

Alberta Conservation Association
2019/20 Project Summary Report

Project Name: Westslope Cutthroat Trout Population Monitoring in the Upper Oldman River Core Area

Fisheries Program Manager: Peter Aku

Project Leader: Brad Hurkett

Primary ACA staff on project: Kacey Barrett, Jason Blackburn, Tyler Johns, Michael Jokinen, and Logan Redman.

Partnerships

Alberta Environment and Parks
Fisheries and Oceans Canada

Key Findings

- Westslope cutthroat trout comprised 81% of our total fish catch ($n = 896$) and were captured at 38 of 39 sample sites.
- Westslope cutthroat trout catch per unit effort was highest in the upper Oldman River watershed followed by the Livingstone River watershed, and lowest in the Dutch Creek and Hidden Creek watersheds.
- Hidden Creek had the lowest total catch of westslope cutthroat trout but the largest average fish size in our study area.

Abstract

In 2018, the Livingstone-Porcupine Hills Land Footprint Plan was introduced by the Government of Alberta to reduce cumulative impacts on the landscape by changing land-use patterns to allow existing land footprints to recover. The resulting Livingstone Public Land Use Zone (PLUZ) encompasses the largest remaining westslope cutthroat trout (WSCT) core area in Alberta. Current land-use restrictions and habitat recovery activities in these critical habitats are anticipated to benefit fish populations and aid in species recovery. ACA is conducting a multi-year WSCT population monitoring study in four watersheds at the hydrologic unit code (HUC) 10 scale in the upper Oldman River (UOM) watershed. The objective of the study is to collect fish data at index sites for five years to determine natural WSCT population variations within the PLUZ. These data will be used to detect population response to the new PLUZ restrictions. In 2019, study year two of five, we completed fish surveys at 39 electrofishing index sites in streams of the UOM core area. Overall, WSCT catch per unit effort (CPUE) rates declined in 2019. Westslope cutthroat trout catches were highest in the UOM watershed, followed by the Livingstone watershed and lowest in the Hidden Creek and Dutch Creek watersheds. We will continue monitoring these four watersheds to examine the ongoing effects of the recent changes to land use in the Livingstone PLUZ.

Introduction

In 2018, the Government of Alberta implemented the Livingstone-Porcupine Hills Land Footprint Plan to reduce cumulative impacts on the landscape by changing land-use patterns to allow existing land use footprints to recover (Alberta Environment and Parks 2018). The resulting Livingstone Public Land Use Zone (PLUZ), encompasses key westslope cutthroat trout (WSCT) core habitat areas and reduces land-use impacts via strict motorized vehicle access restrictions within the upper Oldman River (UOM) WSCT core area. In support of recovery actions with the PLUZ, Alberta Conservation Association (ACA) initiated a multi-year study in 2018 to monitor WSCT population variation within the UOM core area; this is the second year of our study. Our primary objective is to determine WSCT abundance, distribution, and population

structure in four watersheds at the hydrologic unit code (HUC) 10 scale, in the UOM WSCT core area to monitor population trends over time.

Methods

In 2018, we established 39 electrofishing index sites across four HUC10 watersheds in the Livingstone PLUZ area: 17 in the Livingstone River, 12 in the upper Oldman River, five in the Dutch Creek, and five in the Hidden Creek watersheds (Figure 1). We allocated sample sites optimally based on past variance in catch per unit effort (CPUE), and selected sites using Generalized Random Tessellation Stratification (GRTS) by stream order. Site lengths were 300 m for backpack electrofishing and 500 m for tote barge electrofishing, sampling followed Alberta Environment and Parks's (AEP's) standard for operating procedure for sampling small streams. Between July 2 and August 13, 2019, we electrofished all index sites, collecting species and fish measurements (fork length [FL] and total length [TL] [mm], and weight [g]). We determined relative abundance of WSCT for all fish (≥ 70 mm), juveniles (≥ 70 mm - ≤ 149 mm FL), and adults (≥ 150 mm FL), per HUC10 watershed for comparison with future sampling events.

