

**Alberta Conservation Association**  
**2018/19 Project Summary Report**

**Project Name:** Fisheries Barriers in Native Trout Drainages

**Fisheries Program Manager:** Peter Aku

**Project Leader:** Scott Seward

**Primary ACA Staff on Project:** Jason Blackburn, David Jackson, and Scott Seward

**Partnerships**

Alberta Environment and Parks  
Environment and Climate Change Canada

**Key Findings**

- We compiled existing barrier location information within the Peace River, Athabasca River, North Saskatchewan River, and Red Deer River basins into a centralized database.
- We catalogued fish habitat and community data for the Narraway River watershed for use in a population restoration feasibility framework.
- We identified 107 potential barrier locations within the Narraway River watershed, using Google Earth ©, which will be refined using valley confinement modeling and validated with ground truthing in 2019.

**Introduction**

Invasive species pose one of the greatest threats to Alberta native trout species, through hybridization, competition, and displacement. These threats are partially mediated by the presence of natural headwater fish-passage barriers, namely waterfalls, that impede upstream

invasions. In Alberta, several sub-populations of native trout remain genetically pure primarily because of waterfalls. Identification and inventory of waterfalls in the Peace River, Athabasca River, North Saskatchewan River, and Red Deer River basins isolating pure populations and their habitats is critical to inform population recovery and build implementation strategies on a stream by stream basis. For example, historical stocking of non-native trout to the Narraway River watershed may be endangering native bull trout and Arctic grayling. Non-native cutthroat trout, rainbow trout, and brook trout have been stocked in the Torrens River, Stetson Creek, and Two Lakes, all of which have connectivity to the Narraway River. Furthermore, the upper reaches of the Narraway River are assumed critical spawning grounds for bull trout, but have not validated (Tchir et al., 2002). Given the potential for hybridization, competition, and displacement, 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 waterfall passability, in the context of introduced trout invasion, within the Narraway River watershed.

## **Methods**

We compiled existing waterfall data for several watersheds within the Red Deer, North Saskatchewan, Athabasca, and Peace basins into a centralized database. We found waterfall location data from the world waterfalls website (<https://www.worldwaterfalldatabase.com/country/Canada/list>) and limited waterfall, icefield and anthropogenic barrier (such as weirs and dams) location data from Government of Alberta (GOA) spatial layers (Figure 1).

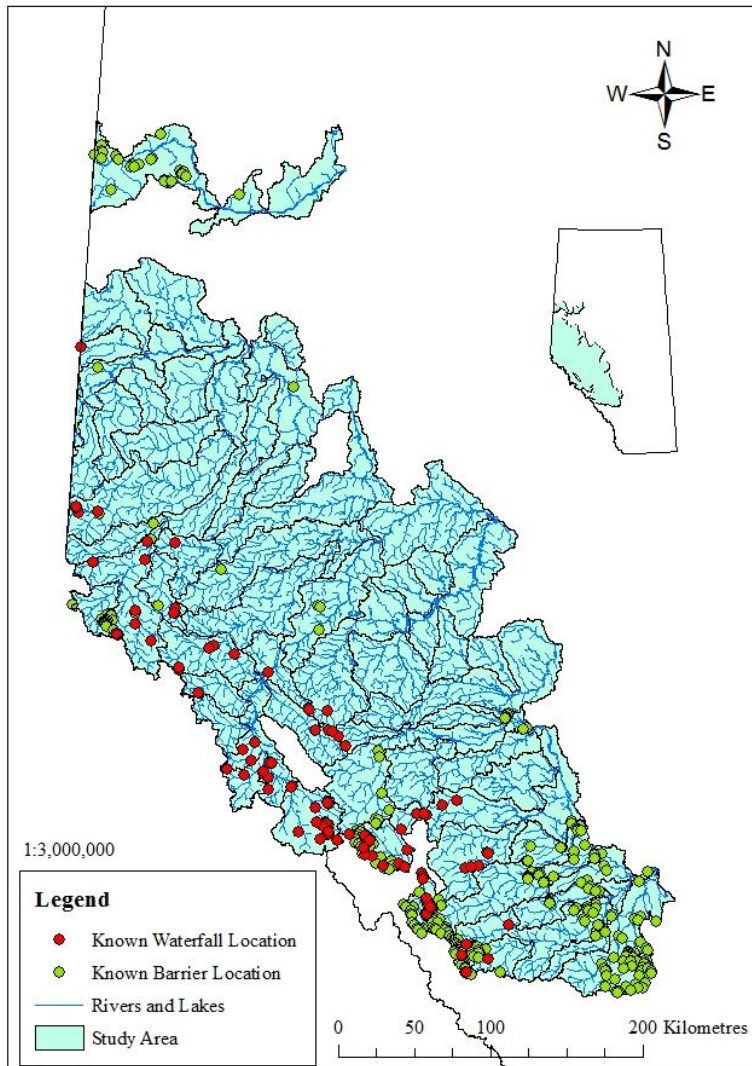


Figure 1: Known waterfall and other barrier (weirs, dams, and icefields) locations within the Peace River, Athabasca River, North Saskatchewan River, and Red Deer River basins.

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 (FWMIS) database. These data are necessary for a native trout population restoration feasibility framework. We determined potential, previously unidentified, waterfall

locations within the Narraway River watershed using Google Earth © (2019) and Bing Maps © (2019 Microsoft). These locations will be validated using valley confinement modelling in the coming months and will form the basis for future ground truthing and subsequent barrier assessment surveys in 2019.

## **Results**

Only four previously known waterfalls were identified in the Narraway River watershed through FWMIS files and geographic information system (GIS) data, whereas 107 potential waterfalls were identified through Google Earth © (2019) and Bing Maps © (2019 Microsoft) imagery searches.

## **Conclusions**

Waterfall information is scarce for the Narraway River watershed. Similarly, most watersheds within the Peace, Athabasca, North Saskatchewan, and Red Deer basins have deficient waterfall data or data that is not publicly available. Desktop searches using Google Earth © (2019) and Bing Maps © (2019 Microsoft) show promise as an effective and cost-efficient method for determining potential waterfall locations. However, further refinement using valley confinement modelling may reduce the number of false positives. Ground truthing will ultimately validate the presence of waterfalls that are fish passage barriers identified using aerial imagery.

## **Communications**

N/A

## **Literature Cited**

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