Alberta Conservation Association
2016/17 Project Summary Report

Project Name: Kakwa River Watershed Arctic Grayling Assessment (Year 1 of 2)

Fisheries Program Manager: Peter Aku

Project Leader: Brad Hurkett

Primary ACA staff on project:

Troy Furukawa, John Hallett, Brad Hurkett, Dave Jackson, Tyler Johns, Nikita Lebedynski, Britt Schmidt, Scott Seward, Rob Stavne and Ken Wright

Partnerships

Alberta Environment and Parks

Key Findings

- Sampled 63 sites covering a distance of 27.2 km of stream in the Kakwa River watershed.
- A total of 57 Arctic grayling, most of which were immature (>283 mm fork length), were captured at 17 sites in 2016; grayling were not detected at 75% of sites.
- Relative abundance of grayling (all fish) was low, with a catch-per-unit-effort (± SD) of 0.24 ± 0.48 fish/h of angling.
- Two prominent waterfalls identified in the study area are suspected fish barriers preventing upstream fish passage.

Introduction

Arctic grayling populations in Alberta have declined drastically because of overharvest and habitat loss, primarily due to human activities (ASRD 2005). Resource development in the Kakwa River watershed has expanded over the last two decades (Ripley et al. 2005, McKay et al. 2014) and is suspected of negatively impacting grayling populations, yet existing data on the species are outdated. To ensure consistency in fish population assessments across the province, Alberta Environment and Parks (AEP) developed a Fish Sustainability Index (FSI) tool (MacPherson et al. 2014). The FSI provides a standardized approach for evaluating existing data and identifying additional data needs that will allow for robust assessments of the status of a species. One of the priority species for which an FSI is being developed is Arctic grayling. The goal of this project is to collect data on adult Arctic grayling density and population structure in the Kakwa River watershed to address data deficiencies identified by AEP. The data collected from our study will feed directly into the provincial Arctic grayling FSI development and will also be used to support regulatory actions to remediate the effects of industrial activities on Arctic grayling populations and their habitats in the Kakwa River watershed.

Methods

From July 6 to 31, 2016, we sampled Arctic grayling using angling throughout the Kakwa River watershed, focusing on streams of order 3 or greater. Sampling sites were selected randomly using the generalized random-tessellation stratified design. Sites were angled in an upstream direction and included all habitat types for a minimum of 45 minutes when no fish was captured and a maximum of 120 minutes when a fish was captured. We measured lengths (fork length [FL] and total length [TL]; mm) of all fish captured and recorded relative abundance of grayling in catch-per-unit-effort (CPUE) expressed as the number of fish captured per hour (fish/h). We calculated CPUE for each site and determined relative abundance of grayling by averaging CPUE of all sites sampled in 2016.

Results

In 2016, we surveyed 63 sites throughout the watershed and captured 57 Arctic grayling, most of which were immature (>283 mm FL) (n = 44). We angled for a total of 169.5 hours over a distance of 27.2 km; sampling site lengths averaged (± SD) 452 ± 315 m. Overall, relative abundance of grayling (all sizes) was low at most sites, with an average CPUE (± SD) of 0.24 ± 0.48 fish/h. Relative abundance of juvenile grayling was much higher than that of adult fish at 0.13 and 0.05 fish/h of angling, respectively. Fish lengths (FL) averaged 225 ± 76 mm and ranged between 112 and 388 mm (Figure 1). In total, 11 sites were sampled in Kakwa Wildland Park, but only one grayling was captured. Arctic grayling were not observed at 75% (n = 46) of the sites and were observed only in streams downstream of the Lower Kakwa River Falls and South Kakwa River Falls (Figure 2).

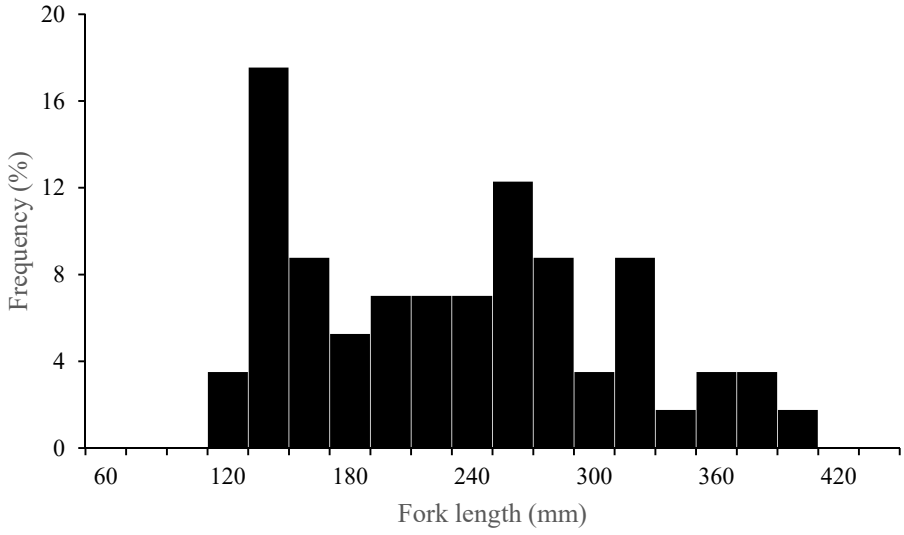

Figure 1. Length distribution of Arctic grayling captured while angling in the Kakwa River watershed, 2016 (n = 57).

