**Natural Flood Management – Tree Planting & Woodland Creation Guide**

**Introduction**

Natural Flood Management (NFM) is the phrase given to the measures and techniques used to reduce flood risk. It falls within the theme of Nature Based Solutions (NBS); a multi-benefit approach to eco-system restoration and protection that addresses societal changes and provides improved biodiversity, and well-being for humans. NBS is encompassed by the broader term of Working with Natural Processes (WwNP); a catchment-based approach aimed to safeguard natural water storage capacities within the landscape by restoring or enhancing natural features and characteristics of wetlands, rivers and floodplains, and by increasing soil and landscape water retention.

NFM features should be viewed as ‘ecological infrastructure/natural capital’ that can be used to provide useful ecological services such as flood attenuation. Flood attenuation refers to the storage, spreading out, and slowing down of flood waters, thereby reducing the severity of floods downstream and the potential damage that the floods may cause.

There are a number of possible NFM techniques that could be implemented to reduce the flood risk of an area, which include but not limited to:

* Soil and land management;
	+ Conservation tillage (low or no-plough);
	+ Buffer strips surrounding agricultural lands;
	+ Vegetation and woodland management;
* Drainage line water storage;
	+ Leaky wooden dams;
	+ Permanent or temporary ponds/wetlands;
	+ Wetland scrapes;
	+ Soil bunds
* River restoration; and
* Floodplain re-connection/enhancement.

This guide has been designed to provide projects with some of the necessary details required when considering planting areas of land with trees.

**Trees for Rivers**

There are multiple benefits to planting trees, whether this is block, riparian, or hedgerow planting. Trees can help to slow water flowing across land, and increase infiltration rates, thus holding water in the natural landscape for longer and reducing the risk of flooding downstream.

The right trees planted in the right area can create physical barriers and rougher ground surface compared to cultivated land. This slowing of the flow has the secondary benefit of reducing soil and nutrient erosion as the erosive power is less.

Soil erosion is further reduced as the root systems help stabilise soils. This is most prevalent in riparian woodland; areas alongside watercourses that allow arable or pasture farming to continue in the landscape. Less erosion and diffused pollution leads to healthier rivers with greater biodiversity.

On average, trees uptake 45-60% of available water from the soil through their roots. Some species such as Salix (Willow) are far greater. This enables enhanced infiltration and allows larger volumes of water to be stored in the soil (Forestry Commission).

In addition to the above, the right trees in the right places can provide excellent habitats for a range of wildlife, providing food sources and shelter. Corridors can join islands of existing woodland and connect landscapes together enhancing biodiversity. Trees are commonly known to contribute to improved air quality, carbon sequestration, and increase the resilience to future climate change, however it’s important to acknowledge that this is dependant on site and species selection.

**Site selection & restraints**

In theory, selecting a site to plant trees is easy. Selecting the appropriate trees for the site can be a little more difficult. It’s worth considering what the main purpose of the woodland is going to be and how it will fit naturally into the existing landscape.

Tree species should be suited to the site and this will dependant on soil type, climate, aspect and location. The Forestry Commission have a database to help select the right species [here](http://www.righttrees4cc.org.uk).

When planting on large scales, the most cost effective method is using tree whips. However, this restricts planting to between November and March and there are many factors that can shorten this window. i.e. warm autumn, dry Spring, heavy frost or snow, etc.

Planting bare-rooted tree whips in water logged or frozen ground will almost certainly be detrimental to the whole plantation.

Avoiding overhead services will reduce further maintenance that will be costly.

The Forestry Commission and the Woodland Trust will be able to assist with advice on species selection, consents and permissions required, and funding opportunities.

Locations such as country parks with historic importance, heritage value, SSSI or NNR designations, certain permissions and consents will also be required. Speak to your Local Authority to see what will apply.

**Consents & permissions**

Land owners permission is always required.

Local Authority consent will be required if planting in a public place. This may involve the Council’s Parks team, Heritage team, the Tree team, and maybe even the Planning and/or Commercial Team.

If planting near to water courses then the Environmental Agency and the Local Authority Watercourse team will need to be consulted.

If looking at large scale projects the Woodland Creation Planning Grant covers all of the above as well as the stakeholder consultation.

**Key points to planting**

It is advised by the Forestry Commission to plant tree whips in autumn/ early winter when the soil is still warm but damp. Spring is also good but avoid planting when frost is present as this will reduce the chances of survival.

Spacing should be every 2-2.5m in rows about 1.2-1.5m apart but a more random spacing can create a more natural looking woodland. Varying the densities can also be effective in larger areas.

