**Mapping fish habitat downstream of hydro-dams in Canada: Estimation of possible long-term modifications and assessment of the current hydraulic geometry conditions.**

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Abstract

Although the use of remote sensing to study fluvial environments exists for decades, only recent techniques proved their efficiency to map fish habitats. I present here the usefulness, for a multidisciplinary network such as HydroNet, of integrating classic multispectral remote sensing to classify fish habitat downstream of several hydro-dams in Canada. The resulting classification maps of the different river units can be used as a framework either to estimate and understand the long-term geomorphologic modifications in the river channel, but also to assess the current hydraulic geometry conditions. In fluvial geomorphology, especially for a fish ecology focus, it is important to consider the hydraulic geometry of particular river section, because the parameters resulting from this analysis (mean water depth, channel width, wetted area and perimeter) can be incorporated into predictive models for fish habitat alteration. Field measurements have been linked with the hydraulic geometry parameters found in the remote sensing analysis, in a manner to test the University of British Columbia Regime Model (UBCRM). The UBCRM is a simple model which predicts the equilibrium for the hydraulic geometry of an alluvial channel from descriptive river parameters (formative discharge, slope, sediment size and bank strength).

In the same context, I show how hyperspectral remote sensing can eventually improve the river habitats classification. This work consist in using Casi (36 bands between 400-950nm) and Sasi (160 bands between 850-2500nm) scenes from the Kiamika and Picanoc rivers (Qc, Canada) to develop algorithms of spectral signature separations in order to differentiate features such as aquatic vegetation species, substrate composition and water depth.

**Key words**: Fluvial geomorphology; remote sensing; river units classification; fish habitat; hydro-dam; hydraulic geometry; regime model.