Regional Forestry Strategy for Yorkshire and The Humber

FORESTRY & FLOODING

BRIEFING NOTE 1 – December 2007

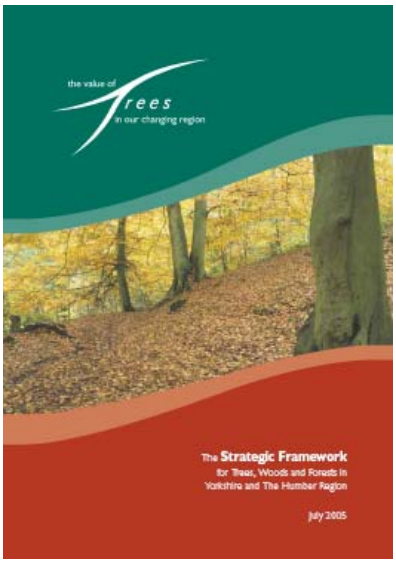
REGIONAL FORESTRY STRATEGY CONTEXT

The Strategic Framework published in July 2005 referred to the autumn 2000 flooding as "providing a powerful wake-up call". We can now add the localised but significant flood event that took place around Helmsley in June 2005, and the far more widespread flood damage that affected the region in summer 2007. Flooding and flood risk is now a critically important issue for the region.

Within the Climate Change theme of the Strategic Framework, two specific flooding related Outcomes were identified under Objective 7.2 - Coping with Change. These were:

7.2.a) Regional flood risk is reduced through increased woodland creation in river catchments (Priority 2)

7.2.c) Regional flood risk is reduced through increased woodland creation on floodplains (Priority 1)



NATIONAL AND INTERNATIONAL UPDATE

Forestry can have a direct influence on water quality and quantity issues at both local and landscape scales. These were recognised at the 5th Ministerial Conference on the Protection of Forests in Europe and form the basis of Warsaw Resolution 2 on 'Forests and Water' (http://5th.mcpfe.org/file/Warsaw_Resolution_2.pdf)

The issues are also summarised on the IUFRO 'Forests and Water Interactions' poster available on the website – http://www.valueoftrees.org

In particular, the potential for changes in land management practices to contribute to reducing flood risk is becoming more widely accepted. A review of the evidence undertaken by the Environment Agency as part of Defra's 'Making Space for Water' programme concluded:

> *"In summary, this hypothesis (i.e. that forests reduce flooding) cannot be accepted for the generation of extreme flood events at a catchment scale on the basis of the available evidence. Nevertheless, well-managed forests can help reduce local flooding and the peak flows for smaller, more frequent events and potentially for infiltration-excess driven extreme summer events. There is increasing evidence to suggest that the hypothesis may hold for riparian and floodplain woodland. Therefore, land use of this type could have a significant role to play in attenuating the downstream progression of extreme flood flows in particular locations. However, this potential is not ubiquitous and needs to be assessed on an individual catchment or sub-catchment basis."*
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> R&D Update review of the impact of land use and management on flooding. Environment Agency, March 2007 (http://www.defra.gov.uk/environ/fcd/policy/strategy/ha6ha7lu.pdf)

FORESTRY AND FLOODING

There are three areas where forestry has significant potential to help reduce flood risk:

Woodland creation to reduce erosion – this has been identified as a particular issue in the Yorkshire Dales where localised erosion has increased the delivery of sediment to rivers, resulting in downstream siltation and reduced flood storage within river channels. This has led to out-of-bank flood events becoming more frequent in recent years. Work by Durham University suggests that the majority of the sediment is originating from unstable, steep valley sides, which comprise only 5% of the catchment area. Targeting these slopes for woodland planting could help reduce coarse sediment delivery by up to 85%, with benefits for soil protection, flood management and water quality. A guide to using woodland for sediment control is available at:
http://www.forestresearch.gov.uk/website/forestresearch.nsf/ByUnique/INFD-62ADD9

Riparian woodland – although it is accepted that trees and woods reduce run-off by evaporating more water and the greater permeability of woodland soils, the overall effect on flood flows is limited. Riparian woodland, however, can increase flood storage and hold back flood waters through the formation of large woody debris dams within headwater streams. Tree

rooting also strengthens river banks and reduces channel erosion and downstream siltation. Woodland shade may become increasingly important for protecting freshwater life from rising water temperatures due to climate change.

