

Alberta Conservation Association
2018/19 Project Summary Report

Project Name: Westslope Cutthroat Trout Range Expansion Feasibility.

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Partnerships

Alberta Environment and Parks

Key Findings

- We identified five factors that determine the feasibility of WSCT range expansion above waterfall barriers and propose quantifiable measures of each factor.
- We will rank stream and lake habitats above waterfall barriers within the WSCT native range that are best suited for re-introductions.

Introduction

Westslope cutthroat trout (WSCT) currently occupy only 5% of their historic range in Alberta and recovery of the species requires expanding their distribution (Fisheries and Oceans Canada 2014). It is therefore imperative to identify additional suitable habitats and determine feasibility for WSCT recovery outside of the current range. Invasive species are potentially the greatest threat to westslope cutthroat trout in Alberta, through hybridization, competition, and displacement. The presence of natural headwater fish-passage barriers partially mediates this threat by impeding invasion by non-native species into headwater streams and lakes. Several

sub-populations of WSCT remain genetically pure because of waterfall barriers. The habitats upstream of these barriers represent opportunities for expanding the range of WSCT and total critical habitat area of the species through introduction or re-introduction of pure stocks. Before re-introductions can begin, a thorough examination of upstream habitats must be undertaken to catalogue and rank range expansion potential and identify those areas most suitable for WSCT re-establishment. Our objective is to assess the feasibility of WSCT range expansion into streams and lakes above barriers currently unoccupied by pure WSCT populations.

Methods

In 2018, we began investigating methods for assessing the feasibility of WSCT range expansion into streams and lakes above barriers that are currently unoccupied by pure WSCT populations. Using an existing framework and scoring system developed for bull trout (Galloway et al. 2016), we began customizing key components to reflect WSCT life history requirements to rank habitats above waterfall barriers. We will assign scores to each of the main suitability components of habitat quality, habitat quantity, habitat complexity, threats to existing WSCT populations, and invasion risk to potential newly established WSCT populations; and rate each based on a combined score.

Results

We have begun refining a scoring system for stream habitats, and plan to research lake habitat scoring through 2019. We have proposed various measurements to quantify each of the main components of range expansion feasibility (Table 1). We are currently researching suitable criteria for assigning scores to the measured data ranges, to fit the overall scoring framework. Final lists for both stream and lake WSCT habitats will be produced and ranked by range expansion suitability score, from which agencies can select individual reaches or waterbodies best suited for WSCT re-establishment.

Table 1. Key range expansion feasibility components and proposed measurements for ranking Westslope cutthroat trout stream habitats above waterfall barriers.

Key component	Proposed measurement	Rationale for highest rankings
1. Habitat quality	Summer growing degree days	The most productive streams for growing WSCT that don't exceed their temperature limits.
2. Habitat quantity	Upstream watershed area (km ²)	Upstream reaches with the largest connected watershed area.
3. Habitat complexity	Stream valley confinement	Unconfined valleys with stream channels that meander the most.
	Distance between successive barriers	Stream distances between barriers that are capable of sustaining WSCT populations
4. Risk of invasion to introduced WSCT	Barrier score	Complete upstream barriers to fish invasion.
5. Threat to existing WSCT populations	Downstream fish community	Fishless habitats on streams with the highest pure WSCT densities below complete upstream barriers.

Conclusions

To ensure WSCT persist in Alberta, it is essential not only to slow or halt population decline, but to move beyond preservation into active recovery and reintroduction of the species. We are developing a habitat scoring framework that will facilitate selection of the most suitable habitats for WSCT reintroductions in Alberta.

Communications

Preliminary concepts have been presented to Alberta Environment and Parks managers.

Literature Cited

Fisheries and Oceans Canada. Recovery Strategy for the Alberta populations of Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) in Canada. 2014. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. iv + 28 pp + Appendices

Galloway, B., C. Muhlfeld, C. Guy, C. Downs, and W. Fredenberg. 2016. A framework for assessing the feasibility of native fish conservation translocations: applications to threatened Bull Trout. *North American Journal of Fisheries Management*, 36(4), 754-768.

Photos



ACA seasonal staff member, Kacey Barret (left), at a complete waterfall barrier on a fishless reach of Dome Creek. Photo Jason Blackburn



ACA seasonal staff member, Kacey Barret, at one of several waterfall barriers on a fishless reach of Slacker Creek. Photo Jason Blackburn



ACA staff, Logan Redman and Kacey Barrett, assessing a chute on Honeymoon Creek that is a barrier to smaller WSCT. Photo Jason Blackburn



Logan Redman at a waterfall barrier on Honeymoon Creek, WSCT inhabit the downstream pool. Photo Jason Blackburn



Potential WSCT range expansion habitat above a complete fish passage waterfall barrier on Honeymoon Creek. Photo Jason Blackburn



Potential WSCT range expansion habitat on a fishless reach of Savanna Creek. Photo Jason Blackburn