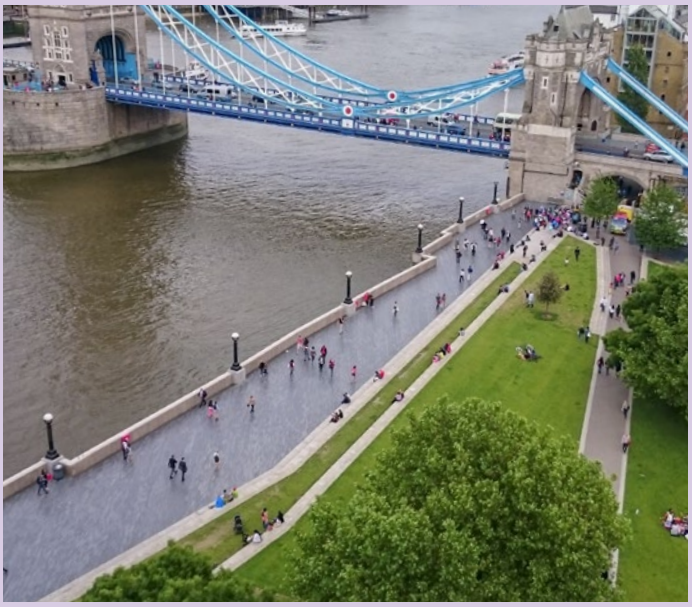
Forest Research

Valuing and governing tree and forest ecosystem services in Great Britain

This summary outlines the key results and messages from a research programme that provides new insights into how to recognise and understand the value of ecosystem services (the goods and benefits) provided by trees and forests. This work aims to inform policy-makers and practitioners, helping them make decisions about tree and forest management in urban and rural areas.

The programme is being delivered by Forest Research, with guidance from representatives from across Great Britain.



Background

There is increasing evidence that trees and forests provide multiple ecosystem services to society. However, there are challenges to understanding and eliciting the benefits gained from these services and their underlying value, and bringing them together into a format useful to policy makers and practitioners.

This programme uses new and innovative approaches to help determine these services and benefits and show how they can contribute to important government objectives such as health, education, wellbeing, civic action, biodiversity, water management and economic regeneration.

Increasingly, these services and benefits are being identified in urban and peri-urban areas and are becoming recognised by large populations within society. Understanding how these benefits affect different groups, including the public and land managers, is important for land use and land management decision-making processes. This awareness can contribute to the design of interventions and approaches that support and help people to access and care for trees and forests; likewise, it can support land managers to create and manage woodlands for a range of ecosystem services.

This programme has three main research objectives:

1. valuing tree and forest ecosystem services;
2. mechanisms to deliver tree and forest ecosystem services;
3. changes in tree and forest ecosystem service values.

Key results and messages

1. Valuing tree and forest ecosystem services

Our research explores the value of different tree and forest ecosystem services and uses innovative methods to identify and capture those values. We expand on just three of these below, but you can learn more about the wider range of research on our website.

Cultural ecosystem services

- Seven high-level, cultural ecosystem benefits have been identified from 56 studies across different European countries: health, learning, social connections, connections to nature, sensory benefits, cultural and symbolic, and economic.
- Shared values bring a new perspective to forest management decision making. These are values that people hold as a group, community or as a society, and are different from individual values.
- Self-reported mental health and wellbeing benefits can be gained through creative, social and woodland craft-based activity programmes for those with drug, alcohol, autism or mental health problems.
- The Active Forest Programme supported 1.2 million sporting visits to 14 forest sites between April 2018 and March 2019. The four key benefits of the programme for participants are physical wellbeing, fun and enjoyment, mental wellbeing, and a feeling of escape and freedom. Since April 2019, 18 forest sites are now delivering the programme.

School children taking part in a yoga session in Delamere Forest.

