Yorkshire & North East England Woodland for Water Project

Phase 1: Opportunity Mapping

Final Report

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Executive Summary

The Yorkshire and North East England Region faces a number of major water issues, with 77,000 properties at high risk of flooding and 73% of river water bodies currently failing to meet Good Ecological Status under by the Water Framework Directive (WFD). A recent review of relevant research provides strong evidence of the ability of woodland creation to mitigate these pressures by reducing and delaying flood waters, limiting pollutant loadings and retaining diffuse pollutants. The main aim of this study was to identify priority rural areas in the region for woodland creation and the improved management of existing woodlands to help reduce downstream flood risk and restore damaged waters. The project boundary was extended to include a small part of the adjacent Anglian Region to complete coverage of the Humber River Basin, although this area is excluded from the calculated statistics presented in the report.

A wide range of spatial datasets were accessed from partners, particularly the Environment Agency, and used to generate a large number of maps and supporting GIS shapefiles showing priority areas suitable for planting. The results provide a strong basis for developing and refining regional objectives, initiatives and projects to deliver new woodlands where they can best contribute to flood risk management (FRM) and meet WFD targets, in addition to generating many other benefits for society. Woodland creation, however, is not without risks and care will be required in planting the right tree in the right place to avoid woodland acting as a pressure on the water environment.

There are extensive opportunities across the region for woodland creation or the improved management of existing woodlands to mitigate downstream flood risk and improve water quality, including:

• 3,466 km^2 (15.3% of region) of priority areas for woodland planting to reduce downstream flood risk, comprising 2,336 km^2 of wider woodland, 505 km^2 of riparian woodland and 625 km^2 of floodplain woodland (Map 18b)

• 3,144 km^2 (13.9% of region) of priority areas for woodland creation to reduce one or more diffuse pollutants (phosphate, nitrate, pesticides and sediment) from agricultural sources (Map 27a)

• 506 km^2 (2.2% of region) of priority land where woodland planting could tackle both flood risk and one or more diffuse agricultural pollution pressures; 62% (313 km^2) of this land is free from all identified sensitivities to woodland planting (Map 28)

• 73.6 ha of priority land where woodland planting could reduce both flood risk and all four identified diffuse agricultural pollution pressures; all of this land is free from sensitivities

• 333 (>100 ha) sub-catchments with >20% conifer forest cover where the scale of felling could potentially increase local flood risk or reduce water quality, including 87 within areas vulnerable to acidification; 18,164 ha of riparian land where conifer woodland remains within 20 m of the river network; and 815 sub-catchments with

>20% forest cover where further conifer planting could potentially pose a risk to future water resources due to the higher water use of trees.

Opportunities for woodland creation to reduce flood risk are greatest within the Yorkshire area, comprising the uplands of the Yorkshire Dales, Southern Pennine Fringe and North York Moors, and the lowlands of the Vales of Mowbray, York and Pickering. Notable locations in the North East include the upper Wear draining the North Pennines and the headwaters and floodplains of the Rivers Coquet and Till draining the Cheviot Hills.

