Alberta Conservation Association

2020/21 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: Jason Blackburn, Tyler Johns, Michael Jokinen, and Logan Redman.

Partnerships

Alberta Environment and Parks
Fisheries and Oceans Canada

Key Findings

- COVID-19 work restrictions limited our sampling to only 20 of 39 index sample sites.
- Westslope cutthroat trout comprised 80% of our total fish catch (n = 677) and were captured at 19 of 20 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.
- 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. Alberta Conservation Association (ACA) is conducting a multi-year WSCT population monitoring study in four HUC 10 sub-watersheds of the upper Oldman (UOM) River. 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 2020, COVID-19 work restrictions limited our summer sampling to only 20 of 39 electrofishing sites. Westslope cutthroat trout comprised 80% of our total fish catch (n = 677) and were captured at 19 of 20 sample sites. 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 within the upper Oldman (UOM) River watershed. Strict motorized vehicle access restrictions are imposed in the PLUZ to reduce land-use impacts. In support of recovery actions within the PLUZ, we initiated a multi-year study in 2018 to monitor WSCT population variation within the UOM core area; this is the third year of our study. Our primary objective is to determine WSCT abundance, distribution, and population structure in four hydrologic-unit-code (HUC) 10 sub-watersheds 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 AEP's standard operating procedure for sampling small streams. Between August 18 and August 28, 2020, we electrofished 20 of 39 index sites, collecting species and fish measurements (fork length [FL] and total length [TL] [mm], and weight [g]); COVID-19 work restrictions delayed our field season which prevented us from completing all index sites. We determined WSCT relative abundance for all fish (≥70 mm), juveniles (≥70 mm - <150 mm FL), and adults (≥150 mm FL), size structure, and distribution in all four HUC10 watersheds for comparison with future sampling.

