

**Alberta Conservation Association
2019/20 Annual Project Summary Report**

Project Name: Fisheries Barriers in Native Trout Drainages

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Partnerships

Alberta Environment and Parks

Fisheries and Oceans Canada

Key Findings

- We completed barrier assessments on the Narraway River watershed to determine fish passage during high flow conditions (spring spawning conditions).
- We assessed 75 of the 110 potential barriers; we were unable to access the remaining 35 due to high water conditions and remote access.
- We were unable to complete barrier assessments during low flow conditions (fall spawning conditions) due to unseasonably high flow conditions. Low flow assessments will be completed in Fall of 2020.

Abstract

To effectively safeguard against extirpation of native fish species in Alberta, it is essential to protect native trout populations from hybridization and competition with invasive trout species. In Alberta, several sub-populations of native trout remain protected from invasive species primarily because of waterfalls that impede upstream fish movement. Maintaining and isolating these populations from invasion is critical to the protection and persistence of native trout. Cataloguing waterfalls is a necessary first step in determining where invasion can be managed,

allowing for prioritization of population recovery and development of implementation strategies on a stream by stream basis. To determine where native trout refuge might still exist, we gathered fish habitat and community data for the Narraway River watershed and identified 110 potential fish barrier locations. We completed field assessments at 75 of the 110 potential barriers during high flow conditions (spring spawning conditions) but were unable to complete low flow assessments due to unseasonably high flow conditions. Low flow assessments will be completed in fall of 2020.

Introduction

Invasive species pose one of the greatest threats to Alberta's native trout species, through hybridization and competition that can lead to extirpation (ASRD 2009). These threats are partially mediated by the presence of natural fish-passage barriers, namely waterfalls, that impede upstream invasions. Identification and inventory of waterfalls in Alberta that protect threatened, native trout populations and their habitats provides the basis for future investigation of upstream refugia and/or the feasibility of range expansions into unoccupied habitats. The presence of non-native fish species in the Narraway River watershed provides an opportunity to investigate the conservation potential of waterfalls to impede invasive fish movements, and potentially provide secure upstream refugia for threatened, native trout in the watershed. The upper reaches of the Narraway River are assumed critical spawning grounds for bull trout (Tchir et al. 2002). However, non-native cutthroat trout and rainbow trout have been introduced into Torrens River, Stetson Creek, and Two Lakes, all of which have connectivity to the Narraway River, where non-native trout are now present. Non-native cutthroat trout have had a negative impact on the spawning success of native bull trout in other watersheds, such as Pinto Lake (Environment and Parks 2017), and rainbow trout compete with bull trout for habitat and food sources (ASRD 2009). Given the potential for competition and predation, the identification of waterfalls within the Narraway River watershed that impede the movement and colonization of non-native species is warranted. Thus, the primary objective of this project is to identify, measure, classify, and rank waterfalls to determine whether fish can traverse such waterfalls within the Narraway River watershed.

Methods

We compiled existing waterfall data for the Narraway River watershed from internet sources (eg., World Waterfall Database, 2019) and limited waterfall and anthropogenic barrier (such as weirs and dams) location data from Government of Alberta (GOA) spatial layers.

We catalogued fish community data, historical stocking reports, and aquatic habitat inventories for the Narraway River watershed, from the provincial Fisheries and Wildlife Management Information System (GOA 2019) database, and identified potential waterfall locations using Google Earth © (2019) and Bing Maps © (2019 Microsoft). We used the aforementioned information to predict barrier locations and completed spring (high flow) barrier assessments of predicted and known barriers in the Narraway River. We measured barrier dimensions, stream velocities, channel and pool depths associated with barriers, and assessed fish passage capability following methods in Blackburn et al. 2020. To fully assess barriers, we must complete additional assessments at low flow during late summer or fall to determine if some barriers become passable with the changing hydrologic regime.

Results

We completed assessments at 75 of the 110 potential barriers in the Narraway River watershed during high flow conditions. Unseasonably high flows during the fall months precluded barrier assessments during the required low flow period. We will resume low flow assessments in fall 2020 to complete barrier evaluations in the Narraway River watershed.

Conclusions

The presence of non-native fish species in the Narraway River watershed provides an opportunity to assess waterfalls in the context of barriers to upstream invasion while laying the groundwork for native fish conservation decision-making. We have collected data to characterize and quantify each barrier within the Narraway River watershed during high flow conditions to identify key, impassible barriers, but require low flow data to properly complete the evaluation. Once completed, the Narraway River watershed barrier assessments will allow us to rank barriers that can then be used for future conservation efforts.

Literature Cited

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Photos



Photo 1. Aerial imagery (Bing Maps© 2019) of potential fish barriers on the Torrens River within the Narraway River watershed.



Photo 2. Suspected fish barrier identified from the above aerial imagery (Bing Maps© 2019) (middle barrier) on the Torrens River, within the Narraway River watershed, Alberta. Photo: Scott Seward



Photo 3. ACA staff investigating the pool below a suspected fish barrier on the Torrens River, within the Narraway River watershed, Alberta. Photo: Scott Seward