2

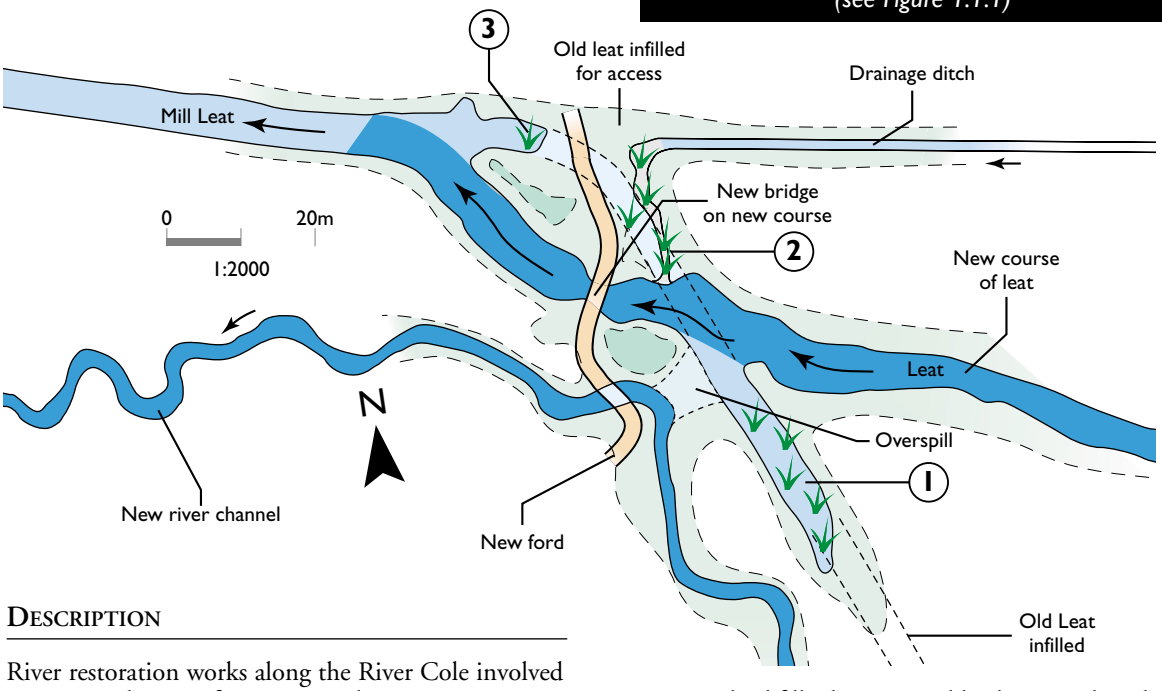
ENHANCING REDUNDANT RIVER CHANNELS

2.2 Creation of backwaters

RIVER COLE

LOCATION – Coleshill, Oxon/Wilts border, SU 234935
DATE OF CONSTRUCTION – Autumn 1995
COST – No direct costs but additional spoil carted to landform area

Figure 2.2.1
BACKWATERS AT 1, 2, 3 DELINIATE COURSE OF LEAT PRIOR TO NEW BRIDGE AND NEW MEANDER IN LEAT *(see Figure 1.1.1)*



DESCRIPTION

River restoration works along the River Cole involved re-routing the river from its straight course into new meandering channels *(see 1.1 – 1.3)*. Remnants of the old river course were incorporated into the overall restoration as backwaters at 3 locations and as a bay at another location.

DESIGN

Each feature created is uniquely different, but all are based upon the common principle of only partial backfilling. This also avoids the need to revet or support backfill where it would otherwise abut the new channel.

Backwaters on mill leat (fig. 2.2.1)
A new bridge was built 'in the dry' before completing the diversion of the leat and backfilling the old course *(see 8.2)*. Backfilling was limited to providing a link to the new bridge, leaving the lengths denoted **2** and **3** on the figure open to the river. Backwater **2** is linked to a drainage ditch which backs up with river water when the leat rises, creating a reversal of flow into other parts of the drainage system, which in turn contributes to the seasonal flooding of fields. The bed of this backwater has been raised to just below normal water level to sustain a marshy aquatic habitat. In contrast, backwater **3** remains as open water with marginal ledges and willows.

Backwater **1** was created after excavating a new meander in the leat *(see 1.3)*. It is an unfilled length of the old leat which was enhanced by removing the embankment from the left side so that rising floodwater could overspill to merge with floodwaters in the new river channel adjacent to it.

