WOODLAND ARCHAEOLOGY IN LONDON

JOHN K. MORRIS

ENGLISH HERITAGE

Forestry Commission England

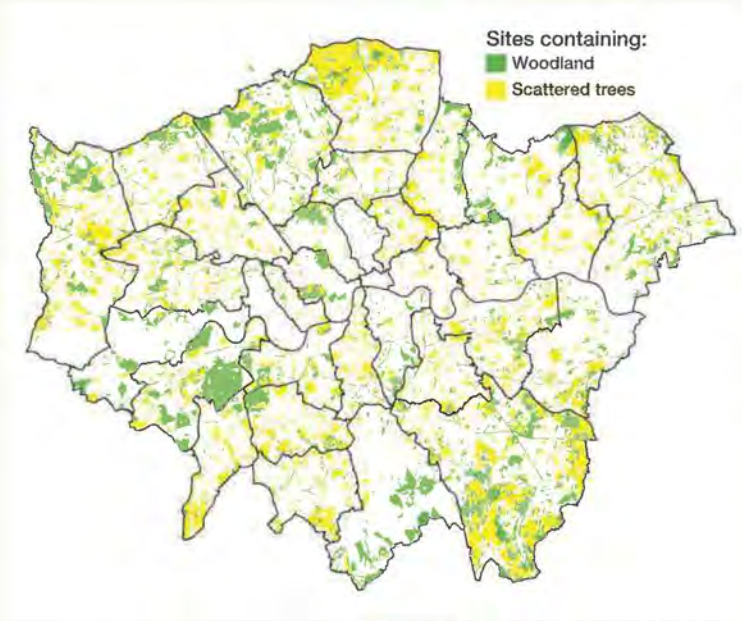
Boudicca's mound, Hampstead Heath

INTRODUCTION

Woods are an important part of the landscape of the London region with many cultural associations. The archaeological evidence that survives in woods can help to explain past woodland management and the wider historic landscape. The importance of the cultural heritage of ancient woodlands has increased considerably in recent years. It is a key part of the government's ***Keepers of Time*** policy.

Woodlands have been the black hole of archaeology as they have been overlooked by many archaeologists, who often identify likely sites by aerial photography, which the trees hide. Features in woods still exist, as both major and minor earthworks, rather than as buried features in a developed landscape. It is not clear how much woodland archaeology there is, as so little has been surveyed. There is more to be discovered!

The remains from earlier land uses have weathered and eroded over the years, and may have been buried in places, but they survive better in woods than elsewhere and can reveal much interesting information about the history of the area.



London region showing distribution of woods

OBJECTIVE

The aim of this guide is to raise awareness of woodland archaeological features that are an important part of London's heritage. It should help woodland owners, managers and others understand and protect them from potentially damaging operations when carrying out woodland operations.

1 LONDON'S WOODLANDS

London's Woods cover about 4.5% of the London region and about 40% of London's woods are ancient. Ancient woods have remained as woodland since at least 1600AD and are seen as an integral part of England's historic landscapes. Although woods have often protected archaeological features from cultivation and disturbance, they can be damaged by public use, equipment and forestry practices if care is not taken to identify and consider them.

The woodland of the London area will have been managed from the Bronze Age. The establishment of Roman *Londinium* demanded large quantities of timber, and many of Roman London's needs would have been supplied from its surrounding woods and forests. Pottery kilns, for instance, were established in woodland in Highgate and Brockley Hill, Stanmore and fuelled by wood.

With the growth of London in the Middle Ages (12th-15th centuries) fringe woodland, such as at Highgate, Leyton, Dulwich, and Wimbledon, was managed to support many of London's trades and industries. These included:

- Charcoal burning of hornbeam and oak, the charcoal was used for fuel for cookhouses and metal working.
- Tanning – using oak bark needed for making leather, based in Bermondsey.
- Ship building – Sir Francis Drake's ship the Golden Hind was made from oak timber from Great Stake Pit Coppice near Norwood.
- Building construction, including the wharves of Roman and medieval City of London.
- Many woods had the job of supplying firewood to the growing city of London. In the eighteenth century this declined through increased competition from coal.

Woodlands were not considered places to enjoy as they are now, but were a valued resource; for those who had commoners 'rights' they were places to gather firewood and graze livestock such as pigs.

WANSTEAD PARK (City of London Corporation since 1882)
A former Elizabethan deer park, then landscaped grounds including by Humphry Repton, around a very grand house which was demolished in 1824, now part of Epping Forest. A Roman mosaic was found here. The park also had old fishponds, ornamental gardens and lake.

Repton also laid out a series of formal paths (or walks) around Kenwood, next to Hampstead Heath in the 1790's.

WHY ARE WOODS WHERE THEY ARE?

Ancient woods have survived around London partly by chance, as suburbia developed around them, and partly due to active campaigning to safeguard these important green features for their amenity and other values.

The management of woods has been heavily influenced by their proximity to and demands from London. Fashions have also played a part, with some landowners clearing woodland for agriculture in the past, or for development, while others planted trees and woods.

