



Photo: Justin Black, iLCP

## THE FUTURE OF FRESHWATER: THE IMPACTS OF CLIMATE CHANGE ON BC'S FLATHEAD WATERSHED AND ALBERTA'S UPPER CASTLE RIVER SUB-BASIN

The Flathead and Upper Castle River watersheds are comprised of beautiful forested landscapes, majestic mountains, and many small streams and rivers that support a high diversity of native species. These watersheds are part of the Canadian Crown of the Continent ecoregion; occupying a central position in the Rocky Mountains and providing a link between Banff, Kootenay, and Yoho National Parks in the North to Waterton Glacier National Peace Park in the South.

In the coming years, both of these watersheds will likely experience drastic changes due to a changing climate. Understanding these changes is critical to developing adaptation strategies to protect these ecosystems. Expanding the existing protected areas as well as creating new ones will help to improve the region's capability to adapt to climate change.



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### IMPACTS TO FRESHWATER

Climate change is expected to alter the timing and amount of water availability in streams and the persistence of water levels in lakes and ponds. Streams and rivers in both watersheds are supplied primarily by rainfall runoff and melt water from high elevation snow packs. Higher temperatures will result in more winter precipitation falling as rain rather than snow, which is



likely to trigger more high flow and flood events. Reductions in winter snow pack means that melt water supply will end sooner in the summer. Decreased late summer flow may cause some streams to run completely dry. Rising temperatures are also expected to cause northward and upslope shifts in species distributions, leading to a reshuffling and possible loss of sensitive species.

Species at the top of the food chain, such as fish, are expected to be affected the most as they are more sensitive to changes in their habitat. In this century it is estimated that climate change will cause a 62% reduction in salmonid (family of fish which includes: salmon, trout and whitefish) habitat range in the Rocky Mountains.



Coupled with changing water temperature and flow, warming will cause previously alpine water bodies and streams to become more montane in nature as they become surrounded by trees and vegetation. Such changes in species composition are expected to make both the Flathead and Castle watersheds more susceptible to invasion by new species.



### **ADAPTATION TO CLIMATE CHANGE**

The intactness of the Flathead Valley Watershed and the Upper Castle River Sub-basin provides resilience against the changes that will take place as climate change progresses. These regions are likely to maintain high ecological value, but only if they and their surrounding areas are protected. The Flathead Valley is relatively free from fragmentation which further increases the watershed's resilience to climate change. The Upper Castle River Sub-basin has been more altered by human activity and fragmentation and as a result, extensive

restoration efforts and increased protection are required to improve this ecosystem's ability to adapt.

### **RECOMMENDATIONS AND A CALL FOR ACTION**

Human disturbances and further habitat fragmentation should be limited in both watersheds in order to preserve the ecological integrity of these areas. Restoration efforts including; road decommissioning and riparian health assessment and repair should be undertaken within the Castle Watershed to improve aquatic habitat connectivity. Much work still needs to be done to increase the amount of protected areas within the Canadian Crown of the Continent; including areas such as the Flathead and The Castle Special Place. Both areas require legislated protection as they are vital to not only the species, but the human populations that occupy the area. Increased protection will allow greater opportunities for species adaptation in a warming world and will help to preserve this beautiful landscape for the enjoyment and health of future generations.

For more information please refer to complete report entitled: "The Future of Freshwater: The Impacts of Climate Change on Freshwater in British Columbia's Flathead Watershed and Alberta's Upper Castle River Sub-basin" by Patrick Thompson, MSc (Zoology), 2010. Or visit [www.cpaws.org](http://www.cpaws.org)