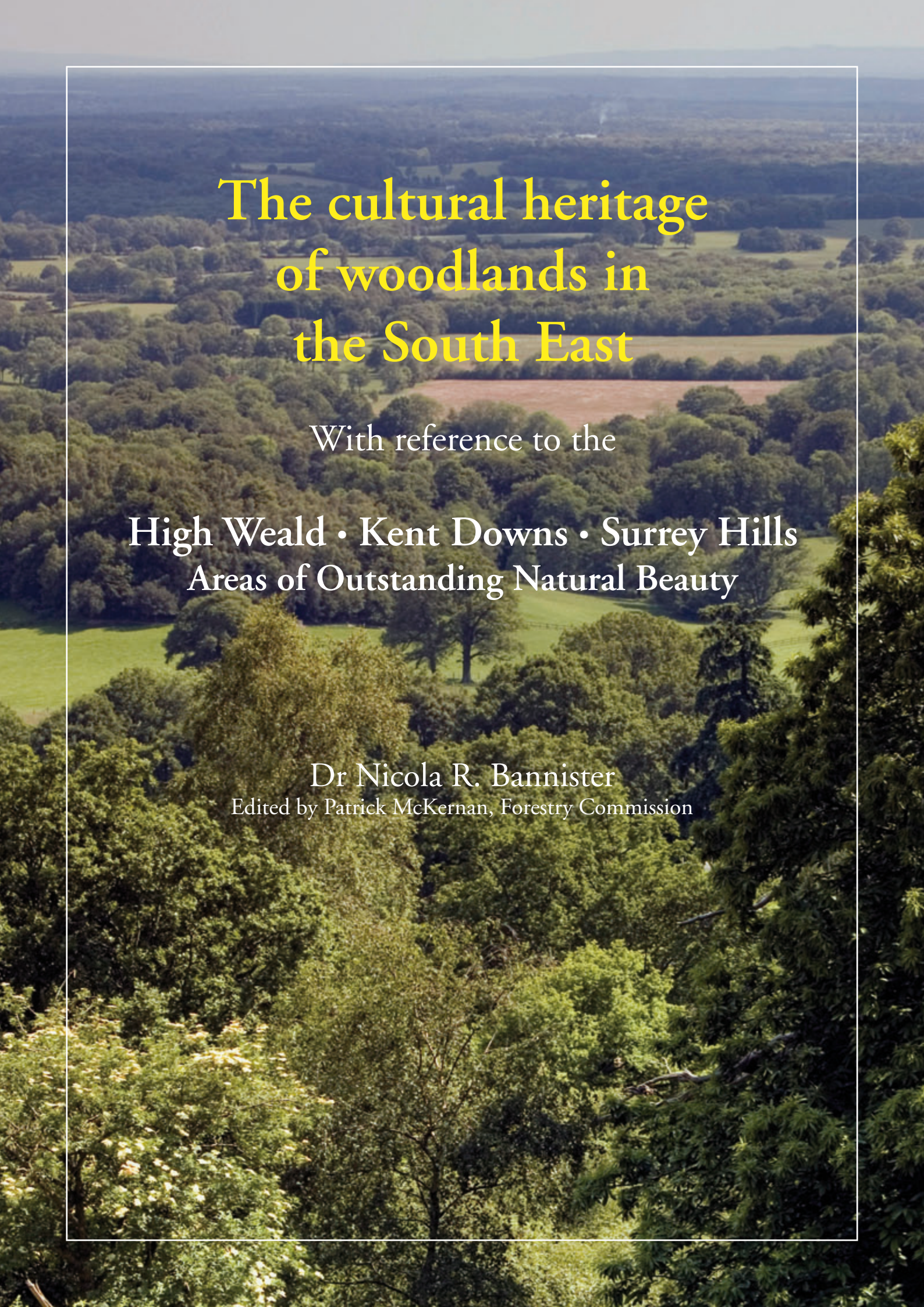


The cultural heritage of woodlands in the South East

With reference to the

High Weald • Kent Downs • Surrey Hills
Areas of Outstanding Natural Beauty

Dr Nicola R. Bannister
Edited by Patrick McKernan, Forestry Commission

IN MEMORIUM

This book is dedicated to the memory of
Geoffrey Roberts
who died in April 2006
A greatly respected Forester and Woodsman

PERIOD TABLE

Description	Archaeological Period	From	To
Hunting societies	Upper Palaeolithic	30,000	10,000 BC
Hunter-gather societies	Mesolithic	10,000-8,000	4,000-3,500 BC
The first agriculturalists	Neolithic	3,500	2,100 BC
The beginning of metal working in bronze	Bronze Age	2,100	600 BC
The beginning of metal working in iron	Iron Age	600 BC	AD 43
	Romano-British	AD 43	AD 410
	Anglo-Saxons [or Early Medieval]	AD 410	1066
	Medieval	1066	1540
	Post-medieval	1540	Present

Front cover photograph: View across the Weald from the Iron Age hill fort at Holmbury Hill in the Surrey Hills
Back cover photograph: Remains of the late 17th century pale at Ashdown Forest in the High Weald (photos - PM)

The cultural heritage of woodlands in the South East

With reference to the

High Weald • Kent Downs • Surrey Hills Areas of Outstanding Natural Beauty

October 2007

Dr Nicola R. Bannister

Edited by Patrick McKernan, Forestry Commission

Produced for the
South East AONBs Woodlands Programme

Contents

Preface

The South East is a special place for woodlands. It is the most wooded region in the country, with its woodland cover being twice the national average. The region is also nationally important for the amount of ancient woodland it holds, supporting some 40% of the total area in England. Woodlands are also a vital part of the South East's protected landscapes - the Areas of Outstanding Natural Beauty (AONBs) in the region are some of the most heavily wooded in the country, and have an important role to play in promoting the great value of woodlands in our most cherished countryside.

The importance of woodlands in AONBs was underlined in 2001 by a Joint Accord between the National Association for AONBs and the Forestry Commission. The organisations' shared priorities, stated in the Accord, included securing an attractive and sustainable landscape in which woodlands help define their character, the protection of existing woodlands, and promoting the environmental, social, and economic value of forests and woodlands.

The Accord led directly to the setting up of the South East AONBs Woodlands Programme, one of four programmes across the country funded by the Countryside Agency (now part of Natural England) and the Forestry Commission. Running from 2003 to 2006, the South East Programme worked closely with the High Weald, Kent Downs, Surrey Hills, East Hampshire and Sussex Downs AONBs. One of the important aims of the Programme was to build a greater understanding of the way in which woodlands have helped shape these landscapes, and to increase our knowledge of their cultural, archaeological, and historical importance. This book was commissioned by the Programme on behalf of the High Weald, Kent Downs, and Surrey Hills AONBs, three areas where the history of woodlands and woodland use, and the way these have shaped each landscape are to a large extent intertwined. The book, however, places these AONBs in the wider context of the South East, by examining the cultural heritage of woodlands across the region.

From the ancient dene holes of the chalk hills to the hammer ponds of the Weald, from Bronze Age barrows to the deer leaps of designed landscapes, the history of woodlands set out in this book is both fascinating and essential to our understanding of the cultural heritage of our landscapes. It is not unreasonable to say that almost every woodland in these AONBs retains valuable evidence of its historic use. However, although there has been important archaeological work in woodlands in these areas, it is clear that much remains unrecorded, unknown, and often at threat.

Through increasing our understanding of the cultural heritage of woodlands in the South East, and in particular these protected areas, this book provides an important underpinning to the polices of AONBs, the Forestry Commission, Natural England, and other organisations, and will help raise awareness of the great, historic resource that still remains within our wooded landscapes.

Patrick McKernan
South East Native Woodlands Officer
Forestry Commission
October 2007

Introduction

The South East is by far the most wooded part of the country, a consequence of geology, landform, settlement and economic history. A visitor today descending into the Weald from any route over the North Downs and Chart Hills is immediately confronted by a landscape covered in trees, dominated by oak, described by Rudyard Kipling as the "Sussex Weed" [1] but a description which could also apply to Kent and Surrey as well. In Spring and Summer, the Weald is often cloaked in a blue green haze, which turns to golden hues in the autumn, stretching as far as the eye can see.

These trees and woods have played a vital role in shaping the countryside of the South East and they give the rural landscape its unique character. From the large forests and plantations as at Bedgebury or St Leonard's, to the small shaws and coppices on the North Downs, which in turn contrast with the sinuous ancient gill woodlands in the High Weald. The numerous ponds, quarries and other areas of mineral exploitation, now long abandoned, support mature trees and together with the numerous hedgerow trees contribute to the overall wooded character of the South East.

The aim of this book is to introduce the reader to the subject of woodland archaeology in the South East, how woods reflect the cultural history of the region, what type of archaeology lies preserved in woodlands, and how to recognise and manage this archaeological resource for the future. Whether you own or manage a wood, or are curious about archaeology and/ or the countryside, this book will be of interest and hopefully encourage more people to look at woodlands in a different way.

View of the Weald from Leith Hill in the Surrey Hills (photo - PM)

The Areas of Outstanding Natural Beauty
This report describes the cultural history of woodland in the South East and in particular the use and role of woods in three of the most heavily wooded Areas of Outstanding Natural Beauty (AONBs) in the country.

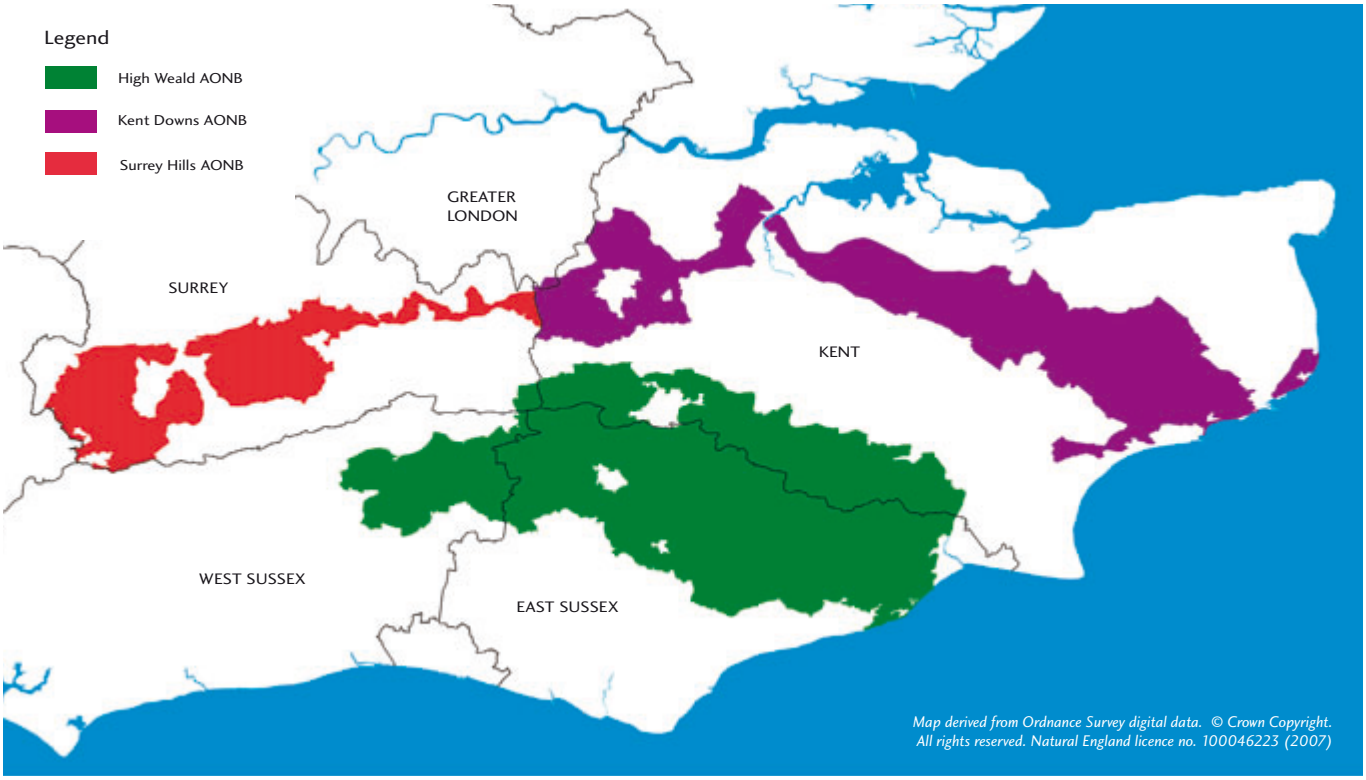
- The High Weald AONB covers the central part of the Wealden landscape stretching from Romney Marsh and Hastings in the east, to Tonbridge in the north and west as far as Horsham.

- The Kent Downs AONB covers the area of the chalk hills in an arc from Folkestone and Hythe to Wrotham and then embraces part of the Greensand Chart Hills at Ightham and Sevenoaks, ending at the county boundary with Surrey.

- The Surrey Hills AONB picks up the arc of Chalk Hills from Limpsfield Chart and follows the North Downs to the Mole Gap. Beyond Dorking, the Surrey Hills includes not only the North Downs but also the high Greensand Hills including Hascombe, Hambledon, and the dramatic Hindhead and Devil's Punchbowl by the Hampshire border. A large section of the Low Weald centred on Chiddingfold and extending to the county boundary with West Sussex is also included.

The Cultural Heritage of AONBs
The term 'natural beauty' is the main purpose for the designation of AONBs under the 1949 National Parks and Access to the Countryside Act [2]. However, over the past 50 years this definition has been updated to recognise the essential fact that the AONB landscapes have been and continue to be modified by human interaction with the environment.

The present landscape character in most instances is the result of settlement, farming and resource exploitation, which took place hundreds of years ago.



Map 1. Location of the High Weald, Kent Downs, and Surrey Hills AONBs

In 2001, the Countryside Agency (now part of Natural England) published the following description for the term 'natural beauty':

" 'Natural beauty' is not just the look of the landscape, but includes landform and geology, plants and animals, landscape features and the rich history of human settlement over the centuries" .

Part of the 'rich history of settlement' is the economic and social exploitation of woodlands, wood products and associated land use activities. Woodlands became an integral part of local communities. Not only were they a source of timber and underwood for building and fuel but they were also a valuable resource for other needs such as food, minerals, grazing, employment, leading to the development of specialist craft skills as well as contributing to both a rich folklore and traditions.

Historically, the three AONBs were once intimately linked, and activities originating in one have contributed to the landscape character in another. The main flow of influence and interchange has been from territories on the outside ring of hills, south and west, towards the centre of the Weald, a process with origins in the early medieval period and possibly even into the prehistoric period. Settlements in the Kent Downs and the Surrey Hills historically had connections and links with settlements, once former swine pastures, in the areas known as the Low and High Weald. Iron Age settlements on the Greensand Hills once had connections with iron producing areas in the High Weald.

These social and economic links are still visible in the network of radiating green lanes, roads, sunken hollow ways and paths.

It is well known that woodlands are important habitats for wildlife, and in particular rare flora and fauna, but they are also important for their visual impact and creating a sense of identity in the countryside. Woodlands and trees give a sense of enclosure and intimacy. But what this book aims to show is the role that woods play in the cultural history of the region, and their value as a resource for preserving archaeological features which record how the landscape has been used over time. The historic management of any given piece of wood has a direct influence on its present wildlife and scenic value appreciated today. Very few (if any) areas of woodland have not been subject to some form of management in the past.

Why does so much woodland survive in the South East?

The wooded character of the South East is a consequence of several factors. The varied geology gives rise in many areas to indifferent and poor soils, unsuitable for intensive farming. Another, historical factor was the demand for wood products in the region, going back to prehistoric times. In Roman and Tudor times fuel was needed in very large quantities for the production of iron. Other industries demanding fuel across the centuries included glass and gunpowder manufacture, leather and tanning, hop growing and drying, agriculture, bakers and cook houses. The demand came not only from the local communities but also from

London and the ship construction industries in the Thames and Medway estuaries. Woodland in Surrey, for instance, provided faggots and brushwood for fuel on a daily basis before coal was shipped in by boat.

Geology

The South East region is underpinned by a unique geological landform, the Wealden anticline, a truncated dome where the top has been eroded, revealing within a relatively small area an arc of numerous bands of sedimentary rock outcrops. The oldest deposits of sandstones, siltstones and mudstones lie in the middle of the Weald and give rise to the area known as the High Weald. The youngest, which lie to the north, south and east of the region, are Tertiary deposits of Thanet Beds, Woolwich Beds, London Clay and Bagshot Beds. In between are the layers of Greensand which give rise to the Chart Hills, and beyond them the arc of Cretaceous Chalk, which gives rise to the North and South Downs. Between the Chart Hills and the High Weald is the Low Weald, a large area of heavy intractable clay. Many of the soils which derive from this geological formation are poor, difficult to work, waterlogged in winter and experience drought conditions in summer, or are very sandy with porous, unstructured soils. These properties do not lend the soils readily to intensive and continuous cultivation. However, despite the poor soils, farming has taken place in the Weald since prehistoric times.

Historic Land use

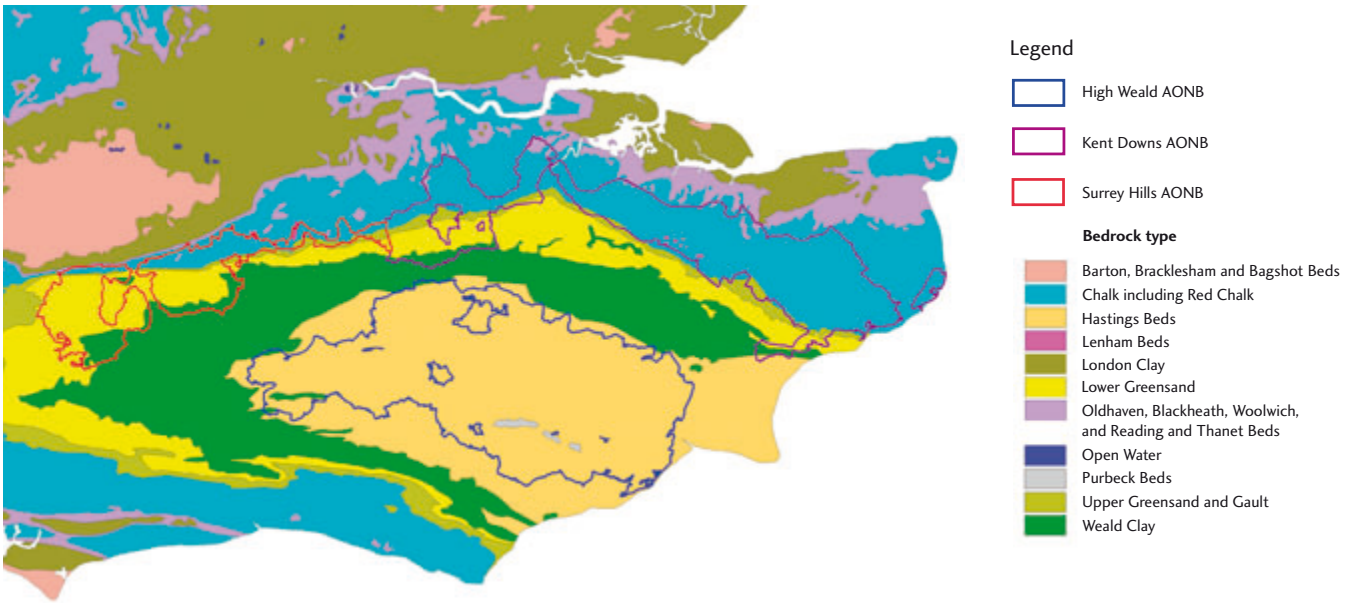
The poor and hard winning soils precluded extensive wholesale clearance of the woodland in early history. Then a demand for wood and timber products meant that many woodlands were actively conserved from the early medieval period into the 20th century. The demand came not only from the local domestic market but also from London, as well as from expanding local industries such as iron, glass, tanning, hop growing and shipbuilding, that readily exploited the mineral resources the Weald had to offer. The Weald was rich not only in woods and trees but also in mineral deposits of iron ore and in the numerous small fast flowing streams, which drain from the upland centre.

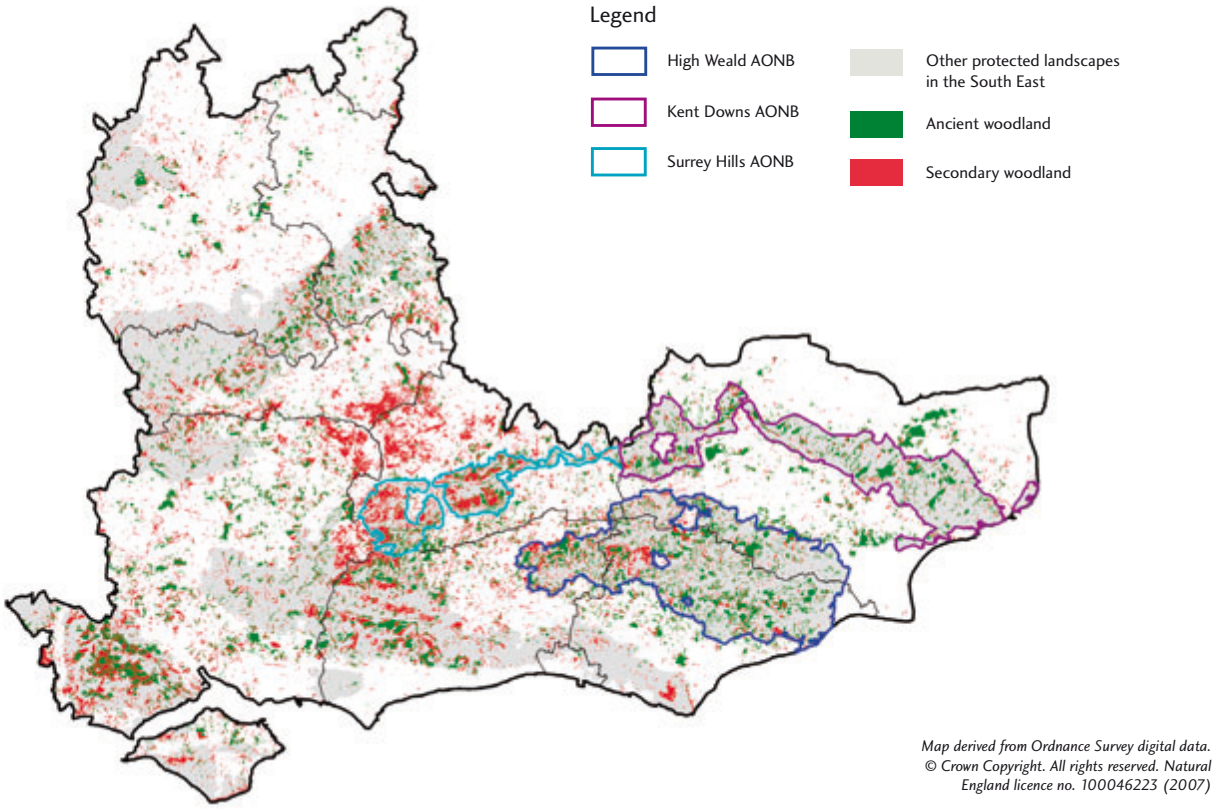
Coverage of Woodland in the South East

The South East retains the greatest concentration of woodland and also the greatest amount of ancient woodland. These are woods which have been continuously wooded for over 400 years (since 1600 AD) and probably for much longer and which are identified on some of the earliest reliable maps [4]. It is generally considered that some of these woods may be directly descended (but significantly modified) from the 'wild wood' which once covered this part of Britain after the last ice retreated (Devensian period) 10,000 years ago. Where the woodland retains its locally native tree population it is described as ancient semi-natural woodland (ASNW). Where the wood has been significantly altered in the modern period by managing it as plantations, often with conifers, these are called 'plantations on ancient woodland sites' (PAWS). Ancient woodland sites are irreplaceable. Once cleared and converted to a different land use other than woodland they are lost for ever.

Secondary or recent woodland (less than 400 years old), is where a wood has either been planted on an area of land, or where trees have been allowed to grow naturally through regeneration, usually as the result of a cessation in land use management. The South East has a large concentration of secondary woodland, especially on the Greensand Hills and in the Low Weald, where large and small areas of heathland and common have become covered in woodland in the 20th century, as grazing and

Map 2. Bedrock geology in relation to the High Weald, Kent Downs, and Surrey Hills AONBs





Map 3. Distribution of ancient and secondary woodland in the South East

active cutting have ceased. Both ancient woodland and secondary woods retain features of archaeological and cultural interest. The range and type of features found within the woods will often reflect the origins of the wood and how they have been managed.

Woods versus Forests

The term 'forest' had a very clear meaning in medieval times. It was a place set-aside for the king's pleasure to hunt beasts of the chase. A forest could cover many thousands of acres of land, as for example at Ashdown. Although people could live and work within forests, they were subject to strict, often brutal Forest Laws, which were in place to preserve the chase. The Forest Laws also generated a valuable source of revenue for the Crown. A Forest would comprise a range of habitats such as wood-pasture, heaths and open spaces often called lawns, as well as traditional enclosed woodlands. Beasts of the chase included not only deer, but also hares and rabbits, as well as wild fowl and game birds.

Rabbit or 'coney' warrens were often a feature in Forests. Introduced into this country by the Normans, rabbit meat and fur were valuable products.

Wood-pasture

The term 'wood-pasture' describes a specific form of woodland management, which had its origins probably in late prehistory but certainly was well developed in the early medieval period. Timber and woodland products were harvested from the same area of land where stock was also pastured. The form of management of the trees, namely pollarding, where timber was cut from the trunk or boling at about 8 to 10 feet high, meant that animals could not graze on the regrowth and thus kill the tree. But they could still graze on the grass and undergrowth.

Wood-pasture is now thought to have been much more widespread in the medieval period than in the post-medieval. Recent changes in thinking regarding how the original 'wild wood' appeared and was subsequently exploited by humans and grazing animals suggests that extensive areas of wood-pasture may have been the characteristic structure of the original Wealden 'wild wood' rather than dark impenetrable woodland as traditionally thought [5].

Areas of wood-pasture today are very rare, and those that survive are often important ecological habitats where the veteran pollards support nationally rare invertebrates and bryophytes.

Heaths and Commons

Outside of the Royal Forests were other areas of open ground, where medieval manorial tenants could exercise common rights such as grazing, peat and turf cutting, furze cutting, etc. These land uses continued well into the post-medieval period with many ending either when the commons were formally enclosed or when many traditional land management practices ceased in the early

Extract from a 1610 map of Sussex showing the extent of Sussex Forests (by John Norden, augmented by John Speede)

20th century. Unenclosed commons may also have had enclosed coppice woods intimately associated with them, whereby underwood products were used in managing the commons, such as the use of hurdles for penning stock, and coppice wood for making broom handles, the broom head being cut from birch growing on the common. Due to a cessation in active management and the extinguishing of common rights in the modern period, many such commons and heaths have become overgrown with colonising trees and scrub.

Brief History of Woodland in the Weald

One reason for selecting the High Weald, Kent Downs, and Surrey Hills AONBs as subjects for this book is that all three were once historically interlinked with each other and with the management of Wealden woods. However, the character and nature of woodland in each AONB is very distinctive, reflecting different methods of management, landform, geology, and social forces.

Prehistory

The character of the Wealden landscape seen today has its roots in the Early Medieval period and probably with elements stretching back to the Iron Age (c. 600 BC). The hills and lands ringing the wooded hinterland were well settled and exploited in the prehistoric period. The North Downs were already being cleared and farmed in the Neolithic period; these farmers built the large and striking megaliths found in the Medway Gap, and long barrows in the Stour Valley. Evidence for this woodland clearance from the Downs has been found from pollen, and molluscan remains caught in hill wash or coluvium and recorded in soil profile sections, or preserved in relict soils preserved beneath burial mounds [6]. It is generally accepted that burial mounds (both long barrows and round barrows) were not usually constructed in woodland but rather in open sites which had a spiritual and landscape significance to those communities building the mounds. Thus their presence in woodland today, especially in sites identified as 'ancient semi-natural' indicates that land use activities other than woodland were taking place in the prehistoric period.

The central lands in the Low and High Weald were traditionally thought of as being thick forest where humans did not settle. However, Mesolithic and earlier settlement sites have been found in the High Weald, for example from rock shelters at Groombridge and sites where other large sandstone outcrops occur. Mesolithic camp sites have also been found at Charlwood in Surrey. The high concentration of Mesolithic finds in the Sevenoaks and Ightham area reflects in part the work of Benjamin Harrison (1837 - 1921), a shop keeper and enthusiastic prehistorian. But it may also be that the high sandy hills probably had areas of open ground and were comparatively easier to travel across, compared with the wetter and denser-wooded Low Weald.

Wood was an important resource for prehistoric communities, as important as flint. It was not only used for fuel, but also for tools, utensils, and the construction of shelters, and larger timbers were used in the construction of ritual monuments, causeways, and boats. Careful selection of the right form of timber was needed for construction works. In addition, the advantage of strong and straight poles from coppiced trees was exploited from the Neolithic period. There is now a large amount of archaeological evidence for wood and timber products created from underwood from apparently managed woodlands in the prehistoric period.

The clearance of woodland was originally thought to have been by a 'slash and burn process'. However, areas of primary wild wood would have contained many large trees, the trunks of which are very difficult to burn in situ. An alternative method of utilising grazing livestock and herbivores to create clearings combined with some burning is probably the more likely scenario. Academic research is suggesting that the Wealden 'wild wood' encountered by the early prehistoric hunters was more like a wood-pasture than a solid block of impenetrable woodland [7]. Areas of open glades and meadows interspersed with shrubby thickets and tall forest is a more likely woodland environment. Passage through this woodland would have been much easier for Mesolithic communities and also for the herbivores they hunted. Wet, boggy areas were probably avoided, with hills and more open ridge tops preferred as routeways.

The links between the landscapes of the Surrey Hills and Kent Downs with the High Weald may have already been in place 8,000 years ago but physical evidence comes from the Iron Age (c. 600 BC). Demand for and control of iron producing areas in the Weald was probably one of the pressures exerting a force on the development of tribal territories. Hill forts or settlements enclosed with ramparts were being constructed on the Greensand Hills and other high ground overlooking and controlling routes in and out of the forest as at Holmbury, Hascombe, Squerryes, Garden Hill and Saxonbury. Iron working has been identified as one of the key activities taking place in these hill forts. The ore was probably transported from iron rich deposits in the Weald to the hill fort settlement where skilled smiths worked the metal into weapons and utensils [8].

Evidence for later prehistoric settlement sites is found along the Chart Hills, along the river gaps and coastal margins of the Downs and throughout the region of North Kent [9]. These are areas where the distribution of woodland and especially ancient sites is infrequent. However, the tops and dip slope of the Downs and the lands west into the Weald where prehistoric settlement is sparse is where woodland is more dense. The dense woodland coverage on the Greensand Hills is possibly the result of the development of secondary growth on a previously more open landscape.

Romans

The country of Kent was described by Caesar after his two visits 55 - 54 BC as being 'thickly studded with farmsteads' and that its people were the 'most civilised'[10]. From this observation it can be inferred that the woodland, certainly in the east and north of Kent, was fragmented by fields and associated settlements. When the Romans finally settled in Britain at the beginning of the 1st century AD, the indigenous population probably continued the same processes of land management, but gradually adopted Roman ways and customs. Timber and woodland would have been in great demand for all the large construction works being undertaken in the newly burgeoning towns at Canterbury, Rochester and London. Timber for buildings, wharves, road infrastructure, as well as for industry – pottery, glass, metal work, tanning, and of course iron smelting.

The Roman iron industry in the Weald is now partly considered a state enterprise, organised and run by the Classis Britannica - the British Fleet. Iron production was on a large scale, beginning in the Hastings-Battle-Sedlescombe area before moving towards East Grinstead and Wadhurst when resources began to be depleted. By the end of the Roman occupation the main iron production area had moved from the Weald to the Forest of Dean in Gloucestershire [11].

Distribution of Roman and Romano-British settlement as evidenced from find sites, reveals some broad patterns. The major concentrations of towns, large villas and farmsteads occurred along the coastal plains, the margins of the Downs, across the Greensand Hills and with a scattering of sites into the Low Weald. The High Weald area was dominated by settlements associated with iron exploitation. Many of the tops of the North Downs and the remote depths of the Weald appear to have not been settled and possibly were utilised for their timber resources. A Roman villa settlement site at Chiddingfold may have been a country estate controlling and producing timber and wood for settlements nearer to London.

Anglo-Saxon

Settlement, after the collapse of Roman rule and administration, probably continued in the countryside much as it had done during the Roman occupation. Following the demise of Roman control, migrant colonists – Jutes in Kent and Saxons in Surrey and Sussex – settled and brought with them extensive farming practices. After initial settlement in the countryside around Dover and the North Kent Plain, the Vale of Holmesdale (between the Greensand Hills and the North Downs) became the focal area for primary Jutish and Saxon settlement, which extended into the Weald and up on to the Downs. Further Saxon settlement took place along the edge of the dip slope of the North Downs in Surrey and in the Coastal Plain of West Sussex.

A glimpse of the Wealden woodland can be gleaned from the Anglo-Saxon Chronicles, where as early as AD 477, the Saxons led by Aelle and his sons came to Selsey and killed many native Britons and put them "to flight" into the wood which is named "Andredesleag". In AD 755 Cynewulf drove Sigeberht into Andredesweald, where he

Artist's reconstruction of a Roman bloomery for iron production (reproduced with the kind permission of the High Weald AONB)

stayed until he was killed by a herdsman by a stream, the herdsman avenging the death of Cumbra who Sigeberht had killed [12].

These two extracts from the Chronicles indicate firstly that the woodland was not an impenetrable thicket but that the Britons sought refuge there, perhaps knowing suitable settlements to hide and regroup. Secondly the reference to the herdsman by a stream several centuries later is evidence of the way the woods were being managed at this time. The extent of the great wood of Andred is recalled in AD 892 as being 120 miles long and 30 miles broad. Its length would have included what is now the New Forest as well as woods in Eastern Hampshire. By the time of Domesday in 1086, the Saxon name 'Andred' had been dropped and from thence the wood and the area was called Weald. (This change in name appears to coincide with the European meaning of 'wald' for wood-pasture, a mixture of grazing and wood production).

The Weald had now become a vast wood-pasture, subdivided into territorial commons, where stock, mainly pigs, but also cattle were driven in the autumn from lands and manors around the edge to feed on the oak and beech mast, before being driven back to the home manor or farm [13]. This practice of herding stock from one area to another with the seasons is known as 'transhumance', and was introduced by the immigrant Anglo-Saxon settlers, mainly the Jutes. They saw the potential of the Weald and its adjacent lands in their entirety. Initially the Weald was carved up into several large commons belonging to the large agricultural estates held by the royal Saxon household, known as Lathes in Kent and Rapes in Sussex. As these large estates became fragmented in the form of gifts and grants from the royal house to secular and ecclesiastical owners, so too did the commons, with 'parent' manors on the north and east of the region claiming individual swine pastures or dens located along main drove ways into the commons[14]. These manorial swine pastures can be plotted today from the place names of settlements and farmsteads with the route ways terminating in the High Weald.

The swine pastures were not just confined to the Low Weald. Manors on the North Kent Plain and in the Thames Basin had grazing pastures on the North Downs and in The Blean, a large forested tract around Canterbury. The legacy of the annual mass movement of livestock is still present in the landscape today. It is visible in the pattern of numerous settlements, some now 'lost', whose names end in the word 'den' in the Kentish Weald and 'fold' in the Sussex Weald. It can also be seen in the numerous radiating routeways leading westwards and southwards into the heart of the Weald, depending on where the parent manor was located on the margins.

The character of the woodland at this time can be postulated as a mixture of enclosed coppice wood, where the trees were harvested for specific products, and tracts of unenclosed wood-pasture and areas of regenerating woodland on former farmed land on the sandy soils. Interspersed were farmsteads where some people were beginning to make permanent settlements in the woodland. Small seasonal hovels occupied by the drovers and stockmen may also have developed into smallholdings and farms, in return for 'fines' and dues paid to the lord of the 'parent' manor.

In the heart of the Weald far more of a grazed 'wood-pasture' type landscape probably still existed comprising interlinking commons and unenclosed wood-pasture with scattered farmsteads and settlements. It was when managed underwood was becoming scarce that woods were being enclosed with boundaries and hedges to prevent stock grazing on regrowth. Settlement and farm names ending in 'Hurst', such as Goudhurst and Hawkhurst indicate enclosed hill top woods, i.e. woods separated from other land use activities indicating active management and conservation of a valuable commodity.

Reconstruction of swine herding in the High Weald (photo - JH)

By contrast, the Forests on the sandstone ridges of the High Weald, such as St Leonard's Forest and Ashdown Forest, are thought to have originated as Saxon hunting grounds and therefore were not subject to manorial swine pastures. Here, great tracts of wood-pasture, heaths, grassy glades and more dense woodland were criss-crossed by tracks and routeways.

In the Domesday Survey of 1086 the main way of recording woodland in the south east of England was by the number of hogs for pasturage. Where manors located in the north and east of the region or in the Vale of Holmesdale were cited as having 'X' amount of woodland for hogs, this woodland was likely to be many miles away from the parent manor. The amount of hogs was an arbitrary amount used as a tax measure and did not relate to an actual measure on the ground. The Weald, the Downs and the Chart Hills were sparsely populated but not necessarily uninhabited, as the lands here were in part included with the assessment for the parent manor.