London's housing expanded rapidly in the 18th and 19th centuries covering large areas of farmland. By the Victorian period there was a move to protect some of the Commons, Heaths and Woods and bodies like the City of London Corporation were given powers by Acts of Parliament to acquire and protect land as open spaces for Londoners.

Fallow deer in Richmond Park

Other woods have developed in parks, gardens and cemeteries – some in a planned manner, in other cases by default as trees will grow when the land is not cultivated or grazed.

DESIGNED LANDSCAPES

such as parks around the great houses are a feature of the Greater London area. These changed with the fashion and the great designers of the day, including Charles Bridgeman in 1720's and Lancelot "Capability" Brown in 1760's. The Royal Parks, such as Richmond, were managed as wood pasture systems with herds of deer and other livestock grazing beneath trees.

Coppiced hornbeam in Ruislip Woods

TYPES OF WOODLAND FOUND IN LONDON

ANCIENT WOODS

Have been continuously wooded since 1600 AD (*Natural England and the Forestry Commission use this definition*). Ancient woods can often be identified on early maps or from other documentary evidence going back over 400 years. These woods are more likely to have a rich ground flora of species adapted to woodland conditions, and other wildlife associated with a long continuity of woodland cover. They are of historical and ecological interest in their own right. Natural England holds lists of plant species that may indicate ancient woodland; the more of these species that occur in the wood the more likely it is to be ancient

SEMI-NATURAL WOODS

Are composed of native species which have arisen by natural means but with their condition modified by management. These woods are considered to be of the highest nature conservation value and also of considerable cultural and historic interest. They retain features that are not found in more recent woods.

HORNBEAM COPPICE

Is an important local semi-natural woodland type found in the London area which is rare elsewhere. Hornbeam was coppiced for fuel, often with oak standards grown for timber. Hornbeam stools can be hundreds of years old. The thin branches were cut and bundled up into faggots, which were used to provide heat for bread ovens. Associated trees include the ancient woodland indicators midland hawthorn, crab apple and wild service tree.

EPPING FOREST

Good examples of former wood pasture with ancient pollards survive in Epping Forest, which is the largest public open space in the London area (owned by the City of London Corporation since 1878 Act). It was a Royal hunting forest with a hunting lodge built by Henry VIII, and it stretches 12 miles from Manor Park in East London to just north of Epping in Essex, a landscape that includes areas of historic wood-pasture, green lanes, ancient pollarded trees and grassy plains, and is internationally renowned for its 50,000 ancient pollarded trees – primarily Oak, Beech and Hornbeam. There are two Iron Age hill forts / camps within the forest, both are scheduled monuments. Commoners from 18 parishes had rights to graze and collect firewood in the forest for 800 years.

RECENT WOODS

Have developed, or been planted, since 1600AD. Landscaping through tree planting has occurred since this date. **Conifer planting** was popular through much of the nineteenth and twentieth centuries.

Other areas have become **Native woodland** by natural regeneration of indigenous trees and shrubs. **Secondary woodland** can develop quite quickly over the remains of collapsed buildings and abandoned land. Wind dispersed trees such as birch, sycamore or ash can develop on bare land or in the rubble from collapsed walls and within a few years hide remains.

COMMONS AND HEATHS

Were privately owned, although "rights of common" have their origin in local custom which date back to the medieval period or earlier.
Some commons were once very large. **Commoners rights** were attached to particular properties and could include, for example, the right for pigs to forage on beechmast and acorns (pannage), to remove peat for the hearth (turbary), to fish (piscary) and to collect bracken or firewood (estovers). Commons provided an important economic role as places for grazing livestock and as a crucial source of fuel.

The extent of commonland in London has been reduced by enclosure and development. Most commons used to be grazed but since this ceased many have developed into scrub and secondary woodland, but in some cases old open grown trees survive. Many commons were managed as **wood pasture,** with grazing animals kept beneath an open canopy of pollarded trees.

Some commons were also important for communications and used as drove routes to move animals to market.

Ponds are frequently found on commons where they were used to provide water for grazing livestock. The layers of sediment may contain pollen grains and other evidence that helps interpret the past environment. Over time deposits build up in layers in the pond or bog, which can be dated. The exact point in these layers that any historic artefact or historic pollen evidence is found is critical to this dating.

TREES AND HEDGES

VEGETATION

Can be an important clue to the historic use of an area. Changes in vegetation can be used to pick out a variety of features such as old banks and ditches, where different soil and moisture characteristics allow different plants to grow. Mosses for example are often found on old boundary banks, as the soil conditions here are different to the surrounding woodland. Sometimes plants such as bluebells fail to spread even quite modest distances if a bank makes it difficult for the seeds to cross. This can be a clue to the age of the woodland. Stinging nettles and elm trees often indicate enriched or disturbed ground around habitation and may remain dominant as evidence of former activities for hundreds of years.

ANCIENT AND VETERAN TREES

Are old trees with holes and hollows resulting from decay and broken branches They are of particular value for rare wildlife, including bats, beetles and fungi, and may also be of considerable historical interest and as landmarks.

