

NON-TECHNICAL SUMMARY

Implementing Natural Flood Management (NFM) Measures



LOCATION	West Fenton, Nesbit and North Doddington Farms, River Till, North Northumberland
AIM	To slow down rainwater run-off rates, to reduce flooding and to restore floodplain habitats
SUMMARY	A mosaic of integrated floodplain habitats has been developed, including floodplain grazing marsh, wet grassland, reedbed, wet woodland and open water, totalling over 150ha.

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 floodwaters. 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 Tweed Catchment 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 Bowmont and Till Catchments: Fenton Floodplains and Wetland Restoration Project

Fenton Floodplains is an innovative project, working with farmers in the Till Catchment, in north-east Northumberland, to find a sustainable approach to the management of the catchment's floodplain and floodbanks. The project supports the cross-border approach embodied in similar work such as in the Bowmont-Glen sub-catchment and the wider Tweed catchment NFM programme. Working on three adjacent farms, the project set out to re-connect the River Till with its natural floodplain through the breaching of targeted sections of floodbank. This created the opportunity to develop a mosaic of integrated floodplain habitats, including floodplain grazing marsh, wet grassland, reedbed, wet woodland and open water, totalling over 70ha.

Throughout much of the Till catchment, and especially on the Milfield Plain, the floodplain has been disconnected from the river by a series of floodbanks. While historic documents suggest that floodbanks were being used in the late 18th century by local farmers to improve productivity, it was not until the 1950s and 1960s that the banks took on their present distribution and form. Now only small fragments of the once extensive floodplain landscape survive.

The Fenton Floodplains project aimed to redress these losses by reconnecting the River Till with its natural floodplain for the first time in over 50 years. The breaching of targeted sections of floodbank allowed floodwater to spread unhindered over once arable fields. This will enable the gradual re-emergence of a mosaic of floodplain habitats, including floodplain grazing marsh, wet grassland, reedbed, wet woodland and open water, which have almost disappeared from the Till catchment over the last century.

Aerial view of the lowland landscape around the Fenton Floodplains, comprising arable and permanent pasture (including rotational grass)



Throughout the programme, the expertise and concerns of local farmers played a fundamental role in the development of the project. These are working farms and, for this new approach to floodplain management to develop further, the project partners needed to ensure not only economic and environmental sustainability but also and also ensure that knowledge about the project was shared both with the local farming community and the wider public.

The project was led by Tweed Forum but is a partnership involving: The Wildlife Trusts, Natural England, the Environment Agency, Northumberland Uplands Partnership, the SITA Trust and a significant number of landowners.

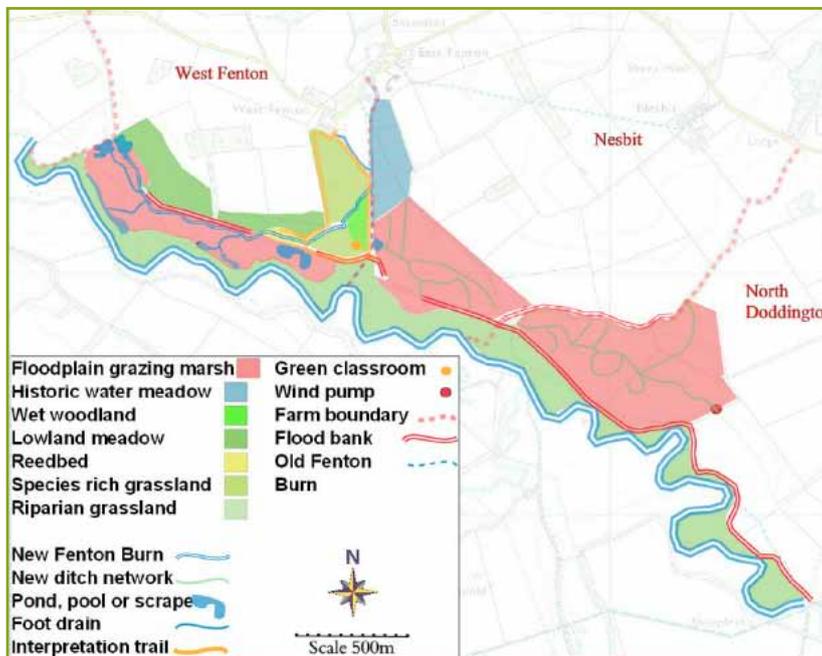
Four key points to consider when implementing a Natural Flood Management programme

1 Land use issues and challenges

The Till catchment represents the English tributary input to the River Tweed and is itself a significant catchment area. It has over 30km of flood defences which protect predominantly agricultural land. The majority of these banks were built or enlarged in the 1950s and 60s during the post-war period of agricultural intensification. The Environment Agency (and its predecessors) have managed and maintained these defences for over 60 years. Recent changes in approaches to flood risk, driven largely by increased maintenance costs and a changing focus on protecting urban areas, rather than agricultural land, from flooding led to a review of floodplain management. Environmental concerns and opportunities associated with the Water Framework Directive, and the designated status of the River Till (part of the Tweed SAC and Tweed Rivers SSSI), were also an important consideration.

A small working group assessed the feasibility of a landscape-scale habitat and restoration project, based around the removal of flood defences, and local advisors were engaged to assess local stakeholder interest. Whilst the proposal to remove sections of floodbank was seen as controversial by some in the local farming community, the level of enthusiasm was sufficiently encouraging for a programme of NFM works to proceed. The works were centred on three farms: West Fenton, Nesbit and North Doddington, located on the northern edge of Milfield Plain, approximately 20km south of Berwick-upon-Tweed and 6km north of Wooler. Over 150ha of land were enhanced through the project, including 73ha of new or restored wetland habitat, the reconnection of 85ha of active floodplain, the abandonment or breaching of 6,700m of floodbank and 5,700m of riverbank brought under positive management.

There is now a wide range of habitat types on the Fenton Floodplains



2 Land management opportunities

Tweed Forum worked through the Cheviot Futures project to help facilitate and co-ordinate a programme of Natural Flood Management measures, which all partners agreed would enhance the river and floodplain habitats. The works involved creating and restoring over 70ha of wetland habitat within this intensively farmed part of north Northumberland. Fenton Floodplains is now a major habitat creation and demonstration site supporting a rich assemblage of plants and animals, many of which are rare or threatened, including waders such as lapwing, snipe, redshank and curlew, wildfowl such as Pink-footed and Greylag geese, widgeon and teal, and mammals such as otter and Water vole.

3 Land management benefits

The management of water is becoming increasingly complex. Past practices have resulted in the disconnection of rivers from floodplains, with the associated loss of biodiversity and the requirement for expensive and sometimes damaging flood defence schemes. Many of our current demands conflict; for example: functioning floodplains are required to accommodate floodwaters and for biodiversity; flat, fertile floodplains are needed to produce food, and there is also a demand for housing beside rivers. The extreme flood in the Tweed catchment area in September 2008 was the largest on record, clearly demonstrating the extent and function of floodplains. It was also a reminder that any operation within the floodplain is at risk and that the floodbanks can cause serious problems, as well as prevent them.

Farming practices differ between the three farms involved. West Fenton is predominantly organic arable, with peas, potatoes and wheat grown in rotation throughout. Nesbit has a mixed farming system, with arable crops grown in rotation and grass leys on the gentle slopes below the farm. The low-lying fields have heavier and less free-draining soils. The remnants of rigg-and-furrow and old drainage networks, including a water meadow, are clearly seen in these permanent pastures. North Doddington is a large intensive dairy farm, with the majority of the fields under arable or in short rotation grass leys.

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 at this site include:

Benefits to the farm business

At West Fenton the new floodplain fields were allowed to develop naturally, providing habitat for breeding waders. The surrounding meadows were managed for hay or late-cut silage, followed by aftermath grazing. Elsewhere on West Fenton 1.2ha of wet woodland has been planted and a small *Phragmites* reedbed established to filter farm steading run-off.

At Nesbit, the heavier soils has meant that drainage is poor. Historic management of the fields has resulted in a 5km network of ditches and foot drains, reflecting various attempts to drain this land. The whole system finally drains into the Fenton Burn via a simple sluice system. This complex network runs back into an old water meadow dating from the mid-18th century. Working with the local topography and the existing drainage network the farmer developed a plan to open out and re-profile over 1.75km of ditch and foot drain. The project installed a series of sluices, which provided the means to manage water either across the entire site or within discrete cells. In addition, a 200m section of floodbank was removed to allow floodwaters to flow back across the fields, and the farmer created a series of small pools and scrapes within the ditch network to increase habitat diversity.

At West Fenton the farmer is using retractable Clippex fencing as a novel technique, which minimises damage to fences as a result of debris accumulation during floods.

The innovative trial of the Clippex fencing solution at West Fenton



Local farmers have found that the field drainage in their wettest fields has improved as a result of the water management techniques undertaken. All the watercourses flowing through the three farms now pass through a series of wetlands. This means that the level of silt and agricultural pollutants entering the Till system has been greatly reduced.

Benefits to the community

Some members of the local community and the wider farming community viewed the removal of the floodbanks with concern and scepticism. From the outset, it was recognised that the support and engagement of the local community was fundamental, not only for Fenton Floodplains, but also for the success and reputation of the wider River Till Wetland Restoration Project. Fenton Floodplains has attracted a considerable amount of interest locally, regionally and nationally, and the project partners have hosted talks and held guided tours for interested professionals. The partners have worked with the Institute of Ecology and Environmental Managers (IEEM) to promote NFM measures undertaken. Drop-in sessions were held to allow local residents the opportunity to talk to members of the steering group and presentations were made to the parish council. A strong relationship has been developed with Glendale Community Middle School by helping them with their wildlife garden, which has a strong wetland theme. It is through the Fenton Education Centre that the main focus on education and access is taking place. The partners have worked with the Fenton Centre and Cheviot Futures to develop a new multi-user trail, which is providing an opportunity for visitors, of all abilities, to access the open countryside, to see and experience the features associated with the Fenton Floodplain. New displays on the work of the Fenton Floodplains are being used to demonstrate adaptation measures necessary to address the predicted changes associated with climate change. These displays have been twinned with displays developed by the Northumberland National Park Authority, at their visitor centre at Ingram, in the Breamish Valley.

The local community are now ambassadors for the project, having seen the reduction in severity of localised flooding despite frequent periods of heavy rain since the banks were breached in 2008. The project illustrates the success of climate change adaptation measures, providing a better understanding of wetlands' multi-functional value.

Children from the local school planting reeds in a newly created swale (vegetated channel)



Benefits to wildlife and the environment through habitat creation

At West Fenton over 450m of floodbank was removed, to ensure that floodwater from the River Till and adjacent Fenton Burn could spill over into the floodplain. The breaches were deliberately over-sized to reduce the risk of scour and future maintenance costs. Once the work to the banks was complete, the surrounding arable fields were restructured and re-seeded. Using data from the baseline vegetation surveys and historic records, Natural England provided a seed mix for the new floodplain grassland, with a more herb-rich mix used for the marginal slopes.

The heavily modified Fenton Burn forms the boundary between West Fenton and Nesbit. Deepened, straightened, bounded by floodbanks and isolated from the River Till by a large metal flood gate, the lower reaches of the stream were little more than an overgrown agricultural ditch. Using a combination of LiDAR (Light Detection and Ranging) mapping and historic maps it was possible to identify the pre-18th century course of the Fenton Burn. A new more "natural" channel was created for the burn, with the assistance of the RSPB's "Big Wheel" Liebrecht rotary ditch cutter. Instead of racing through an embanked and straightened channel the Fenton Burn now meanders sedately across the newly restored floodplain. The new channel is over 1400m in length and connects with a series of existing wetlands, new foot drains and scrapes, allowing controlled drainage of the farmland.

As a result of this work there have been significant improvements to the condition of the River Till SSSI and SAC, with further farms in the catchment considering the breaching or abandonment of floodbanks.