Recruiting volunteers can drastically reduce the cost of planting, enable the planting to be finished earlier, and engages people from the local community with the project but also together, boosting their own health and wellbeing.

**Maintenance**

Using volunteers can be a very effective way to maintain newly planted trees for the first 2-3 years. A maintenance programme is a useful tool to create and may be required by a funder if a grant was received for the trees. It is far cheaper to maintain trees then replace dead ones.

Weeds around the base of each tree need to be removed and if possible apply a layer of mulch. This will suppress further weeds and reduce competition for nutrients and water for the young trees. It will also allow them to establish faster and require less maintenance in the long term.

If the trees have a stake and guard covering them, make sure these are clear of weeds and the stake is firmly in the ground upright. It is common for them to fall over in strong winds or by other means, but an easy fix that could save the tree. Guards also provide a barrier if using a weed killing spray around the base of each tree. Protection should be maintained for the first 5 years of the trees then removed and recycled if possible.

Under the Countryside Stewardship funding WC1, grants are available to help maintain newly planted woodland.

The Woodland Management Plan (WMP) capital grant is available from the Forestry Commission to help develop objectives and work schedule for the woodland.

**Funding**

There are many different sources of funding for tree planting available. The UK Government website has the most up to date information and opportunities available. In recent years this has expanded with the desire to increase tree cover in the UK.

The Woodland Trust also offer packs of trees throughout each planting season. These are often for free to community groups but they have advisors and funding available a range of projects across the country on larger scales.

Some environmental organisations and charities supply and plant the desired area at no cost. Be cautious that opportunities such as this may be in return for the sale of the carbon credits, something that the project may wish to consider to do itself to help make it financially viable.

*Carbon credits:* When woodland is created, it can be surveyed, assessed, and a certificate issued on the land so the carbon credits can be sold to off-set the carbon emissions by an organisation. There are brokers who deal with the whole process such as Forest Carbon yet it can be done by the project manager. There may be restrictions put on the woodland for a contracted period of time that follow a set of principles outlined in the Kyoto Protocol. However, these don’t restrict the woodland being productive.

*Woodland carbon grant:* There are two grants available depending if the area is within a ‘Standard’ or ‘priority’ area. This can be determined using the [Priority map](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/691642/Woodland_Carbon_Fund_priority_places_map.pdf).

 Standard planting rate - this applies to most proposals and you get 80% of the standard costs for planting and establishment capital items, capped at £6,800 per hectare.

Priority planting rate - this applies to proposals near to urban areas, which give access to the public on foot, and you get 100% of the standard costs for planting and establishment capital items, capped at £8,500 per hectare.

*Woodland creation grant:* Currently the Greater London Authority (GLA) is looking at suitable areas around London for woodland creation.

*For maintenance:* Under the Countryside Stewardship funding WC1, grants are available to help maintain newly planted woodland. The Woodland Management Plan (WMP) capital grant is available from the Forestry Commission to help develop objectives and work schedule for the woodland.

**Links & resources**

Forestry Commission tree selection database

<http://www.righttrees4cc.org.uk>

Forest Carbon – carbon credits

<https://www.forestcarbon.co.uk/>

Woodland Trust – Free trees

<https://www.woodlandtrust.org.uk/plant-trees/free-trees/>

Woodland Trust – Large scale tree planting

<https://www.woodlandtrust.org.uk/plant-trees/large-scale/>

UK Government website for woodland creation funding

<https://www.gov.uk/guidance/create-woodland-overview#woodland-creation-funding-and-grants>

Managing ancient and native woodland in England – Practice Guide

[https://www.forestry.gov.uk/pdf/FCPG201.pdf/$FILE/FCPG201.pdf](https://www.forestry.gov.uk/pdf/FCPG201.pdf/%24FILE/FCPG201.pdf)

Design techniques for forest management planning – Practice Guide [https://www.forestry.gov.uk/PDF/FCPG012.pdf/$FILE/FCPG012.pdf](https://www.forestry.gov.uk/PDF/FCPG012.pdf/%24FILE/FCPG012.pdf)

Catchment Based Partnership

<https://catchmentbasedapproach.org/learn/practical-guidance-for-farmers-natural-flood-management/>

WWF Flood guide

<http://envirodm.org/cms/wp-content/uploads/2017/05/WWF_Flood_Green_Guide.pdf>

FWAG SW Flood Management Information Sheet 3 https://www.fwagsw.org.uk/Handlers/Download.ashx?IDMF=a1435b75-1669-468a-891f-86a6b4d14c7d

SEPA Natural Flood Management Handbook

<https://www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf>