

Mapping stream surface flow types by balloon: an inexpensive high resolution remote sensing solution to rapid assessment of stream habitat heterogeneity ?

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Abstract Spatial variation in hydraulic conditions in streams often results in distinct water surface patterns, or surface flow types. Recent studies have demonstrated that these surface flow types represent a distinct suite of hydraulic conditions with biological relevance, highlighting the potential value of surface flow type mapping as a rapid method for assessing hydraulic habitat heterogeneity in streams. Traditional approaches to surface flow mapping have used stream bank visual assessment of the presence and extent of flow type within assessment reaches. Such methods are subject to assessor bias and, particularly in larger streams, difficulties in assessing areal extent from strongly oblique views. This study uses a high resolution remote sensing approach to map surface flow types. The approach uses a balloon-mounted digital video recorder to record images of study reaches in plan view at a height of approximately 12 m. Ortho-rectified images are then used to identify surface flow types and digitise their extent. Areal extents of surface flow types derived through this process in a trial study were compared to those derived from streamside visual assessment to provide a preliminary test of the efficacy of the approach.

Key words hydraulic habitat; surface flow types; remotely sensed data; river habitat heterogeneity