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Contact:

Brent Wolfe, Associate Professor, NSERC Northern Research
Chair, Department of Geography & Environmental Studies
Wilfrid Laurier University
519-884-0710 ext. 3470 or bwolfe@wlu.ca

Kevin Crowley, Associate Director,
News and Editorial Services
519-884-0710 ext. 3070 or kcrowley@wlu.ca

Study shows fresh-water levels in rapid decline with implications for Alberta oil-sands industry

WATERLOO – In a Wilfrid Laurier University and University of Waterloo study published December 17 in *Geophysical Research Letters*, researchers reveal significant reductions in available fresh water in western and northern Canada that is unprecedented in the past 1,000 years. The study highlights important challenges for the Alberta oil-sands industry, but suggests that the perceived negative effects of the W.A.C. Bennett Dam on the Peace-Athabasca Delta ecosystem may have been overblown.

The eight-year research project examined the hydroecology of the Peace-Athabasca Delta in northern Alberta – one of Canada’s 15 UNESCO World Heritage sites.

“We show that river discharge and lake levels in the delta have varied considerably with climate change for the past 1,000 years,” said Brent Wolfe, associate professor at Wilfrid Laurier University and lead author of the article. “However, for as long as our modern society has been developing in western Canada, the amount of available water has been ‘subsidized’ by glaciers and high elevation snow packs in the Rocky Mountains. These sources have dwindled to very low reserves and are now on the leading edge of a rapid decline, which is of critical concern to the areas relying on this fresh water for agriculture and industry.”

The research further indicates that water levels began to decline at the beginning of the last century, well in advance of the W.A.C. Bennett Dam construction in 1968, showing that climate is the overwhelming driver of change in the area’s hydrology and ecology.

“We do, however, identify an urgent message for those in government and industry who develop water-use policy for the Athabasca River,” said Roland Hall, associate professor at the University of Waterloo, who says the province of Alberta has allocated at least half of the low-flow volume of this river for consumption by the multibillion-dollar oil-sands industry.

“Our studies suggest that rapid declines in river flow and lake levels in some parts of the delta will only accelerate unless stringent water policy is practiced. Because the oil-sands industry is so important to Canada’s economy, it is critical that we use this new information to maximize social benefits while minimizing environmental degradation.”

Current policy decisions about water resource allocation are based on climate records spanning the past 80 years at most. This study will provide policymakers with critical data from the past 1,000 years and identifies the need to modify assumptions that river flows will remain stable.

The study, which began in 2000 in response to multimillion-dollar lawsuits launched by the First Nation communities of Fort Chipewyan against BC Hydro and the Government of Canada, employed a unique array of high-resolution paleohydrological reconstructions. Lake sediment analysis showed the evolution of the relationship between climate and river flows for the major watersheds draining the eastern slopes of the Rocky Mountains. It is one of the most highly funded environmental science projects in Canada in this decade.