

Chapter 6

Ancient and other trees of special interest: indicators of old growth biodiversity and heritage

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Introduction

“10 000 oaks of 200 years are no substitute for one 500 year old oak”

Oliver Rackham

Despite ancient trees being among the longest lived and some of the largest organisms on the earth, many UK ecologists are only beginning to catch up with understanding their significance to biodiversity and heritage. As trees age, usually from maturity onwards, they provide different habitats for a host of species from different Kingdoms that are not found on younger trees:

- The heart- or ripe-wood decays and the trees become hollow,
- Columns of dysfunctional sapwood develop,
- Stag-headed dead wood occurs in the crown,
- Decaying wood breaks off and falls to the ground,
- The bark ages and its pH changes and
- The roots age and hollow.

Tree populations are constantly aging and it is important that the habitats they provide are adequately replenished. One break in the timeline may result in extinction of species locally and even nationally.

The aging trees and their decaying wood habitat together with the associated, specialist decay and mycorrhizal fungi, lichens and invertebrate species is known as old growth. The Convention on Biological Diversity (CBD) defines old growth as stands in primary or secondary forests that have developed the structures and species normally associated with old primary woodland of that type that have sufficiently accumulated to act as a woodland ecosystem distinct from any younger age class (Alexander et al., 2003) (Figure 6.1).

Some Swedish research looked at the habitat requirements for hermit beetle *Osmoderma eremita* and found that a minimum area of 57 ha, containing 160 hollowing oak trees, is necessary to sustain this species

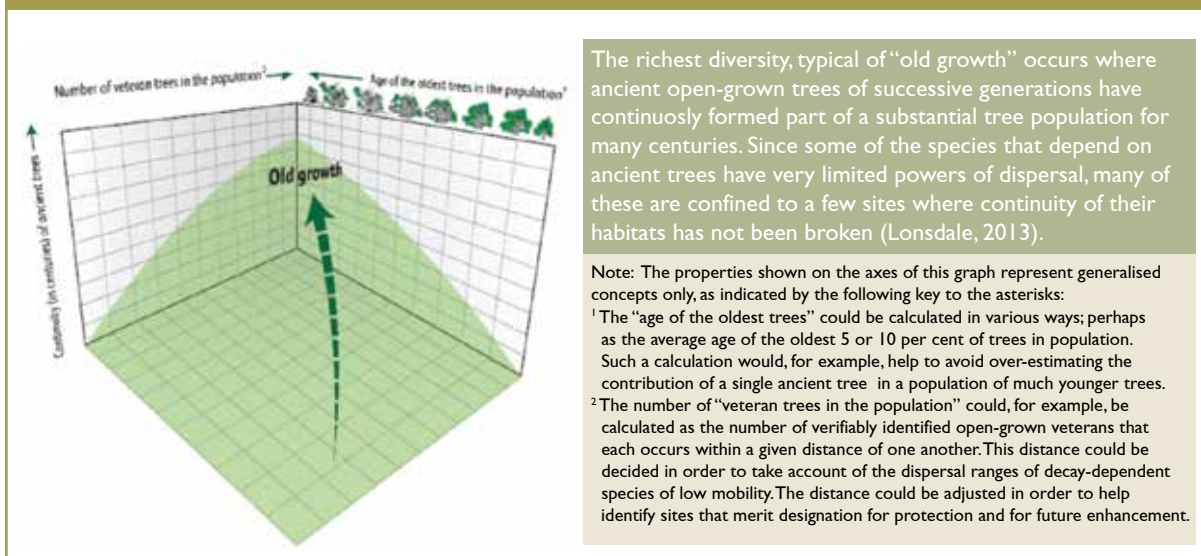
but that for more demanding species the minimum area would be 954 ha, including 2,670 hollowing oaks.

