

Identifying and protecting woodland archaeology

A guide for woodland owners and forestry workers



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Introduction

Woodlands preserve a rich legacy of the past. Nearly all woodlands, ancient or modern, contain archaeological features in some form, reflecting how people have used the landscape over time. These features can include significant trees, such as giant pollards, or various earthworks – sometimes described as 'lumps and bumps' on the ground.

Archaeological features found in woodlands are fragile and irreplaceable. This guide helps woodland owners and people working in the forestry sector to identify archaeological features on the ground, so their protection and management can be built into any plans or proposals.

Left: A historically worked tree growing along an old routeway. Bowerchalke, Wiltshire.

The archaeology *of* woodlands

Some archaeological features found in woodlands are directly related to the past history and management of the woodland itself. These are examples of the archaeology *of* woodland. They include:

- banks which formed the boundary of a managed or enclosed woodland
- charcoal platforms used to convert wood into charcoal for fuel and other purposes
- saw pits used to cut large logs into planks, beams or boards
- trees which have been historically managed, such as coppiced stools or pollards

A woodland may also contain archaeological features for other reasons. Industries such as ironworking or pottery production were often located near to woodlands because of the availability of fuel and raw materials, such as iron ore. Similarly, many woodlands preserve significant evidence of past military use, particularly from the Second World War. Military sites such as airfields, camps, barracks, munitions stores, practice trenches and even bombing ranges were often located within or close to woodland. Trees helped to conceal many military structures, particularly munitions stores, from aerial attack.

The archaeology *in* woodlands

Many archaeological features found in a woodland have a non-woodland history. They were once situated in a more open landscape, but are now surrounded by trees. In some cases, woodland has naturally developed over an archaeological feature. In other cases, a feature previously located on open moorland or heathland has been overplanted with trees.

These features form part of the archaeology *in* woodland. They include:

- prehistoric barrows and burial mounds
- abandoned settlements of varying date, for example Roman farmsteads and medieval villages
- ridge and furrow earthworks from medieval or post-medieval fields
- rabbit warrens used to produce meat and fur, mainly in the post-medieval period



Identifying archaeological features in woodlands

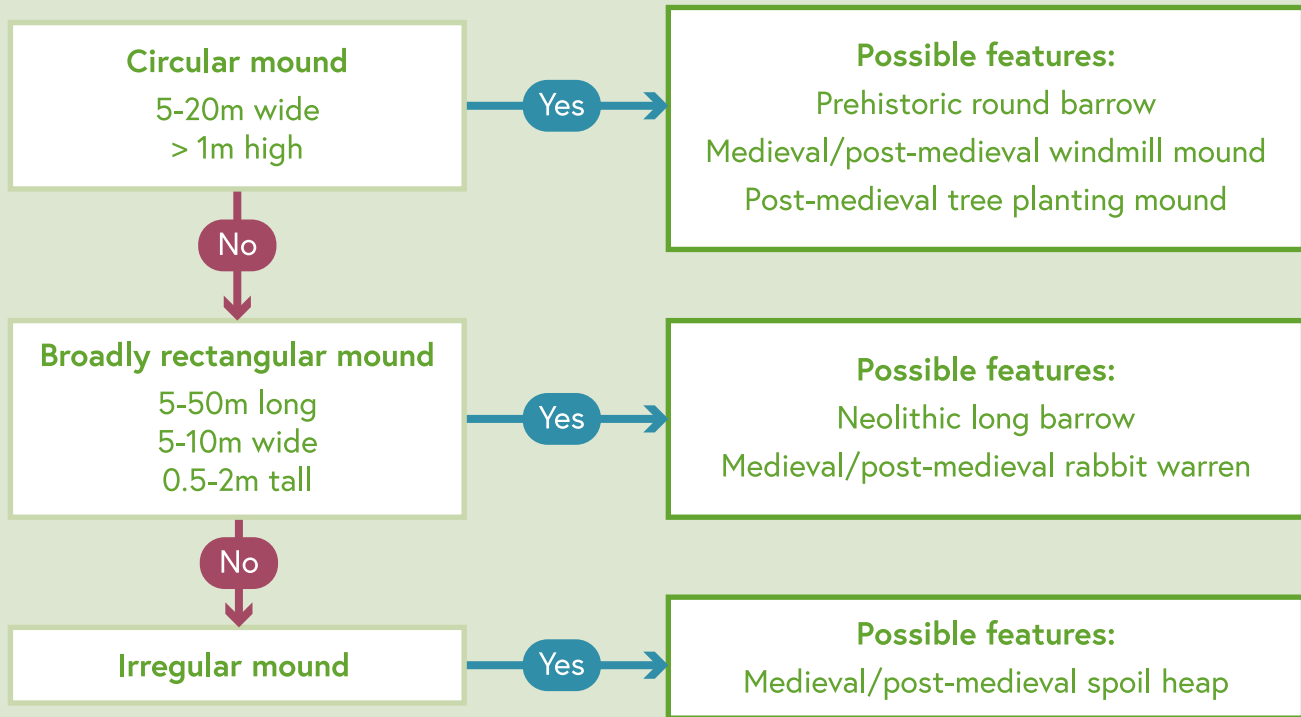
How can we tell an Iron Age hillfort from a medieval moated site, or distinguish a 19th-century quarry from a Second World War bomb crater? Archaeological features that are identified on the ground are less likely to be damaged during forestry works, and you can factor their protection into management plans or proposals.

