

VETERAN TREES AND THEIR CONSERVATION IN THE BRISTOL REGION AND BEYOND

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ABSTRACT

This paper provides an introduction to the ecology and history of veteran trees together with an account of those found in the Bristol region. Early management work to conserve veteran trees at Leigh Woods and Ashton Court is described, and the influence that these two Bristol sites have had on national conservation initiatives is highlighted. The authors conclude by proposing a "landscape" approach to veteran tree conservation, and with a plea for wider recognition of the importance of Bristol's ancient trees.

INTRODUCTION

Veteran trees are an exciting part of our natural and cultural heritage. The sight of gnarled ancient trees can conjure up images of former landscapes in a way that no other living thing can. They can tell us as much about the past as any ancient monument and yet until recently their conservation was largely ignored. Britain, though, has a special responsibility for the conservation of veteran trees as it is home to a large proportion of the northern European population. Fortunately over the last few years there has been a growing recognition of this responsibility and there has been a coming together of conservationists, tree specialists, archaeologists, landscape historians, and others to meet the challenges presented by the conservation of this fragile heritage.

WHAT IS A VETERAN TREE?

Biologists and conservationists like to be able to define and classify the organisms that they work with. Ever since Linnaeus published his classification system in 1753 people have been categorising organisms by species, genera, families, orders, and classes. We can now even place whole plant communities into neat compartments and name, for example, specific types of woodland.

Those working to conserve veteran trees are not so fortunate, as the objects of their efforts are less easy to define. For a start, they are not dealing with a single species, or even a taxonomic group, as trees occur across the range of botanical families, orders, and classes; so even defining a tree is not straight forward.

Age, in something called 'veteran', might be expected to be an important defining factor, and indeed it is, but different species of tree age in different ways and at different rates. A birch, *Betula* spp, that has been alive for a hundred years is an old tree, although the same cannot be said of a yew, *Taxus baccata*, of the same age. Even within a species it would be difficult to fix an age above which an individual tree could be regarded as being a veteran. Any age selected would be purely arbitrary, and in any case ageing trees is fraught with difficulties, although size can give some indication (White, 1998). Rule-of-thumb definitions based on size have been used; for example any tree with a trunk over 1.5m in diameter could be considered to be valuable in terms of nature conservation (English Nature, 1996). However, such a definition will naturally exclude tree species (e.g. those belonging to the family Rosaceae) that do not attain these dimensions.

For those interested in veteran trees for their nature conservation value, the condition of a tree can be just as important as either its age or size. Those features of veteran trees which provide wildlife habitats, such as dead-wood, cavities, or sap runs, are not restricted to very old trees, but are often present on relatively young trees having been induced either by natural damage or by human intervention, for example by cutting. Unfortunately none of this makes it any easier to answer the question 'what is a veteran tree?'

The simple fact is that veteran trees cannot be neatly categorised like other features of conservation interest. Various attempts have been made to define them but the following broad definition is widely used and embraces the many values that veteran trees represent -

'Veteran trees are trees which, because of their great age, size or condition, are of exceptional value culturally, in the landscape, or for wildlife' (English Nature, 2000a).

THE AGEING PROCESS AND ITS VALUE TO WILDLIFE

Throughout its life a tree lays down new tissue every year over the entire under-bark surface, enveloping the growth of the previous year. This is known as the current annual increment. The growth rate of this new wood is influenced by the amount of available energy. If the tree is placed under physiological stress then its ability to generate new wood is impaired. Also, if parts of the tree are under mechanical stress the tree may direct growth to produce wider increments in these areas. This is termed "adaptive growth" and provides the means to build wood around areas of weakness and to incorporate wounds within the body of the ageing tree. This often results in a protective barrier zone around the wound area, a process known as "compartmentalisation", and also strengthening of the region of adaptive growth as the tree grows to minimise the mechanical stresses imposed upon it (Shigo & Marx, 1977; Mattheck & Breloer, 1995).

When the outer covering of bark is damaged, exposing underlying wood to the atmosphere, the partial drying of exposed wood tissue and the change in moisture environment triggers the activity of fungi. Both internal, latent, fungi and colonising micro-organisms from the outside take advantage of the energy supply in the exposed tissue. The tree is usually able to lay down new tissue around the area of degraded wood and isolate the wound area. This ability of the tree to continue laying down new annual

increments over a partially degraded core is important ecologically for it is the dead wood within the still-living tree that is vital to so many other organisms.

As the tree enters late maturity, having optimised its potential crown size, the outer canopy starts to restrict the amount of light reaching the leaves of the inner branches. Areas of the crown die, limbs are shed and there is a further increase in fungal activity. In the veteran stage the current annual increment is spread progressively more thinly over an ever-increasing area. This affects the foliar condition resulting in reduced leaf size and overall cover. Many trees at this stage begin to die back with new growth developing at lower points in the crown as light penetrates to these regions. This is known as 'crown retrenchment' and is followed by rejuvenation of the canopy at a lower level, a process that may occur many times in the life of a veteran tree. The veteran stage may be the longest period in the tree's life and there are many examples of veteran trees that have collapsed and the fallen parts taken root, each giving rise to a "new" tree. It is even conceivable that a tree could live forever if this type of "phoenix" regeneration was repeated indefinitely.

The above describes the natural course of the ageing process. However, the physiology of most broadleaved trees is such that they can withstand repeated cutting. This even has a rejuvenating effect, which means that trees that have been regularly managed by pollarding (see below) have several advantages over ones left to develop naturally. For example their root systems do not have to support a large crown, transport distances between leaf and root are reduced, and being shorter they are less prone to wind damage (Lonsdale, 1996, 1999). The problem, as we shall see later, arises when the cycle of management is interrupted.

It is the ageing process and the development of dead wood that ultimately provides the habitat for a range of other organisms for which veteran trees are important; saproxylic insects feeding on the dead wood, bats using the cavities for roosting, and lichens and bryophytes using the ageing bark as a substrate (Key, 1996, Holmes, 1996, Rose, 1991). The value of veteran trees to nature conservation cannot be understated. There are species of lichen and invertebrate that are found almost exclusively in association with veteran trees; some are even limited to a few individual trees. For example the beetle *Hypebaeus flavipes* is known from just six trees in Moccas Park in Herefordshire (Harding & Wall, 2000). Continuity of the veteran tree habitat is therefore of utmost importance to the survival of such species.

THE HISTORY OF VETERAN TREES

The fact that so many organisms found on veteran trees require a continuity of habitat suggests that the trees themselves may be a direct link with remnants of the 'wildwood' that re-colonised the British Isles after the last Ice Age. During that re-colonisation, species that had taken refuge in warmer latitudes gradually found their niches in the slowly evolving ecosystems of more northerly zones. Veteran trees and their dependent fungi, lichen, and beetle communities may have been co-existing ever since that time. Given the longevity of certain veteran trees it is conceivable that fewer than ten generations may link them back to the wildwood.

It has generally been assumed that the wildwood in Britain consisted of more or less unbroken woodland until clearances by humans began in the Mesolithic (Peterken, 1996). However, an alternative view is emerging which suggests that in lowland Europe the natural landscape evolved through the primary influence of large grazing herbivores (such as the auroch and tarpan, predecessors of the domestic cow and horse, as well as bison, red deer and wild boar) and that in some areas the vegetation structure was a mosaic of grassland, scrub, and scattered trees, set within the more widespread matrix of closed canopy forest (Vera, 2000). While this model of ancient vegetation may be somewhat controversial it could help explain the origins of wood pasture, an ancient system of land management that uses the same ground for both trees and grazing animals. Many veteran trees appear to have originated in such wood-pasture systems and then survived through subsequent changes in the landscape.

In the British landscape veteran trees have survived for a variety of reasons. Most were at one time 'working trees' which were regularly pollarded to provide a renewable supply of boughs and branches for fuel or fodder, and cut at a height at which the re-growth was out of reach of browsing animals. As such they were a valuable resource in pre-industrial societies and worthy of protection (Green, 1996). The only known pre-twentieth century description of pollarding comes from *The Art of Husbandry* of 1523: "If a tree be heeded and used to be topped and cropped at everye xii and xvi yeres ende ...it will beare moche more wood by process of tyme than if it were not cropped and much more profyte to the owner ... and beware that thou croppe him not in sappe tyme." (Read, 1991). Such trees are found in the greatest concentrations in landscapes that have seen relatively little change, such as former Royal Forests, wooded commons, and medieval parks where they formed an important component of the local land use.

Pollards and lapsed-pollards are the most frequent type of veteran tree but many others exist. Other forms of working trees are coppice, almost entirely associated with woodland; coppards, trees originally managed as coppice and later pollarded to avoid the attentions of browsing animals; and shredded trees, which have all their side branches cut back repeatedly with just a tuft of branches retained at the top (rarely seen in Britain, but a common practice, even today, in countries such as France). Material from working trees once had a wide range of applications that included fodder for animals, small dimension wood for dead-hedging and fencing, clog-footwear and firewood. In later times, larger dimension wood was used for carriage making and house, canal and boat construction.

Although oak, *Quercus* spp, is the species most often associated with veteran status, there are also large numbers of veteran beech, *Fagus sylvatica*, and hornbeam, *Carpinus betula*, particularly in the south of England. Examples also exist from around the country of veteran ash, *Fraxinus excelsior*, holly, *Ilex aquifolium*, hawthorn, *Crataegus monogyna*, and willow, *Salix* spp. all of which often played an important part in the local system of land use. With such a variety of species and histories it is not

surprising that veteran trees can be found almost anywhere. In addition to the great concentrations found in parklands etc. they can also be found in many other situations such as upland grazed woodlands, in hedgerows (often on parish boundaries) on riverbanks, orchards and even in towns, while many churchyards have afforded centuries of protection to ancient yews.

