Banking for the future

Planting trees to save rivers

Woodland and rivers: the perfect combination

Trees are proven to help restore our rivers. Woodland planting guarantees results, creates new opportunities and enhances the environment.

Woodland is more than simply foliage and timber; it has a critical role to play in wider water management issues.

Woodlands can help to tackle flooding through both transpiration and reducing the rainfall reaching land. Trees – and their roots – also help to stabilise riverbanks, preventing sediment build up and reducing the need for dredging.

Alongside the riverbanks, woodland can protect other river characteristics: trees create shade, reduce water temperatures and create woody debris for river habitats.

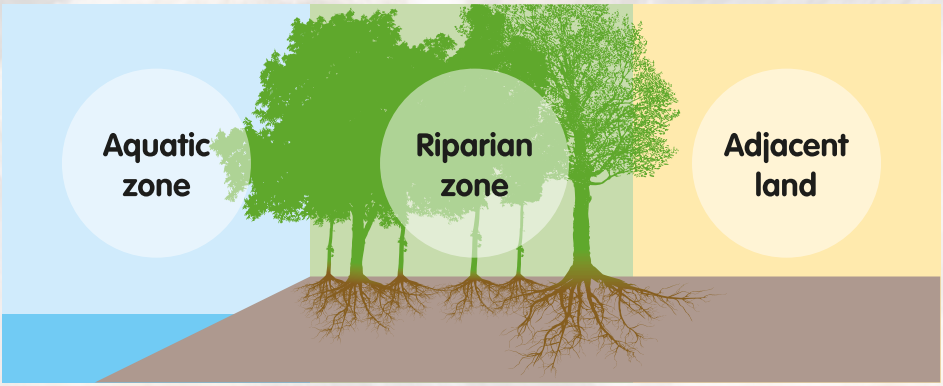
Woodlands also contribute to tackling diffuse pollution, acting as a barrier and helping to trap nutrients and sediment in polluted runoff.

The overarching message is this: where there are rivers, we need trees.

Productive woodland

Productive woodlands can be particularly effective at intercepting and reducing the delivery of diffuse pollutants to water from upslope land. Thanks to modern management practices, productive woodlands can have a hugely positive impact on river restoration. There are also economic benefits in the form of timber, wood fuel and employment, and environmental benefits through carbon sequestration.

The benefits of trees for healthy rivers



Canopy and trunks of trees/shrubs

- Shade moderates water temperature and improves in-stream productivity.
- Source of nutrients (e.g. retained leaf litter, wood, terrestrial invertebrates).
- Uptake of nutrients.
- Coarse woody debris creates habitat and cover for wildlife.
- Trees and woody debris help slow flood flow.
- Improves stream morphology.

Woodland

- Provides shade at stream margins.
- Erosion control, sediment retention and a source of nutrients.
- Uptake of nutrients.
- Habitat for wildlife.

Woodland, shrub and field layer vegetation

- Barrier between stream and adjacent land use.
- Improves soil structure, increasing infiltration and slowing surface runoff leading to uptake of nutrients and retention of sediment.
- Habitat for wildlife, particularly otters.

Tree roots

Stream bank erosion control; provision of thermal refugia and shelter from predators; uptake of nutrients.

The proven benefits of trees for our rivers

Reducing pollution and nutrient loss

Diffuse pollution from agriculture can result in nitrates, faecal indicator organisms, pesticides, phosphates and sediment ending up in our rivers. These can adversely affect aquatic life including fish and insects, as well as encourage the growth of algae.

Woodland cover can be key to stopping pollutants running into nearby rivers by creating a barrier or through interception. In fact, managed woodland has been found to achieve almost complete pesticide retention, preventing harmful pollution from entering our watercourses.

Fish live in trees!

The effectiveness of woodland creation for reducing the delivery of diffuse pollutants from agriculture to water

- Ammonia 50–90%
- Biochemical Oxygen Demand 50–100%
- Faecal Indicator Organisms 50–100%
- Nitrate 50–90%
- Pesticides 60–100%
- Phosphate 70–100%
- Sediment 50–100%

Keeping cool

As global temperatures rise with predicted climate change, temperatures in rivers and streams will do the same. A rise of between 2°C and 4°C may not seem like much but even small changes can have a big impact on river wildlife – salmon and trout are particularly vulnerable. Dappled shade from trees can reduce river temperatures by 2-5°C in summer and helps to maintain healthy rivers and streams.

Managing flood risk

Woodlands are increasingly being recognised for their role in reducing flooding. By taking up water through their roots and slowing the rate of runoff, restoring soil structure and providing filtration, trees can reduce the amount and speed of water reaching our rivers.

With their ability to protect soils and stabilise riverbanks, trees can prevent sediment runoff and reduce the need for dredging. Trees, shrubs and woody debris can slow the flow of water on floodplains in times of flood, thereby delaying flood peaks. As our climate changes, we'll experience more, and heavier, rainfall events – so woodland will be increasingly important in helping to reduce flood risk.