POLLARDS

Result from an ancient form of woodland management in which branches were cut off about 3 metres or so up the trunk to provide fodder and firewood, allowing new shoots to grow out of reach of browsing animals. They are found either as boundary trees or on old wooded commons, where they were on grazing land, ie former "wood pasture". In some cases these trees have survived for several hundred years to become historic features in their own right.

Beech Pollard

MANAGEMENT OF OLD TREES

Retain old pollards and veteran trees because of their historical, cultural and nature conservation importance. In some cases tree surgery may be necessary for safety reasons and this work could help prolong the life of the tree if it is carried out carefully. If trees are to be repollarded then some living branches should be retained with leaves and buds. They should not be cut hard back to a stump.

OLD WOODLAND BOUNDARY HEDGES

Often contain a wide range of trees and shrubs and tend to acquire more species with age, but this depends on the soil type and light levels. Many simple straight thorn hedges were planted in recent centuries, some as a result of Enclosure Acts. Animal damage (for example by grey squirrels) and fire damage are threats to the survival of old boundary hedges.

MANAGEMENT OF WOODLAND HEDGES

Hedges should be retained but are likely to require management such as coppicing or laying. Careful consideration should be given to the position of any fencing. Do not cut corners as the irregular shapes of ancient boundaries are important. One of the greatest threats to a hedge is from shading by the overhanging tree canopy, which kills hedge plants and leads to gaps.

HORNBEAM STUB HEDGES

Are a special feature of many woodland edges in London and are rare elsewhere. Some are very old.

Hornbeam stubs on bank in Ruislip Woods

HORNBEAM HEDGES

Require careful management to conserve them. This might include high coppicing of the stub to prevent its collapse and the removal of surrounding trees to give it the light it needs. Trees may need to be cleared back to give open canopy of at least 7 metres width along the length of the woodbank. Where possible some live shoots should be retained to stimulate new growth. The best time of year for this work is likely to be in winter.

RUISLIP WOODS

Has an extensive network of historically important earthworks and woodbanks. Stubbing of hornbeams has taken place and has been a success. This National Nature Reserve is owned and managed by the Borough of Hillingdon and is the largest woodland in London. These woods were recorded in the Doomsday Book in 1086. They provided timber for the building of Windsor Castle and the great battleships of the past. It now consists of four principal areas: Mad Bess Wood, Bayhurst Wood, Park Wood and Copse Wood.

2 WOODLAND ARCHAEOLOGY

Woodland Archaeology is the study of historical features and remains that survive as earthworks in woods. There are two types, those that relate to past management of the wood (including the trees), and those that now happen to be found preserved within woodland.

Ancient woods may contain many features of interest. Without care, these features which help give the wood its character and its "sense of place" can be damaged or lost for good. It is not possible to recreate them in any meaningful way and so any restoration may depend on the degree of damage. However the intention is not to freeze the landscape at one point in time, but to raise awareness of the significance of the past land-use while considering its future management.

Features of past woodland management include banks and tracks, sawpits and charcoal hearths. There can also be evidence of local industrial activities such as clay working for bricks, tiles and pottery.

Trees are particularly long-lived so they can also tell us much about the way they have been managed as coppice stools, stubs or pollards and may be indicators of earlier land uses.

RETAIN OLD TREES
Ancient individual or groups of trees, which are traditional landmarks or are of historical interest, should be retained in their setting and may require sensitive management.

WOODLAND SURVEYS
Are needed to help plan woodland management. It is valuable to survey all identifiable historic and archaeological elements within a wood. The results can be used to interpret the woods for woodland workers and visitors, to promote the appreciation of them, to inform management plans, and to monitor erosion or change.

People from local communities, historical and archaeological groups, woodland friends and others may volunteer and get involved in helping research, survey and care for their local woods.

Winter is the best time to see and identify woodland features, as you need to examine them closely on the ground on foot, often this has to be off the paths. So visit from January through to May when vegetation such as bracken, brambles and nettles have died down and before the trees come into leaf. Earthworks can be harder to find in summer due to the shade of trees and development of vegetation. In autumn leaf fall can bury many subtle features. Some features can be picked out by changes in vegetation. Old ditches may be damp and fertile and banks dry and

stony, so different plants such as mosses or dogs mercury may grow. Disturbed soil and ground affected by fires may also result in a change in the species of plants.

Sketch mapping can indicate roughly where banks and pits are found. It is a quick and easy method that works best in smaller woods, when you can easily work out where you are!

GEOGRAPHIC POSITIONING SYSTEMS (GPS)

These hand held portable devices can be used to map features within woods as points (for pits) or lines on map (for example to show banks). However, the accuracy can vary as trees and canopy cover can interfere with satellite signals, so work better in winter when trees are not in leaf.

AERIAL PHOTOGRAPHY

Does not show features in woods, as the tree cover will hide major earthworks and small lumps and bumps from view. However aerial photos can be used to identify patterns on neighbouring land, such as old roads, open areas and hedgerows, and will show how the wood fits in the landscape. Aerial photographs are available on websites such as Google.

LiDAR

Is a new remote aerial sensing technique using lasers which can be used to strip off the tree cover using a computer programme to reveal the ground surface as if the trees did not exist.

