

[New tools for the hydromorphological assessment and monitoring of European streams \(Rinaldi et al. 2016\) \[1\]](#)

Hydromorphological stream assessment has significantly expanded over the last years, but a need has emerged from recent reviews for more comprehensive, process-based methods that consider the character and dynamics of the river with greater accuracy. With this as a focus, a series of hydromorphological tools have been developed and/or further extended in Europe within the context of the REFORM (REstoring rivers FOR effective catchment Management) project. The aim of this paper is to present the set of REFORM hydromorphological assessment methods and, based on some examples of their application, to illustrate and discuss their synergic use, specific features, limitations and strengths.

This assessment and monitoring includes three tools: the Morphological Quality Index (MQI), the Morphological Quality Index for monitoring (MQIm), and the Geomorphic Units survey and classification System (GUS). These tools constitute the assessment phase of an overall multi-scale, process-based hydromorphological framework developed in REFORM. The MQI is aimed at an assessment, classification and monitoring of the current morphological state; the MQIm aims at monitoring the tendency of morphological conditions (enhancement or deterioration); the GUS provides a characterization, classification and monitoring of geomorphic units.

A series of examples are used to illustrate the potential range of application, including: (i) an assessment of morphological conditions; (ii) an assessment of the morphological effects of restoration projects; (iii) an evaluation of the geomorphic impacts of interventions for risk mitigation; and (iv) an integrated use of MQI and GUS to assess and characterise morphological conditions. Finally, some of the main features, strengths and peculiarities of the three hydromorphological tools are discussed with the support of examples of their application.

Keywords: Hydromorphology; River management; River restoration; Water Framework Directive

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