



# ENHANCING STRAIGHTENED RIVER CHANNELS

## 3.8 Creation of on-line bays

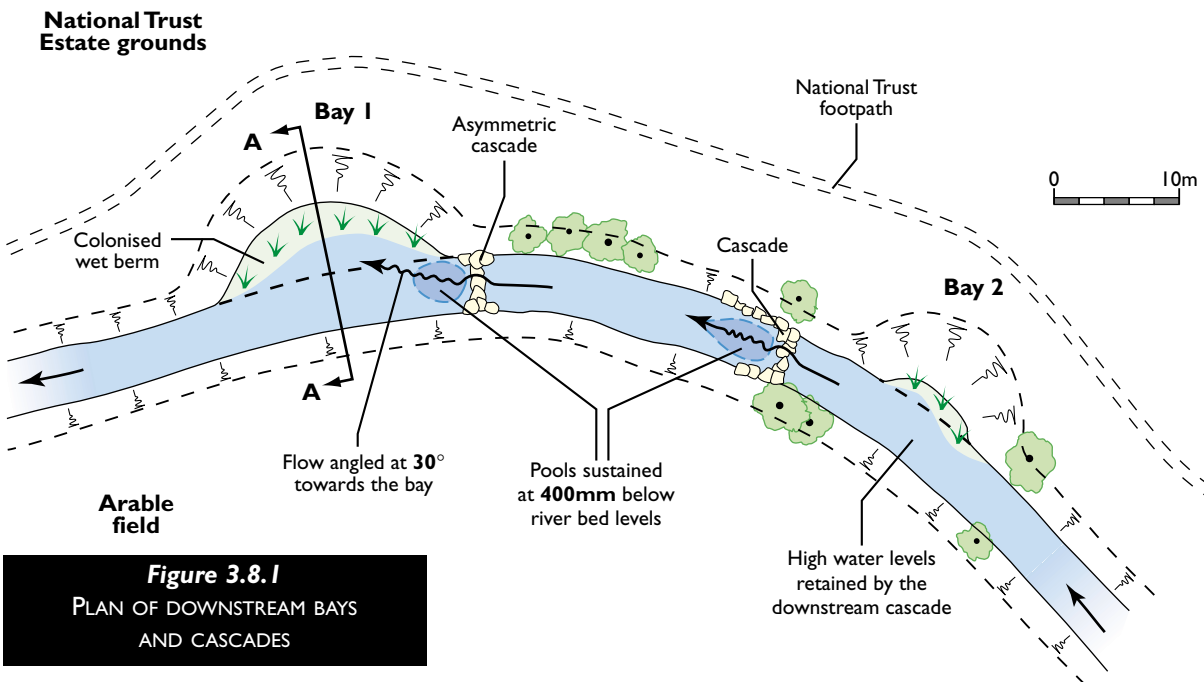
### RIVER TALL

LOCATION - Address, nr. Moy, Co. Armagh, N. Ireland. OS Map 19, H916555

DATE OF CONSTRUCTION - July 1995 to December 1996

LENGTH - Bays between 10m and 30m

COST - NOT AVAILABLE



**Figure 3.8.1**  
PLAN OF DOWNSTREAM BAYS AND CASCADES

### DESCRIPTION

The Tall River is a main tributary of the River Blackwater, flowing through Co. Armagh. It is a slow flowing, low energy river within an agricultural catchment. The river had been subject to an arterial drainage scheme in the 1960's, which deepened and widened the river.

The 1.2km Tall River scheme was the first project within Northern Ireland to address the specific need to enhance the riverine environment, rather than being attached to a larger flood prevention scheme. The enhancement works were a part of a larger 'water recreation' scheme, developing footpath access along the river linking with footpaths already developed by the landowner, the National Trust. Due to landowner restrictions works could only be carried out on the National Trust owned right bank and in-channel.

The deepening resulting from the arterial drainage scheme meant that the river had lost its natural connection to the floodplain. It was felt that some

kind of shallow slackwater habitat was needed. As creation of large backwaters was unacceptable to the landowner, the option of creating small 'bays' was considered. These bays would provide some shelter in high flows suitable for fish fry and invertebrates, and shallow margins should increase the macrophyte diversity within the reach.