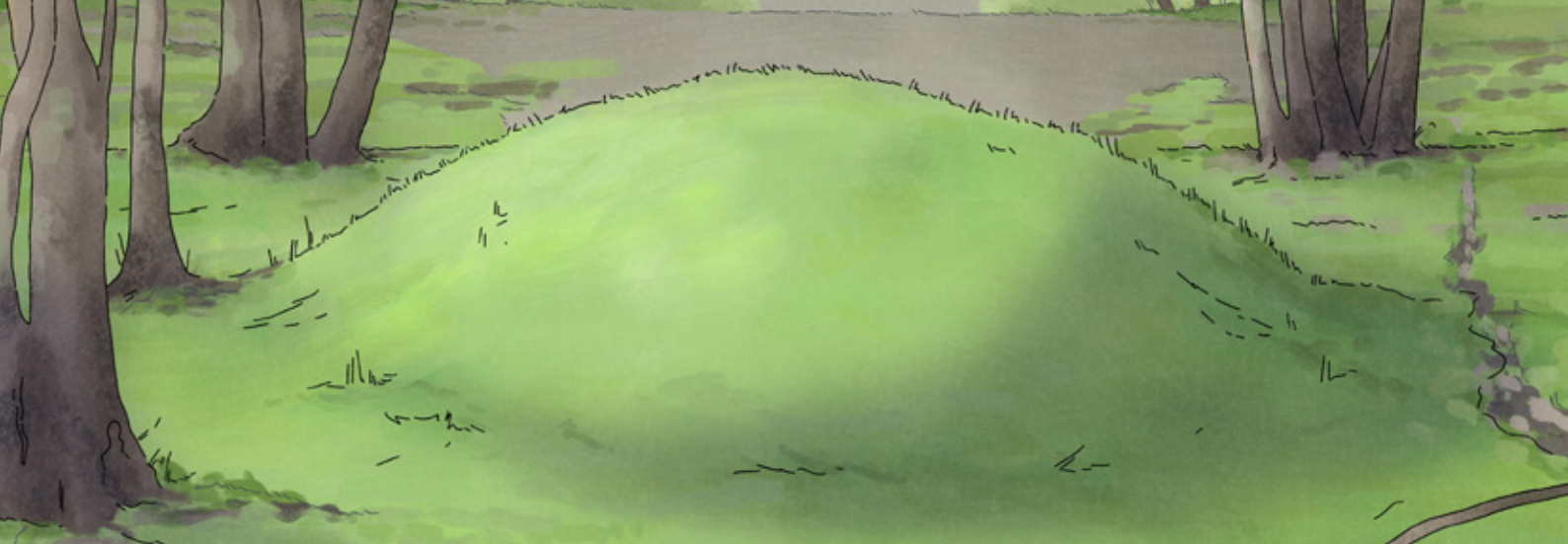
A brief guide to identifying some of the most commonly encountered types of earthworks, buildings and ruins is set out below. **Use this as an introductory guide only.** Some archaeological features are difficult to recognise and interpret correctly. The reason why a woodland contains a ditch, hollow or ruined structure may only become clear through detailed archaeological investigation, or from a close examination of historical sources such as maps, written documents and old photographs.

If you are unsure on how to identify an archaeological feature, seek advice from a historic environment specialist so that it can be properly understood and protected.

Mounds

A guide for identifying mounds in woodlands





Round barrows

Round barrows are commonly found in woodlands. These features were constructed to cover a burial or burials, mainly during the Bronze Age (around 2100-800 BC). Barrows may be confused with other types of circular or oval-shaped mound:

- medieval and post-medieval windmill mounds, which supported the superstructure of the windmill – generally 10 to 30 metres wide and over 1 metre tall
- post-medieval tree planting mounds located in historic parks and gardens – these can vary considerably in size



Long barrows

Long barrows are a type of burial mound used in the Neolithic period (around 4000-3500 BC) by early farming communities. They have an elongated appearance and can be rectangular, oval, trapezoidal and lozenge-shaped. They may be confused with pillow mounds which were used to farm rabbits in the medieval and post-medieval periods.

Spoil heaps

Some mounds encountered in a woodland will reflect the legacy of past industry. Spoil banks created by dumping waste from mining – for example, coal – can create clusters of irregularly shaped mounds arranged in parallel rows or 'fingers'.



Right: A series of spoil heaps or extractive mounds ('finger mounds') formed from dumping mining waste.

Other mounds

Other types of mounds encountered in a woodland may include:

- prehistoric burnt mounds, which were used with hot-stones for boiling, cooking, bathing or other purposes – these are often circular, oval or crescent-shaped, and consist of accumulations of charcoal and fire-cracked stones, are generally 5 to 10 metres wide and around 0.5 metres tall, and are usually located near a watercourse
- prehistoric burial cairns and clearance cairns, which appear as mounds of stone, often partially covered by grassy vegetation – clearance cairns were created by removing stones from fields and can be over 10 metres wide
- medieval mottes associated with Norman castles – these earthen mounds are generally steep-sided with a flat top, and can be very large (over 10 metres tall and 50 metres wide), although some are smaller; the motte is often associated with other earthworks such as banks and ditches

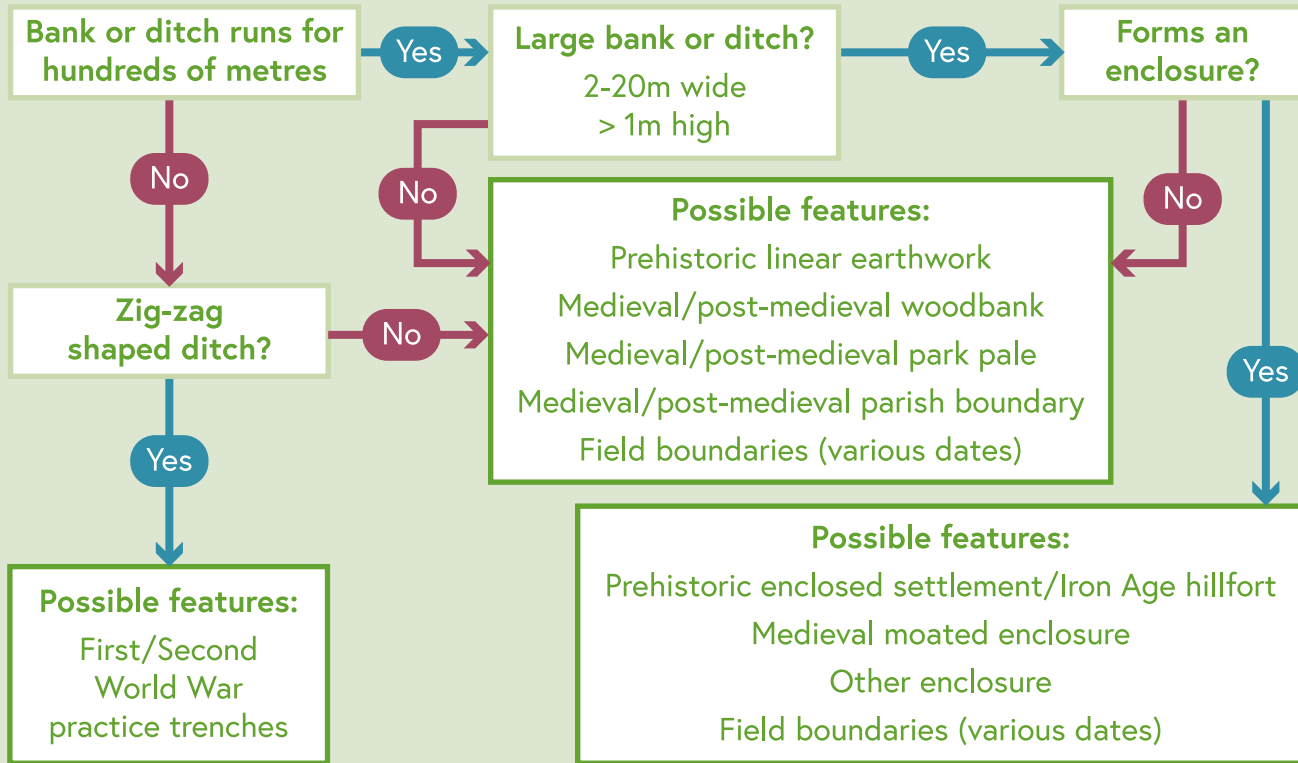


Banks and ditches

Banks and ditches are among the most common archaeological features found in woodlands. They can vary greatly in size and form. Some are very substantial, such as the steep banks marking the site of an Iron Age hillfort or the broad ditches that once enclosed a medieval moated site. Others may only be visible as a slight rise in the ground, as with a 19th-century field boundary.

