

REFORM: REstoring rivers FOR effective catchment Management [1]

Final results FP7 project REFORM (REstoring rivers FOR effective catchment Management) all available online

This is to inform you that the final results of the FP7 project REFORM (REstoring rivers FOR effective catchment Management) are all available online. We sincerely hope that our results will contribute to conserve and restore rivers, stream, riparian zones and floodplains worldwide.

REFORM has generated substantial outputs to support the implementation of the European Water Framework Directive: over **30** deliverables and **>100** scientific publications (see Menu item **RESULTS**). For application in river management, relevant results are summarised user-friendly in the REFORM [wiki](#) [2]. Furthermore, the outcomes of REFORM have been discussed and disseminated through stakeholder workshops, an international scientific conference, a summer school, numerous presentations, newsletters, policy briefs and discussion papers.

Our last two newsletters [#7](#) [3] and [#8](#) [4] give you the overview of the results from the final year.

For teaching you may be particularly interested in the lecture notes of the [summer school](#) [5] and the online videos.

The results of REFORM are rather bulky. The full set of deliverables contains thousands of pages. Therefore we summarised the main findings in our wiki following the logical sequence of river basin management planning: **How does my river work? What's wrong? and How to improve?** The [deliverable 6.3](#) [6] is the guidebook to the contents of the wiki.

Key results, conclusions and recommendations of REFORM

- **Hydromorphological assessment should consider physical processes and appropriate temporal and spatial aspects beyond river restoration project boundaries and project life span.** For this, REFORM developed an open-ended hydromorphology framework incorporating multi-scale spatial and temporal aspects. It aids users in developing understanding of the morphology and dynamics of river reaches and their causes. The Morphological Quality Index (MQI) is the method recommended by REFORM for assessing river condition. The method is extremely useful for analysing and interpreting critical problems and causes of alteration.
- **Vegetation and plants can play a cost-effective and significant role as physical ecosystem engineers for river restoration.** Riparian and floodplain ecosystems are not subject to extensive monitoring but are crucial to river morphodynamics and ecology. Direct measurements of hydromorphological processes and riparian vegetation are likely to be better in assessing hydromorphological degradation than in-stream biota.
- **Current biological sampling methods are not appropriate to capture HYMO impacts and they underestimate the influence of HYMO on biota.** There is a need to develop new biota sampling methods that are more sensitive to HYMO impacts. This includes sampling of habitats (e.g. the riparian) that are in particular impacted by HYMO degradation. Hydromorphological assessment covering the entire range from high to bad should be a quality element in its own right in the WFD status assessment.
- **Restoration projects should adopt a synergistic approach with other resource users to secure win-win scenarios and have well-defined quantitative success criteria** e.g. ranging from hydromorphological improvements to the expected beneficial impact on biota and ecosystem services. Application of existing planning and management tools such as PDCA (Plan-Do-Check-Act), DPSIR, setting SMART objectives and BACI monitoring, can substantially enhance the efficiency and effectiveness of restoration.
- **Cost-benefit analysis can help in prioritizing restoration measures and plans.** At

present, cost data are too scarce hampering cost-benefit analysis of restoration measures. There is a need to gather and incorporate cost information in a more systematic way.

- **Restoration had positive effects even in small restoration projects.** However, other studies indicate that exceptionally large projects indeed have higher effects. Restoration pays - it increases ecosystem services, which should be considered in the assessment of river restoration projects. River restoration benefits not only aquatic biota. Terrestrial and semi-aquatic species benefit and should be considered in assessments. It is important to select measures that restore specific limiting habitats at relevant scales. Hydromorphological restoration has an overall positive effect on biota, but effects vary. It is thus essential to monitor and adjust restoration projects.

Challenges, Objectives and Scope of REFORM - REstoring rivers FOR effective catchment Management

Restoring river ecosystems in Europe: the REFORM project's objectives were to provide tools to support cost-effective implementation of restoration measures and monitoring. REFORM has been a 4-yr large integrated research project, grouping 26 partners from 15 countries, that addressed the challenges to reach the ecological objectives for rivers as required by the EU Water Framework Directive.

Directive. Many European rivers are regulated to support flood protection, navigation, freshwater supply or hydropower production. The ecological impacts of these hydromorphological modifications are poorly understood and the extent to which these impacts can be effectively reversed or mitigated lacks scientific rigour. REFORM aimed to improve existing tools and develop new ones to increase the success and

cost-effectiveness of restoration measures and procedures to monitor the biological responses to hydromorphological changes with greater precision and sensitivity. One example of a new tool that REFORM delivered is a river restoration WIKI. Initial results were made timely available early 2013 to support the second and future River Basin Management Plans of the WFD as well as other European environmental directives.

Project duration: November 2011 - October 2015

- [Home](#)
- [Imprint](#)

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Links

- [1] <https://reformrivers.eu/start>
- [2] <http://wiki.reformrivers.eu>
- [3] <http://www.reformrivers.eu/newsletters/315>
- [4] <http://www.reformrivers.eu/newsletters/362>
- [5] <http://www.reformrivers.eu/events/summer-school>
- [6] <http://www.reformrivers.eu/guidance-and-decision-support-cost-effective-river-and-floodplain-restoration-and-its-benefits>

