Industrial Treescapes Survey Guide

January 2013

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Photograph on the front cover: Measuring and recording a platform feature at Wharncliffe.

Introduction.

Past use as an industrial woodland

Nowadays as a Bluebell wood in spring

Many of our local woodlands are now havens for wildlife and peaceful places to go for a walk. A hundred and more years ago the scene would have been very different. These were working woodlands providing timber, charcoal, oak bark, birch brooms, potash and a whole range of other products needed by local industries. It is still possible to see traces of these former uses by looking at the woodland's history, archaeology and ecology.

The '*Industrial Treescapes*' survey pack has been produced by SYBRG (South Yorkshire Econet) with funding from the East Peak Innovation Partnership's Industrial Heritage Support Programme. It is based on material produced from the *Woodland Heritage Champions* and *Discovering Neighbourhood Woodlands* projects with additional material from local volunteers who have taken part in the '*Industrial Treescapes*' workshops around Silkstone Common, Wharncliffe and Denby Dale. These workshops gave people the hands-on skills to investigate the industrial past of their local woodlands.

Topics covered by the workshops and this survey pack are introductions to:

- investigating surface archaeological features such as pits, platforms, boundary banks and routeways that may be found in a woodland. Pointers are given on assessing whether the features are associated with the industrial past and historic management of the woodland or incidental to that management.
- investigating the forms and management of local trees and shrubs and how these reflect their past uses and the history of a wooded landscape.
- carrying out surveys of woodland features and in using archival material to inform and interpret the survey data.

The Survey Pack And How To Use

The contents of the pack are divided into sections:

1. Background and Context
   - History and archaeology of / within woods;
   - Geological and botanical indicators
   - Pits and platforms; Linear features; and
   - Worked Trees.
2. General Survey Techniques
   - Health & Safety; getting permissions;
   - Level 1: walk-over survey; and
   - Level 2: recording specific features.
3. Survey Sheets
   - General woodland walk-over survey;
   - Point, linear and polygon features; and
   - Worked Trees.
4. Using and Interpreting Findings
   - Archival and other information; and
   - Depositing information with record centres.
5. Glossary
6. Bibliography

The pack is designed to be used by people who haven't attended the workshops. Sections 1, 4 and 5 will give you an initial understanding of the subject. Before carrying out a survey you need to read and follow the information in Section 2. The survey sheets in Section 3 are referred to in Section 2 and are designed to be used whilst surveying. Sections 1 and 4 can also be used at the fieldwork stage.

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1. Background & Context
History & Archaeology of or in Woods.

WOODLAND HISTORY.

This is the documentary or oral record which may describe past conditions, past events and past management practices. Most ancient woods and other wooded landscapes such as deer parks and wooded commons have some form of documented history. Such sites were of economic importance to their owners and their management histories have often survived in great detail over long periods of time.

Documentary evidence can, for example, provide accurate details about the tree composition of a wood at particular dates, about when planting was done and what tree species were planted, about when a wood was extended or reduced in size, about how coppicing was organised and when coppice management ceased, and about the markets for the wood and timber. Details are also often provided about grazing regimes, the construction and maintenance of boundary banks and walls, the preparation of charcoal hearths, the digging and filling in of saw pits, quarrying and mining activity. For most woods, the documentary evidence will not be continuous and will be more plentiful for the post-medieval period. Nevertheless, using ecological and archaeological evidence alone can make it much harder to be sure of past conditions, events and the management practices which were carried out, exactly when and for how long.

Example of modern wood pasture. © SYBRG 2009

One of the traditional types of woodland management is *wood pasture* which occurred in three main forms: Royal Forests and their private equivalent Chases, in Deer Parks and on Wooded Commons. A *Royal Forest* (and Chases) does not necessarily mean or imply woodland. Forest here is a legal term for land on which 'Forest Law' applied, relating to the hunting of deer, the grazing of animals, the clearing of land and the felling of timber. Forests and chases were not fenced and could include woodland, heath, moorland, fen, farmland, and settlements and extend for many miles.

Deer parks were multi-functional, used not just for hunting but also to provide food for the table, timber, and even arable crops, fuel wood from pollards, tree fodder, building stone and more. Besides deer which were often carefully farmed, medieval parks contained hares and rabbits (introduced or re-introduced by the Normans), game birds, fish in fishponds, and sometimes wild swine and cattle. Domestic cattle and sheep were also grazed. Although there are records of parks without trees, deer parks usually consisted of large, open-grown trees (mostly Oak), some woodlands protected from grazing, and areas largely cleared of trees (with grass or heath). The park would be enclosed by a stock-proof boundary and there were boundaries within the park separating the different land uses. In the sixteenth and seventeenth centuries, many well-wooded deer parks were converted into compartmented coppice woods, or 'improved' for agriculture.

Wooded Commons were unfenced areas where commoners (persons who held land in the open fields, or were tenants of the manorial lord, and had certain rights on the common land in the manor) had the right to graze their animals and to take other products such as fuel and building materials. Commoners usually had the rights of cutting underwood, harvesting the wood from pollards, and taking dead wood, but not the right of felling the timber trees. Their common rights were called estovers or botes (e.g. hedgebote, wood for making fences). This tradition often continued until the land was subject to an

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1. Background & Context
History & Archaeology of or in Woods.

Enclosure Award and evidence of an older landscape can sometimes be found in later planted woodlands.

The other major traditional type of woodland management is *coppicing*. From the Middle Ages until the second part of the nineteenth century ancient woods throughout the country were managed as coppices, either as simple coppice or as coppice-with-standards. In coppice woods the trees were periodically (generally every 10-30 years) cut down to the ground to what is called a 'stool' and from the stool grew multiple stems, called coppice or underwood. In a coppice-with-standards, some trees were not coppiced but allowed to grow on to become mature single-stemmed trees and these were the standards. The standards were of various ages. The coppice provided wood and the standard trees provided timber. The timber trees, mainly Oak, were for building projects but their 'by-products', bark and lop and top, were also of economic value. Coppice was long used not only for making hurdles and for house-building, but also for tools (see section on worked trees). Coppice woods were valuable and particularly vulnerable to grazing damage in the first few years after they were coppiced. For this reason, they were surrounded by stock-proof fences, either banks with external ditches or with stone walls. These woodland boundary features often survive and are important archaeological remains.

Deadwood hedge in ancient woodland © SYBRG 2007

Archaeology of the Wood: an external coppice woodlamd boundary. © SYBRG 2006

Woodlands whose history can be traced back to medieval times (prior to 1600) may be recorded as 'ancient woodlands' and as such are listed on the Ancient Woodland Inventory and given some protection from development. Current thinking and approaches are now moving away from the simple recognition of ancient woods to the wider concept of 'wooded landscapes'. This acknowledges the presence of pseudo- or linear woods such as ancient hedges, woodland fragments, and ancient trees from parks and chases. It also reflects the dynamic nature of landscape through time. Many of the ancient woods locally will be either parts of old parklands, or most likely, relict medieval coppices. Along with these are various types of planted or re-planted woods. Some, such as those planted in post-medieval parks and gardens are important in their own right, contributing to our understanding of individual landowners and landscape designers. Woods such as those planted to commemorate famous battles such as Trafalgar contribute to the rich tapestry of the historic environment. Woods planted in the twentieth century, for example to diminish blasts from gunpowder factories, contribute to our knowledge of how such industrial complexes functioned. Many of these woods of more recent vintage also contain historic remains equally diverse, or more so, than of those in older woodlands. Another, often forgotten point is that many 'natural' woodlands develop through ecological successions

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1. Background & Context
History & Archaeology of or in Woods.

on post-industrial sites and on abandoned heaths and moors. Some of these are of considerable interest but often generally neglected.

Woodland archaeology

This is the study of any physical remains of past human activity within and / or relating to woodland. This includes the woodland and individual trees themselves. It is most effective when carried out alongside a study of the woodland's history and ecology.

All woodland archaeological remains present clues and evidence of past human use of woodland sites. This evidence may also occur outside the present boundaries of a woodland so it is important to look at the context of the woodland and its setting in the landscape.

The range and type of archaeological remains and features vary with the continuity of woodland cover, whether it is ancient, or secondary, re-grown or replanted. The type of woodland, for example upland Oak-Birch wood, or lowland Alder carr, also affects the uses it was put to, its likelihood of being cleared or maintained in the past, and so the types of archaeological evidence to be found today.

Archaeology of the Wood: an outgrown coppice stool. © SYBRG 2006

Disturbance in ancient woods and wooded landscapes has generally been less destructive than that in other landscapes. Where land has been converted for arable agriculture for example, archaeological features have often been destroyed through ploughing and levelling of the land. This is not the case in areas that have been wooded for centuries. Here features are much more likely to survive, both those caused by activities directly associated with the woodland and those that happen to be in the woodland, possibly originating from earlier land-use. In some cases, features may also survive in secondary or more recent woods, but this will depend on past management and levels of disturbance.

Understanding this complexity is important if a woodland site is to be appreciated in its totality and to be conserved effectively for the future. Recognition of the evidence and awareness of its potential vulnerability is vital.

Woodland archaeological remains incorporate and survive as:

- soils, sediments, and buried deposits including seeds and other organic material preserved in waterlogged ground;
- living and dead trees and their remnants;
- stones, structures and ruins;
- material scattered on site - such as flints, cast off tools and equipment, domestic materials from settlements, etc.;
- earthworks such as banks and ditches, and platforms and pits; and,
- the vegetation itself.

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1. Background & Context
History & Archaeology of or in Woods.

Archaeological features you may find in woodland can be related to:

- Land ownership and management (banks, ditches, gateposts, hedges, walls, boundary trees).
- Woodland processes and products (pits, platforms, sawpits, storage and processing sites, access routes and trackways; settlement sites).
- Industrial extraction (stone, coal and other minerals) and industrial processes (smelting, milling, production of potash and gunpowder).
- Agricultural phases of land use (field systems, boundaries, buildings, plough marked stones).
- Recreational and sporting activities now (wargaming, pheasant shoots) and in the past (Victorian pleasure gardens).
- Settlement sites (from prehistoric to modern).
- Military activity (trenches and bolt-holes; bomb craters; tank platforms, searchlight and gun emplacements).
- Transport structures (tramways, packhorse routes, bridges).

Archaeology of the woods provides evidence of human activity that relates to the woods and the trees in the wooded landscape. For example, boundary banks and ditches relating to the management of different parts of the wood and pits and platforms relating to woodland processes such as charcoal burning.

Archaeology in the woods provides evidence of human activity that is either to do with other uses such as mineral extraction which are not specifically to do with the trees or wood. They can also be related to settlements or structures which now happen to be within woodland but were built or used before the land became woodland.

The *archaeology of the woods* is hugely important to the understanding how these areas were used and managed but *archaeology in the woods* can be very important too, and together they give a picture of our cultural landscape. Some archaeology of the woods, such as charcoal hearths may not always be found within woods. Where woodland has been cleared charcoal hearths can be found in open situations. In other areas, making charcoal may have always been carried out outside of the woods themselves. There are regional and international variations in these sites of manufacture and often finding an archaeological feature can throw up new questions about the historic landscape.