POLICY CONTEXT

The government published the **Keepers of Time** policy in 2005, which recognises the importance of ancient woods and old trees for their historic and cultural values as well as for biodiversity. It calls for the restoration of plantations on ancient woodland sites to more natural conditions.

Planning Policy Statement 9 (2005) states that local planning authorities should identify any areas of ancient woodland in their areas that do not have statutory protection (eg SSSI). Ancient woodland is a valuable biodiversity resource. Once lost it cannot be recreated.

The government published **A Strategy for England's Trees, Woods and Forests** in 2007, which has been followed up by an **Action Plan 2008-12**. One objective of this is to enhance the contribution of trees, woods and forests to wider landscapes, and ensure that their historic and cultural values are protected and appreciated. Another is to conserve ancient woods and veteran trees, ensure they are resilient to climate change and provide opportunities for people to enjoy woodland wildlife.

UK Woodland management standards

"Woodland management should conserve biodiversity and safeguard and enhance landscape and heritage resources" (*UK Forestry Accord* 1996 – in *UK Forestry Standard* 1998). Scheduled monuments and other important archaeological sites, historic and cultural features should be protected. Our links with and understanding of the past, and our appreciation of the present are thereby maintained. Protecting historic features will also often help maintain the ecological interest and landscape importance of the wood.

LiDAR stands for 'light detection and ranging'; the technology works by "bouncing" harmless laser energy off the forest floor in much the same way as radar ('radio detection and ranging') bounces radio waves off solid objects. See **Forest Research** pages on www.forestry.gov.uk

GEOPHYSICAL SURVEY

Equipment can be used to detect changes in moisture levels or magnetic fields, which can indicate hidden signs of past disturbance of the soil such as burning, old ditches or walls. However these can be harder to use in amongst lots of trees with their spreading roots and other vegetation.

DOCUMENTS AND MAPS AND OTHER ARCHIVES

Such as rentals, surveys, court records, wills and account books, may all provide valuable information about woods. The study of early maps (where they survive) can be particularly important as it may reveal how old woods are. Tithe maps of the mid 19th century and some early estate maps are useful in helping to identify boundary banks, old tracks and changes in extent of woodland. First edition ordnance survey maps and the earlier surveyors' drawings provide a very detailed record from the 19th century. The Record Office and libraries with collections of maps

SCHEDULED MONUMENTS AND ARCHAEOLOGICAL ADVICE

The larger and more important archaeological features may have been identified and protected by law as Scheduled Monuments under the **1979 Ancient Monuments and Archaeological Areas Act.** They can be found on the website www.magic.gov.uk

English Heritage can be contacted about Scheduled Monuments, management grants, repair and consent for works. Most of these will have a management agreement in place with English Heritage. Advice can be sought from the English Heritage Inspector of Ancient Monuments for the Region.

Scheduled Monument Consent must be gained for any works that might disturb the ground in a monument. Both tree roots and forestry operations have the potential to harm archaeological features, so care is needed to take account of the historic environment, whether features are scheduled or not.

Regard should also be given to the character of other identified historic sites. English Heritage holds a **Register of Historic Parks and Gardens,** which are protected as a material consideration in the planning process. The London Parks and Gardens Trust hold a register of Parks and Gardens of local importance.

Much archaeology is not designated, and many sites remain to be discovered. Known archaeology is recorded on the Greater London Historic Environment Record, and the local authority archaeology advisors can provide further advice on this; please contact the English Heritage Greater London Archaeology Advisory Service for all London Boroughs (the LB Southwark and City of London have their own advisors). See the GLAAS website for further details.
www.english-heritage.org.uk/glaas

John Roque country 25 miles round London map of 1754 and shows the Ruislip Woods.

and documents can be a good starting point for research. Much information, such as old photographs, can be found on websites.

PORTABLE FINDS

Or artefacts should be reported to the local museum service or archaeologist. They are the property of the landowner except if made of gold or silver, when they are covered by the **1997 Treasure Act** and should be reported to the coroner.

The **Portable Antiquities Scheme** can help identify and record finds; contact your local museum for more information. The Finds Liaison Officer for London is based at the Museum of London, see www.finds.org.uk/involved/contacts.php

Remember it is the exact location and context of the find that is important historically and this information is essential if the object is to be fully understood. The value of the object can be greatly reduced without this context.

Metal detectors may find buried objects but should only be used with the landowner's consent and away from protected areas. NB – It is an offence to use a metal detector on a Scheduled Monument or on National Trust land.

COLDFALL WOOD

Haringey 14ha, owned by Haringey Borough Council has ancient woodland boundary banks and ditch surviving on northern and western boundaries of this ancient hornbeam coppice woodland. The bank was to protect the coppice from animals grazing on the adjacent commonland.

Marker stones may sometimes be found and should be retained in situ. Eg Parish boundary markers in a ditch on Hampstead Heath

Pinner Deer Park boundary

BOUNDARIES OF COMMONLAND

Are often substantial, frequently sinuous banks, with a ditch on the common side.

HUNDRED, PARISH, ESTATE BOUNDARIES

Can be very significant ancient features, with large banks and deep ditches several metres across. The bounds may have been walked for centuries and individual trees and other landmarks noted in old documents.

