

## A review of river habitat characterisation methods: indices vs. characterisation protocols

Diego Fernández<sup>1,\*</sup>, José Barquín<sup>1</sup> and Paul J. Raven<sup>2</sup>

<sup>1</sup> Environmental Hydraulics Institute “IH Cantabria”. Universidad de Cantabria, PCTCAN. C/Isabel Torres, 15. Santander, Spain.

<sup>2</sup> Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, BS32 4UD, U.K.

\* Corresponding author: fernandezgd@unican.es

Received: 10/6/2010

Accepted: 2/5/2011

### ABSTRACT

#### A review of river habitat characterisation methods: indices vs. characterisation protocols

A wide variety of methodologies have been proposed for characterising river habitats in order to meet different environmental objectives. However, mid- to long-term monitoring of the physical characteristics of river habitats lacks a standardised methodology. This contrasts with well-established methods for monitoring other river ecosystem components. Some attempts have been made to standardise the methods for characterising river habitats including the European Guidance Standard for Assessing the Hydromorphological Characteristics of Rivers (CEN, 2002) and the Physical and Chemical Assessment Module within the Australian River Assessment System (AusRivAS). One of the first steps toward advancing the development and use of methods for characterising river habitats in mid- to long-term monitoring programs is to review current practices so that deficiencies can be identified and addressed. In the present work, we review more than 50 methods that have been used to characterise river habitats worldwide. This review uses the European standard as a reference benchmark for comparison with existing methods of river habitat characterisation. Methods of characterising river habitats differ mainly with respect to three features: (1) the objectives for which they were designed, (2) the time required for their application and (3) whether they measure characteristics or evaluate them. Channel and riparian zone characteristics are more extensively covered than floodplain characteristics. Moreover, of all the described river habitat characteristics, bank stability, channel substrate, artificial structures, riparian vegetation structure, channel dimensions, flow types or flow status, adjacent land uses and bars are the most commonly recorded. We conclude that assessment methods of river habitat characteristics that gather quantitative information at a range of spatial scales could be the most effective, as they provide relatively extensive data sets that can be used to analyse information for several purposes. Finally, some types of rivers, such as intermittent rivers, require further work in order to identify their physical habitat characteristics and the proper monitoring methodology.

**Key words:** River habitat, habitat assessment, physical environment, hydromorphology.

### RESUMEN

#### Revisión de los métodos de caracterización del hábitat fluvial: índices vs. protocolos de caracterización

*Una gran variedad de metodologías se han propuesto para la caracterización de los hábitats fluviales a fin de cumplir con diferentes objetivos medioambientales. Esta diversidad de métodos puede ser vista como una ventaja para hacer frente a diferentes objetivos ambientales. Sin embargo, el seguimiento a medio o largo plazo de las características físicas del hábitat fluvial carece de una metodología estandarizada, lo cual contrasta con otros métodos mucho mejor establecidos para el seguimiento de otros componentes del ecosistema fluvial. Se han hecho algunos intentos para estandarizar los métodos de caracterización de los hábitats fluviales, y estos incluyen el estándar europeo para la evaluación de las características hidromorfológicas de los ríos (CEN, 2002), y el desarrollo del módulo de evaluación fisicoquímica dentro del sistema australiano de evaluación fluvial (AusRivAS). Uno de los primeros pasos para avanzar en el desarrollo y uso de métodos para la caracterización de los hábitats fluviales en los programas de seguimiento a medio y largo plazo es revisar las prácticas actuales a fin de poder abordar las deficiencias e introducir mejoras. En el presente trabajo se revisan más de 50 métodos que se han utilizado para caracterizar los hábitats fluviales en todo el mundo, utilizando el estándar europeo como referencia para comparar los métodos. Los métodos de caracterización de los hábitats fluviales se diferencian principalmente por tres*