

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

Project Name: North Raven River Beaver Management Project

Fisheries Program Manager: Peter Aku

Project Leader: Mike Rodtka

Primary ACA staff on project: Andrew Clough, Marco Fontana, John Hallett, Joe Hopkins, Mike Rodtka, Zachary Spence, and Erin Vandermarel

Partnerships

Alberta Environment and Parks

Key Findings

- Our literature review indicated that low-gradient, groundwater streams like the North Raven River are particularly susceptible to the negative impacts of beaver activity on trout productivity.
- We counted over 1,600 redds during our survey of trout spawning activity in the river upstream of Highway 761.
- Redds occurred in such high densities in some sections of the river that it became impossible for field crews to distinguish between individual redds.
- Trout spawned in areas frequented by beaver, but current beaver management practices appeared to allow for unimpeded trout movement throughout most of the survey reach.

Abstract

The North Raven River (NRR) brown trout (*Salmo trutta*) fishery is widely regarded one of Alberta's best. Management of beaver (*Castor canadensis*) activity in the NRR began in 1973 and is considered necessary to maintain the trout fishery. Management includes removal of beaver, beaver dams, and feed caches. It has been over two decades since the observations and assumptions underpinning beaver management along the NRR have been critically assessed. For our assessment, we reviewed recent studies of beaver and fish interactions and completed a redd (i.e., the gravel nest created by spawning trout) survey to document spawning activity in the NRR upstream of Highway 761. Our literature review indicated that low-gradient groundwater streams like the NRR are particularly susceptible to the negative impacts of beaver activity on trout productivity. We counted over 1,600 trout redds during our survey; redds occurred in such high densities in some reaches that it became impossible to distinguish between individual redds. Trout spawned throughout much of the survey reach, including areas frequented by beaver. Current beaver management practices appeared to allow for unimpeded trout movement throughout most of the survey reach. Our assessment is scheduled to continue in 2020/21.

Introduction

The North Raven River (NRR) brown trout (*Salmo trutta*) fishery is widely regarded as one of Alberta's best. Management of beaver (*Castor canadensis*) activity in the NRR began in 1973 and was considered necessary to recover and maintain the trout fishery (DeRosa and Herman 1996). Management includes removal of beaver, beaver dams, and feed caches, and occurs from April to October. Beaver management focuses on the need to preserve trout migration corridors and minimize sedimentation of spawning areas along the river, but landowner and angler complaints also drive removal effort. Alberta Conservation Association (ACA) assumed full administration of beaver management in 2018.

It has been over two decades since the observations and assumptions underpinning beaver management along the NRR have been critically assessed. Over that timeframe many reports of the negative impacts of beaver on fish in the literature have been found to be speculative, while many experts now consider beaver to have an overall positive impact on fish populations (Kemp et al. 2012). Alternatives to lethal methods of beaver management have also received increased

attention (Hood et al. 2017). The goal of this project is to critically evaluate the current beaver management regimen for maintenance of the NRR trout fishery.

Methods

To assess the potential impacts of beaver activity on stream ecosystems and trout, seven peer-reviewed summary papers written between 2001 and 2018, citing more than 100 unique studies of beaver and fish interactions, were reviewed. Redd (i.e., the gravel nest created by spawning trout) surveys were conducted in October, November, and December in the NRR upstream of Highway 761. During surveys, field crews walked the river noting the number and location of redds in relation to beaver dams. No change to beaver management along the river occurred over the course of the project.

Results

Our literature review indicated that low-gradient groundwater streams like the NRR are particularly susceptible to the negative impacts of beaver activity on trout productivity. These streams do not typically receive the periodic dam-busting peak flows of watersheds with a more dynamic hydrological regime. Beaver dams are more likely to persist in these environments, increasing the potential for sedimentation of spawning gravels and blockage of fish passage. Although we do not know for certain what impact increased impoundment of the NRR would have on brown trout productivity, current knowledge suggests it could be substantial and largely negative.

We counted over 1,600 trout redds during our survey of trout spawning activity in the river upstream of Highway 761, but this is an underestimate. Redds occurred in such high densities in some sections of the river that it became impossible to distinguish between individual redds, so only the most obvious redds were counted. Trout spawned throughout much of the survey reach (Figure 1), including areas frequented by beaver. Trout spawning was well underway by mid-October and essentially complete by mid-December. Current beaver management practices appeared to allow for unimpeded trout movement throughout most of the survey reach.

