

**Alberta Conservation Association
2008/09 Project Summary Report**

Project name: *Upper Oldman Drainage Adult Bull Trout Population Assessment*

Fisheries and Aquatic Program Manager: Peter Aku

Project leader: Trevor Council

Primary ACA staff on this project:

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Partnerships:

Alberta Sustainable Resource Development
Devon Canada Corporation

Key findings

- Hidden Creek is a critical bull trout spawning stream in the upper Oldman River drainage; at least 72% of adult bull trout (≥ 300 mm) captured in the drainage spawn in the Hidden Creek.
- Adult bull trout that spawn in Hidden Creek overwinter in the Livingstone River, Oldman River and Racehorse Creek.
- Spawning bull trout from Racehorse Creek and Dutch Creek also overwinter in the Livingstone River.

Abstract

Bull trout populations in several East Slope drainages in Alberta are under pressure from habitat loss, migration barriers, over fishing, and competition with non- native fish species. As a result, we have initiated a bull trout population assessment to evaluate the adult migratory component of the population in the upper Oldman River drainage. We installed conduit fish traps in Hidden Creek, Livingstone River, Racehorse Creek and Dutch Creek to capture and tag post-spawning migratory bull trout. In addition, we conducted redd surveys to locate critical bull trout spawning areas. Hidden Creek had the highest number of adult migratory bull trout and the highest density of redds of the four streams sampled in the upper Oldman River drainage. Of the 125 adults captured in 2008, 66% were from Hidden Creek, 15% from Livingstone River, 12% from Racehorse Creek, and 7% from Dutch Creek. We observed 108 redds in Hidden Creek compared to 25 and 26 from Livingston River and Dutch Creek, respectively; we observed no redds in the Racehorse Creek. .Throughout the upper Oldman River drainage we captured and tagged (2007

and 2008) a total of 245 adult bull trout (≥ 300 mm) and at least 176 (72 %) of these fish spawn in Hidden Creek. Our recapture results suggest that several bull trout that spawn in Hidden Creek migrate to the Livingstone River, Oldman River or Racehorse Creek to overwinter. Thus, based on the high number of adults and redds, Hidden Creek appears to be a critical bull trout spawning stream in the upper Oldman River drainage.

Introduction

Bull trout (*Salvelinus confluentus*) distribution and abundance have declined throughout Alberta due to human activity, such as angling pressure, habitat degradation and fragmentation, migratory barriers, and the introduction of non-native species (Brewin 1997). The decline is exacerbated by recreational and industrial activity that occurs within the watersheds along the Eastern Slopes of Alberta (Ripley et al. 2005), including the upper Oldman River drainage. As a result bull trout have been reduced to 33% of their historical distribution within the Oldman River watershed (Fitch 1997). This report summarises preliminary results from a long-term bull trout population assessment within the upper Oldman River drainage to more clearly define bull trout status and aid in directing future conservation and management efforts. The main objective of our study is to assess the abundance and distribution of adult migratory bull trout in the upper Oldman River drainage.

Methods

The preliminary phase of the study occurred during the summer of 2007 when we conducted fish traps to determine the significance of Hidden Creek as a bull trout spawning stream and to establish when post-spawn fish begin their migration. During the fall of 2008, we installed directional (post-spawn) fish traps in four historic bull trout spawning streams within the upper Oldman River drainage: Hidden Creek, Livingstone River, Racehorse Creek and Dutch Creek (Figure 1) to capture and tag adult migratory bull trout. Trapping occurred between 25 August and 12 October 2008. We weighed, measured (fork length: FL), and assessed sex for all bull trout captured. All adult bull trout (ie. ≥ 300 mm FL) were tagged with a uniquely identifiable integrated transponder tag injected into the musculature below the dorsal fin. To reduce handling stress, we anaesthetised fish in a clove oil bath during processing. Upon completion of processing, we revived and released all fish back into the creek in their direction of travel. Tagging data will be used to track fish movements and identify overwintering habitats in the upper Oldman River drainage. We also conducted redd count surveys in streams throughout the upper Oldman River drainage to identify critical bull trout spawning areas.

