Forest Research

Slowing the Flow at Pickering

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Aim: To demonstrate how the **integrated** application of a range of best land management practices across the catchment area can help to reduce flood risk at Pickering and Sinnington, as well as deliver wider **multiple benefits** for local communities.

Forest Research
An agency of the Forestry Commission

Forestry Commission England

in partnership with Environment Agency

Durham University

Ryedale District Council

defra
Department for Environment Food and Rural Affairs

North York Moors National Park

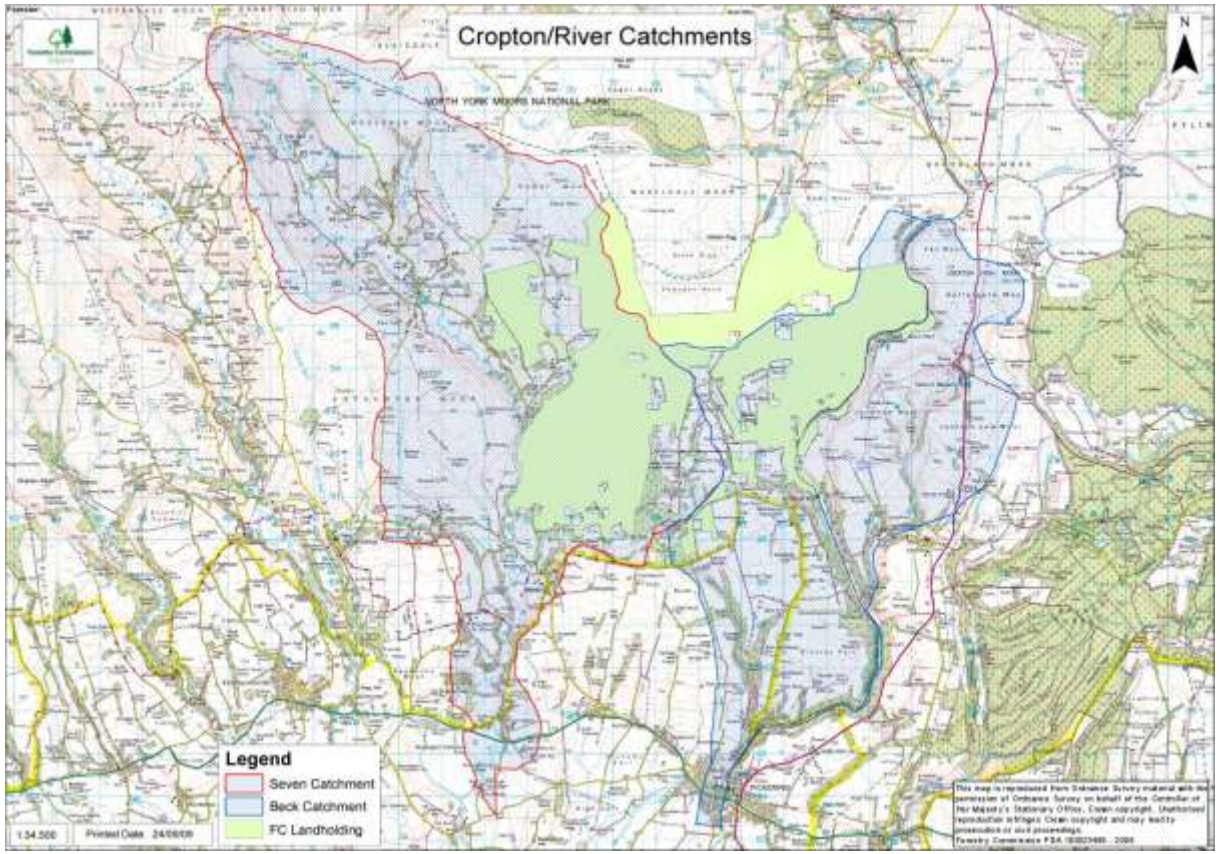
Duchy of Lancaster

Natural England

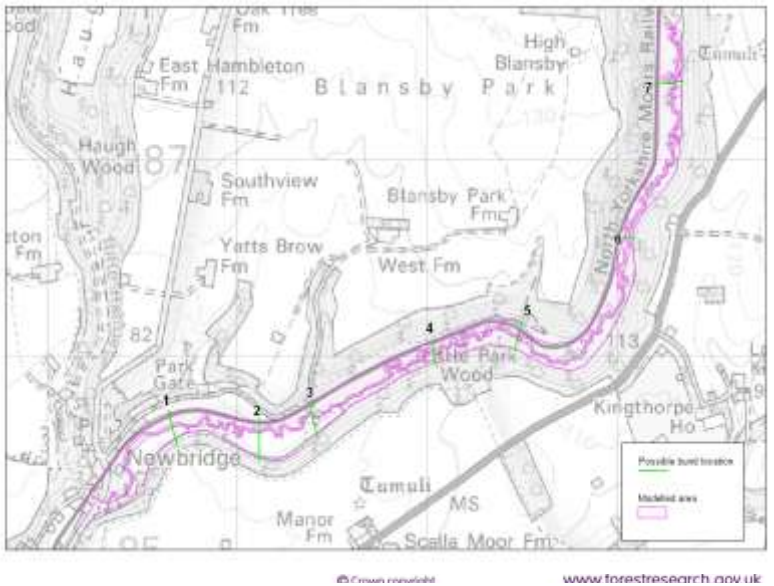
NYMR
North Yorkshire Moors Railway

Sinnington Parish Council

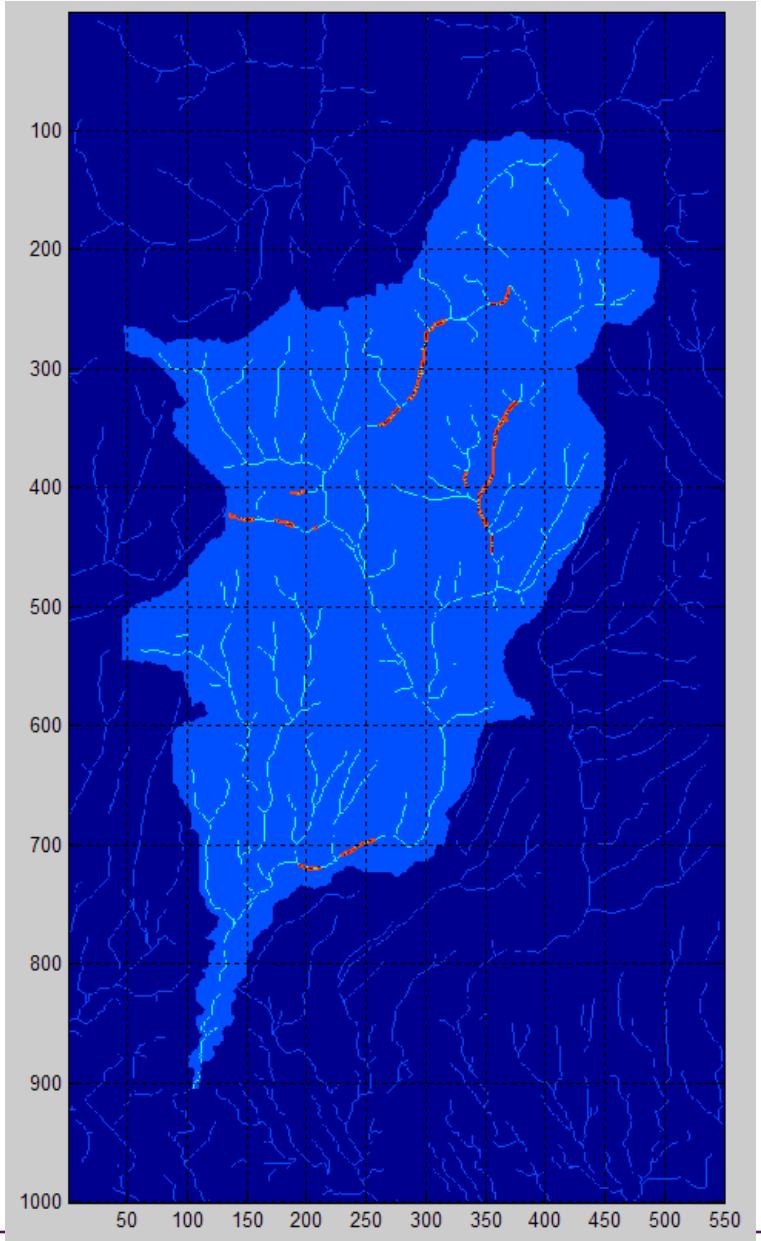
Why Pickering and Sinnington, and why the FC?



