

**Alberta Conservation Association**  
**2021/22 Project Summary Report**

**Project Name:** Westslope Cutthroat Trout Population and Habitat Monitoring

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**Partnerships**

Alberta Environment and Parks

Fisheries and Oceans Canada through the Canada Nature Fund

Fisheries and Oceans Canada – Habitat Stewardship Program Fund

**Key Findings**

- In 2021, overall westslope cutthroat trout catch rates were highest compared to previous study years.
- Westslope cutthroat trout comprised 81% of our total fish catch ( $n = 1,833$ ) and were captured at 37 of 39 sample sites.
- Relative abundance of westslope cutthroat trout ( $>70$  mm - fork length) in 2021 was highest in the Livingstone River watershed ( $16.6 \pm 5.6$  fish/100 m) followed by the upper Oldman River ( $11.3 \pm 2.6$  fish/100 m), and lowest in the Dutch Creek ( $5.1 \pm 2.0$  fish/100 m), and Hidden Creek (1.1 fish/100 m).
- Hidden Creek continues to have the lowest total catch of westslope cutthroat trout but the largest average fish size in our study area (2018 – 2021).

## **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 10 scale in the upper Oldman (UOM) River 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 2021, study year four of five, we completed fish surveys at 39 electrofishing sites in the UOM core area. In comparison to previous years, WSCT catch per unit effort (CPUE) rates in 2021 were highest in all watersheds except at Hidden Creek. Similar to previous years, 2021 WSCT catches were highest in the Livingstone River ( $n = 885$ ) and UOM River ( $n = 509$ ) watersheds and lowest in the Dutch Creek ( $n = 76$ ) and Hidden Creek ( $n = 16$ ) watersheds. We will continue monitoring these four watersheds in 2022 (study year five of five) 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 (AEP 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 (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; this is year four of the 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 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 (GRTS) by stream order. Site lengths were 300 m for backpack electrofishing and 500 m for tote barge electrofishing, and sampling followed AEP's standard for operating procedure for sampling small streams. Between July 6 and August 19, 2021, we electrofished 39 index sites, collecting species and fish measurements (i.e., fork length [FL] total length [mm], and weight [g]). We determined WSCT relative abundance (CPUE) for fish ( $\geq 70$  mm FL), juveniles ( $\geq 70$  mm –  $< 150$  mm FL), and adults ( $\geq 150$  mm FL) and distribution for comparison to future sampling events.

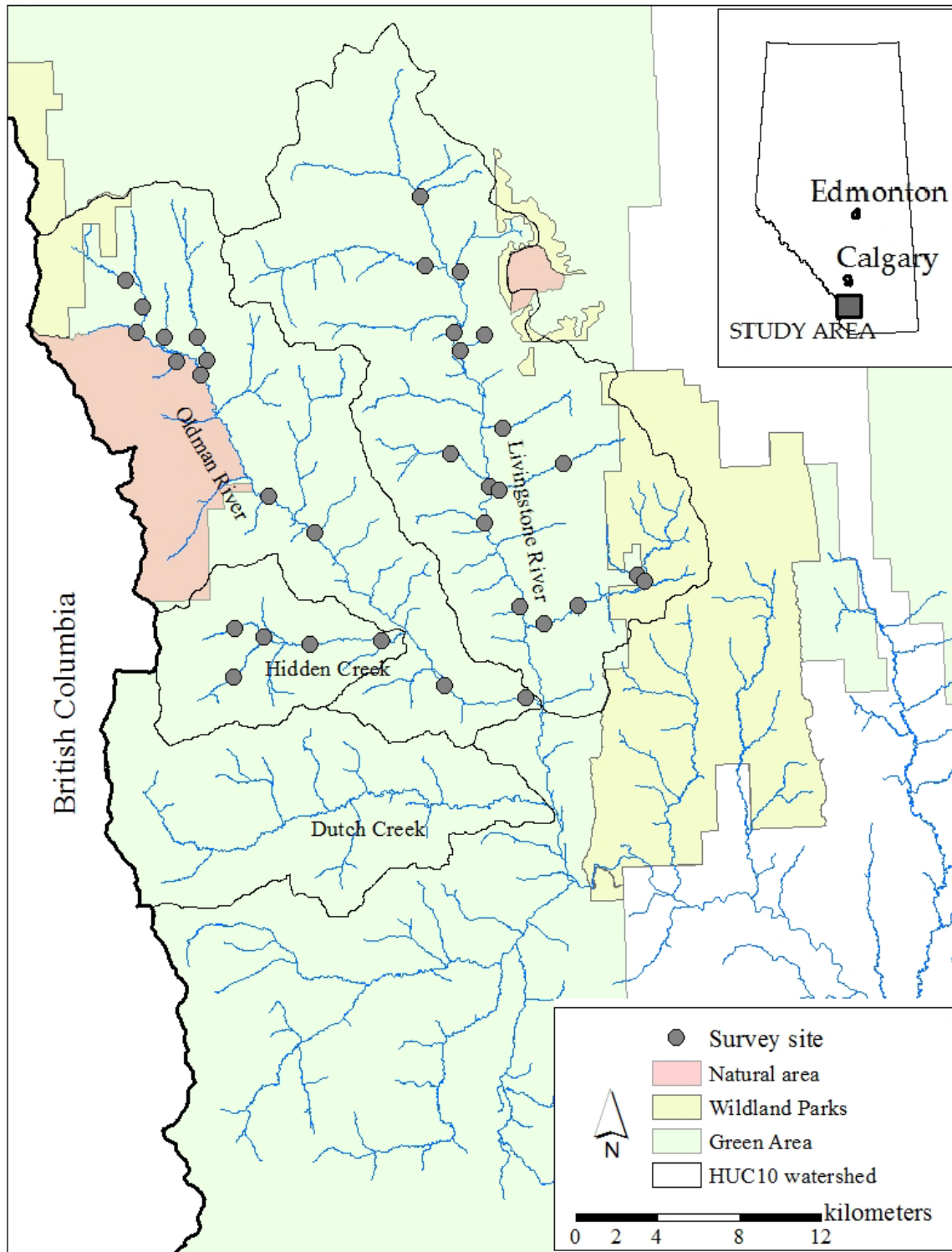


Figure 1. Electrofishing index sites in the upper Oldman River westslope cutthroat trout core area, 2021.

