Hampstead Heath

Veteran Tree Trail

General information

Hampstead Heath was once a wild scrubland area with gorse, occasional patches of pasture and groups of planted pine. Today's oldest trees (a small number of which are pollarded oaks) are remnants of hedgerows and boundaries. The grazing ceased in the 1950's which has resulted in secondary woodland encroaching the older trees. The Heath today, is a mix of managed heath grassland, birch, oak, beech and sycamore woodland and Victorian planted landscape trees.

In 2002 a local veteran tree survey initiative began inspecting and plotting the older tree stock. This resulted in focused veteran tree management to the most vulnerable of these trees. This walk illustrates some of the lessons learned while trying to manage a population of ancient trees and includes some failures as well as successes.

Managing trees on the Heath brings numerous challenges due to the high public use of the site (approximately nine million visits per year). This high number of visitors requires risks from falling trees to be managed appropriately, but also brings conflicts such as soil compaction and anti-social behaviour; including arson.

New management challenges present themselves on a regular basis, for example in 2015 oak processionary moth (*Thaumetopoea processionea*) was first recorded on the site. This pest poses a threat to human health due to irritating hairs found on the caterpillar. To manage this pest the trees in which they nest have to be treated with insecticide, this insecticide has also a negative impact on native insect species.

Golders Hill

Golders Hill Park adjoins the West Heath and was once part of a large mansion estate called Golders Hill. This area became a public park in 1898 when it was put up for sale and bought by the London County Council, it was subsequently transferred to the City of London Corporation in 1992. The site had a working orchard and kitchen garden. There are veteran oaks along the boundary and sweet chestnut and mulberry in the parkland.

Veteran Pear (Grid Reference TQ2562587026)

This tree highlights the historic use of the land and is one of the last living remnants of a traditional orchard. Unlike modern fruit trees, which are grown on dwarfing root stocks making harvesting easier, this specimen is rather tall. The stem of this tree is hollowing and provides fantastic habitat for saproxylic invertebrates; however due to its large stature we need to ensure it does not collapse. The tree has been subject to three crown reductions over the last 10 years to help stabilise the tree.

A woodchip mulch has been laid around the base to improve soil conditions; mulch helps retain moisture and encourages earthworm activity, helping to de-compact the soil. The mulch has an additional benefit that it reduces the likelihood of people sitting beneath the tree, thereby reducing further compaction and helping to manage the risk from falling parts. The mulch material used was originally wood chip from the Rosaceae family but more recently the wood chip comes from a mixture of deciduous trees. The mulch is topped up as needed, normally every two years.

At the base of this tree there is bushy epicormic growth. This growth used to be removed by horticulturalists as it was seen as unattractive. However, we now understand that retaining this growth enables a secondary, lower crown to develop which helps sustain the root system and acts as an insurance policy should the trunk break.

Bandstand Oak (Grid Reference TQ2576886936)

A prominent and well-known tree at the heart of the park. Sitting on a hill it was hit particularly hard by the 1987 storm. Following this damage, the tree was cut back almost to the trunk in certain places. At certain times of year, you may be able to spot the fruiting bodies of *Laetiporus sulphureus*, a bracket fungus that produces brown rot. Fortunately, the tree recovered from the damage caused by the storm and the heavy pruning that followed. The tree's ability to develop a new crown illustrates a process known as reiteration.

This tree faces a number of management challenges. The grass lawn used to extend right up to the trunk. To maintain this lawn, mowers were frequently used in this area causing compaction of the soil and damage to the buttress roots. Furthermore, it encouraged people to walk and sit beneath the tree, increasing the risk. We installed a fence to give this tree some space and moved the benches; this helped ensure the grass mower was kept away from the tree alleviating all three of these problems.

Even with the fence in place management is required; the vegetation inside the fence has to be managed to prevent it competing with the lower sections of the tree's crown and the oak regeneration growing inside the fence. To help improve the vitality of the tree it has been treated with compost tea both to the roots and in the crown. Unfortunately, oak processionary moth has been recorded in the tree.

Sandy Heath Pitts Garden

This area was once part of the garden of William Pitt's (once the British Prime Minister) property. The original house where Pitt lived was demolished in the 1950's when the land, including the garden, were acquired by the London County Council and brought into the management of Hampstead Heath. In 1992 the Heath was transferred to the City of London Corporation.

Pitt's Arch Beech (Grid Reference TQ2614186844)

This significant beech tree brings with it a rather unusual management challenge. It sits next to a wall of a listed building, known as Pitt's Arch. The tree has grown to such a size that it is pushing the wall over. Instead of felling the tree, the wall has been supported to slow its decent to the ground; a nice compromise that retains both the tree and the historic structure.

The tree would have originally been in more open conditions, but due to lack of grazing, secondary woodland has grown up around the tree. To ensure the tree receives enough sunlight, a 'high halo' has been undertaken by removing selected branches from neighbouring trees. Care needs to be taken not to change the tree's environment too quickly as a result of the halo management. For thin barked tree species, such as beech, there is a risk of the bark becoming sun scorched or the tree suffering from drought stress due to increased transpiration.

A potential risk of clearing around this tree is the possibility of exposing this tree to an increased wind loading, which may cause the tree to fail. This area of the Heath is less frequently visited by members of the public. As such our approach to risk management is less intensive here than other areas with higher visitor numbers.

Fruiting bodies of *Perenniporia fraxinea* appeared on the main stem in 2014 and a tomograph undertaken in 2018 has indicated that the trunk is decayed. This decay provides fantastic saproxylic habitat but the stability of the tree needs to be managed to ensure that the tree does not fail.

This tree also demonstrates an interesting trait that trees are capable of – inosculation i.e. forming natural braces. Look at where the two branches just above the Arch have met and fused. This acts as a natural brace.

Sandy Heath

Sandy Heath is the least visited and quietest areas of Hampstead Heath. Originally heathland, it has become secondary woodland dominated by oak and birch with a scattering of planted beech trees. Small patches of restored heathland remain with gorse, heather, pine and several ponds. Historically, sand and gravel were extracted from this area, which has left behind the cratered landscape, which is now overgrown by the woodland.

Two Tree Hill (Grid Reference TQ2636386919)

These unique trees illustrate the historic land use of the area. The surrounding sand was excavated to extract the raw material for London's expansion. The result is that these two trees have been left sitting on top of a small 'hill'. The photo shows the trees in 1866; at this time a toll was payable for those who wanted to travel through the area. Clearly these trees were already well established at the time the photo was taken. It is interesting that these trees survived when so much soil was removed from around them. This may indicate that the roots of these trees travel deep into the soil in search for water; the sandy soil is free draining. The soil that remains has suffered from compaction as a result of this excavation and heavy footfall right up to present day.

Secondary woodland has encroached since the area was excavated; this woodland poses a threat to these trees by way of shading. In 2006 the vegetation surrounding these trees was managed to allow more sunlight to reach the trees. This involved whole tree removal as well as a high clearance of neighbouring trees. Can you see where vegetation has been removed? Material produced by this clearance was installed as a dead hedge to discourage access beneath the trees. However, this dead hedging has been set on fire, posing an additional threat.

Oak processionary moth and the rare purple emperor butterfly (Apatura iris), have been recorded on neighbouring trees. This illustrates an example of a management conflict with regards to habitat of native & invasive lepidoptera species.

Constable Pine (Grid Reference TQ2648087129)

This tree was one in a group of trees painted by John Constable (a famous landscape painter from the 18th and 19th Centuries). Today it is the only one in this group that remains standing. It is the oldest pine tree on Hampstead Heath and of significant ecological and cultural value. A guy rope attached to a neighbouring beech tree helps to keep this tree upright. This was installed due to fears that the pine may fall over. Since this guy rope was installed, the beech tree has died. As the beech tree begins to decay it is likely that it will fall and the pine with it, resulting in the loss of this irreplaceable tree. We are currently looking at alternative ways to keep Constable's pine standing.

Vale

The Vale of Health was once an unattractive swamp area that was drained by the Hampstead Water Company to create a new reservoir in 1777. It was a seldom visited area before the works, but the development made it more ecologically diverse and popular. There is a remnant pound where stray livestock or illegally grazed animals were penned by the local keeper.

The Hollow Beech (Grid Reference TQ2679586572)

This is a well-known tree that has been hollowed out by various bacteria and fungi over the last 100 years or so. We are told that it can accommodate 15 people within its trunk, although we have yet to test this! Look inside the hollow trunk, can you see the internal roots that formed due the presence of decaying wood? Trees can lay down these roots and take advantage of the decaying wood at their heart; this is a survival strategy enabling trees to live longer, by recycling otherwise locked-up nutrients.