For old growth to be fully expressed, a proportion of the trees must be allowed to grow full crowns which can retrench or ‘grow downwards’ in the latter stages of their long lives especially if the species are very light demanding such as pine or oak. An open crowned tree provides habitat that is not found in closed canopy forest such as large lower horizontal limbs in various light conditions depending on their orientation to the sun. Also, if too closely spaced, the aging trees are overtopped as their crowns retrench and are out competed especially in the presence of more shade tolerant trees especially hornbeam and beech. Old growth stands in the UK usually have a very wide diversity of tree and shrub species across the whole range of light demanding to shade tolerant. They also have a long history of grazing and look like parkland with scattered open crowned trees – the open forest hypothesis (Vera, 2000). In the UK the rich habitats in which old growth species have survived are usually not on the UK Ancient Woodland Inventories which represents woods comprising young trees in a coppice or plantation structure. In the UK, stands of old trees and their associated specialist species are commonly found in historic landscapes such as:

- Remnants of mediaeval Royal Hunting Forests – places such as Windsor Great Park and Forest and Sherwood Forest with a wide diversity of native species principally oak, beech, birch, alder, sweet chestnut and lime plus shrubs providing nectar such as hawthorn standing in pastures and heath.
- Caledonian forest – characteristically widely spaced granny pines with birch, alder, rowan and juniper standing in bilberry and moor.
- Mediaeval deer parks – oak with many other species of tree with more recent non-native ancient and veteran trees of great value in grassland but in recent years sometimes converted to arable.
- Ancient hedgerows, old commons and wood pastures

A conceptual representation of current knowledge about habitat quality in relation to tree age and tree population size

Figure 6.1



of pollards of a wide variety of native species including oak, beech, ash, hornbeam, alder, holly, rowan.

Unfortunately, few sites retain the grazing conditions that are characteristic of the best old growth areas such as the New Forest where commoning still provides traditional mixed grazing by large herbivores - ponies, cattle and pigs as well as wild deer and rodents. Many old growth Forests are being lost to secondary tree establishment, especially of shade tolerant species, that are suffocating the old trees or have been subject to arable or grazing intensification with serious consequences for the trees.

Old growth stands are not recognised on any inventory in the UK, even as wood pasture or parkland. Up until recent times parkland old growth has been labelled rather apologetically as a ‘cultural’ or rather man-made habitat and not a semi-natural one and its value has been severely diminished. Although at its best could be said to be the closest to the wildwood before man had a significant impact. By comparison with woodland, there is often for old growth sites documented historical evidence back to Anglo Saxon times i.e. hundreds of years prior to 1600 the cut-off year off date for the Ancient Woodland Inventory. The result is that in planning and landscape scale strategies it is all too easy for old growth or landscapes rich in ancient and veteran trees to be invisible to non-specialists and overlooked.

What are ancient and other trees of special interest (TSI)?

“The man of science and of taste will discover beauties in a tree which the others would condemn for its decay.... Sometimes he will discover an aged thorn or maple at

the foot of a venerable oak; these he will respect, not only for their antiquity, being perhaps coeval with the father of the forest, but knowing the importance of the oak is comparatively increased by the neighbouring situation of these subordinate objects”

Humphry Repton, 1806

The Ancient Tree Forum, an NGO established in the 1990s, grew from the increasing awareness of the role of these trees for biodiversity. They have been the leaders in the UK in defining what distinguishes ancient, veteran and notable trees.

Ancient trees are defined by their age and are trees in the third and last stage of three stages of development - young, mature, ancient. Veteran trees are those trees of any age which exhibit important decaying wood habitat – hollow or hollowing trunks or branches, decaying wood in the crown or already fallen to the ground, crevices or flaking bark. All ancient trees are also veteran trees but not all veteran trees are ancient. Notable trees are those that are large girthed, mature trees by comparison with trees of the same species, but are not old enough to be considered ancient nor exhibiting veteran characteristics. They are still valuable as the generation of trees that will soon have veteran features or become ancient. Traditional pollards will often have deceptively smaller girths than a similar aged maiden tree but because of past management are likely to be rich in veteran characteristic habitat. All ancient or veteran trees are important including non-native trees. There are other categories of special interest such as champion, rare or other heritage trees, where these trees do not also have characteristics of ancient, veteran or notable trees, their records are kept by the Tree Register of the British Isles (www.treeregister.org) (Figure 6.2).

