



# River Styles



## Case Study

### Challenge

Evaluating success of river restoration efforts needs an efficient approach that can be applied consistently across jurisdictions.

### Solution

The REFORM program and Morphological Quality Index (MQI) adapts and builds on various core principles of the River Styles Framework for application in the EU as a structured procedure for monitoring and measuring hydromorphic change.

### Result

The EU now have a fit-for-purpose framework for assessing hydromorphic quality and measuring future improvement or deterioration in European rivers, contributing to fulfillment of the Water Framework Directive.

## Assessing hydromorphic quality in European rivers

The REFORM project came about through implementation of the European Union's Water Framework Directive (WFD), which committed member states to achievement of 'good' status for all waterbodies. The WFD identified 'hydromorphology' as a target area encompassing the physical components of a river system. This required development of a consistent approach to monitoring hydromorphology across the borders of nation states.

Development of an approach to monitoring and measuring hydromorphology in European rivers began with review of a range of existing frameworks, including the River Styles Framework. Elements of River Styles were used to develop a European Morphological Quality Index (MQI).

The MQI followed and adapted procedures outlined in the River Styles Framework and used this as a basis from which to develop 'score cards.' The score cards contribute to an index score, which may be reassessed over time to measure change in hydromorphic quality resulting from restoration projects or other factors such as floods or land use change.

The first phase of the MQI follows Stage 1 of the River Styles Framework, using landscape units, confinement, planform and other morphological features as a basis for delineation of stream 'segments.' Analysis of these characteristics leads to selection of indicators for assessment of geomorphic functionality, artificiality and channel adjustment.<sup>1</sup> Generation of indicators of geomorphic river condition that are appropriate for the character of each river type (open-ended) rather than imposing generic indicators on pre-defined categories (prescriptive) parallels principles from Stage 2 of the River Styles Framework.

<b>Stage 1</b> Catchment-wide baseline survey of river character, behaviour and pattern.	<b>Stage 2</b> Catchment-framed assessment of river evolution and geomorphic condition.	<b>Stage 3</b> Assessment of future trajectory of change and geomorphic recovery potential.	<b>Stage 4</b> River management applications and implications.
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Applications of the MQI as part of REFORM have further explored temporal elements including ongoing monitoring of hydromorphic quality and consideration of possible future trajectories of change.<sup>2</sup> This aligns with aspects of Stage 3 of the River Styles Framework.

The framework adopted by REFORM enables efficient monitoring of the hydromorphic effects of the many river restoration projects currently being undertaken throughout the European Union. Although the WFD's target to achieve 'good' status for all water bodies by 2015 has expired, the MQI continues to be applied as a monitoring framework for hydromorphic condition.

#### References:

1. M. Rinaldi, N. Surian, F. Comiti, M. Bussetti, B. Belletti, L. Nardi, B. Lastoria, B. Golfieri. 2015. Guidebook for the evaluation of stream morphological conditions by the Morphological Quality Index (MQI), Deliverable 6.2, Part 3, of REFORM (REstoring rivers FOR effective catchment Management), a Collaborative project (large-scale integrating project) funded by the European Commission within the 7th Framework Programme under Grant Agreement 282656. <https://reformrivers.eu/guidebook-evaluation-stream-morphological-conditions-morphological-quality-index-mqi>

2. L. Ziliani, N. Surian. 2016. Reconstructing temporal changes and prediction of channel evolution in a large Alpine river: The Tagliamento River, Italy. *Aquatic Sciences*, 78, 83-94.

Learn more about the River Styles Framework at [riverstyles.com](http://riverstyles.com)