

An Investigation of the Hydraulic Impact of Floodplain Woodland

Abstract

The use of floodplain woodland as a soft-engineered aid to flood control has been discussed for many years. Some flood defence engineers have argued that floodplain woodland would only be able to exert a small effect on flood flows, while others have ...

Research Carried Out By

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Equipment Used

The Level Troll 500.

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Background

Some flood defence engineers have argued that floodplain woodland would only be able to exert a small effect on flood flows, while others have expressed concern that any backing-up of floodwaters could adversely affect local properties. The high degree of uncertainty associated with these and other potential impacts has precluded any significant floodplain woodland planting to date.

The main mechanism whereby floodplain woodland could aid flood defence is by slowing the downstream passage of a flood peak, resulting in a lower but longer-duration event. It is suggested that floodplain woodland has naturally carried out this role in the past and its removal has contributed to an increase in flooding severity.



fig1. Site of application.

The delaying effect on flood flows is mainly due to the increased resistance to the flow from the presence of vegetation. The spacing and layout of trees, smoothness of trunks, presence of lower branches, level of undergrowth and amount of dead wood on the woodland floor all contribute to this resistance. By varying these factors, woodland management and design can be expected to exert a strong influence on woodland hydraulic resistance and thus on the capacity of floodplain woodland to impede flood flows.

There is an urgent need for research to quan-

tify the effectiveness of floodplain woodland as a mechanism of flood defence.



fig2. Site of application.

The Solution

Four Level TROLL 500 will be installed at different locations along the river, housed in basic stilling wells. The data will be stored on site loggers, which will be downloaded every 2 - 3 months.

The water level recorders are self-contained units with an on-board data logger and power supply therefore there will be no need for wiring and separate data logger boxes etc. The recorders are submersible devices (no more than 20mm in diameter and 200mm in length)

Velocity measurements will also be taken at fixed positions along the river reach under various flow conditions, including flood events (within safe limits).

The equipment will take no more than 2 days to install and will only need to be checked at times of high flow and occasionally to check on the equipment throughout the duration of the monitoring period.

The data collected over the monitoring period will give a greater understanding on whether floodplain woodland planting is a suitable mechanism of flood defence.