Floodplain woodland creation – Forest Research, the Forestry Commission's research agency, has been exploring the potential of floodplain woodland to help manage flood flows and reduce flood risk. Under contract to the Environment Agency, they undertook hydraulic modelling work on a section of the River Cary, a tributary of the River Parrett in Somerset. This demonstrated that the creation of a 50 hectare floodplain woodland had the potential to increase the temporary storage capacity of the floodplain by 14% and to delay the passage of floodwaters by 30 minutes. The scale of these beneficial effects very much depends on the topography of the individual catchment and the synchronisation of tributary flows.

Woody debris creates natural dams within floodplain woodland, increasing flood storage and slowing flows. (Copyright: FC)

THE RIPON MULTI-OBJECTIVE PROJECT

In January 2007, Forest Research were successful in securing Defra Innovation Fund money to establish a national floodplain forestry pilot study as part of the Ripon Multi-Objective Project (Ripon MOP), another part of Defra's "Making Space for Water" programme. The Ripon MOP is seeking to explore the options for using land use and management practices to reduce flood risk at the small catchment scale, while at the same time achieving multiple benefits in terms of water quality, landscape, biodiversity and recreation. Further information is available at (http://www.defra.gov.uk/environ/fcd/policy/wetlands/riponmop.htm)

As part of this project, hydraulic modelling work for the River Laver, west of Ripon, suggests that the creation of a 15 hectare floodplain woodland could increase temporary storage capacity in planted reaches by 50% and delay the passage of floodwaters by up to 30 minutes in this particular catchment. These are potentially very significant results and suggest that floodplain woodland could be used to help reduce flood risk by 'managing' the transfer of flood waters downstream; delaying and de-synchronising the flood peaks of different tributaries.

DEVELOPMENT OF A REGIONAL OPPORTUNITY MAP

A further facet of the work carried out by Forest Research in Somerset was the development in 2003 of an opportunity map of the Parrett catchment to identify where floodplain woodland had the potential to reduce flood risk. This opportunity mapping work and the hydraulic modelling of the River Cary have been instrumental in raising the issue of using forestry to assist flood management at the national level.

Following on from the success of securing funding for the Ripon MOP, Forest Research is now undertaking a comprehensive opportunity mapping exercise across the whole Yorkshire & The Humber region to identify areas where woodland creation can help the region reduce flood risk. This is a joint project with the Environment Agency and is being undertaken on behalf of the Regional Forestry Strategy Steering Group.

The mapping will be based on available GIS datasets and will seek to identify opportunities for woodland creation on floodplains as well as in areas where erosion and overland flow have the potential to exacerbate flood risk. The opportunity map will then be refined to exclude areas where woodland creation would not be possible or acceptable for a variety of reasons. These include issues like conservation designations, landscape balance, protecting historic sites and the impact on existing development.

Work is also underway by the Environment Agency to try to identify and map economic assets at risk from flood damage. When available, this data will be used to further refine the opportunity map and provide a means through which areas can be prioritised from an 'economic assets at risk' perspective.

TARGETING OF FUTURE FUNDING

The opportunity mapping exercise is being undertaken over the course of the 2007/08 winter. The intention is that the map will be used as the basis for the development of a programme to fund woodland creation with flood risk reduction as the primary objective. Evaluation of proposed sites would need to include a detailed hydrological assessment to ensure that the potential consequences of creating these new woodlands are fully understood. The design of each scheme would seek to maximise other objectives alongside flood risk reduction and would be developed in line with both national guidance and the seven Guiding Principles in the Regional Forestry Strategy.

Vince Carter, RFS Delivery Manager
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For further information contact:
vince.carter@forestry.gsi.gov.uk