A revision of the Ancient Woodland Inventory for Mid Sussex District, West Sussex

Report and Inventory Maps
Revised February 2007



Project carried out by the
Weald Ancient Woodland Survey
High Weald AONB Unit

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Natural England foreword

Natural England has been formed by bringing together English Nature, the landscape, access and recreation elements of the Countryside Agency, and the environmental land management functions of the Rural Development Service. Natural England works for people, places and nature to enhance biodiversity, landscapes and wildlife, promotes access, recreation and public well-being, and contributes to the way natural resources are managed so that they can be enjoyed now and by future generations.

Natural England considers that ancient semi-natural woods are irreplaceable, and should therefore be protected and managed so as to maintain and enhance their special character. Many of the elements found in ancient semi-natural stands survive or can be restored in plantations on ancient woodland sites; hence they are also regarded as important. Knowing where ancient woods are is therefore a key nature conservation need.

The Ancient Woodland Inventory was originally compiled by the Nature Conservancy Council (a predecessor to Natural England) between 1981 and 1992, with that for East and West Sussex being produced in 1989. The Inventory was further updated between 1995 and 1999 and was digitised by the Forestry Commission for use on Geographic Information Systems. Natural England has refined the digital boundaries to make them more compatible with other national datasets and OS Mastermap. The High Weald AONB Unit delivered earlier this year the Weald Ancient Woodland Survey data, which is being integrated into the national dataset.

This report, following rapidly in the footsteps of the Weald Ancient Woodland Survey, outlines the work of the project in the Mid Sussex District, taking in additional historical map evidence and site surveys to verify the status of sites, and including woodland sites under two hectares. This latter element has provided a great deal of information regarding these small woods in an area that has high development pressure. Natural England will add the information captured by this project to the national dataset.

The value of recording small ancient woodland sites has been discussed at length, and this study shows how much work it involves, as the number of sites captured increased from 257 to 908, including an additional 1200 hectares not previously mapped in the Mid Sussex District. This has not been a light undertaking, but the conservation value of small woods may be greater in a densely-wooded landscape such as the South East, because there is often greater connectivity between woods.

This report continues the work started in the Weald, consolidating the work on the Ancient Woodland Inventory. There will also be a toolkit available which will allow other districts to undertake similar work to the same standard. This will doubtlessly be well received among those districts who are already thinking of following suit, and Natural England is very grateful to the High Weald AONB Unit and the Ancient Woodland steering group for devising it.

Emma Goldberg
Forestry and Woodland Officer
Natural England

Forestry Commission foreword

As the government department responsible for forestry, the Forestry Commission works to ensure the protection and sustainable management of our woodlands. Ancient woodlands in particular are exceptionally rich in wildlife, and often contain important archaeological and heritage features relating to their past management. The appropriate management and protection of these sites is a key concern for the Forestry Commission, particularly in the South East, England's most heavily-wooded region, which contains some 40% of England's ancient woodlands.

The focus on ancient woodland received a new emphasis in 2005, with the launch by Defra and the Forestry Commission of 'Keepers of Time: A Statement of Policy for England's Ancient & Native Woodland'. This set out the Government's vision that 'Ancient woodlands, veteran trees and other native woodlands are adequately protected, sustainably managed in a wider landscape context, and are providing a wide range of social, environmental and economic benefits to society.'

Ancient woodlands are, by definition, irreplaceable, but many are not protected through designation. Local authorities have a key role to play in the protection of this unique resource through the planning process. This role has been strengthened by the recent publication of Planning Policy Statement 9, which requires local authorities to identify any areas of ancient woodland that do not have statutory protection. The Forestry Commission recognises that this is a complex and potentially time-consuming task and its support for this revision of the Ancient Woodland Inventory for Mid Sussex District is part of a wider initiative to help co-ordinate similar surveys in other densely-wooded districts.

This survey has resulted from a strong partnership between Mid Sussex District Council, Natural England, the High Weald AONB Unit, and the Forestry Commission. The Forestry Commission believes that such partnerships, working with local authorities, provide an important means for increasing the understanding, protection, and sustainable management of our historic ancient woodlands.

Alan Betts
Conservator
South East England Conservancy
Forestry Commission

Mid Sussex District Council - Context of the Mid Sussex Ancient Woodland Survey

Location and Characteristics

Mid Sussex District is located between Crawley and Brighton, in the County of West Sussex. The District shares its boundaries with Tandridge in Surrey to the north, Brighton and Hove to the south, Wealden and Lewes in East Sussex to the east and Crawley and Horsham Districts to the west. The District covers an area of almost 130 square miles and has three main towns: Burgess Hill, East Grinstead and Haywards Heath. These three prosperous and growing towns each have their own strong identity, aspirations and requirements. The remainder of the District is largely rural in character with 23 villages and many small hamlets. Mid Sussex has a population of 127,378 and it is projected that this population will increase to 138,920 by 2016. Sixty percent of the population live in the three main towns with the remaining forty percent living in the villages and rural areas.

