Burnham Beeches

Veteran Tree Trail

General information

Burnham Beeches is a wooded common where historically, the local people had rights to graze their livestock and cut the trees as pollards for firewood. The pollards were cut repeatedly for centuries, approximately every 15-25 years.

Cutting stopped around 200 years ago and this lapse in management meant that by the late 1980s the pollard branches had become very large and heavy. These branches were growing on fragile, often decaying trunks, some 450-550 years old.

Combined with the cessation of pollarding, by the 1940s the grazing of the land around the trees had also stopped. This has resulted in younger trees, initially birch but also oak, beech and holly, growing up between the old pollards, casting shade on them. Where the trees survived the increased shade, the old pollards grew taller to compete for light making them more unstable.

Since the 1980s experimental work has been carried out to try to keep the trees alive for as long as possible. Periodic evaluation has resulted in adaptations to the process and many important lessons for the management of veteran trees have been learnt along the way.

This walk illustrates some of the lessons learnt while trying to manage a population of veteran trees and includes some failures as well as successes.

Pollards - (Grid Reference: SU9506984917)

The change in land management has produced a number of challenges for the veteran trees at Burnham Beeches. Two common themes are stability i.e. large branches growing on decaying trunks, and shading. Lack of grazing resulted in dense vegetation growing up around the pollards. For our old trees we often need to use a combination of halo clearance (a technique where surrounding vegetation is removed to let more sunlight in) and cutting work, to stabilise the trees.

Whilst we aim to keep our old trees alive as long as possible, we also need to plan for the next generation of veteran trees. At the first stop you will find a mixture of old and new pollards.

Old Pollards

The leaning tree has had two phases of reduction pruning, the most recent cut was in February 2018. Look at the epicormic growth, many branches have developed around the bolling (the pollard head) and so this tree is likely to respond well to the reduction work. The path used to run beneath this tree.

The tree has a lean and there is a risk that members of the public will climb it, and may inadvertently cause damage in the process. The dead hedge also discourages people from climbing the tree. This hedge needs to be rebuilt at regular intervals if it is to deter access to the trees.

Many of the old trees in this area are colonised by the wood decay fungus *Kretzschmaria deusta*, look on the trunk for the black crust like fruiting bodies or flat disc-like fruiting bodies that are grey with a white margin. This fungus can be unpredictable, causing tree failure with little or no warning. Here it would seem however, that the fungus has coexisted with our old pollards for a long period of time, without failure. The fact that we monitor these trees means that we can potentially learn more about the relationships between our old trees and this fungus.

New Pollards

Look around and you can see young trees that have been cut as pollards. Many are now on their second or third cut (some here were cut for the second time in the winter of 2017/18). These trees are really important for the future and our aim is to cut over 1000 in total. Other species like whitebeam and hornbeam have also been cut as new pollards, not just beech and oak.

Grey Squirrel Damage

Grey squirrels are a real threat to the survival of the old and younger pollards. Squirrels can strip the bark of new branches on the old trees risking their long-term survival. Here it is obvious on the young trees, both at the base and up the trunk. Newly created pollards are also attacked by squirrels on a regular basis, having implications for future veteran trees on the site. Squirrels are controlled in the spring/early summer when they do most damage.

Bracken

Bracken control may be necessary in this area. Dry bracken can be a fire risk in the early spring if it builds up into a thick layer. If this were to catch fire, then it could seriously damage our trees; old hollow trees act like chimneys making them particularly susceptible to fire damage.

Mendelssohn's Walk - (Grid Reference: SU9504984972)

Burnham Beeches is a nature reserve of European importance largely because of the wildlife associated with the veteran beech trees. Most of these species are flies and beetles found in the decaying wood and the water pools in the trees, but also mosses and lichens growing on their trunks. Veteran trees provide a huge variety of saproxylic habitats, with many species only found in such trees.

The beech pollard here has forster's knot hole moss (*Zygodon forsteri*) growing on it. This tiny moss is only found in three places in the UK. It mostly grows on the root nodules of old beech trees. It is important not to stack cut branches on the roots of the old trees as this can prevent light reaching the moss but too much light means that more common mosses grow and out-compete the rare one; a delicate balance!

The majority of the old and new pollards are beech but around 20% of the old ones are oak. Different tree species have different groups of associated species. The decaying heartwood of oak trees is good for rare species of beetle for example. Cavities in large branches are also valuable for a range of saproxylic species. Our trees are also valuable for other species too; look at the large oak nearest the path, high up in a branch facing the path there is a hole that used to contain a noctule bat (*Nyctalus noctula*) roost.

Safety can be an issue on sites with public access and veteran trees. Can you see evidence of an old path that used to run between this group of trees? The oak furthest from the current path shed a large branch unexpectedly in 2004 and as a result the path was moved. Dead hedging was used to prevent access beneath tree and the tree was reduced to try to prevent further collapse, to help prolong its life. This management has enabled us to retain the trees, and the valuable habitats they provide.

Generally, all deadwood, either cut or naturally fallen, is left on site as it provides a valuable saproxylic resource. Sometimes it is moved to make sure that major paths are not blocked and to allow an easy route to the trees for future work.

Stop 3 - Top Paddock - (Grid Reference: SU9501184853)

In the early 1990's, shortly after the first experimental reduction pruning work on the veteran pollards, this area was cleared of almost all the trees that were not pollards or young beech trees that could be pollarded. This clearance including removal of dense holly scrub. The work was done over just two years and in a period when the summers were hot and dry. After tree clearance, grazing livestock were re-introduced. It is now grazed by cattle, ponies and in some years pigs during the autumn. For a short time, sheep were also used to control the growth of young birch trees that re-grew after clearance. Clumps of bramble or bracken in the wood pasture are cut in some years to prevent them from becoming dominant.

Small Propped Beech Tree

Even the tiny veteran pollards are managed to try and keep them alive as long as possible. Without the prop this tree could be pushed over as it is so fragile. The simple prop is checked each month to make sure it still functions. You will notice that there is a holly bush growing around the tree, this is managed as a hedge to help deter people from getting too close and threatening its survival unwittingly. The holly has to be pruned so that it does not compete with the branches of the beech.

Beech Tree with Mulch Around it

This tree survived the drastic clearance of trees from around it, but it is one of the first trees seen by many visitors walking from the main car park. Due to its interesting shape, it acts like a magnet and people come to explore, and in the process trample around it. In addition, for a while it was a popular resting place for the cattle. The soil erosion/compaction around the roots was such that the tree was in declining health and this could be seen in the poor growth of the twigs at the top of the tree that were becoming claw-like rather than feather-like (Roloff 1999). Mulching around the tree started in approximately 2008. Initially visitors scuffed the mulch away but putting a simple line of logs around the edge acts as a psychological barrier and most people now walk around it. The mulch is topped up most years and it consists of wood chip created by management elsewhere on site. We use small branches and brash to create woodchip, larger sections of wood are retained as decaying wood habitat. Where possible we try to use the same tree species but as a minimum, we ensure it comes from broadleaved trees. Wood chip is stored for a year before use, to allow it to partially decay before being spread. Look at the twigs at the top of the tree which have a featherlike structure where previously they were distorted and claw-like. This has improved since the mulch was added.

Two Dead Oak Pollards

These trees died after the clearance of dense woodland and scrub around them. With hindsight we now know that this clearance was undertaken too quickly. All the surrounding trees were removed at the same time, and this clearance was followed by two hot and dry summers which caused drought stress, eventually killing the trees. Some of the beech trees declined too but these two oak trees died very quickly. This is one of the places where we learnt that halo release must be done gradually. It is important not to change the environment of the tree too quickly, but give the tree time to respond. We no longer undertake clearance like this around the old trees.

The Cage Pollard - (Grid Reference: SU9487184770)

The vegetation that had grown around this group of pollards was cleared in 1989. The clearance was carried our more slowly than at the previous stop and so the trees were not as rapidly exposed. These trees were some of the first trees pruned to try to prevent their collapse and were cut rather harder than we would now do so. It is interesting to see the results of the cutting techniques used then and learn lessons from the historical work. It often takes many years before the results can be properly evaluated.

The Cage pollard is and one of the 50 Great British Trees. It was first made famous by the (1991) feature film 'Robin Hood Prince of Thieves'. Watch the burial scene after the battle and you can spot this tree as it looked then, just after the clearance. We now have strict filming guidelines and longer allow film crews this close to old trees. The fence around it became necessary when so many visitors came to see it after the film and the soil around it was getting compacted/eroded.

Look at the old photos, see how the trunk comprises various columns of living wood. These are known as functional units. Unfortunately, when this tree was cut, we did not take this into consideration. The part of the tree nearest to the sign was cut back hard, leaving just a tiny branch with some leaves on. This small amount of leaves was not enough to support viable new growth and eventually this part of the tree died and in 2018 finally collapsed.

Once the functional unit started to decline the tree started to sink backwards and would have collapsed had it not been propped. This was done initially with oak wood posts but, as they started to decay and the tree became more reliant on the props, they were complemented with metal props.

Despite the poor response of one functional unit in particular, and the installation of the props, this tree shows remarkably good vitality. Look at the amount of growth it is putting on each year by examining the length between the terminal bud scars on the lower branches. The crown has been reduced several times to keep it small; it is one of the trees that has been most frequently cut in recent years at Burnham Beeches.

During the dry summer of 1994 the tree appeared to be suffering from the effects of the drought. Given the importance of this tree, the decision was taken to water the tree. A 10,000-litre slurry tanker filled with water was brought onto site once a day Monday to Friday for approximately a month and the root area drenched. We will never know if the extra water made a difference, but the tree is still alive today.

Look at the tree to the south, this tree was also cut fairly hard but has responded much better. Large stubs were left and the tree responded by producing new shoots from the stubs (now these look like substantial branches). Research undertaken at Burnham Beeches and in Spain has shown the beneficial effects of retaining stubs on beech trees. Stubs are often frowned upon in conventional arboricultural practice but do have a place in veteran tree management.

Druids Oak - (Grid Reference: SU9481984582)

This is the largest tree by girth at Burnham Beeches. As with all old trees it is difficult to estimate the age of the tree. Our current estimate places it at around 800 years old. This figure has been extrapolated from data relating to beech pollards collected by a forester in the 1930's combined with counting the rings on the branches when the tree was last cut. As such, this estimate should be treated with some caution, regarded as a 'best guess' rather a precise calculation.

It is marked on maps of Burnham Beeches and attracts visitors, although perhaps fewer than in the past when this was where most people came. The tree has a spiritual significance to many people and often after the summer solstice we find indications that people have come specially to see this tree.

The tree has not been cut for at least 30 years and the cuts at the top of the tree are most likely from the 1950s. If you look carefully you should also see some cabling, this was probably installed in the 1950s.

The tree has been fenced for a number of years to try and prevent compaction. However, the fence was very close to the tree and the trampling pressure was concentrated around the fence which was still well within the rooting area of the tree. In the winter of 2017/8, the fence was removed by sawing the posts off at ground level (i.e. not excavated) and the new fence erected. Whilst staying behind the new fence, have a look to see if you can still spot the position of the old fence. When we installed the new fence, every other post is 'floating' i.e. it is not dug into the ground but just held in place with a short metal stake. The fence was installed in this way to minimise the potential negative impacts of digging in the rooting environment of this tree. These holes were hand dug and interestingly no roots, not even fine roots, were found during the excavation. It is considered that this is likely due to past ground disturbance, possibly reinstatement works following military occupation during the Second World War (see next stop for more information).

There used to be a small wooden shelter to the east of the tree that attracted people, which in turn caused soil compaction. This was removed and not replaced although the concrete pad was left to avoid further soil disturbance within the root protection area.

Seven Ways Plain Scheduled Ancient Monument (SAM) - (Grid Reference: SU9462684622)

Some of the veteran oak and beech trees in this area are growing on the banks of a Scheduled Ancient Monument which is an Iron Age Hill Fort.

This area was an important recreation area in Victorian times, when people living in the city would visit to admire the scenery and take the air. In the Second World War this area was the location of an army camp providing accommodation for those working in Burnham Beeches. The Beeches was used as a vehicle reserve depot for the storage and repair of up to 10,000 vehicles at a time. It is likely that the combination of these factors have had an impact on the soil in this area.

Archaeologists generally do not like trees growing on the banks of Scheduled Ancient Monuments but here it is tolerated because of their value and antiquity. Keeping the growth of scrub and younger trees down can benefit both the Scheduled Ancient Monument and the old trees.

The health of the oak trees here does not appear to be particularly good. Could the answer lie in the soil? Are the trees suffering from the consequences of the Victorian visitors or the thousands of vehicles kept here during the Second World War?

If you visit in July, keep your eyes open for the rare *Piptoporus quercinus* which has been found on two oak trees in this area.

Fallen Beech Tree (inside gate) - (Grid Reference: SU9490684711)

After experiences of trees suffering from the removal of shade too quickly in the 1990's halo clearance is now done more slowly, and in a series of stages. But even this is not always successful! Ideally, clearance would be done at least one or more growing season before cutting to see how the tree responds to the increased sunlight. However, at Burnham Beeches, we now clear and cut in the same winter. This tree illustrates the issue; the increased exposure increases the risk of failure.

A 'high halo' was undertaken on the vegetation around the tree to allow more sunlight to reach the old tree. Look at the surrounding trees, can you see where the branches overhanging the old tree were removed? The branches have been torn or ripped off on the surrounding trees in an attempt to encourage habitats for fungi and invertebrates; if some trees die after high clearance then this just helps in the continual production of standing decaying wood.

Following the high halo, the old tree was due to be cut in an attempt to keep it upright. When the tree team arrived, they deemed it unsafe to climb and requested an access platform to facilitate the work. Unfortunately, the old tree fell over before an access platform could be brought to site to cut it. This illustrates just how fragile our old trees are.

As with most dead wood at Burnham beeches, the fallen tree will be left to decay naturally where it is. This decaying wood contributes to the decaying wood resource and provides habitats for a wide range of saproxylic invertebrates. Look at the decaying tree, can you see different sized holes? These are where the adult stages of different invertebrates have emerged having spent several years as larvae in the decaying wood.

To inform our management across the site we have undertaken some analysis of the rate of loss of our old trees. Comparing the rate of loss of the old trees before and after any management work was undertaken, shows that we have reduced the rate of loss of old trees at Burnham Beeches. This is encouraging; we will always have some losses, but we want to minimise the rate at which they occur. The analysis has been undertaken over a very short timescale in comparison with the life of these trees and it is important to keep monitoring and checking results of the work at regular intervals, ideally every five to ten years.

Dead Standing Oak - (Grid Reference: SU9479584824)

In the 1950's and 1960's some work was done to try and conserve the old pollards. Some trees, especially the oaks, were cut hard, almost back to the original bolling and for others winching of the branches was tried.

This oak is believed to have been cut in the 1950s and has died as a result of the cutting. However, despite having died at least 50 years ago, this tree has decayed very slowly; compare this oak tree with the beech at the last stop which fell and died more recently.

Many of these dead standing oaks are being decayed by *Laetiporus sulphureus* with fruiting bodies being produced most years. This fungus produces a brown rot in oak trees helping to recycle the nutrients locked up in the heartwood. The tree will be retained and kept upright allowing decay of the heartwood to develop into wood mould, a particularly valuable late-stage wood decay habitat. Look out for a fine, friable soil-like brown substance inside cavities; this is wood mould.

Beech Pollards - (Grid Reference: SU9482684850)

The beech pollards on either side of the path at this stop illustrate the impact of cutting in different ways, with some having been cut hard during the 1990s and others more recently in a more sensitive way. Learning from our experience from the hard cutting in 1990's, the techniques used now involve making smaller cuts and reducing the crown over a period of many years. We are also aware that the final cuts will never actually reach the original bolling; to do so would create large wounds which would cause too much dysfunction and potentially shorten the life of the tree.

Tree on South Side of the Path

This tree (no. 1551) was cut hard in the 1990s. Despite this it has grown quite well; notice however, the dieback at the bases of the large cut branches, which is now extending into the bolling. Holly is managed around the base to restrict access by people to cavities in the tree.

Trees on North Side of Path

Explore a little down the slope to see more gradual cutting techniques, where stubs have been retained to encourage the growth of new shoots. All of these old pollards have been cut at least once, some twice or more. The shape of some trees enables the crown to be reduced closer to the bolling, for others they will have to be to be managed as high crown veterans because all the leaves are so high on the branches. Whilst creating this self-guided trail in 2018, a tree at this location (no. 1227) fell over between visits; this highlights the fragility of these old trees.

Can you spot the tree where the upper branches have been cut using 'pole thinning'? Pole thinning involves removing branches on a rotation, beginning with the larger branches whilst leaving the smaller ones. You then come back after a number of years and remove the branches retained on the first occasion. This tree can never be reduced close to the bolling; pole thinning is an alternative method to try to stop the tree getting too top heavy.

Each time the trees are cut a bit lower, the halo around them needs to be made a little larger so that sunlight can still reach the foliage. Here the halos are starting to amalgamate so the trees as a group stand in a clearing.

Once an area is opened up to let more sunlight in, it can also attract visitors. Note the dead hedge along the path to deter visitors from standing under the trees and causing damage to them.

Ballerina Tree Area - (Grid Reference: SU9487384964)

Towards the bottom of this steep north-facing slope, the soils are some of the richest soils at Burnham Beeches, so the trees have grown very tall. Towards the top of this slope the soils are very thin, resulting in difficult growing conditions for veteran trees. After the Second World War some of the trees on the slope were fenced off to prevent access by people because they were considered liable to fall over and beyond the point at which any work could be done.

Note two large pollards on the left, when looking down the slope. These are not safe to climb and are inaccessible with an access platform because they are so tall. Reduction work is probably impossible on these trees and they will be left.

A small rare snail (*Spermodea lamelata*) which likes deep leaf litter in the shade, lives in this area. The process of halo clearing needs to bear in mind the needs of other species and thus here more holly and other trees will be left to maintain suitable habitat for the snail.

The 'Ballerina Tree'. This is a veteran beech pollard, albeit a very small one. What remains is one functional unit; perhaps once it looked like the Cage Pollard and just one strut of the cage is left now. Despite being a small tree, it is still valued, inspected and a work programme drawn up for it. Probably it will only require haloing to ensure it has enough light and some small trimming to keep the crown small. Have a look to see if you can see the internal roots exposed on the bolling, these have developed in response to wood decay at this location. These roots can take advantage of minerals being released when this wood decays – the tree is 'eating' itself!

Lichen Tree - (Grid Reference: SU9506485076)

This huge pollard has several rare lichens living on it. Sadly, despite a lot of effort over recent years the tree has died, and the lichens will probably not survive for long. Depending on how soon you visit, the tree may no longer be standing!

The roots of this tree are colonised by the wood decay fungus *Meripilus giganteus*; in late summer and autumn you may see the fruiting bodies at the base of this tree. This fungus decays tree roots and can cause windthrow. However, if the beech tree has good health, it can sometimes produce new replacement roots as quickly as *M. giganteus* decays the old ones. To investigate further, the soil around the tree was excavated using an air spade during the winter of 2014/15. This allowed us to inspect the roots.

At that time few were still alive, and subsequently they have all died. Because of its lichen interest, we have installed guy ropes to help keep this tree upright. These tethers have been attached to the maiden trees behind it. As well as helping to retain the lichen interest, these tethers also help manage the risk by preventing the tree from falling into the road.

On the other side of the road, a large beech tree was felled to get light to the lichen tree and a large oak pollard. The oak has responded well to the additional light although the beech did not respond positively.

One of the rare lichens is abundant on the side of the tree nearest the road. Some of the lichen has been cut off the tree and transplanted to nearby beech trees that are younger but have potentially suitable bark conditions. The new host trees may then require halo clearance to make sure enough light can reach the lichen.

Beech Pollard - (Grid Reference: SU9512085052)

Reduction cutting of the old pollards to keep them from falling apart has the aim of keeping the trees alive and upright so they continue to be habitats for associated saproxylic species. Sometimes the decaying wood on a tree contributes to the weight and on fragile trees, like this one, a difficult decision has to be made; either it must be removed or the tree will fall over.

If the habitat has to be removed, ideally it should be re-erected adjacent to the tree. However, in this case it was too fragile and disintegrated when it was removed. Veteran tree management involves some difficult decisions; should we have kept the habitat and risked losing the tree?

Due to the fragility of this tree, it may be possible that by the time you visit the tree has collapsed. It is not possible to save every tree, and we must focus our resources where they are most effective. This may be on trees that will last for a long time and have good vitality or trees that offer unique habitats or support rare species.

Thank you

We hoped you have enjoyed your visit to Burnham Beeches to learn about the management of veteran trees.

Want to see more? We suggest you take a walk through the area marked on the map as 'Egypt'. Here you can see a variety of veteran pollards, mostly beech but also a few oak. Almost every old pollard has had at least one reduction cut carried out, some more. Halo clearance is providing them with sufficient light and some are standing in groups.

There are more self-guided veteran tree management trails at Ashtead Common, Epping Forest and Hampstead Heath. More details can be found on the Ancient Tree Forum website (http://www.ancienttreeforum.co.uk).

The Ancient Tree Forum website also contains a wide range of resources on all aspects of veteran tree management, including books, ancient tree guides, videos and magazine articles (http://www.ancienttreeforum.co.uk/resources).

Have you taken VETcert? VETcert a certification scheme for professionals working with veteran trees. VETcert enables you to test your knowledge and skills as well as to stand out from the crowd. There are two levels of certification, practising and consulting, reflecting the different roles within the industry. See the Ancient Tree Forum website or www.vetcert.eu for more info.

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References

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VETree veteran tree management videos available here:
http://www.ancienttreeforum.co.uk/resources/videos/veteran-tree-management/

Glossary

Air spade – a tool which uses compressed air to excavate soil. Often used to explore around the roots of trees.

Bolling - a term used to describe pollard heads or sometimes the entire permanent framework of a pollarded tree.

Functional unit – semi-automatous unit comprising a foliage bearing region, stem and root system.

Halo clearance/haloing- in veteran tree management, the phased thinning or clearance of non-veteran trees or shrubs that are harming one or more veteran trees by shading or other competition.

Internal roots (syn. aerial roots) – adventitious roots that have developed above ground in response to the presence of organic matter, typically decaying wood. These roots are normally associated with hollow stems/limbs and obtain nutrients and minerals released by wood decay fungi.

Pole thinning – the selective removal of re-growth from a pollard. Typically used as a tool when managing lapsed pollards to avoid the removal of the entire crown.

Pollard – a tree that is managed by on a cyclical basis by the complete or partial removal of the crown of a young tree so as to encourage the development of numerous branches.

Wood mould - a late stage decay product. Wood mould requires stable conditions to form and, being a late stage decay product, takes a long time to form. Due to its scarcity it has a high ecological value.