



Case Study



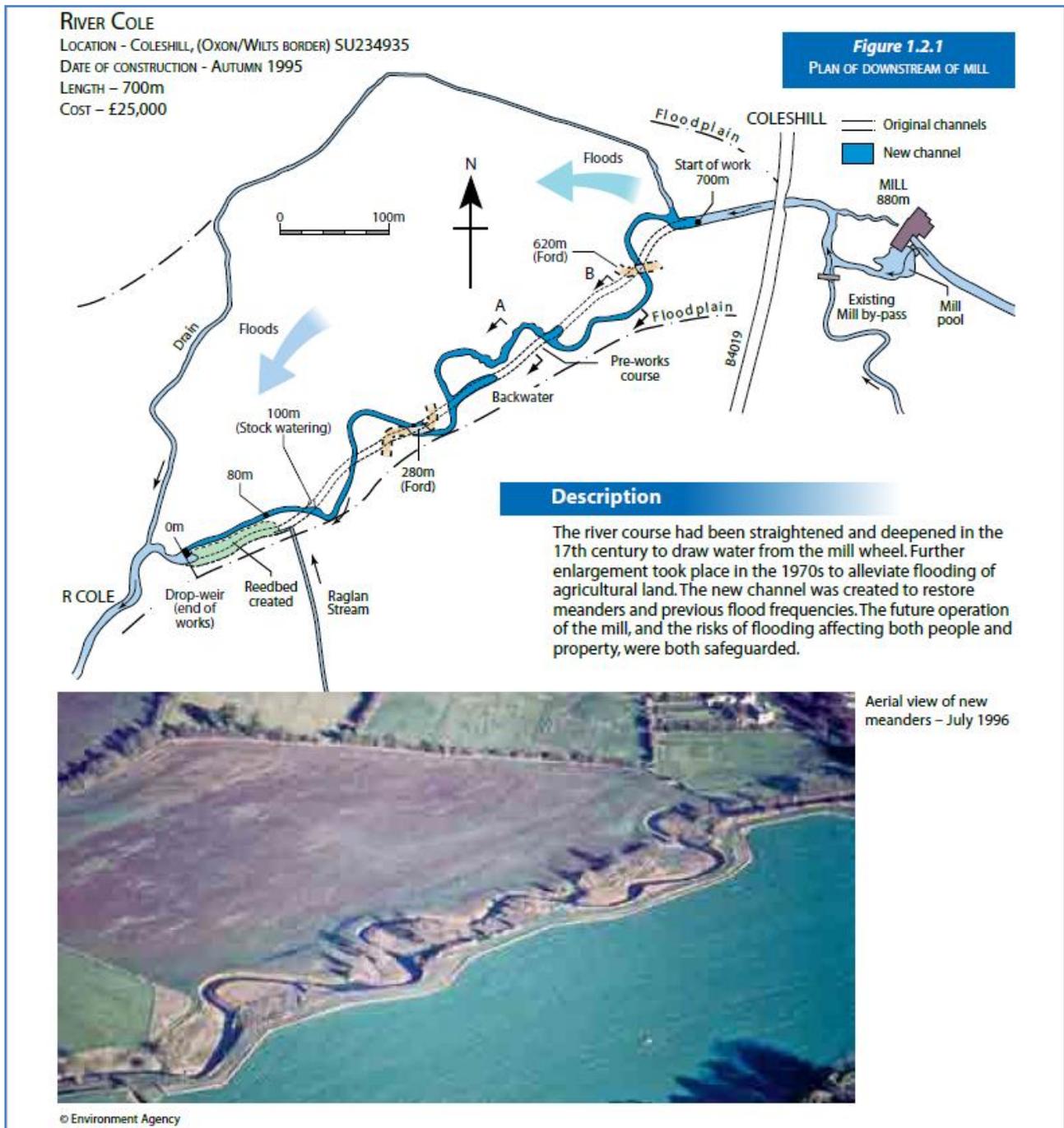
Coleshill, United Kingdom: Restoring Meanders to Straightened Rivers New Channel meandering either side of existing channel