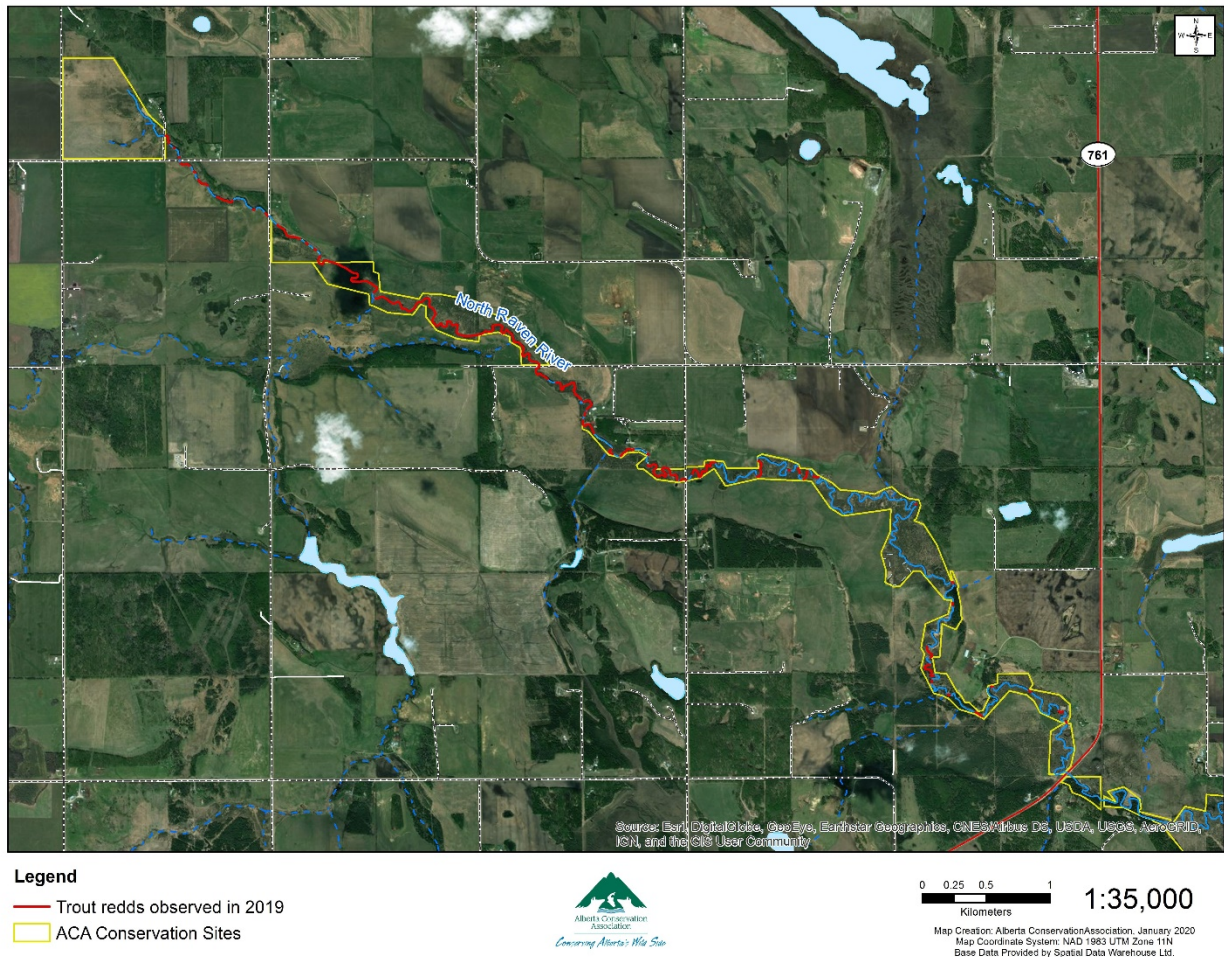


Figure 1. Location of trout redds in the North Raven River upstream of Highway 761 in 2019.

Conclusions

Based on our review of current, peer-reviewed literature, we conclude that increased impoundment of the NRR resulting from unmanaged beaver activity has the potential to substantially and negatively impact the river's trout population. Over 1,600 trout redds were observed in the river upstream of Highway 761 in 2019, but redd densities in some sections of the river were so great that it became impossible for field crews to distinguish between individual redds. Trout spawned throughout much of the survey reach, including areas frequented by beaver. Current beaver management practices appeared to allow for unimpeded trout movement throughout most of the survey reach. Our assessment is scheduled to continue in 2020/21.

Communications

- Submitted redd data to Alberta Environment and Parks for inclusion in its Fisheries and Wildlife Management Information System database.
- Results of redd survey highlighted on ACA's social media channels, winter 2020.
- Prepared an article promoting public awareness of trout spawning on ACA conservation sites for the spring 2020 edition of *Conservation Magazine*.

Literature Cited

- DeRosa, D. and S. Herman. 1996. The 1995 progress report on redd counts and spawning observations of brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*), in the North Raven River, Alberta. Alberta Environmental Protection Natural Resources Service. Rocky Mountain House, Alberta, Canada. 59 pp.
- Hood, G. A., V. Manaloor and B. Dzioba. 2018. Mitigating infrastructure loss from beaver flooding: A cost–benefit analysis. *Human Dimensions of Wildlife*, 23(2), 146-159.
- Kemp, P. S., T. Worthington, T. Langford, A. Tree and M. Gaywood. 2012. Qualitative and quantitative effects of reintroduced beavers on stream fish. *Fish and Fisheries*, 13(2), 158-181.

Photos



ACA biologist, Marco Fontana, documents a trout redd on the North Raven River.

Photo: Andrew Clough



Cleaned gravel substrate characteristic of a trout redd in the North Raven River.

Photo: Zachary Spence