Left: A prehistoric linear earthwork (bank and ditch) which was probably re-used in the medieval period as the boundary of a coppiced wood. Vernditch wood, Cranbourne Chase, Wiltshire.

A guide for identifying banks and ditches in woodlands





Woodbanks

The boundaries of many woodlands were marked in the medieval and post-medieval periods by the construction of banks and ditches, or sometimes by stone walls. These are known as 'woodbanks', and they helped to protect the woodland from damage, particularly from livestock. The interior of a woodland may have been further divided by low banks to create coppice compartments, each of which was managed separately.

*Left: An internal woodland boundary.
Low banks running across a woodland may reflect abandoned coppice compartments.*

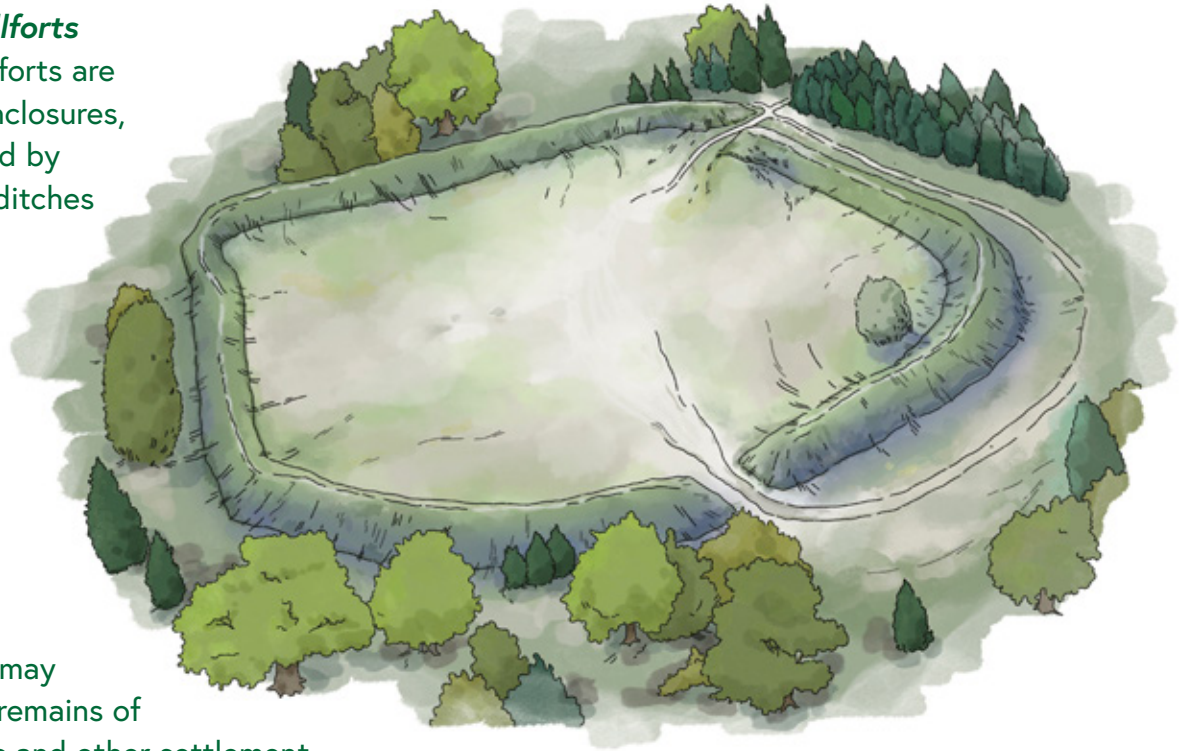
A woodbank may be confused with other types of boundary feature, such as a prehistoric linear earthwork or a bank enclosing a medieval deer park. Many administrative boundaries, such as parish edges, are also marked by banks.



Above, left and right: Woodbanks often marked the edge of a woodland or park.

Iron Age hillforts

Iron Age hillforts are defended enclosures, often defined by substantial ditches and banks.



The interior may contain the remains of roundhouses and other settlement features, such as refuse pits.

Above: An Iron Age hillfort surrounded by substantial banks and ditches.

Medieval moated sites

Medieval moated sites were high-status residences, mainly used in the 13th and 14th centuries. They were often located near woodland and, following their abandonment, were subsequently colonised by trees. Some were later incorporated into designed landscapes such as parks and gardens where trees were deliberately planted. The moat may still be visible as a deep, wide ditch, often retaining some water. The interior of the enclosure may contain the remains of buildings and gardens.

Above: A medieval moated enclosure. In this example, the moat has dried up.

