Project Name: Ram River Bull Trout Assessment

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Partnerships

Alberta Environment and Parks

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Key Findings

- We detected fish at five of the 12 randomly selected backpack electrofishing sites we sampled in the lower Ram River watershed, comprising eight different species.
- We captured 25 bull trout electrofishing, 20 of which were captured at a single site on an unnamed tributary to the Ram River.
- We counted 76 bull trout redds on a survey of a 3.5 km reach of Fall Creek.
- We tested a solar-powered underwater video recording system for monitoring the bull trout spawning run in Fall Creek, obtaining over 36 days of footage during the peak bull trout spawning migration.

Abstract

Bull trout is a native sport species classed as *Threatened* in Alberta and is particularly sensitive to habitat change. A government-led initiative, the North-Central Native Trout (NCNT) program was implemented in 2017 to recover native trout and whitefish in the central and northern east slopes of Alberta. The program involves implementation of recovery actions (e.g., trail remediation/closure, implementing industry best-management practices, suppression of non-native species) in an adaptive management framework. Success of this program will be measured using Alberta Environment and Park's Fish Sustainability Index (FSI). The FSI is a standardized process of assessment that provides a landscape-level overview of fish sustainability within the province and enables broad-scale evaluation of management actions and land-use planning. In the summer and fall of 2019, we used a combination of backpack electrofishing, redd surveys, and underwater video recording to assess the bull trout population in the lower Ram River watershed. Our sample frame for backpack electrofishing included 12 randomly selected sites, where we detected fish at five of the 12 sites, catching eight different species. We captured 25 bull trout electrofishing, 20 of which were captured at a single site on an unnamed tributary to the Ram River. We counted 76 bull trout redds on a survey of a 3.5 km reach of Fall Creek. We also tested a solar-powered underwater video recording system for monitoring the bull trout spawning run in Fall Creek, obtaining over 36 days of footage during the bull trout spawning migration. Our study provides land-use managers with information on fish species distribution and abundance necessary to minimize land-use impacts on fish, evaluate bull trout status, and otherwise balance the diverse values of the Ram River watershed.

Introduction

Bull trout, classified as *Threatened* (Saskatchewan – Nelson rivers populations), are particularly sensitive to habitat change and are thought to reflect general ecosystem health (COSEWIC 2012). This sensitivity, coupled with their relatively wide distribution, make bull trout an attractive species for monitoring sustainability in the North Saskatchewan River watershed. A government-led initiative, the North-Central Native Trout (NCNT) program was implemented in 2017 to recover native trout and whitefish in the central and northern east slopes of Alberta (Government of Alberta 2017). The program involves implementation of recovery actions (e.g., trail remediation/closure, implementing industry best-management practices, suppression of non-

native species) in an adaptive management framework. These management actions will be evaluated using Alberta Environment and Park's Fish Sustainability Index (FSI). The FSI is a standardized process of assessment that provides a landscape-level overview of fish sustainability within the province and enables broad-scale evaluation of management actions and land-use planning (MacPherson et al. 2014). Native fish populations are being monitored during a five-year recovery period using a combination of FSI metrics, redd surveys, and habitat assessments.