Ecology and Landscape

The District contains a high quality and attractive environment. Nearly sixty percent of the District is designated as Areas of Outstanding Natural Beauty. These comprise the heavily-wooded High Weald AONB and the chalk grassland of the Sussex Downs AONB. The three national Character Areas within the District are the High Weald, the Low Weald and the South Downs. The District also contains13 Sites of Special Scientific Interest, 50 Sites of Nature Conservation Importance, 3 Local Nature Reserves, many archaeological sites and historic parks and gardens. The landscape contains significant and varied areas of remaining semi-natural habitat that are of major importance to nature conservation. The presence and distribution of these habitats is influenced by geology and land form. They include varied woodland types, hedgerows, chalk, neutral and dry acid grassland and meadowland, lowland heathland, standing freshwaters, marsh arable field margins and a variety of urban habitats.

Much of the District is in agricultural use, mainly arable land and improved grassland. The woodland cover in the District, particularly in the High Weald is nationally and regionally significant and a major component of the landscape. A significant proportion of this woodland is classified as ancient.

Future Development in Mid Sussex

As elsewhere in the Country, proposed levels of new housing development in Mid Sussex represent a significant pressure for change. For the purposes of regional planning, many parts of the South East have been defined as sub-regions, mainly where growth is anticipated. Most of Mid Sussex lies in the Gatwick Area sub-region. This emphasises the close relationship between future development and economic growth in Mid Sussex with that in the Crawley-Gatwick area. Likely future housing levels to 2026, as set out in the draft South East Plan pose an important challenge for Mid Sussex in accommodating housing levels without harming the high quality environment of the District.

Planning Context

The adopted West Sussex Structure Plan and the Mid Sussex Local Plan seek to deliver the social and economic needs of the County and District whilst protecting and enhancing landscape and biodiversity and particularly those features or areas which have special qualities such as ancient woodland.

The Planning and Compulsory Purchase Act 2004 introduced fundamental changes to the planning system. Local Authorities are now required to produce a Local Development Framework which comprises a portfolio of Local Development Documents that will replace existing plans.

An important principle of the new system is that plan policies and planning decisions should be based on up-to-date information about the environmental characteristics of an area. This information is used to provide a strong evidence base for the preparation of Local Development Documents. Environmental, Social and Economic criteria are considered through the Sustainability Appraisal which tests the policies and proposals set out in the documents.

As part of its Local Development Framework, Mid Sussex has prepared a Small Scale Housing Allocations Development Plan Document and an Area Action Plan for East Grinstead. The Ancient Woodland Survey has contributed to the evidence base of these documents by providing improved information on the extent, location and value of the all ancient woodland in Mid Sussex including those woodlands under 2ha. It has contributed to Sustainability Appraisals and monitoring reports and will ensure greater soundness of the planning documents. The Council is in the process of preparing a Core Strategy for the period up to 2026 which will look at the main issues facing the District over the next 20 years. It will set out the Council's strategic policies and look at broad locations for strategic housing growth. The Ancient Woodland Survey has been specifically targeted at the areas of potential housing growth. It will also be used to identify areas where priority habitats could be extended and linked together as part of the biodiversity content of the Core Strategy.

The importance of the protection of ancient woodland in the Planning System is reinforced by Government guidance in Planning Policy Statement 9 'Planning for Biodiversity and Geological Conservation' and in the Draft South East Plan. The Draft South East Regional Plan identifies the extent of ancient woodland as an indicator in the assessment of effective protection of the environment under Objective 13. Policy NRM5 requires local authorities to support the implementation of the Regional Forestry and Woodland Framework. The Forestry and Woodlands Framework for South East England requires greater recognition of ancient woodlands value; promotes safeguarding them from development; seeks protection against loss of ancient woodlands in planning guidance and development strategies. The framework states that "local authorities have a major role to play in planning decisions affecting ancient woodlands" and that "reducing the fragmentation of habitats can create ecologically more viable landscapes." It advises that "this can be achieved by buffering/linking woodlands with new woodland and other habitat creation" and concludes "these ecologically functional landscapes may prove particularly valuable in the face of climate change."

This approach is also supported by The Habitats Directive which encourages the management of landscape features of importance for wild flora and fauna. Small woods

are included because they function as 'stepping stones' through the landscape essential for migration, dispersal and genetic exchange. The UK Biodiversity Action Plan calls for the maintenance of the extent of ancient woodlands and for management conserving their special characteristics.

Relationship with other studies

The Ancient Woodland Survey will complement and add depth to other relevant plans and strategies that have been carried out in Mid Sussex:

- The Council Published in 2001 'Our Green Heritage – A Landscape and Biodiversity Strategy for Mid Sussex' which provides an overall framework for an action plan for protecting and enhancing landscape and habitats found in Mid Sussex.
- In 2003, the Council produced Supplementary Planning Guidance on Landscape and Biodiversity in order to ensure that landscape and biodiversity is considered fully in all planning decisions.
- The Council is also a partner of the 'The Character of West Sussex Partnership Programme' which focuses on characterisation studies, planning policy guidance and land management guidelines. A Landscape Character Assessment for Mid Sussex was completed in November 2005 as part of this programme which identifies specific character areas across the District and seeks to protect and enhance this character through land management guidelines. Ancient Woodland is a key characteristic of parts of the Mid Sussex landscape in particular the High Weald character area. The Ancient Woodland Survey provides an additional refinement to the character assessment.
- Mid Sussex is also covered by two AONB Management Plans prepared by the AONB management agencies. The Ancient Woodland Survey supports the woodland objectives of these plans.

The Council's Aims and Priorities

The Council's statement of main purpose is "Working in partnership for well being of all in the community." One of its main objectives is to provide a quality and sustainable environment. The Ancient Woodland Survey is a fine example of partnership working which contributes to this objective.

Contents

		Page
1.	**Summary**	8
2.	**Introduction**	8
2.1	Background	8
2.1.1	Mid Sussex revision	8
2.1.2	History of Weald woodlands	8
2.1.3	Project aims	9
2.1.4	Project funding	10
2.2.	Ancient woodland definitions	10
2.2.1	Recent woodland	10
2.2.2	Ancient woodland	10
2.2.3	Pasture woodland	11
3.	**Methodology**	13
3.1	Software	13
3.2	Inventory revision	13
3.2.1	Desk-based mapping	13
3.2.2	Field survey work	16
3.2.3	Archive research	17
3.2.4	Other evidence sources	17
3.2.5	Ancient woodland status	18
4.	**Results**	19
4.1	The ancient woodland resource	19
4.1.1	Extent of ancient woodland	19
4.1.2	Plantations on Ancient Woodland Sites	20
4.1.3	Accuracy of the Inventory	21
4.2	Results form woodland survey work	21
4.2.1	Damage	21
4.2.2	Woodland management	22
4.2.3	Habitat features	22
4.2.4	Archaeological and boundary features	23
4.2.5	Species data	24
5.	**Outputs**	25
6.	**Discussion**	25
6.1	Limitations of the survey	27
6.2	The future of the Inventory	27

7. Acknowledgements 28

8. References 29

9. Appendices 31

Appendix 1: Ancient woodland vascular plant 'indicator species' with % occurrence in sites surveyed 31

Appendix 2: Summary of findings from the woodland survey work 32

10. Maps 33

Map 1. Location of Mid Sussex District showing the Joint Character Areas
Map 2. Comparison of the Ancient Woodland Inventories for Mid Sussex
Map 3. The Revised Ancient Woodland Inventory for Mid Sussex District (North)
Map 4. The Revised Ancient Woodland Inventory for Mid Sussex District (Central)
Map 5. The Revised Ancient Woodland Inventory for Mid Sussex District (South)

Figures

Figure 1. Example of the First County Series map for Sussex (c.1873), showing Ashplats Wood, near East Grinstead. 14

Figure 2. Example of an Ordnance Survey Drawing (c.1800) showing woodlands near Wakehurst Place. 15

Figure 3. Histogram of the size class distribution for the original and the revised AWI Inventories. 20

Tables

Table 1. Summary of the woodland area and number of woodland parcels from the original AWI (English Nature, 2000), and the revised AWI (2006). 19

Table 2. Ancient woodland types. 20

1. Summary

2. Introduction

2.1 Background

Ancient woodland over two hectares in size are recorded in Ancient Woodland Inventories which were compiled in the 1980s and 1990s by the Nature Conservancy Council[1]. These Inventories have become an important tool for policy makers and planners whilst also assisting land managers to identify key areas for the restoration and planting of native woodlands and increasing awareness of the importance of ancient woodland.