Archaeology within the wood: foundations of a Romano-British hut now surrounded by woodland.
© SYBRG 2011

Archaeology of the wood: foundations of a wood-worker's hut (verified from documentary sources).
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1. Background & Context
Geological Indicators.

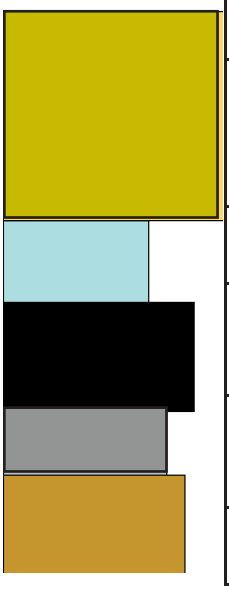
Introduction

An appreciation of the underlying geology of an area is one of the keys to understanding the industrial heritage of a local woodland. The underlying rocks influence how the land has been shaped through natural processes and how humans have exploited the resource. Both have direct and indirect impacts on the woodland.

Local Geology

The geological strata of the East Peak area belong to the Carboniferous (Pennsylvanian) age Coal Measures. The beds are typical of the period consisting of a repetitious succession of sandstones, mudstones, shales, seat-earths (Fireclays/ Ganisters) and coals. The major sandstones which locally include Crawshaw Sandstone, Greenmoor Rock, Grenoside Sandstone and Silkstone Sandstone form the higher parts of the ground. The Penistone Flags describes the other rocks. These are a complex sequence of several beds of fine grained, flaggy sandstones separated by mudrocks with deposits of thin coals and seat-earths interleaved within these. Being softer they form the hollows and valleys.

The Cyclic Unit of the Coal Measure deposits



Lithologies	Depositional Environment
Cross-bedded Sandstone	Progressing Delta Lobe
Mudstone or Shale	Muds washed in over former vegetation
Coal	Remains of forner vegetation
Seat-earth	Fossil Soil (Paleosol) Soft=Fireclay; Hard=Ganister.
Flaggy Sandstone	Sand-bar or Delta Lobe

The coloured blocks to the left of the table represent the different strata within the Coal Measure deposits.

Mineral Exploitation

Most of the geological strata have been worked by humans over the previous centuries for a variety of purposes. These are summarised in the table below.

Commercial Uses of Geological deposits

Sandstones & Grits	Building Stone [Ashlar] Tilestones, Grindstones, Millstones
Mudstones & Shales	Brick & Tile Making
Coal	Chemical feedstock & Fuel
Seat-earth: Gannister : Fire-clay	Refractories: Furnace linings; Crucible pots & linings
Flaggy Sandstones	Building & Walling stones; Grindstones

As a result of this exploitation, the topography of the landscape has been altered. Hollows and spoil heaps of varying sizes have been created; water table and drainage patterns have changed; and associated infrastructure built and (now) abandoned.

Effects on Local Woodland

Geology has both direct and indirect effects on woodland formation and structure. At a basic level it influences the soil and topography which favours woodland growth and makes it less likely for the area to be used for agriculture on a sustained basis.

Many of the East Peak woodlands are on steep valley sides in areas where mineral extraction has occurred, at different scales over many centuries. Evidence of former mining and quarrying in the form of adits, day-holes, bell-pits, tramways, channels and buildings can often be found. Some of the woodlands may have grown up through natural regeneration after the mineral extraction stopped. The mineral industries also needed a good supply of wood and timber for their operations. Local *coppice with standard* woodlands were well-placed to provide the industrial market with the pitprops, rails, ladders, scaffolding, containers etc. which were needed. Old coppice stools and other modified trees are evidence of this past industrial use.

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1. Background & Context
Botanical Indicators.

Introduction

Plants in general have specific requirements in terms of growing medium, pH, moisture, light, slope, climate and altitude (Ellenberg Values). They and their allies, fungi, may all be classed as 'indicators' of a particular set of growing conditions and specific habitat-types, e.g woodland or wetland; areas with high nutrient levels etc. Some have very precise requirements others are more general and able to grow in a range of habitats e.g common nettle. The distribution of plants is also influenced naturally by different mechanisms used in reproduction, e.g. wind-blown seeds, creeping rhizomes and by grazing as well as by human influence. All these factors come into play when considering 'indicator species'.

Botanical Indicators of Ancient Woodland

Lists of plant species which have strong associations with known ancient woodlands and can therefore be used as indicators have been developed covering different areas of the country. These lists reflect different growing conditions and historical management across the UK and are still subject to refinement as further data is gathered and interpreted alongside historical and archaeological studies. Woodlands are classed as ancient using the accepted definition 'in existence prior to 1600'. Although it is important to remember that all woodlands will have been managed in some way since then so the plant species which are present now may be different to those in the past.

In the case of *Industrial Treescapes* the woodland ground flora may consist of only a few indicator species in parts of the wood where industrial activity has taken place. Outside these areas, for example stream-sides and boundaries which have had less disturbance more species may occur. Common 'indicator' species in local industrial woodlands are bluebell, wild garlic, wood anemone and dog's mercury. These can all form carpets of plants covering the woodland floor. A list of some of the key ancient woodland indicator plants for local industrial woodlands is given on page 10 of the pack.

A survey using the list of local ancient woodland indicator species should cover the whole of the woodland and be carried out across the spring and summer to identify the full range of species present. If several of the 'strongly associated' species occur together then this may indicate a site of an ancient woodland which may be confirmed by historical research.

Shadow ancient woods may occur in some plantations, secondary woodlands or ornamental planting schemes which have previously been cleared of their trees. These areas may be overlooked because of their present management regime but may exhibit continuity with an older landscape.

Botanical Indicators Associated with Features

The particular habitat requirements of some plants means that they can indicate areas of disturbance, industrial processing sites and outlines of archaeological features which may otherwise be difficult to pick up. For example, clumps of common nettle indicate an area with high nutrient levels perhaps associated with a former dwelling site and disturbance. Clumps of dog's mercury and wood anemone have been found associated with iron bloomery slag. Common bluebell is often associated with areas that have been previously stripped of turf and so may potentially indicate former coppice woods where turf was used for covering charcoal stacks. The outline of features which include stone work can be spotted by the moss growing on the stones which form a vivid contrast to the surrounding woodland floor.

Vegetation showing line of boundary feature .
© Paul Ardron 2006

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1. Background & Context
Botanical Indicators.

Some Ancient Woodland Ground Flora Indicator Species for Local Woodlands

Species	Species
Angelica	Honeysuckle (native)*
Barren Strawberry	Lesser Skullcap*
Broad Buckler Fern	Red Campion
Chickweed Wintergreen	Remote Sedge
Climbing Corydalis*	Tufted Hair-grass
Common Bluebell*	Wavy Hair-grass*
Common Cow-wheat*	Wild Garlic*
Common Dog Violet	Wild Strawberry
Creeping Soft-grass*	Wood Anemone*
Dog's Mercury*	Wood Horsetail*
Golden Saxifrage*	Wood Melick*
Golden-scaled Male Fern*	Wood Millet*
Greater Stitchwort*	Wood Sage*
Greater Woodrush*	Wood Sorrel*
Hairy Woodrush	Woody Nightshade
Hard Fern	Yellow Archangel*
Hart's-tongue Fern	Yellow Pimpernel*

* Key species for identification

Wild Garlic

Common Bluebell

Wood Anemone

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1. Background & Context
Pits and Platforms.

Introduction

There are many different types of pits and platforms found in woodlands, but not all relate to specific woodland uses. Some may relate to other industrial uses such as mineral extraction; others may be co-incidental, for example, military tank platforms; and others may be natural features. It will probably be difficult to distinguish between some of these without a careful survey and background historical research. The list below gives a description of the more common types of pits and platforms found in local woodlands.

Charcoal Hearth

This is a roughly circular area where a stack was built from lengths of wood, cut from coppice poles, which were then covered by turf (to prevent complete combustion) and burnt to turn them into charcoal (see illustration in introduction). Normally all that remains is a round shallow depression in the ground (around 5 metres in diameter) or a flat surface cut into a slope with a retaining wall on the down-slope. Fragments of charcoal are sometimes seen within the hearth as an additional clue. These are common archaeological features in many local ancient woodlands but may also be found in secondary or re-planted woods if the ground surface has not been greatly disturbed.

Remains of a Charcoal Hearth. © SYBRG 2012

Whitecoal kiln or Q-Pit

This is a roughly circular shaped hollow in the ground surface (between 1 and 2 metres in diameter) with a channel coming off it. They were used to produce kiln-dried pieces of wood known as whitecoal. It is understood that the small pieces of wood were stacked on stone lintels, then covered over with turf. A fire would have been lit underneath the lintels and the heat used to dry the wood out. Today, few Q-pits are well preserved, however the stoke hole can often be distinguished, as can the remains of the stone lining. They are similar in form to Potash kilns and can be confused with these in some areas of the country because they were both stone lined.

Remains of a Whitecoal Kiln, note the change in vegetation showing the outline . © SYBRG 2007

Potash Kiln

The potash manufacturing process involved two stages: firstly, burning vegetation to ash and secondly, boiling down or 'elying' a solution of water and ash in a large metal cauldron. The main surviving evidence is in the form of circular stone built structures where green vegetation was burnt and the ash collected. Other evidence can be seen in variable and often shallow depressions and pits which may have been where the 'elying' took place or could be the sites of less industrial ash burning.

Remains of a Potash Kiln, with volunteers standing in the centre. © SYBRG 2007

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1. Background & Context
Pits and Platforms.

Processing, Storage and Building Platforms

Areas of levelled ground, rectangular or square in shape lying close to a track or path in the woodland. There may be some stone or building material associated with them. Their former use may be difficult to confirm without historical research.

Saw-Pits

Sawpits occurred both within the woods and larger ones at processing locations outside. Despite their widespread use in the past, the smaller sawpits within woods are rarely recognised. This is because many were constructed for a brief period of use and may have collapsed or infilled soon after their abandonment, leaving only shallow depressions that are not very distinctive in appearance. Indeed, many contracts for woodland use specified that the sawpits should be filled in when work was complete. However, where there have been thorough searches, such as in the Chilterns, a good number of well-preserved sawpits have been recorded. Most are rectangular, 2 to 3 metres long by 1 metre wide. You are looking for a trench that is roughly coffin sized and shape, and 1 metre to 2 metres deep.

Filled in Saw-pit. © SYBRG 2007

Bell-Pits

So called 'bell pits' are mines for minerals and stone such as coal or flint which can be found relatively close to the surface. Vertical shafts were excavated into the ground to reach the horizontal seams of the desired rock or mineral. Spoil from the excavation of the shaft was often left creating a circular 'donut' mound around the shaft. The shaft was often loosely backfilled with debris, logs etc. when the mining operation finished giving a sunken appearance to the centre of the mound.

Small-scale mining activity within woodland. © SYBRG 2011

Mining Activity

Disused mine entrances, adits and ventilation shafts are sometimes found in woodlands. In Wharncliffe Wood in Stocksbridge, South Yorkshire, for example, mining for ganister took place and shafts are still evident today. Many entrances and shafts will have been identified and mapped by the Ordnance Survey with historic maps showing more details of the mining operation. Additional survey may be unnecessary apart from confirming the locations within your overall work. Under no circumstances should you enter any mine shaft or tunnel: they can be extremely dangerous.