Periodically old trees have been under considerable pressure, particularly when grazing levels intensified, when produce demands rapidly expanded, and during times of radically changing local economic conditions. While it is likely that individual trees were lost during battles and skirmishes there appears to be little evidence that this led to a significant reduction in the tree population. Rackham (1986) notes that in Ireland during the “evil years” between 1600 and 1654 marauding armies might indiscriminately cut trees for timber or because they got in the way of fighting, however these would be expected to re-grow. Elsewhere he comments on the influence of agricultural economics on trees and hedgerows, referring to the period of agricultural prosperity in England between 1750 to 1870, when the number of hedgerow trees decreased and the period between 1870 to 1951, a time of agricultural adversity, when the numbers doubled due to the general neglect of hedgerows. Rackham argues that trees in parkland and hedgerows, rather than in woodlands, would be the main providers of ship-building and house-building timbers. Limbs selected for their shape and size (for crucks, knees or bends) for construction might be riven or sawn usually for local use, but where branches were of particular dimensions they might be sold for special projects and transported considerable distances.

Pollarding declined during the nineteenth century and the creation of new pollards largely ended (with the notable exception of riparian willows). One of the reasons that Rackham advances for this is the shift in the ownership of pollard products from tenant to landlord and the resulting decline in value to the common user. Whatever the reason, the days of the working pollard were coming to an end.

The utilitarian value of trees was heavily driven by mechanised forestry during the early part of the twentieth century, particularly after the First World War when the Forestry Commission was strategically orientated to the demands of economic forestry with requirements to maximise production of saw-log trees. Old and gnarled pollards with their crown stems and abundant dead wood rising from ancient hollow trunks, having low economic value for sawmill produce, were left standing while semi-mature and mature trees of maiden form were felled.

In the modern world veteran trees face a range of threats to their health and survival. Felling, often on the grounds of a perceived hazard to public safety, disease, fire and vandalism are obvious ones, although changes in land management practice in their immediate vicinity can also have a severe impact. Ploughing, soil compaction by livestock or vehicles, and the application of herbicides and fertiliser can all have a serious effect on the trees or on the other organisms that they support.

Despite their changing fortunes through the ages, veteran trees have often been valued culturally playing a role in myths, religion, and art. For example, in the late eighteenth century the appreciation of the cultural and landscape values of veteran trees are expressed in the paintings of stag-headed old oak trees and the drawings of hedgerow pollards of great character. Mendelssohn, Shelley, Byron and other poets and artists drew inspiration from visits to wood-pasture sites such as Burnham Beeches. The visionary designs of William Kent, Lancelot "Capability" Brown, Humphry Repton and the followers of the Romantic Movement led to the conscious inclusion of trees of great character and significance in the new designed parkland landscapes.

The significance of veteran trees in our cultural life is demonstrated by the abundance of named trees across the country, many associated with historical events, festivals or legends. Perhaps the best known is the Major Oak in Sherwood Forest linked to the legend of Robin Hood, although the Bristol region is not without its own cultural heritage of veteran trees (Morton, 1998).

VETERAN TREES IN THE BRISTOL REGION

Ashton Court, Leigh Woods and Leigh Court

The sites of Bristol's best-known major collections of veteran trees are connected through their common history and the evolution of their landscape management. For example, at Ashton Court, there are wood-pasture elements, which are a direct link with the medieval deer park. This landscape in turn is connected to Leigh Woods to the north, where a substantial number of ancient lapsed oak pollards in the region of Stokeleigh Camp provide clues to a history of grazing (Rackham, 1986; Lovatt, 1989). Further to the north and west beyond Paradise Bottom, Leigh Woods merges into the designed landscape of the Leigh Court Estate.

Ashton Court has one of the finest collections of veteran trees (c.440) in the UK and occupies some 350 ha. Records relating to Ashton Court go back as far as the eleventh century. “Aestune” (Ashton) was first recorded in the Domesday survey. This contains references to the valley in Leigh Woods, owned by the Bishop of Coutances (The Sheriff of Bristol Castle), where war-horses were bred.

The original emparkment was granted in 1393, by Royal license from Richard II to Thomas de Lyon, and occupied some 100 ha within a walled enclosure to retain deer. From that time onwards the ownership of Ashton Court is well documented. In 1545 it was acquired by the Smyth family who owned the estate until 1959 when it was purchased by the present custodians, Bristol City Council (Sumner, 1986).

Seventeenth century estate records refer to payment for the sawing and carriage of timber used for scaffolding and building, as well as for the making of the stairs and for picture framing (Bettley, 1978). It is likely that suitably sized and shaped oak pollard limbs would have been selected for the architectural joinery and building work associated with the southwest wing extension of

Ashton Court. Subsequent periodic additions and alterations to the house are also likely to have drawn on similar timber resources from the estate.

In the early nineteenth century Humphry Repton came to influence the landscape design of the area. He visited Ashton Court Estate, probably in 1801. Although having made proposals for the estate, the work was to be carried out by another designer, probably to save costs (Land Use Consultants 1992; Casing *et al.*, 1982). Repton was later to visit Leigh Court in 1812 and place his mark on its landscape.

Today, Ashton Court Estate is entered on English Heritage's Historic Parks and Gardens Register (English Heritage, 2001).

Until the end of the nineteenth century the southern part of Leigh Woods was included within the Ashton Court Estate and managed as grazed wood pasture. Paintings and watercolours from the early eighteenth century depicting pollards in wood pasture in Leigh Woods and at the head of Nightingale Valley (Greenacre, 1973, Greenacre & Stoddard, 1986) offer a testimony to the constancy of a landscape which had barely altered since medieval times.

