Alberta Conservation Association
2013/14 Project Summary Report

Project Name: Waterton River Watershed Bull Trout Status Assessment

Fisheries Program Manager: Peter Aku

Project Leader: Jason Blackburn

Primary ACA staff on project:

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Partnerships

Alberta Environment and Sustainable Resource Development
Nature Conservancy of Canada – Waterton Park Front
Parks Canada
University of Lethbridge

Key Findings

- Bull trout were mainly restricted to the highest quality thermal habitats. Ninety-four percent of the catch occurred in the coldest headwater reaches of four streams: Spionkop Creek, Blakiston Creek, Yarrow Creek and South Drywood Creek.
- No bull trout were captured in the high-quality thermal habitat of North Drywood Creek upstream of the Shell dam. The catch was entirely non-native species and dominated by brook trout.
- Brook trout was the most abundant and widely distributed sport species in the Waterton River watershed.
- *Bull trout x brook trout* hybrids were captured in nearly every tributary where bull trout occurred.

Introduction

In the Waterton River watershed, bull trout *(Salvelinus confluentus)* is considered at *High Risk* of extirpation as a result of overharvest, habitat fragmentation and degradation, and competition from invasive species (Alberta Sustainable Resource Development 2012). Historical declines are well documented; however, current knowledge of bull trout distribution in the Waterton River watershed is essential to identify and prioritize remediation efforts for recovery of the species. In 2013/14, we completed a two-year study to determine the distribution of bull trout relative to thermal habitats and to its historical distribution. In the first year of the study, we focused on areas of greatest stream connectivity with the highest fish migration potential and on the brown trout (*Salmo trutta*) fishery in the Waterton River mainstem. In year two, we focused on the fragmented Drywood Creek watershed, noted historically for runs of large migratory bull trout but heavily impacted by migration barriers and exotic species introductions. Our main objective

was to determine the current distribution of bull trout relative to assessed thermal habitat quality, existing migration barriers, and the presence of non-native fish species.

Methods

During the summers of 2012 and 2013, we used a combination of backpack and totebarge electrofishing to sample 71 reaches (23.5 stream kilometres), spaced systematically along major tributaries to the Waterton River upstream of Waterton Reservoir. In addition, we used boat electrofishing along the entire reach of the Dardanelles and perimeter of Maskinonge Lake, as well as raft electrofishing along the entire Waterton River (~32 km) from Maskinonge Lake to Waterton Reservoir. Tributary sample reaches ranged from 300 to 750 m in length (based on stream wetted width). We measured and enumerated all captured fish by species and mapped distributions using a geographic information system (GIS). We also monitored stream temperature with data loggers from May through September at 29 different locations spaced systematically across the watershed to identify temperature gradients and suitable thermal habitats for juvenile bull trout, defined in Isaak et al. 2009, by average summer stream temperatures as high (<10°C), medium (10°C to 12°C) and low (>12°C).

Results

Of 71 tributary sample reaches, 11 were upstream of waterfall barriers and yielded no fish (Figure 1). We captured 281 bull trout ranging in size from 44 to 668 mm fork length (FL) from the remaining 60 reaches. Ninety-four percent of our bull trout catch occurred in high-quality thermal habitat reaches of four headwater streams: Spionkop Creek (n = 131), Blakiston Creek (n = 81), Yarrow Creek (n = 52) and South Drywood Creek (n = 5) (Figures 1 and 2). The remaining 6% (n = 11) were captured intermittently in medium- to low-quality thermal habitats on Drywood and Yarrow creeks. We captured *bull trout x brook trout* hybrids in every tributary bull trout were captured, except Yarrow Creek. Brook trout was the most widely distributed and abundant salmonid species, representing 36% of the total catch (n = 902), followed by rainbow trout (*Oncorhynchus mykiss*) 18% (n = 447), mountain whitefish (*Prosopium williamsoni*) 16% (n = 399), brown trout 12% (n = 296) and bull trout 11%. In the Drywood-Yarrow sub-watershed alone, brook trout and rainbow trout catches were identical (n = 403 each) and comprised 76% of the catch. Bull trout were notably absent in North Drywood Creek upstream of the Shell dam.

