



Toward the use of aerial remote sensing for instream flow and fish habitat modeling

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Current models of fish habitat integrate 3-D measurements of the riverbed that are mainly obtained from ground topographic survey when sonar is not available. Such specific topographic methods, adapted to the river constraints and to fish habitat model requirements, had been developed in the case of the Durance river (France) [Le Coarer Y. and Dumont B., 1995]. If the immersed topography obtained is accurate (centimetric), this method is expensive in terms of time and manpower, thus it reduces investigations to small parts of the river. On one hand, the use of remote sensing data should allow a bigger coverage of the river, with competitive cost. On the other hand, inaccuracy of the remote sensing measurement has to be balanced regarding fish habitat modeling.

In this study, we explore the possible use of low elevation aerial photos taken from drone and ultralight aircraft as a complementary way of measuring the topography of the river from ground. Experiments had already been done with such remote sensing data, studying the relationship between depth and radiometry, or using the stereoscopic effect from two pictures covering the same area. The aim here is to evaluate the most optimistic accuracy expected from automated stereorestitution with non-metric photographs. We will then be able to define – for remote sensing techniques - the experimental conditions that will allow obtaining accurate enough inputs for fish habitats models.