Creating woody debris

Woody debris is an important part of river life. Large Woody Debris (LWD) – branches, roots and entire trees – are essential to stabilise banks, provide habitats by improving stream morphology, and prevent the erosion of riverbeds.

LWD re-establishes washed out gravel beds and creates spawning habitats for trout and salmon. Smaller branches, twigs and leaf litter can also reduce the speed of water flow, reduce flooding, provide habitats for fish and other wildlife such as otters, stabilise river banks and even improve the overall water quality.

The economic benefits

Woodlands can be key to reducing the costs associated with flooding and preventing pollution.

For farmers, the fact that trees can 'lock-in' nutrients in the soil and prevent their runoff, as well as the ability of woodland to act as a windbreak and reduce sediment loss, makes for more favourable growing conditions. For farmers keeping livestock, the shade that woodland provides will become increasingly important for the welfare of their animals as we experience more extreme weather associated with a changing climate.

The trees planted also provide a new source of income from timber or wood fuel. The UK currently imports around 75% of its timber and calls for homegrown supplies are increasing. As well as income from timber, improving water conditions and temperatures for fish could open up opportunities for anglers and a source of income from licences.

In fact, more resilient rivers and streams have the potential to offer all round tourism opportunities, as people are looking for beautiful escapes in the natural environment.

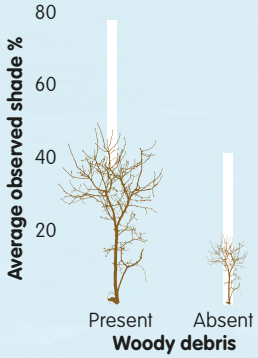
The reasons for considering woodland creation for river restoration are clear, and will become more important in the future.

Financial incentives

Woods for Water grants of up to £6,800 per hectare, plus an annual grant of £200/ha, are available in high priority target areas through Countryside Stewardship.

Evidence from Cu

Relationship between woody debris presence and shade



Restoration in action

There are many examples of woodland planting to protect and restore rivers right across the UK.

In the north west, the Lune Rivers Trust and Ribble Rivers Trust have been targeting priority sites for woodland planting and habitat improvement schemes to tackle diffuse pollution, increase shade and reduce the risk of downstream flooding. With help from volunteers and organisations, including the Woodland Trust, they have planted over 100,000 trees along their banks in projects that are guaranteed to improve the health of their rivers. The scheme has been so successful that both Trusts have a waiting list of farmers who want to work with them to plant trees on their land.

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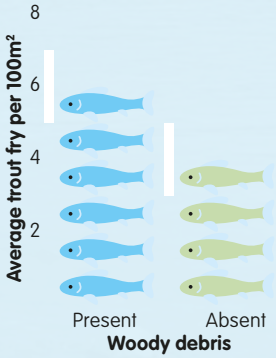
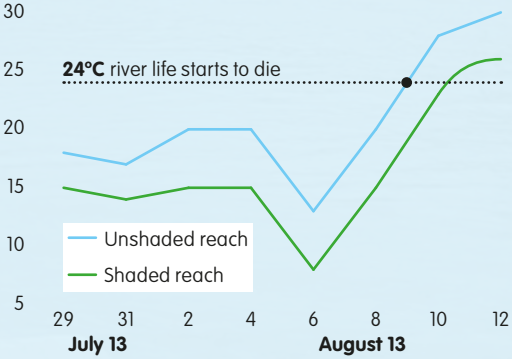
Woody debris influence on trout fry abundance in the Ribble catchment 2012



Trees helping to keep rivers cool



Want to know more?

If you would like to find out more about the benefits of woodland planting for river restoration please get in touch with your **local rivers trust**:

Ribble Rivers Trust www.ribbletrust.org.uk
Eden Rivers Trust www.edenriverstrust.org.uk
Lune Rivers Trust www.luneriverstrust.org.uk
South Cumbria Rivers Trust www.scrt.co.uk
West Cumbria Rivers Trust www.westcumbriariverstrust.org

or:

James Bickley, Partnership Adviser
Forestry Commission England: North West & West Midlands
Ghyll Mount, Gillan Way, Penrith 40 Business Park, Penrith,
Cumbria, CA11 9BP.

References

Forest Research (2011): Woodland for Water: Woodland measures for meeting Water Framework Directive objectives.

Environment Agency (2012): Keeping Rivers Cool: Getting ready for climate change by creating riparian shade.

ConFor (2014): The Role of Productive Woodlands in Water Management.

Mott, N. (2006): Managing Woody Debris in Rivers, Streams & Floodplains. Staffordshire Wildlife Trust, Stafford, UK.

Carter, V. (2014): Catching the Flood. Chartered Forester, Spring 2014.

Ribble Rivers Trust
Eden Rivers Trust
Lune Rivers Trust
SCRT South Cumbria Rivers Trust
West Cumbria Rivers Trust
Forestry Commission England
Woodland Trust
Grown in Britain
Environment Agency
Natural England
Cumbria Woodlands — Working together to make our woods prosper
Morecambe Bay Local Nature Partnership