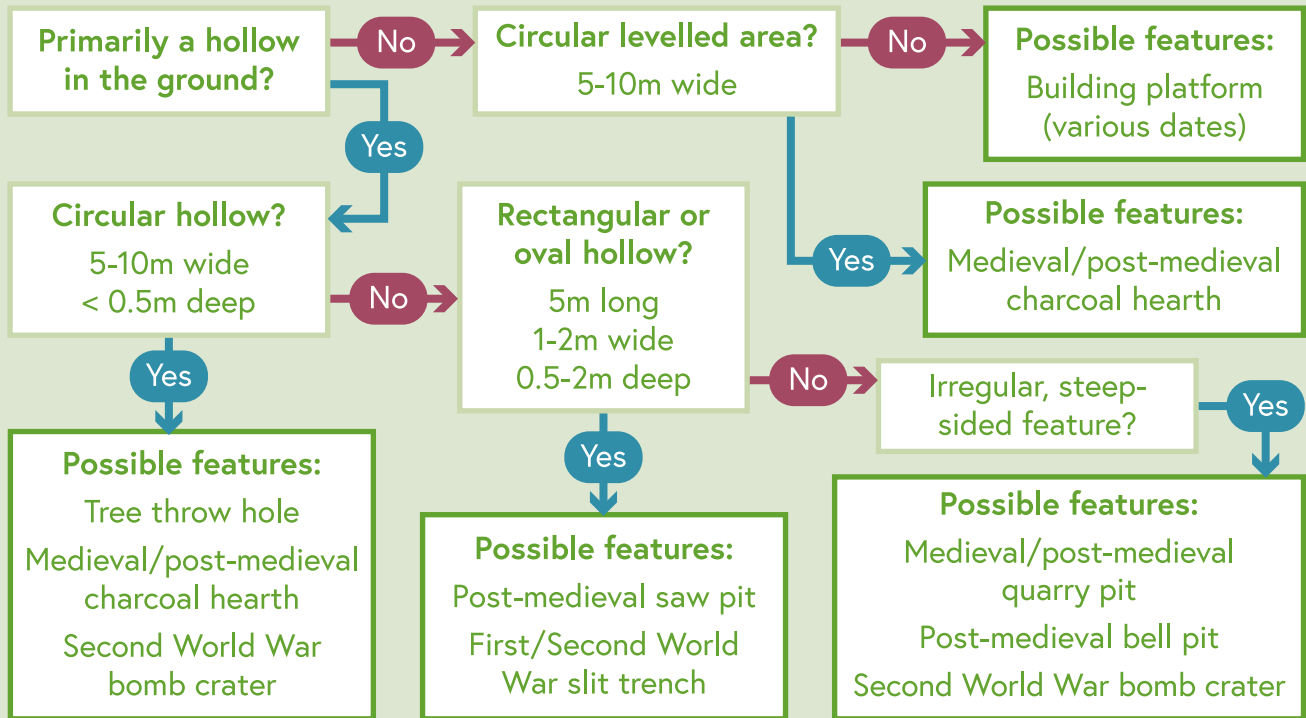


Practice (training) trenches

Large numbers of practice trenches were dug for military training exercises during the First and Second World Wars. Their locations were rarely recorded on maps or in other sources.

Pits, hollows and levelled areas

A guide to identifying pits, hollows and levelled areas in woodlands



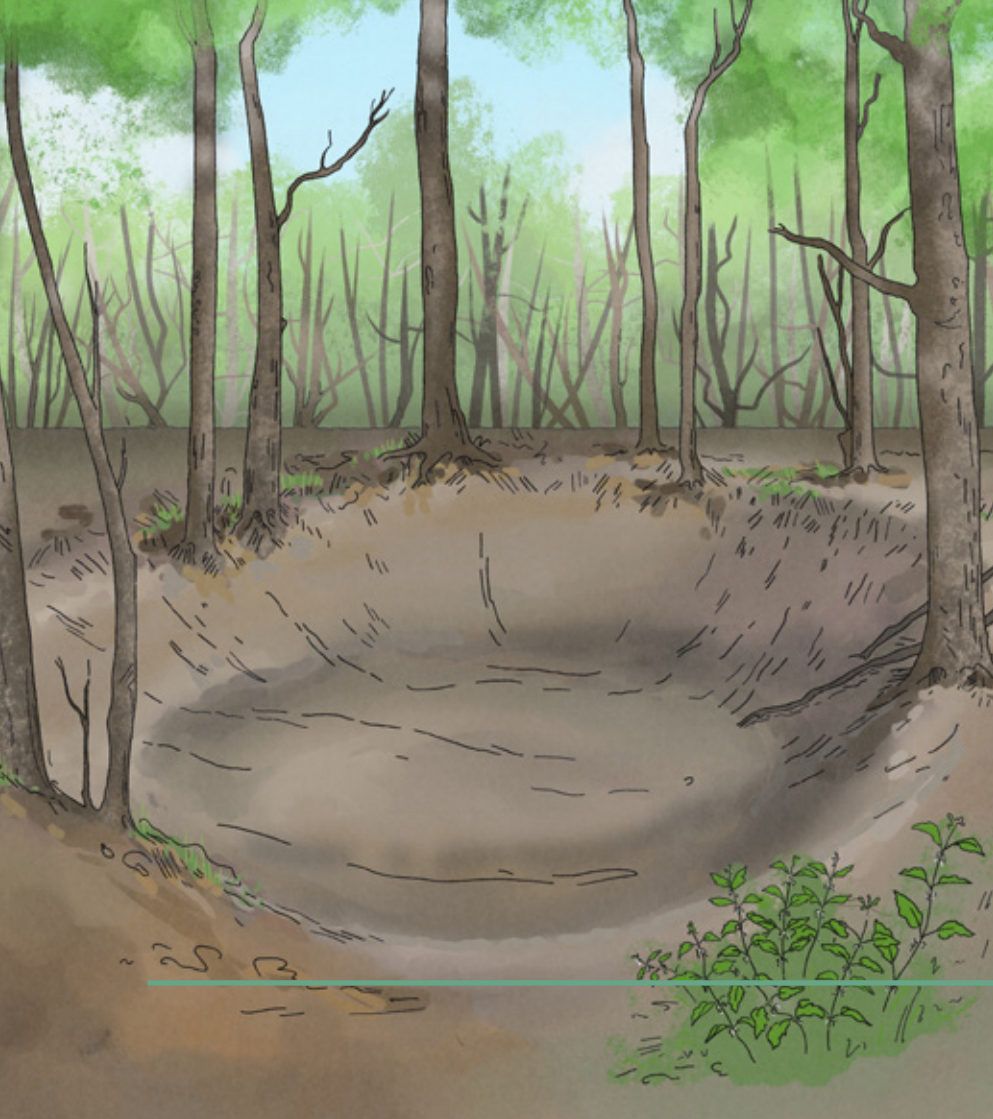
Charcoal hearths

Charcoal production was a major rural industry throughout the medieval and post-medieval periods, providing an important source of fuel for industries such as ironworking. Evidence for charcoal production may take the form of a shallow pit, hollow or levelled area. The soil around the site is often stained black.

An illustration of a forest floor. In the foreground, there is a large, shallow, rectangular trench dug into the brown earth, representing a saw pit. To the left of the pit, several long, thin logs are stacked. To the right of the pit, there are two large, cut tree stumps. The background shows a dense forest with many thin, vertical tree trunks and some green foliage at the top. A green text box is overlaid on the right side of the image.

Saw pits

Saw pits were widely used throughout the post-medieval period to convert trees into timber, for example planks, beams and boards. A large log was placed over a narrow, slit-like pit and sawn by two people – one standing in the pit below and one working from above. Saw pits can be recognised as shallow, broadly rectangular trenches.



Quarry and dell pits

Quarry and dell pits were used to extract materials such as chalk, clay, flint, gravel, sand or building stone, although their date is often difficult to determine. They can generally be recognised by a deep, wide depression in a woodland, although in some cases they may be difficult to distinguish from a natural, geological feature.

Left: A post-medieval quarry or dell pit.



Bell pits

Bell pits are an early type of mine, characterised by a vertical shaft and a wide cavity at their base. This creates the characteristic 'bell' shape when viewed in cross-section. They were mainly used for coal mining in the post-medieval period, although they are also associated with the extraction of other materials. A bell pit typically takes the form of a shallow, circular depression, usually with a spoil collar.

Above: A post-medieval bell pit/shaft.



Bomb craters

Bomb craters can appear as roughly circular depressions in woodlands, often in clusters. They generally measure around 3 to 15 metres across and up to 0.5 metres deep. Some may hold water seasonally or support vegetation that differs from the surrounding area. The craters are often the result of military training exercises during the Second World War. They can be well preserved in woodlands because they have not been filled in or significantly disturbed by later activity.

Left: A large bomb crater located in the Ashley Walking Bombing Range, New Forest, Hampshire. This area was extensively used for bombing practice during the Second World War.



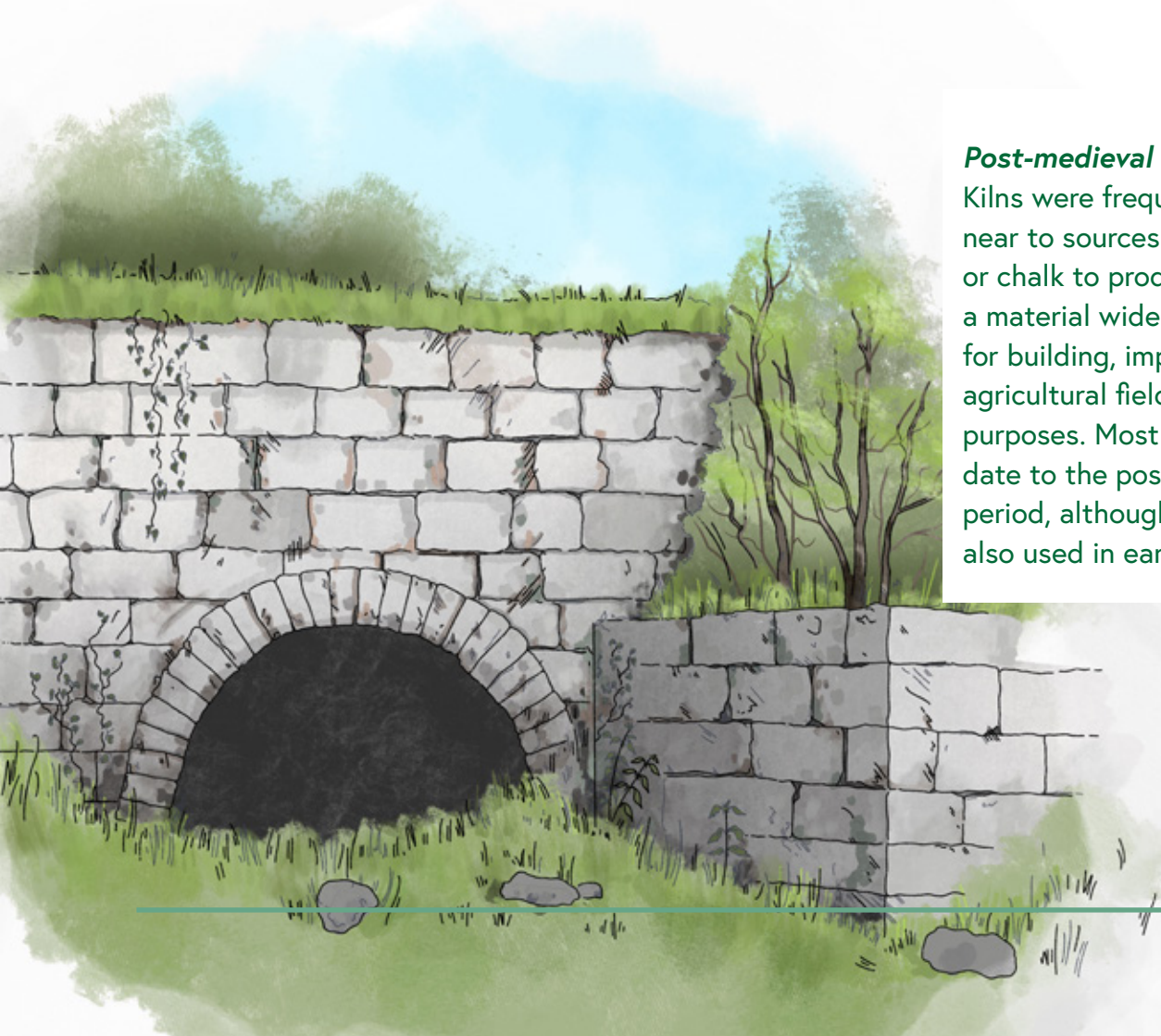
Buildings, ruins and water features

Many of the buildings, ruins and water features found in present-day woodlands were originally located in open areas. Trees, brambles and ivy have often colonised estates, farms, industrial areas and military sites which were abandoned in the 19th and 20th centuries.

Left: An abandoned estate cottage (19th century). Grovely Woods, Wiltshire.

Common structures found in woodland

Structure	Main characteristics	Common date range
Mills	Building or buildings located next to a stream, leat (mill race) or pond, with substantial thick walls. Evidence for a wheel pit. Made of stone or brick.	Medieval to post-medieval
Industrial features (lime kilns, ironworks)	Chimney stacks, spoil heaps and remains of kilns or furnaces. Ponds may be located nearby. Made of stone or brick.	Post-medieval
Woodland industries and crafts (charcoal burners' huts, bark peelers' huts)	Simple, small structures, often roughly built of stone or turf.	Post-medieval
Agricultural and estate buildings (cottages, gate lodges, barns, farmhouses)	Rectangular structures of brick or stone, with windows and remains of chimneys or fireplaces.	Mainly post-medieval
Military sites (air raid shelters, ammunitions stores, Nissen huts, other structures)	Structures made of concrete, brick and corrugated metal.	20th century



Post-medieval lime kilns

Kilns were frequently built near to sources of limestone or chalk to produce lime, a material widely used for building, improving agricultural fields and other purposes. Most lime kilns date to the post-medieval period, although they were also used in earlier periods.



Bark peeler's hut

Oak bark was an essential raw material for tanning leather. It was highly sought after, particularly during the post-medieval period when demand for leather grew significantly. The bark was harvested seasonally, and the remains of shelters or huts used by the workers who stripped the bark may be preserved in woodlands.

Above: A post-medieval bark peeler's hut.

Leats

A leat is an artificial watercourse used to supply water to a watermill, millpond or another structure. Leats are often called 'millstreams' and date to the medieval and post-medieval periods. A leat will have a very even gradient, following the contour of a slope.

Right: A medieval or post-medieval leat supplying a watermill.





