



Chalara in Non-Woodland Situations

Findings from a 2014 Study

Undertaken by The Tree Council on behalf of Defra

Appendix 2: **Non-woodland ash data**

February 2015

1 Summary

In this appendix the Tree Council has compiled the data on non-woodland ash¹ that was located during 2014. Direct quotes from the original research papers are in italics. Bold type is used by The Tree Council to draw attention to key facts. There are also Tree Council estimates or extrapolations from the data in some sections. The following bullets are what The Tree Council considers the main findings:

- It is extremely difficult to provide a reliable estimate for the number of trees of a particular species in the UK due to the lack of a systematic approach to collecting this data.
- This report tries to bring together evidence from a wide range of sources of diverse quality resulting in significant uncertainties (caused by inconsistent definitions of trees, double-counting, extrapolations between regions, etc.). Therefore, the figures quoted in this report should be regarded as an indication of the number of non-woodland ash trees rather than a precise estimate.
- Our estimates suggest that in the **countryside**:
 - There are **17 - 34 million ash trees** (with a stem diameter at breast height (dbh) of 4 cm) **in small (<0.5ha) woodlands** in the UK, plus over 400 million smaller ash seedlings and saplings.
 - Ash is the second most abundant tree species in small woodland (<0.5ha) in GB after Oak.
 - There are an estimated **5.4 - 19.7 million ash** in in 98,900 km **of ash-dominated hedgerows** in the UK.
 - There are also an estimated **1.2 - 2.3 million individual ash trees in the countryside outside of woodlands**
- In the **urban environment**:
 - we estimate that there are an estimated **3.6 - 4 million urban ash trees in the UK** (4.1% of the 89 million urban trees).
 - A sample of a limited number of cities suggests that there is considerable variation between cities in both the absolute and relative number of ash trees.
- Regarding **transportation corridors**:
 - The Highways Agency estimated that there are **at least 4 million ash trees next to their road Network**.
 - Network Rail estimated that there are **400,000 ash trees** with a stem dbh of 15 cm **adjacent to the rail network**.

¹ For the purposes of this report 'non-woodland ash' is defined as ash trees that fall outside the scope of the Forestry Commission's National Forest Inventory for woodlands larger than 0.5ha.

2. Ash in Small Woodlands

For the purpose of this report, the definition of non-woodland ash includes areas of woodland that are less than 0.5ha in size. However, as the only data source on ash in smaller woodlands, a Centre for Ecology and Hydrology (CEH) report using the 2007 Countryside Survey data, provides an estimate of the *area* of ash, we will have to rely on other data sources on ash densities to obtain an estimate of the *number* of ash trees. We have two data sources at our disposal to estimate the density of ash in woodlands: the National Forest Inventory (NFI), which considers woodlands greater than 0.5ha and the National Inventory of Woodland and Trees. We will discuss each of these reports in more detail below.

2.1 National Forest Inventory

2.1.1 Main finding

There are on average **887 ash trees per hectare** in woodlands greater than 0.5ha plus 10,500 seedlings and saplings of ash per hectare of private sector woodland.

2.1.2 Details

Ash numbers in larger (>0.5ha) woodlands are presented in the National Forest Inventory (NFI), '2011 preliminary estimates of broadleaved species in British woodlands'. ([See full report](#)). In this Forestry Commission report, a tree is considered to be anything with a stem diameter at breast height (dbh) of greater than 4cm.

The NFI report gives a figure of **125.9 million ash trees** (with a standard error of 4%) **in British woodlands greater than 0.5ha**, of which 98.7 million are in England, 10.7 million in Scotland and 16.5 million in Wales. The ash woodland area is **142 thousand hectares** (with a standard error of 4%). This data therefore suggests that there is **an average of about 887 ash trees per hectare**.

The NFI also states that there are an additional **1.439 billion seedlings** (with a standard error of 8%) **and 0.199 billion saplings** (with a standard error of 13%) **of ash in 138 thousand hectares of private sector ash-dominated woodland**. From this, we calculated the average density of seedlings and saplings to be approximately 10,500 per hectare.

2.2 National Inventory of Woodland and Trees England - 2001

2.2.1 Main finding

There are an average number of **444 ash trees per hectare** in small woods and linear features of ash habitat in England.

