Alberta Conservation Association

2022/23 Project Summary Report

Project Name: Westslope Cutthroat Trout Population and Habitat Monitoring

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Partnerships

Fisheries and Oceans Canada – Canada Nature Fund
Fisheries and Oceans Canada – Habitat Stewardship Program Fund
Government of Alberta

Key Findings

- Westslope cutthroat trout comprised 78% of our total fish catch (n = 1,461) and were captured at 37 of 39 sample sites.
- Catch-per-unit-effort of westslope cutthroat trout (≥70 mm fork length) captured using both backpack and tote barge electrofishing was highest in the upper Oldman River and Livingstone River sub-watersheds ranging from 23.3–114 and 25.3–42.9 fish/300 m, respectively, and lowest in the Dutch Creek sub-watershed at 12.2 fish/300 m and the Hidden Creek sub-watershed 4.6 fish/300 m.
- Average westslope cutthroat trout was largest in the Hidden Creek sub-watershed and smallest in the Dutch Creek sub-watershed.

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-Porcupine Hills 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) conducted a multi-year WSCT population monitoring study in four sub-watersheds (i.e., Livingstone River, upper Oldman [UOM] River, Dutch Creek, and Hidden Creek) in the UOM River WSCT core area 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 examine population response to the new PLUZ restrictions. In 2022, the final year of the study, we completed fish surveys at 39 electrofishing sites in the UOM core area. In comparison to previous years, overall catch-per-unit-effort (CPUE) of WSCT in 2022 were highest in the UOM River and Livingstone River sub-watersheds and lowest in the Dutch Creek and Hidden Creek sub-watersheds. Average fish size was largest in the Hidden Creek sub-watershed and smallest in the Dutch Creek sub-watershed. This was the final population monitoring year and results will be used to examine the ongoing effects of the recent changes to land use in the Livingstone-Porcupine Hills 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 Livingston-Porcupine Hills 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 (UOM) River WSCT core area. In support of recovery actions within the PLUZ, we initiated a multi-year study in 2018 to monitor WSCT population variations within the UOM core area; 2022 was the final year of a five-year study. Our primary objective is to determine WSCT abundance, distribution, and population structure in

four sub-watersheds (Livingstone River, UOM River, Dutch Creek, and Hidden Creek) in the UOM WSCT core area to monitor population trends over time.

Methods

In 2018, we established a total of 39 electrofishing index sites across the four sub-watersheds: 17 sites in the Livingstone River, 12 in the UOM 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 by stream order. Site lengths were 300 m for backpack electrofishing and 500 m for tote barge electrofishing, and sampling followed Alberta Environment and Protected Area's standard for operating procedure for sampling small streams. Between July 5 and September 16, 2022, we electrofished all index sites, collecting species and fish measurements (i.e., fork length [FL], total length [mm], and weight [g]). We determined WSCT CPUE for fish (≥70 mm FL), juveniles (≥70 mm – <150 mm FL), and adults (≥150 mm FL) and distribution for comparison to future sampling events.