The rotary (Liebrecht) ditcher in operation, creating the new channel for the Fenton Burn



The newly re-meandered Fenton Burn, undertaken by a rotary ditcher



At Nesbit, the short and tussocky nature of the sward, and the hydrology, lends itself to the development of snipe and redshank habitat, with fields managed in spring and summer to provide optimum breeding conditions for these two wading bird species.

During the winter, the fields are flooded to provide an area suitable for winter wildfowl such as teal, widgeon and Pink-footed geese.

At North Doddington the challenge was to establish a high watertable without impacting on the field drains in the surrounding arable fields. Using a technique pioneered by the RSPB on Berney Marshes in Norfolk, a wind pump was used to lift water from a culverted stream into 2km of shallow ditches, and swales were created using the Liebrecht ditcher. Rather than undertaking expensive and disruptive earthworks to achieve the same result, the shallow pools allow water to fill low-lying parts of the field, with water levels throughout the site managed by a simple sluice.

A swale at North Doddington, created by a Liebrecht ditcher



Newly cut channels will facilitate water management on the flood plain



A working reedbed pond at West Fenton



4 Natural Flood Management (NFM) and habitat creation measures, costs and funding

Fenton Floodplains was the first large-scale scheme developed and implemented by the River Till Wetland Restoration Project. The work at Fenton is being closely watched by farmers and land managers throughout the catchment and beyond.

The approach taken and the success of the work at Fenton has encouraged farmers throughout the catchment to show interest and become involved.

In addition to the three farms at Fenton, smaller schemes on other farms in the catchment were completed as part of the Till Wetlands Restoration Project. The partners worked hard to make the features at Fenton accessible. The new interpretation trail and information boards are helping visitors experience and understand the true value of wetlands and floodplains. The Fenton Centre is already a popular venue for schools throughout Northumberland, and more talks and events will be organised in future.

Expenditure and Income

Through the Higher Level Stewardship Scheme, the three farms are receiving over £1.2 million, most of which will be returned to the local economy. In addition, £310,000 was received from the Northumbria Regional Flood Defence Committee for capital works. The SITA Trust's "Enriching Nature Programme" provided £175,000 towards programme costs, while the North Northumberland LEADER Programme secured an additional £45,000 for a new multi-user access route, green classroom and interpretation boards for Fenton.

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 NFM programme. Without this partnership the project would not have been possible. Such partnerships do not come about by accident; 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.

As part of a wider integrated catchment management programme, the following objectives have been achieved:

- Resource protection and sustainable flood management
- Access, tourism and wildlife enhancement
- Education and promotion of flooding issues

Theme	Output
Wildlife	Creation or restoration of 73.4 ha of UK Biodiversity Action Plan (BAP) habitats Creation or restoration of 7.4ha of Northumberland BAP habitat. 5700m of riparian SSSI brought into 'favourable condition' Creation of 1400m of new and improved channel for Fenton Burn
Sustainable flood management	6700m of flood bank breached or abandoned 85ha of floodplain re-connected. Reduced flood risk for properties in the hamlet of Fenton
Access	1100m interpretation trail suitable for all users Green classroom 2 willow viewing points
Interpretation	New display within the Fenton Centre 10 audio information points along the new trail Interpretation panels explaining the value of wetlands
Engagement	Community drop in session 2 reed planting days with the children from the local middle school Series of talks and presentations at a local and regional level.

It is intended that the restoration actions of the wider catchment 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 and lampreys
- The development of a range of demonstration sites that other practitioners, land managers, policy makers, conservation organisations, agency staff and members of the public can visit to exchange knowledge and share experiences.

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 further organised groups to view the range of works undertaken. A range of 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.

Final comment

It was important that the project demonstrated that the NFM options for each farm were simple to manage, cost-effective to undertake and economically and environmentally sustainable.

Part of the River Till Wetland Restoration Project working in partnership with:



Project Partners, Funders and Facilitators

The programme of conservation works was facilitated by Tweed Forum and Cheviot Futures, in association with the organisations above.

Case studies, including further information relating to the works, are available on the project website (www.cheviotfutures.co.uk) and on request from Tweed Forum.

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:

Tweed Forum, South Court, Drygrange Steading, Melrose TD6 9DJ

T 01896 849723 E info@tweedforum.org

www.tweedforum.org