Old quarry site, Silkstone. © SYBRG 2012

Quarry and Stone-getting Pits

These form a diverse range of features from a few metres across to large, opencast mines. Some may

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1. Background & Context
Pits and Platforms.

relate to the woodland itself where the objective of stone extraction was to build a wood boundary or to construct the features associated with woodland industries, for example whitecoal or potash kilns. Woodlands contain pits ranging from prehistoric and Roman (such as for quernstone [grindstone] manufacture) to twentieth century building stone. Historical research is usually needed to verify the use for the quarried material.

Military Remains

During the twentieth century in particular woodlands were used by the army and local defence corps as training grounds, storage areas and defenensive sites. In some woods, military remains are abundant, and include pillboxes, weapons pits and slit trenches, concrete bases of for buildings, and networks of tracks and areas for storage and vehicle parking. Craters left by stray bombs may also be found.

Water Features including Ponds

Natural streams were often exploited and manipulated to provide access to water for power or as part of an industrial process. This can sometimes make it difficult to tell the difference between a natural watercourse and one whose channel has been modified by human intervention. You may not be able to decide on the degree of naturalness, based on an examination of the channel in isolation, especially if the water course has had sufficient time to develop a more naturalised appearance. Streams may have been dammed or water diverted to create what is now a point feature, and both natural and artificially constructed ponds are found. Historical research and the recording of other channels and potential industrial remains in the vicinity will assist in placing these features in context. Some of these features may also be associated with later development of Victorian pleasure gardens.

Tree-throw Pits

When a tree falls over, usually as a result of high winds, it leaves a pit where the root plate once anchored the trunk into the ground, known as a 'tree throw'. These may be quite recent or centuries old. If a tree fall is recent, the presence of the fallen tree, or of an existing stump, will make it easy to distinguish the depression from an artificial earthwork. However, if the stump has rotted away completely, it can be very difficult to confidently interpret the pit that is left. Usually, tree throw pits are approximately circular and about 1 to 4 metres in diameter, depending on the species and size of tree. Sometimes, there are more clues: a semi-circular pit with a mound along its straight edge is characteristic of a fall in which one side of a large root plate has remained partially embedded in the ground, forming the earthen mound after decades of gradual decay. Confusingly, some artificial earthworks, such as small-scale quarries and 'weapons pits' dating to the Second World War, can look very similar after seventy years of erosion. In these cases, analysis of the wider distribution pattern and/or reference to historical sources is usually the key to telling the difference.

Fallen pollarded Ash . © SYBRG 2007

Landslips

Woodland is often found on land that is unsuitable for arable agriculture: on steep slopes, boggy ground, or heavy soil. Clay sub-soils, especially, can combine all three of these factors likely to promote woodland, and they also create conditions under which landslips can occur, especially after wet weather. Therefore, woodland and landslips often coincide. These landslips vary in size and can later be confused for artificial platforms or exploratory diggings. As with tree throw holes, the key to dismissing a particular mound or hollow as a natural feature is to be aware of the underlying geology as well as a thorough examination of the surrounding area and referral to historical sources.

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Supported in partnership by:

1. Background & Context
Linear Features.

Introduction

Linear features can offer remarkable insights into the history of our landscape and are some of the most important historic features you may come across in your research. They may include boundaries and route-ways but also ancient cultivation areas such as field lynchets. Some boundaries are not continuous features on the ground, but are marked at intervals by boundary stones and distinctive immovable landmarks, such as watercourses, natural outcrops, and prehistoric monuments.

Linear feature (bank) within woodland © SYBRG 2006

There are many different types of linear features found in woodlands, but only a few relate specifically to woodland uses. The most important are the boundaries keeping livestock or humans in or out of defined areas. Similar linear features may relate to other uses such as drainage, mineral extraction, water-power and transport; others may be co-incidental, for example, military training areas; and others may be natural features. Linear features may extend around the wood, continue outside the wood or be confined to specific areas within a wood. They can occur as a single feature, a ditch or hedge, or in combination, for example, a bank with a hedge on top and ditch at one side. Individual elements in the combination of features may have been made at different times. Whilst some features will be fairly easy to follow through the wood others may be difficult to distinguish without a careful survey and some background historical research. The list below gives some information about the common types of linear features found in local woodlands.

Banks

Banks used as an outer boundary of a woodland were usually quite substantially built. They were designed to provide a barrier to prevent uncontrolled grazing and trespass by both grazing animals and humans. These outer woodland boundaries varied in their construction depending on the materials to hand. Often there was a ditch on the outside of the wood and then a bank to stop animals or people getting in. There may also be walls, fences or hedges on the top of the banks to strengthen the defence. These types of boundaries are often a feature of an ancient woodland. Hedges on their own were also used as a barrier around the edge of a woodland. The banks may still be apparent as a boundary feature around a woodland today if the extent of the woodland has not changed. Where there have been changes the bank may now exist within the woodland, be some way outside the woodland (and much less obvious) or no longer be continuous. Comparison with old maps and estate documents will assist in working out whether the boundary was an external one. Woodland managed on rotational coppice was often divided into compartments by less substantial banks and ditches so that animals could graze in some areas but be excluded from others. These may also still occur and can be traced.

Other banks may occur within the woodland associated with trackways, settlements, mining and quarrying or industrial processes. These features may be relatively recent or be centuries old. They may indicate that the woodland was cleared at some time in the past or is secondary and has grown up more recently over an older landscape.

Ditches, Goits, Culverts and Trenches

Ditches may be associated with a bank as a boundary feature and in these situations can be recorded at the same time as the bank. They would be used as an additional barrier to prevent access into or out of the woodland or compartment within the woodland.

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1. Background & Context
Linear Features.

Other ditches used for drainage or ditch-like features such as goits / leats (associated with water-power) or trenches may be found. Some of these may be enclosed channels or culverts running under tracks or through other features. These ditches and channels need to be mapped and followed through the woodland to try to understand their function in the landscape. Drainage ditches may no longer carry water and could be much shallower than they were originally as they have not been maintained. Goits/leats are usually associated with or connected to other built structures such as ponds and dams and may be relatively easy to piece together. They may also have been mapped on older Ordnance Survey maps. Again if they have been abandoned they may no longer hold water. Superficially similar are trenches dug as practice sites for military purposes which may date back to the mid 1940s or earlier. During the Second World War, anti-invasion defences including 'stop lines' and anti-tank ditches were dug. Woodlands are some of the few places these military 'boundaries' still survive as earthworks. Once these have been mapped in relation to each other it should be possible to discount other uses as the trenches are fairly uniform in construction with abrupt angle changes and start and end points.

Linear ditch / trench within woodland © SBVHG 2010

Hedges

Hedges will usually occur as part of boundaries around existing or former woodland edges or on either side of trackways through woodlands. Many of these hedges have not been maintained and now only exist as a line of outgrown laid trees (see worked trees section) or ancient standard or pollarded trees. These may or may not be associated with a boundary bank and/or ditch. If that is the case it would be useful to treat the bank, ditch and hedge as one feature for recording purposes. However, a note of caution: they may not all be of the same age so may represent different stages in the boundary's life.

Out-grown hedge lines on either side of a filled in goit. © SBVHG 2010.

Hedges or a row of out-grown enclosure hawthorn trees, for example, may occur within a woodland. These may indicate that the woodland or part of the woodland is more recent; the hedge may surround a garden and dwelling or workshop/industrial complex or it may be along the line of a field boundary. In some cases there may be a scatter of older trees such as out-grown pollards within the area enclosed by the hedge which may be an indication of an area of former wooded common or wood pasture.

Old Ordnance Survey maps are good places to start to look for old field boundaries and hedges as one

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1. Background & Context
Linear Features.

of their functions in the nineteenth century was to accurately survey boundaries of landowenership so they would record lines of individual trees across a landscape.

Tracks and Routeways

Trackways, in particular, can reflect the history of a piece of woodland. Tracks leading into the woodland are related to processes being carried on within the woodland. They may be relatively recent or centuries old. Trackways through the woodland typified by deeply eroded 'hollow ways' (trackways used heavily and thus eroded to form a sunken path) are largely the product of industries or centuries of transport by pack animals. In this area along the flanks of the Pennines often braided hollow-ways were used by pack-horse trains in medieval times. Many of these salter or psalter lanes were for transporting goods, especially salt from the Cheshire Plains and metal tools back over to Cheshire. Trackways can also include rides, carriage drives and avenues, linked to aristocratic traffic or with the many minor houses and halls that dotted the landscape during the eighteenth and nineteenth centuries, and may also be related to farmsteads.

Old 'hollow way' track leading out of woodland © SYBRG 2010

Tramways occur in local woodlands associated with mining and quarrying activity. Similar to trackways they lead to the site of the industry in the woodland but will probably be more substantially built and on a shallower incline.

It is worth noting that both physically and over time many of these features had multiple and over-laying uses.

Landslips / subsidence

Depending on the geological and other physical conditions these features may be linear. If this has recently occurred it is usually fairly obvious but if it has happend a long time ago it may mimic a boundary feature.

Area of old landslip within woodland © SYBRG 2011

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1. Background & Context
Worked Trees.

Introduction

A **worked tree** is one that at some stage in its life was managed by people to generate wood, worked timber or tree fodder for a particular usage e.g. charcoal making, for firewood and/or building materials. These trees are often very old but may look younger because they do not exhibit the classic characteristics of an ancient or veteran tree such as the Major Oak in Sherwood Forest. In many cases the worked trees were managed for centuries before being abandoned around the beginning of the twentieth century as the demand for locally sourced wood-based products declined. In the local area a few trees continued to be worked until the 1970s and more recently there has been a revival in these traditions. Some abandoned worked trees were felled and removed when woodlands were converted to plantations but there are still many abandoned worked trees which survive today. They can give an insight into the history of the surrounding landscape.

Tree Forms

Bundle planting

Sometimes several tree seeds were planted in the same hole to increase the chances of a tree establishing itself. The resulting clump of trees were not thinned out and continued to grow closely together. They can now be seen as a tight knit group of even aged trees.

Bundle planting. © SYBRG 2007

Coppice

The stem of a tree is cut at ground level to encourage growth of multiple stems from the base (known as a stool). These stems (known as poles) are then cut back at periodic intervals which may be as little as just a few years or up to thirty years depending on the variety of purposes they may be put to. This was a very common form of management for trees over several hundreds of years. The coppice tradition had largely died out by the early twentieth century but many coppice stools and the outgrown stems survive. They can often now appear as circular clumps of quite large trees with the original base having decayed to form a hollow (see right hand picture).

Recent coppice (left) and outgrown coppice (right) . © SYBRG 2010

Stored Coppice

The creation of this form often occured when the coppicing tradition was abandoned. One or two stems were selected from a large coppice stool to continue to grow as standard timber trees. This has sometimes resulted in what is known as an 'elephant's foot' at the base of the tree.

Stored coppice. © SYBRG 2011

Pollard

A tree whose stem has been cut above the height of grazing animals' browse lines to create a number of stems (known as poles). The pollarded tree is then managed in a similar way to that of a coppice stool. Pollards were created in areas of wood pasture, for example in deer parks and on commons.