Medieval

The main structure and pattern of settlement and land use in the Weald was probably in place by the time of Domesday. The physical movement of people and stock between parent manors and swine pastures was gradually declining as permanent settlements were being established in the 'dens'. This pioneering settlement was allowed in return for dues, monetary fines, heriots and rents. However, the lord of the parent manor still retained control over timber and wood production within these areas, as shown by the numerous cases which involved the Archbishop of Canterbury. It is probable that when a den or several adjoining dens became formally settled, the remaining wood-pasture was enclosed and managed either in hand by the lord of the manor or tenanted out, as for example at Dering Wood near Pluckley in the Low Weald [15].

The settlement and enclosure of 'dens' produced a field pattern of more regular assart fields with smaller areas of woodland, the result of the more open nature of the wood-pasture. By contrast, later clearance of woodland resulted in smaller, irregular fields with thick wooded shaws and larger areas of remnant woods. On the Downs, the topography of long and steep valleys influenced field and woodland shape far more than in the Weald, creating a ribbon pattern of fields interlinked by shaws, shaves or rews and small coppices.

Management of woodland by coppicing interspersed with standard trees such as oak and ash was practiced across the region as a means of providing a ready supply of timber and underwood for fuel and for a vast range of other uses. The poorer soils derived from the clay-with-flints on the North Downs and the sandy infertile soils on the Greensand Hills gave rise to extensive commons and wood-pastures, many of which are still evident today, but are more often than not covered by dense secondary woodland. The folding of sheep usually took place on common fields, more frequently encountered in Surrey than in Kent, but not to the extent as that which occurred on the South Downs in Sussex. In Surrey, sheep grazed on the chalk grass of the Downs or commons on the Greensand during the day, were driven on to arable fields and 'folded' using hurdles where their dung was used to manure and enrich the cultivated soils. This further exacerbated the impoverishment of the upland grounds. The severe mortality experienced in the Great Famine in the early part of the 14th century and the Black Death in 1348-9 meant a reduction in the work force available to work the land. Coppice was probably left unmanaged and areas of former cultivated land reverted to scrub and woodland. On the North Downs, former arable areas were allowed to develop into sheep walks, though not as extensively as on the South Downs.

Post-medieval

In the post-medieval period aspects of traditional management of woodlands underwent several key changes, reflecting changes in economic demand. In the 17th and 18th century iron production in the Weald was reaching its zenith, with numerous forges and furnaces operating across the Sussex Weald and into Kent and Surrey. The demand for suitable underwood or cord wood for fuel and conversion into charcoal was immense. Hornbeam, oak, ash, alder were all utilised. Coppice woods, however, were being created at the expense of timber trees. This was seen as a threat to national security, the lack of timber for ship building and the threats from Spain and France being very real. Acts for the preservation of timber trees were passed and iron masters were extolled to allow some trees to remain as standards and not be brought into coppice management.

The first, in 1543, the 'Acte for the preservacion of woods' stated that there should be 12 timber trees to the acre with these not felled until they had reached a certain size. The period of the Commonwealth Parliament (1649-60) resulted in many woods, wood-pastures, and fine trees being felled as part of the sequestration of estates held by royalist landowners; the timber and underwood were taken in lieu of monetary fines. Some woods were replanted but many others were converted to farmland.

A further change in coppice management took place with the development of the hop industry in the 18th and 19th centuries, both in the growing and drying of hops in kilns. It coincided with the decline in demand for fuel from the iron industry (the centre of production having moved to the Forest of Dean and then to the north, where coal, the preferred fuel, was in ready supply). Hop bines grew best up long straight poles and growers needed poles which did not rot quickly. Sweet chestnut coppice was the most suited, able to grow quickly and strongly on a wide range of soils, throwing up numerous straight poles. Many estates and woodland owners grubbed up the hornbeam and oak coppice woods, replacing the trees with sweet chestnut.

Traces of the older woodland structure may still survive today in the adjacent shaws, gills and smaller woods. Associated with the hop industry were the small brick tar tanks, with their hearths, where the ends of poles were dipped in heated bitumen to seal and preserve them. Coppice wood was also used in the oast kilns to dry the hops before they were bagged and taken to the brewery. Underwood was also valued in the production of gunpowder, alder being one of the best trees to convert into charcoal. Gunpowder works were founded in the Tillingbourne valley in Surrey and also at Oare near Faversham, to the north of the Kent Downs. Fuel was also needed for kilns for glass manufacture and also for burning lime.

By the 19th century many large estate owners were looking at ways to improve timber production from their woodlands. John Evelyn, who resided at Wotton in Surrey, had written in the 17th century 'Sylva', a popular and informative book on trees and all aspects of their management and use [16]. It was based on his forestry and woodland experience on the North Downs and Greensand Hills. The continental method of 'high forest' management was beginning to be adopted along with the continuing coppicing of sweet chestnut. Areas of traditional coppice and also heaths and commons were being planted to conifers. Areas of redundant farmland were also being planted up, with the former field patterns preserved under the canopy. Characteristic of this time were the extensive networks of formal forest rides and drainage systems laid out to facilitate ease of management of the newly planted trees. This process continued into the 20th century.

Not all woodland was seen just for its economic worth. The 'Picturesque' movement in landscape design and appreciation resulted in woodlands and small groups of trees being planted to create 19th century gentrified parkland. On some estates, cover for game in the form of new coverts or existing woods specifically managed as coverts added to the diversity of woodland cover. In decline in the 19th century was the practice of commoning, the grazing of stock on heaths and greens. Many of these areas had by now become enclosed to fields or woodland but for those that remained, birch scrub and conifer invasion diminished the open areas. The quarries, brickworks, and areas of turf cutting, as well as prehistoric remains began to disappear under a clothing of trees.

Modern

In the South East, woodlands had a crucial part to play during the two World Wars, not only as a supply of timber needed for construction work but also as places for training and places to hide supplies in. Large areas of woodland, especially the high forest and plantations were felled to fuel the 'war effort'. In Surrey and Kent woods were used to hide ordnance, ammunition bound for the coastal batteries. Associated with these sites were networks of field defences, anti-tank traps and camps. When allied forces came over, many camped on the heaths and commons, practicing field activities and creating all sorts of different and obscure earthworks.

Woodland management today

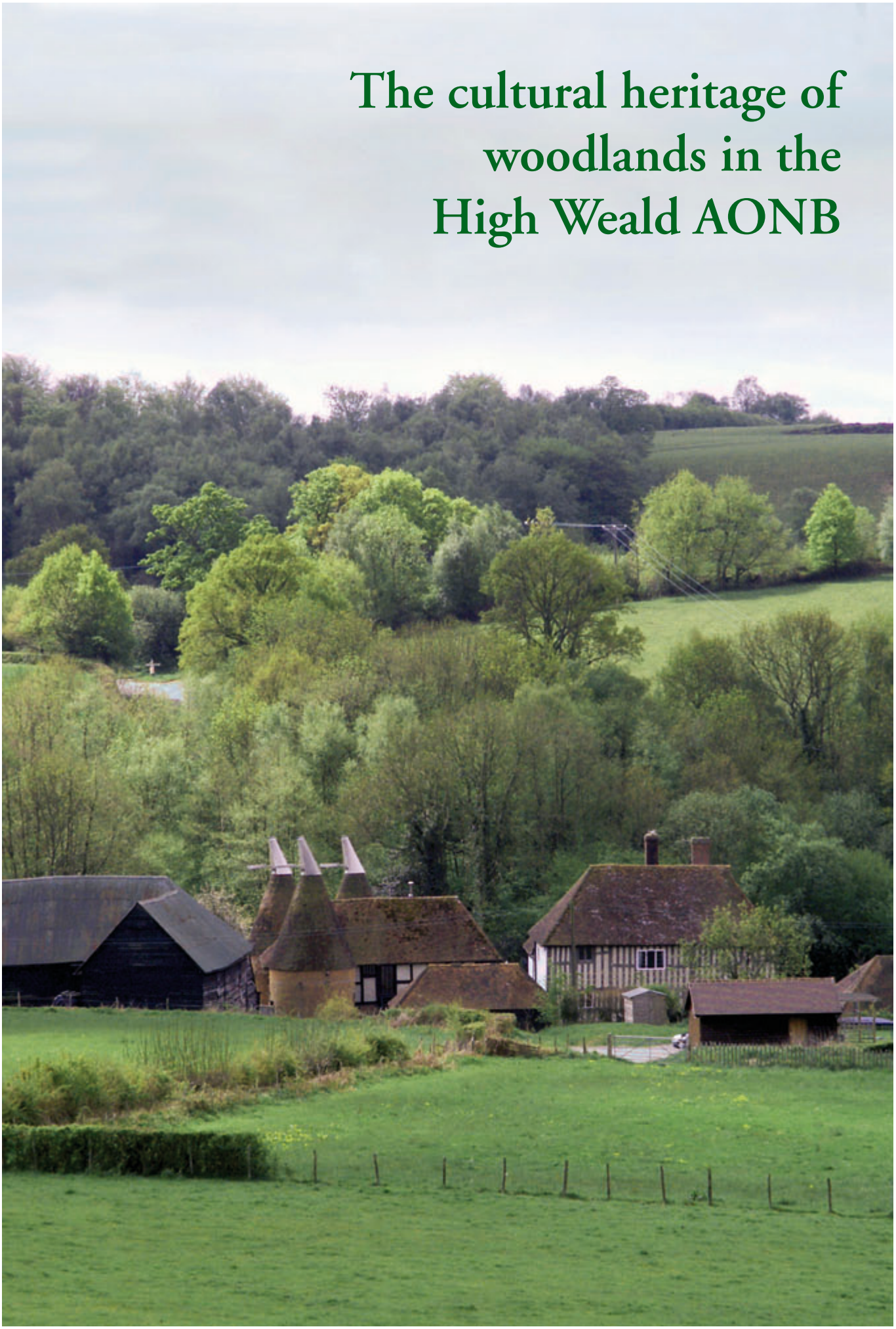
Today, the commercial management of woodlands remains on an economic knife edge, with the market for homegrown timber limited due to costs and a lack of suitable processing plants but also out competed by cheap and sometimes unsustainable imports from abroad. This means that many woods, especially small ones are often uneconomic for commercial producers. In 1991, the paper mill at Sittingbourne in Kent closed its broadleaved roundwood intake. This, and the recent closure of the pulp mill at St Regis in South Wales have had a significant impact on the market for coppice underwood in south east England.

Coppice is the most widespread traditional woodland structure still found in woods in the High Weald, Kent Downs, and Surrey Hills. The economic returns for managing traditional coppice are very low and the demand for woodland products is small, with few financial incentives. For coppice woodland to retain its cultural and ecological value these woods need to be managed by regular cycles of cutting, in a sustainable way. However, there are signs of growth in the fire wood market, and the considerable interest in wood fuel as a heat source has the potential to create a significant market for managed woodlands.

Footnotes

[1] Rudyard Kipling 'Sussex' 1902. In 'The works of Rudyard Kipling. Wordsworth Poetry Library p.215
[2] National Parks and Access to the Countryside Act 1949, Section 14
[3] Countryside Agency (2001) Areas of Outstanding Natural Beauty. A guide for AONB partnership members. CA24, p.6
[4] Nature Conservancy Council (1989) East Sussex Ancient Woodland Inventory; West Sussex Ancient Woodland Inventory; Surrey Ancient Woodland Inventory; Kent Ancient Woodland Inventory. Pilot projects are now revising the Inventory in the light of additional map evidence and a greater understanding of woodland origins. See Westaway, S. (2006)
[5] Vera, F. W. M. (2001) Grazing Ecology & Forest History CABI Publishing
[6] Ashbee, P. (2006) Kent in Prehistory pp.50-52 Tempus
[7] Vera, F. W. M. (2001) Grazing Ecology & Forest History CABI Publishing
[8] Hanworth, R. (1987) The Iron Age in Surrey pp.157-161. In Bird and Bird 'The Archaeology of Surrey to 1540' Surrey Archaeological Society.
[9] Lawson, T. & Killingray, D. (2004) An historical atlas of Kent, Phillimore p.19
[10] ibid p.20
[11] Cleere, H. & Crossley, D. (1995) The Iron Industry of the Weald. Chapter 4. Merton Priory Press
[12] Swanton, M. (2000) The Anglo-Saxon Cronicles. Phoenix p.15, p.47, p.84
[13] Witney, K. P. (1976) The Jutish Forest, Athlone Press
[14] ibid
[15] Bannister, N. R. (2002) The Management of Dering Wood, Smarden, since the Medieval Period: Archaeological and Documentary Evidence. Archaeologia Cantiana CXXII pp.221-235
[16] John Evelyn (1664) 'Sylva' or A Discourse of Forest Trees

The cultural heritage of woodlands in the High Weald AONB



View of the High Weald near Ticehurst in East Sussex (Photo - RH)

The Cultural Heritage of Woodlands in the High Weald AONB

Description of the High Weald AONB
The High Weald AONB, designated in 1983, covers 1,457 square kilometres, and is the fourth largest AONB in the country. It stretches from St Leonard's Forest in the west to the channel coast at Fairlight near Hastings in the east. The AONB lies mainly in East Sussex, but also extends in the west into West Sussex and Surrey, and to the east into Kentish High Weald [1]. The headwaters of the river systems of the Medway, Ouse and Arun commence in the High Weald. The Rother, Brede and Tillingham rivers also flow through the AONB before discharging into the sea near Rye.

Geology and Soils
The High Weald AONB comprises the central part of the Wealden anticline created about 65 million years ago when layers of sedimentary rock (laid down in a marshy plain inundated by the sea) were uplifted by a series of earth movements which also created the Alps. The anticline or dome was raised high above sea level. Its long axis (215km) stretched from the Bas de Boulonnais in France through Kent into Surrey, Sussex and Hampshire. Over the following 20 million years the Wealden dome has been eroded rather like an onion, revealing a very varied geological structure. The oldest exposed rocks - the Hastings Beds - lie in the centre of the Weald and dominate the High Weald AONB. The youngest lie around the outer edge marked by the chalk escarpment of the Surrey Hills and Kent Downs AONBs. Drift deposits are confined to the alluvium accumulated in the lower reaches of the river valleys around the Lower Rother and Brede. The differential erosion of the sedimentary deposits of the Hastings Beds has resulted in a hilly terrain comprising ridges and valleys with deep sinuous gills draining into them [2].

The differential layers of sedimentary rocks which make up the High Weald provide valuable mineral and stone resources. The most well known geological resource exploited in the High Weald is ironstone found in a discontinous layer in the Wadhurst Clay. Where rivers and streams have eroded valleys, these layers became exposed and have been exploited from prehistoric times to the 19th century. The course of these deposits can be traced in a line along the sides of the valleys by looking at field and woodland names, such as 'Mine Pit Copse'. Irregular pits, mounds and excavations are the physical evidence which often survive in the woodland, for example near Mayfield in East Sussex.

Topography
The landform of the High Weald is dominated by a

Map 4. Woodland cover in the High Weald AONB

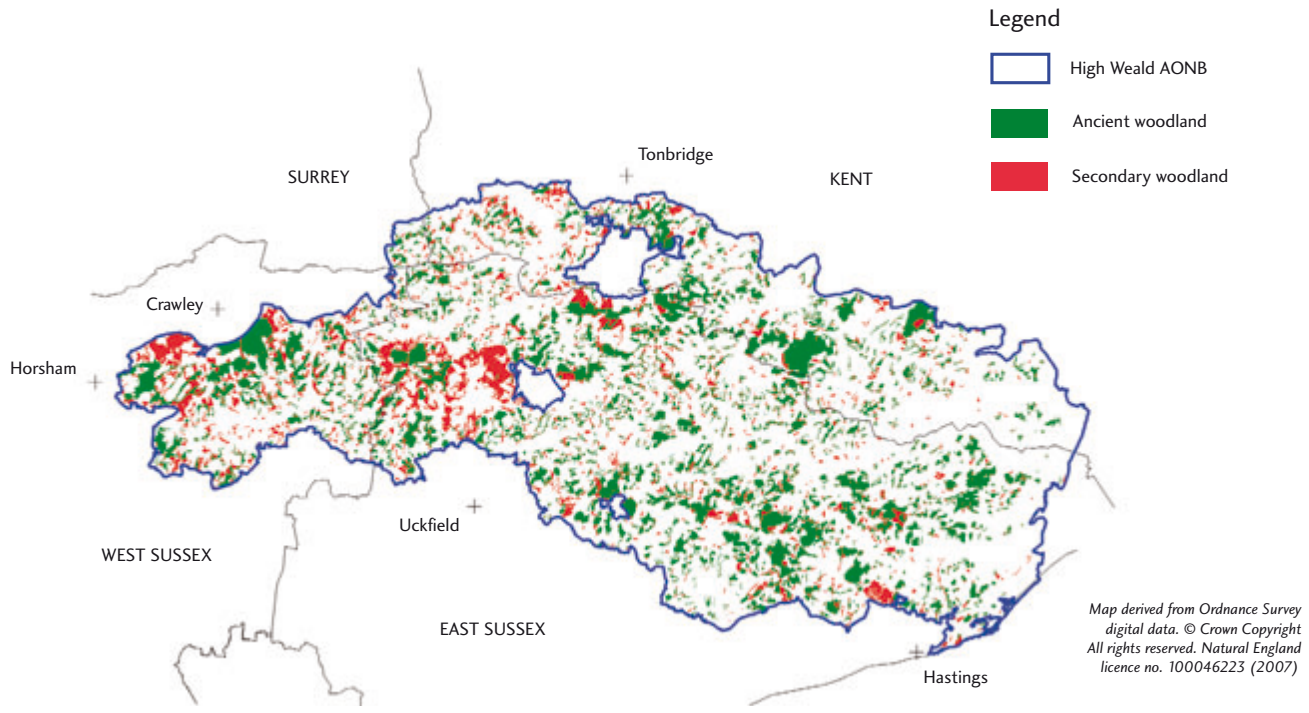


Table 1. Woodland types in the High Weald AONB (woodlands > 2 hectares)

Woodland type	Area (hectares)	% of AONB woodland resource
Broadleaved	18,404	51.3
Coniferous	4,957	13.8
Mixed	3,477	9.7
Coppice	3,188	8.9
Felled	2,835	7.9
Young trees	1,984	5.5
Coppice-with-standards	646	1.8
Shrub	249	0.7
Ground prepared for planting	165	0.5
Total	**35,905**	**100.0**

Source: Derived from the National Inventory of Woodland and Trees, Forestry Commission, 2000

series of large east-west ridges and valleys; the Battle Ridge terminates at the high cliffs at Fairlight. Just beyond the boundary of the AONB and around the hinterland of Rye, is the denuded cliff escarpment of the former coastline. The sea once extended several miles inland, and the estuary of the River Rother, now heavily silted up, lay close to Rye and Winchelsea. Between Rye and Fairlight are the enclosed marshlands of the Pevensey Levels. To the north lies the Forest Ridge, so called from the several tracts of 'forest' which occupy the high ground. The largest of these is Ashdown Forest, but there are also Worth and St Leonard's Forests as well.

Extent of woodland type and distribution

The High Weald has the greatest amount of ancient woodland in any AONB, representing 7% of all the ancient woodland in England. Together, both ancient and secondary woodland cover around 25% of the High Weald. About 11% of the woodland is under active coppice management (see Table 1, above). Of the ancient woodland, 64% is recorded as ancient semi-natural, and 36% plantations on ancient woodland sites [3]. Sweet chestnut is the most frequently cut wood today, because of its value for fencing, construction and furniture.

Woodland Landscape Character

The character of woodland within the High Weald is dominated by numerous small woods and sinuous gills interconnected by narrow shaws or rewes. These smaller woods were managed as coppice with standards, but today, many have not been cut for decades and have grown to high forest with mature canopies.

Larger tracts of woods, such as at Brightling, are often a characteristic feature of the larger landed estates.

On the Forest Ridge are large tracts of plantation woodlands in the areas of former 'forests' at Ashdown, Worthing and St Leonard's. Some of these plantations occupy former ancient wood-pasture commons, others are afforested heaths or ancient woodland.

The term 'Forest' has two meanings. In the historical sense a Forest was an area set aside by the Crown for hunting, usually for deer but also other forms of game. The word is derived from the Latin *foris*, meaning 'outside of the jurisdiction of the common law' [4]. The area was not solid woodland, rather a mosaic of woods, coppices, wood-pasture, heaths and commons. Ashdown is an example of a medieval Forest, which still retains to a certain extent its open character and mixed habitats. Other land use activities took place including farming, probably on a subsistence scale. The residents within the designated area were subject to strict 'Forest Laws' laid down by the Crown, with the aim to preserve the deer and game.

Today, 'forest' in the modern sense of the word means high mature woodland, where the trees are managed for timber (not underwood). It is a term brought from the Continent during the 18th and 19th centuries, when large areas were planted with non-native trees, especially conifers. So Worth Forest is so-called in both senses of the word, as much of the former wood-pasture common of the medieval forest was enclosed and planted with conifers in the 19th and 20th centuries.

Ancient woodland in the High Weald with a carpet of bluebells in the spring (photo - PM)

Introduction
The character of the High Weald is dominated by ancient woodland, ancient routeways and historic dispersed settlement, all well established by the 14th century and surviving in the main part intact through major social and economic changes to the present.

Prehistory
Evidence for human impact on the woodlands in the Weald is present from about 8000 BC. Excavations on a Mesolithic site on Iping Common in West Sussex revealed the site was located in dense hazel woodland but that towards the end of its use as an occupation site the locality had developed into a heather covered heathland[5]. At the High Rocks Mesolithic rock shelter site, hazel together with beech, oak, birch and yew dominated essentially a woodland environment [6]. However, the role of wild herbivores in suppressing tree growth and maintaining open glades should not be under estimated. Naturally occurring glades would probably have been focal points where hunters caught animals. Well into the Iron Age (c. 60 BC) the adjacent land at High Rocks was still fairly wooded, with oak predominant amongst charcoal remains found on the site [7]. However, the site of the fort itself was probably cultivated for a period of time before the defence ramparts were built.

The High Weald landscape was shaped in the main by transhumance – the seasonal movement of stock between grazing pastures. But this is not to recognise that other land uses were also taking place in the prehistoric period, including farming and iron manufacture. However, the environmental and archaeological evidence suggests that the High Weald was still a place where hunter/ gather practices prevailed into the Neolithic period of early farming, with seasonal woodland camps exploiting the woodland resources [8]. Where the sandstone rocks are exposed, around the Tunbridge Wells area, woodlands may preserve sites of undisturbed prehistoric camp sites. Naturally occurring sources of water such as springs will have been focal points for seasonal camps, identified today by scatters of flints.

Mesolithic rock shelter at High Rocks in the High Weald (photo - PM)

Environmental analysis of sites in the eastern Rother valley reveals a landscape in which early cultivation of cereals with their associated weeds was taking place [9]. The impact of the early farming communities on the woodland cover in the High Weald may have been considerable. Silts and alluvium accumulated in the valleys of the Brede, Rother and Cuckmere indicate significant silt load in the water which can only have come from land with a significant reduction in the number of trees and an increase in the amount of bare soil [10]. Whilst grazing animals will create openings, glades and wood-pasture within woodland, it is not usual for them to create large areas of bare soil as it is with human clearances for cultivation.

Bronze Age burial mounds and Late Iron Age enclosures and boundaries have been found in Ashdown Forest [11]. These former heathy commons may have been caused in part by the prehistoric clearance and subsequent cultivation of the sandy soils. There has, however, been no systematic field investigation of woodland on former heaths and commons, which would identify any further evidence of extent prehistoric field systems and enclosures.

There are six Iron Age hillforts or enclosures within the High Weald and all are thought, from archaeological evidence, to have been associated with iron production. However, they may have served other functions, such as being centres for pastoral farming defence, administration and trade [12].

Roman
The High Weald was the centre of Roman iron production, which underwent considerable expansion and development in the 2nd century AD. It is now thought that the Weald comprised two main groups of iron works. The first, an Imperial Estate organised by the Roman Fleet, *Classis Britannica* (CL BR) was centred in the eastern part, while the second, a private group, was located in the western area. By the end of the 3rd century iron production was in decline, with the closure of many of the eastern sites, leaving only the western ones [13]. The main centre for the eastern production area was at

Beauport Park (near Hastings in East Sussex), where an extensive iron working site has been excavated, including a bath house roofed with tiles bearing the CL BR stamp. Around Beauport Park were other iron production centres, such as at Bardown which in turn were served by smaller scattered sites [14]. Iron was manufactured using bloomeries and it is the remains of these with their associated slag heaps and mine or 'bell' pits which can be found in woods and gills throughout the High Weald, where the Wadhurst Clay Formation mudstone comes to the surface.

Bloomery sites are usually identified by rounded slag heaps, the by-product of smelting, and by large concentrations of slag found in the beds of gill streams. Slag was produced in large quantities, and at Beauport Park, the hub of iron production, it has been estimated that 100,000 tonnes of slag were produced, much of which went for metalling roads in the 19th century [15]. Near to a bloomery site there may be evidence of the iron ore pits or 'bell' pits, large rounded depressions, sometimes containing water, with adjacent spoil mounds. Fragments of the ironstone, a siderite mudstone, may still lie scattered on the surface. Such areas of uneven ground were difficult to level and bring into cultivation, thus many still survive in woodland today.

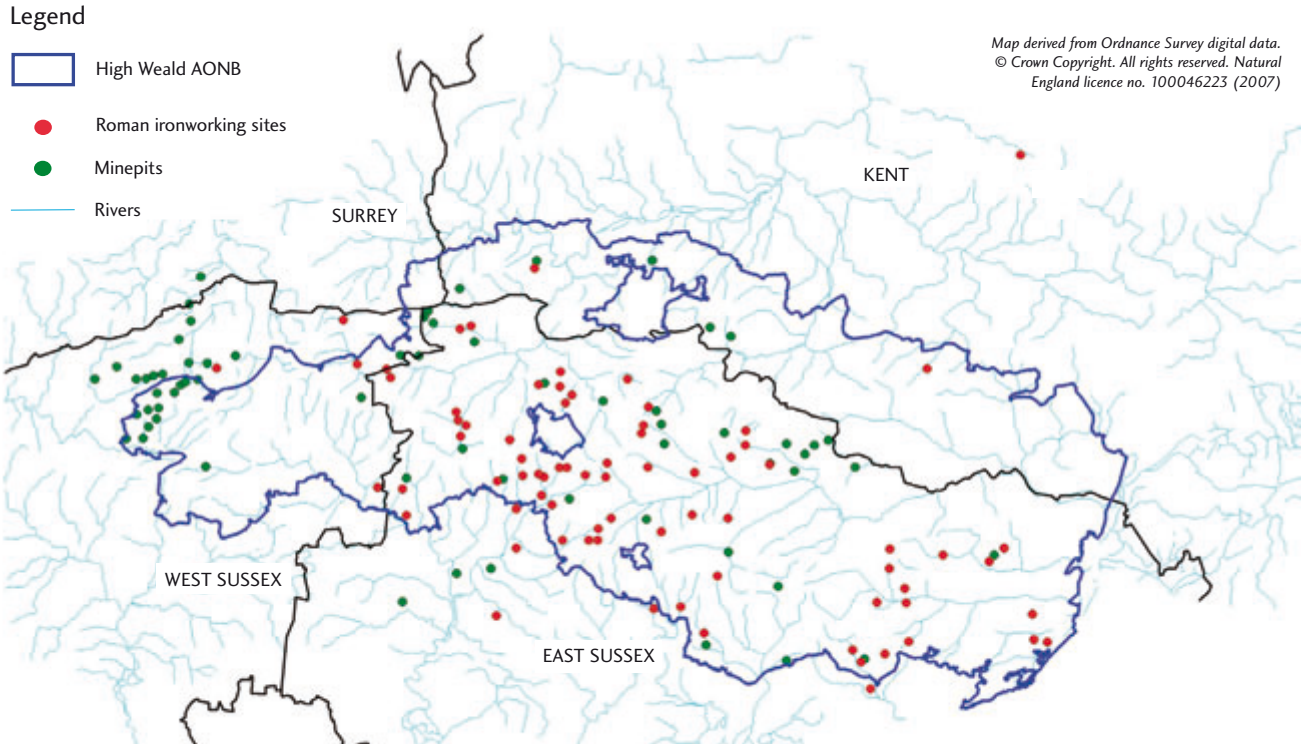
The density of iron production sites suggests that management of the woodland was of prime importance in order to keep a ready supply of suitable wood for fuel. A form of coppicing may have been practiced and it has been estimated that the 750 tonnes of iron produced in the peak period 150 - 250 AD would have required 33,000 hectares of coppice wood [16]. The sheer quantities of material involved in production at this time suggests that there was a large workforce operating in the area. This would have included not only those producing the iron but also those quarrying the iron stone, coppicing the wood, and making charcoal, as well as people to service the workforce, providing food and shelter. Little evidence for these activities has yet come to light.

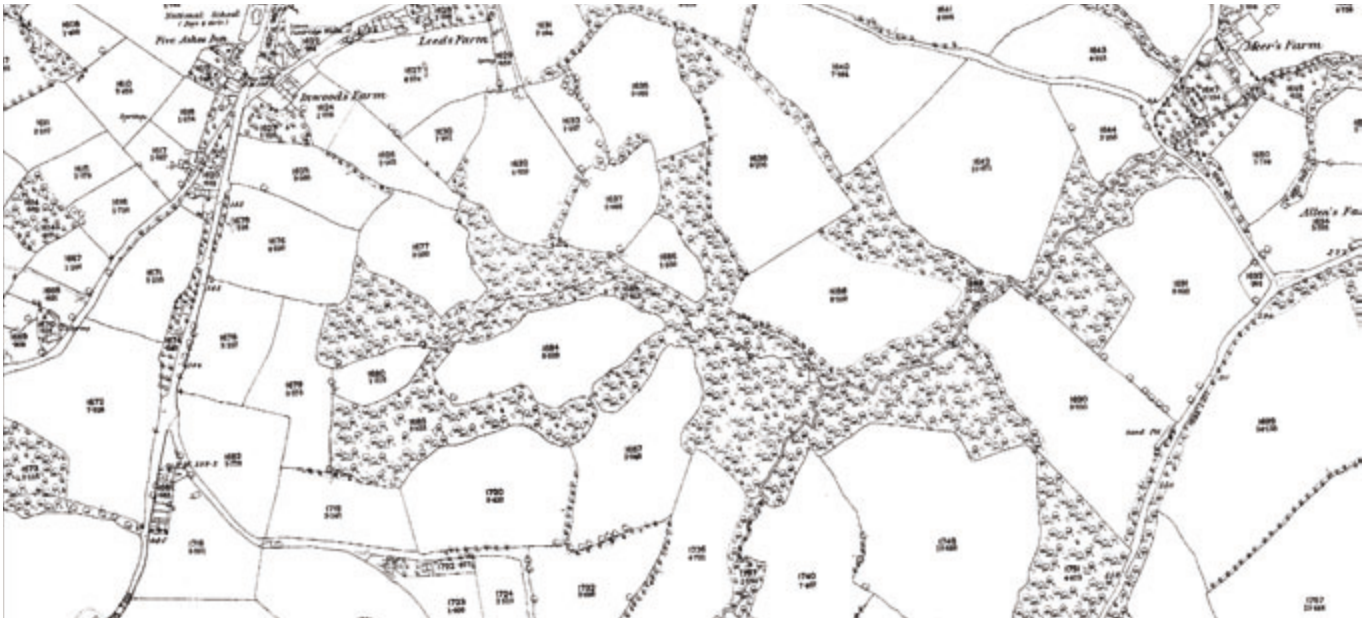
Medieval

There were four main driving forces shaping the type of woods in the medieval period. The first was the open wood-pasture and heathy commons with associated woods of the several Forests. These forest landscapes characterise the ridge of high ground in the north of the AONB – the Forest Ridge. A chase was also preserved for hunting primarily by the king but held by a local magnate who could also exercise hunting privileges. These are more commonly found in the Low Weald and West Sussex. As well as chases and Forests, enclosed parks for deer were created as a means of providing a ready supply of venison. These comprised a mix of wood-pasture, enclosed woodland and lawns, all of which were bounded within a roughly circular pale.

A pale comprised a large bank with accompanying ditch or ditches (one on either side). The boundary bank was topped by a wooden 'paling' fence usually constructed of upright posts of oak. It was the duty of the lord's tenants (in the manor where the deer park lay) to maintain the pale in return for land. Eridge Park still retains much of

Map 5. Roman ironworking sites in the Weald and their relationship to iron-ore minepits (adapted from 'The Making of the High Weald', Harris, R. [2003])





Example of later assart woodland east of Five Ashes in the High Weald, from the Ordnance Survey First Edition County Series map for East Sussex (25 inch to the mile, 1869-75). The area is characterised by small irregular fields with wood boundaries which have been carved out of the remaining ancient woodland.

its medieval character and its earthwork pale. Park pales can still be traced in woodland at Mayfield and the pale of the Tudor deer park at Penshurst is also preserved in woodland. As with deer parks, forests were bounded by pales. The one at Ashdown can still be followed on the ground, in places as a large single or double earthen bank and ditch.

The second driving force shaping woodland in the High Weald at this time was the continued traditional management of ancient coppice woods and gills for underwood and charcoal, predominately for the iron industry. Many of these enclosed woods may date from the period of Roman exploitation of the iron, especially in the area of Bardown and further to the east, towards Hastings.

The third process was one of transhumance; the swine pastures or dens which had their origin in the early medieval period, where pigs and possibly other stock such as cattle were herded in the autumn to feed on the oak mast. Long distance transhumance of swine is not thought to have generally taken place in the High Weald to the same extent as in the Kent, Surrey, and Sussex Low Weald. This is probably due to the distance of territory in the High Weald from potential parent manors and the difficult physical conditions of the ground terrain.

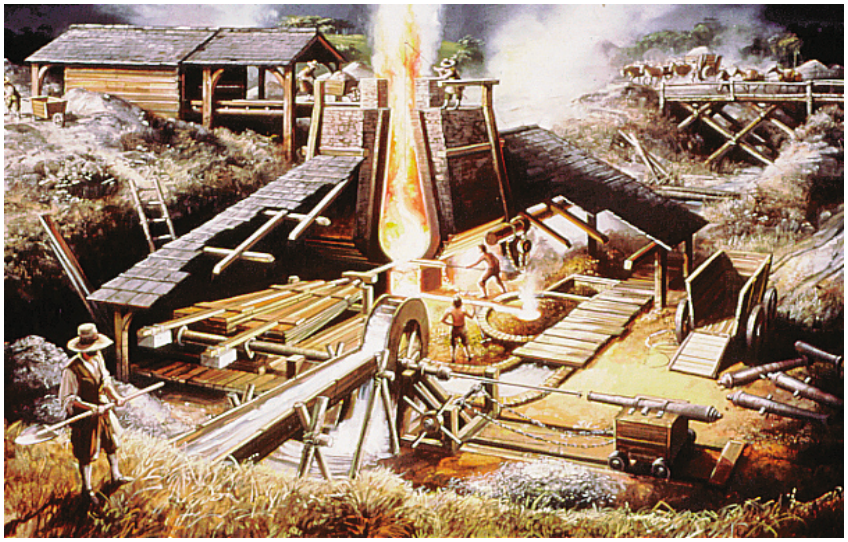
The eastern end of the AONB around Hawkhurst marks the limit of the extent of the dens and drove routes from the Kentish manors. The High Weald dens were probably used by local Saxon settlements. Many of these dens occupied the higher and better ground, which were subsequently cleared and settled by the time of the Norman Conquest.

The fourth driving force was the coppice woods, shaws and gills left by the medieval period of assarting and new farmstead settlement of the remaining early medieval swine pastures or dens. This form of assarting also took place in the Forest areas as well. The later period of assarting is characterised by small, irregular fields (often about an acre in size) which were 'nibbled' out of woods and unenclosed waste. Today, they can be identified by small farms surrounded by small fields, narrow shaws and irregular shaped woods of ancient character.

Remains of the pale at Ashdown Forest in the High Weald (photo - PM)

Use of High Weald Woodlands in the Post-medieval Period

The amount of woodland still surviving in the High Weald is due not only to the poor soils and terrain being unsuitable for agriculture, but also to the historic demand for timber and underwood products, particularly for industry.



Artist's reconstruction of a 17thC gun casting blast furnace in the Weald (reproduced with the kind permission of West Sussex County Council)

Iron Manufacture

An expansion in the iron industry in the Weald took place in the Tudor period and reached its height at the time of the Civil War, when furnaces and forges were producing arms for both sides in the conflict. Iron production continued into the 18th century, with the last furnace operating at Ashburnham in East Sussex in the early part of the 19th century. Many of the obvious features of the industry found in woodland today relate to this period of production. The sites often operated on or near to former medieval or Roman forges, a probable consequence of the availability of iron stone.

The hammer pond, a characteristic landscape feature of the High Weald, dates from this time, when flowing water was used to power the huge hammer in the forge and the bellows in both the forge and furnaces. Whilst some hammer ponds still retain water, as for example at Gravetye near West Hoathly, others have become silted up and returned to farmland as at Hawksden near Mayfield. At Furnace Farm close to Bedgebury Forest ('forest' in the modern sense of the word) the pond bay or dam has been breached but still survives in excellent condition in the plantation woodland.

Artist's recontruction of a 17th century hammer pond in the Weald (reproduced with the kind permission of West Sussex County Council)

Other features found in many woods and associated with iron production are the slag heaps. These are often much reduced in size as the slag provided valuable hard core for metalling the poor Wealden roads, before the days of tarmacadam. Close by and also in woodland are often found the mine pits where the iron stone was dug out.

The enclosed coppiced woods of the High Weald were dominated by oak and hornbeam, the latter in particular being favoured for charcoal manufacture. At this time, such was the demand for underwood for fuel and charcoal, many woods were converted to just coppice with no 'tellers' being allowed to grow on to replace the standard trees. It has been estimated that an average 16th century blast furnace in the Weald required 2,500 acres of coppice for its coal supplies, with an additional 1,500 to 1,600 acres for its forge [17].

This caused alarm at the highest level of the country, as there was a lack of good quality timber needed for ship

Remains of a pond bay near Mayfield in the High Weald (photo - PM)

building at a time when the threat of invasion from the Continent was increasing. Royal Acts were passed in order to preserve timber trees from being felled for iron production.

At the same time, an increase in the demand for wood fuel came from the clothiers based around the Cranbrook area, who were required by Queen Elizabeth I to sell finished cloth i.e. dyed, and that required fuel. Thus the clothiers came into direct conflict with the iron masters, and there was also the demand from the local population for domestic use of fuel.

Hops

As the iron industry began to decline during the mid-17th century, a new industry was gaining momentum, the growing of hops for the brewing of beer. The hop plant requires a clean straight pole up which to grow and from which the tendrils hang. The early form of growing was by erecting a 'wigwam' of several poles around a mound of soil in which the hops were planted. These poles were dismantled each year and stored in barns or corners of the fields. In the late 19th and early part of the 20th centuries, a fixed system of upright poles held in place by wires and linked by strings was devised. The hops were encouraged to grow up the strings.

In either system, vast amounts of poles were needed by the hop growers. It was found that the strongest pole, which did not decay in the ground too quickly and which grew rapidly, came from sweet chestnut coppice. This species grows well on a variety of soils and thus large areas of the old hornbeam and oak coppices of the iron industry were grubbed up and replanted with sweet chestnut. Chestnut also made excellent fencing, and could be used for stakes for orchards as well. Woodland owners, especially the large estate proprietors, converted many of their woods in response to this demand. Edward Hussey III of Scotney Castle records in his diaries the grubbing of old hornbeam stools in his woods at Kilndown and replanting with sweet chestnut. Like many of these estate owners Edward Hussey ran his own wood and timber yard, processing timber for home consumption as well as for sale. He also sold standing coppice to local timber merchants [18]. Today there is still (just) a market for sweet chestnut, and the coppice cutters who work the woods have a history stretching back to the 18th century.

Stone and other mineral extraction

Many woods within the High Weald retain areas of uneven ground – former diggings and quarries, not only from iron stone exploitation, but also from the quarrying of stone used in building and other structures. Horsham stone, a calciferous sandstone, and 'country stone', a yellow sandstone from the Hastings Beds, streaked with iron veins, were both used locally for building and give the High Weald its distinctive vernacular character. Large and small quarries can be found in many woods, for example on the Gravetye Estate, where sand was also dug locally for brick making.

Hop field near Witherenden Hill in the High Weald (photo - PM)

Typical chestnut coppice in the High Weald (photo - PM)

Wood Crafts

The presence of so much woodland in the High Weald meant that woodland crafts relating to harvesting timber and underwood, as well as working wood into tools, buildings, vehicles, fuel, etc., continued well into the 20th century. However, by the time of the First World War traditional coppicing practices were already in decline. Many of these woodland crafts leave little evidence surviving in woods. Saw pits and charcoal hearths are the most obvious feature but are often difficult to find due to the 'subtle' nature of the earthwork. Woodland crafts and skills are still retained and kept alive today by a small number of people who practice and earn a living by coppice cutting and related crafts in the High Weald.

Gentrification of the landscape

The 19th century, with improved transport links by rail and road, opened up the High Weald as a place of scenic beauty not previously appreciated. Small 'gentrified' country estates were springing up on former farmsteads for example around Horsham, close to railway stations. The 'Picturesque' movement in landscape appreciation and design embraced the wooded gills, fast flowing streams and embanked hammer ponds. Gravetye near West Hoathly is a late 19th century semi-formal landscape created by William Robinson. Once an iron master's estate with furnace and pond, it was landscaped with plantations and specimen trees intermixed with the medieval shaws, coppices and small fields [19].

Management issues and threats concerning the cultural heritage of woods

The key management issue for the cultural heritage of woods in the High Weald is the lack of understanding and awareness of the history of woodland management and associated land use activities. Our limited knowledge of the origins and function of many features found in woodland is exacerbated by the minimal amount of detailed archaeological research being undertaken. This in turn can lead to a lack of awareness by woodland owners and managers of the impact woodland management and other activities can have on the archaeological resource preserved within woodland.

Fragmentation of Ownership

Ownership of woodland in the High Weald often lies with private individuals. There are large tracts of woodland associated with medieval 'forests' which are in trust, public or other secure ownership but the dominant woodland character is of small coppices, gill woodlands and shaws.

Ownership fragmentation is still a real issue, with areas of woodland being subdivided and sold off in parcels to private individuals (who often live many miles away from the site) wishing to own a small piece of wood. Subsequent use of the wood may not be sympathetic and can lead to a decline in the condition of the flora and earthworks. Multiple ownership of a wood can lead to conflicts and disparate, unsympathetic management activities.

Lack of understanding of wood and tree care

With many small woods coming into the hands of 'amenity owners', there is a lack of knowledge concerning sustainable and good practice with regard to management and the care of trees. A lack of cutting can

Traditional hedgelaying in the Weald (photo - PM)

be just as detrimental as too much. Woodlands which abut equestrian enterprises can also suffer, either as an informal manure dump, or from overgrazing, with bark stripping and removal of ground flora where the fencing is insufficient.

Policies for enhancement of conservation of the woodland cultural resource

These are taken from the High Weald Management Plan 2004-2009:

W1. To maintain existing extent of woodland and particularly ancient woodland.

W2. To enhance the ecological functioning of woodland at a landscape scale.

W3. To protect the archaeology of AONB woodlands.

W4. To increase the output of sustainably produced high quality timber and underwood for local markets.

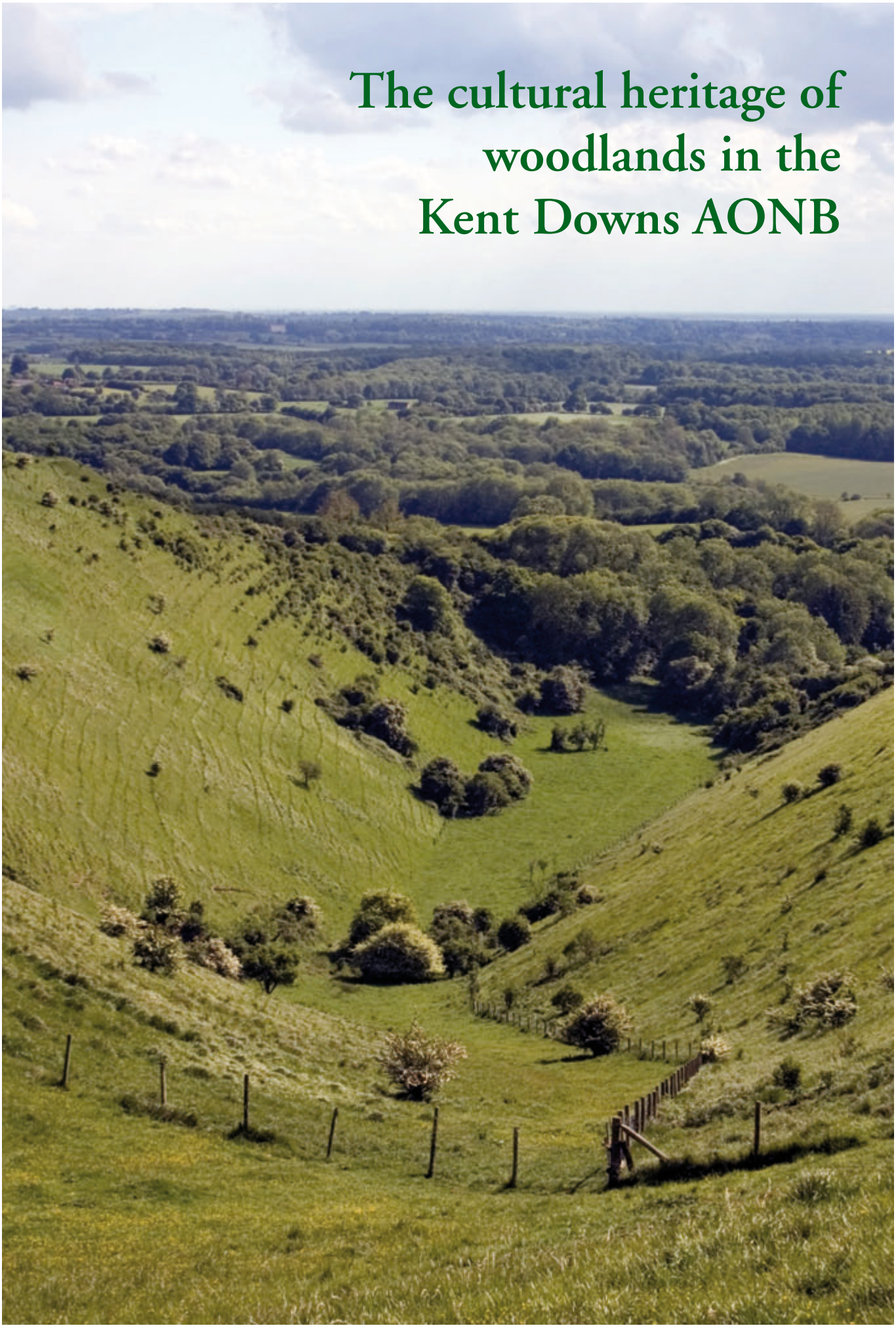
Woodlands to Visit

The High Weald AONB abounds in many sites where there is open access to woodlands and wooded landscapes, and where many archaeological features can still be seen. These areas are marked on current editions of the Ordnance Survey 1:25,000 Explorer series, such as the woods along the Forest Ridge, and at Bedgebury Forest. However, much of the public footpath network runs through coppices, gill woodland, plantations, wooded heaths, etc., enabling people to view boundary banks, hollow ways and associated features at close hand.

Footnotes

[1] Countryside Commission (1994) The High Weald Exploring the landscape of the AONB CCP466 p.11
[2] Countryside Commission (1994) The High Weald. Exploring the landscape of the AONB. CCP466 p.5
[3] High Weald AONB Management Plan 2004 : a 20 year strategy p.17
[4] Brandon, P. (2003) The Kent and Sussex Weald. Phillimore p.75
[5] Keef, P. A. M., Wymer, J. J. & Dimbleby, G. W. (1965) A Mesolithic site on Iping Common, Sussex, England. Proceedings of the Prehistoric Society, 31 pp85-92; Drewett, P., Rudling, D. & Gardiner, M. (1988) The South East to AD 1000. Longman pp.13-15
[6] Dimbleby, G. W. (1960) Appendix D. Pollen. In J. H. Money (1960) Excavations at High Rocks, Tunbridge Wells. Sussex Archaeological Collections, 98, pp.212-217
[7] Dimbleby, G. W. (1968) Pollen Analysis. In J. H. Money (1968) Excavations at an Iron Age Hillfort at High Rocks, near Tunbridge Wells, 1957-1961. Sussex Archaeological Collections, 106, pp.100-7
[8] Drewett, P., Rudling, D. & Gardiner, M. (1988) The South East to AD 1000. Longman p.29
[9] Scaife, R. G. (1987) Further evidence for the environmental impact of prehistoric cultures in Sussex from alluvial fill deposits in the eastern Rother Valley. Sussex Archaeological Collections 125 p.8
[10] ibid
[11] Margery, I. D. (1930) 'A Celtic Enclosure in Ashdown Forest'. Sussex Notes and Queries 3 pp.71-2
[12] Drewett, P., Rudling, D. & Gardiner, M. (1988) The South East to AD 1000. Longman p.160
[13] Rudling, D. (1999) Roman Sussex. In an Historical Atlas of Sussex. Ed Kim Leslie and Brian Short. Phillimore, Chichester pp.24-25
[14] Drewett, P., Rudling, D. & Gardiner, M. (1988) The South East to AD 1000. Longman p.195
[15] Cleere, H. F. (1976) Some operating parameters for Roman ironworks. Bulletin of the Institute of Archaeology 13 pp.12-13, p.238
[16] Rackham, O. (2003) Ancient Woodland. New Edition Castlepoint Press, p.108; Cleere, H. & Crossley, D. (1995) The Iron Industry of the Weald. Merton Priory Press, Cardiff. 2nd ed. p.81
[17] Roberts, G. (1999) Woodlands of Kent, Geerings pp. 93-94
[18] Bannister, N. R. (2001) Scotney Castle Estate. Unpublished Report for the National Trust
[19] Bannister, N. R. (2005) Gravetye Manor Estate. Archaeological Assessment. Unpublished Report for the William Robinson Charitable Trust

The cultural heritage of woodlands in the Kent Downs AONB



View across the Devil's Kneading Trough at Wye in the Kent Downs (Photo - PM)

The Cultural Heritage of Woodlands in the Kent Downs AONB

Description of the Kent Downs AONB
The Kent Downs AONB was designated in 1968 and covers 878 square kilometres. The AONB stretches from the Surrey and Greater London boundary in the west (and is contiguous with the chalk escarpment of the Surrey Hills AONB), to the Straits of Dover in the east. The Kent Downs AONB lies wholly in Kent (except for a small area in the London Borough of Bromley) and occupies 23% of the county [1]. Although the Kent Downs is dominated by the chalk hills, at its western end the AONB extends south into the Greensand Hills (known locally as the Chart Hills) and the Weald Clay which forms part of the river catchment area of the Medway. At the eastern end of the AONB, a small arm extends west to include the countryside which forms the backdrop to Folkestone and includes the Old Saxon Shoreway around Lympne.

Geology and Soils
The Kent Downs form the eastern half of the North Downs – a ridge of chalk forming the rim of the Wealden anticline created about 65 million years ago when the layers of chalk were laid down over a marshy plain inundated by the sea. These sedimentary layers were subsequently uplifted by earth movements which also created the Alps. The anticline or dome was raised high above sea level. Its long axis (215 kilometres) stretched from the Bas de Boulonnais in France through Kent into Surrey, Sussex and Hampshire [2]. Over the last 20 million years the Wealden dome has been eroded rather like an onion, revealing a very varied east-west banded geological structure. The oldest exposed rocks - the Hastings Beds - lie in the centre of the Weald and dominate the High Weald AONB, and the youngest lie around the outer marked by the chalk escarpment and dip slope of the Surrey Hills and Kent Downs AONBs. On the top of the North Downs escarpment are Drift deposits dominated by a capping of Clay-with-Flints, and an iron-rich sandy deposit known as the Lenham Beds.

Topography
The landform of the AONB is varied and dominated by the North Downs escarpment, with long dry valleys extending northwards along the dip slope. The Greensand or Chart Hills to the west give rise to the highest point at Toys Hill near Sevenoaks. The rivers of the Medway and the Stour have made deep breaches through the chalk hills, the latter giving rise to a lush, scenic winding valley, where from the high hills northward views reveal the spire of Canterbury Cathedral. Where the boundary of the AONB extends

Map 6. Woodland cover in the Kent Downs AONB

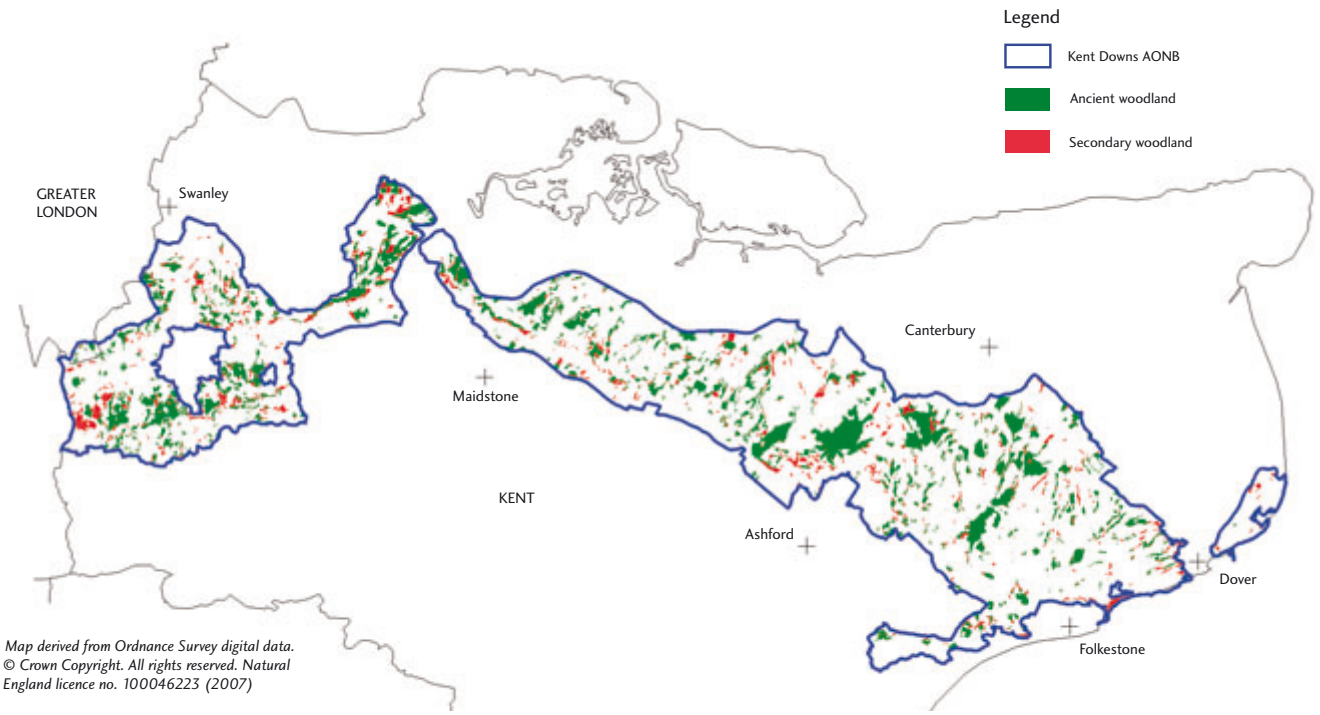


Table 2. Woodland types in the Kent Downs AONB (woodlands > 2 hectares)

Woodland type	Area (hectares)	% of AONB woodland resource
Broadleaved	7,196	47.2
Mixed	2,822	18.5
Coppice	1,839	12.1
Felled	1,073	7.0
Coniferous	941	6.2
Young trees	664	4.4
Shrub	479	3.1
Ground prepared for planting	124	0.8
Coppice-with-standards	117	0.8
Total	**15,254**	**100.0**

Source: Derived from the National Inventory of Woodland and Trees, Forestry Commission, 2000

into the Low Weald the landform is gently undulating with narrow winding streams.

Extent of woodland type and distribution

Woodland covers some 20% of the Kent Downs, of which over 70% is recognised as ancient woodland. This is 3.4% of the total national resource of ancient woodland and is the second highest (10%) area of ancient woodland in an AONB, after the High Weald [3].

Ancient woodland is identified as one of the special characteristics of the landscape of Kent Downs AONB along with the rich legacy of the historic and built heritage. There are several large areas of woodland, for example at Kingswood near Challock, Denge Wood overlooking the Stour Valley and West Wood near Lyminge, mostly owned and managed by the Forestry Commission. However, the majority of woods are in fragmented and diverse ownership.

Woodland Landscape Character

The woodland character of the Kent Downs is determined by the geology, with the claylands dominated by ash, hornbeam and oak in small woods and narrow shaws. The chalk hills support ash, beech and yew in both large and small woodlands linked by woody shaws. Oak and hornbeam also occur on the chalk hills where there is a covering of Clay-with-Flints. The sandstone hills have oak, birch and beech in larger tracts of woodland often colonising areas of former commons and heaths. Large blocks of plantation, mostly conifer woodland planted in the early part of the 20th century, occur in the eastern part of the AONB.

Bluebells under chestnut coppice with oak standards at Kings Wood in the Kent Downs (photo - PM)

The greatest concentration of woodland is on the Greensand Ridge, where there is a mix of both ancient woodlands and also secondary woods on former heathland. Along the chalk escarpment, large tracts clothe the hill tops and overlook the Stour valley at Challock, Kings Wood, and Denge Wood, with further areas over the East Kent Plateau.

A characteristic feature of much of the dip slope of the chalk hills are the narrow shaws or shaves. These are generally narrow strips of woodland bounding the margins of fields, some of which show characteristics of an ancient woodland origin whilst others are woodland encroachment on to former cultivated ground.

Introduction

The woodlands on the North Downs preserve evidence of thousands of years of human activity on the chalk and sandstone hills. Evidence occurs in the form of earthworks, monuments, place names, the consequence of farming and settlement but also ritual practices, many of which survive deep in woodland.

The Prehistoric Legacy

There is a growing body of environmental evidence supporting the prehistoric clearance of 'wild wood' from the Downs. The idea of a dense, unbroken swathe of woodland covering the whole of the early prehistoric landscape has been replaced by the concept of a more open 'wood-pasture' type woodland created and maintained by large and smaller grazing and browsing herbivores [4]. The process of clearance was possibly initially one of extending and creating glades to attract wild herbivores to pasture in order to hunt them, then exploiting the open areas for farming – cultivation and stock rearing – and for settlement.

The evidence for prehistoric land use has been found either from buried head deposits in coombes and valleys, or from ancient soils preserved beneath prehistoric monuments.

Two important sites are firstly, Brook near Ashford, where cores taken from hill wash in the "Devil's

Kneading Trough" (see title page photograph at the beginning of this section) revealed evidence for a former predominantly wooded environment, with birch, yew and other hardwoods [5]. Some open ground was also present. However, by circa 300 - 500 BC the land was open grassland, with the shells of snails introduced by the Romans appearing towards the top of the core. The second site is nearby "Juliberries Grave", in the Stour Valley. This is a Neolithic long barrow, one of several in this part of the Kent Downs. The ancient soil beneath the burial mound revealed an assemblage of molluscs which once lived in a more open environment rather than a woodland, indicating that the barrow was constructed in open ground [6]. This process of clearance is also recorded at Wingham and Frogholt towards the eastern end of the Kent Downs, where pollen evidence from the valley soils show that woodland clearance on the adjacent Downs had taken place by the Early Bronze Age [7]. Beech then as now formed part of the woodland canopy. By contrast, in the western part of the Kent Downs woodland was still covering much of the area.

At Caesar's Camp at Keston, pollen from the soil profile indicated that the camp had been constructed (c. 300 - 150 BC) in dense oak woodland [8]. Squerryes Hill Fort, on the Chart Hills at Westerham, preserved evidence from ancient soils which indicated a high forest intermixed with cultivation and also scrub woodland at the time of its construction (c. 150 BC - AD 43). This suggests that areas of arable were possibly reverting to scrub as the sandy soils became impoverished through continuous cultivation [9]. However, the role of grazing herbivores, both wild and domesticated in keeping tree growth suppressed and maintaining open areas should not be underestimated.

It is possible that some woods on the Downs and Chart Hills today preserve evidence of former prehistoric fields, especially near to known prehistoric burial mounds. Low linear boundaries formed by lines of flints have been recorded in an ancient woodland site, Trundle Wood near Wormshill, and at Hucking [10]. Similar features have been recorded in Surrey and are closely associated with prehistoric finds and other field monuments [11].

On the top of the Downs escarpment are drift deposits - the Lenham Beds - which are rich in iron. These deposits appear to have been exploited in the Iron Age as a source of ore. Irregular shallow diggings and quarrying indicate this activity, for example at Hucking in the wooded shaws bounding a hollow way running up the scarp from the vale below, and also further east at Wye near the prehistoric enclosure and chalk hill figure of the 'The Crown' [12]. It is probable that further evidence of such diggings may be found in woods along the crest of the chalk escarpment.

The Kent Downs has a rich legacy of Neolithic monuments and sites such as the megalithic long barrows overlooking the Medway Gap on Bluebell Hill. There are also earthern long barrows located in the Stour Valley. Juliberries Grave has already been mentioned; another long barrow lies well preserved in woodland on the edge of Kings Wood near Boughton Aluph. More frequent in the landscape are the round burial mounds erected during the Bronze Age (c. 2,000 - 1,000 BC). These were earthern mounds erected over one or more cremations and/or inhumations. Burial mounds were often located on high open ground or in prominent positions, many of which have now become covered in woodland. Examples of prehistoric round barrows are well preserved in Kings Wood, near Challock and Iffen Wood, near Chartham, and there are some fine examples in West Wood, near Lyminge. Such earthworks are rarely found in isolation and there may be additional burials close by which were not covered by a mound.

"Julieberries Grave", a neolithic long barrow near Chilham in the Kent Downs. The earthern and turf covered chalk structure is 44 metres long, 15 metres wide, and 2.5 metres high. It is the only long barrow in Kent without a stone burial chamber. (photo - PM)

Hill forts date from the Iron Age c. 600 BC to AD 43. These are large enclosures, occupying high ground, surrounded by one (univallate) or more (multivallate) earthern ramparts. Bigbury hill fort overlooking the Stour Gap near Canterbury is partly covered by woods and is where Caesar in 54 BC with his Seventh Legion reputedly attacked the British [13]. Oldbury Camp, near Ightham and Squerryes

Bronze Age round barrow at Eggringe Wood in the Kent Downs (photo - PM)

Hill fort near Westerham are located on the Chart Hills overlooking the Weald and form the eastern end of a chain of hill forts on the Greensand stretching from Hascombe in West Surrey. The fact that these hill forts now lie in woodland is probably due to the uneven ground and poorer soils of the land - the sites would have come to be managed as a heath or common, and then become wooded in the 20th century as the land was considered only suitable for growing trees.

Hill forts, together with many burial mounds of all periods and most other extant prehistoric sites are recognised to be of national importance and are thus protected by scheduling [14] (see Guidelines for Preserving Cultural Features in Woodlands section).

Medieval Woodlands

It is very probable that there was an ebb and flow in the coverage of woodland across the Kent Downs throughout the prehistoric and Roman period. After the collapse of the Roman administration, the native population of Romanised Britons probably reverted to aspects of the late Iron Age method of land management.

The early medieval period probably saw the enclosure of woodland specifically for the production of wood products. Enclosure in the form of banks and with live hedges and 'dead' hedges (hurdles), meant that the regeneration of coppice stools could take place without damage by grazing stock. This need to enclose and define woodland was also probably driven by the spread of settlement and the division of land into ever smaller divisions and territories. It is at this time that parishes began to evolve as formal territories, allowing the church to exert its pastoral care over land and settlements from which tithe could be claimed. Thus, wood banks enclosing ancient woodland and parish boundaries in both ancient and recent woodland are likely to be medieval in origin. As the better soils were cleared, woodlands were confined to the margins of parish and manorial territories, often abutting or straddling these boundaries.

Territorial earthworks such as manor, parish and hundred boundaries generally tend to be quite large in size (at least several metres wide), with more often a rounded profile to the bank and with one or possibly two ditches associated with them. On the chalk hills, where the ground is often steeply sloping this boundary may take the form of a large step or lynchet. The alignment of the earthwork may also tend to be sinuous, rather than straight.

The Downland was essentially a wooded and 'wood-pasture' landscape, which was being cleared in the early medieval period for pastoral farms, formerly seasonal holdings linked to farmsteads in the Vale of Holmesdale or on the North Kent Plain [15]. 19th and 20th century field rationalisation combined with grubbing of smaller woods removed much of the woodland/ farmland patchwork, which originated in the medieval period. The countryside around Hucking, however, still retains this wooded character.

Many of the place names in the Downlands have their origins in the early medieval period, and their meanings indicate a wooded and pastoral country, where farms were carved from woods for rearing stock and many woods were used as wood-pasture. Such names are those originating from 'stock' or 'vaccary', 'hay', meaning enclosure for pasture; 'den', the woodland swine pasture, and 'lees' and 'minnis', intercommonable woodland pasture on parish boundaries [16].

A rare feature sometimes found within woodlands are small, earth banked stock enclosures. They may have been used as a small pound to hold stock over night. The enclosures appear rectangular and are enclosed by

a large bank and ditch with the latter on the outside of the enclosure. One such enclosure is located in sweet chestnut coppice at Wormshill.

The remaining woodland was in all probability traditionally managed as coppice or coppice-with-standards enclosed by laid hedges on wood banks or lynchets (see below). The small farmsteads needed timber and underwood, not just for fuel, but also for fencing. Hazel coppice makes very good hurdles, tools and equipment, and building material, especially 'wattles', the framework on to which 'daub', a clay and straw mixture was adhered to create walls and infilling of partitions in timber-framed buildings.

Many field and wood boundaries on the chalk comprise a step-like earthwork known as a 'lynchet' (see Figure 4, page 51). These can form at any time on sloping ground by the down slope movement of soil. As the soil accumulates it preserves in stratified deposits small artefacts such as pot sherds. It is possible that some of these boundary lynchets may have prehistoric origins. The characteristic shaws and shaves on the chalk hills are often accompanied by one or more lynchets suggesting that the woodland has encroached on to former cultivated land and has since been actively managed by coppicing. More field work and detailed research is needed on woodland boundary earthworks of all types and not just lynchets in order to ascertain their origins and function, and to place the boundaries within their landscape context.

A feature of this Downland landscape are the small, winding lanes or hollow ways which run up the scarp slope from the Vale of Holmesdale and across the chalk hills towards the North Kent Plain. In some places where the ground is sloping, the lanes have worn into deep hollow ways bounded on either side by knarled and twisted yew and beech trees. The medieval character of these former drove ways can easily be appreciated where they run through woodland and wooded shaws, forming dark tunnels.

Post-medieval Woodlands

By far the majority of cultural features found within and associated with woods are likely to date from the post-medieval and modern period. Unlike the rich prehistoric legacy which survives on the South Downs, the North Downs, due to the extensive covering of drift – Clay-with-Flints – have many more woodlands surviving into the post-medieval period. The conversion of the upland fields to extensive sheep walks did not occur to the same extent as it did on the South Downs. However, stock were pastured on areas of downland turf and like the South Downs provision of a water supply was necessary.

On the chalk hills, water was a scarce commodity, with springs, winterbourne streams, and wells being the main supply. However, artificial ponds or dew ponds were constructed for stock. An impervious liner made of layers of puddled clay, straw and crushed chalk was laid down in a circular depression and water obtained from precipitation. Where scrub and woodland has spread on to former pasture these ponds now lie hidden in the undergrowth, their clay seals broken by tree roots. John Boys, a local farmer, recorded in the late 18th and early part of the 19th century that "*the fences* (or boundaries) *in the uplands consist of old hedges, such as Nature has formed; quickset hedges raised from berries of whitethorn, and dead hedges, made from the spare bushes from old hedges-rows*" [17]. He suggests that the 'old hedges' were cut down from ten to twenty years and the fences made anew. This suggests that the 'old hedges' correspond to the shaws or shaves which were coppiced and then made stock proof again by either laying shrubs or erecting a bound 'dead' hedge.

Banks of a medieval enclosure at Denge Wood in the Kent Downs (photo - PM)

Woodlands and Industry

On the chalk hills, archaeological features associated with industrial processes are dominated by numerous chalk pits, dene holes and flint quarries. These are of varying size and density. Chalk was dug as a source of building material called 'clunch', but mostly for burning and turning into lime. This was used in mortar for building, as lime wash for painting and sealing walls, and as an improver for clayey soils. In the late 19th century chalk was then used as lime in cement and the large chalk quarries in the Medway valley are the result of modern intensive industrial exploitation. However, elsewhere the chalk quarries are much smaller, as at

Wye. Also associated with them are lime kilns, where the chalk was heated up and turned to lime. Kilns were built of local stone and brick and generally comprised one hearth, fed with chalk from the top.

Lime kilns were built by many farmers, who needed lime to improve soils. The kilns were located close to the wood fuel and where possible, the chalk. But as the finished product, lime, or rather 'quick-lime' was inherently unstable, transporting it long distances was not a sensible option and thus the raw chalk was generally transported instead.

Another way of extracting chalk was by the digging of 'chalk wells' or dene holes. These were shafts dug into the chalk about 10 metres deep, with chambers at the bottom radiating outwards, often in a 'clover leaf' pattern. The chalk diggers were after unpolluted or undegraded chalk with which to spread on fields to 'sweeten' and improve soils. There were two main periods of 'dene hole' digging. The first was in the 13th and 14th centuries, coming to an end with the 'Black Death' [18]. These holes had narrow shafts with foot holes dug into the walls, so avoiding the need for ladders. The second period began in the 17th century, when a further expansion of farmland took place. Where woods had been cleared from heavier clayey soils, chalk was added to improve drainage and aid in the fragmentation of clumps. The deneholes were located close to field boundaries or within woodland edges so that they did not interfere with cultivations. These later deneholes had wider shafts. Evidently deneholes were still being dug into the early part of the 20th century. Once a hole had been sufficiently mined out, the top of the shaft was sealed in one of several ways. A tree or bush could be thrown in, which lodged part way down, with the remainder of the shaft then backfilled. Alternatively, a brick dome or cap was constructed over the shaft and then the remainder backfilled. Today, deneholes appear as circular depressions of varying depths, with diameters of between 3 and 5 metres. However, the capping can fail and deneholes appear dramatically when the seal falls in [19].

Deneholes provide very valuable habitats for bats as hibernation and maternity roosts. The Kent Underground Research Group (KURG) has successfully explored, recorded and sealed with metal frames numerous deneholes as habitats for bats (see Useful Contacts section). There are examples of capped deneholes at Hucking and at Iffen.

Flint, a hard grey stone made from silica is found in the Upper Chalk in nodules, layers or tabular sheets. When it is first quarried from the ground it can be worked easily but hardens off in contact with air. Flint was first used by humans for tools; the technique of 'knapping'

Denehole in woodland near Hucking in the Kent Downs (photo - PM)

- striking a flint core in various ways to fashion a 'blade' or cutting tool - reached its perfection with the delicate scrapers, burins and blades of the Mesolithic period. The use of flint for tools declined with the development of metal working. However, flint was still knapped in the medieval and post-medieval period, to make building material, flints with smooth surfaces to face buildings and also as 'flints' used for striking guns and tinder. As a hard wearing stone it was also favoured for 'metalling' roads. Surface collection of flints from the downland soils was a hard job and often undertaken by women and children. Small flint quarries are a very common feature of woods and shaws on the chalk hills. They appear as irregular depressions of varying sizes, some of which are dug into the natural slope, following the line of a flint deposit.

Management of Coppice

A picture of how coppice was cut and to what uses the poles were put is given in John Boys' 'General Account of Agriculture in Kent', published in 1795 [20]. It is clear that little wood was wasted, with all going for different markets and uses. The standing coppice was sold to a purchaser by the landowner and once the leaves had fallen, the workmen employed by the purchaser were allocated their places in the wood.

Hurdle rods cut from coppice (photo - PM)

The shrub and small growth around the stools (called stocks) was cut back first. The material was made into 'winter kiln bavins' and tied with two wists (or bands). Measuring 6 feet long and 2 feet in diameter at the wists, the bavins were sold in the wood for 6 shillings per hundred. Once the stocks were cleared they were cut down and the poles thrown into 'ranges' wide enough to allow a team (of horses) to pass. As the poles were cut they were sorted or graded into the following:

First Best Poles - chestnut, ash, willow, maple of 18 feet.
Second Best Poles - as above but 15 to 16 feet long.
First Ordinary Poles - oak, gascoign (i.e. cherry), red birch, beech, and hornbeam (the latter two inferior wood) of 17 to 18 feet.
Second Ordinary Poles - as above, 15 to 16 feet.
Use-poles - ash, chestnut, willow oak, asp and gascoign which were too large for hop poles.
Stakes and binders (for hedge laying) - hazel, ash, oak, willow and maple bound in bundles of 25 each. A stake measured 5 feet and a binder 15 to 18 feet.
Thatching rods - these were cut from the same as stakes but were lengths not suitable for either of the above. They were bound up in bundles of 50 measuring 6 feet long.
Austry rods were used to bind billet wood for the London market - cut from hazel and bound in bundles of 100 with a length of 5 feet.
Hurdle rods were cut from hazel to make hurdle gates for folding sheep and smaller binders measuring 5 feet and made into bundles of 100 rods.
Wheel-timber was cut from large beech of two or three falls' (coppice rotation) growth. It was used in making the fellies for wheels and was not less than 7 inches in diameter at the narrowest end. It was cut into 3 foot lengths for a penny. Smaller wood was cut for axle trees, plough cheps and wrests.
Piles - cut out of hornbeam and beech and used to prevent the tide washing away chalk at the foot of the sea walls. Cut at varying lengths.
Props were, according to the author, used in the coal mines in Newcastle and cut from oak and birch at 6 feet 4 to 5 inches long. One would imagine that the coal fields in East Kent would also have demanded a ready supply of pit props as well.

In the spring what was left in the ranges was made up into 'summer kiln bavins' of 6 feet in length and bound with two withies. These were usually the smallest wood. 'Household bavins' were 6 feet long and two feet over the band. The remainder was cut into cord wood three and half feet long, with the length of the cord 14 feet and stacked 3 feet high.

Replacement of decaying stocks or stools was either undertaken by planting with nursery grown stock or by a technique called 'layering' where a stem was bent over and pegged into a previously dug hole which was back filled with top soil. The branch then rooted and a new stock was established.

Sweet Chestnut Coppice and the Hop Industry

From the 1650's Kent had about a third of England's hop acreage, with hop grounds increasing throughout the 17th century, especially around Maidstone, Canterbury and Faversham. In 1867, the acreage was 40,762 reaching a peak of 46,600 in 1878, producing 65% of the national output. By 1897, the acreage declined to 31,661 and thereon downwards due to foreign competition, lower prices and a shift to light beers, which required fewer hops [21].