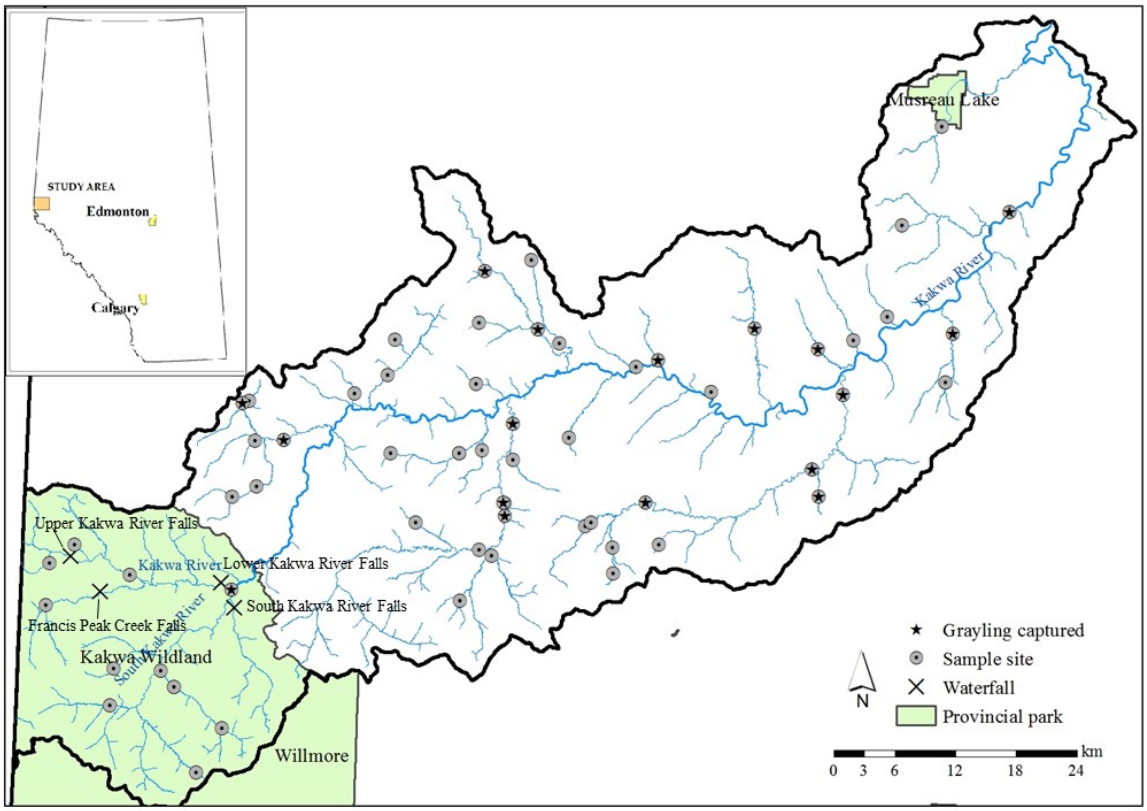

Figure 2. Sample site locations, sites where Arctic grayling were captured, and locations of potential fish barriers in the Kakwa River watershed, 2016.

Conclusions

Our catch of Arctic grayling was low in the Kakwa River watershed. Grayling were captured primarily in the lower two-thirds of the watershed, downstream of the Lower Kakwa River Falls and South Kakwa River Falls. Of the 11 sites sampled in Kakwa Wildland Park, 6 sites occurred in the upper watershed above two prominent waterfalls and suspected fish barriers—South Kakwa River Falls and Francis Peak Creek Falls. We plan to resample streams above these waterfalls in 2017/18 to confirm they are non-fish bearing, complete sampling tributary sites, and sample the lower reaches of the Kakwa River downstream of the confluence of the Kakwa and South Kakwa rivers.

Communications

- Fish data collected has been submitted to AEP's Fisheries and Wildlife Management Information System database.
- Final data report will be completed by March 31, 2018.

Literature Cited

Alberta Sustainable Resource Development (ASRD). 2005. Status of the Arctic grayling (*Thymallus arcticus*) in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, and Alberta Conservation Association, Wildlife Status Report No. 57, Edmonton, Alberta, Canada. 57 pp.

MacPherson, L., M. Coombs, J. Reilly, M.G. Sullivan, and D.J. Park. 2014. A generic rule set for applying the Alberta Fish Sustainability Index, Second Edition. Environment and Sustainable Resource Development, Edmonton, Alberta, Canada. 51 pp.

McKay, T., E. Sahlen, O. Stoen, J.E. Swenson, and G.B. Stenhouse. 2014. Wellsite selection by grizzly bears *Ursus arctos* in west-central Alberta. Wildlife Biology 20: 310–319.

Ripley, T., G. Scrimgeor, and M. Boyce. 2005. Bull trout (*Salvelinus confluentus*) occurrence and abundance influenced by cumulative industrial developments in a Canadian boreal forest watershed. Canadian Journal of Fisheries and Aquatic Sciences 62(11): 2431–2442.

Photos

Adult Arctic grayling captured in the South Kakwa River downstream of the South Kakwa River Falls, 2016. Photo: David Jackson

Aerial view of South Kakwa River Falls. Photo: Brad Hurkett

Nikita Lebedynski (Alberta Conservation Association) sampling the upper Kakwa River in Kakwa Wildland Park. Photo: Brad Hurkett