The original Ancient Woodland Inventory (AWI) for West Sussex was produced in 1989 by the Nature Conservancy Council (NCC) [11]. The Inventory was only available on printed maps, until being digitally mapped (digitized) in the mid-1990s by the Forestry Commission. This dataset was subsequently updated from time-to-time by English Nature, the successor to the NCC. For the purposes of this report, a comparison has been made with the digitized 1989 Inventory, with amendments by English Nature up to the year 2000 (referred to in the text and maps as the 'original Inventory'). This version is the nearest to the original Inventory available to this survey.

Whilst the compiling of the original Inventory was a valuable process at the time, new information and advances in technology mean that its inaccuracies and omissions can now be addressed. With the pressure on land increasing year on year, these errors can cause significant problems for a planning authority. The original Inventory also only recorded ancient woodlands greater than two hectares. In heavily-wooded areas such as Mid Sussex, small woodlands make up a significant proportion of the woodland resource, and their omission from the Inventory has the potential to undermine their protection through the planning process. This survey includes these small woodlands for the first time.

2.1.1 Mid Sussex Revision

Mid Sussex District is the tenth most wooded district in the South East, with nearly two thirds of its woodland currently classified as ancient. A large part of the area falls within the High Weald Area of Outstanding Natural Beauty (AONB) where field, heath and woodland form an intimate mosaic of habitats. This largely unchanged landscape with its convoluted topography and famously heavy clay soils has protected what is probably among the greatest concentrations of ancient woodlands in the UK. Many of these woodlands are field shaws, belts of trees, or woodlands less than two hectares in area. These small ancient woods tend to surround ancient disused historic features such as marl or iron pits and hammer ponds, or occupy narrow linear features such as gills.

2.1.2 History of Weald woodlands

Major woodland clearance in the South East began in the Neolithic period [2] and during the Neolithic, Bronze and Iron Ages, with most of the woodland on the South Downs was cleared for agriculture and livestock [3]. Clearance on the heavier clay soils of the Weald took place at a much slower rate [4].

From pre-Roman to late medieval times woodlands in the Weald were heavily exploited for iron ore [4]. This is documented by the number of primitive bloomeries, extraction pits and furnace sites recorded in the woods of the Weald [5]. The richest and most accessible ores were often found exposed in steep gills and furnaces were frequently situated in these wooded gills where wood for fuel, ore and water for the smelting process were all available [6]. Large areas of woodland were needed to supply the underwood for fuel. Rackham (2003) suggests that in order to ensure a constant fuel supply, the Roman industry probably actively managed its fuel supply by a stable coppice system [7]. The majority of woodland in the Weald would probably have been managed as coppice or coppice with standards by the late middle ages providing both underwood and timber.

Medieval woodlands would probably have been very well organised, with wooded commons, wood pasture for stock feeding and timber and enclosed woods for timber and fuel [8]. Medieval forests and deer parks would also have been a common feature in parts of the Weald; used as deer hunting grounds these would have been well-wooded with widespread pollarding [4]. Many former deer parks are prime examples of relic woodlands.

Concerns over depletion of the woods by the iron and glass industries led to King Charles II commissioning John Evelyn's Sylva [9] published in 1664. This work encouraged the planting of both deciduous and conifer plantations across the country. During the 18th and 19th centuries many landowners began formalising and landscaping their estates and it was then that the planting of large areas with trees became common together with the introduction of many exotic species [8].

From the 17th century, woodland industries began to decline in the Weald, primarily as a consequence of the Industrial Revolution when coke from coal became the preferred fuel for iron production [8]. Industries using coppice products declined during the 19th century as they became increasingly uneconomic and timber production replaced coppice systems. The Forestry Commission was established in 1919 after the First World War. Its remit was to promote afforestation in order to rebuild and maintain a strategic timber reserve, and large conifer plantations were created [10].

Traditional woodland management had ceased almost entirely by the end of World War II and the planting conifers became widespread in the 1960s and 1970s. However, the increasing recognition of broadleaved trees for conservation, and declining timber markets, both led to the decline of plantation management. Today many woods in the Weald are dominated by a high forest of derelict broadleaved coppice or conifer plantations with woodlands now often seen primarily as a recreational resource.

Many of the woodlands in the area have a complex history and traces of past uses and management can still be seen today. Ancient coppice stools reveal previous management practices, and pits and hollows provide evidence of former industries such as timber conversion and iron ore extraction. Pales and pollards indicate a previous parkland use and trenches and pits provide evidence of more recent strategic uses.

2.1.3 Project aims

The primary aim of the Ancient Woodland Survey was to re-examine all available information and to present a revised Ancient Woodland Inventory for the District.