Hop bines needed a framework to grow up. Initially, three or four poles were erected like a wigwam over a growing 'hill'. The number of 'hills' per acre varied with ground conditions, and thus so did the number of poles, ranging from 2,000 to 3,600 per acre. The cost of poles was second only to the labour bill (excluding hop duty tax) to a hop grower. During the period 1835 to 1878 it was probable that over sixty million poles were needed for the new hop gardens. Every six years all poles needed to be replaced as they rotted out. It is estimated that 60,000 acres of coppiced woodland were needed to supply the industry at this time [22].

In 1795, John Boys of Betteshanger wrote in his review

to the Board of Agriculture that the woods of the eastern part of Kent, between Watling Street and the North Downs Scarp slope, supplied the country with fire wood, tillers for husbandry uses, and timber of the dockyards, but by far the greatest product was the immense quantity of hop poles [23]. They were not only used in the immediate locality but transported as far as Maidstone [24]. Originally, hop poles came from oak and alder coppice, however, such was the demand and need for clean, straight poles, that sweet or Spanish chestnut was preferred due to several factors. The species grows well on poor soils but not heavy ones, and has little sap wood so it does not rot so readily. Its fibrous strength also meant that tall but slimmer poles could be grown around which the bine could climb more readily [25]. Woodland owners quickly grubbed up the old oak, hazel, hornbeam coppice and replaced it with sweet chestnut. They also planted up areas of poorer agrarian fields to chestnut.

There are numerous sweet chestnut coppice woods across the Kent Downs, some of which are still actively managed as chestnut makes good fencing (post and rail, and paling). Around the margins of these coppices and in the more inaccessible areas, evidence of the former oak, hazel, birch, ash and hornbeam coppice woodland may still survive.

Also expanding in acreage at this time were the fruit orchards, sometimes intermixed and in rotation with the hop gardens. In 1872 there were over 11,000 acres of orchards, which doubled to 25,050 acres, with a further 20,080 acres of soft fruit [26]. As with hops, underwood was needed for fencing, stakes, ladders, and other tools.

By the beginning of the 20th century the hop industry was in decline and with changes in the way of growing hops, using a system of fixed poles, wires and strings (up which the bine grew) the demand for chestnut poles was also severely reduced. However, many of the newly planted chestnut coppices were becoming well established.

Landscape 'Gentrification'

The 18th and 19th centuries saw changes in woodlands, not just from a purely commercial aspect but also for aesthetic and recreational reasons. The creation of formal landscapes around large and smaller country houses saw the planting of specimen trees, shelter belts, roundels and other formal plantations. In addition, game - especially pheasant shooting - was seen not only as recreation but also a valuable form of income (especially as the coppice market was in serious decline) and woodland cover was developed as habitat for this non-native bird.

Formal parkscapes occur in considerable number in the eastern part of the Kent Downs, for example at Goodnestone (pronounced 'Gunston'), Waldershare and Fredville. Many of the plantation woodlands often preserve former field boundaries and routeways. Godmersham Park in the Stour Valley, formerly the home of Jane Austin's brother Edward, has the sinuous edge of the Kings Wood as its backdrop. The smaller woods in the park itself preserve traces of a prehistoric field system (c. 600 BC to 1st century AD), which once extended across the whole of the dry valley in which Godmersham Park is situated.

Military Features

Woodlands played a crucial role during the two World Wars, not only as a supply of timber and underwood, but also as screens and cover for ammunition stores, hideaways for the secret army of saboteurs trained up in the event of invasion.

Two First World War 'stop lines' traverse the Kent Downs, one at Maidstone, from Detling to the Swale, the other North from Fort Halstead to Dartford. Anti-tank and other defences were erected along it. The valley behind Godmersham Park hid the moorings for an airship, which in the Second World War became the site of a Resistance Army Bunker. Today, a large rectangular depression lies in open scrub and woodland marking this site.

Deer leap at Godmersham Park in the Kent Downs, lying between the park boundary and Kings Wood. The leap is 1.5 metres high, and its ditch, on the park side, is 1.5 metres wide. (photo - PM)

Second World War defence lines included a line from Dover, past Canterbury to Whitstable, the Royal Military Canal, and the River Medway. At Goodnestone, evidence for one of these lines survives as former slit trenches in a pocket of woodland close to a couple of pill boxes. The remains of bomb craters are frequently found in woods. These are circular depressions, not unlike deneholes, but without the evidence of spoil and diggings.

Management issues and threats concerning the cultural heritage of woods

The main issue concerning the cultural heritage of woodland and the long term conservation of woods in the Kent Downs is the cessation of traditional coppice management due to a lack of demand for woodland and coppice products. The Kent Downs AONB Management Plan lists the main issues and threats to woodlands and trees [27]. All those identified can have an impact on the cultural and archaeological value of woodlands.

Fragmentation of Ownership

The motivation of woodland owners is not fully understood and increased fragmentation in ownership of woods, especially the smaller ones means that many woods are being inappropriately managed or not managed at all, leading to a decline in biodiversity and damage to the archaeological resource.

Lack of understanding of wood and tree care

Other non-woodland activities which are introduced into woodland can have a negative effect on the cultural resource, especially as owners and managers may not be aware of the impact. Game bird shooting, whilst providing a valuable income to many woodland owners, is often intensely managed, resulting in physical damage to earthworks and veteran trees. Use of woods as extensions to gardens, particularly where farmsteads are being developed into residential dwellings can also have a negative impact.

Policies for enhancement of conservation of the woodland cultural resource

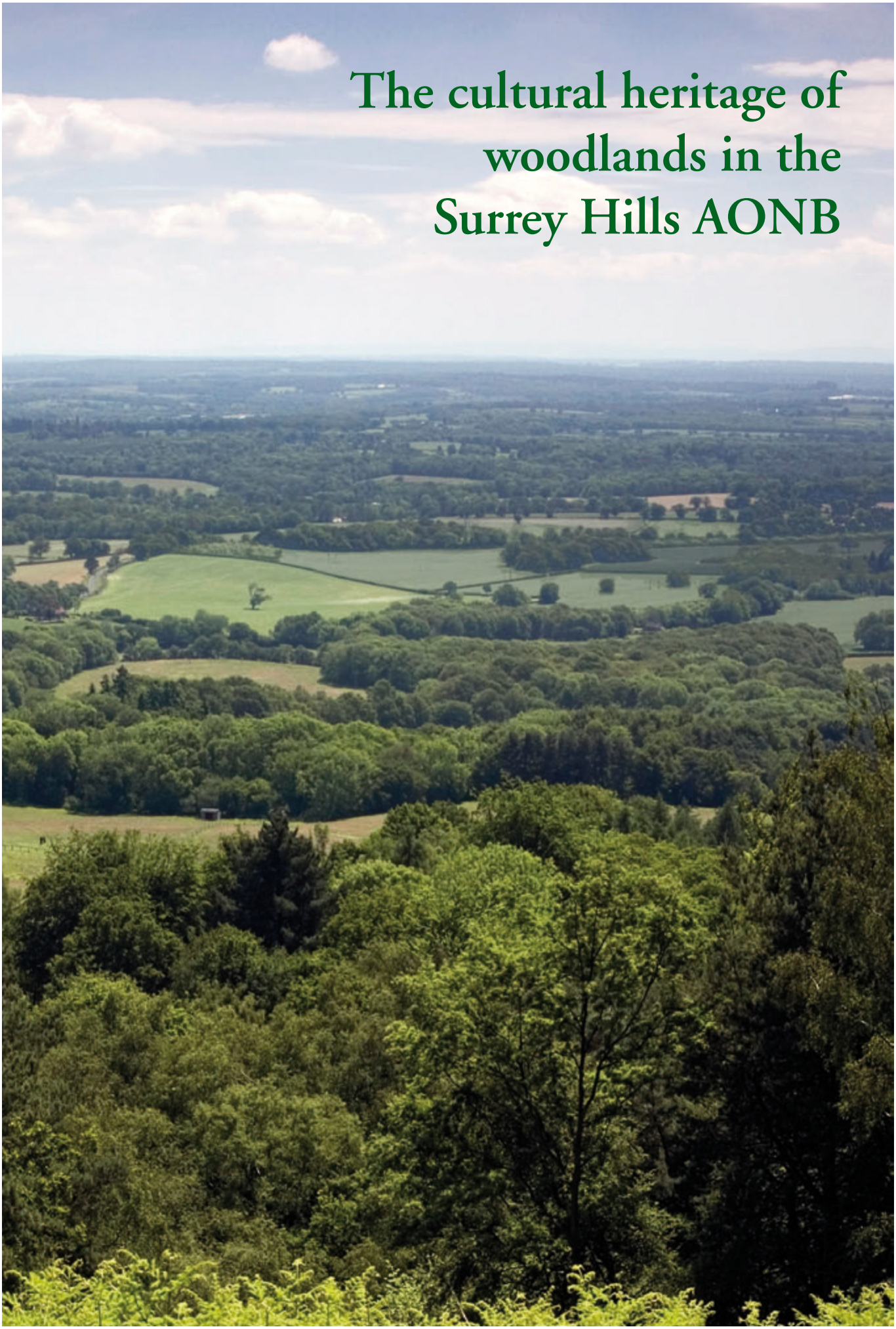
These are taken from the policies set out in the Kent Downs AONB Management Plan 2004-2009:

- Creation and promotion of new markets for woodland products, working within the Forestry Certification Scheme for sustainable management of woodland.
- Establishment of supply chains and a network for small woodland owners in order to address economies of scale.
- Education of owners, especially new owners and small wood owners on the cultural importance of woodland [28].
- Education of woodland managers, game managers [29], and coppice workers on the cultural importance of the AONB's woods, including the role played by veteran trees in woods and in the landscape as a whole.
- Replanting with local provenance species, with natural regeneration, and with due regard for the landscape character of woods within the vicinity [30].

Footnotes

[1] Kent Downs AONB (2004) A management plan for 2004-2009, p.10
[2] Countryside Commission (1998) The Surrey Hills Landscape, CCP 530 p.9
[3] Kent Downs AONB (2004) A management plan for 2004-2009, p.37
[4] Vera, F. W. M. (2001) Grazing Ecology and Forest History, CABI Publishing
[5] Kerney, M. P., Braun, E.H. & Chandler, T.J. (1964) The Late-Glacial and Post-Glacial history of the Chalk Escarpement, near Brook, Kent. Phil. Transactions Royal Society, London, B248; Watt, T. A. & Chapman, G. P. (1994) The Natural History of a Country Estate: Wye College, Kent. Wye College Press, pp.48-51
[6] Evans, J. G. (1975) The Environment of Man in the British Isles, London p.120
[7] Godwin, H. (1962) Vegetational history of the Kentish chalk downs as seen at Wingham and Frogholt. Veröff. Geobot. Inst., Zürich 37, pp.83-99
[8] Dimbleby, G. W. (1969) Report on Pollen Analysis, N. Percy-Fox, Caeser's Camp, Keston, Archaeologia Cantiana 84, 196
[9] Dimbleby, G.W. (1970) Pollen Analysis. In N. Percy-Fox (1970) The Iron Age Camp at Squerryes, Westerham. Archaeologia Cantiana pp.32-33
[10] Bannister, N. R. (1992) Historic Landscape Survey, Wormshill Estate near Sittingbourne. Unpublished report for English Heritage;
Bannister, N. R. (1998) Archaeological Assessment of the Hucking Estate. Unpublished Report for the Woodland Trust
[11] Bannister, N. R. (2002) Archaeological Assessment of Marden Park. Unpublished Report for the Woodland Trust
[12] Cleere, H. & Crossley, D. (1995) The Iron Industry of the Weald. Merton Priory Press p.15; Bannister, N. R. (1995) Wye College Estate, Historic Landscape Survey. Unpublished Report for English Heritage Vol. 1 p.32; Bannister, N.R. (1998) Archaeological Assessment of the Hucking Estate. Unpublished Report for the Woodland Trust, pp.28, 42
[13] Ashbee, (2006) Kent in Prehistoric Times, Tempus pp.160, 189
[14] Ancient Monuments and Archaeological Areas Act 1979
[15] Everitt, A. (1987) Continuity and Colonisation; the evolution of Kentish Settlement p142-143. University of Leicester
[16] ibid
[17] John Boys (1795) A General View of the Agriculture of the County of Kent p.61
[18] Le Gear, R. F. (1992) The Bexley Deneholes. Bexley Libraries and Museums
[19] ibid
[20] John Boys (1795) A General View of the Agriculture of the County of Kent pp.138-141
[21] Lawson, T. & Killingray, D. (2004) An Historical Atlas of Kent, Phillimore, p.109-110
[22] Roberts, G. (1999) Woodlands of Kent, Geerings. pp.135-138
[23] Roberts, ibid p.136; John Boys (1795) A General View of the Agriculture of the County of Kent
[24] John Boys ibid p.137
[25] ibid p.136
[26] Lawson, T. & Killingray, D. (2004) An Historical Atlas of Kent, Phillimore, p.108
[27] Kent Downs AONB (2004) A Management Plan for 2004-2009. Kent Downs AONB
[28] Forestry Commission (2003) So, you own a woodland? Getting to know your wood and looking after it. Forestry Commission, Alice Holt
[29] Game Conservancy (2003) Woodland Conservation and Pheasants
[30] Kent Downs AONB (2005) Kent Downs AONB Landscape Design Handbook. Kent Downs AONB

The cultural heritage of woodlands in the Surrey Hills AONB



View across the Weald from Leith Hill in the Surrey Hills (Photo - PM)

The Cultural Heritage of Woodlands in the Surrey Hills AONB

Description of the Surrey Hills AONB

The Surrey Hills AONB was designated in 1958 and covers 42,210 hectares (25%) of the county of Surrey [1]. It stretches from the county boundary with Kent in the east, where it meets the Kent Downs AONB, to the county boundary with Hampshire in the west. The hills themselves comprise the North Downs chalk escarpment and the Greensand outcrops of the Weald. These uplands are cut through by the river valleys of the Mole, Wey and Tillingbourne [2]. The AONB is a richly textured, diverse and dramatic landscape, modified and managed by human intervention over thousands of years.

Geology and Soils

The Surrey Hills comprises part of the Wealden anticline created about 65 million years ago when the layers of sedimentary rock (laid down in a marshy plain inundated by the sea) were uplifted by earth movements which also created the Alps. The anticline or dome was raised high above sea level. Its long axis (215 kilometres) stretched from the Bas de Boulonnais in France through Kent into Surrey, Sussex and Hampshire [3]. Over the following 20 million years the dome has been eroded rather like an onion, revealing a very varied geological structure. The oldest exposed rocks lie in the centre of the Weald and dominate the High Weald AONB. The youngest lie around the outer edge of the Weald in the Thames valley and North Kent Plain. The Surrey Hills comprise the outcrops of the relatively harder rock of the western half of the chalk ridge and the sandstones of the Greensand deposit. Drift deposits in the Surrey Hills are confined to alluvium in the river valleys and the capping of Clay-with-Flints in the Downs.

Topography

The differential erosion of the sedimentary rocks has produced a striking and dramatic landscape. The North Downs escarpment dominates the Surrey Hills, running from Farnham and the Hogs Back in the west, above Guildford, Dorking and Reigate, towards Oxted in the east, where it continues as the Kent Downs. South of the chalk escarpment are the Greensand Hills with the dramatic 'Devil's Punchbowl' at Hindhead, and the high hills at Leith and Blackdown. Geologically, these are the continuation westward of the Chart Hills in Kent. Between the two hills running east from Guildford is the Tillingbourne Valley, a part of the Vale of Hollingbourne which continues into Kent, towards Ashford and thence to Folkestone. The valleys of the Wey and Mole cut through the Surrey Hills on their way north to the

Map 7. Woodland cover in the Surrey Hills AONB

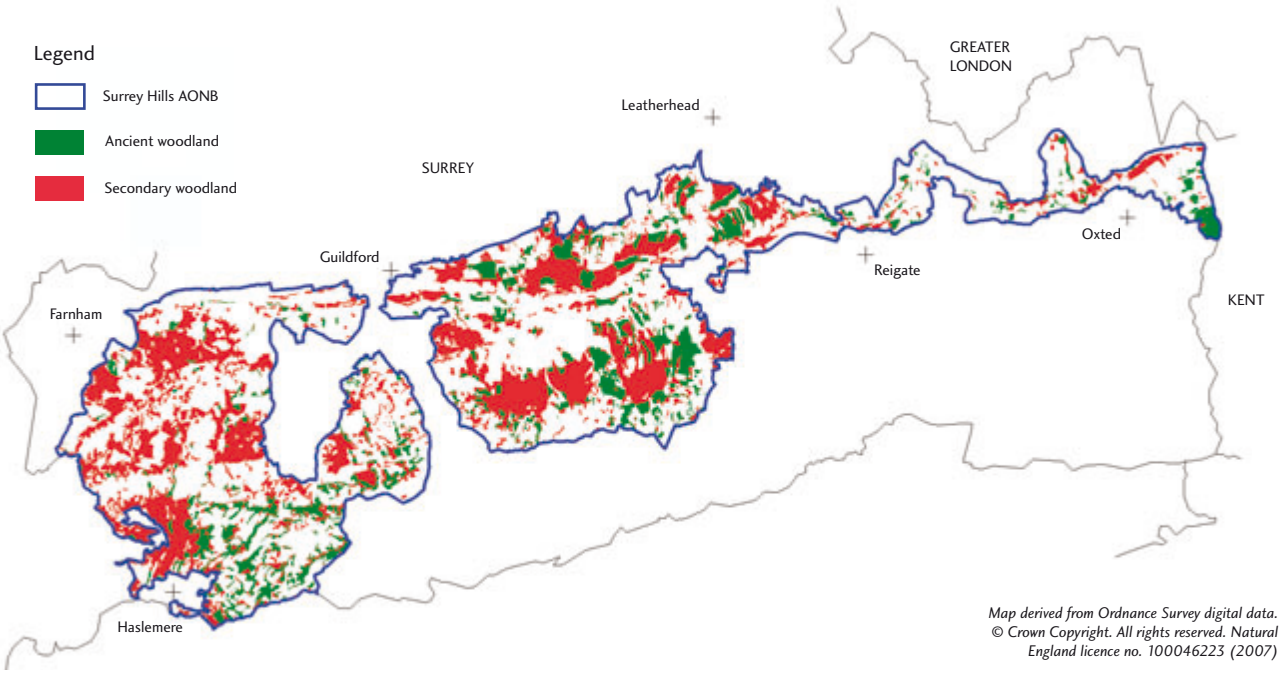


Table 3. Woodland types in the Surrey Hills AONB (woodlands > 2 hectares)

Woodland type	Area (hectares)	% of AONB woodland resource
Broadleaved	6,612	40.3
Coniferous	3,562	21.7
Coppice	344	2.1
Felled	1,138	6.9
Ground prepared for planting	41	0.3
Mixed	4,229	25.8
Shrub	170	1.0
Young trees	313	1.9
Total	**16,410**	**100.0**

Source: Derived from the National Inventory of Woodland and Trees, Forestry Commission, 2000

River Thames. The southern edge of the Surrey Hills is marked by the northern edge of the Low Weald, a gently undulating landscape with dense coverage of woodland and trees [4].

Extent of woodland type and distribution

The Surrey Hills is one of the most wooded AONBs, with almost 40% of its area covered by woodland. Ancient woodland covers nearly 12% of the AONB area [5], and internationally important yew and box woods survive on the North Downs at Box Hill, designated a Special Area of Conservation. The clayey soils in the Low Weald are dominated by woods of ash, hornbeam and oak. The chalk hills support woods dominated by ash, beech and yew, and the sandy soils on the Greensand have oak, birch and Scots pine. Many of these woods were once managed by coppicing, but actively coppiced woods now only contribute to about 2% of the woodland cover (see Table 3, above). As a management type, coppice has been neglected for many years resulting in a loss of landscape character, biodiversity and historic interest [6].

The decline in traditional methods of managing the farmed countryside such as grazing of downs, commons and heaths has also led to an increase in the amount of secondary woodland and scrub developing on previously open landscape. Thus the overall character of woodland in the Surrey Hills has altered considerably since the beginning of the 20th century, with high forest, mature plantations and overmature coppice leading to dense, often impenetrable woodland. This, together with the dense scrubbing over of once open land such as downland and heaths has contributed to the heavily wooded nature of the landscape.

Woodland Landscape Character

Woodland is the defining feature of the Surrey Hills. The Low Weald is characterised by ancient woodland comprising extensive networks of sinuous gills, small woods and shaws, akin in part to areas of the High Weald AONB. In addition, modern plantations of conifers are sometimes intermixed with ancient woods.

The Greensand Hills have some of the largest extents of wood managed as high forest covering former commons, as at Hurtwood and Leith Hill, and to the west around Farnham. Associated with these commons are smaller enclosed woods of ancient origin.

On the chalk hills are again large tracts of 18th and 19th century forest plantations as at Netley and Ranmore. Further east the chalk is characterised by narrow shaws and extensive areas of scrub. Yew and box woods are a characteristic element of the landscape around the Mole Gap at Mickleham. These woods were once more extensive across the Downs escarpment, but grazing and cultivation have now reduced them to localised habitats.

Wotton, in the Tillingbourne valley, which runs through the Surrey Hills, was the home of John Evelyn. He was one of the first people in the 17th century to look at woods and their management in a professional manner. The wooded hills and designed landscape at Wotton were partly the inspiration for his book 'Sylva or a Discourse of Forest-trees', first published in 1664. John Evelyn came from a family who had made their money out of, amongst other things, gun powder. The works in the Tillingbourne valley were set up by the Evelyns and the kilns consumed vast quantities of wood, not just for fuel and construction but also for charcoal to make the gun

Beech, yew, and ash woodland at Box Hill, near Dorking in the Surrey Hills (Photo - PM)

View from Box Hill in the Surrey Hills towards the Weald (Photo - PM)

powder with. Evelyn alludes to the intensive cutting of the underwood for the gun powder works influencing the diversity and quality of the woods.

Other large historic landowners in the locality include the Bray Family who own the Shere Estate and who also in the past managed adjacent estates such as Albury on behalf of their owners. The vast conifer woods covering the Hurtwood are forestry managed self-sown Scots pine and other coniferous species.

Introduction

The Surrey Hills is essentially a landscape of 'margins'; it lies on the margin or edges of the Weald proper – a ring of hills overlooking the Low and High Weald. The hills themselves comprise poorer upland soils, which were utilised as land 'marginal to' but integral with the main settlements in the valleys and dip slopes. Generally farms and villages were located on the more fertile and easily cultivated soils.

This was once a much more open landscape than seen today, with much of the woodland cleared in the prehistoric period. Historically, it has been managed by grazing and low intensity farming, with the remaining woods enclosed and managed for underwood and timber. Essentially the main components of the cultural landscape were in place by the 14th century. However, cessation in traditional management, especially grazing of commons and heaths, and coppicing, has resulted in the development of large tracts of high canopied woodland covering formerly open land.

In the 20th century, there was a cessation in many of the traditional grazing systems, with the economic and social links with home farms and parent manors broken by changes in ownership and fragmentation in land use. This has resulted in the spread of encroaching woodland and scrub, and with coppice developing into high forest. This is why there is more secondary woodland in Surrey Hills than the other AONBs. A further feature of the Surrey Hills are the numerous north-south routeways which traverse the landscape and along which goods and products from Weald passed to London and vice versa.

Prehistory

The traditional view of a poly-climax of high forest covering the whole of the landscape around 8000 bp has been questioned in recent years by the role of free ranging wild herbivores, such as aurochs, deer and swine which lived in the woodland [7]. The very variable edaphic, drainage, topography and geology of the Surrey Hills probably resulted in locally dominant trees occurring on the hills compared with the valleys. It is postulated that lime dominated the hill tops, with oak and elm on the gault clay and scarp face of the greensand, and oak on the Weald clay [8]. Areas of waterlogged conditions were likely to have supported willow and alder carr. However, it was probably unlikely that the Surrey Hills were covered with a dense blanket of trees but rather that a more open wood with the characteristics of a 'wood-pasture' type landscape existed.

Woodlands on the Surrey Hills preserve some fine examples of prehistoric monuments. In particular are the round burial mounds of the Bronze Age (c. 2,500 - 700 BC) and the hillforts or ditched enclosures of the later Iron Age (c. 600 BC). Burial mounds, as well as being cemeteries, are also generally thought to have been located on prominent open ground by the local community in order to make a 'statement' or mark some form of territorial control. Where such mounds still survive extant they are usually found in woodland. Two examples are located at Box Hill, on the crest of the Downs escarpment. Nearby are traces of a 'Celtic' field system on the slopes of Box Hill overlooking Mickleham. Further east at Marden, a similar situation occurred. A small cemetery of at least four or five burial mounds was once located in what is now Woldingham Golf Course. The field was called 'Barrowleys' in the 17th century. Adjacent to the golf course and surviving in a small area of ancient woodland are the extant remains of a possible prehistoric field system, with some of the former prehistoric lynchet boundaries in use as wood boundaries as well as marking the ecclesiastical parish boundary [9]. Extensive 'Celtic' field systems also survive on the Leatherhead and Mickleham Downs, further to the west.

The Surrey Hills has a number of fine hillforts occupying prominent positions overlooking the Weald. The only hillfort surviving on the chalk hills is at Caterham

overlooking the Vale of Holmesdale in the east of the Surrey Hills. Hascombe, Holmbury, Felday, and Anstiebury are all located on the Greensand Hills. Their origin and use is still under debate, but it is thought that the hillforts served several functions, not only as places of refuge in times of conflict, but also as places where the redistribution of goods such as timber, querns and iron could be controlled. The suggestion is that a number were built either in or adjacent to wooded environments where timber or wood was needed not only for construction but possibly also for fuel. The latter may have been required for the other commodity valued by the local communities, iron, brought up to the hills from open mines in the Weald. The iron was transported either in the form of iron stone, which was then smelted and worked on site, or as lumps of smelted iron, which was then reforged into tools, etc. at the hillforts. Another suggested use for the forts, as possible evidence from Felday suggests, is as seasonal pastoral camps and enclosures for stock, and for the herdsmen that looked after them[10].

There is very little apparent visual evidence in the Surrey Hills for the use and management of woodlands by the Romans and Romano-British. However, given the number of fuel-based industries, such as pottery, tile, iron, and glass, as well as the fuel needed for heating the villas and larger farmsteads, a managed and organised woodland industry must have been in existence.

Medieval Period

The marginal character of the Surrey Hills with the fertile vale of Holmesdale was probably well established by the time Roman administration had collapsed after AD 410. The resulting cessation in social organisation probably resulted in rural communities being thrown back on their own resources, leading to the rise of multiple agrarian estates with a reliance on self sufficiency. The process of transhumance, which was developing in nearby Kent, was also becoming a feature of Surrey, with the Surrey Hills providing areas of commons or 'staging posts' on droving routes reaching into the Weald proper.

The main settlements to the north of the chalk hills and in the Vale of Holmesdale claimed common territories further south. Evidence of this process can be seen in the shape of some of the historical ecclesiastical parishes which straddle the Surrey Hills, such as Wotton, Abinger, Effingham, and Bookham. All have settlements which go back to prehistoric times and are recorded as established at the time of Domesday (1086). Towards the end of the Saxon period, the decline and breakup of the transhumance system coincided with the spread of settlement into the Weald, with permanent farmsteads being established, a process which was well developed by the time of the Conquest, and which continued into the 12th and 13th centuries.

As with the North Downs in Kent, the chalk hills in Surrey were generally an area of wood-pasture and pastoral farming set in a wider farmed landscape, where the upland farms were founded by yeoman gentry rather than the large landowners [11]. Polesden near Ranmore on the chalk hills may have originated as a summer pasture, a 'den' with the 'poles' referring to coppice wood. Thus a temporary summer grazing pasture in woodland evolved into a permanent farmstead. Ranmore was formerly woodland belonging to the Abbot of Chertsey and may have originated as a wood-pasture common as indicated by the associated 'hatch' names [12].

Across the chalk hills the medieval landscape was a mixture of large commons and areas of wood-pasture, with settlements with open arable fields, enclosed pastures and small, enclosed woodlands. Evidence for the management of woods at this time is very slim. Given that buildings were in the main constructed of timber, the conservation and active management of woodland was likely to have been an integral part of the land use of estates and manors. It is probable that two management regimes were practised in varying degrees; enclosed coppice woods with standards, and unenclosed wood-pasture. Enclosed coppice woods enabled a regular supply of poles and underwood for fuel, tools and building materials. The new regrowth had to be protected from grazing stock and wild herbivores, hence

Remains of the ramparts of the Iron Age hill fort at Holmbury Hill in the Surrey Hills (Photo - PM)

Manor, parish, and hundred boundary at Great Ridings Wood, near Effingham in the Surrey Hills (Photo - NB)

the need for banks and hedges. By contrast, 'wood-pasture' enabled stock to graze within a woodland environment but with the advantage that timber could also be harvested regularly without subsequent damage to new shoots. It is probable that many of the heaths and commons across the Greensand Hills operated under a wood-pasture type system. Today, ancient pollards, descendants of the medieval woodland, may be found in remote corners of these commons.

Place names are also a clue to past land use, for example Pasture Wood near Abinger. The wooded origin of many parts of the Surrey Hills can also be traced through names with Saxon or Old English suffixes, such as 'falod' or 'fold', a place to enclose stock. These indicate a 'swine pasture' and occur mostly in the south of the Godalming, Blackheath and Wotton Hundreds [13]. An indication of widespread woodland clearance in the early medieval period comes from settlements with hurst or 'hyrst' in their name indicating a wood or wooded eminence. The recording of a wood by name suggests that it was a prominent landscape feature and occurred in some form of isolation from other woods.

Sites of ancient woodland bounded by wood banks may have been enclosed in the early medieval period and thus the boundary of the wood may be contemporary with the nearby church or even pre-date it. For example, running through Great Ridings Wood on the chalk dip slope of the North Downs near Effingham is a fine example of a common edge wood bank. It also functioned as the manor boundary (between East Horsley, Dritham, and Byfleet cum membris), parish boundary (between East Horsley and Effingham), and hundred boundary (between Woking and Effingham), and thus as a feature in the landscape may pre-date the nearby medieval churches at Effingham and East Horsley [14].

Coppice wood with standards was probably the main form of management of many of the enclosed woodlands in the Surrey Hills. A ready supply of poles and timber was needed for domestic and industrial use. Local communities demanded woodland products as did the expanding 'metropolis' of London. Actively managed coppice was vital for maintaining a ready supply of fuel and faggots, not only for local industries but also for supplying the expanding city populace of London. Carriers would probably have taken daily loads into the town from woodlands not only in the northern part of Surrey but also from the chalk dip slope coppices.

The 14th and 15th centuries saw a rise in the number of timber-framed buildings, which required large timber and shaped beams. The buildings were mainly constructed of oak, with other species used for wattles, supports, etc.

Post-medieval Period

The Surrey Hills contains a large proportion of manorial 'waste' lands; uplands of heaths, commons and chalk downlands where extensive grazing and common rights were the traditional forms of management. These originated in the medieval period from the former swine pastures and commons. Piecemeal enclosure and settlement especially by artisan and itinerant craftsmen led to some fragmentation and shrinkage but overall the commoning management continued into the post-medieval period.

The 17th and 18th centuries saw a decline in the Wealden

Hazel coppice with oak standards near Leith Hill in the Surrey Hills (Photo - PM)

industries such as iron and glass when coal replaced charcoal as the preferred fuel. Alternative, more specialised markets were found for underwood, which preserved the continuity of many coppices at this time. Charcoal was still in demand for gunpowder, for use in in distillation, and for hop drying. Underwood itself was also required for the various specialised nursery and horticultural growers that were establishing themselves in the north west of the county. Tanning, leather and numerous other crafts and small industries all still required timber and underwood in various forms, as well as the expanding hop industry.

Much of the archaeological evidence found in all types of woodland today in the Surrey Hills generally dates from the post-medieval period. This includes the living cultural features. Ancient pollards, coppice stools and stubs are a common feature of many ancient coppices and former commons. Stubs themselves are often associated with earth banks, be they agrarian or of woodland origin (see Gazetteer of Archaeological Features Found Within Woodlands).

As with woodland in the Kent Downs AONB, lynchets are a frequent element of woods found on both the chalk and to a lesser extent the Greensand Hills. These subtle earthworks can be seen in woodland across White Down by Netley Heath and in valleys in the Hurtwood. Lynchets are formed by the down slope movement of soil particles collecting against a linear boundary. They can vary in size from a few centimetres to over a metre or more (see Figure 4, page 51).

Similarly, flint and chalk quarries are closely associated with woodland on the chalk hills. Chalk was an important source of fertiliser in the form of lime as well as its use as a mortar and lime wash. The woodlands along the North Downs are pitted with pits and quarries of varying sizes. Some, as at Betchworth, were on a commercial scale, with kilns, packing areas, etc., whilst others were small, servicing the local farms. It is likely that much of the lime produced from these so-called 'flare kilns' was used to improve the acidic soils on the Greensand. Small lime kilns were usually constructed of a single hearth and their remains can be found in woods. The chalk was fed into the top of the kiln, a fire lit in the hearth below and the resulting lump lime dug out from beneath. This lime was in the form of the 'quicklime' and had to be 'slaked' with water in order to enable it to be used as a fine powder.

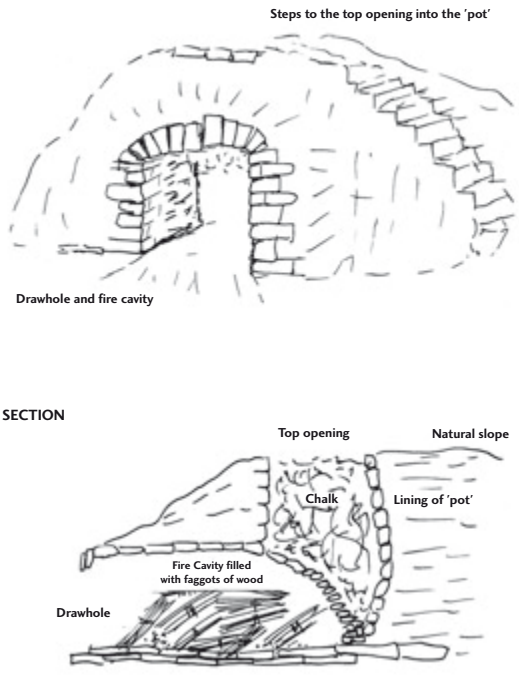
Other quarries found in the Downs are former flint pits. The 18th and 19th century saw a rise in the construction of brick and flint buildings. Flint was either used in its natural state or more usually 'knapped' to make regular-shaped blocks. Examples of these type of construction can be seen at East Horsley, where the Earl of Lovelace created the gothic Horsley Towers with its flint and brick park wall, lodges, gates and farm buildings. Flint was also used as hard core to repair roads. In contrast, in the Greensand Hills, the extensive pits and quarries here are where stone was quarried or sand dug. Here 'ragstone', a soft ferruginous sandstone, was dug for local buildings.

Charcoal hearths are more likely to be found in woods in the Greensand Hills, rather than on the chalk. Oak and hornbeam, favoured species for turning into charcoal, are more frequently found here. The gun powder works in the Tillingbourne valley required large quantities of charcoal both as a fuel and also to mix with the saltpetre powder (potassium nitrate) and sulpher (brimstone).

The Evelyn family held the sole trading licence to produce gun powder for the Ordnance Board in the early decades of the 17th century [15]. Their mills were at Wotton and Abinger and John Evelyn had the sole trading right to saltpetre produced in this country. The East India Company founded the works at Chilworth further downstream on the Tillingbourne, producing gunpowder from saltpetre imported from India [16]. Charcoal would have been obtained locally. However, by c.1880 a smokeless gunpowder was developed using charcoal made from rye straw instead of wood.

The steep and undulating topography of the Surrey Hills has led to the development of many deep, incised hollow ways traversing the slopes of the chalk and Greensand Hills. It is possible to trace the former drove ways linking the primary settled lands to the north of the Downs escarpment with their 'common swine pastures'

Figure 1. Sketch of a simple 'flare kiln' (NB)



Hollow way near Wotton in the Surrey Hills. Likely to be an ancient drove way, the hollow way also marks the parish boundary (Photo - PM)

in the Weald. Hollow ways are created by the wear of 'soft' rocks by the passage of feet, hooves and wheels exacerbated by water erosion from rain. Today, many of these hollow ways form part of the statutory public access network. Where they traverse the chalk, ancient yews and beech line the edges. On the greensand, the yews are generally replaced with hornbeam.

Surrey has played an important role in the defence of the country. The Hills provide a natural defence line by which to protect London. During the threat of invasion from France in the 1890s a ring of forts (or rather mobilisation centres) was constructed on the Downs escarpment as a defensive line around London. Several of the store houses survive, some of which lie within woodland, as for example at Box Hill [17]. Second World War pill boxes as well as anti-tank obstacles may also still survive in woodland.

However, the use of many woods and heaths in Surrey for training soldiers both in home defence and the allied armies, as well as camouflage for equipment (especially armaments) is evident from the earthworks which still survive. Across the Hurtwood on the Greensand are slit trenches, fox dug outs and former anti-tank defences scattered amongst mature conifer plantations.

The long dry valleys on the dip slope side of the North Downs provided suitable sites for rifle ranges. Traces of the butts for the range used by the 1st Volunteer Battalion of the Queen's Royal West Surrey Regiment in the late 19th century can be seen in woodland at Marden Park[18]. The target mound is also present, in an open glade of chalk grassland.

The 18th and 19th centuries saw a rise in the influence of the gentrified landowners on woodlands. The increasing prosperity of London as a trading centre and the hub of the growing empire led to a rise in the number of wealthy business men, merchants and financiers. Having made their money in 'The Wen' (William Cobbett's name for London), these prosperous entrepreneurs were looking for country retreats and estates for their pleasure and relaxation.

Numerous former farmsteads soon acquired the status of a country gentleman's estate, where outside money was used to create 'scenic' and 'picturesque' landscapes, modifying the countryside with exotic tree planting, plantations, water features, and so on. Existing woods were replanted and new ones created, for example at The Rookery at Dorking and at country villas along the Mickleham valley. Towards the western end of the Surrey Hills, around Hindhead on the acidic and well drained soils, specialist gardens and nurseries were established in order to grow and propagate the exotic plants being brought in by the Victorian plant hunters, such as Joseph Hooker. Rhododendrons were a firm favourite. Today, *Rhododendron ponticum* has invaded many woodlands, to the detriment of the native flora. It is also expensive and difficult to eradicate. At Hindhead, large areas of the former heath are being reclaimed from woodland, scrub and rhododendron as part of heathland restoration schemes.

As well as new gentry appearing on the scene, the existing landed families also benefiting from the increased wealth were returning from 'Grand Tours' of the continent with new ideas for designing and formulating pleasure grounds. John Evelyn's 'Sylva'

Box Hill fort in the Surrey Hills. Built in 1899, the fort was one of a line of 13 mobilisation centres built to protect London from the threat of invasion from across the channel (photo - PM)

provided advice on planting and management of trees and forests, together with the ideas of designers such as 'Capability' Brown and Humphry Repton. The influence of this process can be seen in the Tillingbourne Valley, where several of the large estates occur, such as at Albury and Shere. Another line of country properties lies along the dip slope of the North Downs, for example at Clandon. The desire was to create vistas and views which extended beyond the 'park pale' and into the wider landscape.

Derelict coppice woodland in the Surrey Hills (Photo - PM)

A further process taking place in the landscape in the 19th century was the enclosure of many of the open commons and heaths, where traditional manorial rights were being extinguished, and where the opportunities for agricultural labourers and craftsmen to rent or acquire small plots of land were diminishing. It was the decline not only in the grazing of heaths and commons, but the processes of turf and furze cutting for domestic fuel which allowed the encroachment of woodland over many of the former open spaces. Today, many are covered in mature woodlands used for amenity purposes. The public perception is now of an enclosed wooded landscape, which can have a negative effect on attempts by landowners and conservation organisations to undertake management programmes which involve tree felling and scrub removal.

Management issues and threats concerning the cultural heritage of woods

An important management issue for the cultural heritage of woodlands in the Surrey Hills is the lack of management, particularly coppicing. The introduction of adverse and unsustainable management practices can also lead to damage of the wood and its cultural resource.

Fragmentation of ownership

A large proportion of woods in the Surrey Hills are in public or charitable ownership, or with open access agreements in place for woods in private ownership. Thus the threat of fragmentation is not as great as for example in the High Weald or the Kent Downs. However, it is still a real issue, with areas of woodland being subdivided and sold off in parcels to private individuals (who often live many miles away from the site) who wish to own a small piece of wood. Subsequent use of the wood may not be sympathetic and can lead to a decline in the condition of the flora and earthworks. Multiple ownership of a wood can also lead to conflicts and disparate management activities.

Lack of understanding of wood and tree care

With many small woods coming into the hands of 'amenity owners', there can be a lack of knowledge concerning sustainable and good practice with regard to management and the care of trees. A lack of cutting can be just as detrimental as too much. Woodlands which abut equestrian facilities can also suffer, either as an informal manure dump or from overgrazing, resulting in bark stripping and removal of ground flora where the fencing is insufficient.

Policies for enhancement of conservation of the woodland cultural resource

These are taken from the Surrey Hills Management Plan 2004-2009:

Woodland Management Policies

W1. Woodland owners and managers will be supported to sustainably manage all ancient woodlands, and other woodlands that contribute to the landscape character.

LP5. Research ancient woodlands and other woodlands of high environmental quality and secure funding for management.

W2. Markets for timber and other high and low value forest products will be identified, promoted and supported in order to generate incomes to help sustain appropriate woodland management.

LP7. Identify, promote and support markets for timber and other high and low value forestry products including wood fuel.

Yew, beech, and ash woodland at Box Hill in the Surrey Hills (Photo - PM)

W3. The wider importance of woodlands and the need for management, including the felling, replanting and coppicing of trees, will be disseminated to woodland owners and managers.

LP8. Increase the understanding of the management of woodland amongst woodland owners and managers.

W4. The benefits of removing inappropriate trees and woodland, particularly for the restoration of heathland, chalk grassland and the reinstatement of views, will be supported and promoted.

LP4. Identify and map significant Surrey Hills' views.

E7. Promote the benefits of removing inappropriate trees and woodland.

Vision for historic and cultural heritage

HC1. A wider understanding of how the Surrey Hills landscape has evolved will be achieved by promoting the interpretation of the AONB.

E1. Promote the interpretation of the Surrey Hills.

HC3. Valuable historic landscape features that contribute to the character of the Surrey Hills will be identified and protected.

LP2. Promote, market and evaluate land management grant schemes.

LP3. Deliver small landscape conservation grant scheme.

LP4. Identify and map significant Surrey Hills' views.

LP5. Research ancient woodlands and other woodlands of high environmental quality and secure funding for management.

HC4. The rich artistic and cultural heritage of the Surrey Hills will be promoted. Existing traditions will be kept alive and new work will be inspired.

E2. Promote and interpret inspirational views.

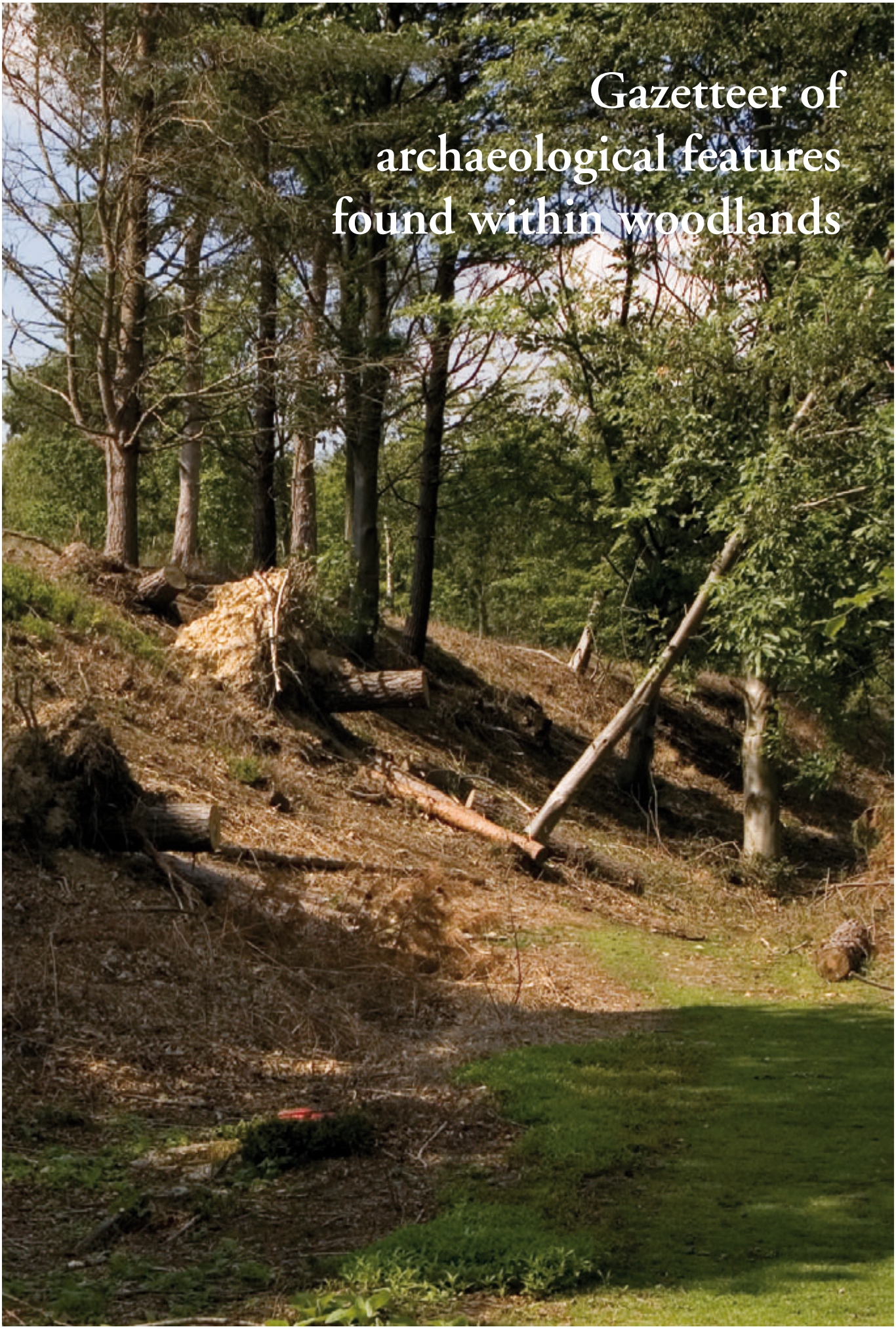
Woodlands to Visit

The Surrey Hills AONB abounds in many sites where there is open access to woodlands and wooded landscapes, and where many archaeological features can still be seen. These areas are marked on current editions of the Ordnance Survey 1:25,000 Explorer series. The Hurtwood, Hindhead Commons, Box Hill, Mickleham Valley, White Down, and Ranmore Common are a few good examples.

Footnotes

[1] McKernan, P. (2005) Unpublished information from the South East AONBs Woodland Programme. High Weald AONB, Flimwell.
[2] Countryside Commission (1998) The Surrey Hills Landscape, CCP 530 p.5
[3] ibid p.9
[4] Surrey Hills (2004) Management Plan 2004-2009 p.16
[5] ibid p.37
[6] ibid p.19
[7] Vera, F. W. M. (2000) Grazing Ecology and Forest History
[8] Macphail, R. I. & Scaife, R. G. (1987) 'The geographical and environmental background, in The Archaeology of Surrey to AD1540 by D.G. & J.Bird, Surrey Archaeological Society p.41
[9] Bannister, N. R. (2002) Archaeological Assessment of Marden Park Woods. Unpublished Report for the Woodland Trust
[10] Hanworth, R. (1987) in The Archaeology of Surrey to AD1540 by D.G. & J.Bird, Surrey Archaeological Society pp.160-161
[11] Blair, J. (1991) Early Medieval Surrey. Surrey Archaeological Society p.45
[12] Currie, C. (2000) Polseden Lacey and Ranmore Common Estates. Surrey Archaeological Collections. 87 pp.55-56
[13] Blair, J. (1991) Early Medieval Surrey. Surrey Archaeological Society p.51
[14] Bannister, N. R. (2002) Great Ridings Wood, Archaeological Assessment. Unpublished report for the Woodland Trust
[15] Fairclough, K. R. (2000) The East India Company and gunpowder production in England 1625-1636. Surrey Archaeological Collections 87 p.96
[16] Fairclough ibid p.100
[17] Smith, V. (1975) The London Mobilisation Centres. London Archaeologist II pp.244-248
[18] Bannister, N.R. (2002) Archaeological Assessment of Marden Park Woods. Unpublished Report for the Woodland Trust

Gazetteer of archaeological features found within woodlands



Ramparts of the Iron Age hill fort at Holmbury Hill in the Surrey Hills (Photo - PM)

Gazetteer of Archaeological Features found within Woodlands

Introduction

The following section gives brief descriptions of the range and type of features likely to be found within woodlands in the South East, and particularly the High Weald, Kent Downs, and Surrey Hills AONBs. Some features may only be found within woodland due to their origin as part of the management of that particular wood. These are termed '*woodland origin*'. When woodlands include areas of secondary encroachment on to other land uses, then the scope and range of archaeological features that can be found is much greater. These are generally termed '*non-woodland origin*' [1].

The following gazetteer is not a definitive list but rather a guide to the most commonly encountered archaeological features already recorded in woodlands. In the future, further survey work is likely to add additional features to this list. The individual descriptions are often a 'rule of thumb' and like most things there are always the exceptions, particularly where, for instance, there has been a complex land use history for a given area of woodland.

Gill woodland at Fairlight Glen near Hastings in the High Weald, known as the 'Dripping Well' (photo - PM)

The Shape and Name of the Wood itself

Before actually looking for individual features within the wood, it is important to look at both the shape of the wood and its relationship with adjacent land use features, its position in the landscape and its name or names. All these can provide clues to its past land use, its origin and what might be found within it.

Woods with irregular and sinuous outline with chunks 'bitten' out of them are remnant woodland remaining from the assarting of fields – that is the creation of fields by the clearance of the woodland, leaving thick woody hedges with a characteristic diverse woodland shrub composition. These woods are likely to be ancient in origin. Names such as 'copse' may also be an indication of continuous woodland management. More regular shaped woods - often square or rectangular with very straight boundaries, sitting within a regular field pattern - may be plantations or fox coverts. Woodland names which include 'plantation' or 'acres' are a strong indication of secondary planted woodland. Other names such as 'rough', 'furze' or 'brake' usually indicate secondary woodland developing on former farmed land or areas of unenclosed common.

A specific form of woodland, which occurs in the High Weald and in more undulating areas of the Low Weald are 'gills'. These are sinuous, narrow strips of woodland often bounding steep, narrow valleys containing streams. In summer these streams can be mere trickles or even partially dry out, but in winter they can become raging torrents, loaded with silts and stones. Gills are important ecological habitats, where the woodland has often been undisturbed for centuries and where the dark, moist environment makes them ideal habitats for shade- and humid-tolerant flora, especially bryophytes.

Archaeological Features Originating from Woodland Management

The study of woodland archaeology recognises the cultural importance of living structures as part of the historic record. Repeated cutting or harvesting of wood from trees prolongs their life and as a consequence some individual specimens can be of considerable antiquity. In many cases, the presence of such veteran trees may be the only indication of how that wood was managed in the past.

Field maple stub near Hucking in the Kent Downs (photo - PM)

Living Structures

Traditionally, archaeology is the study of inanimate objects. However, woodland archaeology includes the recording of and research into living features, namely the trees and woods themselves. These features are discussed in detail below.

Coppice

Coppice stools are created by the repeated cutting of trees to ground level in cycles of between 7 and 25 years. This is termed 'underwood' – the layer beneath the standard timber trees. The cut stem, known as a stool, then responds by producing numerous new shoots, which become the coppice poles for the next 'harvest'. This form of management is probably the earliest method used by humans to exploit woodland. With repeated cutting coppice stools extend in size and some species can reach diameters of several metres. The most common form of traditional management was coppiced underwood with standard trees (full grown trees from a single stem).

Different species of tree were coppiced for different uses; hornbeam for fuel either as faggots or for turning into charcoal; oak for building and the bark stripped for its tannin used in curing animal skins for leather; alder made good charcoal for gun powder and sweet chestnut coppice was used for hop poles. In the 18th and 19th centuries, large areas of traditional oak and hornbeam woods were grubbed and planted to sweet chestnut for the hop growers. After coppice was cut, it had to be protected from browsing by herbivores, so a hedge was 'laid' or a hurdle fence erected on the boundary bank as a form of protection. In some areas, after about seven years from cutting, the fence was thrown down and animals allowed in to graze the ground flora.

Stubs

A 'stub' is produced by cutting a coppice tree at about 1 metre high (3 feet) to form a 'marker' tree. The tree develops a short thick stubby trunk with a multi-branched crown. Lines of stubs running through woodland may mark 'undefined' (i.e. with no defined earthwork) boundaries such as a parish or manor boundary but may also mark changes in ownership between different parts of the same wood. Stubs can also be associated with an earthwork bank.

Pollards

Pollarding of trees took place where animals were grazed on the same land, such as commons giving rise to 'wood-pasture'. The crowns of mature trees were harvested for their timber by regular cutting at a height of between 2 and 3 metres above the ground level. Pollards are larger versions of stubs, identified by significantly thickened trunks and many upwardly curving multi-branched stems forming the crown. The practice of 'pollarding' has all but ceased today, and many pollarded trees are over mature, with extensive decay and loss of branches. However, these trees - usually termed 'veteran'

Historical photograph of a woodsman stripping bark using a metal 'spud' (by kind permission of Hastings Museum and Art Gallery)

Ancient laid hedge on the edge of Admiral's Wood near Bicknor in the Kent Downs (photo - PM)

or 'ancient' - are of immense ecological and cultural significance. Apart from rare examples of former wood-pasture, pollards are most often found on edges of woodland, marking boundaries. But they also occur in areas where secondary scrub and wood has encroached on to a former common or more rarely in an area of wood-pasture. Oak pollards are most frequently found on the clays but beech, chestnut and lime are also found, especially on the chalk and Greensand Hills.

Outgrown Hedgerow Trees
Where a laid hedge once topped a boundary bank around a wood, remains of the hedgerow trees may be identified by the presence of branches with right-angled 'elbows'. These are where the former 'laid' branch or stem has turned through 90 degrees, creating a new upright stem. Oak, hornbeam and beech are common examples.

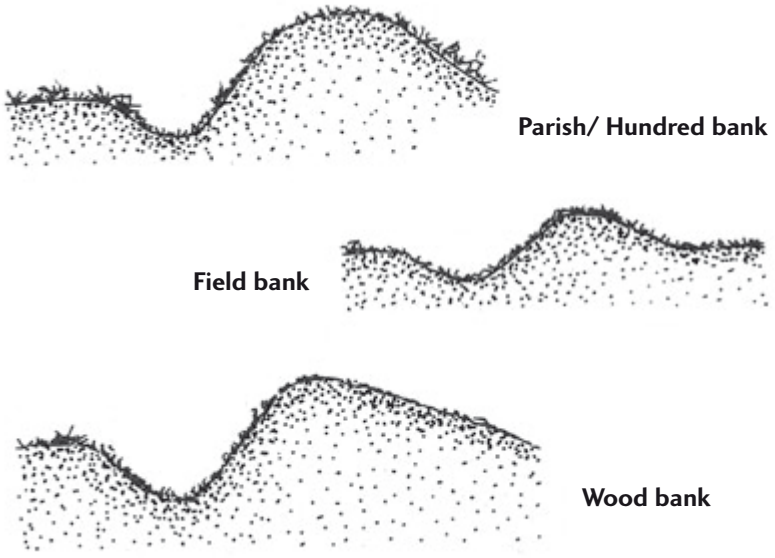
Timber Trees
Trees grown for timber rather than underwood are the other main component of the traditional coppice-with-standards method of managing deciduous woodland. Mature single stemmed trees of oak, beech, or ash will often occur throughout a coppice wood. Those standards grown from a coppice stool will have a swollen base to the trunk where the other coppice stems have been removed. Planted or self sown timber trees will have a regular base. Traditionally, timber trees will have been recruited from the natural self-sown regeneration. However, in the 18th and 19th centuries clear felling of the traditional coppice may have been replaced by new standards being planted and managed as 'high woodland'. A period of intensive harvesting and replanting is often associated with the setting out of drainage ditch networks (see next page).

Shaws – Shaves - Rews
There is some debate about what a shaw is. On the chalk hills, shaws, shaves or rews are identified as narrow strips of woodland dividing up fields. Many show characteristics of an ancient woodland origin, whereas others may be managed encroachment of former fields, sometimes medieval strip fields. Earthwork lynchets are closely associated with these small woodland strips (see page 51). As a general term 'shaw' is also applied to thick woody hedges in the High Weald. However, the term is also given to small areas of woodland planted in the 19th century. This usage is particularly frequent in Sussex. These shaws are usually located next to areas of ancient woodland or to gills. It could be that the original shaws were narrow woods but in the 19th century the name was adopted for small planted woods, in a similar manner as the name for 'gill' was changed to 'ghyll'.

Linear Features
The following section covers both boundaries arising from various origins and also drainage networks.

Boundary Earthworks
The most frequently encountered earthworks in woodlands are linear boundaries. These earthworks can be found bounding the edge of the wood and also running through it, creating subdivisions within the

Figure 2. Generalised profiles of boundary banks (adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council)



woodland. Sometimes the origin of the boundary is clear but in many cases the original function for the division has ceased or been 'lost'.

Wood bank and ditch at Kilndown Wood, near Kilndown in the High Weald (photo - PM)

Wood Banks

Wood bank boundaries are usually accompanied by a ditch, with the latter generally lying on the non-woodland side of the bank. Wood banks bound and define the woodland and can be of varying sizes depending on their historic ownership and former management. A characteristic feature of many wood banks is that the profile of the bank is usually asymmetrical with a long dip slope on the woodland side and a sharper scarp slope into the ditch. These earthworks can vary in size, with banks having a width of not less than 1 metre but sometimes being several metres wide and up to a metre high. Their original size is difficult to determine as erosion and settlement of the soils have taken place over the centuries. The ditch is usually heavily clogged with leaves, silt and debris unless it forms part of a still functioning drainage network. The larger, more sharply defined wood banks often bound woods which were in ecclesiastical or monastic ownership. This is probably because the church owners were richer and were able to afford the manpower to repair and make good the banks on a regular basis.

These earthwork banks are often devoid of ground flora, except for a covering of mosses. However, the presence of moss is not an indication of age, as relatively recent banks under the right environmental conditions can become covered in moss quite quickly. Where clearly obvious wood banks run through woodland, they may mark changes in ownership, or else define the former woodland edge where secondary woodland has encroached onto farmed land.

Rounded Banks

Low (less than 0.25 metres high), and wide (between 2 and 3 metres) rounded banks may also be found in woodland, especially ancient woods. It is not clear what their origin may be – former coppice divisions perhaps, or former ancient field boundaries (see page 50).

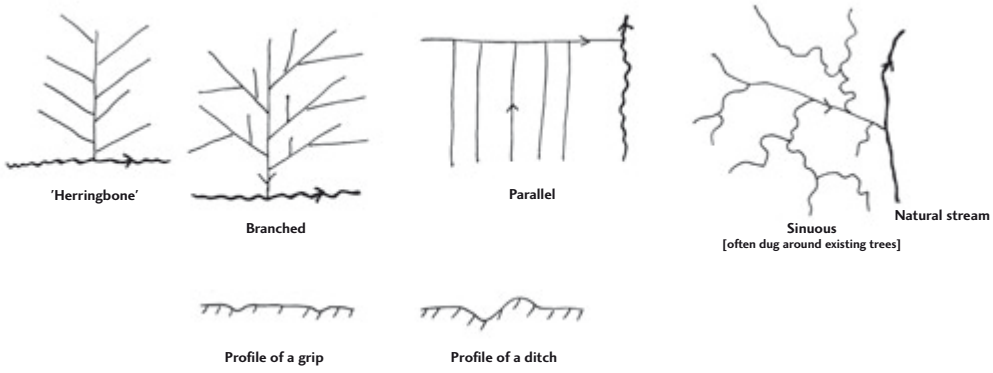
Drainage Earthworks

The second most common linear feature of many woods, especially those on clay soils where seasonal waterlogging occurs, are the drainage networks. The layout of these drainage networks can come in several patterns, with ditches of varying sizes, and often they may incorporate existing natural water courses. More often these systems are associated with a period of intense clearance and harvesting, followed by replanting, such as conversion from coppice-with-standards to high plantation woodland.

A parallel ditched system may at first glance look like ridge and furrow. But the ridges are flat and wide and the 'furrows' are clearly narrow ditches. These ditches individually run into a natural stream or a main ditch to a wood bank. A more sophisticated system is the 'herringbone' pattern where in plan, the network looks like the branches of a tree, the straight grips and ditches feeding into a main ditch and thence into a stream (see Figure 3, opposite).

These regular networks were probably laid out when the wood underwent a period of

Figure 3. Types of drainage networks (NB)



Culvert at Strawberry Wood, near Benenden in the High Weald (photo - NB)

intense harvesting either in the 18th or 19th centuries, or, if found in forests belonging to the Forestry Commission, were constructed after the Second World War.

Where there is already a pre-existing natural drainage network of small rills and streams, a smaller herringbone network of grip may feed into the streams. Within a wood there may be several phases of drainage networks. Although cessation in management means that many of these systems appear blocked, they may still continue to contribute to the drainage of the woodland.

Ditches and Drains
Wide, deep ditches with corresponding banks may occur winding their way through woodland or cut through in clear straight lines. An approximate guide is that the more sinuous ditches are possibly older than straighter ditches. Ditches can vary in size from 0.5 to 1 metre wide and the same deep. The banks may not have a clear formed profile, but be more irregular where spoil from cleaning of the ditch has been piled up.

Grips
Ditches which are only a spade's depth and width are often termed 'grips'. They may be straight or sinuous. The straight ones are probably part of an extensive 'herringbone' pattern or may head up a complex drainage system within a wood. Sometimes the grips are very sinuous and it is clear they have been dug around standing trees.

Streams and Gills
Natural streams can be identified by their very sinuous course, with varying depths within a given length. They may even be marked and named on maps. Gill streams can be fierce and fast flowing in winter and gentle trickles in summer.

Access Routeways
Once timber and underwood was cut it had to be taken out of the wood. Access routes can take the form of trackways, sometimes bounded on either side by a bank and ditch. The bank may be a former wood bank topped with outgrown stubbed trees, or the route may be just a faint but sinuous line through the trees. Where the ground is more undulating and the soil liable to erosion, hollow ways can occur. Older routeways are often sinuous, winding through the woodland, whereas later tracks or rides are straight, forming a distinct network which accesses all parts of the wood. Some of these routeways may have a form of hardcore or metalling to the surface to prevent wear and rutting. In the High Weald, slag from iron manufacture was frequently used to metal tracks. Flints were frequently used on the chalk hills. Other features such as saw pits may be associated with access routes (see below).

Culverts
Where a track has to cross a stream or ditch, a small bridge or culvert will take the water beneath the routeway. Culverts may be small simple structures made from brick, or a single pipe, or they may comprise a more complex construction made of stone or a combination of stone and brick. Older culverts may have been rebuilt, with large modern concrete pipes laid in them. Where a stream may become swollen in winter more than one culvert might be constructed to take the flow of water. Associated with culverts and drains are overflow or sump ponds (see Ponds section, page 49).

Mounds & Depressions
Woodlands preserve mounds and depressions, a feature of numerous activities which have taken place. The origins of some of these earthworks may not be very clear but others have distinct characteristics which enable them to be identified.

Saw Pits
The felling of standard trees and turning them into sawn planks produces a considerable amount of 'waste'. It made sense to process the trunks into planks on site, especially where access into and out of the wood was difficult. Thus, the cost of haulage was for the finished product, rather than the whole trunk. Many estates, large landowners and also villages had their own timber yard with a saw pit and its location may be identified by field names such as 'Saw Pit Field'. Pits in yards were permanent structures, often lined with stone or wood, surmounted by a wooden frame and lifting tackle.

Where it was necessary to process timber on site,

Left: Remains of a sawpit at Yellowcoat Wood, near Flimwell in the High Weald (photo - PM)
Right: Reconstruction of a sawpit at Cotehele National Trust property, Cornwall (photo - NB)

temporary saw pits were dug. When standing timber and coppice were purchased or let for felling, the leases may have specified the digging but also the making good of pits for sawing. In reality many pits were not backfilled or if so only in a cursory manner. These saw pits can be found in woods across the South East - dug not only on sandy soils, but also on clay and into chalk. Several pits may be found in one wood, but it is in the chalk hills of the Chilterns that numerous pits, sometimes as many as 30, may be found in a single woodland.

Saw pits are often located on gently sloping ground adjacent to old access tracks leading out of the wood. However, they may also have been dug close to where the standard was to be felled. The spoil from the pit was thrown up in the downslope side of the pit to create a level area on which to construct the frame to hold the trunk. Today these pits survive as shallow, elongated, elliptical depressions (about 3 metres by 1 metre), with the mound about 0.5 metres high. The pit had to be deep enough to take a small man or boy (probably the apprentice) who stood beneath the trunk to push the saw upwards. This is where the term 'under-dog' came from. The 'top-dog' stood on the trunk and pushed the saw down.

Once the tree had been felled and all the canopy branches removed, the trunk was rolled on to the platform, supported by cross poles and fixed into position using iron 'dogs' or hooks. Excavation of a saw pit in Gloucestershire revealed the remains of an iron hook, a pair of metal dividers, sawn oak planks lining the bottom of the pit and covered by a layer of saw dust, a bottle for fortified spirits and a drinking cup [2]. The width of the planks to be sawn were possibly measured using the pair of dividers and the line of the cut may have been marked by a length of taut chalked string. Sawing tree trunks into planks was dry and thirsty work – hence the bottle and drinking cup. The latter artifact dated the Gloucestershire saw pit to the late 18th century. More saw pits need to be excavated professionally in the South East in order to ascertain their age, duration of use, and if any artefacts are associated with them.

Charcoal Hearths

Another woodland industry which can leave traces behind on the woodland floor is charcoal burning. This is a process of turning underwood, usually tree species such as oak, alder, hornbeam, willow, and ash into 'coals' by heating the wood under conditions which limit oxygen, to leave just the pure carbon component of the wood. The round charcoal 'clamp' or 'kiln' was carefully constructed of cut lengths of underwood, covered by turves and soil, and located on an area of circular, levelled

Historical photograph of charcoal burners in the High Weald (by kind permission of Hastings Museum and Art Gallery)

Soil disturbance around an animal earth revealing charcoal remains in a woodland in the High Weald. Further evidence of iron industry activity here is the presence of two pond bays nearby (photo - PM)

ground, called a 'hearth[3] or pit'. It is this latter feature which can be found in woodland today. The hearth is approximately 4 to 5 metres in diameter and where the ground is slightly sloping, a small 'back wall' between 0.25 and 0.5 metres high can survive. The main clue to a site being a charcoal hearth is the presence of dark, nearly black soil beneath the layer of leaf litter covering the site. Pieces of charcoal may also be present, especially around the 'front' or downslope edge, where the coals were loaded into bags or panniers for transport out of the wood.

The whole area around a kiln was kept swept and clean of debris in order to prevent anything catching fire. During a burn, the charcoal burner would have lived on site to tend the kiln. Home would have been a wooden shelter made out of coppiced underwood, perhaps with a thatched roof or a tarpaulin. Evidence for these is very rare.

Ponds

A source of water was important for those working in woods as well as for their draught animals. Ponds of many origins and types can be found in woodlands. Some ponds created from springs or damming small streams. A specific form of 'multi-armed pond' are those which acted as overflow or sump ponds linked to drainage networks. During periods of heavy rain they acted as reservoirs collecting water before it discharged into the ditches beyond the wood, thus preventing flooding onto farmland or adjacent roads. Other ponds may have arisen through the flooding of former extraction pits (see Irregular Ponds section, page 54).

Badger Setts and Rabbit Warrens

Although not a feature of woodland management, but rather the use of woodland by wildlife, extensive areas of mounds and depressions can represent the burrows of badgers, foxes or rabbits, and occur in many woods. Areas of freshly turned soil and bedding material indicate the area being in active use. Badgers and their setts are protected under the Protection of Badgers Act 1992, which makes it illegal to kill, injure or take badgers or to interfere with a badger sett. Interference with a sett includes blocking tunnels or damaging the sett in any way.

Archaeological Features Originating from Non-Woodland Management

Archaeological features which have originated from land use activities other than woodland management are covered in this section. They are most often found in areas of secondary woodland and plantations, but may also be found on ancient sites where other activities took place within the woodland, such as mineral exploitation or military activity. Features from the latter are often difficult to identify or even interpret.

Non-woodland features can be grouped according to their original function: agrarian, settlement, industry, recreation or military, or by their form as below. Earthworks dating from the prehistoric period are often well preserved in woodland compared with

Field bank at Highfield Wood near Wanborough in Surrey (photo - NB)

other landscapes because, despite damage by roots and burrowing animals, woodland management is relatively less damaging and intrusive compared with intensive farming or development.

Living Structures
As with trees managed for their timber and underwood in ancient woodland forming distinct features, so there are trees which have been planted or managed for other uses, but which occur in woodland.

Pollards
Boundary marker pollards which mark parish or manor perambulations can survive within woods and are often associated with an earthern bank (see Administrative Boundaries section, page 51). They are almost identical to pollards managed for timber as part of a grazed wood or common. Pollards on boundaries which have become enveloped in woodland may have been cut by farmers or former manorial tenants as part of the right to 'hedge-bote' – the right to gather underwood for repairing hedges and fences. Boundary pollards may often be recorded on early editions of the Ordnance Survey maps or even on estate maps of the 18th century.

Specimen Trees
Individual specimen trees of both native and non-native origins may be found within woodland. In ancient woodland sites, these trees may have been planted as part of a formal designed landscape or as landscape markers. Where they occur in areas of recent woodland, they again may have been part of a formal planting, which has been allowed to scrub over.

Exotic Plantings
Former nurseries which have been abandoned to woodland may contain groups of exotic species - not only trees but also shrubs. In some cases these have become invasive, such as with rhododendron, causing severe management problems. The planting up of existing woods with non-native specimens reached a peak in the 19th century as part of Victorian 'gentrification' of small country estates and large 'villa' gardens, particularly in Surrey.

Linear Features
Linear earthworks originate from a range of land uses and served a host of functions. Woodland, especially areas of secondary woodland and plantations preserve many linear features arising from a wide variety of origins. A number of such features are described below, however the list is not exhaustive.

Field Boundaries
Where woodland has encroached into areas of former farmland, the hedgerows with their bank and ditch will become fossilised within the woodland. Boundary

Manor, parish, and hundred boundary at Great Ridings Wood in the Surrey Hills (Photo - NB)

banks created to divide up fields tend to have a more rounded or symmetrical profile and are accompanied by a ditch, which is usually silted up. Depending on the length of time the area has been under woodland, there may be well developed vegetation cover with evidence of an outgrown laid hedge. When conditions are shady the shrub component of a hedge dies out leaving only the shade tolerant tree species which grow to join the woodland canopy. The earth banks are usually between 0.75 and 1.5 metres wide and up to 0.75 metres high with a corresponding ditch.

The shape of the fields that the former boundaries enclosed can give a clue to the age and origin of those boundaries. Where the fields are a regular shape with straight boundaries, with few hedgerow shrubs surviving, then these are planned fields laid out perhaps to enclose former open fields or commons. If the fields are irregular and the boundaries sinuous, with a high proportion of woodland trees on them, then these fields were probably originally assarted from woodland, with the boundaries possibly deriving from the remains of

the original woodland. In both cases, the farmed fields were abandoned to pasture, with scrub and secondary woodland then developing.

Administrative Boundaries

A characteristic feature of woodland in the landscape, especially of ancient woodland, is that it is often found at the margins of 'territories' - either parishes, manors, or country estates. There are several reasons for this. Woodland was often left to grow on less productive soils which historically were found at the edges or margins of territories. Woodland was not an intensive land management activity, i.e. woodland did not need daily care and attendance as did live stock, thus it was enclosed at a distance from the main settlement. As a consequence of this woodlands will often preserve boundaries which served an administrative or territorial function. Parish, Hundred, Lathe and Manorial boundaries can often be defined by substantial earth banks and ditches well preserved within woodland, both of ancient and more recent origin. These banks are often large, between 3 and 5 metres wide, and up to 1 metre high. The bank may be bounded on both sides by a ditch. Pollard marker trees may also be found located either on the bank or close by.

Administrative banks can also be confused with park pales. These may comprise a large earth bank with a deep ditch on the non-parkland side. The actual wooden pale is long gone but it would have comprised a split oak fence surmounting the mound. There may also be evidence of 'deer leaps' along the bank; places where deer could get into a park but not jump out again (as for example on the north side of Godmersham Park in Kent, where it abuts Kings Wood - see photo, page 30). The boundary itself will generally be curved and it may be possibly to trace the outline of the park in the adjacent landscape.

Lynchets

Frequently found on sloping ground, especially on the chalk and Greensand Hills, lynchets are the result of cultivation of the adjacent fields. They appear as a 'step' on the slope and can originate in any period. Some are as little as 0.25 metres high with others reaching over 2 metres in height. Lynchets are created by the downslope movement of soil under cultivation. The soil catches and collects against a barrier – a hedge, grass balk, fence or line of stones marking a field division. An accumulation of soil occurs on the upslope side of the obstruction – the positive lynchet.

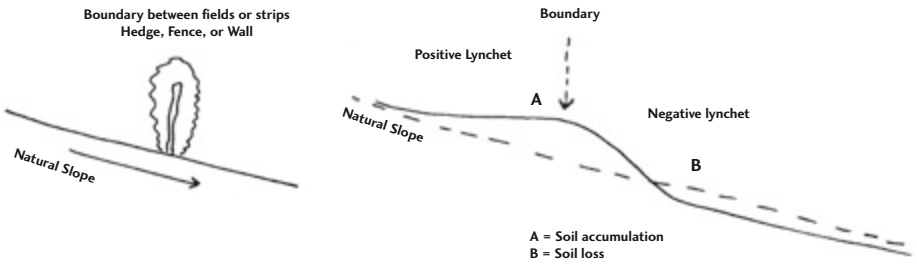
If cultivation takes place on the downslope side of the obstruction, soil creep downslope then creates a negative lynchet. These features are common in secondary woodland covering former fields on the chalk hills. Some shallow lynchets can be identified by lines of flints along their length, the result of former field clearances. Lynchets are a valuable archaeological record of stratified deposits. The process of manuring fields by spreading domestic and farmyard waste on to fields results in fragments of domestic artefacts being introduced into the ploughed soil. Some of these will, with the process of cultivation, be caught in soil deposits in lynchets. The position that they are found within a section or profile can provide evidence as to the age of the lynchet boundary. Similarly palaeo-environmental evidence such as snail shells can provide clues as to what the surrounding vegetation was like when the lynchet was being formed.