Methods

From July 30 to August 1, 2019, we used backpack electrofishing gear to sample 12 sites in the lower Ram River watershed. Our sample frame for backpack electrofishing included all third- to fifth-order streams. These 12 randomly selected sites were sampled following Alberta Environment and Parks's (AEP's) standard operating procedure for sampling small streams (Figure 1). Bull trout were visually inspected upon capture for morphological features of hybridization with brook trout based on criteria in Popowich et al. (2011). We surveyed a 3.5 km reach of Fall Creek, a known bull trout spawning tributary, for bull trout redds. From August 29 to October 10, 2019, we installed a solar-powered underwater video recording system in Fall Creek, using a fence to funnel fish through a box containing an underwater camera. We also monitored summer water temperature (hourly) at five locations throughout the study area to assess thermal suitability of habitat for bull trout (Figure 1).
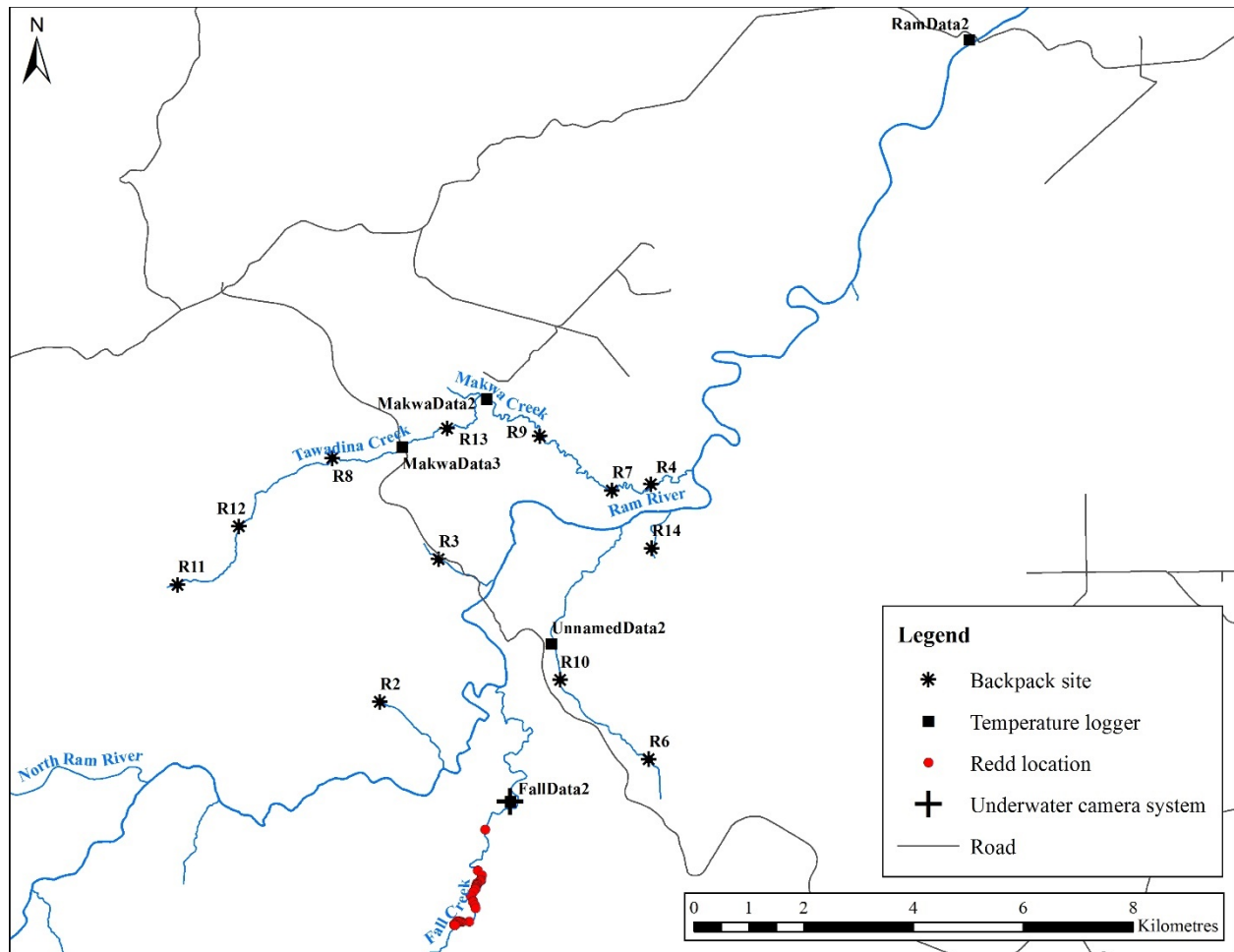
Figure 1.   Ram River bull trout assessment project 2019 study area and sample sites.

Results

We backpack electrofished 12 sites resulting in over 12,000 s of electrofishing effort over 3,600 m of stream. Fish were captured at six of the 12 sites and included six brook trout, 25 bull trout, one brown trout, two cutthroat trout, 202 longnose dace, seven longnose sucker, 21 mountain sucker, and five mountain whitefish (Table 1). Bull trout were most abundant at site R10, located along a cold, spring-fed tributary to the Ram River. Of the 25 bull trout we captured electrofishing, none exhibited morphological characteristics of hybridization with brook trout. On October 4, we conducted a redd survey on 3.5 km of Fall Creek and counted 76 bull trout redds. Yearly bull trout redd counts are summarized in Figure 2. Our test of an underwater video recording system was successful. We obtained over 36 days of footage during the peak bull trout

spawning migration in Fall Creek. Average water temperature over the summer months is summarized for each logger location in Figure 3.

Table 1. Summary of backpack electrofishing sites (NAD 83, Zone 11) and fish capture by species in the Ram River watershed, July 30 to August 1, 2019. Species codes: BKTR = brook trout, BLTR = bull trout, BNTR = brown trout, CTTR = cutthroat trout, LNDC = longnose dace, LNSC = longnose sucker, MNSC = mountain sucker, MNWH = mountain whitefish.