Recently pollarded Lime. © SYBRG 2011

Lapsed/Abandoned Pollard

These trees result from the abandonment of the pollarding tradition. If they now occur in a woodland this indicates that the area was formerly much more open and grazed by large herbivores. Due to the smaller stems being cut repeatedly to encourage new growth from the main trunk, a lapsed pollard has a

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1. Background & Context
Worked Trees.

short trunk with a mass of vertical 'branches' above it. These may look natural, however if they all come from the top of a trunk at about the same height it could be an indication of an abandoned pollard tree.

Stub
This type of tree has a main stem or trunk that was cut in the past above coppice (ground level) but lower than pollard (grazing animal) height. As with coppice and pollard, smaller stems grow from the cut stem. These had similar functions and their management was also abandoned.


Lapsed Beech stub. © SYBRG 2011

Maiden / Standard
A tree that has been grown in its natural form as a single stem for timber production in a woodland or as an open-grown tree outside woodland.


Standard tree. © SYBRG 2011

Medusoid
These trees are often found in upland rocky areas as irregularly shaped multi-trunked / multi-boughed trees. They are characterised by their sprawling growth forms in and amongst the rocks. They may have been used in a similar way to coppice and pollards or have grown naturally in response to grazing and climatic conditions. They may be of considerable age.


Medusoid growing amongst rocks. © SYBRG 2011

Shredded Tree
This form occurs when the side branches are repeatedly removed from a tree trunk, often for animal fodder. This creates small groups of stems growing laterally from the trunk of the tree instead of large branches.

Phoenix Regeneration
This occurs when a tree partially or completely collapses to the ground. The tree then roots from the sides of the main trunk or large branches which are touching the ground creating a new tree or a series of trees.


Lime showing natural 'phoenix' regeneration.© SYBRG 2005

Layering
This can take place naturally as part of phoenix regeneration (see above) when a branch or fallen tree takes root. It is more commonly seen in old hedges where humans have exploited the natural process and have 'laid' the hedge to create a dense stock-proof barrier then the management of the hedge has lapsed. The re-growth after layering grows vertically up towards the sun creating a characteristic pattern of growth.


Natural 'layering' from fallen tree.© SYBRG 2007


Old laid hedge © SYBRG 2006

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1. Background & Context
Worked Trees.

Tree Species and Their Uses

Alder: Coppice poles used for clog-making and for charcoal which was used for making gunpowder.

Ash: Various uses including wagon building, wheel rims, hay rakes, ladder-poles, tool handles and police truncheons.

Beech: (Not native in local area, planted in the nineteenth century). Used for furniture making, ladder rungs, rolling pins, tent pegs, treen and ox yokes.

Birch: Various uses including spoons and dishes; textile industry (bobbins, reels and spools); besom brushes and bundles made from twigs were used to take impurities from molten steel; sap used for wine and 'sugar'; bark for making baskets; firewood.

Elm: Used for furniture; for water pipes, piling under bridges and keels of wooden ships; chopping blocks and wheel hubs.

Hawthorn: Used for hedging (layered) along boundaries.

Hazel: Hurdle making; basket making; fish traps; hoops for barrels; thatching spars; shepherds' crooks; and nuts.

Holly: Cut for winter animal fodder; bark used for bird lime; butter prints and engravers' blocks; and horse whips.

Hornbeam: firewood; ox yokes; cogs and pulleys; mallets.

Oak: Beams and posts for house and ship building; tree nails and ship pins; wheel spokes; furniture; mining pit props; fencing; coppice poles for charcoal; bark used in tanning industry; acorns used for pannage (pig fodder).

Rowan (Mountain Ash): tool handles; fruit for jam-making.

Sweet Chestnut: (Not native in area, planted in the nineteenth Century). Used in furniture making, for pit props.

Sycamore (and Field Maple): Used for kitchen and dairy utensils; rollers including washing mangles; wood-turning, carving and musical instruments (violins).

Willow (Osier): Used in basket making; for tool handles; flooring of carts and barrows; and milk-maids' yokes.

Yew: Used for bows and by the Vikings to produce nails. Often boundary and churchyard trees.

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Supported in partnership by:

2. General Survey Techniques
Health & Safety; Permissions.

Permission

Ensure you have permission to carry out the survey. Contact the landowner to let them know what you intend to do, where and when. You may need to re-assure them that you are not planning to do any excavation type work or harm trees and other vegetation. They will also be able to tell you whether there is any management operation (e.g thinning trees) being carried out which may affect your survey. Always offer to let them have a copy of your survey results. They may also have copies of other information which may be useful for your historical work that they will allow you to see.

Health and Safety Advice

Before you start your surveys, please read the points below carefully.

- If you are part of a community group you may be insured; however, you need to check before carrying out any survey. If your group does have insurance you should fill out a RISK ASSESSMENT and check what guidelines apply. If your group does not have insurance or you do not belong to a woodland group please be aware that you are carrying out all survey work AT YOUR OWN RISK.
- Carry out all survey work with other group members or a friend, do not work alone. Make sure you carry a mobile phone and emergency numbers and leave details of your mobile phone number, route/location and expected return time with a friend or family member.
- Carry a first aid kit, sufficient drink and food, and any personal medication that you require. It is recommended that at least one of your group has up-to-date first aid training.
- Ensure you have permission to carry out a survey (see previous section). Always let the landowner(s) know a few days beforehand when and where you will be on site.
- The ground in woodlands can be uneven and there are trip hazards such as fallen branches, ditches and exposed roots. It may also be cold and wet. Wear sturdy footwear and suitable clothing for the weather conditions.
- Do not carry out surveys during adverse weather conditions particularly storms, high winds and heavy snow fall.

Please make sure that you are properly prepared for your visit. It is your responsibility to take care of your own safety and that you follow the up-to-date health and safety guidelines for your group.

Basic Field Equipment

Listed below are items needed to carry out field-based surveys. Some are optional and you will not need all of these for each survey.

- Maps: We recommend that you carry out all your field surveys at a scale of 1:2,500 (1mm on your plan = 2.5m on the ground). This scale will correspond to the largest scale maps produced by the Ordnance Survey.
- Notebook and pencil: Waterproof notebooks can be bought in many outdoor shops and pencils are more effective in damp conditions than pens. Make sure you also take a pencil sharpener and eraser.
- Ruler for measuring distances on the map (preferably with mapping scales including 1:2,500). A set-square may also be useful for plotting points on a map.
- Tape Measure: at least one but preferably three: 30m or 50m.
- Compass and 360-degree protractor (if no GPS).
- Camera: preferably digital cameras
- Sticks (Bamboo Canes) and Hazard Tape: to mark features to return to.
- Torch: useful for examining hollow trees and building interiors (if safe to do so).
- Identification Guides: for tree, wildlife and vegetation surveys.
- Hand-held GPS: not essential but useful especially now the up-to-date ones work better under woodland canopies.
- Mobile phones (check mobile phone reception) or Two-way radios: for communication if your group splits up, as well as for emergencies.
- Small First Aid Kit.

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2. General Survey Techniques
Level 1: Walk-over Survey.

Introduction

As a starting point, even if you already know the woodland well, you should carry out a rapid but thorough reconnaissance visit / walk-over survey to your study area. This will help to set the wood and any features you find there into context and can be done before any documentary research. The aim of this initial walk-over reconnaissance is to acquire an overview of your study area: its geology, topography, ecology and most obvious historic features, so do not spend too long examining any individual tree or other historic feature. A walk-over survey form can be completed and you can take photographs or make a few sketches on your map or in your notebook. This basic information will help you to structure any more detailed surveys.

A survey of a large wood can seem daunting so break the area down systematically into smaller, more manageable chunks, and agree a suitable timetable. Check that the wood is not already divided into compartments which is often the case if forestry operations are carried out. If compartments already exist then it may be more meaningful if your surveys match these. It is recommended that a general survey (Level 1) of the whole woodland is carried out before a very detailed survey of a small area possibly overlooking a unique feature. Always remember that, as a volunteer, you can return to the woodland and expand the surveys at a later date.

For all surveys make a note of the following as a minimum:
The date of the survey.
Who carried out the survey.
Where the survey was carried out (provide map references or GPS reference points where possible).
Take pictures of or draft a sketch showing the dimensions and location of any important features.

An appropriate map and the skills to locate and record features onto a base map, is key to undertaking survey work. The 1:2,500 scale (1mm on the map = 2.5m on the ground) map is recommended for the general survey. It will have fixed point features already mapped which you can check they still exist and then use them as reference points for your more detailed mapping and to orientate yourself.

How to Record Features onto a Background Map (Level 1 Survey)

Using the survey form, note the surrounding land use, aspect/slope and any distinctive features of the woodland as background information. If you are able to, walk around the boundary of your woodland or if not, follow all the major footpaths and note down any distinctive features you can see from them. The sort of features you are looking for include, a ditch or bank; a fence or wall; any large, tightly clustered or mishapen trees or shrubs; any square, oblong, oval platforms; any round, oval or oblong hollows or pits; any entrances or gateways; and tracks or paths; any streams or other watercourses; distinct patches of ground flora; changes in vegetation and any standing building / structural remains.

Features are divided into three categories (point, linear and polygon) for mapping purposes.
Point features are those which are too small to usefully define their perimeters and which can be depicted as a single point on a map. Examples of these are a single tree, boundary stone or small hollow or pit. In practice it will be up to you to decide when it is worth recording a structural feature's extent in more detail at a later stage. For example, recording inscriptions on boundary stones. See page 21 for recording worked and veteran trees. As a general rule, it is appropriate to record any feature smaller than 10m by 10m as a point feature.
Linear features are those which are long and narrow where their course can be defined as a line. Boundaries and tracks should always be recorded as linear features, even if only short lengths survive intermittently, in order to give a clear indication of their direction. A linear feature is recorded by using a sequence of Grid References with a minimum of two points (one at either end) if it is a straight line. For other lines more points are needed, with one at each major angle change, creating a 'dot-to-dot' effect. Curving lines are depicted as a series of

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2. General Survey Techniques
Level 1: Walk-over Survey.

short straight segments. Some linear features such as watercourses, hedges and the woodland's boundary should already be shown on modern Ordnance Survey maps but note when the map was surveyed and if any recent management work has taken place. Straight linear features which appear on the modern Ordnance Survey maps and still exist on the ground are very useful as 'fixed points' for pin-pointing newly discovered features especially in dense woodland.

Polygon features are used to depict large features or clusters of similar features that you can group together. They require a sequence of Grid References to define the perimeter of the area they cover. They are recorded in a similar way to linear features except that the last Grid Reference point is identical to the first. Some such as ponds are obvious and may already appear on Ordnance Survey maps others such as old coppice compartments, less so and you may need to think carefully how you define these.

For each feature, you will need to work out a Grid Reference. This is of fundamental importance so that you and other people can locate the feature in the future. Grid references can be derived in several ways.

- Directly from an Ordnance Survey map if the feature has already been mapped.
- From an Ordnance Survey map if you can plot new features onto it using other details shown on the existing map.
- Using a hand-held Global Positioning System (GPS).