Unfortunately, the hollow stem acts like a chimney and has attracted various arson attempts, a number of which have been extinguished by pouring water down the top of the hollow. Luckily the tree still shows signs of good vitality despite the fires.

The tree was damaged during the 1987 storm, with the main trunk failing at around 13 m. The upper crown has re-grown well and is now managed on a five-year cycle. Each time, 1-2 meters are pruned from the top to stop the tree protruding beyond its neighbours. In combination with this reduction, the surrounding trees have been removed to ensure sufficient light reaches the beech crown.

Wild Service Trees (Grid Reference TQ2680586572)

Although on glance this appears to be one tree, you are looking at two trees. This is illustrated in the spring when they flower at slightly different times. One of these trees has lost a significant limb and there were concerns that more might fail.

To manage this risk, the path was moved to stop people walking beneath the tree; moving the path also provides benefits by reducing soil compaction. Dead hedging was installed to deter people from using the old path, however this material was set alight. In 2013 the tree was braced to reduce the likelihood of it falling apart.

The Three Sisters

These three gnarly veteran oak trees have been given more sunlight by removing surrounding vegetation. Look to see the how the surrounding younger trees have been managed.

Hampstead Gate

This area is a gateway between Hampstead Heath & the Kenwood Estate. There is a Saxon ditch which has been here since at least AD986. Ancient trees and stones also mark this old Manorial and Parish boundary.

Remnant Veteran Oak

This tree may be dead, but it is still full of life. The main trunk of this tree failed in two stages; partial failure in 2015 and complete failure in 2016. Between these two events the path beneath the tree was closed to manage the potential risk from this tree. Unfortunately, the tree died, but is now retained as standing deadwood and still provides a valuable saproxylic habitat which would be lost if removed. This tree houses many different species of fungus. Look to see if you can see the fruiting bodies of *Pseudoinonotus dryadeus*, *Laetiporus sulphurous, Fistulina hepatica* and *Grifola frondosa*. A sapling from an historic ancient oak has been planted here as a replacement.

Hampstead Gate Oak (Grid Reference TQ2693286756)

The oak on the opposite side of the path is still alive and has been managed by means of a phased reduction. Similar to the dead tree opposite, this tree provides fantastic saproxylic habitat in its gnarly trunk. During summer and autumn, the fruiting bodies of *Fomes fomentarius, Fistulina hepatica* and *Laetiporus sulphureus* might be present.

Ribbed Oak (Grid Reference TQ2691686776)

This oak used to have a busy track directly beneath the crown. This track encouraged people to walk beneath the tree, causing the soil to become compacted. To address this, the path was moved and a dead hedge installed to discourage people from using the old path and the tree has been treated with soil drench applications of compost tea. A halo clearance was also undertaken to remove some of the surrounding trees and let more sunlight in. Look at the dead lower branches, these died as a result of shading from surrounding trees; the halo clearance will help prevent any more branches from being shaded out.

Chubb Path/ South Meadow

The South Meadow was once a pasture with three separate fields with hedgerow boundary oak trees which are now engulfed by secondary woodland comprising birch and oak. Across the boundary into Kenwood Estate, the woodland is designated as a Site of Special Scientific Interest for its "…*exceptional structure comprising an abundance of old and over-mature trees providing dead wood habitat for a range of invertebrate species*...". This important neighbouring habitat is a consideration when managing this area; wildlife species do not pay much attention to ownership boundaries.

Dead Habitat Oak on Path (Grid Reference TQ2706286857)

This is another example of retaining dead trees for their ecological value. This tree sits adjacent to a busy path. Rather than removing it when it died, the risk posed by this tree has been managed by reducing the branches. This tree has been worked on three times; with each intervention the branches have been reduced further.

Look at the branches on the far side of the tree, these have been retained whilst the branches over the path have been removed. This balances the value of the standing deadwood against the risk posed. The unique microhabitats provided by decaying wood vary depending on a wide range of factors such as size of the branch or trunk, aspect, height, etc. Keeping the branches on one side retains some diversity, which is preferential to just a straight trunk.

Unfortunately, this tree eventually fell over in early 2020 due to root decay and wet ground conditions experienced during the winter of 2019/20. The fallen tree will be retained as decaying wood habitat.