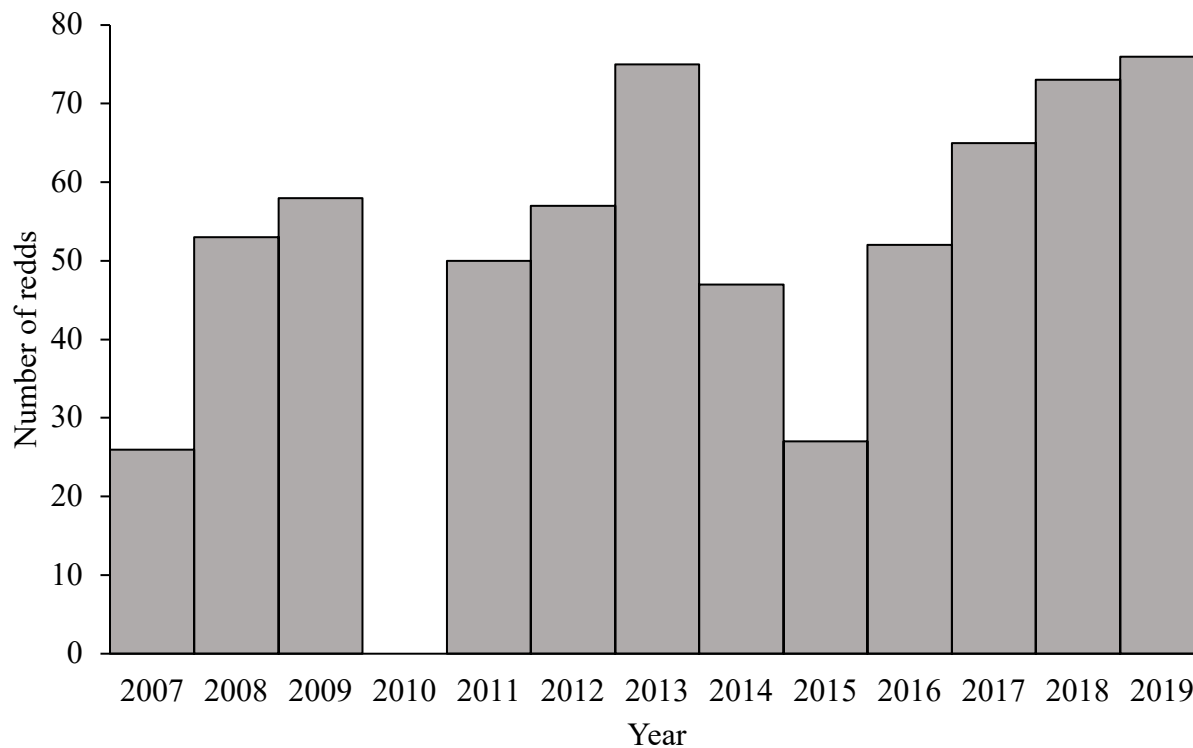| Site ID	Distance (m)	Effort (s)	Species							
			BKTR	BLTR	BNTR	CTTR	LNDC	LNSC	MNSC	MNWH
R2	300	1031	0	0	0	0	0	0	0	0
R3	300	699	0	0	0	0	0	0	0	0
R4	300	1552	0	1	1	2	45	4	13	2
R6	300	781	0	0	0	0	0	0	0	0
R7	300	1612	0	1	0	0	54	1	0	1
R8	300	542	0	0	0	0	0	0	0	0
R9	300	1596	0	1	0	0	95	2	8	2
R10	300	926	0	20	0	0	0	0	0	0
R11	300	1001	0	0	0	0	0	0	0	0
R12	300	814	0	0	0	0	0	0	0	0
R13	300	1164	6	2	0	0	8	0	0	0
R14	300	414	0	0	0	0	0	0	0	0

