



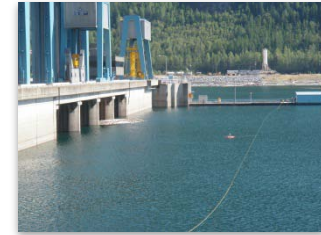
**HydroNet Project Title: Field investigation of forebay hydraulics at Columbia River hydropower facilities**

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Project Code: 2.2.1



**Rationale:** *Hydropower induced fish entrainment deals with the scenario in which resident fish in the upstream reservoir are involuntarily passed through the structure. Forebay hydraulic modelling and assessment of this risk is necessary for the environmentally sound operation of these facilities.*

**Description:** *The research will include the review and development of computational fluid dynamic (CFD) models to predict the velocity fields in the forebay areas of the Mica, Revelstoke, Hugh Keenleyside and Aberfeldie dams in the Columbia River Basin. These models will be calibrated and verified against field measurements of the flow fields completed under conditions where the reservoir temperature is both isothermal and thermally stratified. Flow field data will be measured using an acoustic Doppler current profiler and the reservoirs thermal regime will be continually monitored for an extended duration.*

**Outcomes:**

- *A three-dimensional numerical model to assess a dam's forebay hydraulics under various operational scenarios.*
- *An understanding of the impact of hydropower generation on the physical (hydraulic and thermal) conditions on upstream hydropower reservoirs.*

**Benefits from this research**

*A 3D CFD model can be used to predict which areas of the forebay are of particular entrainment risk to fish species under varying operational conditions. This will allow the utility to assess fish entrainment risk, and focus mitigation measures on areas of high risk for fish entrainment, if required.*



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