Area of Wood Pasture Restoration (Grid Reference TQ2709786802)

This area is in the process of being restored to wood pasture habitat, a once widespread but now scarce habitat. To achieve this, secondary woodland is being cleared; the first stage is a halo clearance around a group of veteran oaks. Whilst it may seem counter-intuitive to remove this secondary woodland, restoring the landscape will provide a habitat of greater value than young, closed canopy woodland.

An open structure provided by wood pasture habitat provides sufficient light to existing veteran trees, provides suitable conditions for new veterans to grow, and allows room for grassland communities that would otherwise be absent from closed canopy woodland. There is a long-term aspiration to graze this area, but challenges around managing livestock and large numbers of visitors would first need to be overcome. In the interim, this area is kept open by cutting once a year.

The low branches on the downhill side which re-grew after it was last cut, indicate that the surroundings were more open with lots of sunlight at that time. If the tree had been shaded, the branch structure would have a more upright form as the branches would have grown in search of light.

Highgate

This area is the south western entrance to the Kenwood Estate.

Fallen Oak (Grid Reference TQ2743887016)

This tree had its crown reduced in 2013 due to a significant lean and the presence of a hollowing stem and wood decay fungus *Fistulina hepatica*. It is likely that the tree's roots were damaged when the adjacent path was installed. In 2016 it was noticed that a crack had developed through one of these buttresses, and it fell the following day during calm conditions. Inspecting the fallen tree, it was apparent that what appeared to be buttresses were not connected to roots and therefore provided little structural support.

A crown reduction aimed to reduce the chance of the tree failing. In hindsight the volume removed was not enough to prevent this. There is always a challenge with veteran tree management in terms of reducing the risk of mechanical failure; finding the balance between removing enough to avoid the loss and leaving enough for the tree to survive physiologically. The fallen deadwood has been retained as it provides a valuable saproxylic resource. This is a well-used area and so the retention of this tree provides a strong visual message and an opportunity to educate the public about the value of decaying wood as a habitat.

Row of Lapsed Pollards

Adjacent to the path, leading away from the fallen oak, is a row of lapsed oak pollards. These trees were last cut approximately 100 years ago. Have a look at the form of these trees, the trunk is straight until around 2-3m above which point multiple branches are growing and/or evidence of previously removed branches can be seen.

Once a widespread practice, pollarding was undertaken to produce winter fodder for livestock, firewood or timber. Pollarding speeds up the rate of trunk hollowing creating valuable saproxylic habitats at a younger age than occur naturally. Due to the length of time elapsed since these trees were last cut, it is not intended to re-instate pollarding. The size of the wounds and amount of dysfunction re-pollarding would cause would compromise the trees. Instead, these trees will be allowed to continue to grow in their current form.

This highlights an important principle in veteran tree management; as tree managers prescribing tree management, the first question we should ask ourselves is 'does anything need to be done?'. Only when there is an identified need should we consider intervening. It is also vital to be clear about the objective of any work.

Dead Standing Oak

Further along the path is another example of standing deadwood being retained. Similar to the dead tree at stop 6, the branches have been reduced to reduce the risk but retain important habitats. Look at the top of the tree, there is a small cavity which is used by roosting bats. This means that this tree is protected as a roost site and contributes to the local bat population.

Bird Sanctuary Path

The Bird Sanctuary is a conservation area which has restricted access to protect wildlife.

Lapsed Pollard Behind Fence (Grid Reference TQ2761186768)

This tree has lost a number of limbs that have fallen onto the path. The wood decay fungi *Fistulina hepatica* is present in this tree. Look at the large cavities in the main trunk. Trees with large cavities are valuable for larger bird species; this tree is used by nesting tawny owls (*Strix aluco*). To reduce the likelihood of further limbs failing, this tree is programmed for a phased crown reduction over 10 years.

Meadow Oak

In 2014 this tree was reduced as part of a phased crown reduction programme that will take place over 10 years. This work was carried out due to significant peripheral branch dieback. The crown contained a number of long, dead lateral branches, these were stabilised by shortening them. A small vertical reduction was also undertaken to remove the apical dominance and stimulate growth lower in the crown. Look at the epicormic growth arising from the lower sections of the trunk, this growth is developing well following the first reduction and it is hoped it will develop into a secondary crown allowing the tree to retrench over time.

Cut material was stacked at the base of this tree. Subsequently, fruiting bodies of *Armillaria tabescens* (ring-less honey fungus), a saprophytic relative of the more common *A. Mellea*, have appeared at the base of this tree.