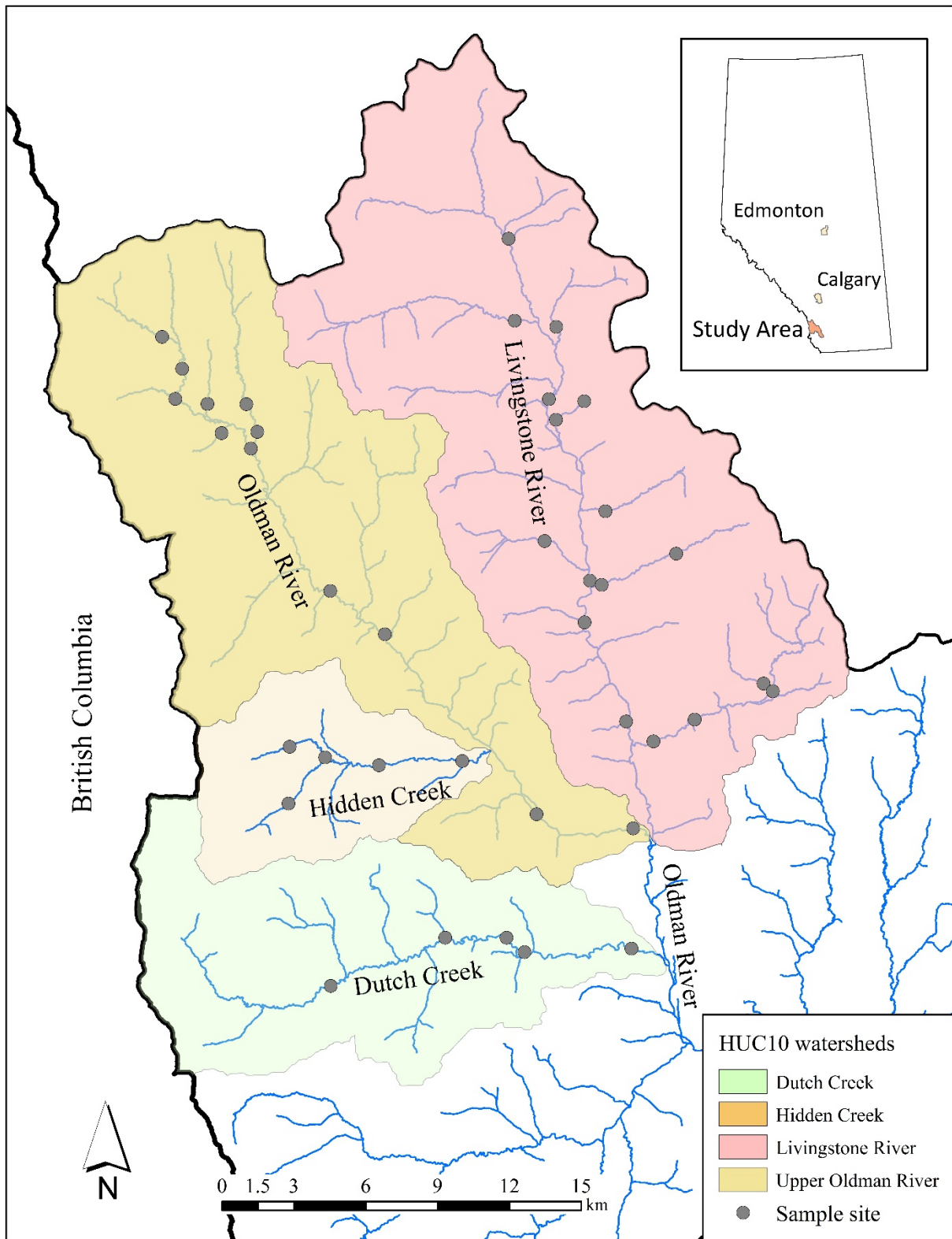


Figure 1. Electrofishing index sites in the upper Oldman Westslope cutthroat trout core area, 2019.

Results

We captured 1,108 fish in four major HUC10 watersheds in the UOM core area in 2019 (Table 1). Westslope cutthroat trout was the most abundant species comprising 81% ($n = 896$) of the catch and was captured at all sites except one. Median total CPUE of WSCT was highest in the watersheds of the UOM at 5.0 fish/100 m and Livingstone River at 4.0 fish/100 m, and lowest in Hidden Creek at 2.7 fish/100 m, and Dutch Creek at 2.0 fish/100 m. Similarly, CPUE of adult WSCT was higher in the UOM River watershed than in that of Hidden and Dutch Creeks, however adult CPUE in the Livingstone River and Hidden Creek watersheds were 1.7 fish/100m. Juvenile CPUE were highest in the UOM and Livingstone River watersheds and lowest in Hidden Creek and Dutch Creeks watersheds. Conversely, average WSCT size was the largest in the Hidden Creek watershed where few juveniles were captured (Table 2).

Table 1. Westslope cutthroat trout catch per unit effort by HUC10 watershed in the Livingstone PLUZ, 2019.

Watershed	Size class	CPUE (fish/100 m)	Total fish catch (n)
		Median (\pm SE)	
Livingstone River	All (≥ 70 mm)	4.0 ± 1.76	361
	Adult (≥ 150 mm)	1.7 ± 0.67	
	Juvenile (< 149 mm)	1.7 ± 1.36	
Upper Oldman River	All (≥ 70 mm)	5.0 ± 2.33	383
	Adult (≥ 150 mm)	3.8 ± 1.27	
	Juvenile (< 149 mm)	1.7 ± 1.39	
Dutch Creek	All (≥ 70 mm)	2.0 ± 0.65	33
	Adult (≥ 150 mm)	1.0 ± 0.67	
	Juvenile (< 149 mm)	1.0 ± 0.39	
Hidden Creek	All (≥ 70 mm)	2.7 ± 0.83	32
	Adult (≥ 150 mm)	1.7 ± 0.51	
	Juvenile (< 149 mm)	1.0 ± 0.34	

Table 2. Summary of length measurements of Westslope cutthroat trout captured in the Livingstone PLUZ, 2019.

Watershed	Fork length (mm)		n
	Mean (\pm SD)	Range	
Upper Oldman River	184.2 ± 80.5	47 - 442	393
Livingstone River	150.2 ± 101.1	40 - 428	429
Dutch Creek	151.4 ± 94.0	55 - 310	41
Hidden Creek	190.7 ± 95.9	66 - 397	33

Conclusions

We completed the second year of fish sampling in the Livingstone PLUZ and will continue resampling index sites for another three years (2018 – 2023). Results from our sampling series will be used to monitor changes in WSCT abundance, distribution, and population structure in

response to the new PLUZ land-use restrictions and proposed habitat restoration activities in the UOM WSCT core area.

Communications

- We presented our 2019/20 fish catch results to AEP fisheries managers in 2019.

Literature Cited

Alberta Environment and Parks, 2018. Livingstone – Porcupine Hills Land Footprint Management Plan. Government of Alberta. ISBN No.978-1-4601-3965-3. Available at: <http://aep.alberta.ca/land/programs-and-services/land/programs-and-resource-planning/regional-planning/south-saskatchewan-region/default.aspx>. ISBN 1-4601-3966-0

Photos



ACA staff counting and measuring fish in the Livingstone River. Photo: Logan Redman



Westslope cutthroat trout recovering after sampling. Photo: Jason Blackburn



ACA staff backpack electrofishing a stream in the Upper Oldman WSCT core area.
Photo: Logan Redman