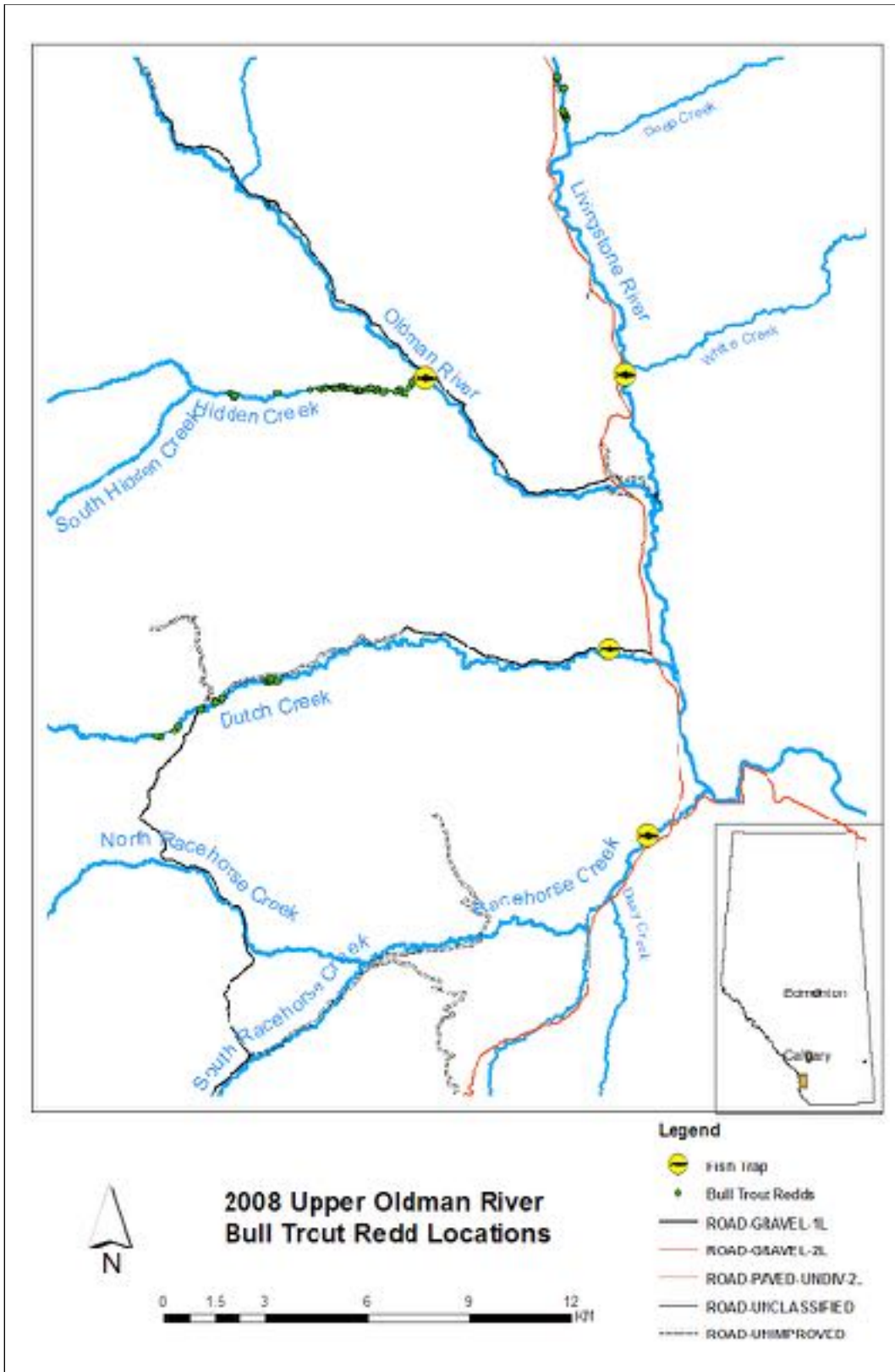


Figure 1. Upper Oldman River bull trout population assessment study area, 2008.