Ridge & Furrows

The large, sinuous and wide ridge and furrow earthworks, which are so characteristic of the Midlands, are not encountered in the South East. However, ridge and furrow can occur in woodland created by ploughing of the ground, but for different reasons. Ridge and furrows are created by the process of repeated ploughing of a number of narrow strips, using a fixed mould board, continually in the same direction. By ploughing the same strips the sods are turned in from the resulting furrows. Where it occurs on former commons or heathy ground, now covered by secondary woodland, it may represent a brief period of cultivation of the common before abandonment. Elsewhere, evidence of narrow ridge and furrow is likely to be an indication of a former orchard. Fruit trees were often planted on raised ridges to help the roots become established. There may even be some old fruit trees still growing in the wood.

Confusion may arise between ridge and furrows arising from cultivation, and the wide flattened ridges with narrow ditches formed to aid drainage in new plantations. The relationship of the ridge and furrow with other features such as boundaries and drainage ditches will provide further evidence as to its origin.

Figure 4. Development of a lynchet, formed by the downslope movement of soil as a consequence of cultivation (NB)



Routeways

Woodland preserves former routeways arising from all types of land uses: from the raised agar of a Roman Road to the modern forest rides laid out in plantations. A characteristic feature of routeways in the South East are the numerous sinuous and deep hollow ways. These are generally found on sloping ground, where the combination of passage of feet and hooves over centuries, combined with a soft substrate and water action, have created deep, sometimes sinuous, almost tunnel-like tracks. On the chalk or Greensand the hollow way may be bounded by knarled and ancient yew or beech trees, whereas on the more clayey soils old oak trees may line the route. These hollow ways are of great antiquity, with possible prehistoric origins. They may occur on routes linking the sources of iron ore in the Weald with settlements on the Greensand and chalk hills. The routes in turn were then used as drove ways in the medieval period and today may form important links in the networks of public routeways. By contrast, other trackways may survive as just a break in the trees, or are bounded by earth banks. Modern forest rides are usually wide and straight with ditches on either side. The mound from the ditch will have an irregular profile, the result of mechanical excavation.

Ancient drove way in the High Weald (photo - MJ)

Military Trenches

Many woods in the South East were used for military activities during the Boer War, and the First and Second World Wars. Sites were used for training practice by the home defence, and also the Allied Armies, or for the hiding and storage of ammunitions. In some areas Prisoner of War Camps were erected. Whilst many dugouts, trenches and other earthworks were 'made good' at the end of hostilities, others were abandoned. Field defences in the form of slit trenches and 'fox dugouts' (see page 54) occur on both ancient and secondary woodland sites. Slit trenches may have a characteristic 'W' or 'M' alignment, occurring singly or as part of a larger network. Other large scale earthworks may be anti-tank defences.

Mounds and Depressions

The most common feature found in many woods of all types are undulating mounds and depressions. Many have little form or pattern but some are relatively easy to recognise by their location and character. However, it is important to record all earthworks even if their origin and form is not immediately apparent. Future research or field walking may reveal what they are.

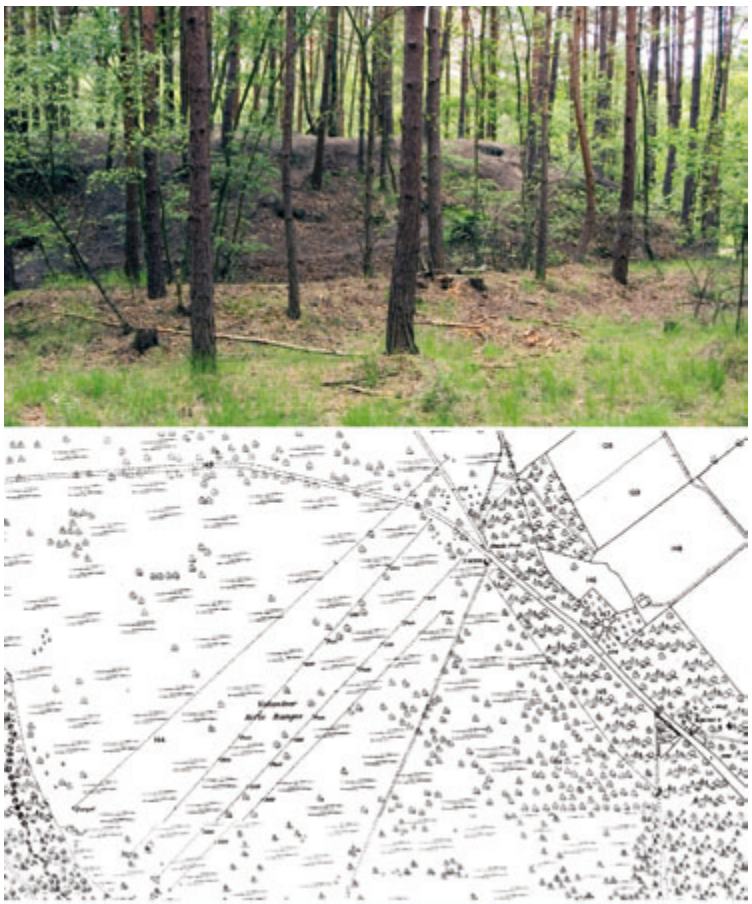
Round Mounds

Single circular mounds, 4 to 6 metres in diameter, may be one of several features - either a Bronze Age (2,000 BC - 600 BC) or Saxon (6th to 7th centuries) burial mound, a tree or prospect mound, or a mound on which a post-mill once stood. Deciding which it may be will be determined by size, location and also archive evidence. Generally most burial mounds are recorded and also statutorily protected. However previously unrecorded ones can still be found, especially in woodland on former heaths and commons. Tree mounds are more variable in size, whilst windmill mounds tend to be larger – 10 metres in diameter. It has been known for burial mounds to be modified to take a post mill.

Prospect mounds are associated with designed landscapes and therefore it is necessary to look at the wider landscape. Tree mounds were used for displaying specimen trees as part of a designed landscape and also to form a landscape feature. The mound also helped the tree roots to become established.

Elliptical Mounds

Burial mounds may also be lozenge shaped - these are the rare long barrows dating from the Neolithic period (4,000 BC – 2,000 BC). As with round barrows, most known long barrows are recorded and scheduled. Long barrows should not be confused with pillow mounds found on the sites of former rabbit warrens. These are long, lozenge shaped earthworks, often occurring in groups, sometimes with a shallow ditch on each long side. The mounds were built as places for rabbits to burrow into where they could be easily caught for their food and fur.



Top: Victorian rifle target at Broadwater Forest in the High Weald (photo - PM). Bottom: The rifle ranges shown on the Ordnance Survey First Edition County Series map for East Sussex (25 inch to the mile, 1869-75). The longest firing distance of 800 yards to the target is accurately mapped.

Other Mounds

Undulating ground or more rectangular mounds, called 'platforms', may be the sites of former buildings. They can be several metres in size and may occur on level or sloping ground. There may be other clues, such as garden plants growing close by, fruit trees or even an outgrown garden hedge. There may also be a water source and a hollow way associated with the platform. Verification from map evidence will be needed to give a date to the feature.

Round Depressions

Circular depressions are another common feature of all types of woodlands. Again, as with round mounds, they can be one of several features. Where circular depressions occur on chalk they may be the tops of deneholes. These were vertical shafts (up to 10 metres or more deep) opening into underground quarries, where chalk or possibly flints were mined. Surrounding the depression may be low mounds of spoil. Deneholes may remain as open holes or more often as sunken depressions 3 to 4 metres in diameter. The sunken depression does not mean that the shaft has been back filled. The usual method was to build a wooden framework to fit in the top of the shaft and cover this with vegetation and soil. Over time the frame begins to rot away causing the ground surface to sink. The frame is then likely to collapse. Therefore, it is very important not to stand in the middle of any depression in woodland until its origin has been verified. If a denehole is suspected, seek professional advice from the Kent Underground Research Group [KURG] (see Useful Contacts section).

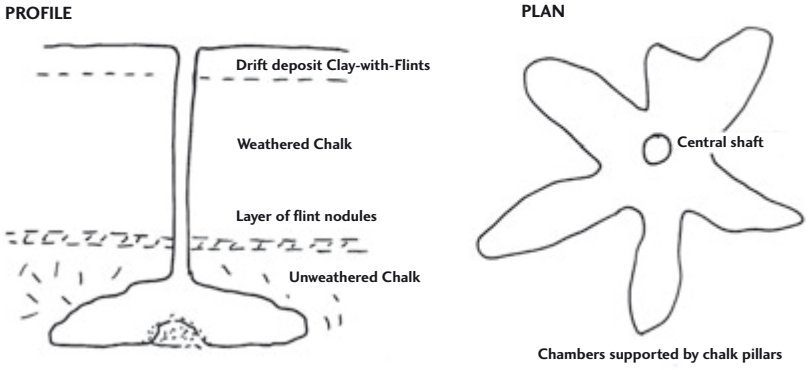
Not all the circular depressions found on the chalk hills are deneholes - they may also be bomb craters, a feature of which is an absence of a mound or ring of spoil around the depression. German fighters returning from a bombing raid over London would often drop the remainder of their lethal load across the countryside, resulting in a line of craters. Many craters in arable fields were backfilled, but those in woods were left.

More rarely, dew ponds may become preserved in woodland, where scrub has encroached on to former pasture and downland. Dew ponds are large, shallow circular depressions made of layers of puddle clay, straw and chalk or more recently of concrete. Fresh water is a scarce commodity on top of the chalk hills and therefore these ponds, with impervious bottoms, were constructed near to drove routes and on former sheep pastures. Unless regularly managed, the roots of invading trees and scrubs will penetrate the 'skin' leading to water loss.

Irregular Mounds and Depressions

Woodlands were often the location for the extraction of minerals and stone used in local industry. Evidence of extraction activity is usually shown by irregular spoil mounds and depressions. Some depressions can be

Figure 5. Diagram of a denehole (after Le Gear 1992) (NB)



quite deep with a clear working face and an access track where the material was hauled out by horse and cart or on skids. What was being quarried depends on the local underlying geology in the vicinity of the wood in question. Stone, iron ore, sand, clay, gravel, chalk and flints are all common raw materials exploited in the South East. In fact the varied, sedimentary geology of the Wealden anticline means that many different industries have operated within the region.

Chalk and Flint Pits
On the Downs, chalk pits and quarries are a frequent feature of woodland and scrub. The chalk was dug as the raw material to burn in kilns into 'quick' lime for mortar and fertilizer. Lime kilns may also be found nearby. In some areas, chalk blocks or 'clunch' were dug for use in constructing buildings. Flint pits tend to be smaller, and more shallow than chalk pits, and follow a seam or deposit of suitable stone. Flint was used both as hard core for roads and also shaped or 'knapped' for facing buildings and walls. Flint knappers also worked in the post-medieval period producing flints for armaments - hence the 'flint stock gun'. Many of the narrow shaws and woods on the Downs have small pits hidden in them.

Iron Mining
Water-filled pits and irregular mounds occur in many woods across the Weald, but are especially associated with outcrops of Wadhurst Clay. Iron ore has been dug in this area since around 600 BC. Often the line of a deposit can be traced along a valley by the location of pits in the numerous shaws or rews. Fragments of the heavy iron rich stone may still be scattered around. A concentration of woodland names, which include 'pit' and 'mine' may provide clues for presence of an exploited seam of iron stone.

By contrast, hidden in the Wealden gills may also be irregular mounds, comprising iron slag, the by-product of extracting the metal from the stone. These mounds are likely to be sites of bloomeries and may be Roman in origin. Later blast furnaces are more commonly associated with the large embanked hammer ponds (see page 55).

Brickworks
Former 18th and 19th century brickworks can often be identified on historic maps. All that often remains of the site complex is the pit with its working face from which the clay was dug and possible the shallow rectangular depression where the pug-mill was located. This was a machine powered by a horse, mule or donkey which turned the paddles that churned or 'pugged' the clay – mixing it with sand and making it suitable for moulding into bricks, tiles and drains. The remains of the kiln and drying sheds are rarely found.

Stone Quarries
Within the various softer deposits of the Wealden Series are bands of harder stone - sandstone and limestone - which were quarried locally for use in buildings. Kentish Rag, Bethersden Marble, Sussex Marble, Horsham Stone, and Reigate Stone are all local names for the limestone or Greensand rocks. Some quarries are large but many found in woods are small and were probably used by the local landowners for the construction and repair of adjacent estate and farm buildings.

Irregular Ponds
Water features are described below. However small, deep irregular ponds are frequently found in or adjacent to woodland especially where there are Weald Clay outcrops. These are probably water-filled extraction pits where marl, a bluey/grey calcareous clay was dug and spread on adjacent arable fields as a form of soil improver. Marl pits could be up to 5 metres deep, depending on the depth of the deposit and the level of the water table. Occasionally there may be spoil mounds associated with them.

Military Fox Dugouts
Dugouts or small machine gun hides are similar in appearance to saw pits. However, their profile is likely to be more sharply defined and the hole less silted,

Former hammer pond at Slaugham in the High Weald (photo - PM)

indicating a more recent origin. Dugouts may survive as an elliptical mound, with a mound on the downslope side, and are often located in an apparently strategic position overlooking the local landscape. The advantage of the position may now be less apparent if mature woodland obscures the view.

Water Features

Some water features, namely flooded extraction pits have already been covered above. The control and management of water, especially in the Weald itself, was an important part of the exploitation of the mineral resource. The numerous, fast flowing streams were often too small to power machinery directly and thus they were embanked and empounded, creating ponds and lakes to provide a suitable head of water to power mills, forges and furnaces. In order to achieve a regular supply through the summer months, penstocks or smaller ponds were created by embanking the gill streams often a mile or more upstream from the operating site. Today, only the breached bay or dam may survive from these smaller pen stocks. By contrast the main pond - more often called a 'hammer pond' after the large hammer used in the forges - may still hold water and survive as part of a tranquil scenic landscape, set within its woodland. This character belies its industrial origin. Many former hammer ponds became mill ponds powering corn and/or fulling mills. Others were used as fish ponds or incorporated into more formal landscapes.

Another water feature sometimes found in woodland is the homestead moat - rectangular ponds sometimes with associated fish ponds and earthworks, which surrounded a homestead and its outbuildings (see, for example, the photo on page 63). These features were mainly created in the 13th century as a status symbol but also gave some defence to the homestead, as well as a regular supply of fish. Most moated sites are today recorded and statutorily protected as scheduled sites.

Natural water courses have been discussed above but lengths of artificial water courses such as leats and canals can also be found surviving intact in woodlands. Leats are usually associated with mills, iron works and sometimes with designed landscapes, bringing water to lakes and ponds.

Ruins and Built Structures

Abandoned industrial, domestic and military sites may still survive as upstanding structures and ruins. The form they take and the extent of preservation depends on their origins, what they were built of, and when they were abandoned. Once a roof is no longer water tight rapid decay begins, until the site remains as just a scatter of building material, some of which may have previously been robbed for use elsewhere. Most structures are post-medieval and therefore there is likely to be some archive evidence to support their presence and original function.

One land use not often recorded is hop pickers' camps. These were temporary accommodation used by the hundreds of families who trekked south from London to help in the fruit and hop harvest in the 19th and 20th centuries. Originally, accommodation was limited to barns and livestock shelters, but a move was made in the 19th century to provide clean, sanitary conditions for the pickers and this was when tin and timber huts with cookhouses and latrines were built. Bricks and later concrete blocks were used to build permanent huts on the larger hop and fruit farms. Many camps were located in or on the edge of woodland, both to provide shelter and to ensure there would be a ready supply of fuel for the cook house. Today, few camps survive, having either rotted away, been demolished, or converted to other uses.

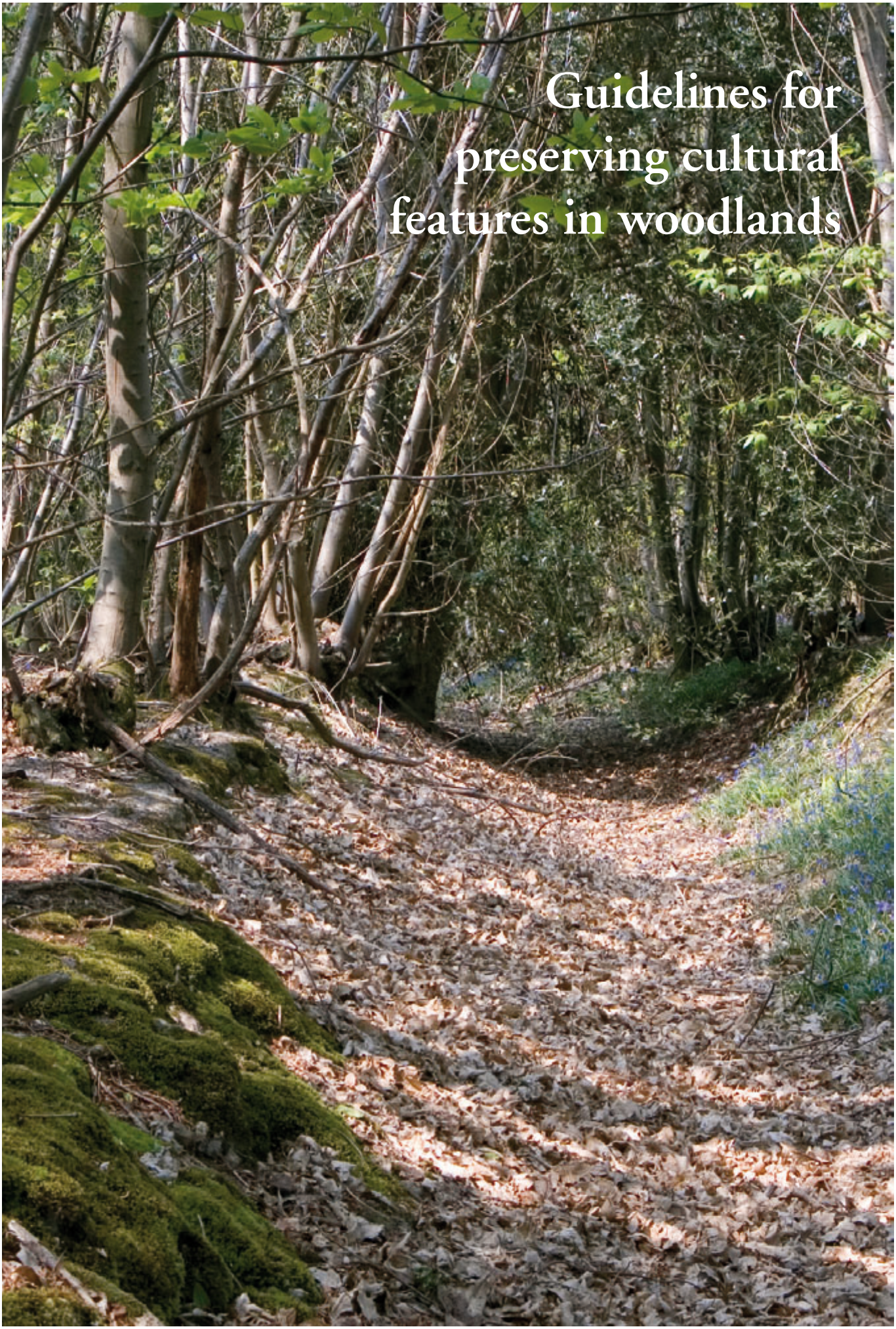
Appendix 2 contains flow diagrams to aid identification of features in woodland.

Footnotes

[1] Darvill, T. (1987) Ancient Monuments in the Countryside: an archaeological management review. English Heritage. p.92
[2] Hendry, G., Bannister, N. R. & Toms, J. (1984) The earthworks of an ancient woodland. Bristol and Avon Archaeology. Vol. 3 pp.47-53
[3] John Evelyn (1664) 'Sylva' or a Discourse of Forest Trees

Former hop pickers' huts restored by the National Trust, Broadham Wood, Scotney Castle estate in the High Weald. The original wallpaper put over the corrugated iron walls can still be found in some of the huts (photo - PM)

Guidelines for preserving cultural features in woodlands



Wood bank and ditch at Kilndown Wood, near Kilndown in the High Weald (Photo - PM)

Guidelines for Preserving Cultural Features in Woodlands

Introduction

There is a dichotomy between woodland and archaeology. On the one hand, trees, and in particular their roots, can damage archaeological features. On the other, woodlands can preserve archaeological features that would otherwise be damaged or destroyed through other land use activities. During and after the First and Second World Wars, many areas of ancient woodland, heathland and common were purchased by the Government and converted to plantation woodland, mostly coniferous. A consequence of this was that hundreds of archaeological sites become partly damaged and 'lost' within these new forests. Meanwhile, agrarian intensification in the 1960s and 1970s, combined with developments in infrastructure and the spread of suburbs resulted in hundreds more archaeological sites being completely destroyed. Today, the archaeological sites in woods and plantations are being rediscovered, and by comparison with other land use activities, are often fairly well preserved. Despite limited damage by tree roots, many barrows, for example, are still extant, whereas, if they had been in the adjacent farmland, they would probably have been ploughed out, surviving perhaps as only a faint crop mark in the soil.

The potential damage by tree roots and the preservation of archaeological sites in woodland is the dichotomy of understanding and conserving archaeological features and sites in this environment. Tree roots damage archaeological features, be they stratified deposits preserved below the ground surface, built structures of wood, brick or stone, or earthworks. The damage takes place in several ways:

Physical Action of the roots growing through the substrate;
Chemical Action of the gaseous exchange during respiration and action of water on organic deposits;
Indirect Action by providing both food and when the roots are large enough, shelter for burrowing animals who dig in the substrate, disturbing deposits.

Trees themselves can seriously damage earthworks when they are wind blown, wrenching up huge plates of earth. Traditionally, the management of woodlands by coppicing involved cyclical periods of inactivity, followed by short bursts of intense management, which in itself had a low impact on the archaeology in the woods. Coppicing involved the regular cutting of underwood in 7 to 25-year cycles depending on the species being cut and the wood products required. Often the process of coppicing helped to preserve features, such as through the re-stubbing of marker trees and the cleaning out of wood boundary ditches. These are now recognized as archaeological features in their own right. Over the recent decades, the decline in active coppicing in many small woods in the South East has resulted in long periods of undisturbed growth which have preserved archaeological sites and features in situ. But this has also brought further problems, with trees growing on archaeological sites becoming over-mature and more liable to wind throw.

Fallen tree on a Late Neolithic or Bronze Age burial mound at Box Hill in the Surrey Hills, showing how easily archaeological features can be damaged in woodland (photo - PM)

However, during the first half of the 20th century, when many ancient woodland sites were planted with commercial species, especially conifers, considerable disturbance took place to the archaeological resource preserved within the woods. The disturbance, though significant, was not as damaging as the changes taking place beyond the woods in the farmed land. Agricultural intensification led by European directives and subsidies has resulted in the loss of and significant damage to many hundreds of archaeological sites. Development - urban, suburban and industrial - with all of the associated infrastructure, has also had a significant impact on the survival of archaeological sites.

Woodlands can provide a stable environment in which archaeological sites can be conserved. Where these sites are managed either as part of a regular programme of work or where active management is resumed after a period of cessation, then good planning is essential to avoid the risk of further damage to archaeological features and sites.

The following section firstly describes the potentially damaging operations and activities which can take place in woods and which may affect the archaeological resource. Secondly, guidance and recommendations are given as to the 'Best Practice' for managing archaeological sites within an actively managed woodland, be it ancient semi-natural, a replanted ancient site, or secondary or plantation woodland.

Demonstration of sympathetic felling and extraction techniques at a woodland management event in the High Weald (photo - PM)

These guidelines also follow the UK Forestry Standard, the chief guide to the practice of sustainable forestry [1]. The Forestry Commission has issued its own guidelines on Forestry and Archaeology [2], and these are also incorporated into the section below.

POTENTIAL DAMAGE CAUSED BY FOREST MANAGEMENT ACTIVITIES

Damage to archaeological features by active woodland management can take place through a number of activities. The main way is through disturbance to the ground surface, caused by:

Ground preparation ahead of tree planting – ploughing, draining and general disturbance to the soils will damage all forms of archaeological features both above and below ground. Planting on archaeological sites not only results in initial physical damage to the feature - in the long term the root damage will be both physical and chemical.

Trimming and thinning of trees – brashing up generally may not be too damaging, although the long term damage by roots will continue. If unwanted trees are pulled up rather than cut down then further damage will occur.

Harvesting and extraction of timber – clear felling can be by far one of the most damaging operations where the ground is churned up by the passage of machinery and the hauling of felled trunks. Bonfire sites where brash is burnt will cause chemical and physical damage to below-ground stratigraphy. Creation of timber storage areas, where the topsoil is stripped back to solid sub-soil can total eradicate an archaeological site.

Farm rubbish dumped in a marl pit in Kent. Since the Agricultural Waste Regulations (2005), this practice is now illegal (photo - NB)

In the past, such activities made a significant contribution to the damage of archaeological sites in woods. Today, however, steps and checks are in place through the Forestry Commission's English Woodland Grant Scheme (EWGS) to identify, record and take necessary action to conserve features. The UK Forestry Standard [3] also sets out the guidance for 'best practice' when working in woods. However, positive and sympathetic management does rely on good communications and understanding between those undertaking the recording and those actually carrying out the woodland and forestry work. In addition, the preparation of a Woodland Plan, [4] which

sets out the environmental issues together with the management objectives for the wood in question, will establish a baseline of knowledge for the site.

POTENTIAL DAMAGE CAUSED BY RECREATION ACTIVITIES

Opportunities for quiet recreation generally do not cause significant damage to the cultural resource within a wood. However, visitor pressure along footpaths during periods of wet ground conditions can lead to loss of ground cover and erosion of any earthworks, and/or buried sites over which the route passes. This, combined with inadequate drainage of paths, can lead to extensive poaching.

Mountain bikes and horse riding can also be damaging to earthworks, especially boundary banks, which can offer opportunities for 'jumping' and 'rough terrain riding', which in turn cause wear, poaching and erosion. Intensive use of woodland for organised activities such as 'war games' and 'motor-X' can again result in severe erosion and poaching as well as disturbance to wildlife.

POTENTIAL DAMAGE CAUSED BY FRAGMENTATION IN OWNERSHIP

There is an increasing public demand to own a wood or piece of wood. There are a number of companies who buy up whole woods and offer them for resale in small, 1 to 5 acre parcels. Whilst many owners of small woodlands may be aware of the history and archaeological potential of their site and undertake good conservation management [5], there are situations where owners of small blocks may not be aware of the duty of care needed to manage and look after their woods. Fragmentation in ownership will also result in differing types of management taking place within a small area and also at varying levels of intensity within a single wood, which in turn will impact on the preservation of the archaeological resource.

Cattle grazing in woodland (Photo - PM)

Mountain bike damage to Iron Age hillfort ramparts at Holmbury Hill in the Surrey Hills (Photo - PM)

'Gardenification and Horsiculture'

Where woodlands, especially ancient sites, lie adjacent to domestic settlement, there is a danger/ threat to the woodland habitat, structure, and features from the extension of gardens and more formal landscaping into the woods. This may involve the planting of non-native species, the controlled invasion of vigorous non-natives into the wood, and the construction of hard landscaping in the form of fences, etc., which may damage earthworks and below-ground features.

Woods adjacent to settlement are often used as alternative 'compost disposal' areas where grass cuttings and other garden rubbish are dumped. This material not only enriches the soils but also can introduce vigorous alien plants into the woodland flora. Where woods lie next to industrial sites, they often become a convenient dumping ground for rubbish, with all its inherent problems. Small woods and shaws can be severely damaged by grazing livestock and in particular horses. The trees provide shade and equestrian owners can allow these areas to become overgrazed, poached and the trees badly chewed. Any boundary earthworks associated with the wood are also damaged by poaching and by the erection of fences.

'Best Practice' - Guidelines for the Preservation of Archaeological Features in Woodland

There are three stages in managing the cultural heritage within woodlands:

1. Identification and location of archaeological features

The important first stage in managing archaeological features is to walk the woodland, marking the sites of archaeological interest on a Ordnance Survey base map at either 1:10,000 or 1:2500 scale. The importance of surveying and recording woodland features is recognised in the Forestry Commission's English Woodland Grant Scheme (EWGS). There are two grants available, one for assessment and one for the preparation of a Whole Woodland Plan.

There are a series of guidelines, drawn up by Archaeological organisations, which set out the detail and method of undertaking archaeological assessments of a given site. Level 1 is a basic desktop evaluation using known records, whilst Level 4 is a very detailed geophysical and measured survey, combined with evaluation trenching. The most useful approach for woodland assessments is a modified Level 2, where more emphasis is placed on the field recording at 1:2500 scale (or 1:10,000 depending on the size of the wood), than the archive research [6]. When any archaeological assessment or survey is being proposed, advice and guidance should be sought from a professional landscape archaeologist (see Useful Contacts section). Surveys undertaken to Level 3 or Level 4 are generally only undertaken by registered and qualified archaeologists and archaeological units.

For an initial assessment of a given site, the following information should be obtained:

- List of statutory designations - archaeological, ecological and landscape.
- List of known archaeological records for the site from the National Monuments Record (NMR) and county Sites and Monuments Record (SMR).
- Copies of all maps both current and historical, which cover the site.
- The whole of the wood should be walked and all features of interest marked and annotated on a base map at a scale 1:2500. Where possible, a photographic record should also be made.

The information gathered above can then be used in the preparation of a Whole Woodland Plan. An outline format is available from the Forestry Commission web site (www.forestry.gov.uk/ewgs). For further advice, contact the local Forestry Commission officer and the County Archaeologist (see Useful Contacts section). A copy of the report of the archaeological assessment together with all maps should be sent to the relevant county Sites and Monuments Officer for entry on to the Sites and Monuments Record (or the Historic Environment Record). This will provide a permanent record of the wood and its cultural heritage.

2. Marking of features within the wood and informing those working on site

The second stage in the management of archaeological features is to mark them, both on a management map (which is used by those working within the

Example of using historic maps to identify woodland features: Park Wood in the High Weald, shown on the left on the Ordnance Survey First Edition County Series map for East Sussex (25 inch to the mile, 1869-75), and on the right, in a modern aerial photograph (1999). The previously wooded area below the road has been cleared for grazing, with only the standard oaks left.

woodland), and on the ground when management is to be undertaken. Prior to the commencement of any work, the owner or person in charge should mark on the ground, using coloured flags or similar, areas of archaeological interest which are to be avoided. Those working on the site should be briefed in detail about these sites and provided as necessary with copies of the management maps.

3. Having due regard for features while carrying out woodland management operations

The third stage in managing the cultural heritage within woodlands is to ensure that management operations do not damage site features. The main principle is to **minimise any disturbance** to archaeological sites. Different features may require different approaches to their management and long-term preservation. These management guidelines are described below for each of the main group of features (see also Appendix 2 for flow charts to aid identification of features in woods).

Management guidelines for minimising disturbance to Earthworks

The majority of archaeological sites and features found within woodland are of earthwork form and construction. An earthwork is either man-made or the result of human actions, consisting mainly of an earth or earth-covered structure which is extant i.e. which sits above and below the level of the surrounding land surface. Earthworks survive in a multitude of shapes and forms depending on their origin and the processes which have shaped them (see the Gazetteer of Archaeological Features found within Woodlands).

Linear banks have different profile shapes and sizes depending on their origins and often, 'by rule-of-thumb' the larger and more sinuous the bank, the older it is. For example, medieval wood banks which once bounded ecclesiastical woodlands can reach substantial sizes because the boundary earthwork was regularly restored by lay-brothers. Earthworks can exist as independent features, for example areas of mineral extraction, or be associated with other elements of the woodland such as stubs and hedges on boundary banks.

The main threat to the preservation of earthworks is through the erosion and wearing down of the profiles by other land use activities, such as the passage of vehicles - two and four-wheeled - people, and animals (both stock and equestrian).

All earthworks

Locate footpaths, bridleways, new wood access tracks and other routes away from earthworks. If it is not possible to avoid part of an earthwork, ensure that where the route crosses the feature, the drainage on and around the site is well maintained to avoid waterlogging and poaching. If a new access route is to be made, then an archaeological evaluation and/or watching brief may be needed to record anything of interest which may be uncovered. Advice should be sought from the County Archaeologist who can advise and help with watching briefs and evaluations. Practical help can also be obtained from the relevant county archaeological society or independent archaeological units (see Useful Contacts section).

Avoid taking wheeled and tracked vehicles over earthworks. However, this may be unavoidable in some situations, especially during thinning or felling. Temporary crossing points can therefore be created, by laying brash down across the track to protect the earthwork from erosion and compaction from the vehicles. Once the extraction, felling, etc. is completed the brash can be removed and the area 'made good'.

Internal boundary feature with pollarded hornbeam stubs at Denge Wood in the Kent Downs (photo - PM)

Boundary earthworks

Avoid erecting fence posts across or along archaeological earthworks, including boundary earthworks. Digging holes or banging in posts damages the structure and any below-ground stratigraphy of the feature. Any new fence needed to protect woodland from stock or to define ownership should be erected on the outer edge of the ditch on the non-woodland side of the boundary.

Management guidelines for minimising disturbance to Living Features

Living features include all forms of veteran trees and other significant trees, which provide evidence for the past land use history of the woodland. Repeated cutting of trees to provide a supply of underwood and timber prolongs their life, and creates aged and veteran specimens. These include ancient coppice stools, boundary stubs and pollards. These trees are vitally important habitat sites for a very wide range of flora and fauna. They are also often highly significant features within the countryside, adding to local character and distinctiveness.

Wood bank and laid hedge at Highfield Wood near Wanborough in Surrey (photo - NB)

In most cases the regular cutting regime has long since been abandoned and the trees are in a state of gradual decay. With careful management and cutting, not only of the specimen but also of the surrounding trees and canopy, these veteran trees can be reinvigorated to extend their lives further and thus continue their role as a significant woodland and landscape feature. Resumption of cutting without seeking advice may actually kill the tree. Advice should be sought from professionals on the suitability and legal status of old trees put forward for re-cutting.

Pollards

To prolong the life of existing pollards, stubs and boundary markers, cut back any competing trees, to leave space for a free, unimpeded crown. These veteran trees need plenty of light to reach their canopy, which is much reduced in comparison with their trunk and root structure. Some old pollards which appear vigorous, with plenty of healthy outer trunk may be suitable for re-pollarding. For detailed advice on re-pollarding see publications produced by the Veteran Tree Initiative [7].

Some veterans may be too old or decayed to re-pollard successfully. It may be necessary to reduce the height of the tree or size of the crown to prevent wind blow or shattering of the trunk. Decaying trees cut back in this way to make them safe can be left to stand as suitable habitats for birds, bats, and invertebrates. They also remain as landscape features. Consideration should be given to recruiting a new pollard by selecting a young tree and looking to pollard this in the future.

Coppice

Old coppice stools can reach quite large sizes and still be cut back. However, it is essential the coppice area or stool is adequately protected from deer, rabbits and stock which will readily eat the new shoots. Hornbeam can successfully sprout even after 50 years cessation of cutting, though there may be a delay in regrowth springing up. Old oak stools, where the stem is greater than 20cm diameter at breast height (dbh), may only put forward weak new shoots. Providing a stem is left on a beech coppice stool, the rest will regrow after cutting [8]. If the area of coppice is all of a uniform veteran age, then consideration should be given to establishing new coppice stools from self-sown saplings.

Stubs

Stubs and boundary marker trees can be managed in the same way as old pollards, by keeping competing trees and canopies cut back. Resumption of lopping may also be considered. This is important where an area of over-mature coppice is brought back into active management. Veteran stubs will then be left 'unprotected' by the mature coppice canopy leading to a greater threat from windthrow, and if the stub is on an earth bank, then the resulting root plate will damage the boundary profile.

Hedges

Many wood banks had a laid hedge along the top, which may now have disappeared (due to shading by tree canopies), or become outgrown. It is possible to re-establish a laid hedge on a bank if the trees and shrubs are not too large or mature.

Outgrown, former laid hedges are difficult to bring back into active management as the individual hedgerow shrubs may have reached the size of mature trees, forming a significant landscape feature. Stubbing, pollarding, or careful reduction in the canopy height may need to be considered in order to retain the trees as historical landscape features. Because they are boundary features, more often than not they will have been used as living 'fence posts' and have barbed, or rolled wire, railings and staples 'locked' within the trunk. This

Iron extraction pit in woodland near Penshurst in Kent (photo - NB)

makes managing them at breast height and below with a chainsaw difficult and potentially dangerous to the operator. Therefore, do not attach new stock fences to trees using nails, staples, etc., and do not use living trees as fence posts. Not only does this allow disease into the tree, the metal becomes embedded and is then a danger when using machinery, especially chainsaws or circular saws, to manage the tree.

Before commencing any management work on trees it is essential to check with the Forestry Commission on legal aspects such as felling licenses, and with the local planning authority on Tree Preservation Orders (TPOs). Also check with Natural England and the local Biological (or Environmental) Records Office to see if bat roosts (both hibernation and maternity) may be present. Both bats and badgers, and some species of bird are protected by law [9].

Management guidelines for minimising disturbance to Water Features

Any feature which holds water on a permanent or temporary basis is liable to poaching and erosion, not only of the feature itself but also of any accumulated, stratified silts and deposits. The latter is particularly relevant with features such as medieval moats, fishponds and natural water bodies, which have not been disturbed for centuries. Post-medieval ponds and water bodies which have not been disturbed are the sites for future palaeo-archaeological deposits which will 'preserve' the environmental evidence for land use in the post-medieval and modern periods. Water features include ponds, leats, streams, moats and industrial sites. There are numerous origins to ponds in woodland, such as natural or man-made ponds as a source of water, or those arising as flooded mineral extraction pits. Size and shape are very variable.