DEER PARK BOUNDARIES

Or park pale, are major banks and ditches which would have had a wooden fence (the pale) on top to keep deer in the park. These were often circular in outline, but may have expanded or

contracted. **Deer leaps** were sometimes created to allow escaped deer to get back into the park. Later landscaped or ornamental parks may not have kept deer so have a less well defined boundary.

GRIM'S DITCH
is a massive earlier linear earthwork, although its significance is not fully understood.

Stretches have been identified at Grims Dyke Golf Course, Grims Dyke Hotel, and in Pear Wood, Stanmore

PROTECT THE INTEGRITY OF WOODLAND BOUNDARIES
Ancient boundary banks and ditches with their associated old trees and hedges are at particular risk of damage and erosion in urban settings. In some ways this is one of the most interesting, yet least understood and neglected, parts of the woodland. Boundaries may be hundreds of years old yet are now likely to be straightened out by developments, with poorly thought out positions of a variety of types of fencing, sometimes in the ditch or cutting the bank.

Debris and rubbish are frequently dumped at the bottoms of gardens to fill the ditch. Inappropriate cutting of hedges may take place, and they are sometimes grubbed out or replaced with Leyland cypress or other garden hedges, resulting in an unattractive piecemeal edge to a wood. Take care where fences and gates are placed to ensure that irregular boundaries maintain their character.

Sometimes boundary ditches will need to be cleared of infill if the sides have collapsed or matter has accumulated. These ditches should only be cleared if absolutely necessary and work should be carried out sensitively, ideally using hand tools. Remember that doing nothing is likely to be better for archaeological remains than insensitive work.

DRAINAGE DITCHES
are more likely to be cleared out on a regular basis and the chance of harm is reduced provided work is of a similar scale to the original ditch. If mechanical diggers are used it is important to follow the line of the old ditch and not enlarge the ditch by using too big a bucket. Disposing of the spoil must also be carried out carefully if the historic feature is to retain its traditional shape and scale. In some cases rare vegetation may be associated with the bank or the ditch; scraping the ditch clean or burying existing vegetation could harm plants or lead to their loss.

A sluice in Mad Bess Wood, Ruislip

Dagnam Moat

ENCLOSURES
are of interest in some woods and may be defined by banks and ditches and sometimes moats. Some of these sites have been scheduled as ancient monuments but in some cases it is only the largest bank and ditch of the enclosure that has been identified, not the surrounding earthworks and the wider woodland context.

EARLIER FIELD SYSTEMS
can sometimes be identified within woods such as evidence of Medieval **ridge and furrow**. Ploughing open fields formed these features which were later abandoned or deliberately planted to become woodland.

OLD TRACKWAYS
have sometimes been abandoned as routes but many others are still in use as footpaths, bridleways and roads. They are important features and may indicate hundreds of years use, and the historic links between places. Some have become adopted as metalled highways but are none the less still important features and require careful management.

Old route through Mad Bess Wood, Ruislip

Hillfort in Holwood – note recent tree clearance

Roman Roads may be found in woods.

Green Lanes are old unsurfaced routes, which were often used for driving livestock to market. They may have parallel hedges or banks and ditches where they pass through woods.

Old Hollow Ways are sunken eroded routes up hills. In places a series of eroded routes has evolved, perhaps to allow traffic to pass in either direction or because one route became impassable.

Milestones on old routeways were placed to show distances between towns to help travellers.

Abandoned railways can be found in some places eg Highgate Woods

INTERPRETING THE SEQUENCE OF EVENTS

The inter-relationship between woods, fields, hedges, banks, quarries and tracks is important in identifying the historic sequence of land use. This can be seen for example where a quarry cuts through an earlier bank. Another example is where a bank runs up to but does not cross an earlier feature.

HILL FORTS

are Iron Age enclosures which are normally circular or oval in shape and often located on top of prominent hills with large banks and ditches. Most of these hillforts are Scheduled Ancient Monuments. Most would originally have been constructed in open grassland, but many are now found within woods.eg Holwood, Keston; Caesars Camp Wimbledon Common.

Lesnes Abbey ruins were once covered in trees

Mound in Lesnes Abbey woods

OLD SETTLEMENTS

may in some cases be delineated by a bank and ditch or a water filled **moat**. They can indicate settlements of various types such as early farms. The remains of **abandoned buildings** and other related structures, including former industries, may lie within invasive woodland. Building platforms are raised level areas that sometimes remain when a building has been abandoned. They may contain the remains of old walls and other materials.

MOUNDS

have been created for various purposes over many years, and these can often be confused. They often have a surrounding ditch from which the soil was thrown up to form the mound.

Barrows or burial mounds can be round, oval or linear, and were most commonly constructed as burial monuments in the Bronze Age. Inhumation or cremation burials may lie under the mound, or inserted into their edge. Roman and Anglo-Saxon barrows are also known. [Hampstead Heath tumulus – see photo page 2]

Windmill mounds are known from the medieval and early post-medieval periods, the windmill was constructed on the raised mound to catch the wind.

A Prospect mound is a viewing point to watch hunting or as a parkland feature, perhaps with a building on top; typically from the17th and 18th centuries – there is an example in Stanmore.