In the twentieth century aerial photographs document the felling of a large area of Leigh Woods during the Second World War and the later grubbing-out of a large part of Oak Wood in the 1950s. Although little of this felled area had previously been wood pasture, much of Repton's designed landscape with its veteran trees was engulfed by the subsequent replantings with non-native tree species (Lovatt, 1989).

Bristol and beyond

Within a 15-mile radius of Bristol there are many more of the finest veteran trees in Britain. A current recent survey of old trees in the Bristol area, undertaken with public involvement, has to date recorded 138 veterans. The criteria for veteran status in this survey have been taken quite broadly, however the trees surveyed include oak trees that are estimated to be 700 and 900 years old according to White's system for ageing trees. Data from this survey are held at Bristol Regional Environmental Records Centre.

There are a number of fine individual examples of veteran trees within the urban boundary. At Bishops Knoll, Sneyd Park there is a major pedunculate oak, *Quercus robur* (6.7m in girth - measured at 1.5m above ground level) in Woodland Trust ownership. It pre-dates the formal Victorian pleasure gardens and is estimated to be over 600 years old, having survived on the edge of a terraced landscaped garden overlooking the Avon Gorge. This old pollard and its neighbours are thought to originate from a time when Sneyd Park was a deer park within Stoke Bishop held by the Bishops of Worcester until the Reformation.

Other important areas of historic wood pasture within the city boundary include the Stoke Park, Oldbury Court and Blaise estates. Repton visited Blaise in 1795 and made a strong impression with his picturesque design. He intended to translate the inherent landscape features and topography of the estate into natural compositions, and in this the trees played a significant part. The estate is now considered to be one of the best examples of Repton's work and is designated Grade II on Historic Parks and Gardens Register (English Heritage 2001). Though there are a number of living trees that have survived from the Repton period there are few trees on the estate that pre-date this. There are, however, two fine pedunculate oaks that appear to be derived from an older landscape, and which are estimated to be over 400 years old. Beyond the estate are further old pollards in Blaise Hamlet where such trees appear to be remnants of a wood-pasture system likely to pre-date the nine cottages of the Hamlet, which is in National Trust ownership.

To the south of Bristol there is a wonderful network of lapsed hedgerow pollards throughout the area from the Dundry slopes, through the Chew Valley and intermittently extending over the northern slopes of the Mendips. A broad scattering of open-grown field trees of mainly pollard derivation, and of parkland character, also covers the area. Fine examples have been noted in Publow, where an oak (that the youthful Acker Bilk is reputed to have once set fire to!) over 500 years old was found, and at Hunstrete House Hotel, where an ancient oak tree is recorded as being the first Somerset record of a little owl residence (Janes, 1987; Mitchell, 1996). A count of large-girth trees in the Chew Valley in the 1980s gave 33 trees over 4.5m in girth. A more recent estimate of the number of veteran trees in the Chew Valley and adjoining area exceeds 600.

Beyond Bristol to the north are a significant number of exceptional ancient oak pollards with a notable wood-pasture specimen in North Nibley with a girth of 9.8m and estimated to be aged over 1000 years. There are other ancients of considerable girth nearby in the Falfield area, and beyond. These are in turn linked to the ash wood-pasture pollards which extend into the Cotswolds.

The Tortworth Chestnut

This extraordinary tree (a sweet chestnut, *Castanea sativa*) is particularly noteworthy. Announced by its plaque which is attached to the entrance gate, the Tortworth chestnut is reputed to have been 600 years old in January 1800. It is more recently celebrated by Pakenham (1996) and others. This tree is a phoenix specimen whose crown collapsed and layered to propagate some eighteen trunks most of which are still connected to the parent trunk, although some have individuated. This single tree is now generating what appears to be a small wood although, in reality, each of the smaller trunks are all part of the same tree and therefore already 800 years old.

Clarkencombe

We return now to Ashton Court to look at one part of the estate that has played an important role in the development of veteran tree conservation.

The main grouping of veteran trees at Ashton Court is found in the south west of the estate in Clarkencombe where there are some 222 pollards that have survived within an area that was once cattle-grazed common land and then later included within the deer emparkment.

The Clarkencombe trees have the character of “giraffe” pollards showing different cutting heights reflecting the changes in the type of browsing animals present during the development of the trees. Early in their lives the trees were probably browsed by cattle, and this would have determined the height at which they were cut. However, the enclosure of the park in the nineteenth century meant the introduction deer, which were capable of browsing at a greater height, and subsequently the trees would have been pollarded at a higher point.

As elsewhere, pollard management in Clarkencombe ceased in the middle of the nineteenth century, so permitting the development of tall and spreading pollard crowns. Then when grazing ceased during the Second World War self-sown ash and sycamore became established and in time started to compete with the oak veterans. The growth of pole-stage ash eventually developed to the point where, by the end of the 1980s, it had over-topped the veterans.

EARLY ATTEMPTS AT VETERAN TREE MANAGEMENT

The plight of the veteran trees at Clarkencombe was not unique. The value of many veteran trees is associated with regular management by pollarding over a long period of time, often centuries. Although, even historically, it was not unusual for a proportion of such trees to die every year (Rackham, 1980) the decline of the practice from the nineteenth century onwards led to there being many lapsed pollards carrying much larger branches than before on rotting boles, and without the periodic rejuvenation which regular pollarding had provided. Such trees were more vulnerable to collapse and wind damage.

Although some work was done to reinstate the practice of pollarding in Epping Forest in Essex as early as the 1940s it was not until the 1970s and 1980s that interest in developing restoration techniques really took hold as a result of pioneering work, notably in Hatfield Forest, also in Essex, and Burnham Beeches in Buckinghamshire (Dagley & Burnham, 1996; Sisitka, 1991; Read *et al.*, 1991).

Little documentation on the practice of pollarding existed at that time and so those who were brave enough to attempt work on their trees were doing so with little information, and often in isolation from others carrying out similar experimental work. As a first step in bringing such people together, the Corporation of London hosted a meeting on 6 March 1991 at Burnham Beeches. The proceedings of this meeting were published as *Pollard and veteran tree management* (Read, 1991), which for five years was the main source of information for those interested in the conservation of veteran trees.

RESTORATION WORK AT LEIGH WOODS AND ASHTON COURT

Leigh Woods

Just a few weeks before the meeting in Burnham Beeches, the Nature Conservancy Council (English Nature from 1 April 1991) had carried out restoration pollarding on an ancient pollard in Leigh Woods, possibly the first such tree to be cut in the Bristol area in the twentieth century. The particular tree was chosen because, being in a prominent position, it was well known to visitors to the woods and so presented an ideal opportunity to provide on-site information to prepare the public for the re-introduction of a woodland practice that had been absent for around 100 years. An additional reason for choosing the tree was that it was a small-leaved lime, *Tilia cordata*, a species which can survive even the most severe mutilation; success in this new venture was, therefore, almost guaranteed. However, most of the old pollards in Leigh Woods are pedunculate oak, which is much less resilient. The following year five oak trees were selected for restoration pollarding in the Nightingale Valley area of the woods with work being done where possible in accordance with guidelines provided by Mitchell (1989).

Following these initial trials a full survey of all the ancient pollards in the former wood pasture of Leigh Woods was carried out during the winter of 1992/93. All trees were photographed, measured, plotted on a map, and had a small plastic numbered tag attached to them. Comments were also made on the health of the trees and an assessment made of their ability to survive restoration pollarding. A total of 194 trees were tagged. Of these 149 were alive and healthy, 16 were moribund and 29 were dead (Avon Conservation Service, 1993). On the basis of this baseline survey a programme was drawn up to carry out restoration pollarding on 123 of the trees over a 20-year period. The plan incorporated a programme for the clearance of younger trees from around the veterans to reduce competition and let in light. In most cases this was to be done a few years in advance of restoration pollarding to allow the veterans time to adjust to more favourable conditions. Trees were cut according to this plan every year up to and including 1998, with a total of 43 being done. In 1998 English Nature transferred the management of the woods back to the owners, the National Trust, and although no more trees have been cut since this time a re-survey of the trees is planned.

Ashton Court

While the work on the veteran trees in Leigh Woods was largely done for nature conservation reasons, and to maintain what remained of the wood-pasture character of the woods, at neighbouring Ashton Court the landscape value of the trees was the driving force behind the restoration programme.

In 1990 Bristol City Council began formulating a whole-estate restoration plan and commissioned Land Use Consultants to prepare a report on the historic landscape. This highlighted the historic and biological importance of Clarkencombe and Pill Grove wood pasture and commented upon the observed decline in the Clarkencombe oaks (Land Use Consultants 1992). This initiative led to grant support from Countryside Stewardship and from the Historic Parks and Gardens Scheme. The restoration

proposals recognised the great importance of the veteran trees throughout the estate and noted that a number of oaks had died while others were susceptible to serious decline where the competitive growth was extensive and dominant.

Bristol City Council plotted all the veteran oak trees and Treework Environmental Practice were then commissioned to carry out a detailed appraisal, assessing their existing condition and identifying the steps to be taken to safeguard their future. The work was jointly funded by Bristol City Council and the Countryside Commission (through Task Force Trees), and began in 1993 against the background of the landscape restoration proposals, which intended to re-incorporate the ancient oaks within the deer park.

Competitive growth was clearly adversely affecting the veterans, with a tendency for a number of attenuated pollard stems to show stressed foliar appearance. Recording of the trees showed that bole heights ranged between 4m and 6m. These boles had developed over-loaded crown limbs of between 100- and 250-years growth. In the majority of trees, trunks were extensively hollowed and in many cases boles were only partially intact. There were cases where trunks were mere residual discontinuous husks of sound, though embrittled wood and others where the main trunk had lost in excess of 60% of the circumference. Additionally there were a number of recently uprooted trees and crowns that had begun to disintegrate.

The assessment showed an almost 10% loss in the population during the previous decade and highlighted a progressive domino effect of mechanical failure, where new crowns became exposed and vulnerable following the loss of adjacent canopy. It was considered that a future management strategy would need to steer a delicate balance to enhance tree vitality while undertaking appropriate arboricultural treatment to re-stabilise the crowns of the veterans. Treatments that involved crown reductions, to compensate for end-loaded pollard stems, ran the risk of reducing the photosynthetic potential of the tree, which in turn would restrict its capacity for rejuvenation. Moreover, removal of the dominant ash and sycamore could also result in desiccation of exposed bark following an increase in wind circulation and light penetration (Fay, 1994).