Water features should be managed in the same way as for earthworks, i.e. minimising disturbance and avoiding walking, driving, dragging or in any way eroding sites. This is especially relevant for those features which may only hold water in winter months, such as drainage networks.

Drainage Networks

The presence of a drainage network in a wood, depends on firstly the ground conditions and soils and secondly, how the wood was managed in the past. It is essential before undertaking any work on the ditches in a wood that the full extent of the drainage network is plotted on a map and studied on the ground (see above). This will provide a clearer picture of how the network(s) - there may be more than one phase or period of system present - operated. Identification of main carriers, and lesser ditches and grips, together with culverts and sump ponds will reveal flow of water, especially where they link with the natural drainage of streams within the wood. It is also important to identify wet boggy and waterlogged areas which are likely to be of high wildlife interest.

Medieval moat at Moat Wood near East Hoathly, in the Low Weald, sympathetically managed by the Woodland Trust (photo - PM)

These may never have been drained in the past or may - due to failure of the drainage network - have become waterlogged or silted up (such as ponds). Some former iron pits in the Weald now support rare communities of bryophytes and invertebrates. Advice should be sought from a professional ecologist on the wildlife present and best way to manage it, with due regard for the archaeology.

Reinstating a drainage system by cleaning it out should only be considered as part of a planting programme. Clearing out of leaf mould and organic debris by hand from ditches will help the movement of water but ditches should not be re-dug as this may cause localised areas of scouring. Use of machines to clean out old ditches is not recommended as this will damage or destroy the original profile. Where grips and drains have become blocked due to the passage of traffic, these should be cleaned out and possible a culvert or bridge constructed. By maintaining a functioning drainage system, routeways should remain relatively dry, reducing the impact of erosion and braiding of paths.

Ponds and lakes

Wherever possible any pond feature should be retained, as the water body and its margins provide an important wetland habitat. Any built structures, such as sluices, weirs and gates should be maintained, consolidated and kept clear of obstructions. If a public right of way crosses or is adjacent, such structures should be made safe and/or fenced off.

Ponds and larger water bodies such as fish ponds, decoy ponds and hammer ponds will have a large embankment or pond bay, the condition of which should be checked regularly for leaks, cracks and signs of wear. Dew ponds now located in woods are unlikely to hold water or if so very little, due to root damage to the impervious liner by adjacent trees and shrubs. Depending on the condition of the pond and the proposed management of the wood e.g. conversion back to grassland, it may be worth considering restoring the pond as a source of water for animals and stock.

Other water features

Other water features include mill leats, disused canals and remains of water meadows. Where stone, brick, etc., have been used, then the feature should be treated as for built structures. Mill leats and other artificial channels should be treated in the same way as ditches.

Management guidelines for minimising disturbance to Built Structures

Woodlands can preserve a range of built structures in various stages of decay from domestic dwellings to industrial sites. These are not always confined to areas of secondary woodland as sites of ancient origin may also have structures built within them, perhaps just within the woodland boundary, such as hop pickers' huts, small animal barns, etc.

Once the structure has been identified, it should be recorded, and if necessary the brick or stone work consolidated to make it safe. This is particularly relevant if the wood is open to the public. It may be necessary to fence the structure. Repair to built structures is prohibitively expensive and frequently uneconomical. As with all archaeological sites the objective for practical management is to minimise the amount of damage in the future. It is also important to reduce the rate of decay by controlling the amount of scrub growth and root penetration, and consolidating any brick and stone work. All features should be marked on the management map.

Management guidelines for minimising disturbance to Buried Features

Identification of buried features is difficult without detailed archive information, or, as with prehistoric sites, by association with extant features. Areas of archaeological potential should be annotated on the management map and in the Whole Woodland Plan. The area of a scheduled site usually includes a 5 metre buffer zone in which possible buried features may survive. A similar buffer zone should be adopted for non-scheduled sites which are of archaeological importance, such as iron bloomery sites. As with

Former marl pit at Dering Wood in the Low Weald in Kent (photo - PM)

Second World War tank at Broadwater Forest in the High Weald, probably abandoned by the Canadians after military training (photo - PM)

earthworks, minimise disturbance to the site; avoid taking vehicles over it or dragging timber across it. If possible manage the site as a meadow or glade, which will also have wildlife benefits.

Management guidelines for minimising disturbance by Stock Grazing

Grazing of woods by stock may have been a traditional management activity in the past for some woodlands, but it was carefully and strictly controlled by rules and 'fines' in order to avoid damage to the timber, underwood, and the potential for regeneration. Stock were generally herded by people and only grazed at certain times of the year or during certain times in the cycle of coppice management. Today, grazing by stock is either unintentional, by allowing fences to collapse and stock to move in, or intentional, by the opening up of woods to stock for shade, or for providing a 'natural environment' for free range animals such as pigs. In these cases, damage can take place quickly and be very severe.

Keep all woodland well fenced from domestic stock and equestrians animals. If grazing is to be part of the management of the wood, then only keep stocking density to the very minimum and only allow stock in when the ground conditions are dry. Do not allow poaching or erosion to take place. Where deer are a problem seek advice from the Forestry Commission.

Management recommendations for the general care of woodland

As well as specific management for individual features, there is a general duty of care or stewardship by owners and managers to woodlands in their management. Practically every wood contains some feature of archaeological, historical or cultural interest, part of the 'story' of how that part of the landscape was managed in the past.

Preserving the historic outline and name

The wood itself - its shape, its relationship with other landscape features such as hedges, lanes, greens, etc. - can tell a lot about how that particular area has evolved and how it was exploited for timber, underwood and other resources. A woodland shape with, for example, very irregular fields 'bitten' into it, would suggest that this is a wood created by 'assarting', where fields were created by clearing the woodland, leaving only a small core area (see historic map example, page 17). A regular, straight-edged wood set within a field pattern may derive from former coverts, planted as shelter for game. The name of a wood where it has remained unchanged through the centuries can also give clues as to its past, for example Moat Wood, Mine Pit Copse, Frith or Hurst Wood. Ensure that the historic name of the wood is retained for the future and that the shape of wood is not altered by piecemeal clearance to tidy up boundaries. If a new tree planting scheme is planned, ensure that its design and form is in keeping with the local character and historic form of existing woodlands.

'Gardenification'

There are two main threats to woodlands where they are in close proximity to domestic dwellings. The first is where rubbish of all forms and in particular garden rubbish are dumped in the wood. In the case of the latter, garden escapes from compost and cuttings can quickly become established and spread through the undergrowth choking out the native ground flora.

The second threat is where a woodland is brought into the curtilage of the house or where the garden is extended into a wood. It is a process which can occur when farmsteads are split and converted into several residences. Adjacent small woods or shaws become subsumed into the garden with undergrowth cleared and many underwood trees removed, leaving a few of the larger, mature trees as a remnant of the wood. The fences and boundaries are also removed and exotic species are planted. The character and ecological diversity of the wood is thus compromised and this may result in the long term felling of timber and eventual loss of the woodland.

The overall aim is to control the regeneration and spread of exotic and invasive species, which can locally dominate the native woodland flora. Notifiable invasive species such as Japanese knotweed, giant hogweed and Himalayan balsam, together with rhododendron, should be strictly controlled, with the aim of total eradication of the former three. Guidelines on how to do this are available from Natural England and the Environment Agency (see Useful Contacts section). Woods adjacent to gardens and domestic dwellings should be retained and managed in a traditional way such as by coppicing. Garden rubbish should be composted in a way that does not allow garden species to spread into woodland.

Summary of Management Guidelines for Archaeological Sites and Features

Minimise disturbance to archaeological sites and features

- Identify and record all cultural heritage features within and associated with the woodland, including scheduled and non-scheduled sites, veteran trees, etc. Seek advice from the county archaeologist and a professional landscape archaeologist with experience in woodland archaeology.
- Produce a Woodland Plan and include an annotated map showing all the features identified.
- Inform all workers and contractors of the cultural heritage of the wood, the location of individual features, and mark out sites prior to operations using posts, tape and/ or flags.
- Prior to undertaking active management within the wood, plan access and extraction routes, timber storage and refuelling areas to avoid archaeological features and sites.
- Avoid taking machinery over earthworks or buried sites. If this is unavoidable, select one key area and cover with brash or other protective material. Remove after use. Avoid using such an area when the ground conditions are wet or after periods of heavy rainfall.
- Ahead of tree planting, avoid ground preparations over archaeological sites including drainage works, scarifying, etc. Do not plant trees on such sites but manage as open glades. Avoid scrubbing up by cutting the vegetation or using an approved selective herbicide. Discourage burrowing animals without disturbing the ground surface.
- Site recreational facilities including paths away from archaeological sites. Maintain existing routeways, restore any drainage channels and reinstate any eroded paths with a suitable covering.
- Clear tree and shrub growth away from veteran trees such as pollards and stubs; maintain these features within the wood; reduce height if in danger of wind throw after felling of adjacent woodland. Where feasible, recruit new pollards into the woodland structure.
- Maintain, and if possible restore any water features, having due regard for the archaeological potential of any accumulated silts and deposits. Do not drain any wet, mirey areas which are not on public rights of way.
- Fence and where possible restore traditional coppice management of small woods and shaws which are grazed by livestock. Allow natural regeneration from the seed bed. If it is necessary to replant, use saplings grown from local, native seed stock.
- Where hedgerows are the usual boundary feature, re-introduce traditional hedge management techniques either through laying or coppicing. Where possible, re-stub boundary marker trees.
- Do not use metal detectors on archaeological sites.
- If archaeological remains and finds are discovered while working, leave them undisturbed and make a report to the County Archaeologist. Finds have a greater significance when left in place. If removed from context they can become meaningless.

Statutory Protection of Archaeology in Woodland

Scheduled Ancient Monuments
Archaeological sites and monuments which are recognised as being of national importance are protected under the Ancient Monuments and Archaeological Areas Act (AMAAA) 1979 (currently under review). Owners of Scheduled Monuments must protect them from any potentially damaging operations. These sites can receive grant aid towards their management in the form of management agreements under section 17 of the Act. It is against the law to use metal detectors on a scheduled site (see below).

Most extant prehistoric features in woodlands are scheduled, as are medieval moats, settlement sites and nationally important industrial sites. However, many woodland archaeological features are not protected. Their preservation relies on good 'best' forestry practice following the UK Forestry Standards and guidelines (see Appendix 1). Where such sites occur in National Nature Reserves (NNRs), Sites of Special Scientific Interest (SSSIs) and Sites of Nature Conservation Interest (SNCIs), then management for nature conservation could accommodate the management of such features. The objectives for these sites are for the improvement and maintenance of wildlife habitats, but any works should be tailored to minimise damage to archaeological sites. For example, the creation of glades and rides could coincide with archaeological sites, keeping them free from scrub encroachment and trees. Where natural regeneration is proposed this should be kept clear of known archaeological sites. This will provide diversity of woodland habitat whilst minimising disturbance to the site from tree growth. However, this approach requires the managers of reserves to have an understanding and knowledge of the cultural resource on their property. There is an increasing trend towards the use of grazing as a means of management on woodland reserves. The full implications of such an option should be seriously considered, not only for the ecological functioning of the site, but also for the impact on any archaeological features.

Use of Metal Detectors
Recovering archaeological artefacts using metal detectors can damage archaeological sites. Removal of artefacts out of their context diminishes the understanding that can be gained from studying an artefact in situ. Removal can also damage the integrity of features associated with the site, including any stratified deposits. Removing archaeological artefacts without recording the object, its location and context, and inadequate conservation of the artefact and subsequent loss to the public domain are equally damaging. The information that could have been obtained using professional guidance and 'best archaeological practice' is then lost forever. This also follows for field-walking (collection of material from the ground surface). The use of metal detectors in woodland should be actively discouraged unless it is part of an approved archaeological assessment with a prepared brief, and clear structures in place for the conservation, recording, interpretation, and preservation of all finds, and which meets best and current archaeological practice. Metal detectors used under these conditions can contribute significantly to knowledge about a particular site.

The use of metal detectors on schedule sites is prohibited by law, without a licence issued from the Secretary of State. It is also an offence to remove from a scheduled site any artefact or object discovered using a metal detector [10].

The National Trust along with other similar trusts and public bodies do not permit the use of metal detectors on their land without consent from the appropriate managers [11].

On private land, the owner's consent must be obtained in writing. A woodland owner, approached by a request to use a metal detector, should ensure that the individual or group belongs to the National Council for Metal Detecting, which has a Code of Conduct to which all members must adhere. Any other requests should be refused. Further information is available from the web site of the Portable Antiquities Scheme.

However, any stray surface finds found on a property should be taken to the county's Small Finds Liaison Officer (Portable Antiquities Scheme), for identification, record and advice on preservation (see Useful Contacts section).

Forestry Commission English Woodland Grant Scheme
In 2005, the new English Woodland Grant Scheme (EWGS) was launched, replacing the previous Woodland Grant Scheme. The Scheme comprises six parts (see Appendix 1), and includes grants for the preparation of a Woodland Plan and one for undertaking more detailed assessments of a site prior to undertaking active management, including 'historic and cultural assessments'. For further information and an application pack, visit the Forestry Commission web site (www.forestry.gov.uk/ewgs).

UK Forestry Standard Notes and Guidelines
The UK Forestry Standard sets out the Government's approach to sustainable forestry and standards for best practice [12] . It covers all aspects of forestry management. The Standard Notes are supported by published guidelines on 'best practice'. The Forestry Commission's guidance on Forests and Archaeology is currently under review and due for re-publication [13].

Footnotes

[1] Forestry Authority (1998) The UK Forestry Standard. The Government's Approach to Sustainable Forestry. DANI. Forestry Commission, Edinburgh. 2nd Ed. 2004

[2] Forestry Authority (1995) Forests and Archaeology Guidelines (currently being updated). Forestry Commission, Edinburgh

[3] Forestry Authority (1998) The UK Forestry Standard. The Government's Approach to Sustainable Forestry. DANI. Forestry Commission, Edinburgh. 2nd Ed 2004

[4] Forestry Commission 'Woodland Plan'. An outline structure and guidance is given on the Forestry Commission web site (www.forestry.gov.uk)

[5] The Association of Small Woodland Owners (see Useful Contacts section)

[6] RCHM(E) (1999) Recording Archaeological Field Monuments. A Descriptive Specification. English Heritage. National Trust (2000) Archaeology and the Historic Environment. Historic Landscape Survey Guidelines. Estates Dept Archaeology Section Cirencester. English Heritage

[7] English Nature (2000) The Future of Veteran Trees; English Nature (1999) Guide to the care of ancient trees; Read, H.J. (1996) Pollard and Veteran Tree Management. Corporation of London.

[8] Forestry Commission (1994) Forestry Practice Guide 1 Lowland Beech-Ash Woods

[9] The Wildlife & Countryside Act 1981; Countryside and Rights of Way Act 2000
EC Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, 1992

[10] The Ancient Monuments and Archaeological Areas Act 1979; The Treasure Act 1996 Code of Practice (England & Wales) Dept of National Heritage 1997

[11] National Trust (2002) The National Trust and the use of Metal Detectors. A Position Paper, Policy & Guidelines

[12] Forestry Authority (2001) The UK Forestry Standard. DANI

[13] Forestry Authority (1995) Forests and Archaeology Guidelines. Forestry Commission, Edinburgh

Sunken trackway alongside Broadham Wood, near Kilndown in the High Weald (photo - PM)

References and Bibliography

Ashbee, P. (2006) Kent in Prehistoric Times, Tempus

Bannister, N. R. (1992) Historic Landscape Survey, Wormshill Estate. Unpublished Report for English Heritage

Bannister, N. R. (1996) Woodland Archaeology in Surrey: Its recognition and management. Surrey County Council

Bannister, N. R. (1998) Archaeological Assessment of the Hucking Estate. Unpublished Report for the Woodland Trust

Bannister, N. R. (2002) The Management of Dering Wood, Smarden, since the Medieval period: Archaeological and Documentary Evidence. Archaeologia Cantiana Vol. CXXII pp.221-235

Bannister, N. R. (2002) Archaeological Assessment of Marden Park. Unpublished Report for the Woodland Trust

Bannister, N. R. (2002) Great Ridings Wood, Archaeological Assessment. Unpublished report for the Woodland Trust

Bird, D. G. & Bird, J. eds. (1987) The Archaeology of Surrey to 1540. Surrey Archaeological Society

Blair, J. (1991) Early Medieval Surrey. Surrey Archaeological Society and Alan Sutton Publishing

John Boys (1795) A General View of the Agriculture of the County of Kent

Brandon, P. (2003) The Kent & Sussex Weald, Phillimore

Brandon, P. (2006) The North Downs, Phillimore

Countryside Commission (1994) The High Weald: Exploring the landscape of the AONB. CCP 466

Countryside Commission (1998) The Surrey Hills Landscape, CCP 530

Cleere, H.F. (1976) Some operating parameters for Roman ironworks. Bulletin of the Institute of Archaeology 13

Cleere, H. & Crossley, D. (1995) The Iron Industry of the Weald. Merton Priory Press, Cardiff. 2nd ed.

Crow, P. (2001) Trees and Forestry on Archaeological Sites in the UK: A discussion document. Forest Research. Environmental Research Branch. Forestry Commission, Alice Holt

Currie, C. K. (2000) Polesden Lacey and Ranmore Common Estates near Dorking: an archaeological and historical Survey. Surrey Archaeological Collections. 87: pp.49-84

Darvill, T. (1987) Ancient Monuments in the Countryside: an archaeological management review. English Heritage

Dimbleby, G. W. (1960) 'Appendix D. Pollen', in J.H. Money, 'Excavations at High Rocks, Tunbridge Wells. 1954-56', Sussex Archaeological Collections 98, pp.212-17

Dimbleby, G. W. (1968) Pollen Analysis, J.H. Money. Excavations in the Iron Age Hillfort at High Rocks near Tunbridge Wells 1957-1961. Sussex Archaeological Collections 106, pp.193-7

Dimbleby, G. W. (1969) Report on Pollen Analysis, N. Percy-Fox, Caeser's Camp, Keston, Archaeologia Cantiana 84, p.196

Dimbleby, G. W. (1970) Report on Pollen Analysis, N. Percy-Fox, The Iron Age Camp at Squerryes, Westerham, Archaeologia Cantiana 85

Drewett, P., Rudling, D. & Gardiner, M. (1988) The South East to AD 1000. Longman

English Heritage (2005) Outstanding Beauty: Outstanding Heritage. AONBs and the Historic Environment. CADW, Welsh Assembly Government, English Heritage, NAAONB

English Nature (1999) Guide to the care of ancient trees. English Nature, Peterborough

English Nature (2000) Veteran Trees. A guide to grants. Veteran Tree Initiative. English Nature, Peterborough

English Nature (2000) The Future of Veteran Trees. English Nature, Peterborough

Evans, J.G. (1975) The Environment of Man in the British Isles, London

Evelyn, J. (1664) 'Sylva' or A Discourse of Forest Trees

Everitt, A. (1987) Continuity and Colonisation; the evolution of Kentish Settlement. University of Leicester

Fairclough, K. R. (1999) Thomas Coram: his brief period as a gunpowder producer. Surrey Archaeological Collections. 86: pp.53-72

Fairclough, K. R. (2000) The East India Company and gunpowder production in England. Surrey Archaeological Collections. 87: pp.95-112

Ibid (2000) The Cordwell Family, gunpowder producers at Chilworth 1635-1650. Surrey Archaeological Collections. 87: 113-126

Forestry Commission (1994) Forestry Practice Guide 1. Lowland Beech-Ash Woods. Forestry Commission, Edinburgh

The Forestry Authority (1995) Forests and Archaeology: Guidelines. Forestry Commission. (Currently being updated and republished)

The Forestry Authority (1998) The UK Forestry Standard. The Government's Approach to Sustainable Forestry. Forestry Commission. DANI. Forestry Commission, Edinburgh. 2nd Ed 2004

Forestry Commission (2003) Tree Felling: getting permission. FCCS100

Forestry Commission (2003) So, you own a woodland? Getting to know your wood and looking after it. Forestry Commission, Cambridge

Forestry Commission (2005) English Woodland Grant Scheme. Grants for the stewardship and creation of woodlands. Applicant's Pack

Game Conservancy (2003) Woodland Conservation and Pheasants

Godwin, H. (1962) Vegetational history of the Kentish chalk downs as seen at Wingham and Frogholt. Veröff. Geobot. Inst., Zürich 37, pp.83-99

Harris, R. B. (2003) The Making of the High Weald. Informing the High Weald AONB Management Plan 2004. High Weald AONB Joint Advisory Committee. Version 2.2. High Weald AONB Unit, Flimwell

Hendry, G, Bannister, N.R. & Toms, J. (1984) The Earthworks of an Ancient Woodland. Bristol and Avon Archaeological Journal. Vol. 3 pp.47-53

High Weald AONB (2004) Management Plan 2004 : a 20 year strategy. High Weald AONB Unit, Flimwell

James, N.D.G. (1991) An Historical Dictionary of Forestry and Woodland Terms. Blackwell

Keef, P.A.M., Wymer, J.J. & Dimbleby, G.W. (1965) A Mesolithic site on Iping Common, Sussex, England. Proceedings of the Prehistoric Society, 31 pp.85-92

Kent Downs AONB (2004) A management plan for 2004-2009. Kent Downs AONB

Kerney, M.P., Braun, E.H. & Chandler, T.J. (1964) The Late-Glacial and Post-Glacial history of the Chalk Escarpement, near Brook, Kent. Phil. Transactions Royal Society, London, B248

Kipling, R. (1902) 'Sussex'. In 'The works of Rudyard Kipling. Wordsworth Poetry Library

Lawson, T. & Killingray, D. (2004) An Historical Atlas of Kent. Phillimore

Le Gear R.F. (1992) The Bexley Deneholes. Bexley Libraries and Museums

Margery, I.D. (1930) 'A Celtic Enclosure in Ashdown Forest'. Sussex Notes and Queries 3 pp.71-2

Morris, J. (2005) Woodland Archaeology in the Chilterns. Chiltern Woodlands Project. 3 volumes

National Trust (2000) Archaeology and the Historic Environment. Historic Landscape Survey Guidelines. Estates Department. Archaeology Section. Cirencester

National Trust (2002) The National Trust and the use of Metal Detectors. A Position Paper, Policy & Guidelines

Nature Conservancy Council (1989) East Sussex Ancient Woodland Inventory
Ibid (1989) West Sussex Ancient Woodland Inventory
Ibid (1997) Surrey Ancient Woodland Inventory
Ibid (1994) Kent Ancient Woodland Inventory

Rackham, O. (2003) Ancient Woodland. New Edition Castlepoint Press

Read, H. J. (1996) Pollard and Veteran Tree Management. Corporation of London.
Roberts, G. (1999) Woodlands of Kent, Geerings
RCHME (1996) Recording Historic Buildings. A descriptive specification. Royal Commission on the Historical Monuments of England

RCHME (1999) Recording Archaeological Field Monuments. A descriptive specification. Royal Commission on the Historical Monuments of England

Rudling, D. (1999) 'Roman Sussex' in An Historical Atlas of Sussex ed. Kim Leslie and Brian Short (1999). Phillimore, Chichester

Scaife, R. G. (1987) Further evidence for the environmental impact of prehistoric cultures in Sussex from alluvial fill deposits in the eastern Rother Valley. Sussex Archaeological Collections 125

Smith, V. (1975) The London Mobilisation Centres. London Archaeologist II 244-248

Spencer, J. (2002) Ancient Woodland on the Forestry Commission Estate in England. Survey Report. Forest Enterprise

Swanton, M. (2000) The Anglo-Saxon Chronicles. Phoenix Press, London

Thompson, R. Humphrey, J. Harmer, R. and Ferris, R. (2003) Restoration of Native Woodland on Ancient Woodland Sites. A practical guide. Forestry Commission

Vera, F. W. M. (2001) Grazing Ecology and Forest History, CABI Publishing

Westaway, S. (2006) A revision of the Ancient Woodland Inventory for Wealden District, East Sussex. Final Report. High Weald AONB Unit, Flimwell

Watt, T. A. & Chapman, G. P. (1994) The Natural History of a Country Estate: Wye College, Kent. Wye College Press

Witney, K. P. (1976) The Jutish Forest, Athlone Press

Woodland Trust (n.d.) Ancient Tree Guides. No.1 Trees and Farming. Ancient Tree Forum

Glossary of terms used in the text

Assart	Originally a French word meaning to 'clear and enclose land' from waste or woodland. The resulting fields are termed assart fields.
Bloomery	A furnace and forge in which wrought iron in the form of blooms is made from iron ore, or (less frequently) from cast iron.
Boling	The thickened stump of a pollarded tree.
Coppice	Trees cut on regular cycles in order to harvest multi-stems.
Coupes	Areas of a coppice which are cut in rotation of 7 to 15 year cycles depending on the species and the type of poles required.
Gill	A sinuous narrow wooded valley, characteristic of the High Weald. These woods are often ancient in origin and may contain evidence of former iron workings.
Hundred	A division of the shire, which probably originated in the 10th century, consisting of hundred families, 100 hides of land or ten tithings. A Court was held presided over by a hundred reeve acting on behalf of the king.
Lynchet	A step-like boundary earthwork formed by downslope accumulation of soil under cultivation, collecting against a hedge, stones, fence.
Manor	Land held by a lord, tenure of which was held by various rights and customs, and administered by a manorial court.
Pollards	Trees cut at a height of 3m or 10ft above ground level in order to harvest the timber. Used especially where stock are grazing in wood-pasture systems.
Rew	Can be a hedgerow, row of trees or a shaw [1].
Shaw	A small wood, coppice or spinney, but is more commonly used to mean a narrow strip of woodland growing alongside the edge the margins of a field [2].
Shave	Is a small wood or copse and is similar to that of a shaw, although the name is sometimes used in reference to a hedgerow [3].
Standards	Trees allowed grow to maturity with single stem in order to produce long, straight timber.
Stratigraphy	The horizontal layers of accumulated soils and buried human artifacts. The presumption being that oldest deposits are the lowest (deepest) in the profile.
Stubs	Trees cut at a height of about 1 metre or 3 feet to produce multi-stems. Used as a way of marking boundaries and coppice coupes.
Timber	Wood produced from mature or standard trees.
Underwood	Wood produced from coppice.
Wood-pasture	An open woodland, or wooded pasture where stock were allowed to graze beneath trees managed for their timber. An ancient form of woodland management rarely practised now.

Footnotes

[1] James, N. D. G. (1991) Forestry and Woodland Terms. Blackwell

[2] ibid

[3] ibid

Useful Contacts

AONBs

High Weald AONB
Woodland Enterprise Centre, Hastings Road,
Flimwell, East Sussex TN5 7PR
Tel: 01580 879500
www.highweald.org
email: info@highweald.org

Kent Downs AONB
West Barn, Penstock Hall Farm, Canterbury Road,
East Brabourne, Ashford, Kent TN25 5LL
Tel: 01303 815170
www.kentdowns.org.uk
email: mail@kentdowns.org.uk

Surrey Hills AONB
Warren Farm Barns, Headley Lane,
Mickleham, Dorking, Surrey RH5 6DG
Tel: 01372 220653
www.surreyhills.org
email: surreyhills@surreycc.gov.uk

Archaeological Societies

Kent Archaeological Society
The Museum, St Faith's Street, Maidstone,
Kent ME14 1LH
www.kentarchaeology.org.uk

Surrey Archaeological Society
Castle Arch, Guildford, Surrey GU1 3SX
Tel: 01483 532454
www.surreyarchaeology.org.uk
email: surreyarch@compuserve.com

Sussex Archaeological Society
Bull House, 92 High Street, Lewes,
East Sussex BN7 1XH
Tel: 01273 486260
www.sussexpast.co.uk
email: ceo@sussexpast.co.uk

Archaeological Trusts

Independent Local Archaeological Trusts and Units with specialist knowledge of archaeology in the South East (registered with the Institute of Field Archaeologists, IFA)

Canterbury Archaeological Trust Ltd
92a Broad Street, Canterbury, Kent CT1 2LU
Tel: 01227 462062
www.canterburytrust.co.uk
email: admin@canterburytrust.co.uk

Surrey County Archaeological Unit
Surrey History Centre, 130 Goldsworth Road,
Woking, Surrey GU21 6ND
Tel: 01483 518777
www.surreycc.gov.uk/archaeology
e:mail archaeology.scau@surreycc.gov.uk

Archaeology South-East (a division of University College London Field Archaeology Unit)
1 West Street, Ditchling, Hassocks,
West Sussex BN6 8TS
Tel: 01273 845497
www.archaeologyse.co.uk
email: d.perring@ucl.ac.uk

Names of other specialists in woodland archaeology can be obtained from the Forestry Commission

Archives and Local Study Centres

Access to Archives
www.a2a.org.uk

Canterbury Cathedral Archives
The Precincts, Canterbury, Kent CT1 2EH
Tel: 01227 865330
www.canterbury-cathedral.org
email: archives@canterbury-cathedral.org

Centre for Kentish Studies
Sessions House, County Hall, Maidstone,
Kent ME14 1XQ
Tel: 01622 694363
www.kent.gov.uk/archives
email: archives@kent.gov.uk

East Kent Archives Centre
Enterprise Zone, Honeywood Road, Whitfield,
Dover, Kent CT16 3EH
Tel: 01304 829306
www.kent.gov.uk/e&l/artslib/archives
email: eastkentarchives@kent.gov.uk

Medway Archives and Local Studies Centre
Civic Centre, Strood, Medway Kent ME2 4AU
Tel: 01634 332714
www.medway.gov.uk
email: local.studies@medway.gov.uk

The National Archives (formerly the Public Records Office)
Kew, Richmond, Surrey TW9 4DU
Tel: 020 8392 5200
www.nationalarchives.gov.uk
email: enquiry@nationalarchives.gov.uk

Surrey History Centre
Tel: 130 Goldsworth Road, Woking, Surrey GU21 1ND
01483 518737
www.surreycc.gov.uk
email: shs@surreycc.gov.uk

County Archaeologists

Casper Johnson
County Archaeologist
Transport and Environment Department
East Sussex County Council, County Hall, St Anne's Crescent, Lewes, East Sussex BN7 1UE
Tel: 01273 481608
email: casper.johnson@eastsussex.gov.uk

Dr John Williams
Principal Archaeologist
Heritage and Conservation Department
Environment & Waste, Kent County Council
Invicta House, Maidstone, Kent ME14 1XX
Tel: 01622 221535
email: john.williams@kent.gov.uk

Surrey County Archaeological Unit
Surrey History Centre
130 Goldsworth Road, Woking, Surrey GU21 6ND
Tel: 01483 518777
email: archaeology.scau@surreycc.gov.uk

Mark Taylor
Senior Archaeologist
Historic Environment Department
Environment Group, West Sussex County Council
Third Floor, The Grange, Tower Street, Chichester,
West Sussex PO19 1RH
Tel: 01243 382018
email: mark.taylor@westsussex.gov.uk

County Records Offices

East Sussex Records Office
The Maltings, Castle Precincts, Lewes,
East Sussex BN7 1YT
Tel: 01273 482349
www.eastsussexcc.gov.uk
email: archives@eastsussex.gov.uk

West Sussex Records Office
Sherburne House, 3 Orchard Street, Chichester.
Postal enquiries to County Hall, Chichester,
West Sussex PO19 1RN
Tel: 01243 753600
www.westsussex.gov.uk
email: records.office@westsussex.gov.uk

Non-government Conservation Organisations

The National Trust
Central Office, Heelis, Kemble Drive, Swindon,
Wiltshire SN2 2NA
Tel: 0870 609 5383
www.nationaltrust.org.uk

The Woodland Trust
Autumn Park, Dysart Road, Grantham,
Lincolnshire NG31 6LL
www.woodland_trust.org.uk

Research Groups

Kent Underground Research Group
www.KURG.org.uk

Wealden Iron Research Group
www.wealdeniron.org.uk

Sites and Monuments Record (SMR)

East Sussex SMR
East Sussex Historical Environment Record
Archaeology Section, Transport & Environment,
East Sussex County Council, St Anne's Crescent,
Lewes, East Sussex BN7 1UE
Tel: 01273 481608
email: gregory.chuter@eastsussex.gov.uk
casper.johnson@eastsussex.gov.uk

Kent SMR
The Sites and Monuments Record Officer,
Heritage Conservation Group, Invicta House,
County Hall, Maidstone, Kent ME14 1XX
Tel: 01622 221541
www.kent.gov.uk
email: heritageconservation@kent.gov.uk

Surrey SMR
Surrey County Council, County Hall,
Kingston-Upon-Thames, Surrey KT1 2DY
Tel: 020 8541 9083
email: smr@surreycc.gov.uk

West Sussex SMR
West Sussex County Council
Environmental and Economic Policy Service,
The Grange, Tower Street, Chichester,
West Sussex PO19 1RH
01243 756858
email: keith.watson@westsussex.gov.uk

The National Monuments Record (NMR)
NMR Enquiry & Research Services,
National Monuments Record, English Heritage,
Kemble Drive, Swindon, Wiltshire SN2 2GZ
Tel: 01793 414600
www.english-heritage.org.uk
email: nmrinfo@english-heritage.org.uk

Government Departments and Agencies

English Heritage (South East region)
Eastgate Court, 195-205 High Street, Guildford,
Surrey GU1 3EH
Tel: 01483 252000
email: southeast@english-heritage.org.uk

Forestry Commission
South East Conservancy and area office for
Hampshire, Isle of Wight, West Sussex and Surrey
Forestry Commission, Alice Holt, Wrecclesham,
Farnham, Surrey GU10 4LF
Tel: 01420 23337
www.forestry.org.uk
email: southeast.fce@forestry.gsi.gov.uk

Forestry Commission
Kent and East Sussex Area Office, Park Lane,
Goudhurst, Cranbrook, Kent TN17 2SL
Tel: 01580 211123
email: southeast.fce@forestry.gsi.gov.uk

Forestry Commission England
Great Eastern House, Tenison Road,
Cambridge CB1 2DU
Tel: 01223 314546
www.forestry.gov.uk/ewgs
email: nationaloffice.fce@forestry.gsi.gov.uk

Natural England
Eastern Area Team (covering, Kent, Surrey, and Sussex)
Lewes office:
Natural England, Phoenix House, 33 North Street,
Lewes, East Sussex BN7 2PH
Tel: 01273 476595
www.naturalengland.org.uk
e-mail: sussex.surrey@naturalengland.org.uk

Other Relevant Organisations

British Horse Loggers
National Industry body representing horse logging
contractors in the UK
www.britishhorseloggers.org.uk

National Hedgelaying Association
Allan Portas, The Secretary, 88 Manor Road,
Toddington, Bedfordshire LU5 6AJ
www.hedgelaying.org.uk
email: allan.portas@farmersweekly.net

Portable Antiquities Scheme
British Museum, London WC1B 3DG
Tel: 020 7323 8611
www.finds.org.uk for local officers and contacts

Royal Forestry Society
Main Office: 102 High Street, Tring, Hertfordshire
HP23 4AF
Tel: 01442 822028
www.rfs.org.uk
email: rfshq@rfs.org.uk

Small Woodlands Association
The Old Bakery, Pontesbury, Shropshire SY5 0RR
Tel: 01743 792644
www.smallwoods.org.uk

Appendix 1: Legislative Background to 'Best Practice'

A number of woodland sites may have already been researched in the past, either as part of a detailed historic or archaeological landscape survey or as part of a management plan. More usually, the first time an interest is taken in a wood is when active management - be it traditional or commercial - is to be reintroduced or resumed. This is usually as part of a grant scheme, such as the former Woodland Grant Scheme (now EWGS) or as part of an environmental stewardship project.

Statutory Protection

Archaeological sites which are statutorily protected, (under the 1979 Ancient Monuments and Archaeological Areas Act), will usually have a management agreement in place drawn up by English Heritage and the woodland owner. This agreement will set out the best way to preserve the feature in woodland, and identify the programme of work needed to prevent damage or further damage to the site. These agreements are reviewed every five years.

Ecological sites - NNRs, SSSIs, SNCIs, TPOs and species protected under the Wildlife & Countryside Act 1981; Countryside and Rights of Way Act 2000; EC Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, 1992. See also Planning Policy Statement 9 (PPS 9): Biodiversity and Geological Conservation (2005).

English Woodland Grant Scheme
The Forestry Commission's England Woodland Grant Scheme (EWGS) was introduced in 2005, replacing the former Woodland Grant Scheme (WGS). The EWGS comprises six grants depending on the type of management to be undertaken: [1]

Woodland Planning Grant – This grant contributes to the costs of producing management plans for existing woodlands that meet the planning requirements of the UK Woodland Assurance Standard.

Woodland Assessment Grant – The Forestry Commission may consider that further information is required before decisions can be made about work in a woodland. Woodland Assessment Grant contributes to the standard costs of undertaking these specified assessments, which can include a 'Historic and Cultural Assessment'.

Woodland Regeneration Grant – One of the greatest opportunities to change a woodland is when felled areas are regenerated, whether by planting or by natural seeding. This can improve both the woodland's delivery of benefits to the public and its capacity for sustainable management. Woodland Regeneration Grant contributes to the costs of making changes to the composition of woodland within the normal cycle of felling and woodland regeneration.

Table 4. 'Criteria' and 'Indicators' for the UK Forestry Standard [3]

Criteria for Sustainable Forest Management [SFM]	Source of National Level Indicators	National SFM Requirements	Forest Management Unit Indicators. Evidence that:
Conservation of Heritage Features.	Surveys and Registers of ancient monuments. Reports of damage to ancient monuments. Woodland aspects of rural countryside character and landscape assessments. Survey reports for special areas, e.g. National Parks, moorlands, coastal plains.	Important heritage features are protected. Due account is taken of cultural, historic or designed landscapes. Landscape quality is enhanced.	Important sites are clearly recorded. Sound principles for integrating archaeological sites in woodland are adopted. Archaeological sites are protected and damage is avoided. Landscape principles of forest design are used. Cultural and historical character of countryside is taken into account when creating new woods and when making changes to existing woods.