This will enable local authority planning officers to identify areas of ancient woodland and hence provide these woodlands with the appropriate recognition in accordance with planning guidance and policy.

Additional aims of the survey were:

- To develop a better understanding of the key issues and threats affecting ancient woodland sites.
- To document the location of ancient woodland sites within the District which will help to identify areas of opportunity for environmental enhancement and hence qualify for funding to carry out woodland management programmes.

2.1.4 Project funding

The Survey was jointly funded by Mid Sussex District Council, Natural England, the High Weald Area of Outstanding Natural Beauty (AONB) Unit, and the INTEREG IIIB Programme "Lifescape your Landscape". Additional support for the project was provided by West Sussex County Council, Sussex Wildlife Trust and the Sussex Biodiversity Record Centre.

2.2 Ancient woodland definitions

Currently Britain's woodlands can be grouped into two categories; more recent woodlands and ancient woodlands, depending on their history.

2.2.1 Recent woodland

This is woodland that has arisen within the last 400 years by planting or through natural regeneration on abandoned or un-grazed land. Recent woodland sites can show similarities to ancient woodland depending on their age, proximity to ancient sites and the diversity of microhabitats within the site. However, their biological diversity is generally not as great as that of ancient woodland. These woods are therefore excluded from the Inventory [11].

2.2.2 Ancient woodland

Ancient woodlands are defined by Natural England as those where there is believed to have been continuous woodland cover since at least 1600 AD.

For this survey, this definition includes: [12]

- Areas with continuous woodland cover.
- Areas managed or periodically cleared for timber or underwood production.
- Areas regenerating following woodland management.
- Open grazed areas within the woodland site (at least 20% canopy woodland over 80% of the site).
- Temporary clearings that may have been created within the woodland complex but which have regenerated, or are regenerating, back to woodland.

Ancient woodland is then further divided into two categories:

- **Ancient semi-natural woodland** (ASNW)

These are areas of woodland composed predominantly of tree and shrub species native to the site that do not obviously originate from planting but have arisen from natural regeneration or coppice re-growth [1]. This includes small areas of secondary woodland within ancient sites which may have developed on former settlements, gravel pits or disturbed ground, semi-natural woods which have been slightly modified, for example woods with a scattering of ornamental conifers, and woods containing some self sown sycamore. In the South East sweet chestnut coppice is also included in this category [13].

- **Plantations on ancient woodland sites** (PAWS)

These are areas of ancient woodland where the original native tree cover has been felled and replaced by planted stock most commonly of a species not native to the site; this can be coniferous or broadleaf tree species or a mixture. For the purposes of this survey broadleaved woodlands are defined as those with 10% or fewer conifers in the canopy and coniferous woodlands those with less than 10% broadleaf species in the canopy [14]. The UK woodland assurance scheme stipulates the full or partial restoration of PAWS [15].

Both woodland types are classed as ancient woodland.

2.2.3 Pasture woodland

Wood pasture describes woods derived from ancient pasture woodland managed for both trees and livestock or deer [7, 16]. These woodlands are usually associated with ancient deer parks, Royal Forests or wooded common land. They frequently occur in a mosaic with other habitats and the boundaries are often poorly defined. Wood pasture was previously included on the original Inventories as ASNW where recognisable stands of trees evident on old maps remain unchanged, parkland sites with wide-spaced trees were omitted [1]. However the map sources used were often inconsistent with only a partial coverage.

Revision of the AWI in Wealden District [17] highlighted the problems of classifying woodland sites in historically more open areas such as the Ashdown Forest and other former commons and hunting forests. Some of these woodlands had been classified on the original Inventory as ancient whilst others had been omitted. However, re-examination of the historic map and other evidence doesn't always appear to support these decisions. Detailed examination of the historical extent of these sites can reveal a complex management history with a mixed pattern of woodland, grazing and shifting agricultural use [18].

Within the revised AWI for Wealden District these habitats were classed as a subcategory of ancient woodland, pasture woodland, whilst keeping the ASNW/ PAWS split. The following criteria define the subcategory:

- Wooded today (at least 20% tree cover over 80% of the site).
- Woodland shown on the First County Series OS map (1873), with the cartography indicating at least 20% tree cover over 80% of the site.
- Former enclosed Forest or common land as identified on the Ordnance Survey Drawings maps (c.1800).

(See section 3.2.1 for a fuller description of these map sources).

Pasture woodland is therefore defined as a semi-natural habitat that has retained a wooded nature throughout recent history as documented by the above map sources. The revised Inventory includes these areas and they can be readily extracted from the dataset.