Boating pond

The boating pond is a reservoir which has recently been re-engineered, providing the opportunity to redesign the shape to include a new island. It attracts a large number of visitors during the summer months.

Hollow Oak (Grid Reference TQ2770686606)

A large section of this tree fell in 2012, exposing a hollow trunk. The fallen dead wood has been retained. As well as retaining a decaying wood resource it also provides benefits for visitors to the site; people frequently use it as a bench and children climb and play on it. In 2016, a new path was installed running between the boating pond and this tree. To minimise impacts upon tree roots during construction, no-dig technology was used to construct the path.

People walk under and congregate beneath this tree, which means risk management needs to be considered. To manage this risk, the tree's condition is regularly monitored and in 2016 the crown was reduced with a plan to phase further reductions over a period of 10 years to help keep the tree stable. This approach demonstrates proportionate risk management, taking account of the wide range of values this tree provides (ecological, aesthetic and ecosystem services such as shade or a place to congregate) and weighs them against the risk.

Dead Tree and Regeneration (Grid Reference TQ2756686550)

This dead tree standing in the middle of the field has been retained for its ecological value. Next to the tree is a patch of bramble scrub, providing a source of nectar for invertebrates (often a requirement of adult stages of saproxylic species). Look in the middle of the scrub and you'll see some saplings growing. The bramble acts as a nurse crop for regenerating trees that would otherwise fall victim to the mower. Scrub plays a similar role on sites that are grazed, preventing browsing damage until the tree becomes established.

Thank you

We hope you have enjoyed your visit to Hampstead Heath to learn about the management of veteran trees. There are more self-guided veteran tree management trails at Ashtead Common, Burnham Beeches and Epping Forest. 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 is 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.

Thank you to the City of London Corporation for funding this project and also to David Humphries and Alasdair Nicoll for providing their time and expertise.

References

Humphries, D (2017). Veteran trees, extreme weather and habitat benefits. The Arb Magazine. Arboricultural Association, Stonehouse.
Available here: http://www.ancienttreeforum.co.uk/resources/atf-in-the-media/the-arb-magazine/

Glossary

Compost tea - a liquid, biologically active amendment that can be applied to soil and plant leaves to potentially assist disease suppression, root growth and aid photosynthetic efficiency.

Ecosystem services - the benefits that a particular species or range of species bestow upon others (including humans) through ecological relationships (e.g. by pollination or by the breakdown of dead remains of plants and animals). Such services can sometimes be estimated in a form that allows them to be included in financial accounting.

Dead hedging - a barrier constructed from cut woody material such as branches and young trees.

Epicormic - pertaining to shoots or roots which are initiated on woody stems; shoots can form in this way from dormant buds or they can be adventitious.

Fodder – cut branches (leaves and twigs) typically dried and fed to livestock during the winter months when other food is scarce. It can also be used directly in the summer months in the event of a drought.

Inosculation – where stems, branches or roots of the same or two different trees grow together, often forming a natural brace.

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.

No-dig pathway – a construction technique for the installation of pathways that does not require excavation. Pathways constructed using this technique protrude above ground level. This technique is often used within the root protection area of trees to avoid damage to tree roots that would occur if excavation was required.

Reiterative growth – on a mature or old tree, the secondary development of twigs or branches in a form which resembles that of a young tree or of its primary branches.

Resi-drill – a piece of decay detection equipment used during tree surveys to provide an indication of the extent of decay by measuring the resistance to drilling.

Retrench – progressive reduction in the size of the crown of an old tree, by means of the dieback or breakage of twigs and small branches, accompanied by the enhanced development of the lower or inner parts of the crown.

Saproxylic - pertaining to organisms that depend on decaying wood for their habitats.

Secondary crown - a crown that develops lower down inside of the original typically as a result of changes in crown architecture such as retrenchment.

Secondary woodland – woodland that has developed due to a change in land use, e.g. cessation of grazing.

Tomograph – the visual display produced as a result of sonic tomography which displays the likely extent of sound and decayed wood in a tree trunk or branch. Sonic tomography measures the speed of sound between multiple points on the trunk or branch; sound waves travel faster through intact wood compared to decayed wood.

Wood pasture – a habitat that typically contains large, open-grown or pollarded trees at varying densities, in a matrix of grassland or heathland, scrub and sometimes with areas of denser or closed-canopy woodland.