It was considered that the trees were at a critical stage in a fragmentation process and so in January 1994 work started around a central core of oaks, involving clearance of some 700 ash and sycamore. In this area a gradual approach to the removal of competition was not practicable, while in other sectors of Clarkencombe a phased approach to release from competition was advocated. Following the clearance work the veteran oaks were subject to a programme of crown restoration involving gradual weight reduction targeted at heavy and unbalanced pollard stems, while attempting to maintain and stimulate as much fine twiggy (epicormic) growth as possible on the trunk and crown branch system. The trees were photographed prior to undertaking the arboricultural work and again in the following summer to monitor the response to treatment.

THE ANCIENT TREE FORUM

Meanwhile, at a national level, interest in veteran trees had been gathering momentum, and in 1993 the Corporation of London had hosted a second meeting, this time at Epping Forest, which later resulted in the publication of a new and more substantial *Pollard and veteran tree management* (Read 1996). This second meeting was soon followed by the formation of the Ancient Tree Forum (ATF) by a group of enthusiasts, co-ordinated by Ted Green and Keith Alexander, who were interested in veteran trees and their management.

News of the work at Clarkencombe attracted the interest of the Ancient Tree Forum and on 30th May 1995 Treework Environmental Practice and Bristol City Council jointly hosted a meeting at Ashton Court to discuss and review all the issues relating to the Clarkencombe oaks. This stimulated vigorous debate about the management of veteran trees and the range of individual methods that were being used for surveying them. From this emerged a strong need to harmonise the various approaches to surveying and recording. Following a series of consultative meetings the idea of developing a specialist method for recording veteran trees was taken up by the Veteran Trees Initiative.

THE VETERAN TREES INITIATIVE

In English Nature the growing interest in veteran trees was recognised and supported by the establishment of the Veteran Trees Initiative (VTI), a partnership project involving the Ancient Tree Forum, the Corporation of London, English Heritage and the National Trust, amongst others. The VTI, which aimed to collate information on veteran trees and promote their conservation, was formally launched in Windsor Great Park on 11 November 1996 by David Bellamy who was accompanied by a group of school children under one of the great oaks in the park. Simultaneously other school groups gathered at another 10 veteran tree sites across the country, including children from Embleton Junior School, Bristol who took part in an event at Leigh Woods.

One of the first actions of the VTI was to commission Treework Environmental Practice to develop their veteran tree recording system, building on experience gained at Clarkencombe. This was published as the Specialist Survey Method (English Nature 1997). It operates at three Levels; an Introductory level for the non-specialist enthusiasts, an intermediate Generic Level and the detailed Specialist Level.

During the course of three years the VTI ran a series of over 20 demonstration events and training workshops for landowners, land managers, tree surgeons and others to help set new standards of best practice in the management of veteran trees and the landscapes in which they grow. The very first of these was held in Leigh Woods in February 1997 and included a practical demonstration of restoration pollarding by tree surgeons. The following year Ashton Court was the venue for one of the training workshops, which was over-subscribed to such an extent that a further two were held there a year later.

Reflecting the importance of parklands as sites for veteran trees, the VTI hosted a Parklands Symposium in May 1998, which attracted a cross section of delegates from the breadth of disciplines involved in parklands (Bullock & Alexander, 1998). The

VTI also produced a number of publications on veteran trees and their care, including a practical management handbook and guidance on safety issues (English Nature, 2000a, 2000b; Read, 2000; Davies *et al.*, 2000). The Veteran Trees Initiative formally ended in 2000, although, as we explain later, the work to conserve veteran trees goes on.

LESSONS FROM EARLY WORK

An important element of the VTI was the promotion of best practice in the management of veteran trees. This best practice was distilled from the experience of many people gained during the early attempts at managing veteran trees. In defining best practice it was important to learn the lessons from this early work including that done in the Bristol area.

At Clarkencombe the results of the 1994 course of treatment were evaluated in 1996. Here, 54% of the trees had been affected by the clearance of competing ash and sycamore, and 35% were subject to tree surgery (Fay, 1996). Subsequently, a further major assessment has been carried out over the whole estate including both Clarkencombe and the parkland. This has included an assessment of the population dynamics on the estate. The Clarkencombe population evaluation indicated that while there had been minimal tree failure between the 1994 and 1996 surveys, the mortality rate between 1996 and 2001 was 22%. This failure rate corresponded to the number of trees identified as being in marked decline during the previous surveys (Fay, 2001).

Treated trees at Leigh Woods were also surveyed during 2001 (Robinson, 2001). Of the 43 trees, eight (19%) were found to have subsequently died. Nearly all of these deaths appeared to have occurred in situations where it had not been possible to leave much in the way of living branch material on the cut stems at the time restoration pollarding was carried out. The subsequent growth of ivy, *Hedera helix*, over the cut stems was implicated in the death of six of the trees.

It is worth noting that the early restoration experiments at Hatfield Forest, Epping Forest and Burnham Beeches had also experienced a considerable number of failures (Sisitka, 1991, Dagley & Burnham, 1996; Read *et al.*, 1996).