3. Methodology

The methods used for the Inventory revision are based on those used to compile the original Inventory, and utilise methods piloted in the Wealden Inventory revision [17] combining digital map sources, field surveys and archive research. By necessity, these methods are relatively simple and quick with detailed historical and field surveys confined to a priority set of sites. The Inventory is therefore inclusive, meaning that the default for borderline sites, or those for which data is lacking, is that they are retained on the Inventory, thus ensuring they can be considered in future surveys [1].

3.1 Software

All mapping work was carried out using a Geographic Information System (GIS). The use of GIS was central to this project, enabling the comparison and combination of a variety of spatial data sources. The GIS software used for this work was ESRI ArcMap 8.3 [19]. This GIS database can then be linked to external databases which hold more detailed site survey and archive data.

Where possible OS MasterMap derived polygons were used to map boundaries of woodland sites. This gives reproducible boundaries and ensures consistency of mapping efforts.

Woodland survey data is held in a Recorder 2002 [20] database from which a report for each site outlining the main survey findings can be generated. Recorder 2002 is specifically designed for biological recording. It allows species observations and habitat data to be captured in an electronic format that is compatible with the National Biodiversity Network. This enables the methods of data storage to be easily reproduced and also allows easy exchange of data.

3.2 Inventory revision

Revision of the Inventory was carried out in three stages:

- Desk-based mapping
- Field survey work
- Archive research

A more detailed discussion of the rules and methodologies used will shortly be available in the ancient woodland revision toolkit being produced by the Weald Ancient Woodland Survey.

3.2.1 Desk-based mapping

At the initial mapping stage, areas of more recent and secondary woodland were eliminated by checking the presence of each wood against available digital data sources. Any continuous blocks of woodland were regarded as discrete sites with historical or ownership boundaries disregarded; ponds or open areas within the wood less than one hectare in size were included.

The datasets used for the base-mapping process were:

- The First County Series Ordnance Survey 25"to 1 mile maps (c.1870)

These are scanned geo-referenced raster images of the original Ordnance Survey 1: 2500 historic mapping. They are very accurate maps which record a great deal of detail. The main disadvantage of these maps is the relatively recent date, although more recent woods can often be identified as regularly shaped enclosures or having map symbols that indicate a previous non-woodland use. Because of the high level of accuracy of this source, absence of a wood from these maps is considered highly significant.