The bunded storage proposal: Environment Agency are leading on this. The aim is to explore the potential for constructing a number of low-level bunds at appropriate locations on the floodplain of the Pickering Beck catchment in Newtondale to increase flood storage and reduce flow levels through Pickering to manageable levels.

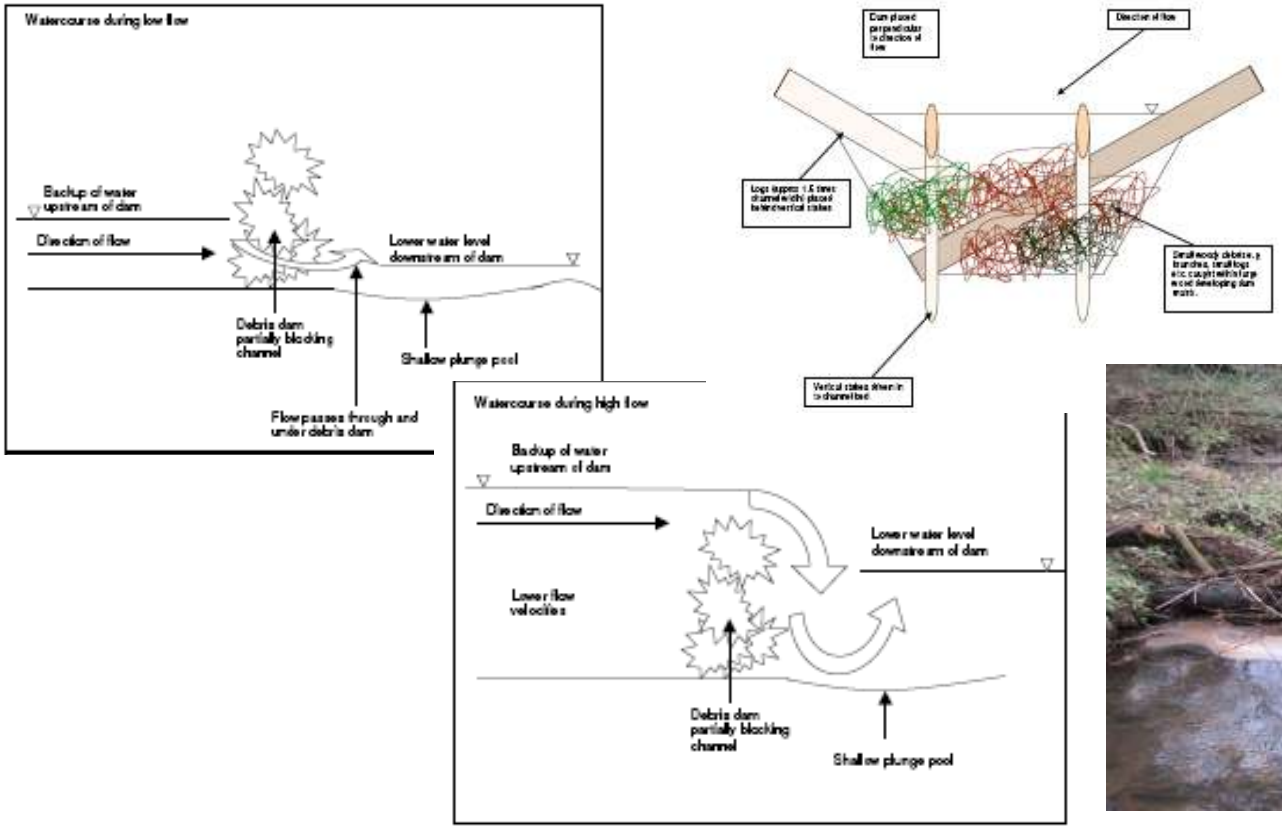


‘Overflow’ hydrological modelling by Durham university enabled the targeted application of measures. Below Catchment map of Pickering Beck showing 17 target CRIM sites which appear to be the most promising for reducing flood peak and flood volume. Out of 96 potential CRIM sites investigated over 2/3rds should NOT be used because the effect is minimal or even negative i.e. flood peak is actually increased.



PROJECT TARGET:

Restore/create up to 100 Large Woody Debris dams in Pickering Beck catchment and 50 in the River Seven catchment.



LWD dams occur naturally within woodland streams and tributaries. The dams we construct will develop over time as more woody debris, vegetation and sediment accumulates in the river system.