Diagram to indicate the way different categories of tree value relate to one another

Figure 6.2

Collectively these trees are called Trees of Special Interest (TSI) (Woodland Trust, 2008).



Additional information on the features and values of trees of special interest is provided in “Ancient Tree Guide no 4: What are ancient veteran and other trees of special interest “ and also “Ancient and other veteran trees: further guidance on management“ (Lonsdale, 2013).

Mapping ancient and other trees of special interest - the Ancient Tree Hunt

During the Veteran Tree Initiative (1996-2000), a UK wide awareness raising project led by English Nature (now Natural England) with other partners including the Ancient Tree Forum, many organisations were inspired to undertake veteran tree surveys. These varied in scope and depth – some involved detailed site surveys based on the Specialist Survey Methodology (Fay, 2003) by professional surveyors, others covered larger administrative areas and were often citizen science based, gathering only basic information about the trees and their location. All of the surveys demonstrated the growing need to do something tangible like mapping and recording trees as part of the process of conserving them.

The Woodland Trust in partnership with the Ancient Tree Forum and the Tree Register of the British Isles went on after the end of the Veteran Tree Initiative to develop the Ancient Tree Hunt (ATH). The aim of the ATH was to inspire more ordinary people in mapping the most valuable trees in the UK landscape and that the process of collection would inspire owners, government agencies and authorities at national and local level, NGOs, communities and individuals to take action to secure their future (no further avoidable loss) and to establish new trees so that this heritage could be taken forward into the future.

Outcomes from Ancient Tree Hunt

At the end of December 2012, a British, European citizen added a 112,000th hand-picked, special tree to the growing UK Ancient Tree Hunt database. Thousands of people have so far participated by contributing their favourite tree record. Dedicated recorders continue to explore the length and breadth of the British countryside to seek out and capture the vital statistics of the UK’s most special trees, take long lasting ‘fixed point’ images of their find and upload the information to the live database, mostly in the hope that this action will raise awareness of the value of each and every remarkable tree to the landscape and help to secure its future. On average 20,000 tree records are added each year and the likelihood is that there are so many trees of great interest yet to find in the UK that the process could continue for the next decade if the capacity can be maintained to embrace this level of engagement.

Each record is a special tree that by its shape and presence speak to us from out of the past, is a living ecological encyclopaedia and a grand master in its own right. They are keystone historic and ecological structures playing unique and exceptional roles that are not provided by younger trees (Figure 6.3).

The Ancient Tree Hunt has been a success especially from a citizen science perspective in terms of direct engagement of the public and wider public relations awareness raising (Table 6.1).

One of the priorities for the project was to develop a team of trained volunteers who could review data added by the general public and amend it where necessary to ensure that the data collected was as robust as possible.

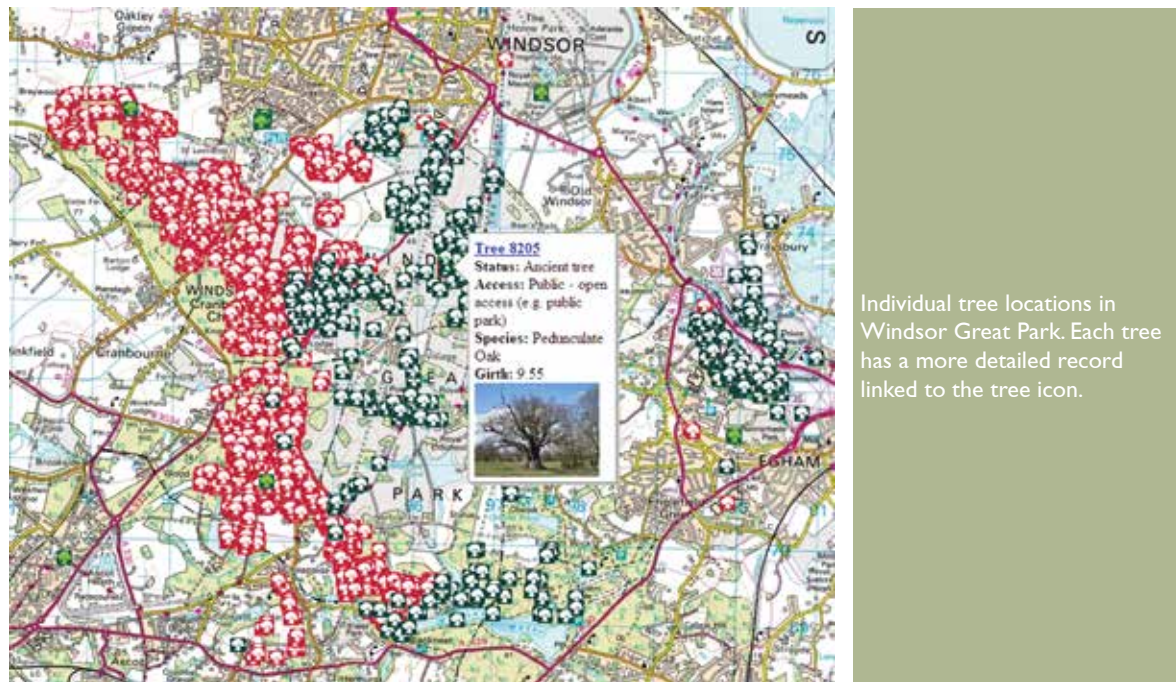
Targets and actual outcomes for the first five years of the Ancient Tree Hunt Project 2006-2011

