

Evidence

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Ecosystem services assessment of buffer zone installation on the upper Bristol Avon, Wiltshire

Project summary

Cattle and other livestock removing vegetation from and trampling river banks and margins can be very damaging to local habitats and water quality, and can have far-reaching effects. This report from the Environment Agency demonstrates how installing a buffer zone along a vulnerable bank allowed regeneration of a river ecosystem, improved the diversity of water flows in the river channel, and encouraged fish, plant and animal species back to the area. By assessing the impacts on all ecosystem services, this report helps us recognise the multiple benefits that can arise from modest investment carefully targeted to address habitat enhancement and pollution control in a river catchment.

Dr Mark Everard from the Environment Agency and Dr Sid Jevons from the Somerfords Fishing Association have completed an analysis of the impacts of installing a buffer zone on the upper Bristol Avon, North Wiltshire. A buffer zone is a strip of protected land between the top of the river bank and the river channel, where natural habitat can regenerate, supporting wildlife and abating pollution. The buffer zone was primarily intended to improve the river for fish stocks and addressed a section of river which had been identified as being badly eroded. The field edge, formerly severely poached by cattle and denuded of vegetation, had been considered a potentially significant source of sediment and associated pollutants entering the river.

A visible outcome of the buffer zone was the return of healthy and varied plant life. This has stabilised the river bank, narrowed the river channel promoting flushing of the river bed and diversified flows, reduced pollutants running off from the field, and provided refuge habitat for juvenile fish and other wildlife.

Economic valuation revealed that the benefits flowing from this buffer zone project were multiple and significant. Although the calculated benefit-to-cost ratio (3.0:1) justified investment in the buffer zone on the basis of fishery interests alone, the economic value of fishery enhancement accounted for less than 10% of the total benefits.

More than 90% were wider benefits to society. Thus, this fisheries investment made a significant contribution to the broader integrity, conservation interest and societal value of the river ecosystem (with an overall benefit-to-cost ratio of 31:1).

In common with similar habitat restoration case studies, this study demonstrates that ecosystem-based regeneration schemes appear to have a uniformly positive effect on a wide range of ecosystem services. The study also supports the conclusions of prior research that the outcomes of habitat rehabilitation may be evident and positive enough to justify the investment without the necessity of full economic evaluation.

The study underlined the power of ecosystem services as a tool to help identify the breadth of issues and potential beneficiaries touched upon by environmental management schemes. This revealed a broad range of 'collateral benefits' that were not part of initial scheme design. Accounting for all potential benefits and impacts simultaneously may enable optimisation of ecosystem management schemes to maximise value to all interested sectors of society. The study also demonstrates the converse dangers of 'silo thinking', where thinking and planning in narrowly-defined disciplinary terms, often enforced by organisational structures, mandates and/or budgets, creates a blinkered view of scheme design, benefits and broader ramifications. Optimal societal value and sustainability of outcomes can occur only when a full range of impacts and benefits is considered simultaneously.

Many of the benefit values used in this study were transferred from other studies, whilst some were deduced from uplift of pre-management economic value. All lessons and values deduced in this Bristol Avon buffer zone study are therefore relevant and transferable, with caution, to other environmental initiatives founded on restoration of river habitat, function and suitability for characteristic fish and other species.

The study also demonstrates the value of engaging key affected stakeholders (in this case the Environment Agency, the Somerfords Fishing Association and the landowner) in facilitating the planning and implementation of habitat protection and wider river restoration work. Collaboration in design can optimise the value of a scheme to all key stakeholders as well as the wider public.

This information will be useful to environmental managers, practitioners and policy-makers. This includes not only those concerned primarily with fisheries and river restoration, but also with wider environmental initiatives (such as determination of 'programmes of measures' under the EU Water Framework Directive, water quality improvement or Biodiversity Action Plan measures) for which alternative, ecosystem-based solutions may yield broader, more sustainable benefits.

The information in this report provides both generic principles relevant to environmental management initiatives, but also quantified and monetised values that may be transferred to other schemes. This will help the Environment Agency and its partner organisations in applying an 'ecosystems approach' to environmental interventions, and in taking better and more rounded account of all outcomes for the environment, people and economic interests. It also promotes the case for buffer zone installation as a low-cost intervention in degraded habitat to enhance fishery and wider benefits in affected river systems.

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