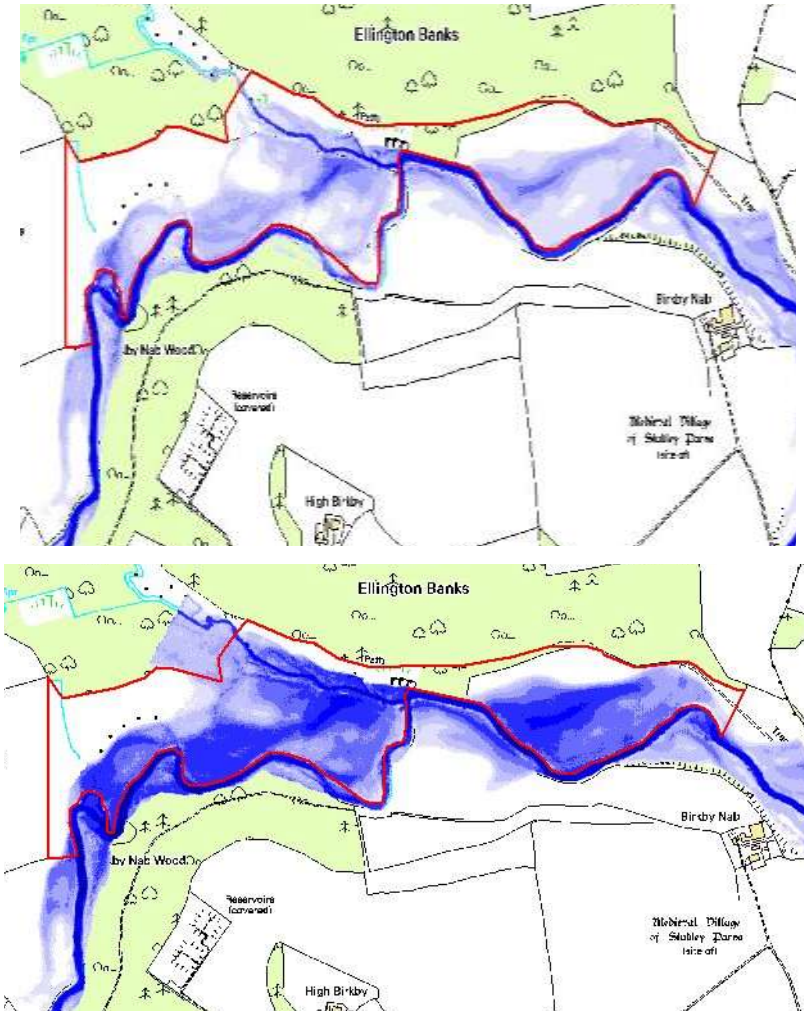
New LWD dams constructed in February 2011 on stream reaches in Pickering Beck catchment.

How can trees reduce flood risk?

- Planting on the floodplains - modelling shows that floodplain woodland can increase flood storage and delay the flood peak

- Planting to reduce erosion modelling in the Dales shows that targeted planting of 5% of catchment could reduce erosion and coarse sediment delivery to rivers by nearly 80%

- Planting to increase infiltration - research in Wales has demonstrated that infiltration rates in woodlands can be 60x higher than for badly compacted agricultural soils



Modelled impact of planting 19.3 ha of floodplain woodland

- Reduction in flood velocity up to 1.8 m s^{-1}
- Mean flood depth predicted to increase by 44 cm within woodland
- Net effect would be to delay arrival of flood peak in Ripon by c.40 minutes.

PROJECT TARGET:

Another round of the Catchment Sensitive Farming capital grant scheme has been announced for 2011 covering the project area. This will include a greater range of complimentary items as detailed below with a higher grant ceiling of £10,000.

A clear solution for farmers

Capital Grant Scheme 2011 Yorkshire Derwent

To help farmers and landowners make improvements to reduce diffuse pollution from agriculture, the Capital Grant Scheme will be open for applications between **1 March and 30 April 2011**. The target area will be the northern part of the catchment **above the A170** and preference will be given to applications from within this target area.

Grants **up to a maximum of £10,000 will be** available to:

- Improve clean and dirty water separation
- Manage run-off and drainage water
- Help reduce sediment contamination of watercourses
- Reduce poaching and improve water provision for livestock
- Roof over manure stores and livestock gathering areas.

Applications containing the following priority items will be given preference.

1. Relocation of field gates.
2. Resurfacing of gateways.
3. Hard bases for livestock drinkers and feeders.
4. Livestock troughs and associated pipework to replace drinking river water.
5. Cross drains in farm tracks.
6. Sediment ponds.
7. Swales and check dams.
8. Roofing manure stores and livestock gathering areas.
9. Livestock and farm machinery tracks.
10. Yard works for clean and dirty water separation*.

