

## Valuing ecosystem services provided by the urban trees of Bridgend County Borough

Urban forests provide a range of services, often termed ecosystem services, that help alleviate problems associated with urbanisation. Trees improve local air quality, capture carbon, reduce flooding and cool urban environments. They provide habitat for animals, and can improve social cohesion in communities. In summer 2014, Forest Research worked in partnership with Natural Resources Wales and Bridgend County Borough Council to complete a survey of urban trees in Bridgend County Borough, using i-Tree Eco, to quantify and value a range of these ecosystem services.



The ecosystem services provided by urban trees in Bridgend County Borough are valued at £950,000 per year

### Background

Urban trees benefit people who live and work in towns and cities by providing a range of ecosystem services and these can be valued using models like i-Tree Eco, developed by the USDA's Forest Service. The i-Tree Eco study in Bridgend County Borough focussed on the ecosystem services of carbon capture, rainwater interception, the removal of air pollution, habitat provision and building's energy use. The threat to trees posed by pests and diseases, such as Chalara ash dieback, and the cost to replace the Borough's trees if they were lost was also calculated.

### Objectives

This research aimed to:

- identify tree location, species, sizes and health,
- calculate the ecosystem services they provide,
- determine the distribution of trees across land-use types and the extent of land available to plant more trees,
- value the trees as a community asset, and
- assess the risks posed by pests and diseases to ecosystem service delivery by the trees.

The study provides the essential baseline data required to inform management and policy making in support of the long term health and future of the urban forest of Bridgend County Borough.

### Methods

A survey of 199 random plots was undertaken across Bridgend, Maesteg, Pyle, Porthcawl and Pencoed. Information on 766 trees was recorded, including species, height and canopy spread, as well as details on the location - such as land use and ground cover. The cost of replacing trees if they were lost was calculated using tree valuation methods published by the Council of Tree and Landscape Appraisers and the London Tree Officers Association. Data analysis was conducted in the US by Davey Tree using i-Tree Eco v5.



### Findings – Bridgend County Borough’s urban forest:

- o has over **439,000 trees**, resulting in an average **urban tree density of 99 trees per hectare**, this is above existing estimates for other areas in the UK
- o has a **12% urban tree cover**, equal to an area of 533 ha. The trees were primarily found in **parks**, on **residential land** and on **vacant land**
- o has a **low proportion of large trees** compared to previous i-Tree Eco studies conducted in the UK, and would benefit from more medium and large sized trees
- o includes **60 tree and shrub** species, recorded across 12 land use categories. **Ash, hawthorn** and **goat willow** are the most commonly encountered species.

### Findings – The trees in Bridgend County Borough:

- o intercept an estimated **124 million litres of water** every year, equivalent to an estimated **£163,790** in sewerage charges avoided
- o remove an estimated **61 tonnes of airborne pollutants** each year, worth more than **£326,000** in damage costs
- o remove an estimated **2,080 tonnes of carbon** from the atmosphere each year, this amount of carbon is estimated to be **worth £461,400**
- o store an estimated **53,500 tonnes of carbon**, estimated to be **worth £12.1 million**.

### Findings - Threats and Opportunities:

- o Chalara dieback of ash and *Phytophthora kernoviae* pose significant threats to the current urban forest; both are present in S Wales and each could affect >10% of Bridgend CB’s tree population
  - o The cost of replacing all the Borough’s trees is estimated at £142 million; this rises to **£686 million** if valuation is based on visual amenity and replacement on a like-for-like basis
  - o A further 27% of urban land in the Borough could be planted with trees or shrubs.
- +

### Recommendations

This study demonstrates the value that urban trees provide for all who live in, work in and visit Bridgend County Borough. Tree canopy cover, at 12%, is low compared to the Welsh average (17%). With 27% of Bridgend CB’s urban land assessed as suitable for planting with trees, canopy cover could be significantly increased. This would enhance the overall benefit that the urban forest provides to society. Trees capable of attaining large stature, such as limes, oaks and pines, provide more ecosystem services per tree and species choices should reflect this. Three species were very common, each making up more than 10% of the population. Planting a wider variety of species would decrease the risk of the urban forest succumbing to pests and diseases. Trees on private land provide a valuable contribution to the overall urban forest of Bridgend CB, representing approximately 55% of the total tree population. A repeat i-Tree Eco survey is recommended every 5-10 years to support the long-term management of Bridgend CB urban forest.

#### Partners

Forest Research, Bridgend County Borough Council, Natural Resources Wales

#### Funding/Support

Funded by Bridgend County Borough Council and Natural Resources Wales

For further information contact: [kieron.doick@forestry.gsi.gov.uk](mailto:kieron.doick@forestry.gsi.gov.uk)  
Land Regeneration and Urban Greenspace Group, Forest Research  
[www.forestry.gov.uk/fr/itree](http://www.forestry.gov.uk/fr/itree)  
or  
[urbantrees@naturalresourceswales.gov.uk](mailto:urbantrees@naturalresourceswales.gov.uk)