There are several low-tech survey techniques, which require only a few cheap items of equipment (tape-measures etc). Even if you have a GPS these more basic techniques may prove useful, for example, to plot angle changes in linear features or polygons. Two of the more useful and straightforward techniques are 'baseline and off-set survey' and 'tape (or pace) and compass survey'. With the 'baseline and off-set survey' technique, you establish straight 'baselines' in relation to fixed features shown on your Ordnance Survey base map. You can then measure out 'tape-off' from the baseline at right angles, or 'off-set', to survey new points, whether individual point features or angle changes in linear or polygon features. The baseline is drawn on your recording map and the features plotted onto the map in relation to the baseline. The 'tape (or pace) and compass survey' may be the only way of penetrating into the heart of your woodland if there are no fixed reference points in its interior. Using a tape measure is obviously more accurate than pacing, especially on uneven ground or in undergrowth, but it is always slower and sometimes impossible. Here a single fixed reference point is used and new points you want to record are taken from that using a compass bearing in degrees towards the new point you want to record, and either pace or tape out the distance to the new point, keeping your pace length as close as possible to 1m. Write down the bearing and distance and use a 360-degree protractor and scale ruler to plot it onto your Ordnance Survey 1:2,500 background map, ideally straight away. Remember that Magnetic North and Map North (or Grid North) are not exactly the same: the angle of Magnetic North will be shown in the margin of the map sheet (so make a separate photocopy of this part of the sheet if you are planning to use a compass). Repeat this process, either from your original start-point, or starting again at the new point you have established. In this way, you will end up with a zig-zag line possibly with several side branches. It is useful to finish at another fixed reference point so that you can establish the accuracy of your survey.

Details of these techniques are described in more detail in the *Woodland Heritage Manual* and English Heritage's free guidance publications *With alidade and tape* (2004) and *Understanding archaeological landscapes: a guide to good recording practice* (2007), which are both downloadable from the English Heritage website (see bibliography page).

Note down any features, numbering them in sequence, on your map and survey form or in a notebook with a brief description including a grid reference or GPS location for future reference. This will enable you to assess the data you collect to pinpoint where you will need to carry out more detailed work.

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2. General Survey Techniques
Level 2: Specific Features.

Introduction

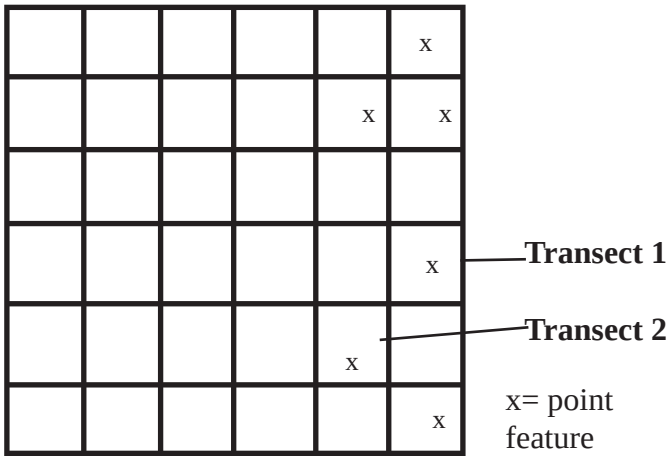
Having undertaken a reconnaissance or walk-over survey and assessed the data collected you will be in a position to plan further more detailed survey work. This may involve doing a **transect** survey across the woodland or in a particular part of the woodland where you have identified clusters of features and more detailed mapping of the co-incidence of features is required. More usually, specific features will have been identified from the walk-over survey as worth recording in more detail.

Transect / Grid Survey

The technique uses the baseline and off-set method to set out the transects you will carry out across the distinctive features or habitats identified. Two or three 30m tape measures are used. One tape measure acts as the base-line and the other(s), placed at 90° to the first are used to set up transects spaced out at intervals across the feature or area of the woodland. The intervals used will depend on the size of the feature you are surveying.

Whilst this type of survey can be done alone, it is recommended and often easier to work in small teams of two or three people. One person, at the base-line is responsible for plotting distances measured on the squared / graph paper; one walking along the transect recording features and distances; and (if a third person is available) one monitoring the transects - keeping the line straight (90° from the base-line) and spotting features.

The Transect Survey can be used to record clusters of features such as old coppice stools or small pits within a polygon area identified from the walk-over survey. Individual sample or specimen records can be made of some of the point features separately. In this case the recording transects would be set at 5m spacings along the base-line. It can be done by one person doing the recording who walks along the length of the tape measure, writes down the features found, the distance from the base-line and plots the points onto squared graph paper. Gradually, you will end up with a 30m x 30m grid



plot of all the features found. The survey can then be extended by starting again at the end point of the previous base-line or finished before the 30m end if the area is smaller. At least one of the base-line points should be related back to a grid reference on your base map so that it can be plotted with reference to other features in the woodland. Whilst carrying out this type of survey it is also worth looking at what is growing along the line of the transect and try to identify some of the tree / shrub and ground flora species. These may also indicate past industrial use.

The Plan Survey allows you to record individual surface features (point, linear or polygon) in detail. If the feature is part of a standing structure, it may already have been recorded on your Ordnance Survey map. The grid plan technique can be adapted

Coppice survey showing base and transect lines.

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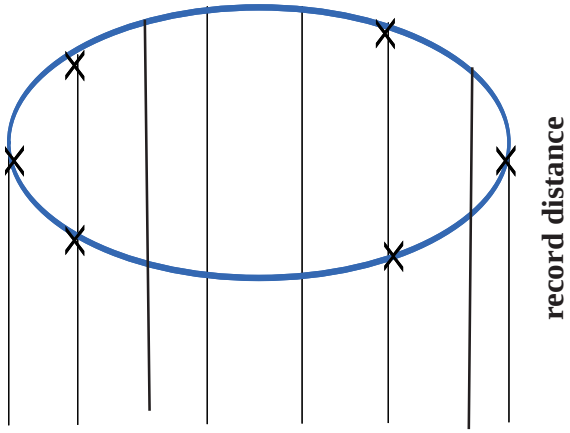
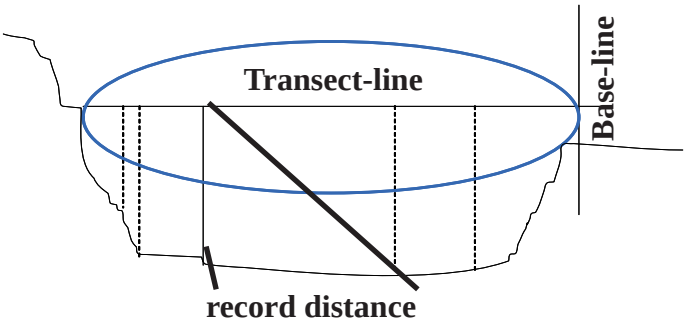
2. General Survey Techniques
Level 2: Specific Features.

where you may use one of the edges of the standing structure as the base-line or use further base-lines across the structure. There is also a separate type of survey for worked trees (see page 21). Here the base-



line is set up along one edge of the feature and a tape measure placed at right angles across the feature at 0.5m intervals. The overall dimensions of the feature can then be measured by recording distances from the base-line and plotting these onto squared graph paper. The positions of any changes in levels or relevant objects within the feature can also be recorded in a similar way. This will enable you to build up a plan of the surface of the feature.

A Profile Survey is useful if the feature is a hollow, mound, a combination of these or shows a distinct change in levels from the front to the back. Note: if the feature is a hollow, test the depth and stability before going into it. The technique is basically the same as that described above but you will also need either a third tape measure or a ranging pole or can be marked out at intervals. Here a base-line and



transect line is set up across the feature as previously described. For a hollow this is at ground level. For a mound, the tape needs to be suspended at the height of the mound tied to canes or poles or held by the survey team. Then using the third measuring device, measurements are taken at intervals along the tape transect vertically downwards to the surface of the ground or feature. The distance between the two surfaces is recorded and plotted on squared graph paper as before. There are standard archaeological symbols, in this case a triangle for denoting whether the change in surface level is a hollow or mound (see page 22).

Plan survey showing base and transect lines.

Profile survey showing base and transect lines.

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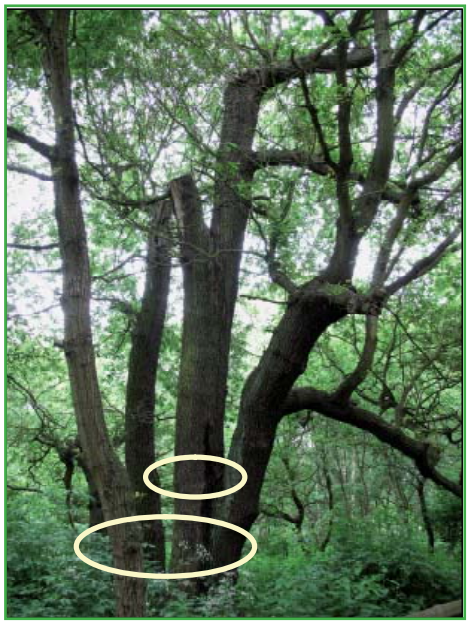
2. General Survey Techniques
Level 2: Specific Features.

Where possible, photographs should be taken of the feature from different perspectives and these related to the plans made. The geographic orientation (North / South etc. should be marked on to the plan for future reference as should the reference number from your walk-over survey.

For all the surveys, it is important to plot the feature(s) whilst you are in the field so that any errors or discrepancies in the distances measured can be seen and corrected on site. This will also enable you to build up a picture of the woodland in a methodical way linking it back to your walk-over survey and any historical or ecological information you may gather.

Measuring the girth of trees.



A coppice stool should be measured as a whole around all the individual stems at the lowest point. Individual coppice poles should also be measured to give an indication of the cutting regime.

A veteran tree, such as the one shown above, should be measured at approximately 1.2 to 1.5m above ground level (sometimes known as diameter at breast height (d.b.h)) to get an overall circumference of the trunk).

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2. General Survey Techniques
Level 2: Worked Trees.

Introduction

In most cases in woodland there is a variety of species, age of trees and growth forms. It is the older, mature trees which are of particular interest to survey as they indicate the history and type of past management practices carried out. For example, if all the old worked trees in the wood are pollards it may indicate that you are in former wood pasture or a deer park. It is worth remembering that some worked trees such as coppiced Rowan and Hawthorn may be quite small but very old and can easily be overlooked.

Worked trees have often been managed for centuries before being abandoned as markets and management practices changed. A coppice stool for example, can be extremely old but the stems arising from it can be relatively young. This gives the appearance of a cluster of small-stemmed trees indicating when the tree was last coppiced.

From the walk-over survey, you should have identified some notable or obvious worked trees to be recorded in more detail. Recording the worked trees can be carried out as a separate excercise or in conjunction with recording detailed surface features.

Context

Make a note of where the tree is growing and any other features or similar trees growing close by. This will help you to build a picture of the history of the woodland and what has happened within it. Describe if the tree appears to be growing in or on another feature and sketch the relationship on the reverse of the survey sheet.

Tree Data

Where possible identify the species of tree that is being recorded. There are very good guides available, for example, by The Woodland Trust who also now have a tree identification website http://www.british-trees.com/introduction and the Field Studies Council http://www.field-studies-council.org/publications.aspx which you can use. Make a note of which part of the tree you used to identify it, for reference.