Highgate Wood

HISTORIC WOODLAND MANAGEMENT FEATURES

(not to be confused with natural ones!)

CHARCOAL HEARTHS

are evidence that charcoal burning once took place. Charcoal hearths are not the easiest feature to recognise, and are very difficult to photograph! Charcoal used to be burnt from stacks of logs in turf covered mounds. The hearths are level circular patches that have often been cut into the hillside to create a flat base, or in shallow depressions. If it is a charcoal hearth then you are likely to find that the soil is blackened by the remains of charcoal dust which colours your fingers black when rubbed (a different colour to nearby woodland soil). There may also be lumps of charcoal. These are most likely to be found on the lower, but raised, edge of the circle. They are an indication of an important former use of woodland, which was related to other industries such as smelting or gunpowder production. Some examples are about 6 metres across. Most charcoal production was replaced by the early 1800's when canals and later rail could transport coal cheaply around the country.

Note – **fire sites** do not need to be levelled and are more variable in size, these sites may also have lumps of charcoal. Old fire sites change the soil and are colonised by different mosses and plants such as willowherb.

Charcoal Burners huts were temporary shelters near to the hearths so the burners could keep an eye on them. These may well have been small turf covered structures. Charcoal needed to be

BOSTALL WOOD
Greenwich
A chalk cave adjacent to the wood in Federation Way was dug to provide building materials for the Co-op Estate at the turn of the last century. It is still complete and is home to a colony of bats. This cave is situated at the end of Cemetery Lane. There are also a number of Dene holes, which date back to the middle ages. These were used for fertiliser and once discontinued, were boarded over and back-filled. A number have opened up over the years and have been filled in by the Council.

SAFETY NOTE
Be aware of the possibility that vertical shafts for mines or wells may have been dug. They can be hidden or partly covered and may be dangerous!

tended continuously for a few days when it was being cooked (rather than burnt) to ensure that it did not burn fiercely or go out.

IRON SLAG AND BLOOMERIES
may date back to the Iron Age and Roman period. Some woods may contain iron waste from small scale smelting activities. The reason they are in woods is that perhaps 60 tonnes of wood was needed to smelt a tonne of iron ore. The wood had to be converted to charcoal first so that it would burn hot enough to produce molten iron in simple kilns known as bloomeries. It was much easier to bring the iron to the wood for it to be worked than to carry bulky and friable charcoal to the iron. Clay was required to make a bloomery kiln, a simple sort of oven heated with a bellows.

NATURAL SWALLOW HOLES
are caused by natural erosion of underlying chalk by water. They may be fed by small streams which disappear underground in the swallow hole. They are more regular in shape than quarries and lack an extraction point.

HOLLOWS AND PITS
where material has been removed. **Dene Holes** are ancient underground mines, often for chalk [examples in Pinner and south east London]

QUARRIES
are frequently found in woods. Some are very shallow where surface deposits have been removed. Others are steep sided and irregular in shape but frequently have a low entrance point so cart

Ancient bank in Highgate Wood

loads of the material could be extracted. Sometimes obvious tracks lead from the quarry. Woods were an important source of raw materials. The quarries reflect the geology in London this may be for flint, chalk, sand, gravel or clay. Claypits may now be ponds.

Brick and tile making industries used local deposits of brick-earth or clay, suitable for commercial brickmaking, and wood for fuel and were found in some woods.

HIGHGATE WOOD

Originally part of the ancient Forest of Middlesex, **Highgate Wood** in Haringey covers some 28 hectares (70 acres) and came into the City of London's care in 1886. It is oak and hornbeam coppiced woodland. Prehistoric flints have been found in the wood. During the Medieval Period, the wood was part of the Bishop of London's hunting estate. It is possible that an ancient earthwork that runs across the wood formed part of an enclosure for deer or it may be from an earlier period. Roman pottery kilns AD 50-150 have been found here.

SAWPITS

may be a feature of some ancient woods and indicate the use of timber trees rather than coppice. These oval pits were normally dug so that they follow along the contour, with all the material from the pit piled on the downhill side. A wooden frame would then have been constructed above the pit to hold the log. Most pits are roughly 4 metres or so long by about 2 metres wide. Trees may have grown on the mound or in the pit since they were used. The exact use of such every day features was rarely documented. Sawpits were used until the early years of the twentieth century. Many pits have become filled with soil, leaf litter and other debris. Some were deliberately filled in after use. They are unlikely to have been dug where they would have filled with water.

LYE OR POTASH PITS

were used to burn bracken and branches to produce a fine ash, potash, which could then be used to create a liquid known as lye. Potash was important in glass making and as a fertiliser/soil

MANAGEMENT OF TREE STUMPS
Do not level the site or grub out stumps if this is not absolutely necessary. It is far better (and cheaper) to leave tree stumps to rot in situ. In some cases regrowth may not be desirable and treatment with herbicide may be necessary.

WARTIME FEATURES
Careful consideration should be given and advice sought before these features are removed or damaged.

conditioner. They are almost circular pits but with a stoke hole in one side for stirring the embers to make sure it burnt evenly to a fine ash.