Figure 2. Survey counts by year of bull trout redds observed along Fall Creek in a 3.5 km stretch below the falls, 2007 – 2019 (note: a redd survey was not conducted on Fall Creek in 2010).
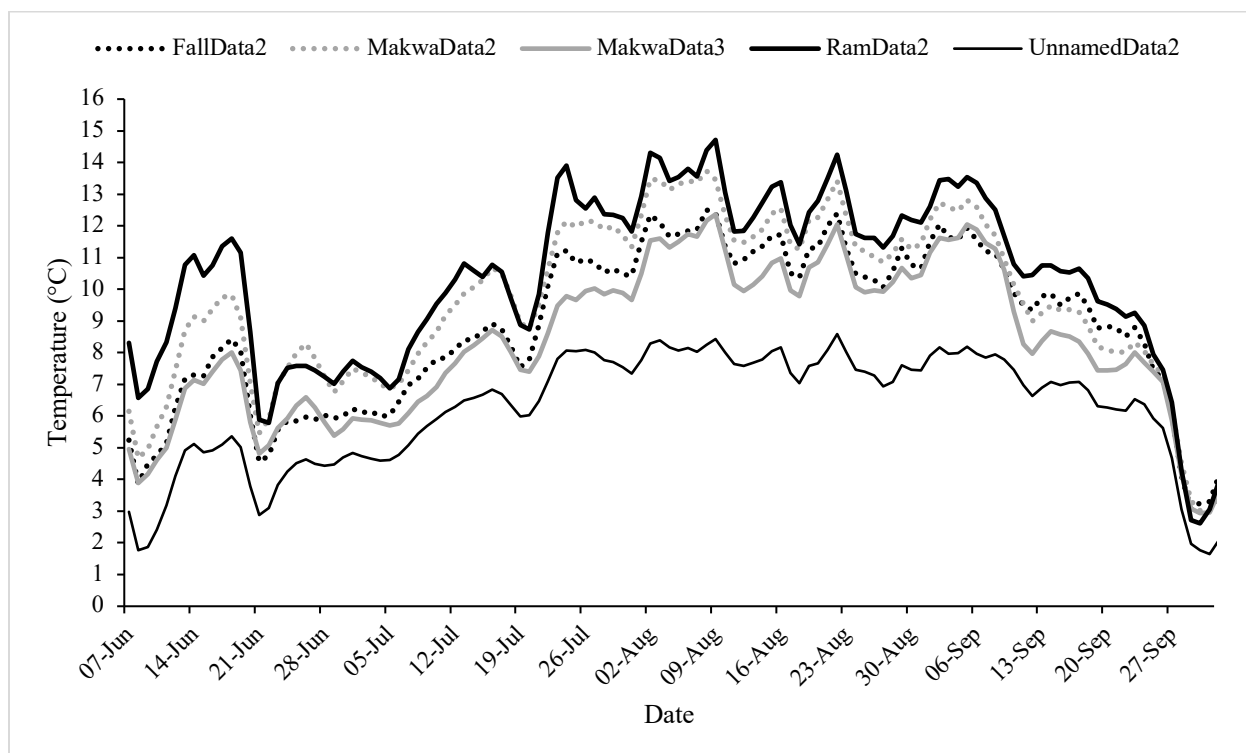
Figure 3. Two-day moving average water temperature at five locations in the Ram River watershed from June–September 2019.

Conclusions

Bull trout were the most widely distributed species detected while electrofishing. Bull trout were most abundant at site R10, located along a cold, spring-fed tributary to the Ram River. Additionally, there has been an increase in the number of bull trout redds observed along Fall Creek since 2015. We will continue to monitor the bull trout population in the Ram River watershed next year, repeating the same backpack sites, conducting redd surveys on Fall Creek, and recording underwater video of the spawning migration. Our study provides managers with information on fish species distribution and abundance necessary to minimize land-use impacts on fish and evaluate bull trout response to recovery actions.

Communications

- Submitted data to AEP for inclusion in its Fisheries and Wildlife Management Information System database.
- Presentation to AEP.

Literature Cited

COSEWIC. 2012. COSEWIC assessment and status report on the bull trout Salvelinus confluentus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario, Canada. 103 pp.

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MacPherson, L., M. Coombs, J. Reilly, M.G. Sullivan, and D.J. Park. 2014. A generic rule set for applying the Alberta fish sustainability index, second edition. Environment and Sustainable Resource Development, Edmonton, Alberta, Canada. 51 pp.

Popowich, R.C., P.A. Venturelli, J.D. Stelfox, and E.B. Taylor. 2011. Validation of
morphological characteristics used for field identification of bull trout × brook trout
hybrids. North American Journal of Fisheries Management 31: 548–553.

Photos

Site R10, located on a cold, spring-fed tributary to the Ram River where bull trout were most abundant. Photo: Chad Judd

Solar-powered underwater video recording system and fish fence installed in Fall Creek. Photo: Zachary Spence

Adult bull trout travelling downstream past underwater camera after spawning in Fall Creek. Photo: Alberta Conservation Association