Opportunities to reduce diffuse pollution are also greatest in the Yorkshire area, although in contrast to FRM, are dominated by the lowlands, reflecting the distribution of arable crops and improved grassland. Target areas for reducing one or more diffuse pollutants include the Vales of Mowbray, York and Pickering, and Holderness. Opportunities in the North East mainly lie in the middle and lower Tees catchment and in a number of Northumberland Rivers, including the Wansbeck, Coquet and Till catchments. The greatest scope for multiple water benefits arise in the Vales of Mowbray, York and Pickering, parts of the Yorkshire Dales and Dales Fringe, and in Holderness.
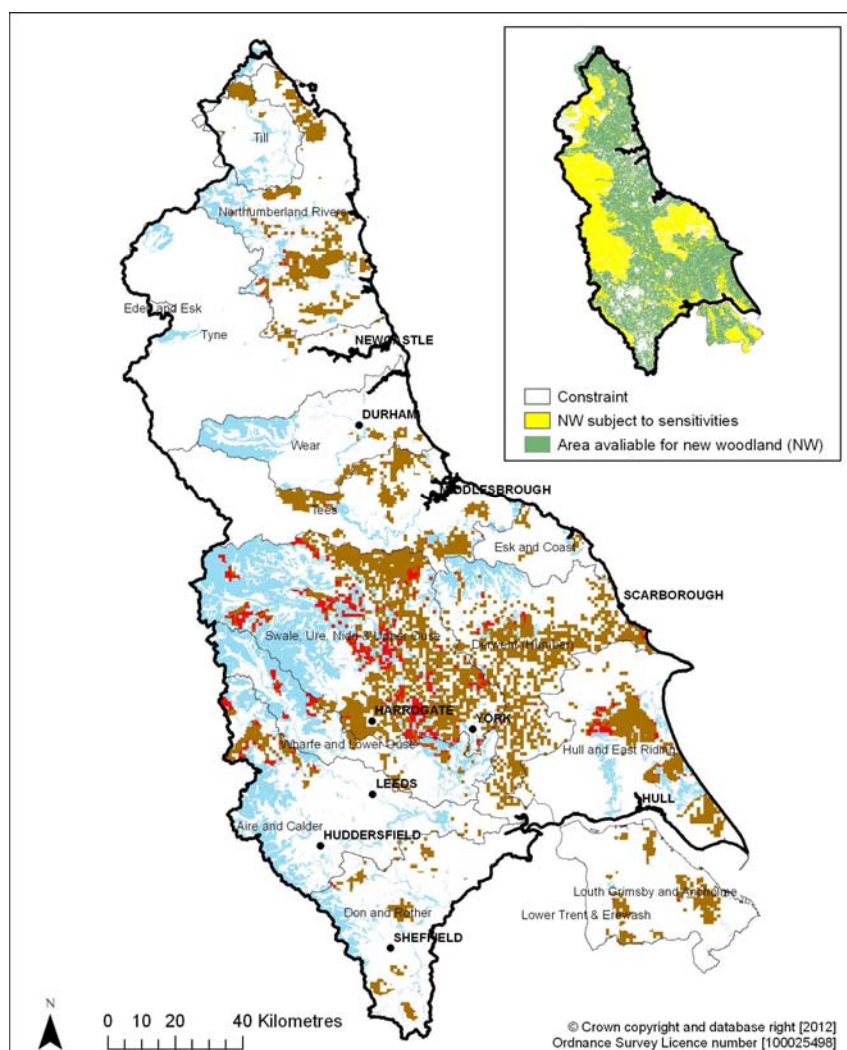
There is a large degree of overlap between the identified priority land for woodland creation and existing regional initiatives designed to promote land use change or improve land management to mitigate flooding and diffuse pollution. This includes Catchment Flood Management Plans and Catchment Sensitive Farming Priority and Strategic Partnership catchments. A significant proportion of the priority land is subject to sensitivities that may restrict the scale and character of any woodland creation.

It is recommended that partners and other regional stakeholders use these maps and spatial data to target locations where woodland planting can provide the greatest benefits to water at the catchment scale. This includes using the identified opportunities to better integrate woodland into existing and new catchment initiatives to improve the chances of success and help secure longer-term performance. There is also significant scope to overlay the maps with woodland functions not specifically addressed in this study, such as slope stabilisation and erosion control, or other woodland values, such as the provision of recreation and health benefits. This approach should help realise optimum benefits from any planting scheme tailored to local circumstances.

Woodland planting is limited by economic and other considerations. In particular, landowners and farmers are likely to be resistant to land use change unless it is economically attractive. While recent progress has been made in raising the value of woodland grants to promote better targeting of woodland creation for water, more will need to be done to achieve the required level of planting to make a difference at the catchment scale. This is especially the case for tackling agricultural diffuse pollution pressures, which tend to be greatest on arable land. While land values and crop prices will greatly constrain woodland creation on such land, small scale planting targeted to riparian buffers and along pollutant pathways could make a significant difference, while having a limited impact on agricultural incomes. There is scope for better integration of