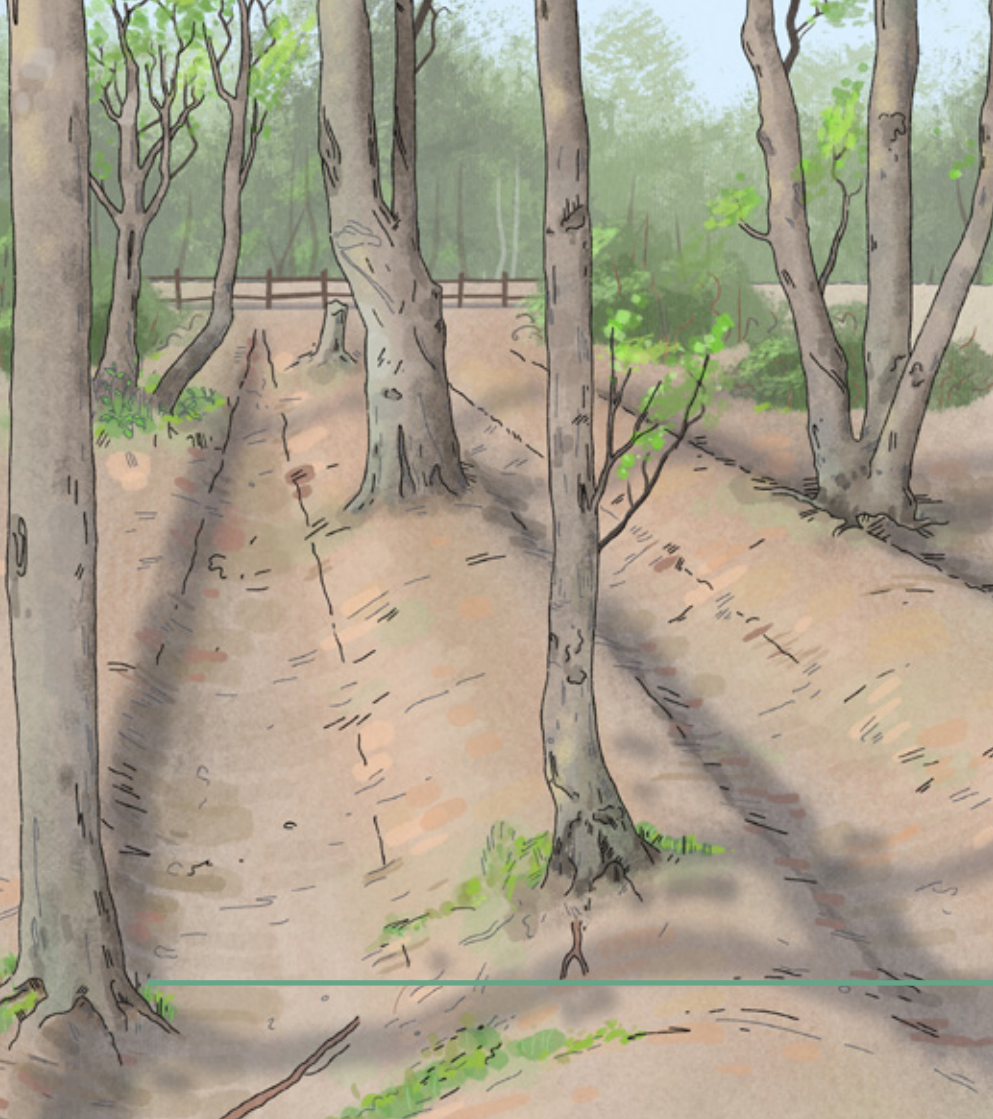
Routeways

Many routeways survive in woodlands as sunken tracks, subtle earthworks or linear clearings, sometimes flanked by low banks, ditches and walls.

Above: A holloway flanked by mature trees.

Common types of routeway found in woodlands

Feature	Width	Main characteristics	Main time period
Roman road	5-12 metres	Largely straight alignment, with the road raised slightly on an embankment. Often re-used in later periods.	Roman and later
Holloway	2-10 metres	Deep, sunken lane with banks, often flanked by mature trees.	Medieval to post-medieval, sometimes earlier
Drove road	10-50+ metres	Wide corridor, often narrowing into a funnel, with walls or banks along the edges.	Medieval to post-medieval, sometimes earlier
Railways/ tramways	2-5 metres	Even-gradient route associated with embankments, often near industrial sites such as quarries or mines.	18th to 20th century
Woodland rides	5-40 metres	Wide strip between areas of woodland.	19th to 20th century, sometimes earlier
Forestry tracks	3-8 metres	Engineered road surface, flanked by drainage ditches.	Mostly modern
Other routeways	Variable	Often narrow (1 to 5 metres), and may follow historic routes, such as Roman roads. Can include footpaths, bridleways and pack horse tracks.	Any period



Other earthworks

Ridge and furrow

Ridge and furrow features were created by repeatedly ploughing fields in the medieval and post-medieval periods. They are characterised by parallel rows of low banks (ridges) and ditches (furrows). The ridges can vary considerably in size and form, measuring 5 to 20 metres across. Medieval examples often have a characteristic reversed 'S' shape.



Lynchets

Lynchets are terrace-like features that form through the erosion of plough soil, although they can also accumulate naturally. A positive lynchet forms at the base of the slope, whilst a negative lynchet – a depression – forms where the surface is eroded away. They can vary in date from prehistoric to post-medieval. They run across a slope and can range in length from a few metres to hundreds of metres. Lynchets can be very similar to landslips, and it may not always be possible to tell the two apart.

Above: A lynchet formed through soil erosion.

Significant trees

Coppiced trees

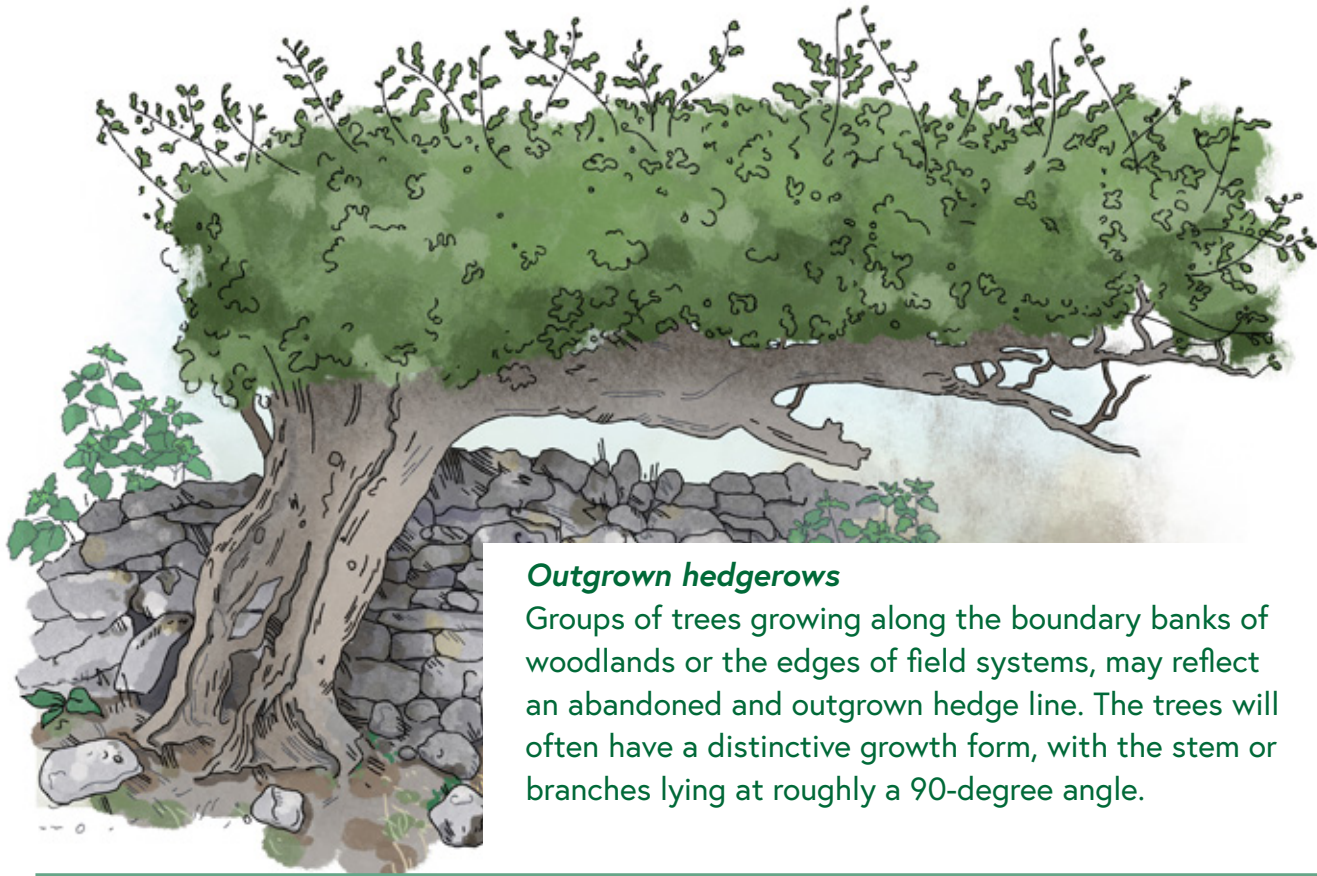
Many woodlands were historically managed by coppicing to produce timber, fuel and wood for a range of uses, such as hazel poles for hurdles or fish traps. Coppiced trees are cut close to ground level on a rotational cycle. Historical sources suggest that this cycle ranged from around 6 to 15 years. One of the most common systems of management was coppice-with-standards, in which some trees were cut on a regular cycle – for example, hazel – while others were left to grow on as mature timber trees – for example, oak.

Pollarded trees

Historically, pollarding was widely used to manage trees in wood-pasture and farmland. Trees were cut back around 2 to 3 metres above ground level to encourage the growth of new branches, which could then be harvested for timber, fuel or animal fodder. This allowed livestock to graze beneath the trees. The trunk of the tree, known as a boll or bolling, often develops a distinctive hourglass shape and a gnarled appearance.



An outgrown coppiced stool (left) and an outgrown pollard (right).



Outgrown hedgerows

Groups of trees growing along the boundary banks of woodlands or the edges of field systems, may reflect an abandoned and outgrown hedge line. The trees will often have a distinctive growth form, with the stem or branches lying at roughly a 90-degree angle.

Above: An outgrown hedgerow reflecting the location of an abandoned field boundary.



Caring for archaeological features in woodland during management works

Archaeological features are fragile and irreplaceable. It is important to protect them now and for future generations. They can be damaged by operations that break the ground surface or cause compaction.

Before starting any works, you should:

- collate information on archaeological features at the earliest stage
- check the protection status of the archaeological features (see Scheduled Monument section below)
- clearly define the extent of the archaeological features
- inform those working on the site of its significance, any legal obligations, the proposed method and the need to avoid damage – consider marking the features with paint or tape



When felling:

- limit works to periods of dry ground conditions
- use existing tracks where suitable – do not drive on or around archaeological features
- if the use of vehicles is unavoidable, use brash matting beneath machines and on existing trackways close to the features
- cut trees as close to ground level as possible – stumps and roots should be left to rot in situ (in their original position) and not be grubbed out
- treat stumps to prevent regrowth where appropriate
- do not leave vehicles and machinery parked on archaeological features
- fell larger trees in sections to avoid damage from falling timber
- use brash matting to cushion the impact of falling timber onto archaeological features where unavoidable



When extracting timber:

- avoid dragging timber across the archaeological features
 - consider using a grapple, winch or horse for extraction
- do not stack timber on archaeological features
- do not burn material on site

When restocking:

- no restocking can take place on a Scheduled Monument without consent
- consider leaving open space around archaeological features, with a plan for the ongoing management of scrub and regeneration



**If you are working near a Scheduled Monument,
you must also:**

- check Historic England's '[Search the List](#)' website to establish whether your archaeological feature has designated status
- contact Historic England for advice where significant works are proposed near designated assets
- be aware that it may be a criminal offence to damage, or permit damage to, the ground surface of a Scheduled Monument, either deliberately or accidentally
- be aware that planned works that will disturb the surface of the ground will require **Scheduled Monument Consent (SMC)**
- note that SMC is generally not required for tree felling – however, a felling licence may require restocking, so SMC would be needed for this on scheduled areas, or you will need an exemption from the felling licence conditions or to undertake compensatory planting elsewhere



Other consents

The activities described in this guide may require additional consents depending on the specifics of the site:

Felling Licence

A felling licence may be required to undertake felling operations. Seek advice from the relevant Forestry Commission Woodland Officer.

Site of Special Scientific Interest (SSSI) consent

Natural England must give consent for any activity on land designated as a Site of Special Scientific Interest.

An outline of woodland development

How do we study woodland history?

Several strands of evidence need to be brought together to study the history of a woodland. Place names and documentary sources are often the first starting point, particularly historical maps, which can provide evidence for woodland continuity.

Surveys of archaeological features tell us how the landscape was used in the past. Archaeological evidence can show whether a woodland has developed on land that was previously open, or whether the site shows evidence of far longer woodland continuity.

Palynology – the analysis of pollen – can extend our understanding of woodlands further back in time. Pollen grains are surprisingly robust, and they can be preserved in waterlogged sediments such as peat or in the organic-rich deposits found in river valleys, ponds and lakes. Many different types of trees, shrubs and woodland plants produce distinctive pollen grains, and their relative proportions can be recorded to examine changes in past vegetation. Alongside pollen, waterlogged sediments may also preserve other types of evidence relevant to past woodland environments, such as wood, seeds and invertebrates.