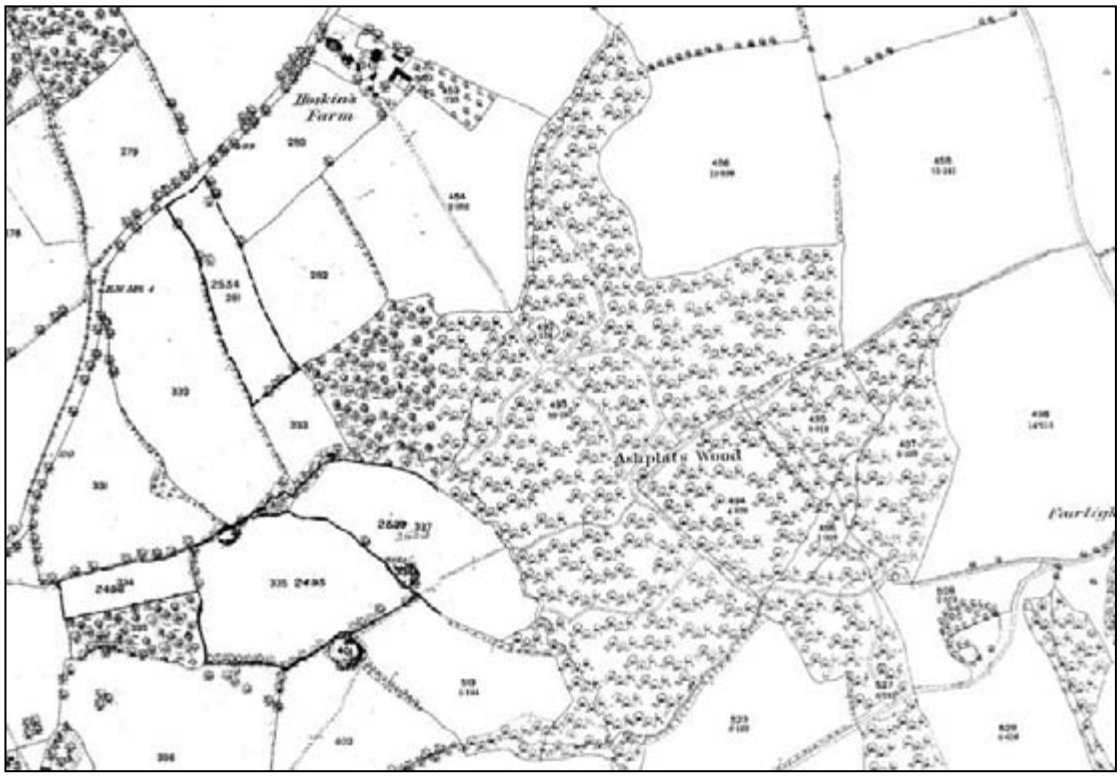


Figure 1. Example of the First County Series map for Sussex (c.1873), showing Ashplats Wood, near East Grinstead.

- Ordnance Survey Drawings (2.5" to 1 mile), c.1800, for the 1st Edition Ordnance Survey maps

Sheets covering East and West Sussex have been geo-referenced by the High Weald AONB Unit to fit the British National Grid. The original drawings are held by the British Library, and scans of this data were used for this coverage.

Individual sheets were often produced by different surveyors and map styles and dates can vary accordingly. Features of military significance were mapped in great detail and these maps are considered to be reliable where woodland is recorded. However absence from these maps cannot be taken as proof of woodland not existing at this time.



Figure 2. Example of an Ordnance Survey Drawing (c.1800) showing woodlands near Wakehurst Place.

- Modern aerial photography

Aerial photographs were used to check for presence today, to document any changes, and to confirm or alter the existing AWI boundaries.

This three-stage process formed the basis of the desk study. A judgement was made at this stage and a preliminary list of woodlands created. This list is generous, showing too many rather than too few woods, so that sites can be deleted as more information comes to light.

Semi-natural/ plantation ancient woodland

The Forestry Commission's National Inventory of Woodland and Trees (NIWT) [21] was used as the core dataset to redefine the boundaries of PAWS and ASNW. This dataset is based on interpretation of aerial photography; it classifies woodland into broad categories including broadleaved, coniferous and coppice woodlands. Boundaries were then further refined using aerial photography, the existing AWI boundaries, OS MasterMap boundaries and the results from survey work.

The reliance on aerial photography for identifying PAWS means that there are inevitably some inaccuracies in the classification, for example, in distinguishing between mature broadleaved plantations and stands of semi-natural woodland. Ancient Semi-Natural Woodland was used as the default classification where it was not possible to determine the woodland type.

Size of a woodland

In general 0.25 hectares was the lowest size of woods considered, allowing the revised Inventory to be comparable with the Forestry Commission's NIWT. However each wood is considered separately and factors such as the location and historical extent of the woodland mean that some woods under 0.25 hectares may be included. This allows these woods to be considered when looking at the whole habitat matrix. Querying the GIS attribute table will allow a size restriction to be imposed if required.

3.2.2 Field survey work

On completion of the primary stage of base mapping a priority set of woodlands was identified for woodland survey and archive work. These woodlands were identified in consultation with the Local Planning Authority and other project partners.

The survey aim was to make a quick assessment of each woodland focusing on confirming site boundaries and recording key information to aid in the identification of ancient woodland. Emphasis was placed on collecting the following information:

- Any evidence relating to the management history of a wood, for example a coppice structure, veteran trees or pollards.
- The presence of archaeological features such as saw pits, charcoal hearths, drainage systems, old banks or the remnants of iron workings.
- Features which indicate a previous agricultural land use, such as ridge and furrow plough markings and lynchets.
- Features, such as woodbanks, stubbed trees or outgrown laid hedges, delineating the boundary of the wood.
- The main canopy, shrub and ground flora species, ancient woodland vascular plant indicator species and any other significant species.
- Any current uses or factors causing disturbance or damage to the wood.
- Dead wood, structural and habitat diversity and the presence of streams and ponds following natural courses and depressions.

These features can all provide evidence of past land use and so help a decision to be made on ancient woodland status. For example;

Wood banks

Distinct wood banks are characteristic indicator features of lowland ancient woodlands. A wood bank consists of an earth bank, often though not always with an associated ditch, constructed at the boundary of a woodland or of compartments within it [16]. These banks, which were constructed to keep out both grazing animals and human intruders, would in most cases have been topped by a hedge or fence [7].

