). Other species introductions since the 1960s include brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*) and lake trout (*Salvelinus namaycush*). In year two of this study, we estimated the abundance of sport fish in the Crowsnest River and tributaries, and provide an overview of species distributions and relative abundance of native trout stocks.

Methods

During the summer of 2010, we conducted fish surveys on the Crowsnest River mainstem and tributaries using totebarge and backpack electrofishing techniques. Sampling reaches were 40 times stream wetted-width, systematically distributed, and ranged 500 – 800 m for totebarge electrofishing and 300 m for backpack electrofishing. In total, we surveyed 22 reaches (16 km) using totebarge fishing and 42 reaches using backpack electrofishing. We conducted capture-mark-recapture (CMR) population estimates to estimate gear efficiency. Using bootstrapping methods, we calculated abundance and density estimates (90% confidence intervals, 90% CI) for each sport species using the following size categories: all fish susceptible to our electrofishing gear (>74 mm total length (TL) rainbow trout and >77 mm TL mountain whitefish, ACA, unpublished data), legal-harvest-sized fish (>300 mm TL), quality rainbow trout (>400 mm TL, Gabelhouse 1984), and fish above the legal slot size (>450 mm TL, ASRD 2010).

Results

We captured a total of 3,979 and 1,085 salmonid fish in the mainstem and tributaries, respectively (Table 1). Our mainstem catch was dominated by rainbow trout (65%, n = 2,645) and mountain whitefish (30%, n = 1,201). Six trout species accounted for the remaining 4%, with native cutthroat and bull trout represented less than 1% each (Table 1). Mountain whitefish dominated catch of legal-harvest-sized (63%), quality (62%) and legal slot size (57%) fish, followed by rainbow trout at 34%, 37% and 41%, respectively. In the tributaries, catch was dominated by westslope cutthroat trout (42%), rainbow trout (27%) and their hybrids (14%) (Table 1); the remainder of the tributary catch was 15% brook trout and 2% mountain whitefish.

Table 1. Number of fish, by size range (mm), captured during totebarge and backpack electrofishing in the Crowsnest River and tributaries.

Species	Main-stem				Tributaries	
	All fish	>300 (TL)	>400 (TL)	>450 (TL)	All fish	>300 (TL)
Rainbow trout	2,645	279	185	51	291	0
Mountain whitefish	1,201	528	304	70	16	2
Cutthroat trout	6	3	0	0	460	6
Hybrids	31	7	0	0	155	1
Brook trout	17	1	0	0	163	0
Bull trout	14	7	2	1	0	0
Brown trout	62	6	3	1	0	0
Lake trout	3	2	0	0	0	0
Total	3,979	833	494	123	1,085	9

Estimated mainstem rainbow trout abundance was 80,131 fish, nearly five times greater than the mountain whitefish population of 16,517 (Table 2). Similarly, legal-harvest-size and quality size fish were more abundant for rainbow trout than for mountain whitefish. In contrast, above the slot size fish were more abundant for mountain whitefish (n = 1,743) than for rainbow trout (n = 1,445).

Table 2. Estimated fish abundance and density by size range for the Crowsnest River mainstem.

Species	Size class Total length (mm)	Total abundance (90% CI)	Fish/km (90% CI)
Rainbow trout	>74	80,131 (42,371 – 141,127)	147 (78 – 260)
	>300	8,501 (4,377 – 15,217)	16 (8 – 28)
	>400	5,290 (2,530 – 9,725)	10 (5 – 18)
	>450	1,445 (642 – 2,707)	3 (1 – 5)
Mountain whitefish	>77	16,517 (7,658 – 33,023)	30 (14 – 60)
	>300	7,340 (3,307 – 14,616)	13 (6 – 27)
	>400	3,816 (1,441 – 8,156)	7 (3 – 15)
	>450	1,743 (513 – 3,648)	3 (1 – 7)