available incentives to secure greater land use change, as well as encouraging water companies to help fund woodland creation for water.
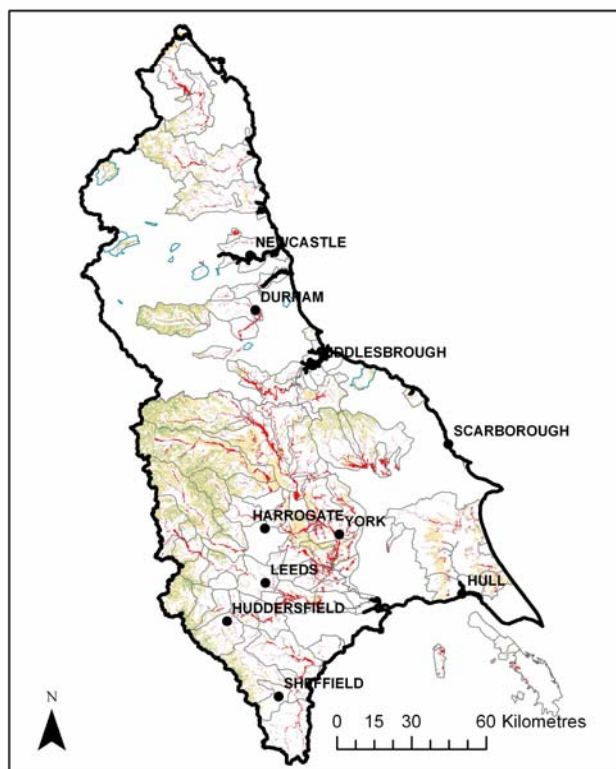
Finally, it is recommended that consideration should be given to establishing one or more sub-catchment studies within the region to demonstrate and help communicate the value and benefits of woodland creation for water. The opportunity maps can be used to guide the location of such a study by targeting an identified priority area where there is significant scope for land use change. The report provides guidance on the design principles for woodland creation to maximise benefits for FRM and WFD.

Map 28 Distribution of priority areas for woodland creation to reduce downstream flood risk in relation to those for reducing one or more diffuse pollutants to surface waters or groundwater
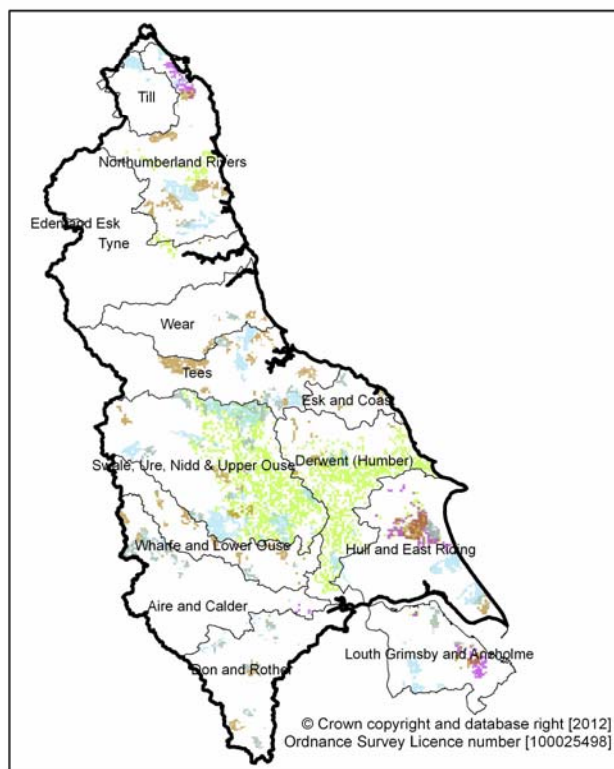
Priority areas for woodland planting
- to reduce downstream flood risk
- to reduce diffuse pollution pressures
- both downstream flood risk and diffuse pollution pressure

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Map 18b: Priority areas for woodland creation to reduce downstream flood risk

- 🟥 floodplain woodland
- 🟩 riparian woodland
- 🟧 woodland in wider catchment
- ⬜ CFMP: policy units 4, 5 or 6
- ⬜ Rapid Responce Catchment within CFMP PU1, 2 & 3

Map 27a: Priority areas for woodland creation to reduce diffuse pollution from agricultural sources

- 🟦 Phosphorus
- 🟫 Sediment
- 🟪 Nitrate
- 🟩 Pesticides

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