Measuring the Girth of a tree

If your tree has a main single stem it should be measured at 1.5m above ground level. Make sure your tape is level around the tree. It is advisable to measure your tree at least twice to check your reading. Note the girth in metres or centimetres (e.g. 3.24m or 324cm). If your tree has a single stem but is burred or knobbly at 1.5m then you can shift the tape down the stem to get a more accurate reading. The same is true if your tree forks at or below 1.5m.

If your tree is a coppice stool or other multi-stem you can carry out some extra measurements. Firstly, measure around the coppice stool at the narrowest point (or around the stems at the narrowest point if no stool is present). This approximates to the girth of the tree. Note at which height you have taken the measurement (below 1.5m). Secondly, count the number of stems and then measure the largest two or three stems at 1.5m above ground level. If you want to measure a multi-trunk, each trunk should be measured separately as you would a coppice. If this is not possible as the trees have merged too high up the stem, measure them as one tree but note that the tree is a multi-trunk. You can also make a sketch of the tree form.

Tree girth varies with the age of the tree, the species, the growing conditions and past management.

It is also useful to record associated features on the tree, for example, cavities and burrs on the trunk which again may indicate former usage or damage to the tree.

Sketches and Photographs

An annotated sketch of the form of the tree with notes on where measurements were taken should be included on the survey form as a record of what the tree looked like at the point of survey. If there are any associated features either on the tree or in context it will be useful to sketch these. Similarly a photographic record of the form and type of tree can be compiled and may be used to verify the species.

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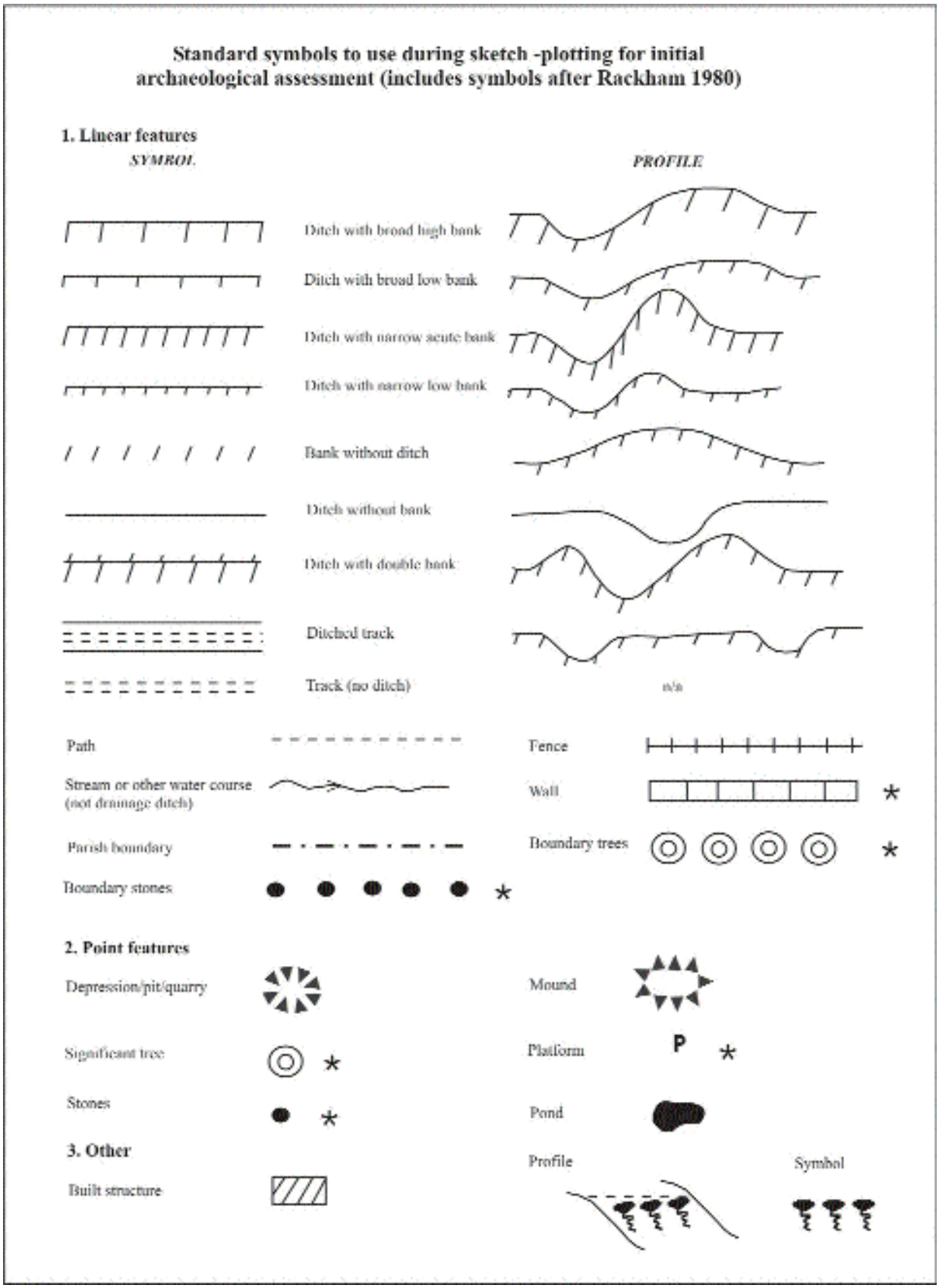
3. General Survey Techniques
Standard Symbols.



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3. Survey Sheets
Walk-over Survey (Level 1).

1. General Information

Woodland Name		**Surveyor(s) Name(s)**	
Woodland Location		**Date of Survey**	

2. Woodland Location and Situation

Grid Reference (Centre using map)		**Approx. size of woodland (in hectares)**	
Topography of the landscape (Situation of the wood)	Broad valley Narrow valley Plain Hill Plateau Lowland Moorland Crag/cliff Other (describe)		
Slope (Is the wood located on a slope and is this uniform through wood)	Vertical Steep Undulating Gently Sloping Flat		
Aspect (if the wood is located on a slope)	North East South West		

3. Woodland Type (circle all that apply)

Broadleaved woodland (over 95%)	Plantation (conifers)
Mixed Woodland - dominated by broadleaves	Conifer woodland (over 95%)
Mixed Woodland - dominated by conifers	Orchard
Plantation (broadleaved)	Wood Pasture (parkland/scattered trees)
Plantation (mixed	Other
Specify Other / Notes	

4. Features in the Woodland (circle all that apply)

Recently felled area(s)	Disturbed / bare ground	Glades / rides / canopy gaps
Springs / streams / flushes	Ponds / standing water	Ditches / goits / culverts
Hedge (s)	Bank(s)	Routeways / paths / trackway
Standing dead wood	Rock Exposure	Platform(s)
Dead wood on ground	Heathland	Pits / Hollows
Specify Other / Notes		

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5. Summary of Features Found in the Woodland. Note: record the feature number on your base map **whilst carrying out the survey** (print out extra pages for your survey if needed)

Feature Number	Grid Reference (s)	Description / Notes	Photograph / sketch (yes/number)

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3. Survey Sheets
Detailed Features.

1. General Information

Woodland Name		**Surveyor(s) Name(s)**	
Woodland Area / compartment (if applicable)		**Date of Survey**	**Reference Number (from walk-over)**
Grid Reference(s)			**Aspect (NSEW)**

2. Context Information (record all that apply / add notes if necessary)

Woodland Character close to feature	Dense woodland Open Woodland Shrubs/ brambles Felled trees Ground flora Other habitat Comments
Topography & Geology close to feature	Steep Undulating Gently Sloping Flat Outcrop rock Stream / wet area Other (describe)
Relationship to other features	Yes / No Number Type Adjacent / Next to/ Parallel Nearby (within 30m) Connected
Chronological evidence (if any)	For example, tree growing in hollow or on top of mound

3. Summary Description /Inferences / Interpretation

Description keyword	Pit Platform Mound Earthfast stone / post Standing building Ruined building Other Structure Bank Ditch/ channel Fence /wall Trackway Other (specify)
Description of feature and inferences	
Interpretation	
Further survey work / research required	Yes / No / Not Sure

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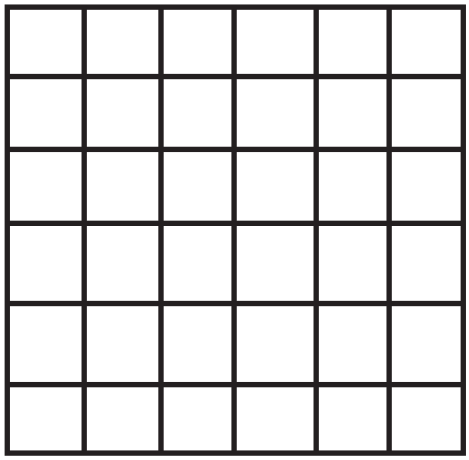
3. Survey Sheets
Detailed Features.

4. Summary Transect Survey / Sketch Plan of Feature(s)



Base-line

Maximum Actual Length:

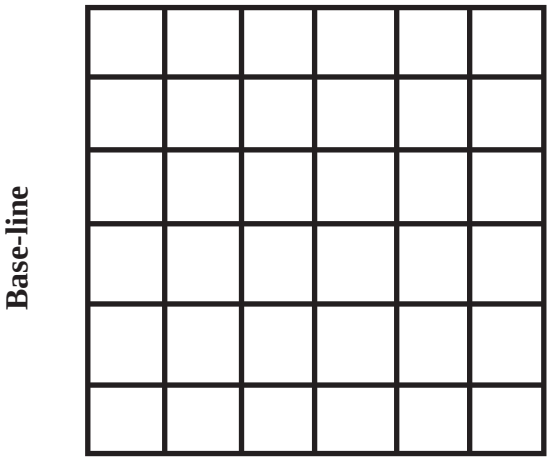
Maximum Actual Width:

Notes:

Scale of plan: 1:

Indicate North:

5. Summary Sketch Profile of Feature(s)



Base-line

Maximum Actual Depth:

Maximum Actual Height:

Notes:

Scale of profile: 1:

Indicate North:

6. Linked Photographs (reference number and description)

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3. Survey Sheets
Worked Trees.

1. General Information

Woodland Name		**Surveyor(s) Name(s)**	
Woodland Area / compartment (if applicable)		**Date of Survey**	**Reference Number (from walk-over)**
Grid Reference			**Aspect (NSEW)**

2. Context Information (record all that apply / add notes if necessary)

Woodland Character close to feature	Dense woodland Open Woodland Shrubs/ brambles Felled trees Ground flora Other habitat Comments
Topography & Geology close to feature	Steep Undulating Gently Sloping Flat Outcrop rock Stream / wet area Other (describe)
Relationship to other features / or similar trees	Yes / No Number Type Adjacent / Next to/ Parallel Nearby (within 30m) Connected
Chronological evidence (if any)	For example, tree growing in hollow or on top of mound

3. Summary of Tree Data

Tree Species		**Identification used eg, in leaf, bark, bud, fruit**	
Overall Girth of Tree and height recorded at.		**Total number of vertical stems.**	
Tree Form (see background sheets for details.)	Bundle planting Coppice Stored Coppice Pollard Lapsed/abandoned Pollard Stub Maiden/Standard Medusoid Shredded Phoenix Layering/laid		
Tree Features	Trunk cavities / decay holes Burrs / burls on trunk Dead wood in tree Fungi / Moss / Lichens on tree Other (specify)		

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3. Survey Sheets
Worked Trees.

