Final report [1]

Executive summary

The assessment of the 1st River Basin Management Plans indicated that 40% of European rivers are affected by hydromorphological (HYMO) pressures caused predominantly by hydropower, navigation, agriculture, flood protection and urban development. Against this background, REFORM (REstoring rivers FOR effective catchment Management, http://reformrivers.eu/ [2]) has generated substantial outputs to support WFD implementation: over 30 deliverables and 60 scientific publications. For application in river management relevant results are summarised user-friendly in the REFORM wiki. Furthermore, the outcomes of REFORM has been discussed and disseminated through stakeholder workshops, an international scientific conference, a summer school, numerous presentations, newsletters, policy briefs and discussion papers.

In summary the key results and conclusions are:

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.

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