

# Improving the Ecological Function of the Upper Bow River: Bow Lake to Kananaskis Dam



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# YELLOWSTONE TO YUKON

CONSERVATION INITIATIVE

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Cover photo by Matt Blank

## **EXECUTIVE SUMMARY**

In 2006, the Yellowstone to Yukon Conservation Initiative commissioned a review of the known factors affecting native bull and westslope cutthroat trout in the upper reaches of the Bow River. This work was overseen by an advisory committee including representatives of Parks Canada, Alberta Sustainable Resource Development, and commercial river users.

For the purposes of this report, the upper Bow River watershed was divided into three reaches. Each reach was assessed for the factors affecting the health of native bull and westslope cutthroat trout populations. Non-native species introductions and the impacts of highway infrastructure (impassable culverts and alterations to alluvial fan functioning) were identified as the primary factors in each of the three reaches.

Bull trout are ranked as “sensitive” in Alberta and have been under review by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) since 1998. Bull trout originally were found throughout the main stem and major tributaries of the Bow. At the time of writing, bull trout had disappeared from Bow and Hector Lakes, the Spray Lakes, the main stem of the Bow River below Bow Falls and the main stem of the Kananaskis River. Bull trout are negatively impacted by changes to aquatic habitat and flow regimes, loss of habitat connectivity (they need to move upstream to find spawning and rearing habitats), competition from non-native species, hybridization, and over-harvesting.

Genetically pure westslope cutthroat trout populations in Alberta are nationally Threatened (and likely to become endangered if limiting factors are not reversed). Decades ago, this species was found throughout the Bow River drainage, from headwater streams through the main stems and into the prairies. Present distribution is confined to headwater streams. Hybridization is the greatest threat to this fish.

The effects of fish stocking and water-regulation activities have affected more than 41.5% of the flowing waters of the Bow River within Banff National Park. Between 1901 and 1972, more than 17 million fish were stocked to improve recreational fishing within the park. Ten species of non-native fish are now found within the park’s boundaries: brown trout, brook trout, rainbow trout, Yellowstone cutthroat trout and lake trout have all been introduced and their hybridized offspring inhabit many of the main stem rivers. Non-native fish compete with native fish for habitat and food. They hybridize to dilute genetic purity and also are thought to destroy bull trout redds (nests).

Restoration projects in fishless lakes inside the Park have proven successful. Where introduced species were removed, native zooplankton species returned or were successfully reintroduced.

As serious as the impacts are within the park, we are able to catalogue them because Parks Canada has done a significant amount of work to inventory fish populations, identify ecological impacts, and take steps to address them. On provincial lands, Alberta has yet to undertake a

systematic assessment of the impacts of transportation infrastructure or introduced non-native fish. Hydroelectric power dams and facilities exist on the Cascade, Spray and Kananaskis Rivers. Dam operations alter daily flow patterns, affecting available habitat and changing water temperatures.

The author recommends a number of areas for further research of factors affecting bull and westslope cutthroat trout:

- determine the distribution of native and non-native species and the genetic structure of each
- develop climate change scenarios specific to the upper Bow River and its major tributaries; model of fish distribution and anticipated changes in response to warming temperatures
- inventory all railroad crossings and complete the road crossing inventory
- quantify the effect of transportation infrastructure on geomorphology
- assess the effects of winter highway maintenance activities on different types of aquatic habitat and organisms
- study the effect of winter water withdrawals on aquatic habitat and fish behaviour, particularly in Reach 2
- assess the effect of roads on hydrologic connectivity
- determine the impacts of the algae *Didymosphenia geminata* on aquatic ecosystems, especially in Reach 2
- assess the effect of the Lac Des Arcs dyke on the aquatic ecosystem and
- quantify the amount of dust (from cement plants) that is reaching the aquatic ecosystem and its effects on organisms and habitat.

A number of potential restoration initiatives were identified that could be implemented across all three reaches of the upper Bow River watershed:

1. Perform an integrity assessment of the watershed study area to identify areas for protection and restoration.
2. Quantify all aquatic barriers, both man-made and natural, and identify the critical barriers that may be limiting access to certain habitat.
3. Assess the effect of climate change on water quality, hydrologic regimes and cold water aquatic habitat; monitor biophysical indicators of change.
4. Study the feasibility of modifying existing dams and operations; assess the potential for improving watershed flow regime as a whole.
5. Identify geomorphic restoration projects and methods that improve the river's access to its floodplain and natural sediment and woody debris inputs; establish natural geomorphic processes within the present constraints of rail and highway infrastructure.
6. Investigate other habitats that intersect road and rail corridors; target specific periods of the year relative to the life histories of bull and westslope cutthroat trout; identify and implement best management practices.

The Yellowstone to Yukon Conservation Initiative and its partners will work toward prioritizing and implementing a number of these research and restoration efforts in the Upper Bow river watershed in the coming year.