One of the conclusions relating to tree failure in relation to management programmes is that while many trees may benefit from measures designed to address threats that have built up over a period of time, those veterans that are noted to show signs of marked decline may be pushed beyond recovery by the very treatment intended to restore their condition. Where restorative measures coincide with other, or new, factors that may adversely affect the root zone of trees then this is most likely to result in a spiral of decline. For example following the restoration work in Clarkencombe the area was enclosed within the extended deer park in 1996. Additional compaction associated with the introduction of the deer at that time may have increased stresses on the trees.

For the time being the majority of the living veteran population at Clarkencombe appear to be faring reasonably well in the light of the re-evaluation. This has been used to update past data and to formulate a long-term management programme for all veteran trees on the Ashton Court Estate, as a major component of a Heritage Lottery funded landscape restoration project. This evaluation has included the identification of the quality of the deadwood habitat and outlines management prescriptions for individual trees in the light of their present condition. By these means it is intended to consolidate and strengthen the veteran-tree and wood-pasture habitat through this century and into the next.

RECENT DEVELOPMENTS

The Specialist Survey Method, as used at Clarkencombe, has been one of the major outcomes of innovative work on veteran trees in the Bristol region. The method has been used in county-wide surveys in Hampshire, Somerset and Norfolk, and is also now being used in Scotland. It is estimated that some 12000 veterans have now been recorded using the method.

Recently Treework Environmental Practice has further developed the survey methodology to include a method for quantifying the habitat and tree associates (termed "Level 4"), involving habitat evaluation scores to enable assessments and comparisons to be made within and between sites. Additionally the elaborated system provides the means to evaluate tree vitality and stability to inform and develop a management programme designed to span a thirty-year period. This is undertaken for all surveyed trees and used to evaluate overall viability and trends in the population. Treework has incorporated this system into a database for collating, analysing, and reporting survey data. The system has been applied at Ashton Court, Richmond Park, and Hatfield Forest allowing comparisons between the sites to be made. Early analysis shows that there are similar rates of decline and proportions of viable trees at each site. It is still early days but the evaluation of population dynamics looks very interesting and is beginning to show some alarming indicators that the structure of the veteran tree population that we take so much for granted is very fragile.

The continued development of the survey method is just one of the ways in which efforts to conserve veteran trees is continuing. The Ancient Tree Forum (through a partnership with the Woodland Trust) is continuing to communicate via its web site, meetings, and discussion groups, to raise awareness of the importance, value and fragility of the veteran tree heritage. The ATF now has representation covering the whole of Britain, and its initiatives include supporting the development of a national veteran trees database, and fostering links with similar groups throughout Europe.

Much of the nature conservation effort in this country today is being directed through the implementation of Biodiversity Action Plans including one which has been drawn up for lowland wood pasture and parkland, a habitat which is very important for its veteran trees (UK Biodiversity Group, 1998). All of the former partner organisations in the VTI, along with many others, are contributing towards the achievement of the targets set out in this plan (Kirby & Reid, 2000).

Local Biodiversity Action Plans are also being published. The Bristol plan aims “to conserve and enhance ancient trees and their associated species and habitats in Bristol” (Bristol City Council, 2000). The plan identifies 10 – 20,000 ha in the area of Bristol that are to be protected and maintained in favourable ecological condition, and a further 2,500 ha to be restored. It also aims to create 500 ha of new habitat by the year 2010. To meet these targets, a primary objective has been set: to identify all ancient trees and obtain detailed information on them and their conservation value, and to obtain information on the extent of the wood-pasture habitat within Bristol.

Parklands are being looked at in a new light and parkland Sites of Special Scientific Interest (SSSI) are being notified. Ashton Court, for example, was notified as an SSSI in 1999 largely as a result of a survey of Coleoptera, in Clarkencombe, which found eight “nationally scarce” species (Alexander, 1997). However, many feel that because there are many veteran trees growing outside wood pasture or parkland, the notification of more parkland SSSIs is not adequate to protect our veteran tree heritage, and that the time has come to consider notifying individual trees as SSSIs (Green, 2001). An alternative may be the landscape approach, now being adopted by some conservation organisations, which addresses the conservation of features that lie outside special sites (RSPB, 2001).

A LANDSCAPE APPROACH TO VETERAN TREE CONSERVATION

The historic and geographic connection between Ashton Court, Leigh Woods and the scattered veteran trees found in their vicinity make the area an important landscape of linked habitats, irrespective of its artificial boundaries. Many of the compartmented distinctions that are made are due merely to issues of ownership rather than biology.

The area from Clarkencombe, through Leigh Woods to the former deer park of Leigh Court embraces populations of veteran trees that, although somewhat fragmented, are inherently linked. Spatial continuity is just as important as temporal continuity for many of the species associated with veteran trees, so when considering the overall management of this landscape complex it should be regarded as a substantial, and species-rich, mosaic of linked veteran-tree and dead-wood habitats.

