

NON-TECHNICAL SUMMARY

Implementing Natural Flood Management (NFM) Measures



LOCATION	Whitehope Farm, Yarrow Water, Selkirkshire
AIM	To slow down rainwater run-off rates and restore natural riverbank vegetation
SUMMARY	The establishment of 7.00ha of new native woodlands

Background and aims: How might climate change affect land management and how might farmers work with it to deliver sustainable land use?

If climate change predictions are correct, we can expect more extreme weather events in future. With respect to intense rainfall events, as experienced in recent years across southern Scotland, it seems sensible to look at ways of reducing the amount of damage to land and property. Well-designed Natural Flood Management (NFM) measures also reflect good land management practice. NFM offers a range of techniques that aim to reduce flooding by working with natural features to temporarily store or slow down flood waters. These techniques can never solve the problems associated with flooding, but they can contribute to reducing the height of the flood peak and subsequent damage to property.

The NFM programme

Tweed Forum is co-ordinating NFM enhancement measures across 60 sites within five sub-catchments of the Tweed river system. The catchments involved include: the Ettrick and Yarrow valleys, upper Teviot, Gala Water, Bowmont Water and Eddleston Water.

The Yarrow valley

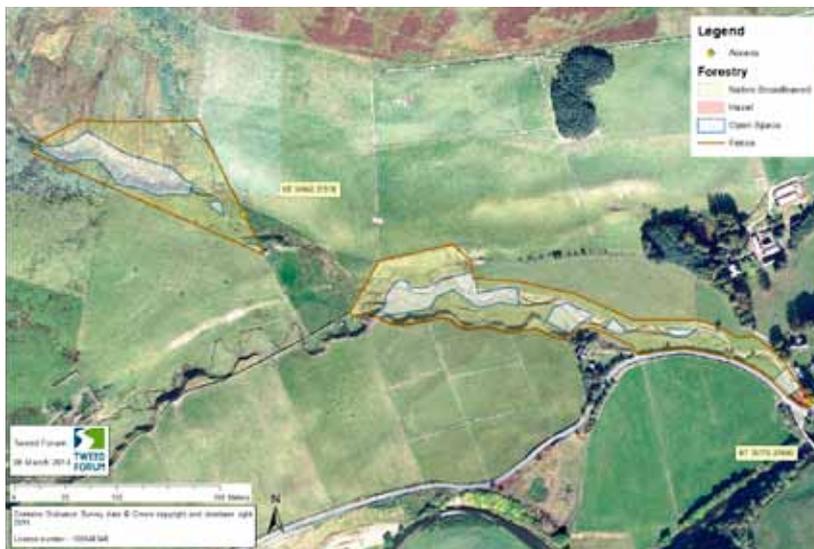
The aim is to slow the flow of surface water run-off rates by restoring natural riverine processes and function by creating native woodland habitats. By undertaking measures such as these, a number of additional benefits can be achieved, including an increase in: diversity of habitats, wildlife, soil carbon storage and diffuse pollution control. The Yarrow feeds into the Ettrick Water a mile upstream of Selkirk and the town is often affected by flooding. Although the Scottish Government approved a £30m flood defence scheme, which commenced in 2014, NFM measures in the Ettrick and Yarrow catchment will help to enhance the more traditional concrete flood defences.

The overall project aims to restore the natural habitats across the wider catchment to improve the ecological status of the river and its fish populations. It also aims to measure the effect that these restoration measures have on flood attenuation downstream. A key objective is to work with land managers and communities in bringing about meaningful and sustainable water and land management changes, and to recognise the services nature provides to society. In other catchments, a comprehensive monitoring programme has been developed to measure the effects on the ecology and hydrology. The project is led by Tweed Forum.

Landscape showing where native riparian woodlands were planted (marked in yellow)



Overview map of the native woodland planting plan



Four key points to consider when implementing a Natural Flood Management programme

1 Land use issues and challenges

Whitehope is an upland livestock farm in the western Scottish Borders. The farm is owned and managed by Buccleuch Estates Ltd. The NFM measures put in place are designed not only to help slow the flow of flood water run-off but also restore the riverine habitats. The landowner was keen to explore the potential of using natural processes, by re-establishing native woodland habitats, to reduce the flood risk to Selkirk. The valley forms part of an old glacial meltwater channel and the river is contained on a floodplain bounded by steep river terraces. As the river is fenced off from livestock, the risk of breaching GAEC regulations is reduced.

2 Land management opportunities

Tweed Forum helped facilitate and co-ordinate a programme of Natural Flood Management measures that all partners involved agreed would enhance the river and floodplain habitats. The works involved creating over 7.00ha of new native woodlands. The tree species planted included a mix of: oak, birch, hazel, aspen, rowan and willow.