Results

We captured a total of 125 adult bull trout from all four fish traps during 2008: 82 (66%) from Hidden Creek, 19 (15%) from the Livingstone River, 15 (12%) from Racehorse Creek, and 9 (7%) from Dutch Creek (Table 1). Of the 82 bull trout intercepted at Hidden Creek, we tagged 54 in 2008 as the remaining 28 fish were recaptures from our 2007 fish trapping. Of the 19 bull trout captured in the Livingstone River, 7 were first-time captures; the remaining 12 fish were recaptures from elsewhere in the upper Oldman River drainage, including 4 from Hidden Creek each in 2007 and 2008, 2 from Racehorse Creek 2008, 1 from Dutch Creek 2008, and 1 from an electrofishing site on the Livingstone River 2007. We recaptured two bull trout from the Racehorse Creek fish trap that were initially intercepted at the Hidden Creek fish trap, one from 2007 and the other from 2008. Our recapture results suggest that several bull trout that spawn in Hidden Creek migrate to the Livingstone River, Oldman River or Racehorse Creek to overwinter. We also observed that bull trout captured from Racehorse Creek and Dutch Creek may overwinter in the Livingstone River. Overall, we have tagged 245 adult migratory bull trout in the upper Oldman River drainage between 2007 and 2008, and at least 176 (72 %) of these fish spawn in Hidden Creek. During the 2008 survey, we located 108 redds in Hidden Creek, 26 in the Livingstone River, and 25 in the Dutch Creek; we found no redds in the Racehorse Creek. Hidden Creek had the highest density (a total of 97 redds within 3.9 km) of bull trout redds out of the four streams surveyed.

Table 1. Summary of bull trout trapping and redd survey data in the upper Oldman River drainage. Data pooled for 2007 and 2008 surveys.

Waterbody	Intercepted Bull Trout (n)	Average (+ SE) Fork Length (mm)	Fork Length Range (mm)	Average Weight (g)	Weight Range (g)	Number of Redds
Hidden Creek (2007)	125	549 ± 12.1	266 - 760	1738 ± 4.0	125 - 4000	-
Hidden Creek (2008)	82	559 ± 10.2	321 - 751	1830 ± 94.9	328 - 3950	108
Livingstone River	19	551 ± 24.5	333 - 680	1657 ± 167.6	350 - 2800	26
Racehorse Creek	15	559 ± 21.3	434 - 693	1663 ± 154.3	700 - 2950	0
Dutch Creek	9	601 ± 15.6	518 - 670	1970 ± 170.0	1200 - 2750	25

Conclusion

Based on the high number of adults and redds, Hidden Creek appears to be a critical bull trout spawning stream in the upper Oldman River drainage. Our data suggests that adult migratory bull trout concentrate spawning efforts in Hidden Creek. Any negative impact to

bull trout or their habitat in Hidden Creek or other spawning streams could result in a further decline in the upper Oldman River bull trout population. We plan to continue monitoring bull trout in Hidden Creek, Livingstone River, Racehorse Creek and Dutch Creek as part of the long-term population assessment in the upper Oldman River drainage .

Communications

- A progress report has been submitted to Alberta Sustainable Resource Development.
- A presentation was delivered to the Oldman Chapter of Trout Unlimited.
- A poster was presented at the 2009 Great Plains Fisheries Workers Conference.

Literature cited

Brewin, P.A., and M.K. Brewin. 1997. Distribution maps for bull trout in Alberta. Pages. 209-216. *In*: W.C. Mackay, M.K. Brewin, and M. Monita, editors. Friends of the bull trout conference proceedings. Bull Trout Task Force (Alberta), c/o Trout Unlimited Canada, Calgary, Alberta.

Fitch, L.A. 1997. Bull trout in southwestern Alberta: notes on historical and current distribution. Pages 147-160. *In*: W.C. Mackay, M.K. Brewin, and M. Monita, editors. Friends of the bull trout conference proceedings. Bull Trout Task Force (Alberta), c/o Trout Unlimited Canada, Calgary, Alberta.

Ripley, T., G. Scrimgeor, and M. Boyce. 2005. Bull trout (*Salvelinus confluentus*) occurrence and abundance influenced by cumulative industrial developments in a Canadian boreal forest watershed. *Canadian Journal of Fisheries and Aquatic Sciences*, 62(11): 2431-2442

Photos



Spawning bull trout in Hidden Creek (Photo Brad Hurkett)



Andrew Clough with a post-spawning female bull trout captured from Dutch Creek

(Photo Mike Marquardson)



Dutch Creek ³



Active fish traps stationed throughout upper Oldman River drainage, 2008
(Photos Mike Marquardson¹ Brad Hurkett² Andrew Clough³ and Brad Hurkett⁴)