Measuring success of river restoration actions: the role of end-points and benchmarking

With an increasing emphasis on river restoration comes a need for new techniques and guidance. These are tools to assess stream and watershed condition, to identify factors degrading aquatic habitats, to select appropriate restoration actions, and to monitor and evaluate restoration actions at appropriate scales. Unfortunately, despite the rapid increase in river restoration projects, little is known about the effectiveness of these efforts (see Figure 1). Restoration outcomes are often not fully evaluated in terms of success or reasons for success or failure. This seems an anomaly if restoration measures are to be carried out in an efficient and cost effective manner. REFORM strives to meet this need by developing a protocol for benchmarking and setting specific and measurable targets for restoration and mitigation. This is carried out in work package 5 (Task 5.1).

Example of a restoration action - Remeandering of the River Dearne at Pastures Bridge, England: But was it successful? (photo: Ian Cowx)

Despite large economic investments in what has been called the “restoration economy”, many practitioners do not follow a systematic approach for planning restoration projects. As a result, many restoration efforts fail or fall short of their objectives, if objectives have been explicitly formulated. This often appears not to be the case. Some of the most common problems or reasons for failure include:

- Not addressing the root causes of habitat degradation
- Not considering upstream processes or downstream barriers to connectivity
- Inappropriate uses of common techniques (one size fits all)
- No or an inconsistent approach for prioritizing projects
- Poor or improper project design
- Failure to get adequate support from public and private organizations
- Lack of or inadequate monitoring to determine project effectiveness

These challenges and problems can be overcome by systematically following several logical steps that are crucial to developing a successful restoration programme or project. One of the first steps is to establish benchmark conditions against which to target restoration measures. This requires i) assessment of catchment status and identifying restoration needs before selecting appropriate restoration actions to address those needs, ii) identifying a prioritization strategy and prioritizing actions, and iii) developing a monitoring and evaluation programme. In addition to these steps, a basic understanding of the social dimension of watershed restoration is needed.

This work should take place within the context of the River Basin Management Plans for the Water

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Framework Directive. Nevertheless, it is our impression that this diagnosis is inadequately specified and insufficiently quantified to identify the causes and bottlenecks of degradation. Thus, it does not necessarily help plan the most effective ways for improvement. Goals and objectives need to be set at multiple stages of the restoration process. There are multiple steps within each stage, but the initial stage is to identify endpoints and benchmarks against which to measure performance. This needs to be reviewed against reference conditions, to determine appropriate targets for restoration, rehabilitation and mitigation activities. Unfortunately, this step is often missing from most restoration planning, although excellent examples exist on which to base the process e.g. Kissimmee River Restoration (Anderson et al. 2005).

To support this process, REFORM is developing a protocol for benchmarking and setting specific and measurable targets for restoration and mitigation measures. This includes the following steps.

- Step 1: Data mining of existing projects to determine how scheme objectives were established, if at all, and against what criteria
- Step 2: Determine whether the objectives have been achieved and if not, determine why
- Step 3: Determine criteria for establishing endpoints and benchmarks against which to measure performance - and determine appropriate targets for restoration activities
- Step 4: Develop a protocol to set realistic quantifiable endpoints for restoration projects

This process of evaluating restoration is ongoing and will be finalized in summer 2013, but examples of good restoration practice are limited to assist the outcomes of REFORM. Readers are therefore encouraged to provide examples of restoration actions that have assessed outcomes, whether successful or otherwise.

Reference

Anderson, D.H., S.G. Bousquin, G.E. Williams and D.J. Colangelo (eds.), 2005 Defining success: expectations for restoration of the Kissimmee River. South Florida Water Management District, West Palm Beach FL USA Technical publication ERA 433

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