### DESIGN

Four bays of differing sizes were excavated within the reach. Three of these were accompanied by upstream stone cascades, to generate turbulence and ensure that the bays remained 'open' rather than quickly silting up. The bays also incorporated a low ledge, just below summer water level to accommodate a variety of macrophyte species. Figure 3.8.1 shows the two bays located at the downstream end of the enhancement reach.

The roughly semi-circular bays were excavated down to bed level where the bay meets the channel. This level is then followed back, rising to the low ledge level at the bay edge. The width of ledge varies with the size of bay.



Downstream bays after less than a year.  
Note: Bay 2 is already becoming choked with vegetation

From the ledge the bank rises at a batter shallower than the existing 1:1 bank (approx. 1:2 to 1:3). The batter angle varies with the difference between bed and bank top (from 2 to 4m) (figure 3.8.2).

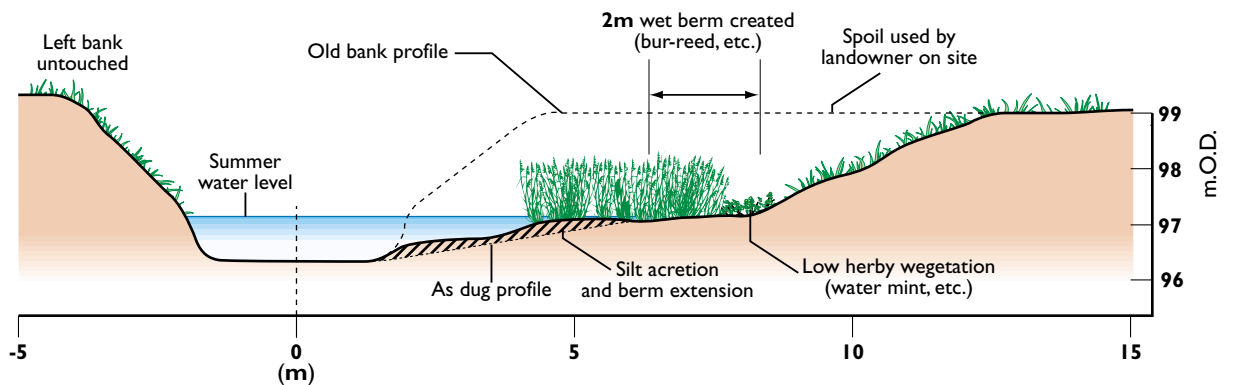
The stone cascades were constructed from 500mm+ boulders formed into a rough 'loose' arc and dished in the centre. This configuration helps to direct the flow away from the potentially erodable banks. The bankside boulders are securely keyed into the sides. The loose construction allows water to pass through

the structures, reducing the backwater effect at low flows whilst providing a good degree of turbulence.

**SUBSEQUENT PERFORMANCE 1995 – 2001**

The bays that had associated upstream boulder cascades have remained 'open' to differing degrees.

*Upstream bays 3 and 4 (not illustrated)*  
These two bays are accessible to cattle and are used as drinking points. There is an element of poaching at



**Figure 3.8.2**  
SECTION A THROUGH BAY 1





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Bay 1 showing the angle of flow keeping the bay 'open'

the water's edge, but the stocking densities are low enough not to be of concern. Grazing maintains a cropped but diverse macrophyte margin.

The smaller of the two (bay 3) is sustained by the turbulence generated by its cascade and is cleared of loose silt during high flow events. The larger (bay 4), 30m in length, is too large to remain silt free and has developed shallow margins. Both cascades have excavated deeper pools adjacent to the bays.

### *Downstream bays 1 and 2 (figure 3.8.1)*

Cattle are excluded from the lower reach and, as a result, the more vigorous emergent vegetation (such as bur-reed) is dominating.

Bay 1 (*figure 3.8.1*) is similar in size to bay 4 but is able to retain its open nature due to the positioning of its cascade. The flow of water over the boulders is angled into the bay, approx. 30 degrees offset from the main channel. This directional flow is helping to maintain the bay at low and high flows.

Bay 2 (*figure 3.8.1*) rapidly silted up and colonised with emergent vegetation, spreading well into the main channel. The cascade for this bay was placed downstream, resulting in increased water levels from the backwater effect created. This has reduced flow velocity and now acts as a silt trap, promoting silt deposition and vegetation growth.

The success of these bays on the River Tall seems to be determined by:

- adequate velocity, turbulence and direction of flow;
- sizing and shaping of the bay;
- grazing of the colonising vegetation.

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