Alberta Conservation Association

2018/19 Project Summary Report

Project Name: North Saskatchewan River Drainage Fish Sustainability Index Data Gaps

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Project Leader: Chad Judd

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Partnerships

Alberta Environment and Parks
Hinton Wood Products – A Division of West Fraser Mills Ltd.
Sundre Forest Products – A Division of West Fraser Mills Ltd.

Key Findings

- We captured four fish species at 31 sites distributed throughout the Cardinal River and its tributaries in the upper North Saskatchewan River drainage.
- The highest relative abundance of bull trout in the Cardinal River watershed was in Ruby Creek.
- We detected brown trout at a single site in Ruby Creek, a species previously only known to occur in Ruby Lake located in the headwaters of the Cardinal River watershed.
- We captured four fish species at ten sites distributed throughout the Willson Creek watershed including 83 bull trout.

Introduction

Fishery inventories provide resource managers with information on fish abundance, species distribution, and fish habitat. This information is a key component of responsible land-use planning and management if threats to stream health are to be minimized. Alberta Environment and Park's Fish Sustainability Index (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). Priority species for FSI assessment known to occur in our study areas include bull trout (*Salvelinus confluentus*) and mountain whitefish (*Prosopium williamsoni*) (MacPherson et al. 2014). Collection of data to support FSI development for imperiled native sport species is a priority activity for ACA.

Bull trout is classed as *Threatened* in Alberta (Saskatchewan – Nelson rivers populations) (COSEWIC 2012). Bull trout are particularly sensitive to habitat change and are thought to reflect general ecosystem health (COSEWIC 2012). This sensitivity, coupled with the species' relatively wide distribution, makes bull trout an attractive species for monitoring sustainability in headwater streams of the North Saskatchewan River. In 2018, ACA assessed fish distribution and abundance in the Cardinal River watershed and expanded our study area to include the Willson Creek watershed within the Red Deer River drainage.

Methods

To assess fish distribution and abundance, we selected sample sites from points placed along third- to fifth-order streams using a spatially balanced design. Priority HUC 10 areas (hydrological unit code 10) for sampling were identified in consultation with project partners and included Upper Cardinal River, Lower Cardinal River, and Ruby Creek (Figure 1) and Willson Creek, a tributary to the James River in the upper Red Deer River drainage (Figure 2). Each HUC 10 watershed contained ten sites; Lower Cardinal River had one additional site (LC11) added to complement an ongoing stream crossing project. We sampled the sites using backpack and tote-barge electrofishing gear. Sampling took place from June 19 to August 17, 2018. Sites

were 300 m and 500 m in length for backpack and tote-barge sampling, respectively. We enumerated all captured fish by species and measured their fork length (FL; mm).