3 Land management benefits:

Due to ongoing flooding issues downstream in the town of Selkirk downstream, the Natural Flood Management measures implemented could bring a significant number of positive benefits to the valley. Tweed Forum has been instrumental in completing a series of catchment-wide demonstration sites to showcase the wide variety of NFM measures that can be implemented at a catchment scale. The multiple benefits accruing include:

Benefits to the farm business through restoring the watercourses

The grazed pasture land was of low to intermediate quality grassland which was prone to droughting, especially on thin in-bye gravelly soils, so its return to native woodland was encouraged by the land owner. Through fencing off the stream sides and planting with native trees, bank-side erosion should be reduced significantly. The new stock fencing, new water trough and newly planted riverside trees will allow native grasses on the banks to colonise and regenerate free from stock trampling. In time, the tree cover may help provide opportunities for sheltering and shading livestock in adjacent field areas.

Benefits to the community through reduced rainwater run-off rates

Reconnecting the river with its floodplain and naturalising the river itself should lead to reduced peak flood levels, which will, in turn, protect built property and infrastructure in towns downstream. The planted trees will increase rainfall interception and infiltration, thus reducing over-land flow of rainwater. Free from bank-side grazing, these short sections of restored watercourse will become narrower and deeper, encouraging a more natural riverine system to function.

Benefits to wildlife and the environment through habitat creation

The main benefits to wildlife are through the creation of habitat linkages. Watercourses are often confined by man-made floodbanks, but the creation of adjacent riverine habitats, such as woodlands connected to watercourses and wetlands, reconnects rivers to their floodplains. Species that may benefit include: dipper, kingfisher, Atlantic salmon, otter, Brown trout, lamprey, Reed bunting, Great crested newt, wildflower and butterfly species.

The areas for 7.00ha of new native woodland planting occur on both improved in-bye (field) land and unimproved out-bye (hill) land. The site forms part of a glacial meltwater channel.



View of the valley prior to planting native woodlands. In summer, the stream bed often dries up, leaving fish stranded and suffocated. Lack of shade from trees will also lead to raised summer temperatures, which can be fatal to fish.



The stream bed is very mobile and is composed of loose boulders and gravel. By establishing native woodlands the aim is to rejuvenate natural riverine processes and reduce the amount of sediment released from river banks.



View looking down the valley post-planting: natural flood management benefits, landscape enhancement and habitat connectivity will be significant



Newly planted woodland in improved in-bye land. Significant numbers of roe deer in the area and the difficulties of making deer fences secure at water gates means that 1.2m tree tubes have been used throughout this scheme.



4 Costs and funding

The illustrative costs of the project are set out below

Farm	New floodplain woodland planting	New stock fencing required	Total	Scottish Rural Development Programme (Capital grant)	Other Funding sources
Whitehope	7.00ha	1,106m			
Expenditure	£25,391	£6,636	£32,027	£19,186	£12,841

Costs do not include facilitation services or VAT

Outcomes and lessons learned

One of the main lessons learned is that working in a loose but focused partnership has enabled the design and delivery of a successful re-meandering of the river (and other restoration elements). Without the partnership – in this case local landowners, Tweed Forum, and SBC windfarm off-site mitigation funds – such a project would not have been feasible or possible. Such partnerships do not come about by accident, and they also require clarity of leadership and governance. An overarching lesson is that initial time spent developing such partnerships is a crucial first step. Finding multiple sources of income is a critical second step in project management to ensure all real and potential costs are covered.

The conservation objectives at Whitehope were to:

- Reduce surface water flow rates by planting areas of native woodland
- Restore the watercourses to a more natural state
- Create more diversity in habitats to attract more wildlife species onto the farm
- Monitor the effect of peak flows on this section of river and on the NFM measures implemented.

It is intended that the restoration actions of the wider natural flood management project will contribute to:

- An improvement of the 'ecological status' of the water body under the Water Framework Directive (WFD) classification and a reduction in flood risk within the catchment.
- An increase in the habitat supporting designated species: otters, Atlantic salmon, Water crowfoot, lampreys.
- The development of a demonstration site that other practitioners, land managers, policy makers, agencies etc can visit to exchange knowledge and share experiences.

Final comment

The habitat mosaic of new woodlands and a more naturalised watercourse should achieve the multiple objectives of reducing peak flow rates and also enhancing biodiversity value, improving water quality and restoring soil carbon.

Promoting to others the benefits of the change in land management

Once the sites have been given time to rejuvenate, the aim will be to take organised groups to view the range of works undertaken. People from diverse backgrounds including farmers, farm advisors, government agency staff, academic institutions and school groups will have the opportunity to see the work on the ground. Visits can be arranged through Tweed Forum.



Forestry Commission Scotland
Coimisean na Coilltearachd Alba



Project Partners, Funders and Facilitators

Facilitated by Tweed Forum, organisations involved in the project include Forestry Commission Scotland, Scottish Borders Council, The Scottish Government, Buccleuch Estates and individual landowners.

If you are a land manager and would be interested in carrying out something similar on your land, please contact Tweed Forum for a confidential discussion of what might be possible and to explore potential funding sources.

Further information can be obtained from:

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