*NB. Yards not previously concreted are now eligible and replacement of damaged rainwater goods is now permitted.

If you would like to receive an application pack please contact the CSF Section, Natural England, Block 7, Government Buildings, Chalfont Drive, Nottingham, NG8 3SN **not before 1st March 2011 by telephoning: 0300 060 1111**.

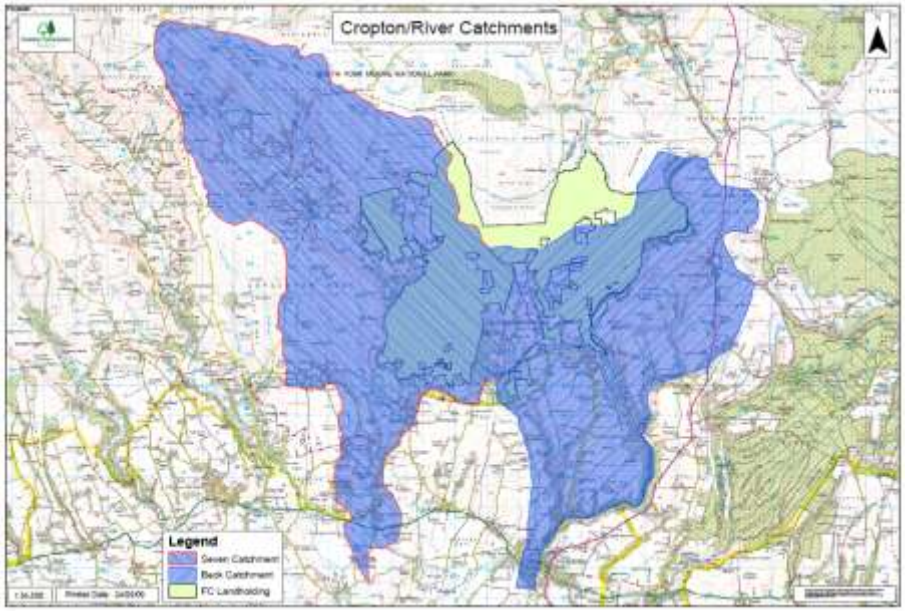
www.defra.gov.uk/farm/environment/water/csf

Applications must be received by 30th April 2011

David Rees Phone: 01904 825806 Mobile: 07795 528905
Catchment Sensitive Farming Officer david.rees@naturalengland.org.uk

Restoration of streamside buffer zones within Cropton

The Forest Design Plan for Cropton was approved in July. In conjunction with the newly revised Forest and Water Guidelines this will enable the operations team in NYM to identify opportunities to slow down peak flows from the public forest estate via drain blocking/realignment and restoration of streamside buffers.



MONITORING:

Installation of Slowing the Flow monitoring equipment completed January 2011

Mini-bund trial River Seven



Forestry Commission England and the Environment Agency are working in partnership to trial an innovative new method of flood risk alleviation as part of the Slowing the Flow project.

The 'mini-bund' trial is based on a concept derived from hydrological modelling from Durham University and supplements the 150 large woody debris dams already under construction in Cropton forest. It involves building two large timber dams across a specifically identified watercourse and its floodplain upstream of Sinnington in Cropton forest in order to temporarily retain flood waters during periods of heavy rainfall. It is hoped that the mini-bunds will help to reduce the flood peak at Sinnington – they will be assessed via the installation of further gauging equipment.

The trial will utilise funding from local levy. This is raised by the Yorkshire Regional Flood Defence Committee from local authorities to meet the cost of schemes which would not otherwise be eligible for national funding. The Regional Flood Defence Committee recognises that flood risk reduction is best delivered alongside or as an integral part of other developments and improvements and is very keen to support projects which, as well as delivering flood risk reduction, also provide wider 'benefits' to communities.

Timber Mini-Bunds

- Cheap build, providing cost-effective flood storage (~£6k/bund: 4-6k m^3 flood storage @ £1/m^3), experienced contractor
- Minor footprint, low/beneficial impact on local habitat, carbon positive, flexible design
- Untested/unknown effectiveness, but expected to work and can be readily modified; may need to strengthen channel outflow
- Short life span: up to 10 years for untreated timber; how fund regular replacement? Ownership, maintenance and liabilities?