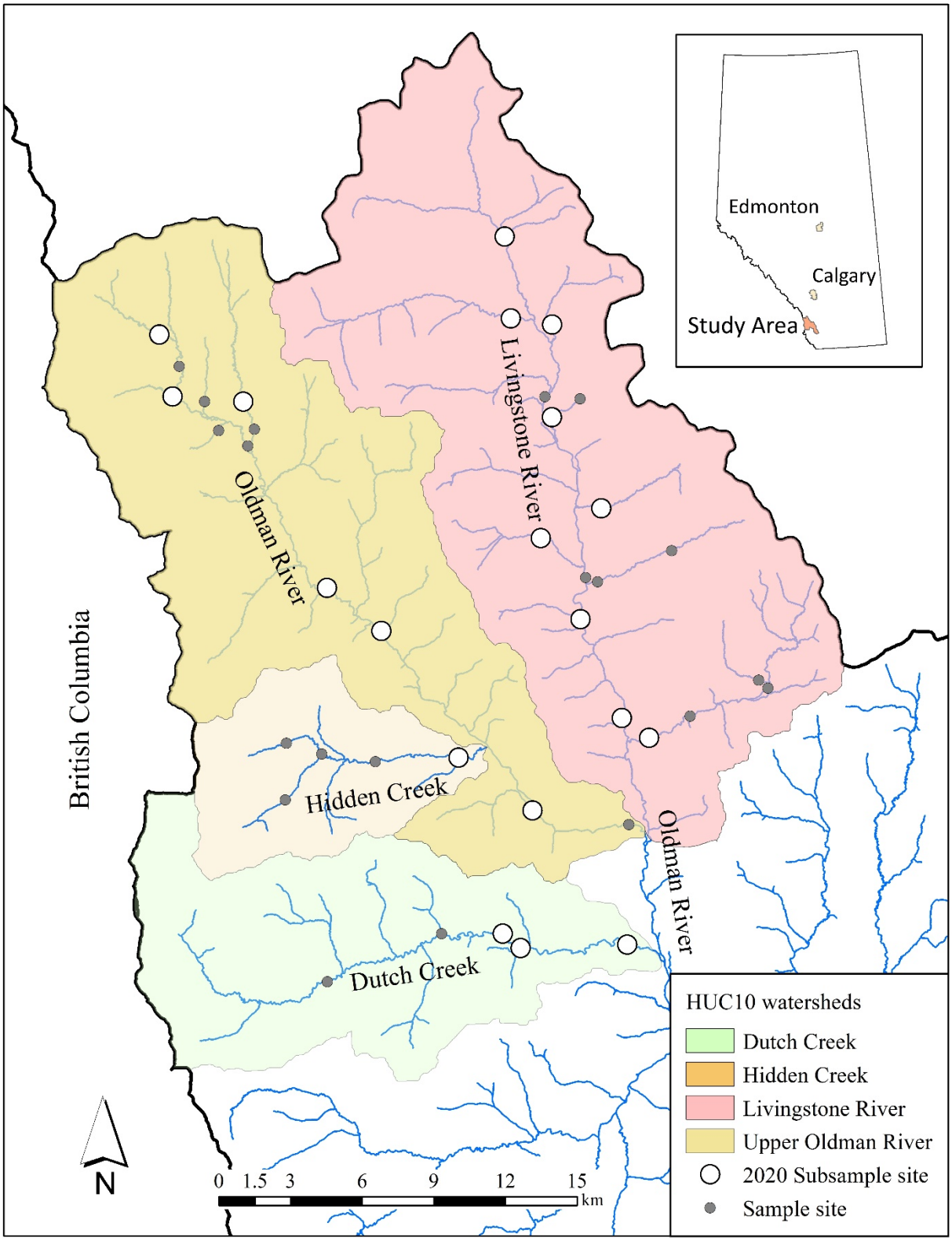

Figure 1. Electrofishing index sites in the upper Oldman River Westslope cutthroat trout core area, 2020.

Results

We captured 677 fish in four major HUC10 watersheds in the UOM core area in 2020. Westslope cutthroat trout was the most abundant species comprising 80% (n = 542) of the catch and was captured at all sites except one (Table 1). Mean CPUE of WSCT (≥70 mm FL – fork length) was highest in the UOM River at 12.6 fish/100 m and Livingstone River at 6.0 fish/100 m, and lowest in Hidden Creek and Dutch Creek at 1.5 and 1.7 fish/100 m respectively (Table 1). Similarly, CPUE of adult WSCT (≥150 mm FL) was higher in the UOM River and Livingstone River watersheds (5.8 and 2.4 fish/100 m, respectively), than in the Dutch and Hidden creeks (1.5 and 1.3 fish/100 m, respectively). Juvenile WSCT (<150 mm FL) CPUE were also highest in the UOM River and Livingstone River watershed and considerably lower in the three other watersheds (Table 1). Conversely, average WSCT size in all sample years was largest in the Hidden Creek watershed where few juveniles were captured (Table 2). Since 2018, WSCT fish size has increased in the Livingstone River and Dutch Creek watersheds.

Table 1. Westslope cutthroat trout catch per unit effort by HUC10 watershed in the Livingstone Public Land Use Zone, 2020.

Watershed	Size class	CPUE (fish/100 m) Mean (± SE)	Total WSCT (≥70 mm)
Livingstone River	All fish (≥70 mm)/100 m	6.0 ± 2.3	184
	Juvenile (<150 mm)//100 m	3.7 ± 1.8	
	Adult (≥150 mm)//100 m	2.4 ± 0.7	
Upper Oldman River	All fish (≥70 mm)/100 m	12.6 ± 3.0	323
	Juvenile (<150 mm)//100 m	6.9 ± 2.3	
	Adult (≥150 mm)//100 m	5.8 ± 1.2	
Dutch Creek	All fish (≥70 mm)/100 m	3.3 ± 2.0	30
	Juvenile (<150 mm)//100 m	1.8 ± 1.1	
	Adult (≥150 mm)//100 m	1.5 ± 0.91	
Hidden Creek	All fish (≥70 mm)/100 m	1.7	5
	Juvenile (<150 mm)//100 m	0.3	
	Adult (≥150 mm)//100 m	1.3	

Table 2. Summary of length measurements of Westslope cutthroat trout captured in the Livingstone Public Land Use Zone, 2018 - 20.

Watershed	Year	Fork length (mm)	
		Mean (±SE)	Range
Livingstone River	2018	142.4 ± 3.0	(28 - 421)
	2019	150.8 ± 4.9	(40 - 428)
	2020	157.0 ± 7.3	(31 - 427)
Upper Oldman River	2018	146.9 ± 3.2	(33 - 425)
	2019	184.2 ± 4.1	(47 - 442)
	2020	175.2 ± 4.8	(60 - 432)
Dutch Creek	2018	135.3 ± 10.7	(55 - 313)
	2019	151.4 ± 14.7	(55 - 365)
	2020	159.6 ± 17.3	(61 - 392)
Hidden Creek	2018	201.2 ± 12.4	(78 - 394)
	2019	190.7 ± 16.7	(66 - 397)
	2020	308.0 ± 61.3	(80 - 452)

Conclusions

Despite COVID-19 work restrictions, we completed the third consecutive year of fish surveys in the Livingstone PLUZ and will continue resampling index sites for another two years (2021 and 2022). 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 2020/21 fish catch results to AEP fisheries managers in 2020.

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-servoces/land/programs-and-resource-planning/regional-planning/south-saskatchewan-region/default.aspx. ISBN 1-4601-3966-0

Photos

Westslope cutthroat trout and bull trout captured in the Livingstone River waiting to be measured. Photo: Brad Hurkett

Westslope cutthroat trout with broken jaw is a result of improper handling during release. Photo: Brad Hurkett

ACA staff hiking in to a backpack electrofishing site in the Upper Oldman River watershed. Photo: Logan Redman.