2.2.2 Details

The National Inventory of Woodland and Trees - England was published by the Forestry Commission and launched on the 21 November 2001 by Forestry Minister Elliot Morley at a Tree Council event to mark the start of National Tree Week that year.

This report provides an analysis of the trees and woods of England for which data was collected on Small Woodlands (0.10– <2.00 ha), Linear Features, Groups and Individual Trees and states that there are 9.229 million ash trees outside woodlands which can be categorized into 1,057,000 boundary trees; 140,000 middle trees; 2,636,000 ash in groups plus 5,394,000 in narrow linear features. Honing in on small woodlands and wide linear features only, this results in 3,833 trees in an area of 8,632 ha of small woodlands and wide linear features. Using these data, we calculated the average density to be 444 ash trees per hectare in smaller English woodlands and wide linear features which is lower than the 887 ash trees per hectare derived from the National Forest Inventory for larger woodland areas across the whole UK.

2.3 Ash in smaller woodlands

2.3.1 Main finding

There are an estimated **17-34 million ash trees (with a stem dbh of 4cm)** in woodlands with an area less than 0.5ha in the UK, plus over 400 million smaller ash trees.

2.3.2 Details

A report was produced in 2013 by the Centre for Ecology and Hydrology (CEH) from the Countryside Survey 2007 data ([see report](#)). In this report a tree is considered to be anything with a stem diameter at breast height (dbh) of greater than 3cm. This report showed that:

- ash is the second most abundant tree species in small woodland patches (<0.5ha) in GB after oak;
- the estimated area of ash in broadleaved woodlands less than 0.5ha in size across the UK is 38,510ha (lower confidence limit of 28,850 – upper confidence limit of 48,170ha);
- the estimated area of ash in broadleaved woodlands less than 0.5ha in size in England is 32,070ha (lower confidence limit of 22,790 – upper confidence limit of 41,350ha).

If ash grows in smaller woodlands at the same average density as in the Forestry Commission 2011 statistics across the UK (887 ash trees per hectare, 10,500 seedlings and saplings per hectare), this would mean approximately **34 million trees** (26 million in 28,850 ha to 43 million in 48,170 ha). If ash grows in smaller woodlands at the lower average density shown in the Forestry Commission 2001 statistics across England (444 ash trees per hectare), this would mean approximately **17 million trees** in England (lower confidence limit of 13 million– upper confidence limit of 21 million).

Based on the 38,510 ha of ash in broadleaved woodlands and the NFI density of seedlings and saplings, we estimate an additional **400 million seedlings and saplings** in small woodland patches.

NB: It should be noted that there is a significant difference between the 8,632 hectares of ash woodland in England (Small Woodlands (0.10– <2.00 ha) & Wide Linear Features) reported in the Forestry Commission 2001 England report and the 38,070 ha of ash woodland below 0.5 hectares in area reported by CEH from the Countryside Survey 2007 data.

2.4 Ash in the countryside

2.4.1 Main finding

There are an estimated 5.4 - 19.7 million ash in hedgerows in 98,900 km of ash-dominated hedge in the UK. There are also an estimated 1.2 - 2.36 million individual ash trees (outside of woodland) in the countryside and ash is the second most common species of individual tree

2.4.2 Details

Two data sources are available to estimate the number of ash trees in the countryside. The 2001 National Inventory of Woodland and Trees England (2.2.2) suggests that there are 5,394,000 ash trees in narrow linear features² and 1,198,000 individual live ash trees.

The CEH report (2.3.2) suggests that:

- *ash is the most common hedgerow tree species (i.e. species growing as a full standard as part of a hedgerow)*
- *the estimated length of woody linear features (hedgerows and lines of trees) composed of ash is 98,900km (61,453 miles) across GB with most of this (86,100 km – 53,500 miles) found in England*
- *there are estimated to be 2.2 million individual ash trees (outside of woodland) in the countryside and ash is the second most common species of individual tree (lower confidence limit of 2,049,303 – upper confidence limit 2,367,123).*

To estimate the numbers of individual ash trees in hedges, The Tree Council held meetings with 21 individuals from the national expert group for hedges called Hedgelinek (www.hedgelinek.org.uk) who collectively arrived at an estimate of one ash tree every 5 metres in these ash-dominated hedgerows. **This estimate would therefore suggest a hedgerow ash population of 19,700,000 in these ash-dominated hedges**, across the UK and 17,220,000 in England (Tree Council estimate).

