

**Alberta Conservation Association
2007/08 Project Summary Report**

Project name: *Cutthroat Trout Assessment in the Upper Oldman Drainage - Phase 3*

Project leaders: Trevor Council and Jason Blackburn

Primary ACA staff on this project:

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Partnerships:

Alberta Sustainable Resource Development
Devon Canada Corporation

Key findings

- An estimated nearly 300,000 cutthroat trout > 70 mm fork length (FL) occur within the upper Oldman River drainage, consisting of approximately 125,000 and 3,000 spawning size (> 149 mm FL) and legal harvest size (> 300 mm total length) fish, respectively.
- Density of cutthroat trout was higher in the Oldman River drainage than in the Livingstone River drainage.
- Although total trout density was lower in the Livingstone River drainage than in the Oldman River drainage, density of legal harvestable size trout was higher in the Livingstone than in the Oldman drainage.

Introduction

Westslope cutthroat trout (*Oncorhynchus clarkii lewisii*) currently occupy no more than 20% of their historical distribution in Alberta (Costello 2006). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has designated the species as ‘*Threatened*’ because genetically pure populations are severely isolated. In the Oldman River drainage, cutthroat trout still occupy most of the historical range in the upper basin but the current status of the population is unknown. The main objective of our study was to estimate the population size and density of westslope cutthroat trout in the Upper Oldman River drainage. The second objective was to compare population density, abundance, and size structure between catch-and-release (Livingstone River) and allowable harvest (Oldman River) fisheries.

Methods

To accurately assess the population and determine if there is a declining trend and/or natural fluctuations occurring, it was necessary to conduct a baseline, watershed-level population assessment that is representative, repeatable and comparable to future assessments. We used random sampling within defined strata to reduce the bias and inaccuracies associated with site-level sampling. We divided the upper Oldman River drainage into four strata based on stream size, using a combination of geographic information system (GIS)-derived stream-order and wetted-width data from previous sampling sites. We selected 126 sites at random using GIS software and sampled 80 sites in 2006 and 46 in 2007. We used backpack and tote-barge electrofishing gear to capture fish; sites were 150 - 500 m in length.

We also conducted 12 Peterson mark-recapture abundance estimates to determine capture probabilities within each stratum. Using mean capture probability, we calculated fish density and abundance per sample site and extrapolated to the entire drainage area using bootstrapping methods (Efron and Tibshirani 1993). We compared fish density, abundance and population structure between the Livingstone and Oldman River mainstems to examine potential differences between a catch-and-release and allowable harvest fishery, respectively.

Results

We captured a total of 9,266 cutthroat trout, the majority ($n = 8,809$ or 95% of the total catch) of which were > 70 mm FL. Of the total catch, 52% ($n = 4,859$) were of spawning size (> 149 mm FL), with $< 3\%$ ($n = 237$) being of legal harvest size (> 300 mm total length). The estimated drainage population of trout > 70 mm was 296,981 individuals, consisting of 125,479 and 2,996 spawning and legal harvest-sized fish, respectively. The mainstem Oldman River had a larger population of fish > 70 mm FL than the Livingstone River. In contrast, the Livingstone River had a greater estimated population of legal harvest-size fish than the Oldman River (Table 1). Similarly, the catch from the Livingstone River had proportionately larger fish than that from the Oldman River (Figure 1).

Table 1. Estimated abundance (95% confidence limits, CL) of cutthroat trout in the upper Oldman River drainage by size class.

Size-classes (mm FL)	Estimated cutthroat trout abundance (95% CL)	
	Oldman River	Livingstone River
> 70	29,567 (11,742 – 52,224)	9,229 (6,908 – 11,738)

> 149	17,729 (6,573 – 32,480)	7,352 (5,048 – 9,964)
> 300 ^a	372 (190 – 598)	1,688 (1,005 – 2,443)