TREE THROW PITS
are the result of mature trees being uprooted, for example in the hurricane of 1987. The result is a D shaped depression with a mound where the tree root plate used to be; beech and birch tend to rot away fairly quickly but oak roots last many years. The tree throw pit depends on the wind direction. You may find a series of variable sized pits, from one to four metres across, close to each other where trees have fallen "like dominoes".

WARTIME FEATURES
can be found in a number of woods, which were used for a variety of purposes during the two World Wars. Military installations were often hidden from aircraft by being placed within woods. This has left a variety of concrete bases, roads, air raid shelters, pits and trenches, which can be hard to interpret. **Bomb craters** can sometimes be found, as can craters from wartime plane crashes and doodle bugs. These may fill with water to become pools.

OTHER FEATURES
found in woods may in time develop greater historical or cultural significance and should not necessarily be cleared away

BURIED ARCHAEOLOGY
may be discovered by digging or by remote sensing. Evidence of past activity and artefacts may lie buried in the soil. This archaeological interest may sometimes be found very close to the surface where it is very vulnerable to disturbance or damage. Wet areas, particularly bogs and deep alluvium, can be useful because they may hold dateable layers of deposits with ancient pollen grains, which can be used to interpret the vegetation and environment of earlier centuries.

BURIED FINDS
The exact location and position of any artefact, such as pottery, is critical to understanding the item's significance. These should be left in situ, undisturbed if possible, or their exact location accurately recorded, and reported to the local museum, or the local finds liaison officer.

WEATHER
can have an impact on the archaeology. Trees uprooted in storms may disturb archaeology, as the root ball can rip up a substantial amount of material.

Erosion by runoff following heavy rain can be a problem on steep hillsides, particularly if felling leaves bare ground or exposes old sunken hollow ways. However these hollow ways have developed by years of erosion! Existing scars can be enlarged by heavy rain.

UPROOTED TREES
In some circumstances it may be desirable to fell trees to avoid damage to banks. Where root plates have ripped up a bank carefully cut the trunk and tip the root plate back to its original position, where it can decay in situ and retain the bank profile.

Flooding may result in burial in sediment, this is one way that remains are preserved under the ground to perhaps be rediscovered by future archaeologists!

4 PROTECTION OF ARCHAEOLOGICAL FEATURES

IDENTIFY AND RECORD INFORMATION

on a sketch map before work takes place. A compass can be useful to plot directions. Walking the wood in winter can be a good time to pick out features when the undergrowth has died down and they are more visible. Frost, snow and vegetation may all pick out subtle variations in soil topography, which could indicate a hidden feature. Please report any new identifications of features to the Greater London Historic Environment Record.

USE BY PEOPLE

- Avoid the creation of new footpaths or access routes on banks and ditches and beware of the risk of damage when crossing these features
- Erosion by horse riding, mountain or scramble bikes and other off-road vehicles can cause localised problems and should not be allowed on sensitive archaeological features. This may require careful use of signs or barriers to prevent unwanted disturbance.
- The use of branches as dead hedges or encouraging undergrowth such as brambles can limit erosion, but may also hide the archaeological interest.
- Avoid the temptation to fill hollows and pits with rubbish or stumps and branchwood. Carefully clear away recently dumped material without digging into the original ground level.

TREE PLANTING

should be avoided on archaeological sites as tree roots can cause damage. The most likely exception could be replanting a hedge on top of a boundary bank. However coppicing or laying existing remnants of the old hedge may be more desirable. Do not plant in ditches or in pits. It is best to keep these areas free from tree and shrub growth and retain them as open features.

- Retain existing open spaces and clearings where these have a long history.
- On some sites regular brush-cutting, mowing or even stock grazing may help keep archaeological monuments open so they can be seen.
- Clearance of scrub or developing trees and control of bracken and bramble by cutting or use of selective herbicides may be appropriate in some cases.

THE REMOVAL OF INVASIVE PLANTS
may be necessary for a variety of reasons. Plants such as rhododendron, laurel, Japanese knotweed, Himalayan balsam and other invasive plants may require treatment. Care should be taken to use appropriate methods to ensure that underlying archaeological features are not damaged by grubbing out plants. Cutting back by hand and use of appropriate herbicides may be necessary.

BURROWING ANIMALS
such as rabbits, badgers and foxes can all harm earthworks and buried archaeology. An assessment needs to be made on the level of damage that may occur and what controls can be carried out. Badger setts are protected so a licence is required if they have to be disturbed.

MODERN HEAVY EQUIPMENT
can cause compaction which can be a serious problem affecting the soil, drainage, the growth of trees, vegetation and historical features. Heavy tractors and trailers may cause ruts. The choice of equipment on sensitive sites is very important.

Until the nineteenth century woodland work was labour intensive and removal of cut material was difficult, so timber was often converted in the woods. Modern saws and machinery can now clear woodlands easily, removing vegetation and levelling the bumps and hollows that give the land its form and character.