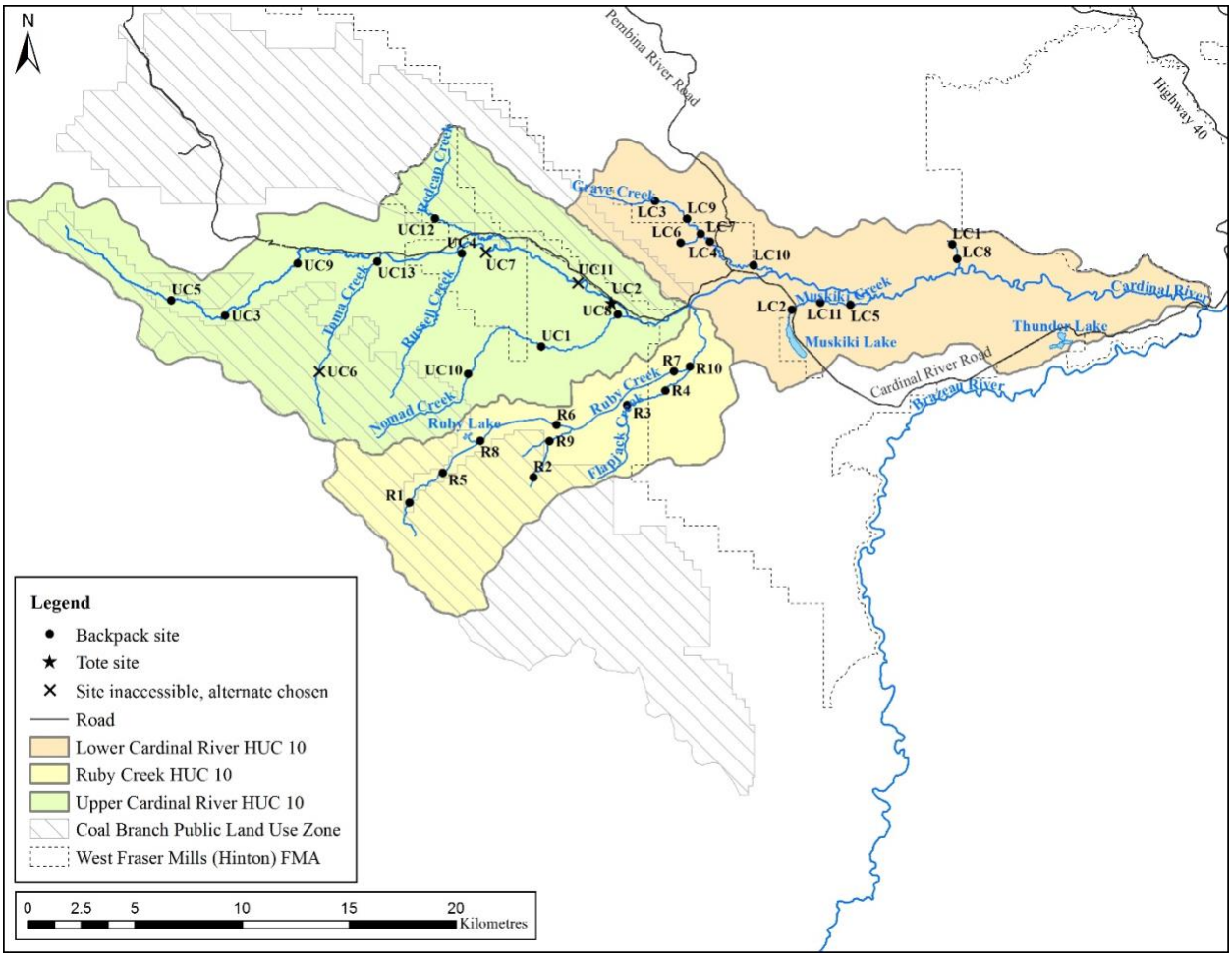

Figure 1. Fish inventory sites within the Cardinal River watershed in the headwaters of the North Saskatchewan River, 2018.