It must be noted that this number does not include any ash trees that are growing in the estimated 715,100 km of other hedge types in the UK, recorded in the Countryside Survey 2007 for which estimating an average number of trees/ km was considered by Hedgelinek to be unachievable with current data sets. Therefore, if it is considered necessary to generate an accurate number of ash trees in the UK's hedges, further primary research will be necessary.

3 Ash trees in towns and cities

A wide range of data sources on ash trees in towns and cities is available, highlighting the regional variation in ash density. In the next sections, we will discuss the only national data source to obtain an estimate for the number of ash trees in the urban environment and present various local initiatives.

3.1 Trees in Towns II

3.1.1 Main findings

Based on the Trees in Towns data there are an estimated **3.6 - 4 million urban ash trees in the UK**.

3.1.2 Details

In 2004 the Office of the Deputy Prime Minister (ODPM) commissioned Trees in Towns II, a new National Survey of England's urban trees and their management, which built upon the original Trees in Towns survey that was undertaken for the Department of the Environment in 1992/93 ([see full report](#)).

The Trees in Towns II report, published in 2008, is still the most complete national survey of our urban treescape. As part of the study, trees were surveyed in 147 English towns and cities including 10 London boroughs. The main findings were that:

- *the average density of trees and shrubs was 58.4 per hectare; common ash (*Fraxinus excelsior*) was amongst the six most frequently recorded species (4.1%);*
- *ash trees were recorded in similar numbers in all regions, and occurred more frequently in open space areas than in any other land use class;*

² A narrow linear feature is defined as a feature with a length of 25 m or more and less than 16 m wide which is at least four times as long as it is broad.

- common ash showed no significant regional differences in tree density. However, the mean tree density in open space areas (5.4 / ha) was greater than in any other land use class;
- low density residential areas and open space had the highest proportions of ash trees in the older age classes (50-100 and 100+ years), with 20% and 24% respectively. The most even age distribution of ash trees was recorded in open space areas. This land use class had the highest proportions of trees in the upper two (50-100 and 100+ years) and lower two (0-5 and 5-10 years) age groups. In the other five land use classes, approximately 70-80% of all ash trees were estimated to be between 10 and 50-years-old, but in open space plots only 31% of trees fell into this age range. In industrial areas, some 96% of ash were between 5 and 50-years-old.

Based on the Trees in Towns II study, Johnston (2008) estimated that there were 89 million urban trees in the UK. If 4.1% of these trees are ash this suggest that there are **3.6 million urban ash trees**.

Using the average trees per hectare (58.4) from the Trees in Town study and the area of the UK that is urban (1,675,000 hectares) from the [National Ecosystem Assessment](#) we can obtain an alternative estimate of the number of urban trees (97,820,000). If 4.1% of these are ash, this would be **4,010,000 ash trees**.

3.2 Regional Studies

3.2.1 Ash trees in London

A 1993 report published by the Countryside Commission and called 'Action for London's Trees' showed that:

- there were approximately 6,000,000 trees in the 33 Greater London Authorities;
- of the 6 million trees, 3.5% were ash. This suggests that, at that time, there were an estimated 210,000 ash trees in London;
- of the trees and hedges in London, 69% are privately owned;
- approximately one third of publicly owned trees in London are along highways – more than any other category of public land.

Extrapolating from these figures, approximately 65,000 of the 210,000 ash trees were in public management (1,970 per local authority). Of these, 21,483 were on the London highway, 651 trees per authority.

3.2.2 Ash trees in Torbay

During 2011 an I-Tree¹ investigation was undertaken in Torbay to estimate the value of the ecosystem services of the urban forest (see full report) provided by trees with a dbh of 2.5 cm or more. The results of this study indicate that the ash was more prevalent in Torbay (94,776 ash trees, **11.6% of the total number of trees**) than in other urban areas (4.1% on average in the UK according Trees in Towns data).

