Computational Fluid Dynamic Modeling of the Seton, Carpenter and Downtown Reservoirs on the Bridge and Seton River Systems. \*M.T. Langford, A.B. Baki, D.Z. Zhu, University of Alberta Department of Civil and Environmental Engineering ([Mathew.langford@ualberta.ca](mailto:Mathew.langford@ualberta.ca): presentation).

Fish entrainment has been identified as one of the key potential impacts of hydropower operations on the productivity and biodiversity of these aquatic species. Fish entrainment deals with a scenario in which resident fish of the upstream reservoir are passed through a hydropower facility. It is anticipated that the risk of fish entrainment at a particular dam facility is correlated with the effect of hydropower operations on the flow and thermal structures of the forebay. A computational fluid dynamic study was initiated to compliment the assessment of entrainment risk at the Seton dam, Bridge 1 and 2 generating stations, Terzaghi dam and La Joie dam on the Bridge and Seton River systems. The project includes simulation of the forebay hydraulics of each facility under multiple operational scenarios and environmental conditions. Simulations were completed using a solution to the Reynolds-averaged Navier Stokes equations and a κ-ε turbulence model. The simulations included a broad range of discharges and operational scenarios, as well as thermally stratified and non-stratified flows to represent each facilities typically annual operations. This project has proceeded hand-in-hand with a biological assessment of the entrainment risk for these facilities. The flow field and thermal structure of the forebay’s is used to evaluate the likelihood of fish entrainment, based on the species that are known to use (or are likely to use) habitat adjacent to the structures at different times of the year.