Table 6.1

Objectives	Target	Actual
National and regional partnerships	15	100
Website visitor sessions	600,000	1,000,000
Audience Reach	95,000,000	300,000,000
Training events	126	240
Trained recorders from events	1890	3000
Public events	150	530
Participants on events	2250	77,570
Tree records on the map	100,000	100,199
Observations including images	50,000	62,700
Active volunteer verifiers	15	130
Numbers of people actively participating	40,195	70,000
Curriculum-based resources for schools		15, 583

A screen capture from the Ancient Tree Hunt map

Figure 6.3



In addition

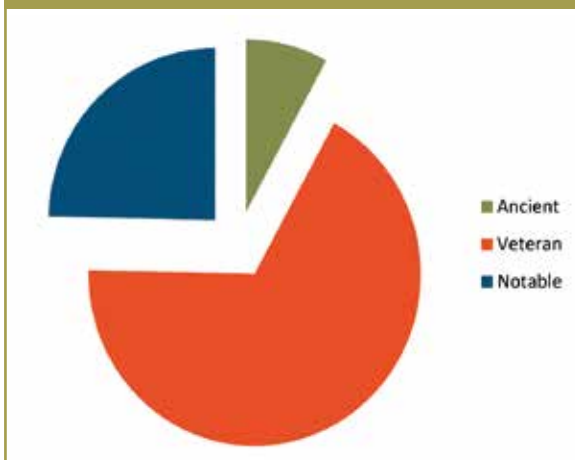
- 1,000 local and national champion trees were recorded
- 68 per cent of all trees recorded were verified as being ancient or veteran (Figure 6.4)
- 61,000 individual photos were uploaded
- 19,000 trees were recorded as pollards - an historic form of tree management
- 45,000 of the trees recorded were oak
- The top five tree species recorded were: Oak (*Quercus robur* and *Quercus petraea*), Beech (*Fagus sylvatica*), Ash (*Fraxinus excelsior*), Sweet chestnut (*Castanea sativa*), Yew (*Taxus baccata*)

At the end of 2012, 103,642 trees (approximately 75%) had been verified largely by 130 active volunteer verifiers. Trees that are unverified are marked by a different symbol on the map.

The original English Nature (later Natural England) document from the Veteran Trees Initiative states: “..a rule of thumb is that most trees over 1m dbh are potentially interesting, the majority of trees over 1.5m are valuable, and all native trees over 2m dbh are truly ancient.” (Figure 6.5).