^aTotal length

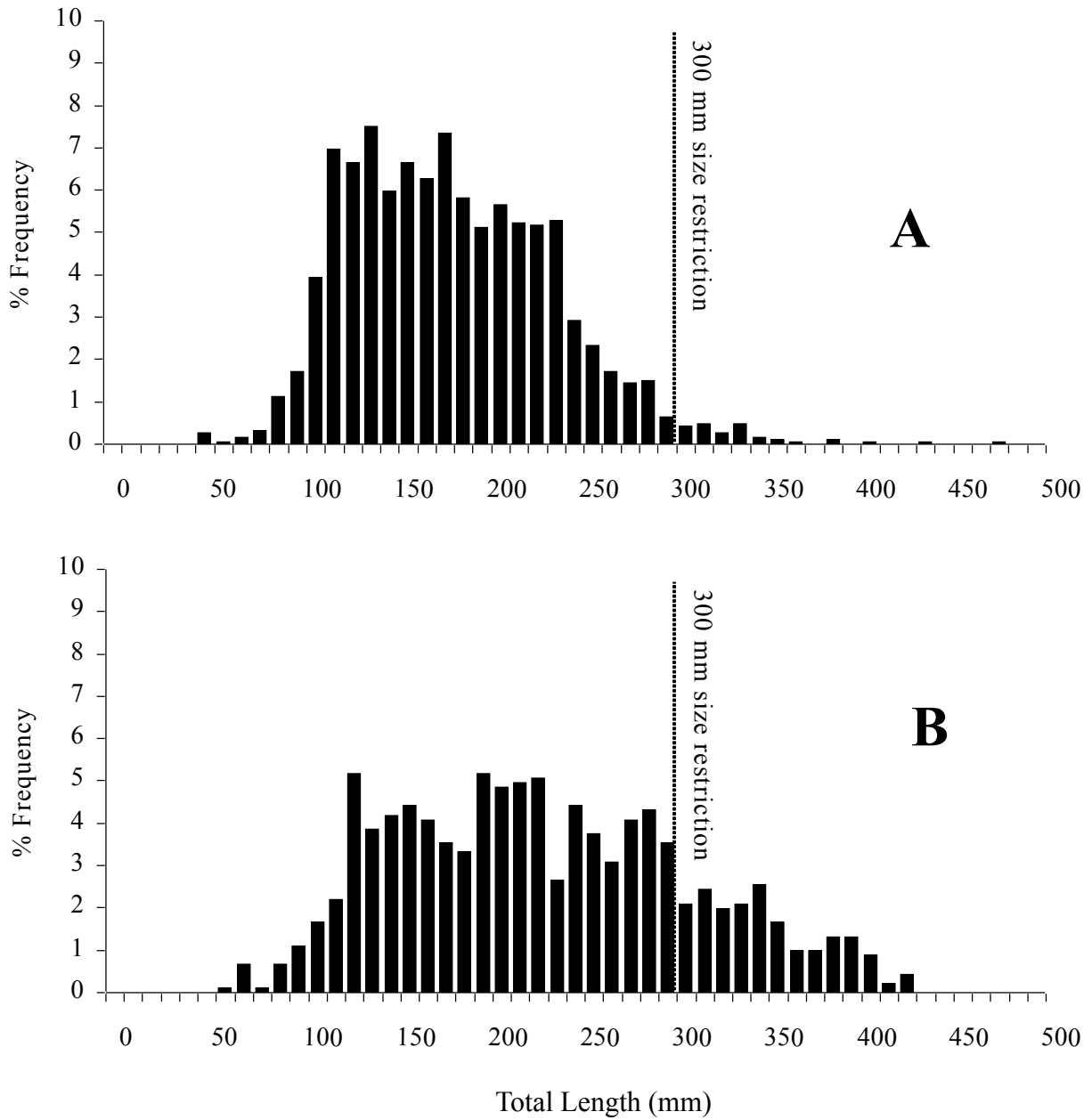


Figure 1. Comparison of length frequency distributions between the Oldman (A) and Livingstone River (B) mainstems, showing the 300 mm total length size restriction on angler harvest.

Conclusion

Our estimate of cutthroat trout abundance and density in the upper Oldman River drainage gives an idea of population size and scale; however, due to the wide range in confidence intervals our results may not be sufficient to detect changes over time. Smaller-scale analyses we performed in the Oldman and Livingstone rivers have been more useful for this purpose. Our observations indicate that the Oldman River has a greater density of small fish than the Livingstone River (which is catch-and-release), whereas the reverse holds for larger fish.

Communications

- Preliminary results were presented to the Medicine Hat Fly-Fishing Club, the Oldman Chapter of Trout Unlimited Canada and regional Alberta Sustainable Resource Development managers.
- Results were presented to the Provincial Fisheries Standards Committee at a Lotic Monitoring Workshop.

Literature cited

Costello, A. 2006. The status of Westslope cutthroat trout (*Onchorhynchus clarkii lewisii*) in Alberta. Alberta Sustainable Resource Development, Wildlife Status Report No. 61, prepared for Alberta Sustainable Resource Development and Alberta Conservation Association, Edmonton, Alberta. 34 pp.

Efron B., and J. Tibshirani. 1993. An introduction to the bootstrap: monographs on statistics and applied probability 57. CRC Press, Boca Raton, Florida. 436 pp.



Alberta Conservation Association crew backpack electrofishing South Racehorse Creek. Left to right: Jason Blackburn, Chris Delage, and Brad Hurkett. (Photo: Mike Jokinen)



Cutthroat trout from Hidden Creek. (Photo: Brad Hurkett)