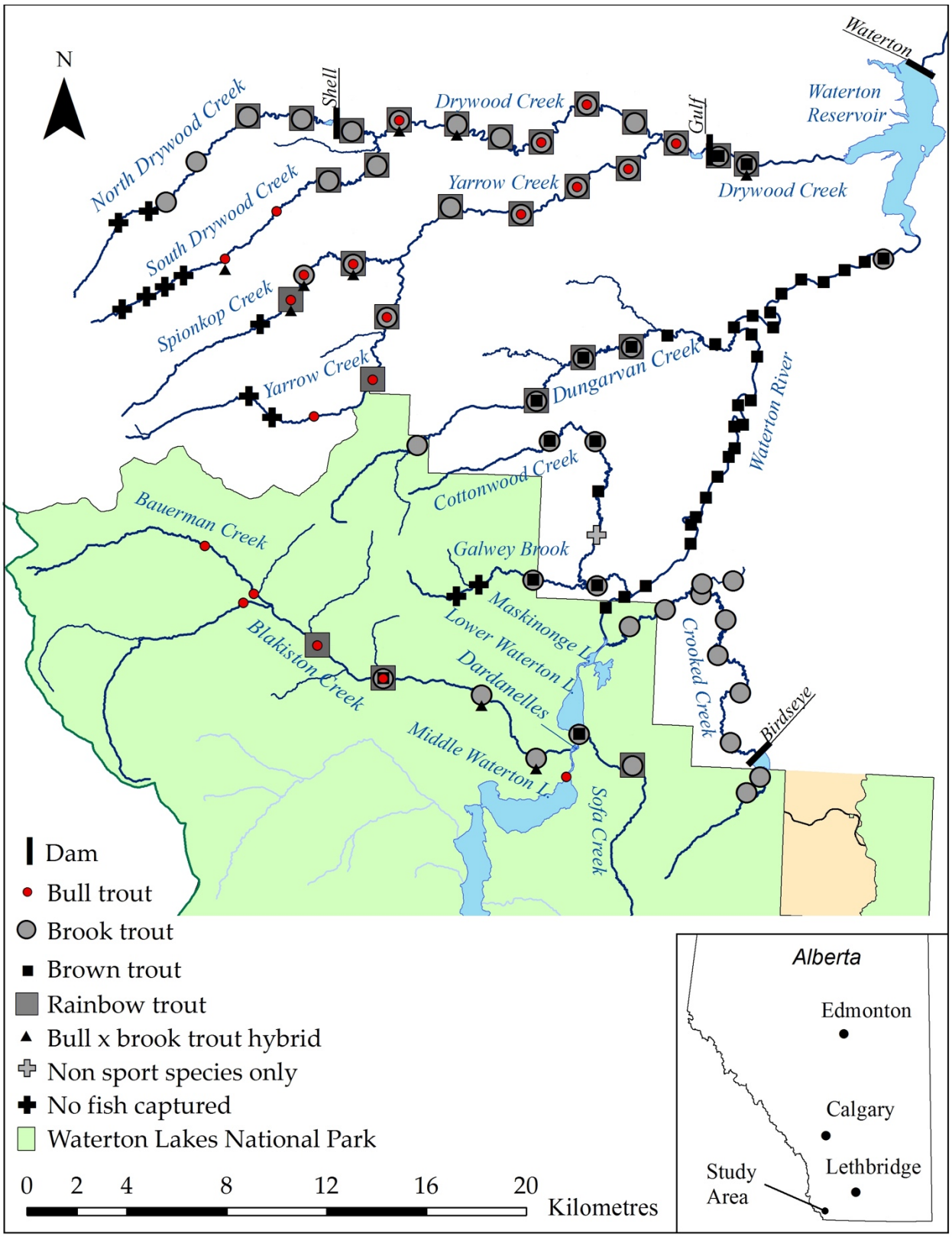

Figure 1. Distribution of bull trout and select sport species at sites electrofished across the Waterton River study area during the summers of 2012 and 2013.