Backwater **1**

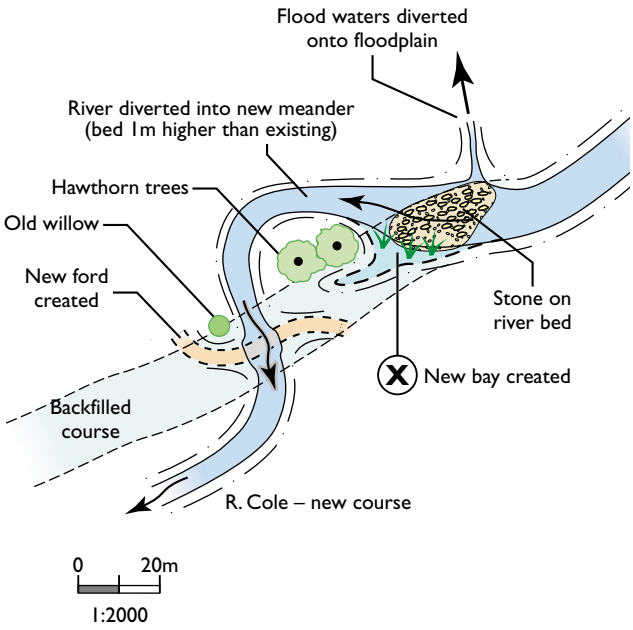
ENHANCING REDUNDANT RIVER CHANNELS

2

New bay at start of lower meanders (fig. 2.2.2)
The new meandering channel is smaller than the existing channel upstream and its bed is elevated c. 1m higher. As a result, water in the upstream channel is impounded and slow moving which contrasts with a marked increase in velocities within the new channel. The design of the junction of the old and new channels reflects these hydraulic conditions. The risk of downward scour of the new bed was alleviated by backfilling the existing channel bed where it abuts the new and adding a layer of stone to create a secure transition. To complete the diversion, the old channel was backfilled in a manner that created a small marshy bay within which the slower moving floodwaters approaching the new meander can eddy freely before entering it. This was preferable to complete backfilling and having to revet the fill to resist erosion.

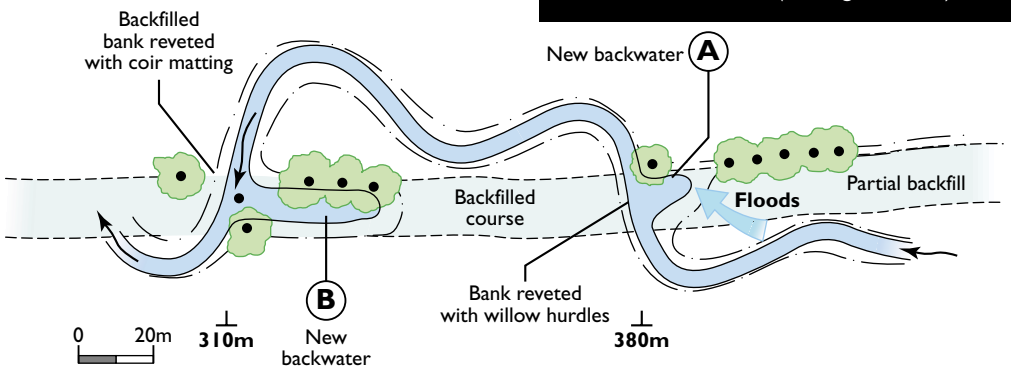
Opposite the bay, an old drainage ditch entered the river. This was incorporated and enlarged to enable floodwaters to pass freely from the river out onto the lowest part of the floodplain, remote from the main river course. As a further safeguard against downward erosion of the new river bed, a stone ford was created 80m downstream where the new channel crosses over the line of the original *(see Part 8)*. This ford acts like a small weir and therefore 'fixes' both bed and normal water levels upstream.

Figure 2.2.2
NEW BAY AT START OF LOWER MEANDERS
(For location see Figure 1.2.1)



View of shallow bay **X**

Figure 2.2.3
BACKWATERS ON LOWER MEANDERS AT CH 310m AND 380m
(see Figure 1.1.1)



Backwaters within lower meanders (fig. 2.2.3)
Two backwaters were created where the new course crosses over the old course. One is much larger than the other, and each is different in nature.

Backwater **A** is located where backfilling of the old channel was kept to a low level so that a valuable line of old river bank trees were not buried. The new river channel approaching the backwater marks the inside of a meander, necessitating further lowering of ground levels, with the result that floodwaters regularly sweep across it to enter the backwater as indicated. This flood flow sustains open water in the backwater as well as shoal deposition, creating varied off-river habitat.

Backwater **B** contrasts with **A** in that the retained trees along the old course all overhang open water and the new channel approaches from behind the trees rather than towards them. The hydraulics are entirely different as a result. The old river bank, behind the trees, remains at a high level preventing any floodwater from passing into the backwater save for small volumes that occasionally pass over the infilled length of channel. The backwater is thus a quiet refuge of still water, and hydraulic interaction with the river is limited to rise and fall of water levels.

The river banks opposite the mouth of each backwater were formed from backfill right up to the new channel profile after infilling of the old river bed. Each was reveted *(see 4.6)*.

Small backwater **A**

Large backwater **B**

SUBSEQUENT PERFORMANCE 1995/8

The new backwaters and bay all add considerably to the overall ecology and landscape amenity of the restored river. Each represents a unique habitat feature created at virtually no direct cost. Savings on the cost of revetment were, however, offset by the need to haul surplus soil to nearby landform areas rather than simply infilling *in situ*. The value of the features created more than justifies the cost of haulage involved.