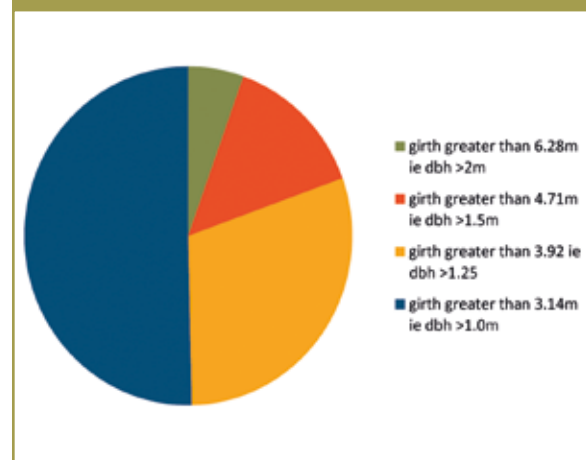
Pie chart showing the proportions of different categories of trees recorded by the ATH

Figure 6.4



Pie chart showing the proportions of trees categorised due to their girth and diameter recorded by the ATH

Figure 6.5



Old growth hot spots

One of the primary outcomes of the ATH project has been to use the results to help identify important concentrations of trees i.e. potential old growth hotspots around which to focus landscape scale action.

An analysis of the data took place in August 2011 when there were approximately 100,000 records on the database. The results only provide a provisional assessment of the resource as the dataset is still incomplete. Expert qualitative assessment of the UK TSI trees suggests that the database may at present contain 20% of the ancient, veteran and large diameter (greater than 1.5m dbh) trees – ie the most individual, special and valuable trees in the UK landscape. The Specialist Survey Method Review (Fay, 2003) from English Nature estimated that there were 9 million trees with dead wood habitat value in British Isles.

The analysis was based on a Joint Nature Conservation Council protocol (JNCC 2006) to be used in the assessment of nationally important Sites of Special Scientific Interest for biodiversity. The protocol is based on priority criteria which are the numbers of ancient and veteran trees and trees with a dbh greater than 1.5m (Table 6.2).

The development and refinement of this protocol benefits the identification of valuable old growth sites. The trees used are large and permanent and are therefore very simple to record and a one off record lasts for the lifetime of the tree. This is a very straightforward exercise compared with detailed surveys most commonly for rare invertebrates or lichens and very occasionally for important fungi.

The protocol should be considered provisional as it has yet to be properly tested against a significant number of sites of known biodiversity value. There are also issues related to the thresholds. For example the requirement for a significant number of trees to have large diameters favours those sites with trees, such as oak and beech, that may grow to a large size in the lowlands. The cut off point between a high and other value sites should be more graded. A site may have 14 ancient, 99 veteran and 14 large diameter trees and be categorised as medium quality and yet would be only two trees different from a high value site. In addition the protocol does not allow for a mix of categories. In the examples below an intermediate category, orange, which lies between high and medium, has been identified for sites with 1-2 primary field measures in the high category but not all three.

Analysis of the data was undertaken initially on 125m, 250m and 500m radii around the trees see Figure 6.6.

At a more local level the individual trees that make up the collection can be seen. As the hotspot is built up by connectivity between the trees, its shape does not follow ownership, geographical or political boundaries. Both of these factors encourage wider landscape scale consideration (Figure 6.7).

Protection

A red hotspot should be considered equivalent to a Special Area of Conservation (also known as a Natura 2000 site in other European countries). However the EU Habitats Directive does not contain a description that matches the UK, parkland, old growth habitat on Annex 1. Nor does Annex 2 contain any lichens or fungi and only a limited range of saproxylic beetles - the primary species which should be used to confirm primary, old growth habitat. Even many old growth National Nature Reserves cannot be designated as SACs as a consequence. In the absence of adequate recognition in EU legislation, perhaps another more appropriate landscape designation such as Biosphere Reserve should be used or a new one created such as Important Tree Area to match Important Bird Areas.

Many of the high value concentrations of ancient and other veteran trees in the UK lack any national or local protection. It is well known that the wood pasture and parkland (or old growth) priority habitat is poorly recognised in the suite of sites designated as Sites of Special Scientific Interest or Special Areas of Conservation despite this new evidence.