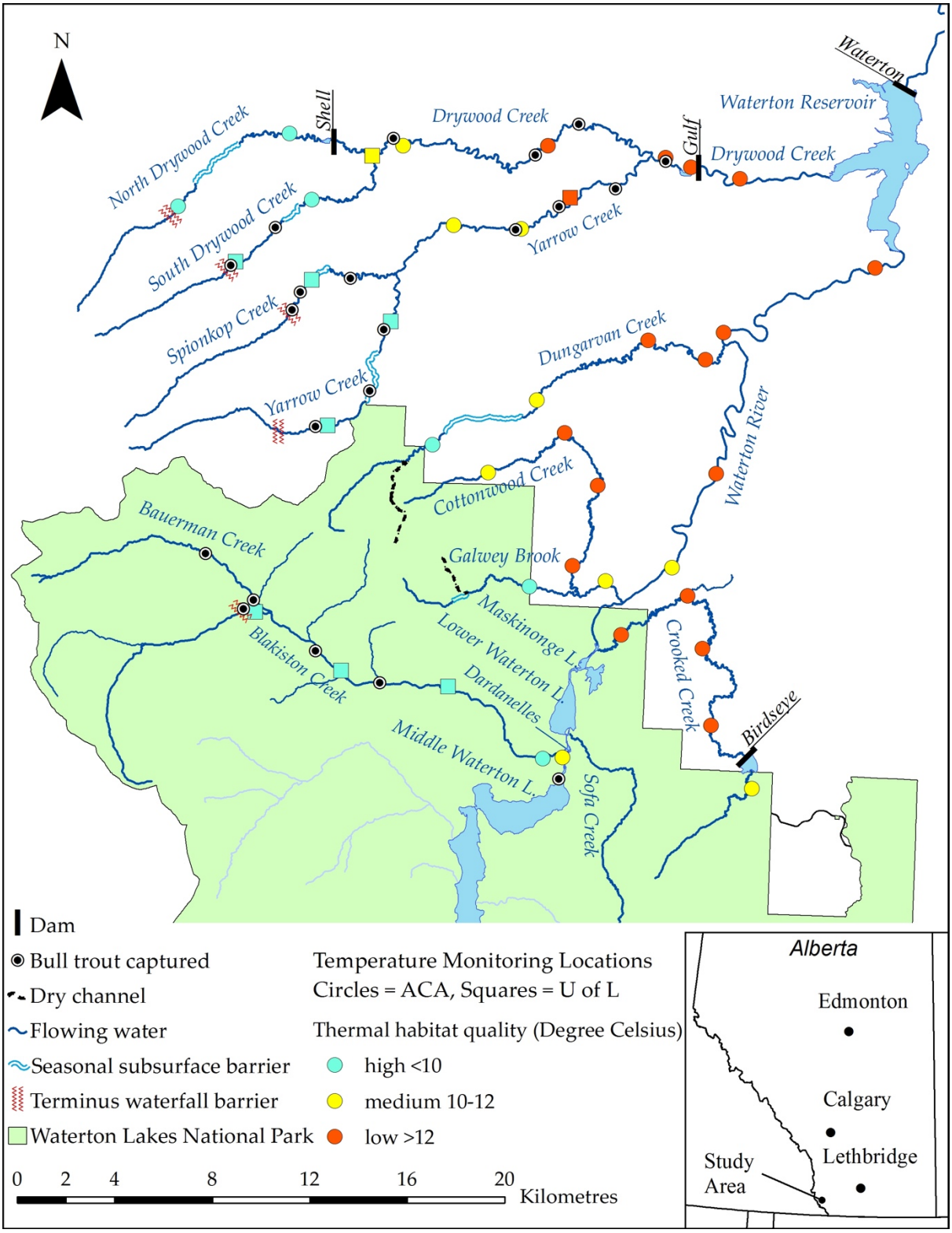

Figure 2. Bull trout capture locations relative to fish migration barriers and juvenile bull trout thermal habitat rankings in the Waterton River watershed. Circles represent data collected by Alberta Conservation Association from 2012 to 2013; squares represent data collected by the University of Lethbridge from 2009 to 2011 (Warnock 2012).

Conclusions

The Waterton River watershed was dominated by non-native fish species, particularly brook trout, which we captured in every flowing waterbody. Rainbow trout were equally dominant in the Drywood-Yarrow sub-watershed, and brown trout were well established in the Waterton River. Bull trout were primarily restricted to the coldest habitats and confined to the largest remaining unfragmented reaches. Encroachment by non-native brook trout appears to be a considerable threat to the remnant bull trout populations in the watershed.

Communications

- Preliminary findings were shared with the Wildlife Conservation Society in Conservation Report 7: *Protecting and Connecting Headwater Havens: Vital Landscapes for Vulnerable Fish and Wildlife, Southern Canadian Rockies of Alberta*.
- Electrofishing, stream temperature and habitat data from Crooked Creek watershed were shared with Nature Conservancy of Canada, Waterton Park Front.

Literature Cited

Alberta Sustainable Resource Development. 2012. Bull trout conservation management plan 2012 – 17. Alberta Sustainable Resource Development, Species at Risk Conservation Management Plan No. 8, Edmonton, Alberta, Canada. 90 pp.

Isaak, D., B. Rieman, and D. Horan. 2009. A watershed scale monitoring protocol for bull trout. Gen. Tech. Rep. RMRS-GTR-224. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 25 pp.

Warnock, W. 2012. Examining brook trout invasion into bull trout streams of the Canadian Rockies. Ph.D. thesis, University of Lethbridge, Alberta, Canada. 184 pp.

Photo Captions

Underwater bull trout release. Photo: Eztiaan Groenewald
[filename: Photo1_Waterton_BLTR_2013-14_Eztiaan Groenewald.jpg]

Alberta Conservation Association staff members Eztiaan Groenewald and Jason Blackburn electrofishing beneath Yarrow Creek waterfall barrier. Photo: Brad Hurkett
[filename: Photo2_Waterton_BLTR_2013-14_Brad Hurkett.jpg]

Brook trout catch from North Drywood Creek. Photo: Jason Blackburn
[filename: Photo3_Waterton_BLTR_2013-14_Jason Blackburn.jpg]

Alberta Conservation Association crew backpack electrofishing a terminus waterfall barrier on South Drywood Creek. Left to right: Tyler Johns, Leah Neigum and Eztiaan Groenewald. Photo: Jason Blackburn
[filename: Photo4_Waterton_BLTR_2013-14_Jason Blackburn.jpg]