Woodland Improvement Grant – This grant funds capital investment in woodlands, over an agreed period, to create, enhance and sustain an increase in the quantity and quality of public benefits delivered.

Woodland Management Grant – This grant aims to encourage low key, sustainable woodland practice. It is designed to protect the delivery of existing benefits to the public and improve the capacity of the woodland to increase these.

Woodland Creation Grant – This grant supports the establishment of new woodlands that meet national and regional priorities. The grant is available on a competitive and regional basis, using scoring systems that select applications based on best fit with the public benefit priorities.

Forestry Guidelines

The Helsinki Guidelines (1993) Resolution 1 – General Guidelines for the Sustainable Management of Forests in Europe – 6 *"Forest Management Practices should have due regard to the protection of... areas of cultural heritage, and the landscape*".

The 'Pan-European Criteria' (1994) following the Helsinki Guidelines are *"...maintenance of other socio-economic functions and criteria*" [2].

UK environmental guidelines covering aspects of forestry were already in place before 1993. The guidance was built on the Basic Resources of Forestry using 'criteria' and 'indicators' to produce the UK Forestry Standard. "*Cultural Resources – Heritage and Landscapes – People recognise the value of artefacts and amenities found in forests. There is also a fundamental association between our culture (past and present socio-economic activity) and the landscape, where woods often play a significant role".*

Extracts relating to the cultural heritage from "UK Forest Standard – Achieving Good Practice in UK Forests" (1998):

Archaeology and Cultural Heritage

Scheduled Ancient Monuments and their settings are protected by law. These and other important archaeological sites, and historic and cultural features should be protected. Our links with, and understanding of, the past, and our appreciation of the present are thereby maintained. Woodland can obscure many of these features and the best opportunities for identifying and incorporating them in the woodland plan occur at initial planting. Unscheduled sites are described and mapped on local Sites and Monuments Records held by County Archaeologists (England)... These organisations may have - or know of - old maps or aerial photographs which show the history of the site. They can also advise on general areas of archaeological interest where less obvious, possibly buried, features require expert survey before planning a new woodland. Local archaeological societies are another source for information and will sometimes be able to give assistance in marking out sites and in archaeological surveys.

Examples of the variety of archaeological and historic features are:
Signs of ancient habitation, burial and fortification;
Standing stones;
Isolated ruins, deserted farming communities, bridge and ford sites;
Memorial stones, boundary stones and mile stones;
Boundary banks, ditches and walls of political or past management significance;
Individual trees, hedges, avenues, clumps of trees, and woods of historical interest or which are traditional landmarks;
Sites of old mills, kilns and early mining activity;
Recent structures or artefacts of potential interest to future generations.

Proportionately, very few woodlands have been systematically surveyed and recorded. In the past, archaeological investigation and research have been concentrated in areas where either the resource has been rich or where development has necessitated detailed rescue recording and excavation, usually under the policy guidance of PPG15, (currently under review as PPS15). As a consequence, few non-scheduled woodland archaeological sites are recorded on the county Sites and Monuments Record (SMR). As already described, woods preserve a whole range of archaeological features, most of which do not fall into the criteria for scheduling. Some wood banks around ancient woodland sites may be as old as the local parish church (which in all probability is Listed Grade I or Grade II*). Therefore, relying on the county SMR as the source of archaeological features can be misleading. Only by undertaking an archaeological survey (or site check) ahead of planning forestry and woodland management can the woodland owner be sure of taking due care and regard for the cultural resource of the wood as stated in UK Forestry Standard Note 1 (see below).

The UK Forestry Standard states that the 'Woodland Plan' *is an essential management tool. It may build on the detail included in a grant scheme or Forest Plan proposals but should incorporate additional information and make provision for keeping records and for revision.*

Extracts relating to the cultural heritage taken from 'The UK Forestry Standard' with qualifying statements (in brackets and italics).

Standard Note 1 - General Forestry Practice

Precautions applying to all types of operation

- Make specific arrangements for the protection of archaeological sites, protected habitats and protected species of wildlife. If discoveries are made in the course of operations avoid further disturbance and obtain expert advice.

Planning and preparation for forest operations

- Make sure that site planning and the conduct of operations take due account of possible on-site and external impacts e.g. to ancient monuments, access routes, downstream areas, wildlife and people. (Undertake an archaeological assessment of the whole wood, recording features and annotating a site map, together with reference to historic maps and to the county SMR).

- Check and comply with any requirement by a Government body or statutory undertaker for notification or consultation, and decide whether neighbours need to be notified (for scheduled monuments the county or regional English Heritage Field Monument Warden and Inspector for Ancient Monuments - see Useful Contacts section). For non-scheduled sites contact the County Archaeologist. For wildlife and habitats contact the regional office of Natural England. (*It is an offence to damage or disturb protected species and their habitats*).

- Make sure that staff and contractors clearly understand safety precautions, plans for the protection of the environment and emergency procedures. (*Archaeological features can be very difficult to see in woodland; some earthworks are very subtle. If necessary walk people around the site to familiarize them with the cultural resource. Mark or tape off features prior to active management*).

Cultivation and Drainage

- Avoid damage to the hydrology of wetlands of conservation or heritage value and take opportunities to restore those previously drained but which have not been successfully replanted. (*Avoid siting new drains through archaeological sites and especially boundary features. Waterlogged areas are important sites for stratified palaeo-archaeological remains, where information on past land use and environment are preserved in organic deposits. Their preservation relies on maintaining a high, non-fluctuating water table, where the chemical equilibrium of the water remains stable. These sites include bogs, marshes, former ponds, moats etc. Avoid cleaning out ponds etc. without first consulting with a professional archaeologist. Spoil and silts from pond and ditch cleaning should not be dumped on archaeological sites*).

Establishment and Protection

Open space - see SN2.
(*Plan areas of open space, which are not going to be used for recreation, access, timber storage etc, to include formerly wooded archaeological sites. Manage these sites as glades for wildlife*).

Planting and natural regeneration.
(*Avoid planting new trees and where possible prevent regeneration on archaeological sites and features*).

Protection and Maintenance

- Use fertilisers, pesticides and herbicides according to the specific needs of the site. Select products approved for use in that situation and apply at recommended rates, limiting application to the target area. (Avoid use of chemicals on archaeological sites as they can lead to chemical deterioration of sub-surface stratified deposits, especially organic and metal artefacts).

- Erect and maintain fences on alignments which respect the landscape, public rights of way and other access routes, and adopt good practice to minimise undesirable impacts on wildlife such as badgers, deer and woodland grouse. (*Avoid erecting fence posts across or along archaeological earthworks, including boundary earthworks. Digging holes or banging in posts damages the structure and any below ground stratigraphy of the feature. Do not attach fences to trees using nails, staples,x etc. Do not use living trees as fence posts. Not only does this allow disease into the tree, the metal becomes embedded and is then a danger when using machinery, especially chainsaws or circular saws to manage the tree*).

- Ensure that ride, road edge and open space management regimes promote, or are sympathetic to, wildlife conservation, especially where they support rare or endangered species. (*This also follows for any archaeological sites on*

or adjacent to rides, etc. Avoid cutting vegetation when the ground conditions are wet to avoid compaction).

- Keep important archaeological sites clear of natural regeneration of trees and shrubs. (*By undertaking an archaeological assessment and record of the wood, an idea of what are important archaeological sites will be obtained. Basically wherever possible avoid regeneration on all known features and sites*).

Tree harvesting operations

Harvesting operations can also have a very significant environmental impact on the forest. Good silviculture and cost-efficiency must be combined with care for people and the environment.

The timing of the operation will usually be determined by financial or market considerations and the availability of expertise and equipment. However, timing must be adjusted to protect certain species, especially in their breeding season. If in doubt, the nature conservation agencies should be asked for advice. (*Felling and extraction near and on archaeological sites should not be undertaken when the ground conditions are unsuitable, usually when the ground is wet or after periods of heavy precipitation*).

- Select equipment and methods which will allow all parts of the site to be harvested without danger to people or the environment (*tracked vehicles are generally less damaging to the ground surface than wheeled vehicles*).

- Make allowance for changes in weather and therefore site conditions during the operation.

- Identify any improvements needed for satisfactory machine access, stacking and refuelling (*plan these areas away from archaeological sites and features*).

- Decide how to safeguard sensitive or easily damaged parts of the site and ensure that only the intended trees and shrubs are felled. (*Tape or mark off archaeological features to avoid accidental traversal by machines. If necessary place layers of brash over sites during harvesting and remove immediately the operations are completed*).

- Plan any necessary bonfire sites away from archaeological sites. The intense heat can penetrate the ground and damage stratified deposits.

Control of harvesting operations

- Do not allow trees to be felled into watercourses and immediately remove any accidental blockages caused by the operation.

- Prevent erosion by using brash mats and culverts to avoid rutting and blocked drains. Take prompt remedial action if an erosion risk becomes apparent.

- Clear drains as extraction progresses through each part of the site.

- Remove temporary culverts as soon as machine operations in felling and restocking are complete.

- **Keep harvesting machinery off archaeological sites and operate within the restrictions planned to protect other sensitive areas.**

Forest roads and tracks

- Avoid archaeological sites and disturbance of protected habitats and species. (*Also avoid using historic and old access tracks as new forest roads and rides, especially where it is likely the road will damage any boundary features, old culverts and associated archaeological features*).

- Incorporate turning points, loading and passing bays in the design of any road intended for later harvesting. (*Ensure these sites are not located on or adjacent to archaeological sites and features*).

Standard Note 2 - Creating New Woodland

Ensuring the location is suitable

Planting woodland on land not previously managed as woodland and which is not a protected habitat. An assessment of the archaeological potential of the area to be planted should be undertaken. Statutorily protected archaeological sites should not be planted with trees. Non-protected archaeological sites ideally should also not be planted up. Where possible, the history of the past land use should be taken into account - historic hedgerows and field patterns should be preserved within any new planting. Former field boundaries used as forest compartment boundaries. Ponds and other cultural features should be preserved within the new wood and perhaps made a focal feature, providing this does not attract intense use, for example for recreation.

General forest design

- Incorporate designated and protected sites sensitively into the design (*also non-protected archaeological sites and features*).

- Allow for 10 - 20% open space within the area. Open space, including streams, ponds and well laid out roads and rides, should be used to encourage the development of wildlife habitat. (*Where possible, combine open spaces with archaeological sites, but minimise any potential damage from recreational use of the open space*).

Standard Note 3 - Creating 'new native woodland'

New native woodland can be created on previously wooded land as a replacement to non-native woodland (*PAWS restoration*) or on land which historically was once woodland but has subsequently been used for farming or other land use activities.

Choosing a suitable site

Where possible, replant or allow woodland to regenerate on land which historically was once woodland at one time. Follow historic boundaries and avoid archaeological sites and features which are the result of subsequent land use, such as former settlement sites.

Design for development of a semi-natural ecosystem

The design of open ground is particularly important. Wherever possible it should be based on features of conservation potential and site diversity, including archaeological sites (*take account of the local historic character of the area, the shape, pattern and form of adjacent semi-natural woodlands*).

Use of natural colonisation and planting

Avoid natural regeneration and planting on archaeological sites.

Site preparation and maintenance

- Avoid intense cultivation, ploughing and drainage. Irregular scarifiying and mounding are acceptable (*except in areas of archaeological potential and over possible buried sites*).

Standard Note 4 - Felling and Restocking planted woodland

Planning felling and restocking: preparation of a forward plan

- Take account of the effect of land designations, important archaeological sites, protected habitats and species, water and other issues.

See the notes under SN1 and SN2 above.

Standard Note 5 - Managing Semi-natural Woodland

The guidance given in the sections above also follows for SN5.

Grazing and browsing

Maintaining low to moderate densities of wild and/or domestic herbivores is usually desirable for maintaining the ecological diversity of semi-natural woodlands. (*Historically, grazing was sometimes permitted in enclosed woods following a period after the last coppice cut - such as 7 years. The landscape of the Weald was shaped by the practice of transhumance – where stock, especially pigs, were driven in the autumn to feed on 'oak and beech mast' before being taken back to the home settlement for slaughter for winter. In both cases the grazing was low and controlled. Fencing stock in woodland for long periods and during unsuitable ground conditions leads to severe damage to the ground flora, regeneration and archaeological features*).

Standard Note 6 - Planting and Managing Small Woods

Woods up to 5 hectares in lowlands and includes long narrow woods, shelter belts and clumps of trees.

The guidance given in the sections above also follows for Standard Note 6.

Footnotes

[1] Forestry Commission (2005) English Woodland Grant Scheme Applicant's Pack. Forestry Commission, Cambridge

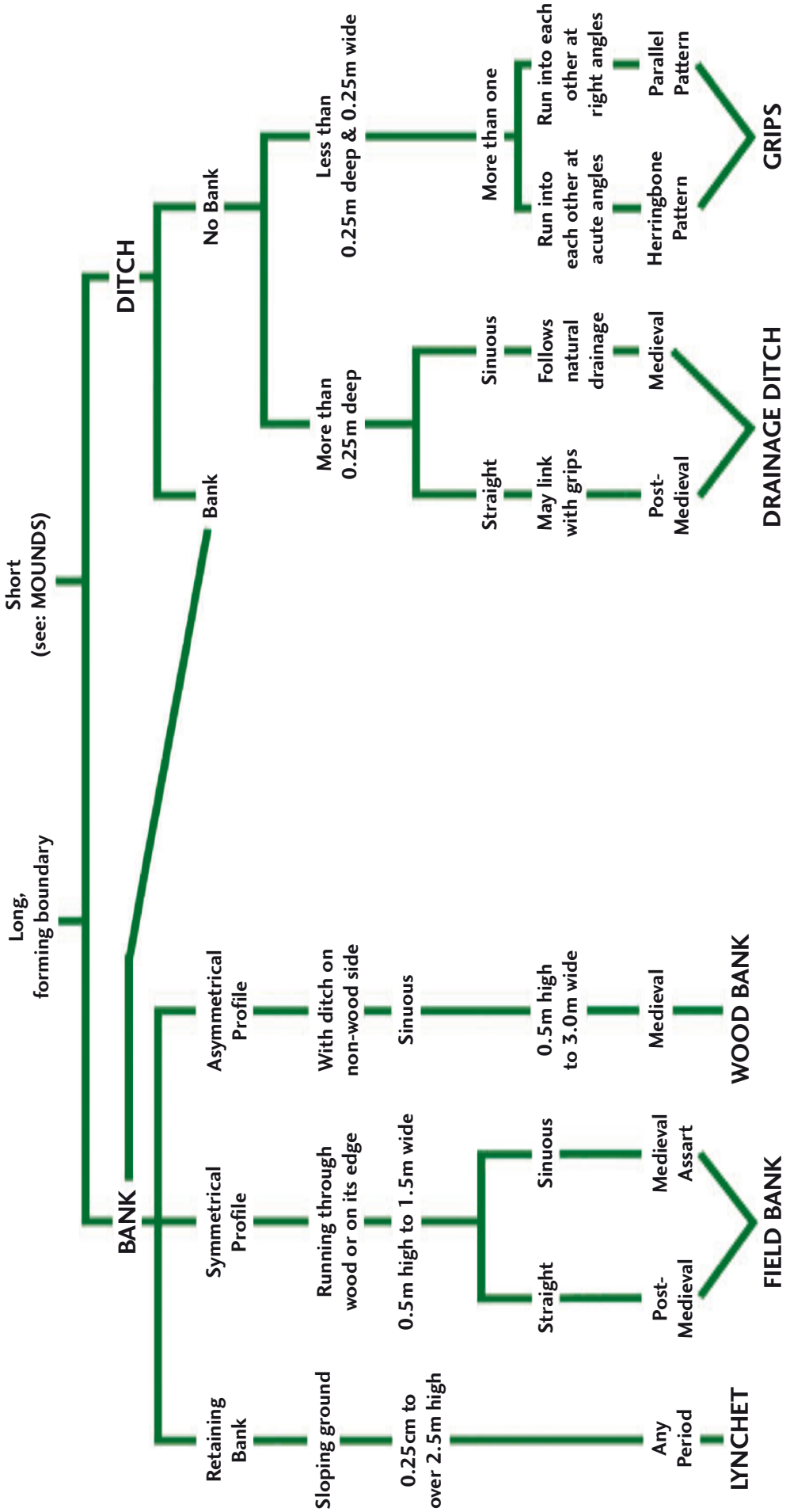
[2] Forestry Authority (1998) The UK Forestry Standard. The Government's Approach to Sustainable Forestry. DANI. Forestry Commission, Edinburgh ibid pp.7-11. 2nd Ed 2004

[3] Ibid p.18

Appendix 2: Flow charts to aid identification of archaeological features in woodland

Adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council

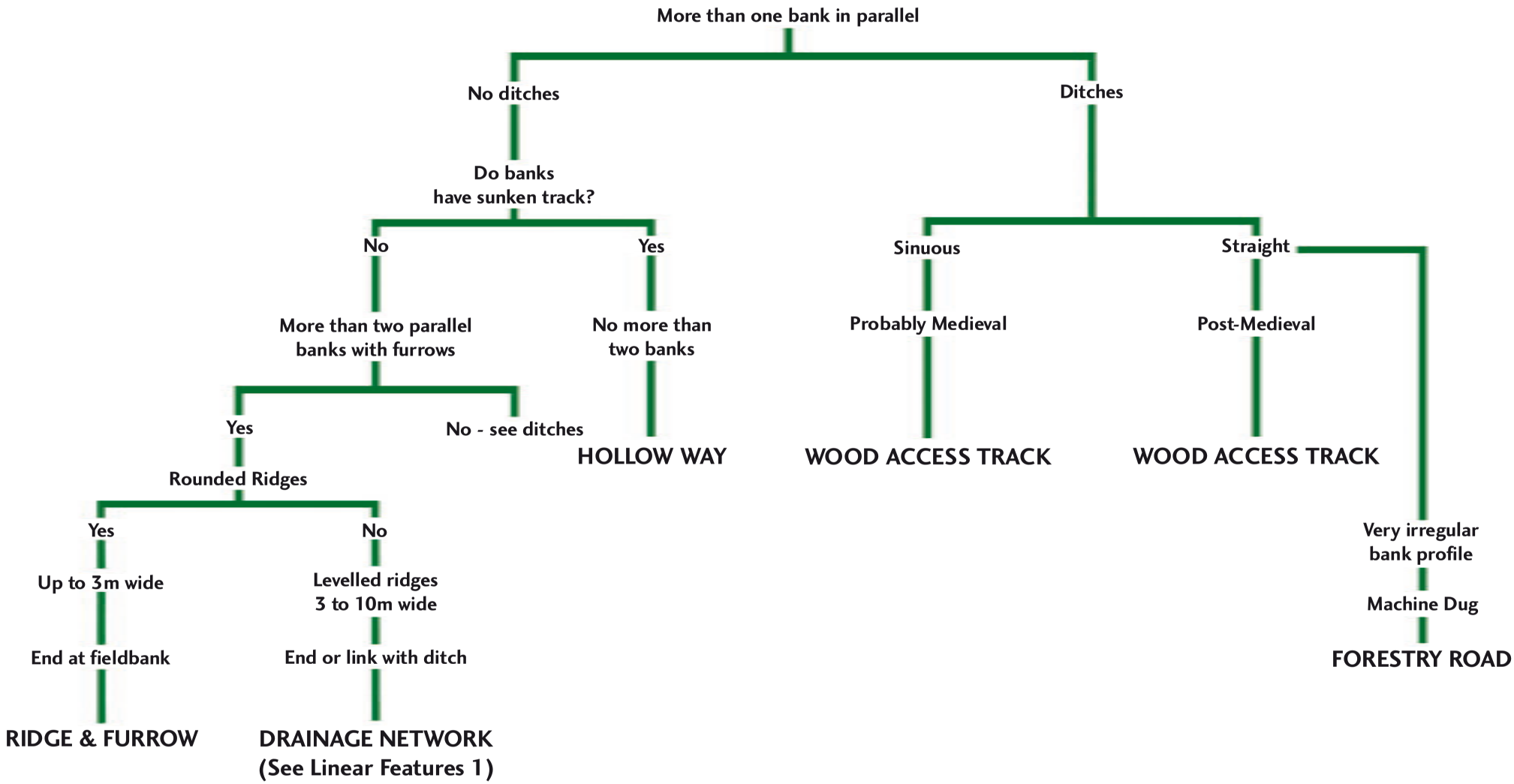
LINEAR FEATURES I



Appendix 2: Flow charts to aid identification of archaeological features in woodland

Adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council

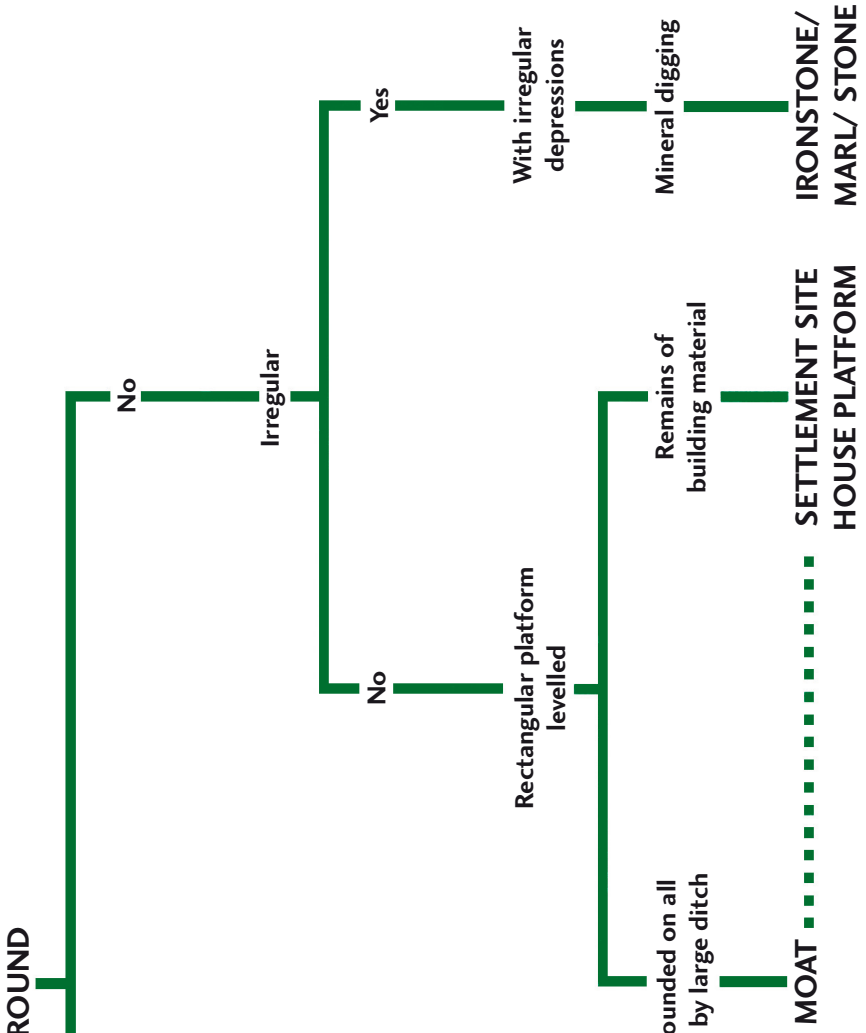
LINEAR FEATURES II



Appendix 2: Flow charts to aid identification of archaeological features in woodland

Adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council

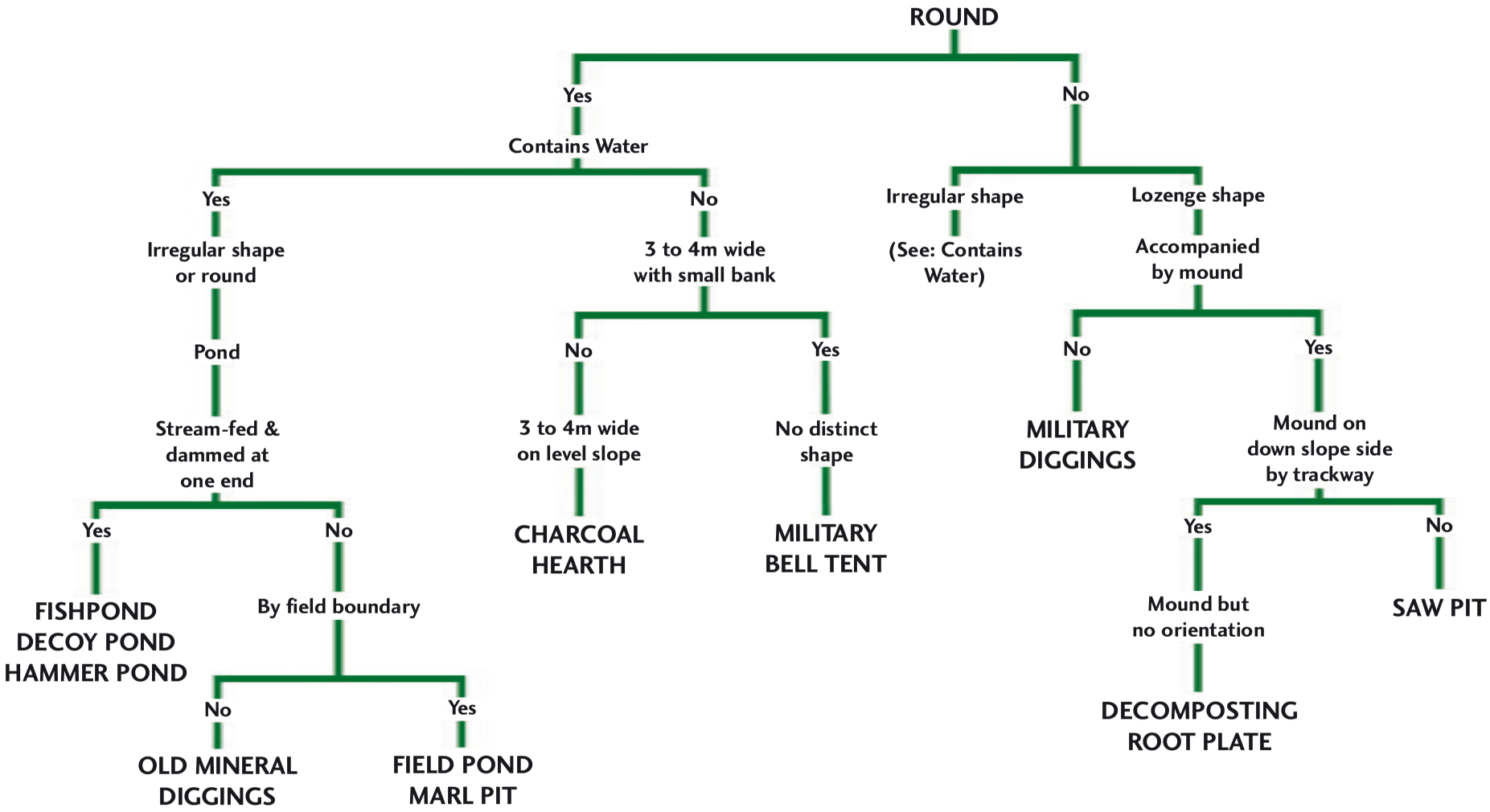
MOUNDS & EXTANT FEATURES



Appendix 2: Flow charts to aid identification of archaeological features in woodland

Adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council

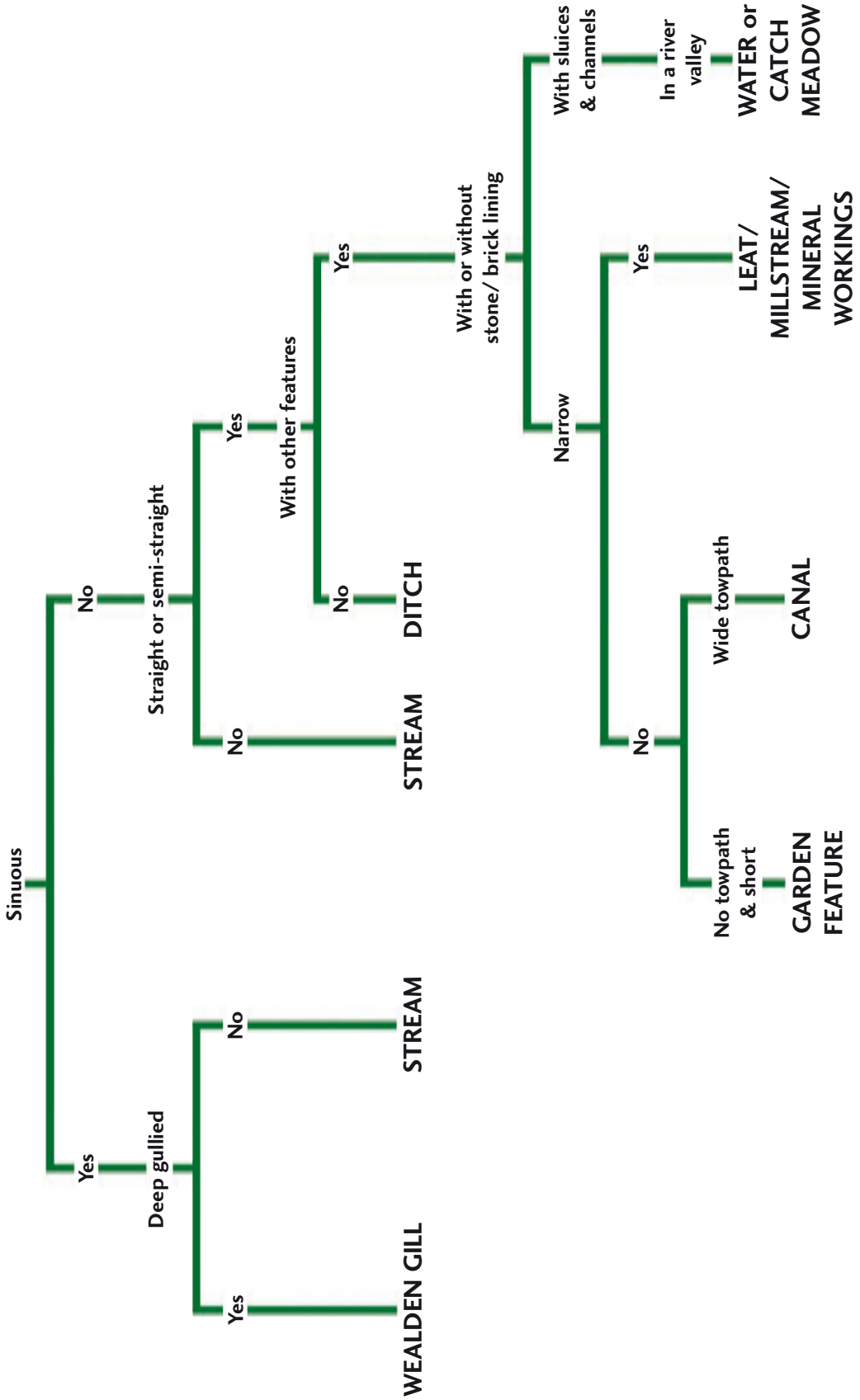
DEPRESSIONS & PONDS



Appendix 2: Flow charts to aid identification of archaeological features in woodland

Adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council

WATER COURSES



Appendix 3: Archaeological features to look for in woodland

Adapted from Bannister, N., 1996, reproduced with the kind permission of Surrey County Council

CHECK LIST

LINEAR FEATURES

Earthbanks	Symmetrical	Asymmetrical	Ditches
Internal	☐	☐	☐
Outer	☐	☐	☐
Drainage	☐ Grips	☐ Straight	☐ Sinuous
	☐ Herringbone	☐ Parallel	
	☐ Ditches	☐ Large	☐ Small
	☐ Gills	☐ Leats/ canals	
Ridge & furrow	☐ Rounded ridges	☐ Levelled ridges	
	☐ 3m	☐ 3m +	
Trackways	☐ Straight	☐ Sinuous	
	☐ Banks & ditches	☐ Hollow ways	

LIVING FEATURES

Pollards	☐ Boundary	☐ Scattered	
Stubs	☐ Boundary	☐ Scattered	
Coppice stools	☐ Large	☐ Small	
Outgrown hedges	☐ Boundary	☐ Internal	☐ Wood edge
Deciduous timber trees	☐ From coppice	☐ Self-sown	☐ Planted
Exotics	☐ Grouped	☐ Avenues	☐ Individual

MOUNDS & DEPRESSIONS

Irregular shapes	☐ Water filled			
	☐ Scatters of brick/ stone			
Regular mounds	☐ Levelled platforms			
Hollow	☐ Regular	☐ Mound	☐ Saw pit	☐ Tree plate
	☐ Irregular	☐ Water filled		
	☐ Regular	☐ Embanked		
	☐ Field pond	☐ Decoy pond	☐ Hammer pond	

BUILT STRUCTURES

☐ Kiln ☐ House ☐ Barn ☐ Other

ARCHIVE CHECK LIST

		DESCRIPTION/ REFERENCE
OS 25" 1st edition (c.1870s) ...	☐	.....
OS 6" 1st edition (c.1860s)	☐	.....
OS 1" 1st edition (c.1810s)	☐	.....
Parish Tithe Map (c.1840)	☐	.....
Enclosure Map (if any)	☐	.....
Estate maps (if any)	☐	.....

INCLUDE SKETCH MAP OF WOOD

Acknowledgements

The author would like to thank the following for their contribution towards the writing and preparation of this book:

Janina Holubecki, Interpretation Officer, High Weald AONB
Sally Marsh, Director, High Weald AONB
Sally Westaway, formerly Habitat Survey and Mapping Officer, High Weald AONB
Nick Johannsen, Director, Kent Downs AONB
Rob Fairbanks, AONB Officer, Surrey Hills AONB
Alan Betts, Regional Director (South East England), Forestry Commission
Matthew Woodcock, Operations Manager (South East England), Forestry Commission
Tim Yarnell, Historic Environment Adviser, Forestry Commission
Helen Neve, Land Management Services
The late Geoffrey Roberts, woodland owner and forester

PHOTOGRAPHIC CREDITS

Photographic credits are shown by the initials of the photographer in brackets after each photograph. The copyright for each image is held by the respective photographer, organisation, or museum.

Nicola Bannister (NB)
Roland Harris (RH) - independent research historian, formerly at the High Weald AONB
Janina Holubecki (JH) - High Weald AONB
Martin Jones (MJ) - Contract photographer for the High Weald AONB
Patrick McKernan (PM) - Forestry Commission
The historical photographs used in the book are by the kind permission of Hastings Museum and Art Gallery.

ILLUSTRATION AND DIAGRAM CREDITS

Illustration and diagram credits are shown by the initials in brackets after each image. The copyright for each image is held by the respective illustrator or organisation.

Nicola Bannister (NB)
Artist's reconstruction of a Roman bloomery (page 8) used by kind permission of the High Weald AONB (artist - Michael Codd, independent illustrator).
Artist's reconstruction of scenes from the iron industry (page 18) used by kind permission of West Sussex County Council (artist - Michael Codd, independent illustrator).
Diagrams on page 45, and in Appendices 2 and 3, from 'Woodland archaeology in Surrey: Its recognition and management' (Bannister, N., 1996) used by kind permission of Surrey County Council.

This book was published with funding from the Forestry Commission, Natural England, and the High Weald, Kent Downs, and Surrey Hills AONBs.

Printed using environmentally-friendly paper with wood pulp sourced from sustainable forests.
Paper includes recycled fibre and is acid free and elemental chlorine free. Printing inks soya-based.

Biographies

Dr Nicola Bannister

Dr Nicola Bannister is an independent Landscape Archaeologist and Associate Member of the Institute of Field Archaeologists (AIFA), with over 20 years' experience of surveying and recording woodland archaeology in the south and south east of England. Her archaeological surveys and assessments of woods have included work for the Woodland Trust, the Forestry Commission, the National Trust, and Surrey County Council.

Her publications include 'Woodland archaeology in Surrey: Its recognition and management', published by Surrey County Council, 'Wye, 10,000 years of a Kentish community and its landscape' (with Trudy A. Watt), published by Wye College Press, and 'Exploring your woodland's history: A guide for community groups and woodland owners', published by The Blean Local Heritage Initiative.

Dr Bannister's current work includes producing the Historic Landscape Characterisation map for Sussex, and an assessment of Bedgebury Forest in Kent as part of a Local Heritage Initiative Community Project.

Patrick McKernan

Patrick McKernan is a woodland specialist currently on secondment from Natural England to the Forestry Commission, working across the South East region to increase the understanding and appropriate management of ancient and native woodlands. He previously managed the South East AONBs Woodlands Programme, working with heavily wooded AONBs to promote and enhance their cultural, biodiversity, landscape, and access value.

Patrick McKernan's current work includes co-ordinating the Weald and Downs Ancient Woodland Survey, which is undertaking a revision of the Ancient Woodland Inventory in Kent and Sussex.

Produced for the South East AONBs Woodlands Programme

October 2007

Published with funding from the Forestry Commission, Natural England, and the High Weald, Kent Downs, and Surrey Hills AONBs

Forestry Commission
www.forestry.gov.uk

Natural England
www.naturalengland.org.uk

High Weald AONB
www.highweald.org

Kent Downs AONB
www.kentdowns.org.uk

Surrey Hills AONB
www.surreyhills.org

Forestry Commission England | NATURAL ENGLAND | HIGH WEALD JOINT ADVISORY COMMITTEE | KENT DOWNS Area of Outstanding Natural Beauty | SurreyHills Area of Outstanding Natural Beauty | SOUTH EAST AONBs WOODLANDS PROGRAMME