4. Summary Sketch Showing Form of Tree

Sketch (overall form) :

Total girth (measure at approx. 1.2m) :

Number of vertical stems:

Stem girths (for multi-stem forms):

Maximum:

Minimum:

Maximum internal distance between stems:

Layering / laid length:

Notes:

5. Sketch(es) Showing Tree Features and Context (optional)

6. Linked Photographs (reference number and description)

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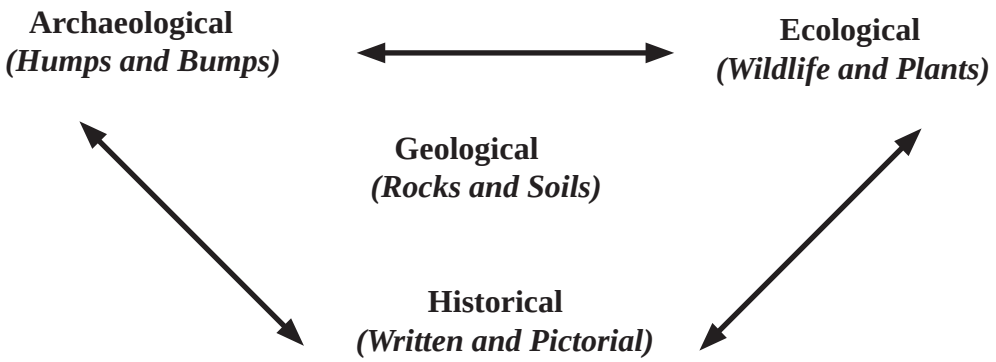
4. Using and Interpreting the Findings.

Types of Evidence



Introduction

Individual surveys of sites are valuable as a starting point to understand the development of a woodland. However, bringing together different types of survey evidence with historical research enables a full and often detailed picture to emerge. Sites where documentary and landscape evidence can be integrated are more valuable still and can provide a biography of the woodland over several centuries. This helps to identify different phases and types of industrial usage which can be set in context of industry which took place over a wider area.

The following kinds of information can emerge from the documentary study of a woodland:

- Status or designation of the woodland and changes in ownership. (Can it be classified as ancient?).
- The significance of boundaries and internal earthworks. (Are they related to management of the woodland or of a non-woodland phase?)
- Woodland clearance(s) and woodland extension(s). (Has the shape and function of the wood changed?)
- Past management practices (Was it a wood pasture, simple coppice or coppice-with-standards?)
- Clarification of the status of different tree species (Are they 'exotic' species for the area; has any planting taken place and of what species?).
- Markets for the wood, timber and other woodland products. (Who used them, what were they used for and where?).
- Other land-uses of parts of the wood. (Is there evidence for quarrying or mining; mill sites; or other settlements?)
- The relationship of trackways, routeways and settlements around and through the wood. (Are they related to woodland management practices or incidental to these?)

Planning the research

The woodland's landowner should already have been contacted to ask for permision to carry out surveys. It is also worth contacting them if historical research is planned as they should have details of where the estate archives are held. Below are some basic steps to help provide a structure for conducting the research. It is important to plan the research due to the wide range of sources which may be available. Some of the key questions to address are:

- How was the wood managed in the past?
- What crafts were carried on in the wood?
- Are there records of clearance or planting?
- What industries are recorded locally? What use did these make of woodlands?
- Who have been the woodland owners?
- When was the wood first recorded? (including place-name and field boundary evidence)

Decide on the amount of time which can be spent on documentary research and what the budget might be. Depending on the location of the sources of information, there may be travel costs and, or costs for copying material.

Look on a modern map and note the nearest

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village and any place names or prominent features. These will help when looking through references and carrying out archival searches.

Consult the local library for any relevant publications, or guide books. The books may give sources of information which can be used as a starting point and some local libraries have their own local studies reference section.

Choose a couple of types of information to focus on initially. Maps are an easy starting point as the series of Ordnance Survey maps go back to the mid-nineteenth century. Enclosure Award and Tithe maps may be available as may maps made for land surveys of estates or when railways, roads and canals were built.

Decide on a filing system and cross-reference to the survey evidnece. Plan the visit to a library, archive centre or even the internet. Note opening times, membership and any rules or restrictions.

Finally try to stay focused on addressing your initial set of questions but note any points of interest for future investigation.

Sources of research material

Archives and Record Offices are the official repositories for administrative, legal and estate records for counties or other large administrative districts. Records can include detailed estate accounts of woodland management over long periods.

Local Historic Environment Record Centres (H.E.R.) or County Archaeological Services should be able to provide records of archaeological finds within or near your woodland. They may also have some historical information or reports that have been compiled about the area. **Biological Records Centres** should hold some information about the wildlife and biodiversity within or near the woodland. These centres may be run by the Local Authority, a museum or another body.

Local Studies and reference sections in libraries are sources of printed materials such as books, pamphlets, newspapers and trade directories. They often also have maps, photographs and records such as for the population census.

Local authority planning or countryside departments may have management or conservation area plans which include historical, archaeological and ecological information. They may also have reports which give the results of specialist surveys.

Local History, Archaeology, or Natural History Societies and Groups may provide a good starting point for finding out what is available as they may already have been gathering information which is relevant.

Local people and their personal recollections may be able to provide local knowledge about the history which has not been recorded because it is thought to be commonplace. They may also have photographs or documents which are part of their family collection but have added significance when researching woodland history.

Searching for **information using the internet and specific websites** has opened up the research possibilities. More collections of material can be used directly and organisations advertise what they have available on a visit.

Using the Information

The first stage in using the information from documentary research and survey work is to collate the data and make an assessment of its reliability. This means looking at all the evidence gathered in a critical way, perhaps discarding some and putting a question mark against others for further investigation. It is good practice to get into the habit of doing this at an early stage, as is reviewing the information when new material comes to light.

There will be a high degree of reliability in surveys where factual measurements and basic

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4. Using and Interpreting the Findings

descriptions are involved. Where features are being interpreted initial reliability may be less without background work. Documentary and historical records may also need to be interpreted cautiously. These were created for a particular purpose and with a meaning and significance which may not now be apparent.

The next stage is to note down data from all your sources (survey and documentary) into a table or matrix for each of the research questions. This will provide a useful summary of how the different sources fit together and enable links to be made between different surveys and documents. It will also show up gaps in information and perhaps suggest new links which are not immediately apparent. This process is key to understanding and interpreting the data from the surveys and placing the findings in context. It should also pick up anomalies or isolated pieces of information which may need further investigation. The aim, by the end of the process, is to have several different types of data (survey and documentary) which suggest a single interpretation which can be independently verified.

Once the collation and review process has been carried out, the findings should be written up into a report. The report may include all of the following sections but should include those marked with an asterisk (*) as a minimum:

- How the research was carried out*
- Background to the wood (location, size, topography, geology, ownership)*
- Summary of the historical research*
- Archaeological features in their historical context*
- Ecological features and nature conservation issues
- Evaluation and recommendations for management work
- Summary of main points and suggestions for further research work*
- References and Bibliography*
- Appendices (including copies of survey forms)*

Depositing the Survey Information

It is important that a copy of the information gathered through surveys and research is given to any funders of the work and to the landowner for their records. This should make the landowner aware of any areas of the woodland which are significant in terms of archaeology and/or ecology and may need to be taken into account in future management plans. With the owner's permission, a copy of the information should also be given to relevant organisations so that a permanent public record is made. Doing this will mean that the work in turn becomes part of the historical record which others can use.

The Historical Environment Records Centre (H.E.R.C) or the County Archaeology Service or Museums Service should be sent a copy of the report and survey sheets of the archaeological features for their records. This is important so that the centre can build up a picture of the known features and finds within an area as they act as a central reference point for planning and other enquiries.

Similarly, if any ecological records have been made, the Biological Records Centre (BRC) or Local Authority Ecology Unit or Museums Service should be sent a copy of the surveys and report for their records. Local natural history groups may also have recording schemes which link to the BRC.

There is a national recording scheme for notable trees, *the Ancient Tree Hunt*. Records of trees can be added onto their website by members of the public. It is worth doing this as they are building up a database across the UK of such trees which have often been overlooked in the past.

The Local Studies section of the library may also be happy to receive a copy of the report or a summary of the information for their files. Other local groups in the area may also be interested in receiving a copy and may have other information to share.

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5. Glossary

A

Ancient Semi-natural Woodland: ancient woodland sites that have retained the native tree and shrub cover that have not been replanted. They may have been managed by coppicing or felling and allowed to regenerate naturally.

Ancient Tree: a tree that is very old and in the declining (end) stage of life; normally such trees have a larger girth than other trees of the same species. The term encompasses trees defined by three guiding principles: 1. trees of interest biologically, aesthetically or culturally because of their age, 2. trees in the ancient stage of their life and 3. trees that are old relative to others of the same species.

Ancient Woodland: woodland that has been under continuous tree cover from 1600AD. Then ancient woodland can be primary woodland, Ancient Semi-natural or Ancient replanted.

Archaeological Remains: buildings, earthworks, artefacts (including ecofacts such as veteran trees and hedges), subsurface deposits and environmental data.

B

Beech Mast: the prickly fruits of beech trees which contain the beech nuts used as fodder for pigs.

Bell Pit: a hollow in the ground created by shallow mining by sinking an unsupported vertical shaft into the ground.

Berl: mark made on a tree (by the head woodman) to denote whether it is to be retained or cut down.

Black-bark: a timber tree which has grown through two coppice cycles (between 40 & 50 years old).

Bloomery: a type of furnace once widely used for smelting iron.

Bole: main trunk of a pollard.

Bolling: the trunk or stem of a tree; and may also be used to describe the trunk and cut branches of a pollarded tree.

Bote: denotes the rights of commoners to gather wood or timber for particular purposes on common land, e.g. cart-bote, house-bote, hedge-bote.

Brash: small branches trimmed from the side of a tree;a process known as shreding.

C

Carr: ancient Norse name for wet woodland.

Charcoal: a carbon containing material made by heating wood or other organic matter in the absence of air.

Charcoal Hearth: the area used to process wood into charcoal. Often all that remains is a round shallow depression in the ground or a flat surface and retaining wall cut into a slope.

Chase or Frith: a private hunting area, which may be forested or open.

Coke: mineral coal from which most of the gases have been removed by heating.

Common: a piece of land over which people exercised traditional rights, such as grazing their animals, collecting timber etc.

Compartment: a subdivision of woodland, historically an area of land used for forest inventory and/or management.

Coopering: making or repairing wooden casks.

Coppice Ring: an old coppiced tree where the middle of the coppice stool has died and new shoots grow from the stump forming a ring of shoots.

Coppice-with-standards: an area of woodland where most of the trees are coppiced but a few are allowed to grow into timber trees.

Cordwood: wood cut into four foot lengths and then stacked in piles eight foot long, four foot wide and four foot high which makes a load of about two tons.