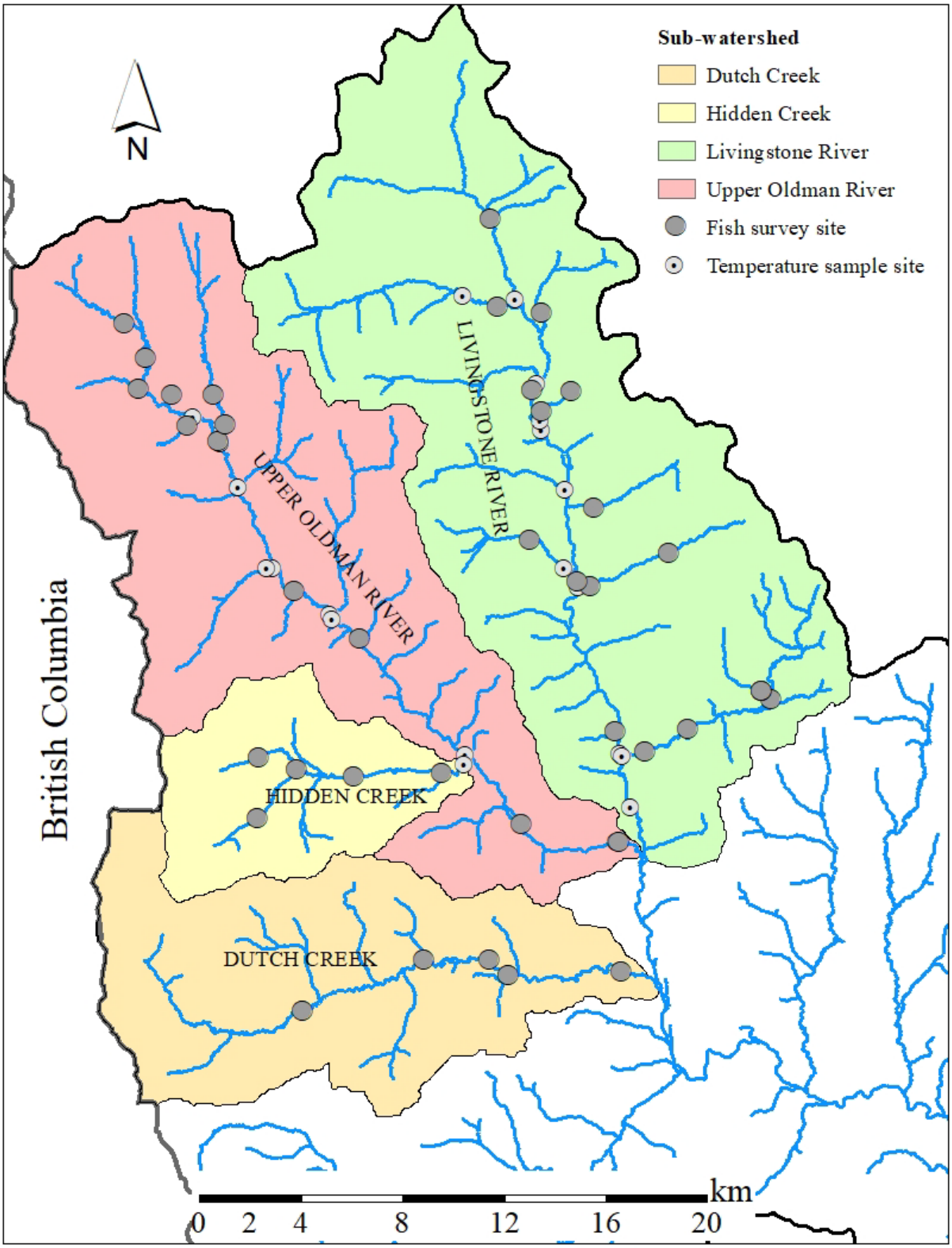

Figure 1. Electrofishing index sites in the upper Oldman River westslope cutthroat trout core area, 2022.

Results

We captured a total of 1,863 fish in the four sub-watersheds consisting of three species (WSCT, bull trout, and mountain whitefish); WSCT was the most abundant species comprising 78% (n = 1,461) of the catch and was captured at all sites except two. Like previous study years, mean CPUE of WSCT (≥70 mm FL) captured using both electrofishing methods was highest in the UOM River sub-watershed with a range of 23.3–114 fish/300 m and lowest in the Hidden Creek sub-watershed with 4.6 fish/300 m (Table 1). Similarly, CPUE for both juvenile WSCT (<153 mm FL) and adult WSCT (≥153 mm FL) was highest in the UOM River and Livingstone sub-watersheds and considerably lower in the two other sub-watersheds. Overall, average WSCT size was largest in the Hidden Creek sub-watershed and smallest in the Dutch Creek sub-watershed (Table 2).

Table 1. Catch-per-unit-effort (CPUE) of westslope cutthroat trout by sub-watershed in the upper Oldman River westslope cutthroat trout core area, 2022.