INFORM CONTRACTORS AND OTHERS WORKING IN THE WOODS
- Draw up clear yet detailed contracts to avoid accidental damage. It is essential to inform contractors in a written agreement with a map, and on site, about features of interest and areas to avoid.
- Mark off sensitive areas using coloured tape, temporary fencing or similar easily visible markers, so workers can identify at a glance where they should not go. Do not assume they will recognise features if they have not been pointed out to them. It is not easy to remember these details when driving a machine in the woods!
- Keep fences off archaeological features wherever possible.
- Access routes and stacking and loading areas must be carefully planned and machinery

restricted to designated routes in work agreements.

- Agree and mark extraction routes clearly, especially if they have to cross sensitive areas such as banks.
- Use existing tracks for access and extraction where this is appropriate.
- Keep ground disturbance to a minimum.
- Mats of brash or lop and top can be used to protect features from damage such as rutting.
- Keep working areas subject to heavy use and compaction well away from sensitive locations.
- Agree what equipment can be brought on site in writing.
- Consider using lighter forestry equipment, low ground pressure tyres, or even horse extraction on vulnerable sites.
- Mobile sawmills can help by converting timber on site.
- Leaving felled trees and branches in situ may cause less damage than removing them.

Horse extraction on vulnerable sites

OXLEAS WOODLANDS SSSI

Owned by Greenwich Council, Oxleas, Jack and Shepherdleas Woods date back to at least the 12th century, and their management is known from the mid-14th century. In 1311, the Royal manor of Eltham was established and included the woods. The woods passed out of crown occupation in 1679 when they were leased to Sir John Shaw, whose family managed them until 1811, when they were taken over by the War Department. The woods were acquired by the London County Council and opened to the public in 1934.

In parts the former coppice system of management is evident, and this traditional management has been reinstated recently. The majority of the woodland comprises stands of hazel-sessile oak, pedunculate oak, and birch woodland, mature wild cherry *Prunus avium*, and the wild service tree *Sorbus torminalis*. Severndroog Castle is listed as a Grade II* listed building and included on the English Heritage Buildings at Risk register.

REFERENCES, WEBSITES, ABOUT THE AUTHOR AND ACKNOWLEDGEMENTS

REFERENCES

Keepers of Time – A statement of policy for England's Ancient and Native Woods (defra and FC 2005).

A Strategy for England's Trees, Woods and Forests (2007) Defra

The cultural heritage of woodlands in the South East (2007) Dr Nicola Bannister edited by Patrick McKernan

Restoration of Native Woodland on Ancient Woodland Sites (2003) Forestry Commission Practice Guide

The Cultural Heritage of Chiltern Woods John K. Morris (2009)

"*New Perspectives on Chiltern Landscapes*" John K. Morris (2003) in conference papers edited by Melanie Solik

"*Woodland Archaeology in Surrey*" Bannister, Nicola R. Surrey County Council (1996)

"*Trees & woods in the British Landscape*" , Oliver Rackham (1976)

"*The History of the Countryside*" Oliver Rackham (1986)

"*Ancient Woodland, its history, vegetation and uses in England* Oliver Rackham *(revised 2003)*

The Woodland Heritage Manual – A guide to investigating wooded landscapes (2008) Edited by Ian Rotherham et al. Sheffield Hallam University

The Archaeology of Greater London, Museum of London 2000

WEBSITES

The **Greater London Archaeology Advisory Service** (GLAAS) is part of **English Heritage** London Region and seeks to promote understanding and enjoyment of our archaeological heritage through its protection, management and interpretation. They work with a number of partners to achieve this, in particular the London Boroughs. They maintain the Greater London Historic Environment Record (or SMR) which lists the known archaeology of the Region. www.english-heritage.org.uk/glaas a 'one stop shop' to link people to where they need to go for information and contacts in London's archaeology.

The **Forestry Commission** website has a map based land information search to check for landuse designations see www.forestry.gov.uk

For landuse designations, including ancient monuments see www.magic.gov.uk

The **Portable Antiquities Scheme** to record archaeological objects found by the public and to broaden awareness and understanding of the past see www.finds.org.uk

Natural England sites to visit in London http://www.natureonthemap.org.uk/identify.aspx

Woodland Trust www.woodland-trust.org.uk includes management plans for their woods.

Museum of London – www.museumoflondon.org.uk

Chiltern Woodlands Project – www.chilternsaonb.org

ABOUT THE AUTHOR

John Morris was born and went to school in North London. He now works as Director of the **Chiltern Woodlands Project Ltd,** a registered charity formed by the Chiltern Society in 1988. Its aims are to promote and encourage the sustainable management of woods in the Chilterns (an Area of Outstanding Natural Beauty to the north west of London). John is carrying out research into woodland history and archaeology in the Chilterns. The woods of the Chilterns in medieval times supplied London with fuel, sent by barge down the Thames.

PICTURE CREDITS

Text and Photographs by John K. Morris, unless indicated. English Heritage photos on pages 2, 16, 17, 18, 19, 20 & 26 Leaf-shaped arrowhead image page 14 by Jon Cotton, Museum of London

ACKNOWLEDGEMENTS

This guidance has been published by the Forestry Commission and English Heritage, with help from City of London Corporation and the Museum of London.

Layout design and production by Em Associates
Printing by ReproCity, London.