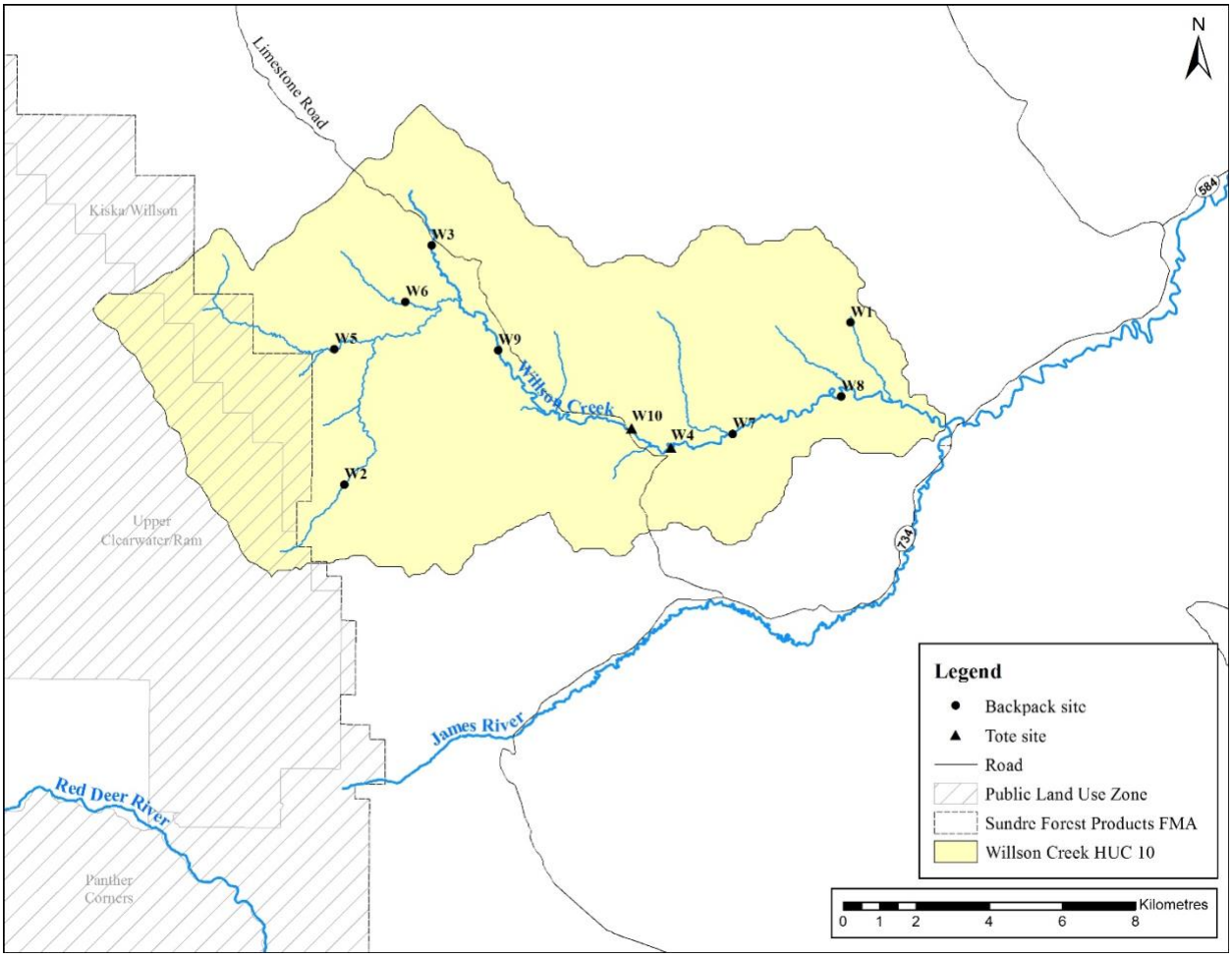

Figure 2. Fish inventory site locations within the Willson Creek HUC 10 watershed, a tributary to the James River in the headwaters of the Red Deer River, 2018.

Results

We sampled 41 sites resulting in over 45,000 seconds of effort over 12.6 km of stream. Bull trout were detected at 21 sites in the study areas (Table 1). We captured 221 fish in the Cardinal River watershed, including 98 bull trout, 22 cutthroat trout, and ten brown trout. Bull trout were most abundant in Ruby Creek and had a mean catch rate of 2.43 fish/100 m (Table 2). Brown trout were caught at a single site immediately downstream of the outflow of Ruby Lakes. In the Willson Creek watershed, we captured 208 fish, including 83 bull trout, 119 brook trout, and five mountain whitefish. The mean catch rate for bull trout was 2.58 fish/100 m (Table 2).

Table 1. Number of sites fish were detected per HUC 10 watershed and total catch of fish species during the North Saskatchewan River FSI Data Gaps project using backpack and tote-barge electrofishing gear, June 19 to August 17, 2018.

Species	Site detections (n)				Total catch (%)
	Lower Cardinal	Ruby Creek	Upper Cardinal	Willson Creek	
BKTR	0	0	0	9	119 (27)
BLTR	0	7	6	8	181 (42)
BNTR	0	1	0	0	10 (2)
CTTR	4	0	2	0	22 (5)
LNDC	0	0	0	1	1 (<1)
MNWH	0	0	0	2	5 (1)
PRDC	3	0	0	0	91 (21)

Species codes: BKTR = brook trout, BLTR = bull trout, BNTR = brown trout, CTTR = cutthroat trout, LNDC = longnose dace, MNWH = mountain whitefish, PRDC = pearl dace

Table 2. Bootstrapped mean relative abundance (10,000 replicates) of bull trout in each HUC 10 watershed using backpack and tote-barge electrofishing gear, June 19 to August 17, 2018.

	Mean catch
HUC 10 watershed	BLTR/100m (95% CL)
Lower Cardinal	0
Ruby Creek	2.43 (0.47 - 5.13)
Upper Cardinal	0.78 (0.25 - 1.40)
Willson Creek	2.58 (1.40 - 3.78)

Conclusions

Bull trout was the most abundant and widely distributed species captured in the Cardinal River watershed, with the highest relative abundance occurring in the Ruby Creek HUC 10 watershed. Historic stocking of Ruby Lake has resulted in a small self-sustaining population of brown trout

in Ruby Creek. Bull trout remain abundant and widely distributed in the Willson Creek watershed. Our study provides current information on abundance and distribution of FSI priority species within the Cardinal River and Willson Creek watersheds. This information is useful to land managers when attempting to balance the diverse values of the landbase upon which they operate and critical for the conservation of native fish species particularly sensitive to habitat degradation like bull trout.

Communications

- Submitted data to Alberta Environment and Parks for inclusion in its Fisheries and Wildlife Management Information System database.
- Presentations to Alberta Environment and Parks and the Edmonton Trout Club.
- Data report completed and copies submitted to Alberta Environment and Parks, Hinton Wood Products, and Sundre Forest Products.

Literature Cited

Committee on the Status of Endangered Wildlife in Canada (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.

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.

Photos

ACA technician, Andrew Clough, measuring a brook trout in the Willson Creek watershed. Photo: Chad Judd

ACA biologists, Nikita Lebedynski and Zachary Spence, backpack electrofishing Ruby Creek in the Cardinal River watershed. Photo: Dave Jackson

Ruby Creek in the Cardinal River watershed. Photo: Zachary Spence