For tributaries, Blairmore Creek had the highest and most dense tributary population of oncorhynchid fish comprising 34% of the total tributary estimate at 60,637, and a density of 736 fish/km. Native trout (cutthroat) were most abundant in Gold Creek (85%, n = 6,379) and Blairmore Creek (65%, n = 19,839). Invasive brook trout were most abundant in Allison Creek (n = 3,551), more than doubling the local cutthroat trout population. In terms of drainage-scale native species distributions, bull trout remain restricted to below Lundbreck Falls and the Crowsnest River mainstem, whereas cutthroat trout remain primarily restricted to headwater tributaries above barriers.

Conclusions

Total mainstem abundance was nearly five times greater for rainbow trout than for mountain whitefish; however, the proportion of legal-harvest-sized fish was greater for mountain whitefish at 43% of the estimated population than for rainbow trout at 10% of the estimated population. In terms of drainage-scale native species distributions, bull trout remain restricted to below Lundbreck Falls and the Crowsnest River mainstem, whereas cutthroat trout remain primarily restricted to headwater tributaries above barriers.

Communications

- Provided information to ASRD upon project completion.
- Project results presented to the Oldman Chapter of Trout Unlimited Canada and the Magrath Rod and Gun Club.
- ACA project report completed by March 2011.

Literature Cited

Alberta Sustainable Resource Development. 2010. Alberta guide to sportfishing regulations. Produced by the Government of Alberta, Edmonton, Alberta, 112 pp.

Alberta Sustainable Resource Development and Alberta Conservation Association. 2006. Status of westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) in Alberta. Alberta Sustainable Resource Development Wildlife Status Report No. 61, Edmonton, Alberta. 34 pp.

Alberta Sustainable Resource Development and Alberta Conservation Association. 2009. Status of bull trout (*Salvelinus confluentus*) in Alberta. Alberta Sustainable Resource Development Wildlife Status Report No. 39, Update 2009, Edmonton, Alberta. 48 pp.

Gabelhouse Jr., D. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4: 273-285.

Genereux, D.B., and M.B. Bryski. 2002. A creel survey of the Crowsnest River, June – September, 2001. Prepared for Alberta Environmental Protection, Natural Resources Service, Lethbridge, Alberta. 32 pp + App.

Taylor, E., and J. Gow. 2007. An analysis of hybridization between native Westslope cutthroat trout (*Oncorhynchus clarkia lewisi*) and introduced Yellowstone cutthroat trout (*O. c. bouvieri*) and rainbow trout (*O. mykiss*) in Canada's mountain parks and adjacent watersheds in Alberta. Prepared for Parks Canada and Alberta Fish and Wildlife. University of British Columbia, Native Fishes Research Group. Vancouver, British Columbia. 46 pp.

Photo 1

Alberta Conservation Association staff dip-netting fish from the Crowsnest River while electrofishing near the town of Frank. Left to right: Mike Uchikura and Jason Blackburn. (Photo: Clint Goodman)

Photo 2

Alberta Conservation Association staff conducting a backpack electrofishing population estimate on upper Gold Creek. Left to right: Brad Hurkett and Clint Goodman. (Photo: Jason Blackburn)

Photo 3

Quality size rainbow trout electrofished by Alberta Conservation Association staff near the Highway 507 crossing. (Photo: Andrew Clough)

Photo 4

Alberta Conservation Association crew totebarge electrofishing the Crowsnest River near the confluence with Rock Creek. Left to right: Jason Blackburn, Brad Hurkett, Clint Goodman and Matthew Szumilak. (Photo: Andrew Clough)

Photo 5

Example of upper Crowsnest River sampling reach upstream of the town of Coleman. Left to right: Andrew Clough, Clint Goodman and Brad Hurkett. (Photo: Jason Blackburn)

Photo 6

Rare large brown trout electrofished from the Crowsnest River near the mouth of Allison Creek by Alberta Conservation Association staff. (Photo: Andrew Clough)