Ecosystem services associated with urban forestry

- We have defined 'Urban forest ecosystem services' as a separate classification. It reveals the importance of tree management, location, proximity to people, land use and ownership to the delivery of benefits, as well as whether trees are isolated or in a group. This is helpful in informing urban forest planning and management.

Urban trees providing shade, colour and shape within a civic space, Hackney, London.

- Forest Research has led or partnered in 20 i-Tree Eco projects to reveal variation in urban forest composition in the UK. i-Tree Eco is a tool to assess the composition, structure and economic value of the benefits provided by urban forests. It is used worldwide and has been specially configured by Forest Research and partners for use in the UK.
- The first evaluation of the impact of UK i-Tree Eco projects has shown that they improve understanding and awareness of urban forests, can influence policy and can lead to increases in resources available for urban trees.
- We have developed a framework for informing urban forest sustainability assessments. We applied it to 12 British cities and, drawing on their i-Tree Eco data, it revealed sustainability could be improved due to a lack of diversity in tree size and species range in 10 and 12 of the cities, respectively.

Regulating ecosystem services linked to water and forest management

- The first study on flood-risk reduction benefits of the UK woodland estate estimated a value of approximately £6.5 billion per year (£2,600 per ha) based upon a replacement cost approach. A review of evidence on water quality improvement associated with planting trees found that creation of woodland buffers reduced nitrate concentrations by over 70% on average in oceanic climates such as the UK's. The strength of the effect is strongly related to the width of the buffer.

2. Mechanisms to deliver tree and forest ecosystem services

Our research explores mechanisms for delivering tree and forest ecosystem services and examines land managers' perspectives in relation to mechanisms.

Land managers discussing forest planning.

