The Northern Forest

Cooling the canopy

Forests in the UK hold around 150 million tonnes of carbon in their biomass and 640 million tonnes of carbon in their soil. Each year they soak up a further 10 million tonnes.[1] As a newly planted forest matures just half a hectare is enough to soak up as much carbon as an average driver generates in an entire lifetime of motoring.

If we increased the north's tree cover significantly, the carbon impact would be profound. If we hit our target of 50 million trees in the Northern Forest, and average around 500 trees per hectare, we'd establish 24,000 hectares of woodland with the potential to absorb up to 60 megatons of carbon dioxide by the time we hit the 2050s.

As humankind strives to keep global temperatures below a 2°C rise, a new Northern Forest could be a fundamental contributor to these efforts. Fifty million more trees planted from Liverpool to Hull could also help to keep our cities and towns cool and shaded, and play a real part in reducing the risk of floods.

Better management of woodland for fuel and timber can also reduce carbon emissions, as wood fuel is carbon-neutral and timber is a sustainable substitute for more carbon-intensive products, such as steel used as a building material.[2]

The Northern Forest is a partnership of:

Manchester City of Trees · heywoods · White Rose Forest · The Mersey Forest more from trees · Woodland Trust

Play it cool, plant a tree

The UK's overall woodland cover stands at just 13% of our land area.[3] By comparison Germany boasts 33%; France has 31%; Italy has 32% and in Sweden, 68% of their land area is forest.[4] If we planted enough new woodland to cover 16% of our land area, it would be enough to absorb 10% of our overall greenhouse gas emissions by 2050.[5]

Worryingly though, we've been planting fewer trees in recent years. Figures for woodland creation in England in 2016/17 stood at just 525 hectares. That's the lowest rate in a generation and just 10% of what we need to achieve, according to the Government's planting targets set in 2013.

A sustained regime of woodland creation across the north of England would play a significant role in locking up carbon in the years ahead. As a strategy for carbon removal, woodland creation offers a great return on investment too. According to the Forestry Commission's Read Report, anything that delivers carbon storage at below £100 per tonne would be considered affordable. Depending upon the type of woodland, the cost per tonne of locking up CO2 through woodland creation ranges from £75 for broadleaf farm woodland to a negative cost – in other words, a positive economic gain – of £50 per tonne for forests producing energy crops.[5]

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A resilient Northern landscape

From over-grazed uplands to our flood-prone towns and cities, trees can help us adapt to climate change as well as reduce carbon emissions. And the need for climate change adaptation is inevitable. Even if we achieve a zero carbon economy later on this century, the gases we've already emitted will remain in the atmosphere for the duration of our lifetimes. In fact, we're already seeing the start of the climate shift in year-on-year hikes in average temperatures and an increasing regularity of extreme weather events.

Trees work in different ways to reduce climate change impacts. First of all they are nature's air conditioning units through the process of evapotranspiration. They also provide shading in the warmer months, help to 'slow the flow', and their roots can help to stabilise soils and reduce runoff.

In short, if you had to design a carbon-absorbing, shade-giving, aesthetically pleasing machine that also reduced flood risk, you'd pretty much come up with a tree.

The benefits have been quantified in several studies. In our towns and cities there is a phenomenon known as the 'heat island' effect, where denser, more built-up districts experience higher temperatures than city outskirts or rural areas.

One study by the University of Manchester found that if Greater Manchester increased its tree cover by 10%, it would neutralise the heat island effect and stabilise temperatures at or below the 1961-1990 baseline average. Conversely, a 10% decrease in urban greening would increase the maximum surface temperature by up to 7°C in high density residential areas.[6]

Green infrastructure lowers temperatures in urban areas significantly. Grassed surfaces in tree shade can be 15-20°C cooler than hot, sun-drenched tarmac[7], and urban parks with dense vegetation are on average 1°C cooler than built-up areas during the day.[8]

Slow the flow, weather the storm

Climate change scenarios for the north of England show a hike in both summer and winter temperatures over the coming century, but they also reveal a change in likely rainfall patterns. Current projections suggest that our summers could be up to 40% drier by the 2080s, while our winters could be up to 30% wetter, particularly in the west of the British Isles.[9]

By the 2080s, intense winter precipitation events (snow as well as rain) that are experienced on average once every two years, may become between 5-20% heavier each time.[10] UK climate predictions are for a five-fold increase in rainfall intensity this century.[11]

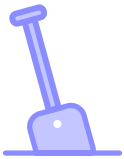
When all that rain hits an over-grazed and treeless landscape, the water runs off, takes some topsoil with it, and can become a flood risk further down the catchment.

The Northern Forest has real potential to help address these problems. Well-designed areas of planting have the potential to 'slow the flow' and reduce flood risk. While hard measures such as flood defences and barriers may well be needed, natural water retention further upstream and holding water in the landscape is an investment worth making too.[12]

Planting 50 million trees across the north will have a significant impact on water management and quality. The rivers of the new Northern Forest drain the conurbations of Liverpool, Manchester, Leeds, Sheffield and Hull with vast catchment of 2,030km^2 for the Mersey, 1,932km^2 for the Aire, 818 km^2 for the Warfe and 1,256 km^2 for the Don.[13]

Along riversides in particular – the 'riparian forest' – planting trees can make a major difference. In one study, restoring riparian forest cover over 20-40% of one catchment area reduced flood peak magnitude by over 19%.[14]

In rural areas, reforestation of previously grazed sheep pasture could increase infiltration of rain into the soil by 67 times, and reduce surface runoff volume by up to 78%.[15] Urban forests could be used to combat surface water flooding; interception by leaves and stems can reduce the amount of rainfall reaching the ground by as much



The best time to plant a tree was a generation ago. The second best time is now.

45%.[16] Grass and tree pits can slow the flow further, reducing runoff by 99% and 60% compared to tarmac.[17]

The secondary benefit is worth noting too – only 22% of water bodies across the north have good ecological health status[18], and rainwater draining from hardstanding carries pollutants including grit, bacteria, oils and detergents, and this is part of the problem.

Green infrastructure intercepts, infiltrates, stores and evaporates rainwater. Runoff can be reduced by 60% by trees compared to hard surfaces and nearly 100% by grassland.[19] And if the water is not held in the landscape for long enough, aquifers may become insufficiently recharged to secure our future water supplies. A hectare of grassland and broadleaved woodland in the UK can evaporate, respectively, 3.4 and 4.0 million litres of water for each precipitation event.

While trees alone can't hold back the floodwaters, they can be part of a smart solution for making a river catchment area less prone to flooding, and they can boost the quality of our water too.

Dig in, make it happen

The best time to plant a tree was a generation ago, but the second best time is now. Climate change represents the most significant danger to the long-term health of global ecosystems as well as our way of life and, currently, efforts to curb our collective carbon emissions are not delivering fast enough.

The time to create a Northern Forest is now.

We can't do this on our own. This is a once in a lifetime opportunity and we need your support.

If you would like to get involved in delivering the Northern Forest – whether as a financial supporter, landowner, partner, or in any other way – please visit thenorthernforest.org.uk

Join us

Footnotes

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