Problem to resolve: Frequent inundations after straitening of a natural river

Response: Restoring Meanders to Straightened Rivers

Background.¹ The river has a long history of modifications and already the Domesday Book of 1086 has a record of a mill in Coleshill. On the earliest map from the area, dated 1666, the river appears to have been straightened for milling. The section downstream of the mill has more recently been enlarged to safeguard agricultural production from flooding. Until the late 1700s, the mill was fed by a small artificial channel carrying water from the Cole, but by 1818 the mill leat had been largely extended to take the entire flow of the Cole, and most of the old river course filled in. This type of historical management is typical of many other rural rivers in the United Kingdom.





Restoration: The River Cole was included in a joint initiative between England and Denmark to demonstrate best practice in urban and rural river rehabilitation and encourage river restoration in Europe. The wider aim was to promote further river restoration and demonstrate how river restoration could provide multiple benefits such as enhancement in wildlife, landscape, recreation, water quality, fisheries, amenities and other local interests.

The restoration of the River Cole was initiated in July 1995. The site consists of a 2.5 km long reach divided into two parts, upstream and downstream of the mill. Upstream of the mill the river was restored to its original course (retaining a small flow in the mill leat) to join the old surviving mill by-pass channel. This new smaller channel encourages beneficial flood storage on the fields and allows fish to pass the mill weir. Downstream the river was reduced in size and re-meandered across the old course to a more natural profile, retaining existing mature riverside trees. The restoration of bed level, water level and flood regime was achieved by cutting the new meandering river at a much higher level, similar to that prior to the last major deepening scheme of the 1970s.

The river length was increased by 30%. The cross-sectional area was considerably smaller and less deep. The number of natural in-channel features, such as pools and riffles, increased after restoration. In the downstream section maturing trees also provide woody debris, creating habitats and flow diversity. The restoration measures recreated a more natural flooding regime.

Results: Plant species richness increased immediately after restoration. Marginal emergent plant species richness increased significantly, but submerged aquatic plants showed a less immediate effect. The new upstream channel was quickly recolonized by macro-invertebrates. The downstream reach did not change significantly, but some more niche specific taxa were found 12 years after implementation. Two new species were found in the restored Cole, one stonefly (*Leuctra geniculata*) and a caddis fly (*Athripsodes albifrons*) Fish biomass and density returned to pre-restoration levels, and species richness remained unchanged. However, long-term surveys have shown an overall decline in fish density at both restored and control sites, indicating impact from an external factor. The number of breeding wetland species did not increase in the first year. The abundance of Yellow Wagtails (*Motacilla flava*) increased significantly. Casual inspection suggests little change after two years.

Public perception was measured via a questionnaire and 53% of the respondents in Coleshill mostly approved with the measures while 17% strongly approved. The long-term monitoring showed that only about half of the local residents strongly (25%) or mostly (31%) approved to the river restoration project. The restoration measures showed overall positive results for the ecological status. The downstream channel benefited greatly from the restoration measures, but the new upstream course was not fenced off from cattle and has therefore little riparian vegetation. However, due to lack of initial engagement, some local residents were unhappy with the project.

Lessons learnt

- Engaging the local community is critical
- In these early days of river restoration the project showed what could be expected from a restoration project and how it develops (might be different from anticipated) – this needs to be built into decision making process
- It is important to do a formal long-term management plan, and have a cooperating (and stable) land owner
- The project showed a whole suite of demonstration techniques (included in the Manual of River Restoration Techniques³)

- The project clearly showed the complexity of a linear system (compared with pond), and that it's difficult to distinguish success between different components
- The project gave a big boost to river restoration in the UK and showed that it is possible to do “large scale” (for that time) projects

Credentials:

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Sources:

¹ Source: https://restorerivers.eu/wiki/index.php?title=Case_study%3ARiver_Cole-_Life_Project

² Source: https://restorerivers.eu/wiki/images/thumb/d/dd/Image07_1_2d.jpg/800px-Image07_1_2d.jpg

³ http://www.therrc.co.uk/rrc_manual.php