Conclusions

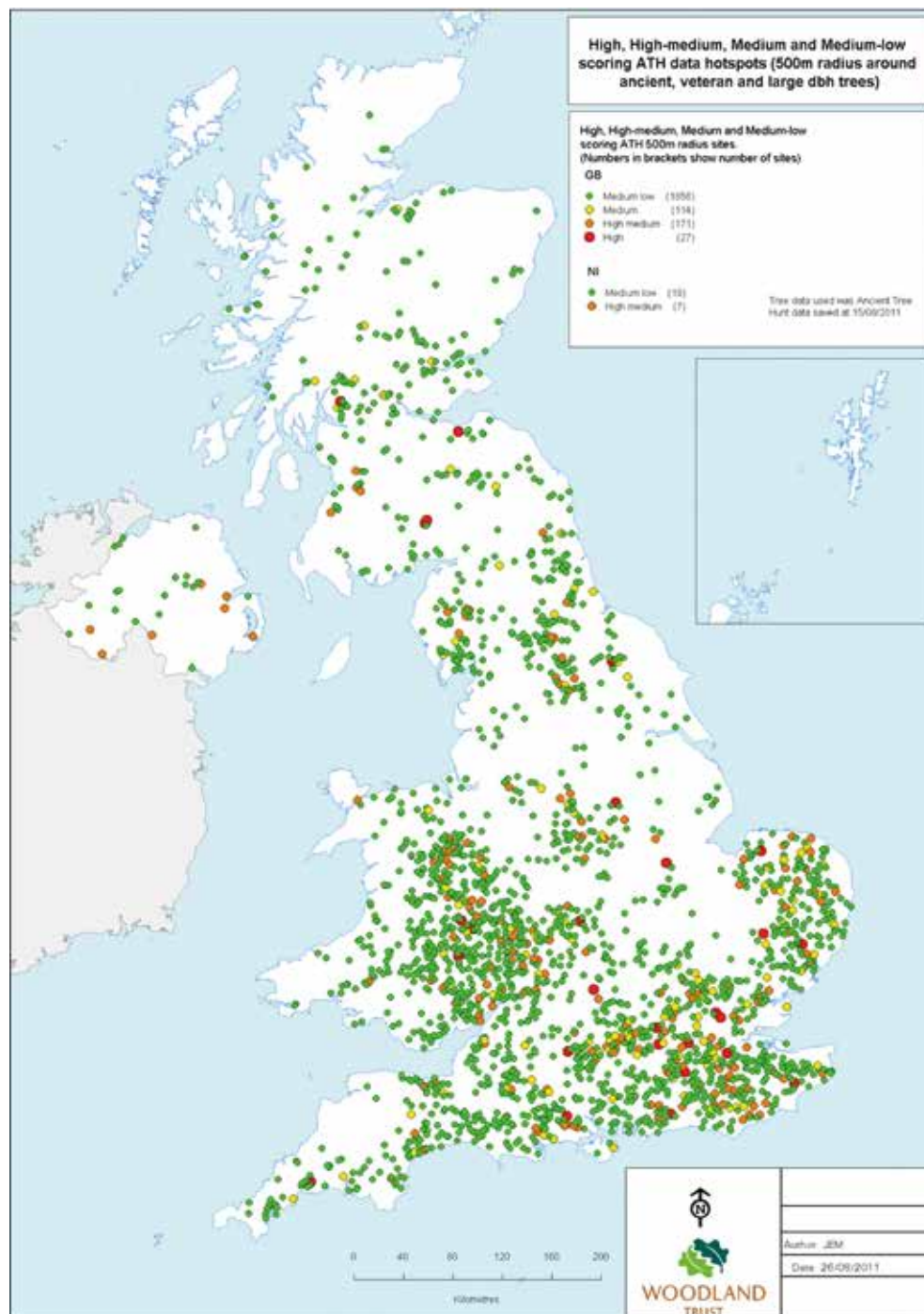
The quality of the tree records on the Ancient Tree Hunt is remarkable and demonstrates the value of citizen science projects. The majority of the trees recorded are completely new to the experts and some outstanding 'finds' have been captured. The project has mapped thousands of ancient trees - the most valuable trees in the UK landscape. These hand-picked trees go to show that the UK has landscapes rich in special trees that we should value above all others because of their age, size or condition. The UK benefits from this Natural Capital of fat, old and decaying trees.