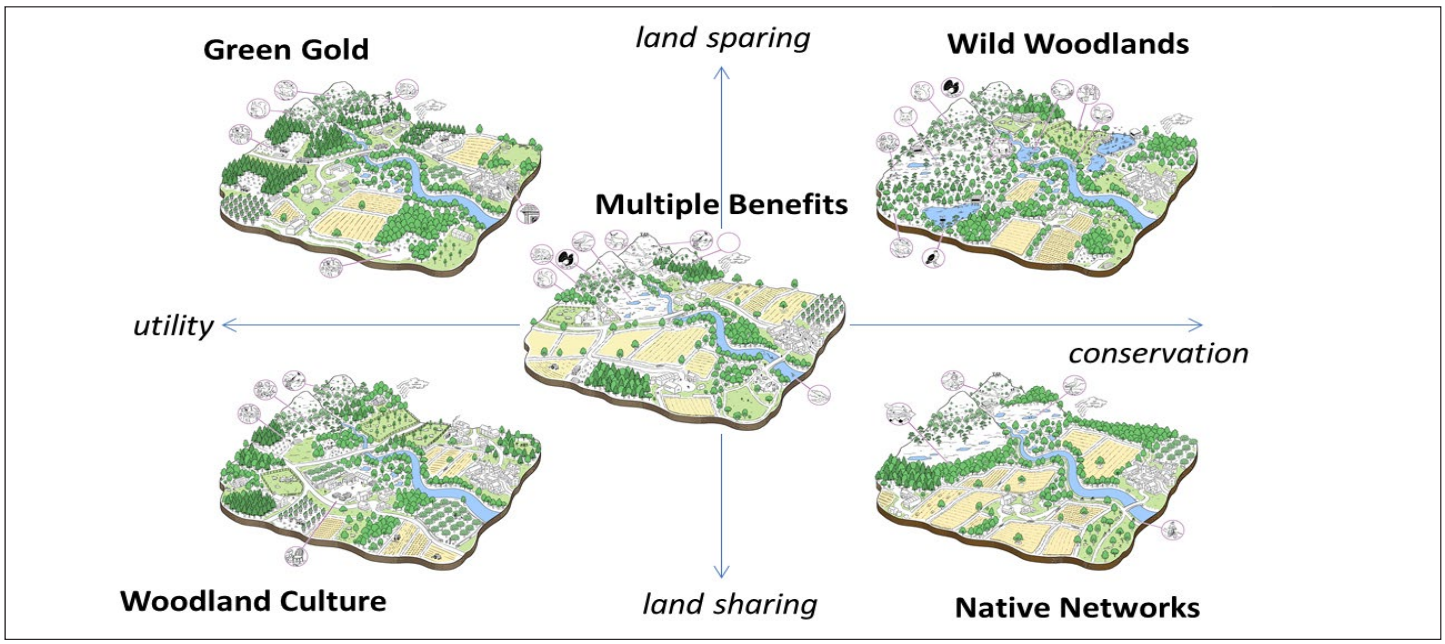
Land manager perceptions and behaviours

- We held in-depth interviews with 44 land managers and identified important networks related to: (i) place, (ii) management and associated institutions, and (iii) social and personal identity. Land manager networks aid learning and knowledge sharing and are important routes to generate interest and traction for changes or new initiatives affecting forestry.
- These interviews showed that many land managers are not familiar with the term 'ecosystem services' or the concept of payments for ecosystem services (PES). However, they do often recognise that their woodlands can provide a range of benefits to society. Policy makers need to pay attention to creating accessible descriptions of these terms.
- Community woodland groups play an important role in helping to deliver tree and forest ecosystem services and benefits.

Payments for ecosystem services

- A survey of Southampton citizens found they were willing to pay an additional amount for a tree planting scheme. The estimated 'willingness to pay' per household, per year, for air quality improvement was £6 to £10 per avoided death, and £2 to £9 for stormwater attenuation per 100 fewer properties at risk. For a scheme involving planting 14,000 trees that would increase the city's tree cover from 18.5% currently to around 20%, the results suggest households would be willing to pay an additional £140 per year, equivalent to an 8% increase in Council tax for the average property.
- An EU-funded research network (PESFOR-W) is currently gathering evidence across its 40 member countries on the use of woodlands to intercept and reduce pollution from agriculture reaching watercourses, and of woodlands for water payments for ecosystem service schemes. Examples include the creation of 'water forests' in Denmark, which aim to protect drinking water quality and are partly funded by the simultaneous provision of timber and recreation benefits. Likewise, there is a payment scheme in Italy for a range of benefits from planting trees, including increased infiltration for groundwater recharge.

Tree planting around three boreholes to improve and protect the groundwater supply for a small town in Denmark as part of a PESFOR-W scheme.



Courtesy Vanessa Burton

Visions for woodland expansion in Scotland.

3. Changes in tree and forest ecosystem service values

Future options

- Stakeholder analysis was used to develop five visions (or options) for woodland expansion in Scotland, based on different priorities. The visions each had a particular focus (see diagram above): Green Gold (productive woodland), Wild Woodlands (naturally regenerating native woodland), Native Networks (native, semi-natural woodland), Woodland Culture (community empowered management) and Multiple Benefits (right tree in the right place). Working in this way can help support more joined-up and effective approaches to land use planning.
- Applying forest simulation tools to model the UK National Ecosystem Assessment scenarios at multiple scales can help land managers anticipate how future changes may affect the delivery of the goods and benefits from woodlands.
- We developed a novel dashboard interface to help forest managers explore options and visualise the impact of changing management and species choice in different forest zones where objectives (timber production, recreation, wetlands and a native woodland transition) had been prioritised to support the development of the next land management plan.

Cost effectiveness

- Several climate change adaptation options (for example, using different tree species) are being explored to show where replanting with an alternative species is cost-effective.
- Surveys on the expected costs and benefits of introducing practices to limit introduction and spread of phytophthoras suggest that often measures are not considered cost-effective from the nursery's perspective, limiting the potential for relying on a voluntary certification scheme to increase uptake by the sector.

Further information

This summary was compiled in October 2019 and outlines the results so far from a broad range of research projects, however this work is ongoing. Our website lists further details from the individual projects that form this research programme – visit **www.forestresearch.gov.uk/valuingtrees** for more information.

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