## Results

We captured a total of 1,833 fish in the four HUC10 watersheds. Westslope cutthroat trout (WSCT) was the most abundant species comprising 81% ( $n = 1,486$ ) of the catch and was captured at all sites except two (Table 1). Like previous study years, mean relative abundance of WSCT ( $\geq 70$  mm FL) was highest in the Livingstone River and UOM River watersheds at  $16.6 \pm 5.6$  fish/100 m and  $11.3 \pm 2.6$  fish/100 m, respectively. Similarly, relative abundance of adult WSCT ( $\geq 150$  mm FL) was considerably higher in the UOM River and Livingstone River watersheds (3.5 and 2.1 fish/100 m respectively), than in Dutch and Hidden creeks (both at 1.3 fish/100 m). Juvenile WSCT ( $< 150$  mm FL) relative abundance was also highest in the Livingstone and UOM River watersheds and considerably lower in the two other watersheds. Conversely, average WSCT size in all sampling years was largest in the Hidden Creek watershed than all other watersheds where few juveniles were captured (Table 2). The combined average fish length of WSCT caught in 2021 was the smallest in all four sampling years.

Table 1. Relative abundance, expressed as catch-per-unit-effort (CPUE), of westslope cutthroat trout by HUC10 watershed in the upper Oldman River westslope cutthroat trout core area, 2021.

Watershed	Size class	CPUE (fish/100 m)	Total number fish ( $\geq 70$ mm fork length)
		Mean ( $\pm$ SE)	
Livingstone River	All fish ( $\geq 70$ mm)/100 m	$16.6 \pm 5.6$	885
	Juvenile ( $< 150$ mm)/100 m	$14.5 \pm 5.3$	
	Adult ( $\geq 150$ mm)/100 m	$2.1 \pm 0.6$	
Upper Oldman River	All fish ( $\geq 70$ mm)/100 m	$11.3 \pm 2.6$	509
	Juvenile ( $< 150$ mm)/100 m	$7.9 \pm 2.5$	
	Adult ( $\geq 150$ mm)/100 m	$3.5 \pm 0.7$	
Dutch Creek	All fish ( $\geq 70$ mm)/100 m	$5.1 \pm 2.0$	76
	Juvenile ( $< 150$ mm)/100 m	$3.8 \pm 0.9$	
	Adult ( $\geq 150$ mm)/100 m	$1.3 \pm 0.4$	
Hidden Creek	All fish ( $\geq 70$ mm)/100 m	1.1	16
	Juvenile ( $< 150$ mm)/100 m	$0.8 \pm 0.3$	
	Adult ( $\geq 150$ mm)/100 m	$1.3 \pm 0.5$	

Table 2. Summary of length measurements of westslope cutthroat trout captured in the upper Oldman River westslope cutthroat trout core area, 2018 - 21.

Watershed	Year	Fork length (mm)		Total number of fish (all sizes)
		Mean ( $\pm$ SE)	Range	
Livingstone River	2018	142.4 $\pm$ 3.0	(28 - 421)	776
	2019	150.8 $\pm$ 4.9	(40 - 428)	433
	2020	157.0 $\pm$ 7.3	(31 - 427)	196
	2021	99.1 $\pm$ 1.5	(28 - 442)	1204
Upper Oldman River	2018	146.9 $\pm$ 3.2	(33 - 425)	521
	2019	184.2 $\pm$ 4.1	(47 - 442)	393
	2020	175.2 $\pm$ 4.8	(60 - 432)	329
	2021	119.9 $\pm$ 2.8	(33 - 425)	709
Dutch Creek	2018	135.3 $\pm$ 10.7	(55 - 313)	41
	2019	151.4 $\pm$ 14.7	(55 - 365)	41
	2020	159.6 $\pm$ 17.3	(61 - 392)	33
	2021	110.2 $\pm$ 6.1	(48 - 402)	100
Hidden Creek	2018	201.2 $\pm$ 12.4	(78 - 394)	39
	2019	190.7 $\pm$ 16.7	(66 - 397)	33
	2020	308.0 $\pm$ 61.3	(80 - 452)	5
	2021	166.7 $\pm$ 20.2	(62 - 362)	17

## Conclusions

We completed the fourth consecutive year of fish surveys in the Livingstone PLUZ and will complete the final study year in 2022. Overall, of the four watersheds surveyed, relative abundance of WSCT was highest in the Livingstone River and UOM River watersheds and lowest in the Hidden Creek and Dutch Creek watersheds. In contrast, average WSCT size was largest in the Hidden Creek watershed than in all other watersheds. 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 River WSCT core area.

## Communications

- We presented our 2021/22 fish catch results to AEP fisheries managers in 2021.

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



## Photos



Photo 1. Westslope cutthroat trout caught in the upper Oldman River watershed.

Photo: Brad Hurkett



Photo 2. Tote barge electrofishing equipment used on the upper Oldman River.  
Photo: Brad Hurkett





Photo 3. ACA staff backpack electrofishing a stream in the upper Oldman River watershed.  
Photo: Brad Hurkett