

Funded PhD level graduate position in the Natural Resources and Environmental Studies Graduate Program at the University of Northern British Columbia (UNBC) on modeling streamflow input to Hudson Bay

The Natural Resources and Environmental Studies Graduate Program at UNBC, in collaboration with colleagues at the University of Manitoba and Manitoba Hydro, is offering four years of funding in support of a Ph.D. on simulating streamflow input to Hudson Bay.

Project Overview:

The project's objective is to incorporate regulation effects into projected freshwater exports for two major rivers in the Hudson Bay drainage system: the Lower Nelson River Basin (LNRB) in Manitoba and La Grande Rivière in Québec. These rivers are influenced by hydropower developments by Manitoba Hydro and Hydro-Québec respectively, with future development being a possibility. Hydropower regulation has the potential to influence both the timing and magnitude of freshwater export into Hudson Bay, which will be examined as follows: 1) *LNRB*: projected future monthly streamflow will be provided at key nodes within the Manitoba Hydro system (as specified by them) for the 2030s and 2050s time horizons under various climate scenarios. Manitoba Hydro will provide output from their system model in the form of average monthly streamflow export into Hudson Bay from the lower Nelson River under assumed inflow conditions (i.e., climate scenarios), and assumed export market conditions and future development scenarios. 2) *La Grande system*: similar to the lower Nelson system, projected future streamflow under the various climate scenarios and two time horizons (2030s, 2050s) will be provided to Hydro-Québec. Hydro-Québec will provide data from their system to project streamflow export into Hudson Bay under various assumed conditions from the La Grande system for each inflow condition. Comparison to historical observed [Déry *et al.*, 2005; 2011] and climate-only projections will afford shifts in both the magnitude and timing of average annual (monthly) freshwater export from each respective system to be quantified for both time horizons. Possible impacts on the freshwater export into Hudson Bay can be evaluated via comparison with climate-only projections, and will provide model forcing for other teams in the project.

Application Process:

The successful candidate will have a strong science background (Master's degree) with previous focus on the hydrological sciences, climate change scenarios and projections, statistics, and numerical modeling. Previous experience with hydrological models (especially the VIC model) and programming in Fortran will be an asset. Funding for the position may be available for four years. Course work and supervision will be at UNBC and

will be in conjunction with our research partners. For more information, please contact Dr. Stephen Déry at: sdery@unbc.ca or consult the group's website (<http://nhg.unbc.ca>).

Candidates must submit electronically a one-page letter of intent describing interests in the project and their qualifications to undertake this work, along with an unofficial transcript and CV to Dr. Déry by January 15th, 2015. Deadline for application to graduate programs at UNBC is February 15th, 2015 for a Fall 2015 admission.