The aggregated area covers some 600 ha. It is considerable both in its scale and in its topographical variation. The scale of the ancient tree cover is regionally and nationally significant in its own right. As knowledge of this veteran-tree habitat network deepens and becomes more widely appreciated it may increasingly be compared with celebrated and well-documented historic landscapes such as Hatfield Forest and Burnham Beeches.

In the light of the potential importance of linked habitats, future assessments of the biological value of the wood pasture and parkland in the Ashton Court – Leigh Woods complex might be expected to consolidate and add value to the status of the district. This is, in part, addressed in the Bristol biodiversity action plan, which aims to “review the management of areas that can be considered as wood pasture, ... with a view to increasing their ecological value”. (Bristol City Council, 2000). However, this plan will need refining if the concept of a habitat network is to be brought into sharper focus.

CONCLUSION

The Bristol region has been a source of inspiration for the development of veteran tree surveying and management. This has led to rapid progress and has influenced thinking and practice amongst those involved in the veteran tree conservation. The importance of this work is probably not well known by the people of Bristol themselves. While Ashton Court and Leigh Woods are exceptionally well known amongst the Ancient Tree Forum and its growing number of supporters, the great value and importance of the veteran trees and their associated flora and fauna are not yet fully appreciated by the local population. It is hoped that Bristol City Council, and other landowners, will become aware of the fame of this nationally important habitat and the degree to which others appreciate their stewardship of it. It is hoped that this article will go some way to redress this by celebrating the veteran trees of the Bristol region.

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GLOSSARY OF TERMS

As tree managers tentatively developed techniques to conserve veteran trees, they either had to rely on traditional words or devise new ones to describe the trees and the work they were doing. This often led to confusion with different words being used to describe the same thing. With the exception of the third, which is our own, the definitions we use here are those used by Read (2000) although earlier authors may have used some of them interchangeably.

Bole: The main trunk of a pollard.

Crown restoration or retrenchment: The staged and gradual reduction of a tree's crown over a period of years to a lower point of growth. The rate of restoration will relate to the vitality and stability of the crown.

Lapsed pollard: A pollard that has not been cut for many years. A tree that has not been modified by cutting. Unless it has been damaged by wind etc., it has its original natural crown.

Pollard (verb) The formative process of removing the crown of a young maiden tree creating a pollard. Often now referred to as pollarding

Pollard (noun) A tree cut once or repeatedly at a height above which grazing animals can reach the regenerating shoots. Usually cut on a semi-regular basis, with the whole or part of the crown removed.

Pollard (verb) The act of cutting an already created pollard. (originally a noun derived from the transitive verb 'to poll', now used as a verb in its own right.)

Repollarding: A confusing word, used in the past for both pollarding and restoration pollarding, best not used.

Restoration pollarding: The re-establishment of a cycle of pollarding on trees that have not been in a regular cycle for many years.

PHOTOGRAPH CAPTIONS

Transparencies

- 1 Leigh Woods – dead pollard CREDIT - Tony Robinson
- 2 Leigh Woods – Large lime lapsed pollard CREDIT - Tony Robinson
- 3 Leigh Woods – the same lime as in 2 following restoration pollarding in 1991 CREDIT - Tony Robinson
- 4 Leigh Woods – Children from Embleton Junior School, Bristol help launch the Veteran Trees Initiative on 11 November 1996 - CREDIT Stephen Parker/English Nature
- 5 Magnificent veteran oak (estimated to be over 900 years old) on farmland near North Nibley CREDIT – Neville Fay
- 6 Clarkencombe, Ashton Court – veteran pollards CREDIT – Neville Fay
- 7 Clarkencombe – thinning and crown restoration CREDIT – Neville Fay
- 8 Clarkencombe – tree showing vigorous response to crown restoration treatment CREDIT – Neville Fay
- 9 Clarkencombe – tree showing vigorous response to crown restoration treatment CREDIT – Neville Fay
- 10 Ashton Court – Domesday Oak CREDIT – Neville Fay
- 11 Ashton Court – Domesday Oak with props - CREDIT – Neville Fay
- 12 Ashton Court – Old oak which has been released from competition from other trees. Note fire damage. CREDIT – Neville Fay
- 13 Ashton Court – Veteran sweet chestnut planted in the 16th century CREDIT – Neville Fay
- 14 Ashton Court – Veteran sweet chestnut planted in the 16th century CREDIT – Neville Fay
- 15 Ashton Court – Veteran trees with views to Bristol beyond CREDIT – Neville Fay
- 16 Ashton Court – Veteran sweet chestnut and oak CREDIT – Neville Fay
- 17 Ashton Court – Veteran sweet chestnut and oak CREDIT – Neville Fay

Prints

- 1 Clarkencombe – old oak pollard with extensive ash and sycamore competition in the background Ashton Court – Veteran sweet chestnut and oak CREDIT – Neville Fay
- 2 Clarkencombe – old oak pollards showing the heavy pollard stems on weakened boles with clearance having been done around the trees together with crown restoration CREDIT – Neville Fay
- 3 Hunstrete – veteran tree on arable land CREDIT – Neville Fay
- 4 Leigh Woods – Lime 10 years after restoration pollarding (SAME TREE AS IN TRANSPERENCIES 2/3) CREDIT – Tony Robinson
- 5 Hunstrete – veteran tree on arable land CREDIT – Neville Fay