The development of woodlands

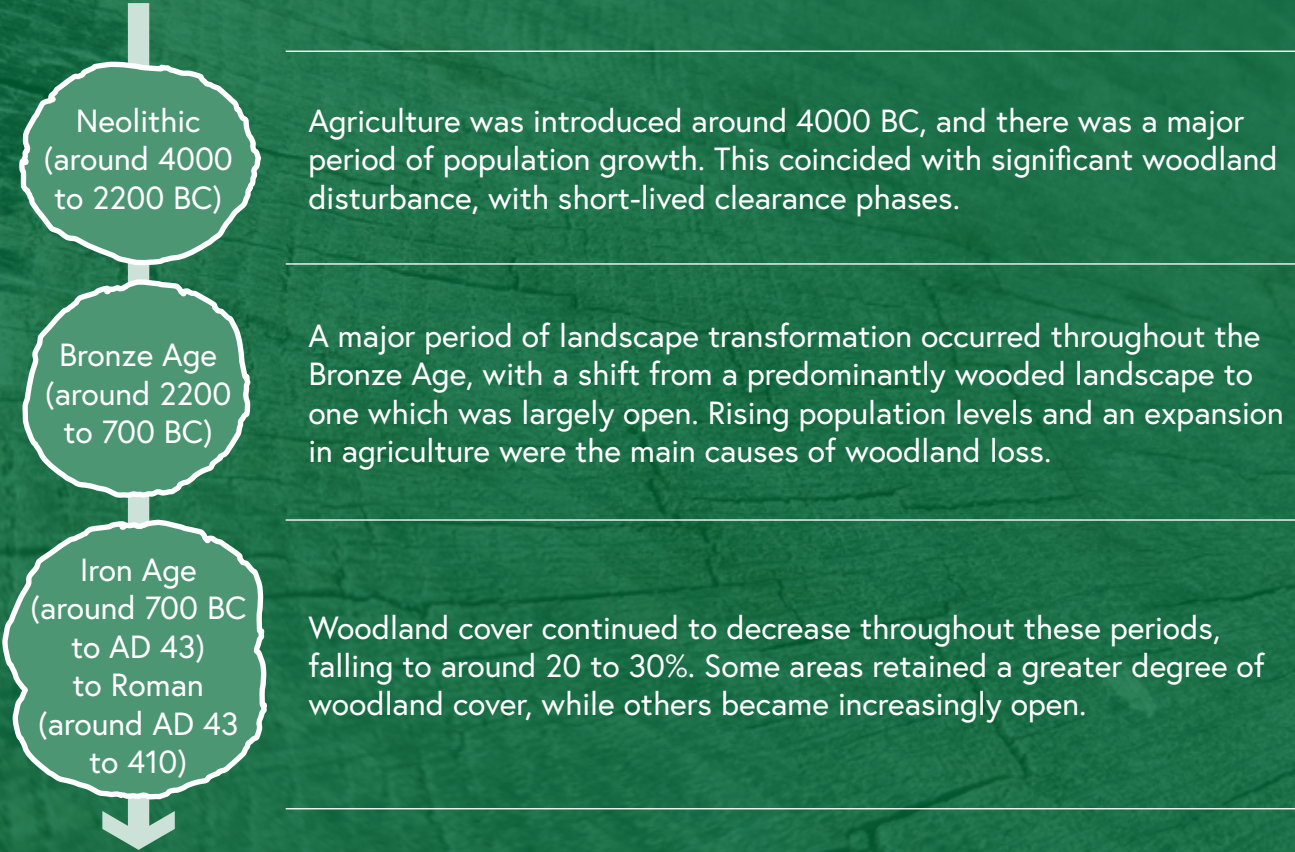


Late Upper
Palaeolithic
(around 25,000
to 11,000 BC)

Thick ice sheets covered most of northern Britain around 25,000 BC, although these were beginning to shrink as the climate gradually warmed. By 11,000 BC, much of Britain had become free of permanent ice cover, although the climate remained cold. Landscapes were largely open, with windswept plains of tundra and steppe. Trees only grew in scattered locations where conditions were favourable.

Mesolithic
(around 10,000
to 4000 BC)

Woodlands developed following a rise in temperatures around 10,000 BC. Many trees, shrubs and woodland plants, as well as animals and people, colonised Britain through a vast land bridge known as Doggerland. This land bridge connected large parts of eastern Britain to mainland Europe until it was submerged by rising sea levels around 8000 to 6000 BC. By 6000 BC, mixtures of closed-canopy woodland and open woodland covered around 70 to 80% of the landscape. Some areas had even higher levels of woodland cover, while others were more open. The level of woodland cover was influenced by hunter-gatherer populations and natural factors, such as climate, soils and the effects of wild grazing animals.



Neolithic
(around 4000
to 2200 BC)

Agriculture was introduced around 4000 BC, and there was a major period of population growth. This coincided with significant woodland disturbance, with short-lived clearance phases.

Bronze Age
(around 2200
to 700 BC)

A major period of landscape transformation occurred throughout the Bronze Age, with a shift from a predominantly wooded landscape to one which was largely open. Rising population levels and an expansion in agriculture were the main causes of woodland loss.

Iron Age
(around 700 BC
to AD 43)
to Roman
(around AD 43
to 410)

Woodland cover continued to decrease throughout these periods, falling to around 20 to 30%. Some areas retained a greater degree of woodland cover, while others became increasingly open.



There was little overall change in the level of woodland cover between the Roman and early medieval periods. However, between the 8th and 11th centuries, woodland cover had fallen further. It is estimated that around 15% of the English landscape was either woodland or wood pasture by the end of the 11th century.

Significant population growth in the 13th century and an agricultural expansion contributed to further woodland loss. Woodland only covered around 10% of the English landscape by the 14th century. More formal systems of woodland management developed in this period, notably coppices.

Population levels rose further, and woodland loss continued. By the end of the 19th century, woodlands (including plantations) covered around 5% of the English landscape. Changing social and economic circumstances had a significant impact on how woodlands were managed and used.



Early to mid-
20th century
(around AD
1900 to 1950)

Woodland cover reached a historic low point and traditional methods of woodland management had gone into sharp decline. There were severe timber shortages and in response there was a major expansion in timber plantations. Large numbers of ancient woodlands were partially cleared or modified, often by replanting with dense conifer plantations.

Mid-20th
century to
present day
(around AD
1950 onwards)

Woodland cover gradually increased over time, reaching 19% in Scotland, 15% in Wales and 10% in England. Environmental and social values became central to woodland management in order to enhance biodiversity, carbon capture and public health.

Further information

Historic environment guidance for forestry in England

www.gov.uk/government/publications/historic-environment-guidance-for-forestry-in-england/

Selected references

This document has drawn upon information in published studies.

Key sources used are outlined below:

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www.gov.uk/forestrycommission

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