Cruck: a pair of curved timbers used to support the walls and roofs of houses.

D, E

Deer Park: an area of land enclosed to provide a constant supply of deer and other animals for hunting and food. These areas were also managed for timber and woodland resources.

Earth-fast: objects (for example boulders) held in the ground and not easily moveable.

Earthwork: any artificial feature surviving as humps and bumps visible on the ground surface.

Enclosure: the conversion of common land into individual ownership, may involve the construction of barriers such as banks, ditches, walls and hedges.

Epicormic Growth: thin, twiggy shoot growth di-

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rectly from the trunk of a tree, often forming substantial clumps.

F

Fall: The verb 'to fall' was used to describe trees that were to be felled. The noun 'fall' was the South Yorkshire word used to describe a compartment within a large coppice wood. The word was also used to describe the felling of underwood and timber in a particular place or during a particular period.
Faggot: bundlesof brushwood tied up with twisted bands (called withies) of ash, birch, hazel or willow. Faggots were used as fuel in bread ovens and for strengthening river banks.
Flush: either the sprouting of new leaves, or an area where water has washed over the surface or through the soil creating a small area of wetter habitat.
Forest: nowadays a term used to mean a woodland, historically it applied more broadly to any land on which forest laws applied. Forest laws were medieval laws introduced into England by the Normans and designed to protect wild animals for hunting by the aristocracy.

G

Ganister: a type of sandstone with a very high silica content and which was used to make bricks to line blast furnaces.
Goit (also leat / lete or race): an artifical water channel that connected water-powered industrial sites to the rivers or streams on which they were located. The head goit is a water channel leading to a water-powered wheel and the tail goit, a water channel leading away from the wheel.

H

Hammer Pond: pond used for providing power to water-powered forges.
High Forest: woodland dominated by tall trees (standards) suitable for timber.
Historic Environment: all the physical evidence for past human activity and its associations that people can see, feel, find and understand in the present world.
Hollin, Holling or Holly Hagg: an area where holly was historically managed to provide leaf fodder.
Hurdle: a small gate made of woven wood, used in temporary animal shelters.

I, J, K

Ironstone: a sedimentary fine-grained rock, important as a source of iron (iron ore).
Keystone species: a species that has a key role in an ecosystem.
Kid(d): a bundle of small branches and twigs of wood; similar to a faggot but smaller.

L

Landslip: downhill movement of unstable earth and rock, etc.
Laund or plain: an open area of land containing mainly grassland and scattered trees usually found in parkland, see also plain.
Leaf fodder: cut leafy branches of trees cut to provide grazing for domestic animals.
Lording: a timber tree more than fifty years old.

M, N, O

Multi-trunk: a tree which has several trunks growing up together which may occur naturally. Multi-trunks may look similar to a coppiced tree.
Newcastle rail: length of wood used for wooden railway tracks.
Old growth: a tree which has not been managed for over 200 years.

P, Q

Pale: a high fence or wall often surrounding a wood or deer park.
Pannage: autumn feed for pigs in woodland (for example beech mast or acorns), or a payment for pasturing pigs in woodland.
Park: land containing widely spaced trees and enclosed for domestic or wild animals.
Pen pond: small pond lying close to a larger pond, used to fill the main pond during dry weather.
Pitstead: another name for a charcoal hearth (from northern England).
Plantation: a woodland where most of the trees have been deliberately planted for timber production.

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5. Glossary.

Pole: a young tree or a stem from a coppice or pollard, of a size suitable for making poles.
Potash: describes any material containing potassium, but is specifically used to describe potassium carbonate (lye) mixed with other potassium salts derived from wood ashes. Potash was used in dyeing, soap and glass manufacture and as a fertiliser.
Processing platform: levelled areas, cleared of smaller trees and undergrowth lying close to a road or path within a woodland, used to store wood and timber products from woodland industries.
Q-pit: a Q shaped hollow in the ground surface, linked to the historical production of whitecoal.

R
Ramel / Rammel(l): first recorded in fifteenth century woodland records in South Yorkshire in Latin as *ramayllis*. It means brushwood and was used to make faggots. Rammel is now the South Yorkshire dialect word for rubbish.
Ride: These are sometimes called Ridings in South Yorkshire. A ride was and still is constructed to provide access for the extraction of wood, timber and bark, fire fighting, inspection and setting out of coppice-with-standards. As well as being used for sport and recreation by their owners.
Ridge and Furrow: a term used to describe the pattern of peaks and troughs created in a field from a system of ploughing with oxen from the Middle Ages.
Royal Forest: land over which certain rights were reserved for the monarch and /or aristocracy. It was introduced to England by the Normans in the eleventh century; at its height one third of the country was designated as Royal Forest.

S
Saw pit: a rectangular hole in the ground used to saw tree trunks into planks by two people, one working above the hole and the other in the pit.
Shred or shredding: the process where side branches are removed from a tree often for use as fodder.
Smelting: the process for extracting metal from ores.
Spring: a term used to describe a coppice-with-standards woodland in South Yorkshire.
Standard: a tall straight tree with a trunk of 1.8 metres or more which is suitable for use as timber.
Stool: the base of a tree left after coppicing.
Stub or Stubbin: a. the stump of a tree, the piece remaining on a trunk or branch after it has been cut. b. a short pollard, where the tree has been coppiced above ground level but below the level needed to protect the re-growth from grazing animals, often found in ornamental planting.

T
Tanning: the process for preserving animal hide as leather by primarily using extracts of tannins from tree (especially Oak) bark.
Tar: a viscous black liquid derived from the distillation of organic matter, including wood.
Timber: large trunks of trees which are suitable to be sawn into planks (lumber).
Tithe: a tax or assessment of one tenth of produce levied on all communities to support the established church.
Topography: the shape of the land.
Trackway: a beaten or trodden path, sometimes deeply eroded by use to form a hollow way.
Turf: the surface layer of soil containing a mat of grass and grass roots.
Turnery: the use of a lathe to turn solid wood into shapes for chair legs, pegs, toys, etc.

U, V
Underwood: the lower storey of a woodland (lying under the canopy layer of trees) and/or of coppice/ pollard poles or suckers.
Veteran tree: a tree that is usually in the mature stage of its life with micro-habitat features including; hollowing, holes, wounds and large dead branches. Veteran trees may also be of interest for cultural, historical or aesthetic reasons.

W, X, Y, Z
Waver: a young maiden tree that had only grown through one coppice cycle..
Whitecoal: kiln-dried wood used as fuel in lead smelting.
Wood: a term used to describe branches of a tree

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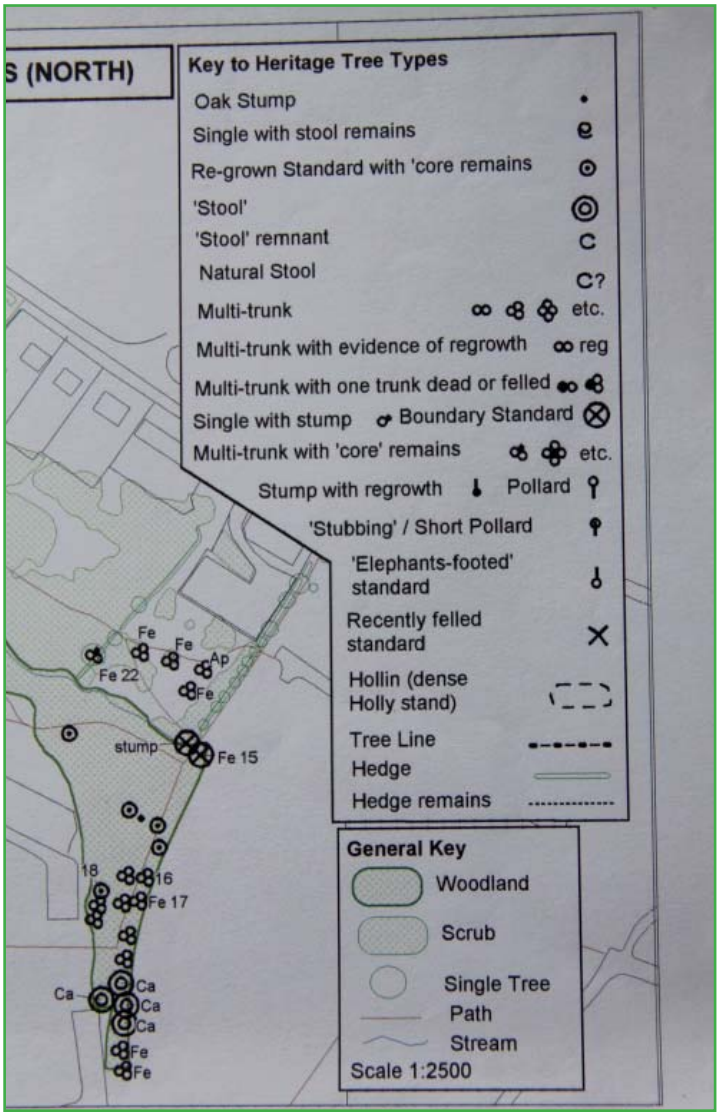
which are smaller than timber, or to describe an area covered in a dense canopy of trees. Coppicing produces wood not timber.

Wood pasture: a very open type of woodland, a cross between grassland and woodland, historically often used for grazing.

Woodbank: an earthen bank often topped with trees, a stone wall or laid hedge.

Wooded Landscape: a generic term for woodland, parkland, wood pasture, former forest and other treescapes.

Worked tree: a tree which at some stage in its life was managed by humans to generate wood for a particular usage, such trees normally have a modified shape/form.



Example of Symbols used for recording worked trees. © Paul Ardron 2012

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Useful Websites

Ancient Tree Hunt
http://www.ancient-tree-hunt.org.uk/recording

Archives and Local Studies Service
http://www.nationalarchives.gov.uk/
http://www.barnsley.gov.uk/barnsley-archives-and-local-studies
http://www.rotherham.gov.uk/info/448/records_and_archives-information_and_advice
https://www.sheffield.gov.uk/libraries/archives-and-local-studies.html
http://www.archives.wyjs.org.uk/

British Association of Local Historians
http://www.balh.co.uk/index.php

Council for British Archaeology
http://www.britarch.ac.uk/

English Heritage
http://www.english-heritage.org.uk/

Family / People History
http://www.findmypast.co.uk/home.jsp

Institute of Historical Research
http://www.history.ac.uk/

Museum of English Rural Life
http://www.reading.ac.uk/merl/

Woodland Trust (identification guides)
http://www.woodlandtrust.org.uk/en/learning-kids/Pages/children.aspx

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Professor Ian Rotherham (Sheffield Hallam University) talking about an outgrown coppice tree in Wharncliffe Wood. February 2012 © SYBRG 2012.

Photograph on back cover: Field work in Stephen Wood, Upper Dearne Valley Woodlands. © SYBRG 2013.

This survey guide has been written and designed by Christine Handley (South Yorkshire Biodiversity Research Group), Professor Melvyn Jones and Professor Ian Rotherham (Sheffield Hallam University); Dr Frank Spode and Dr Paul Ardron. It is available free to be shared but please acknowledge if you use it for your own project. Pages from the survey guide can be photocopied. Visit our website www.ukeconet.co.uk.

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