3.2.3 Ash trees in Edinburgh

During 2011 an I-Tree³¹ investigation was undertaken in Edinburgh to estimate the value of the ecosystem services of the urban forest (see full report). Information was recorded about trees with a trunk girth over 7cm dbh. The result show that **ash represents 5.8% of the tree cover** – an estimated 34,800 trees.

3.2.4 Ash trees in Wrexham

A survey of Wrexham County Boroughs trees to value a number of ecosystem services was undertaken in summer 2013 with the aid of i-Tree Eco, used for the first time in Wales. The results show that ash represents 4.8% of the tree cover in Wrexham – an estimated 17,472 trees.

3.2.5 Ash trees in Glasgow

During 2014 an I-Tree¹ investigation was undertaken in Glasgow to estimate the value of the ecosystem

³ I-Tree developed by the USDA Forest Service provides urban forestry analysis tools <http://www.itreetools.org>

services of the urban forest (see full report). Information was recorded about trees with a trunk girth over 7cm dbh. The analysis suggests that **ash represents 12.7% of the tree cover** in the city, the species also providing 13% of the leaf surface area. This represents an estimated 254,000 ash trees in the city.

3.2.6 Ancient ash trees in Wokingham

In 2011 a survey was undertaken of the ancient and veteran trees in the town of Wokingham. The survey discovered that 3% of the veteran trees were ash. These ancient [ash] trees grow in what remains of the extensive network of field hedges and copses that existed when the town was an agricultural centre. Many more will exist that have not been recorded as the survey mostly focused on trees with a girth of more than 3m and only the English oak and ash are likely to grow to this size.

3.2.7 Ash trees in Kent

A Kent survey (pers. comm.), showed that there are 20,000 Kent County Council owned and maintained ash street trees. Their 2013 survey (pers. comms.) suggested that there may be as many as 500,000 ash trees on private and unregistered land adjacent to the public highway in Kent.

As part of this survey 2km square tetrads on, or adjacent to, publicly accessible land including highways, public rights of way and public open spaces were compared according to land use (suburban/urban edge, managed agricultural landscape and a heavily wooded landscape with some urbanized and managed agricultural land). The number of trees recorded showed that per tetrad, there were:

- 2574 ash trees in the urban area
- 422 in the agricultural landscape
- 523 in the wooded landscape.

This data suggests that there are 4–5 times the number of ash trees in the sampled urban edge area compared to the wider countryside. Ash is also the most widespread tree species found in Kent, with records from 930 of the county's 1,043 tetrads.

3.2.8 Ash trees in Devon

A second detailed survey of trees in Devon (pers. comms) during 2014, estimates that there are 447,639 ash trees growing adjacent to the highway in the county, with 6999 trees growing in Devon's schools and other County Council corporate sites.

3.3 Ash records on the Ancient Tree Initiative (ATI) database

The Ancient Tree Inventory is a project that has compiled a database of ancient and special trees. The project began in 2004 as a joint venture between the Tree Register of the British Isles, the Ancient Tree Forum and the Woodland Trust. There are 9591 ash tree records in the Ancient Tree Initiative database, 6.75% of all the records, an internationally significant population of ancient ash trees. Of these:

- 930 are classified as ancient trees with 10 having a girth of more than 8 metres.
- 6073 are classified as veteran trees.
- 2046 are classified as notable – of which over 1056 trees have a girth greater than 3.41m i.e. 1m dbh. These are very significant landscape trees and future veterans.
- 542 unverified trees, lost ancient, veteran or notable trees and other heritage trees.
- Two counties have significant numbers of ash recorded in the database: Gloucestershire – 937 and Cumbria – 1186.

4 Ash trees in transportation corridors

4.1 Main transport corridors

The Highways Agency (pers. comm.) estimate that there are at least 4,000,000 ash trees planted or growing alongside their managed road network. Over the last 20 years, 45% of the forest trees planted by the Agency has been ash, of which up to 15% was sourced from abroad. Estimates for highway ash trees managed by local authorities are scarce. The majority (72%) of local authorities surveyed within this study have not undertaken such a specific species survey.

Network Rail (pers. comm.) data set show the estimated proportion of each tree species on the rail network; ash making up about 16% of the trees on railway land (20% England and Wales; 12% Scotland). Approximate tree counts suggest that there are in the order of 400,000 ash trees with a diameter above 15cm dbh: numbers below this size criterion are unknown.