The numbers of ancient and veteran trees and trees with a dbh greater than 1.5m			
Area Quality Value			
Primary field measure	High	Medium	Low
No Ancient Trees	15+	1 to 14	0
No Veteran Trees	100+	11 to 99	3 to 10
No trees with dbh >1.5m	15+	6 to 14	2 to 5

Table
6.2

Map showing locations of high to medium value, hotspot collections of trees in the UK

Figure 6.6



Results from data analysis of 100,000 tree records August 2011.

Finding and recording trees has helped them to be better recognised, as individuals, as hotspots and as part of landscapes. The process of collection has inspired owners, government agencies and authorities at national and local level, NGOs, communities and individuals to seek ways to safeguard their futures.

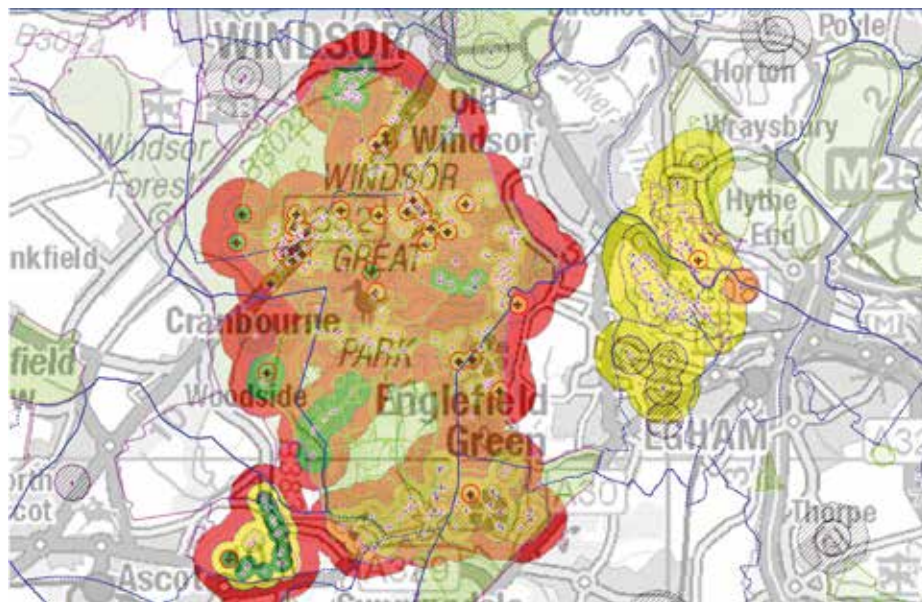
The analysis of the data indicates the places in the UK with some of the best old growth stands although absence of data is not evidence that no old growth is present – further tree record collection should be continued as it is

of such biodiversity value. Other types of analysis should be considered such as kernel density analysis. This may better indicate the hottest locations and zones of value radiating from them.

The majority of TSIs in the UK face unprecedented threats similar to those across the world. Recent research provides shocking evidence of massive declines of some of the largest organisms on earth (Lindenmayer et al., 2012). Losses are primarily due to intentional removal, new pests and diseases, root compaction and

Spatial analysis of the data at a local level

Figure 6.7



Windsor Great Park and Runnymede Protection

damage especially from agricultural intensification, competition and removal due forestry intensification and fire. However the biggest danger is that the loss is iterative and cumulative – one tree here, another there, so it is remarkably difficult to see the overall picture until very late in the day. If such trees are lost and populations continue to collapse, as predicted, with them will also disappear the ecological, historic and landscape roles of these keystone structures that cannot be provided by younger trees.

The Woodland Trust and Ancient Tree Forum campaign for it to be a national priority to seek to safeguard their lives for as long as possible. It should also be a Europe wide aim for all countries to capture the records of old or giant or hollow trees and pollards and the habitats in which they occur with the aim of using the data to raise awareness of these large, very long-lived organisms and help to conserve global old growth biodiversity and history associated with them.

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