



The thermal and spatial ecology and associated entrainment risk of burbot, *Lota lota*, in a large hydropower reservoir in British Columbia, Canada.



Philip M Harrison, PhD Candidate, University of Waterloo

Supervisor: Dr Michael Power¹, Co-supervisor: Dr Steven J Cooke²
Collaborators: Lee Gutowsky², Eduardo Martins², David Patterson³, Alf Leake⁴
¹University of Waterloo, ²Carleton University, ³DFO West Vancouver, ⁴BC Hydro
Project Code: 2.2.2

Rationale: Given the global increase in demand for hydropower, improving our knowledge of how burbot interact with hydropower infrastructure and operations will be essential for the future conservation of this important recreational and subsistence fishery species, and may shed light on the behaviour of all fishes in hydropower systems.

Description: Many populations towards the southern end of the burbot range are threatened, endangered or extirpated and the development of hydropower infrastructure has been implicated in this decline. My research focuses on Kinbasket Reservoir and Mica Dam, British Columbia, and utilizes three linked burbot specific studies; 1) a 3 year thermal and spatial ecology study continuously monitoring the temperature and depth of 70 tagged burbot using a lake-wide telemetry array; 2) an otolith thermometry project developing a novel fractionation equation production method and a burbot specific equation; 3) a study of burbot behaviour in the vicinity of turbine intakes utilizing a positional acoustic telemetry array designed to provide sub-metre real-time 3D tracks of 56 burbot within the entrainment zone.

Outcomes:

- An increased understanding of burbot thermal and spatial ecology in hydropower systems and the influence of hydropower operations on burbot behaviour;
- A fractionation equation that can be used to infer lifetime environmental water temperatures from the otoliths of a holarctic distributed species;
- A quantification of the factors that influence burbot entrainment risk

Benefits from this research: My research will provide regulatory authorities and the hydropower industry with a quantitative assessment of burbot entrainment vulnerability and will inform on the design of any necessary entrainment mitigation, minimization and compensatory strategies, and therefore assist both parties in meeting their obligation 'to maintain the fish habitat productivity of inland waters'.