**Physical Restoration of the Kingsmere River in Prince Albert National Park***

Michael Fitzsimmons (Parks Canada) and Guy Melville (Saskatchewan Research Council)

## 1. Abstract

The Kingsmere River (54.03°N, 106.42°W), located within Prince Albert National Park, flows approximately 3 km from Kingsmere Lake to Waskesiu Lake. It is a river in name only, and would be better characterized as a cold, clear-water boreal stream. The Kingsmere River was modified by the construction of a breakwater, a diversion canal and several dams in order to improve accessibility by motor boats. Over a period of decades, much of the Kingsmere River was gradually transformed from a wild river into a regulated boat canal. Prince Albert National Park was established to keep lands and waters unimpaired for future generations, but aquatic systems (lakes, rivers and fish) were manipulated and exploited during the same time period that terrestrial ecosystems (forests, mammals and birds) were largely preserved and protected.

Studies carried out by the Saskatchewan Research Council and Prince Albert National Park between 1993 and 1996 revealed substantial ecological differences between the Kingsmere River and a reference stream that lacked similar human modifications, the MacLennan River. Sites along the Kingsmere River had lower variability in water depths, water velocities and substrate particle sizes. This lack of habitat diversity was associated with reduced species richness for fish and stream-edge plants. Fish and invertebrate fauna adapted to flowing-water habitats were neither abundant nor widely distributed in the Kingsmere River relative to the MacLennan River. Fallen trees and beaver dams played an important role in directing current flow and changing channel morphology, adding temporal dynamics to the MacLennan River system. The removal of large woody debris and beaver structures from the Kingsmere River resulted in a static channel and less turbulent flow. The picture which emerged was that the spatial and temporal heterogeneity of both habitats and biota were much less along the Kingsmere River than would be expected under natural conditions. The ecological changes caused by the alterations of the Kingsmere River were determined to be largely reversible, primarily because of the remnant physical and biological diversity maintained in a 400 m section of rapids which boaters have portaged around since the 1940s.

Upon completion of these studies, Parks Canada began to restore the original natural characteristics of the Kingsmere River in accordance with the park's management plan. The objectives of restoration actions included (i) increasing water velocities and dynamic channel movement; (ii) increasing the abundance and extending the distribution of organisms adapted to flowing-water conditions; (iii) removing artificial obstacles to the

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movement of fish between Waskesiu Lake and Kingsmere Lake; and (iv) reintroducing important biotic elements such as large woody debris and beaver works.

Restoration was initiated in 1996 when the park's lake crew removed a submerged dam on the outflow of the original river channel, adjacent to Waskesiu Lake. In 1997 the rock and timber breakwater at the river inflow was dismantled by the Kingsmere District Warden, the park fire crew, and Young Canada Works students. Later the same year, park staff opened the original river channel using explosives and fire crews blocked the diversion canal with sandbags. Work scheduled for 1998 was cancelled due to mild weather that allowed open water to persist on the river throughout the winter. During the colder winter of 1999 contractors trucked sand down the frozen river to re-establish a beach ridge across the former diversion canal. In the fall of 1999, the remaining dam on the river is scheduled for removal. It is anticipated that this will be a public event involving both citizen volunteers and park staff. Several other physical restoration works remain to be scheduled pending the availability of funds, including the elimination of erosion problems at the public access point used by boaters.

Physical restoration of the Kingsmere River has been been a labourious and unglamorous effort to move tons of rock, sand and timber by many individuals and organizations. The work has been protracted due to lengthy public consultations, intra- and inter-agency tensions pursuant to environmental assessments and other decision-making processes, and limitions in financial and labour resources.

Although major components of the physical channel rehabilitation have been completed, biological restoration will take many more years. A long-term monitoring program carried out by the Saskatchewan Research Council and Parks Canada will evaluate the success of restoration efforts. It is hoped that future visitors to the Kingsmere River, one of the most popular aquatic ecosystems in Prince Albert National Park, will witness the revitalization of the river's physical dynamics and biological diversity. Unfortunately, the Kingsmere River is one of the only streams in the region where restoration works have been initiated to reverse the ecological degradation caused by impoundments and other human modifications.

## 2. Available Publications


Fitzsimmons, M., N. Fagnou and G. Melville. 1998. Ecological restoration of the Kingsmere River: a progress report. Department of Canadian Heritage, Parks Canada, Waskesiu Lake, SK. 4 pp.

Melville, G.E. 1997. Kingsmere aquatic ecosystem restoration, Prince Albert National Park: landscape features, stream flow alteration and lotic habitat characteristics in the boreal plain. Saskatchewan Research Council Publication No. R-1580-6-E-97, Saskatoon, SK, 47 pp + appendicies.

Melville G. and M. Fitzsimmons. 1997. The state of the Kingsmere River. Saskatchewan Research Council Publication No. SRC-R-1580-3-G-97. Saskatoon, SK, 4 pp.

Melville, G., D. Wieder and M. Fitzsimmons. 1999. Bugged about dams: Kingsmere aquatic ecosystem restoration. Research Links 7(1):9,17-18.

Parks Canada. 1999. Prince Albert National Park's Kingsmere River dam scheduled for removal. Department of Canadian Heritage, Parks Canada, Waskesiu Lake, SK. 1 p.

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