Watershed	Electrofishing Method	Size Class	CPUE (fish/300 m) Mean (95% CI)	Total Number Fish (≥70 mm fork length)
Livingstone River	Backpack	All fish (≥70 mm)	42.9 (15.2–76.3)	558
		Juvenile fish (<153 mm)	36.9 (12.4–66.2)	
		Adult fish (≥153 mm)	5.9 (1.7–11.2)	
	Tote barge	All fish (≥70 mm)	25.3 (17.2–32.0)	87
		Juvenile fish (<153 mm)	9.5 (6.0–12.5)	
		Adult fish (≥153 mm)	15.7 (11.8–20.0)	
Upper Oldman River	Backpack	All fish (≥70 mm)	23.3 (7.1–44.0)	164
		Juvenile fish (<153 mm)	20.5 (4.4–41.9)	
		Adult fish (≥153 mm)	3.0 (1.4–4.7)	
	Tote barge	All fish (≥70 mm)	114 (28.2–266.6)	568
		Juvenile fish (<153 mm)	88.0 (10.8–225.2)	
		Adult fish (≥153 mm)	26.5 (16.6–41.8)	
Dutch Creek	Backpack	All fish (≥70 mm)	12.2 (8.2–16.0)	61
		Juvenile fish (<153 mm)	10.4 (5.6–14.6)	
		Adult fish (≥153 mm)	1.8 (1.0–2.6)	
Hidden Creek	Backpack	All fish (≥70 mm)	4.6 (1.8–7.4)	23
		Juvenile fish (<153 mm)	1.8 (0.6–3.6)	
		Adult fish (≥153 mm)	2.8 (0.8–5.4)	

Table 2. Summary of length measurements of westslope cutthroat trout captured in the upper Oldman River westslope cutthroat trout core area, 2018–2022.

Sub-watershed	Year	Westslope Cutthroat Trout Fork Length (mm)		Total Number of All Fish (all sizes)
		Mean (±SE)	Range	
Livingstone River	2018	142.4 ± 3.0	28–421	777
	2019	150.8 ± 4.9	40–428	434
	2020	157.0 ± 7.3	31–427	197
	2021	98.4 ± 1.5	28–416	1,205
	2022	116.8 ± 2.2	32–440	727
Oldman River	2018	146.9 ± 3.2	33–425	522
	2019	184.2 ± 4.1	47–442	394
	2020	175.2 ± 4.8	60–432	330
	2021	119.9 ± 2.8	45–450	710
	2022	125.1 ± 2.2	44–445	795
Dutch Creek	2018	135.3 ± 10.7	55–313	41
	2019	151.4 ± 14.7	55–365	41
	2020	159.6 ± 17.3	61–392	33
	2021	110.2 ± 6.1	48–402	100
	2022	112.6 ± 6.2	55–374	70
Hidden Creek	2018	201.2 ± 12.4	78–394	38
	2019	190.7 ± 16.7	66–397	33
	2020	308.0 ± 61.3	80–452	5
	2021	166.7 ± 20.2	62–362	17
	2022	187.3 ± 14.8	90–335	23

Conclusions

We completed the final year of fish surveys in the UOM River WSCT core area. Results from our sampling series have determined natural population variations in the UOM River WSCT core area that can be used to monitor changes in WSCT abundance and distribution in response to the new land-use restrictions and proposed habitat restoration activities in the Livingstone-Porcupine Hills PLUZ.

Communications

- We presented the WSCT population monitoring study at the 2022 Alberta Native Trout Science Workshop.
- Final 2018–2022 data report is available online at: https://www.ab-conservation.com/.

Literature Cited

Alberta Environment and Parks (AEP). 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.

Photos

Photo 1. ACA staff tote barge electrofishing a log jam in the upper Oldman River. Photo: Abigail Doerksen

Photo 2. ACA staff backpack electrofishing a small stream in the upper Oldman River westslope cutthroat core area. Photo: Brad Hurkett

Photo 3. ACA staff collecting biological measurements on a westslope cutthroat trout. Photo: Brad Hurkett