Ancient woodland indicator species

The presence of these vascular plant indicator species can aid in the identification of ancient woodland and ancient woodland sites tend to be richer in terms of their species composition [22]. However, care is required as other factors affect the presence and abundance of these species. These factors include the area of the wood, the date of the survey, the diversity of habitats within the wood, soil type and the position of wood relative to other wooded areas. Current uses, including disturbance, damage or invasive species may also affect species diversity and the time spent surveying will affect the number and abundance of species recorded as well as the likelihood of other features being recorded.

Lists of vascular plant species strongly associated with ancient woodland sites known as 'indicators' have been compiled for different geographical areas of the British Isles. These lists are based on the occurrence of species in known ancient woodland sites, the species are also chosen for ease of recognition [22]. The South East list used in this revision is appended.

3.2.3 Archive research

Further archive research was carried out on the priority set of woods at the county archive office. Woodland presence was verified against two further key historical map sources:

- Parish Tithe maps (c.1840)

Tithe maps provide an important record of land use in the 19th century. They were drawn up between 1836 and 1850 when tithes to the parish church were replaced by payments in rental value. The maps are large-scale (between 12" and 25" to 1 mile) showing the fields, woodlands, and villages of the parish. An accompanying apportionment schedule details the owner or occupier, the field name and a land use description. Tithe descriptions such as "copse" and "shaw" relate to a definite woodland use, however descriptions such as "Firs" or "Plantation" may be indicative of secondary woodland.

- Estate maps and records (pre-1800 only)

Estate maps provide a major source of information for the post-medieval period. Records were drawn up for a specific purpose usually to show land boundaries, buildings, issues of ownership and land use. They can include correspondence, accounts, surveys and maps. Farms within the estate will usually have had a map drawn up showing the boundary, land use of individual fields and wooded areas within the holding. They vary significantly in their quality and accuracy and do not give a complete coverage of the district.

3.2.4 Other evidence sources

In addition to the wood being present on a wide suite of historical maps and any evidence from ground survey work, there are a range of other factors which may be indicative of ancient woodland, these include:

- Wood name

The value of historic place names is their survival long after the features they describe have disappeared. They can therefore be used as a guide to help reconstruct the landscape [4]. For example 'Leah' or 'ley' refers to a woodland glade or clearing, 'den' to a woodland swine pasture and 'Hyrst' or 'hurst' to a wood or a grove especially one on a hill [4,7].

Wood names can also be used to identify non-ancient woods. 'The plantation', for example, may indicate more recently planted woodland. However, a degree of caution should be exercised as names can change over time and 'the plantation' could also be an ancient site within which some planting has taken place [23].

- Woodland shape and situation in the landscape

Ancient woodlands often survive on parish boundaries or follow steep inaccessible topography such as the slopes down to a gill or the land surrounding old iron extraction pits. The boundaries of older woodlands are rarely straight and often follow natural features such as streams.

3.2.5 Ancient woodland status

It is recognised that a desk based exercise will always be flawed and ideally ground survey work would be undertaken in every woodland. Due to time and financial constraints this is clearly impractical. Therefore the decisions are based on available data. Thus, whilst every effort has been made to make this revision as accurate as possible, the Inventory is still regarded as provisional.

4. Results

The results of the Ancient Woodland Inventory revision are primarily stored in a digital format and these files will be available to download. The revised map boundaries are shown at the end of this report.

4.1 The ancient woodland resource

The total amount of all woodland (ancient and secondary) within Mid Sussex District, as recorded in the Forestry Commission's National Inventory of Woodland and Trees [21], is 7,366 hectares. This accounts for 22% of the district's area, and as such is well above the national average of 7.5%.

4.1.1 Extent of ancient woodland

The original AWI contained 3,835 hectares of ancient woodland, covering 11.5% of the district's area. The revised Inventory contains 5,282 hectares of ancient woodland and now covers 15.8% of the district's area, an increase of 4.3% (see Map 2).

The woodland area lost from the original Inventory amounts to 470 hectares. This is offset by the overall woodland area gain of 1,447 hectares. The revised Inventory includes 593 new woodlands not included in the original Inventory, with a total area of 865 hectares. The average size of these new woodlands is 1.46 hectares.

Table 1. Summary of the woodland area and number of separate woodland parcels from the National Inventory of Woodland and Trees (NIWT, Forestry Commission, 2000[21]), the original AWI (English Nature, 2000), and the revised AWI (2006).

	All woodland >2ha (NIWT)	**Original AWI (ancient woodland >2ha)** *ancient woodland only*	**Revised AWI** *ancient woodland only*
Total Mid Sussex District woodland area (ha)	7,366	3,835	5,282
Total number of Mid Sussex District separate woodland polygons	415	258	897
Average area of woodland parcel (ha)	17.7	14.9	5.9

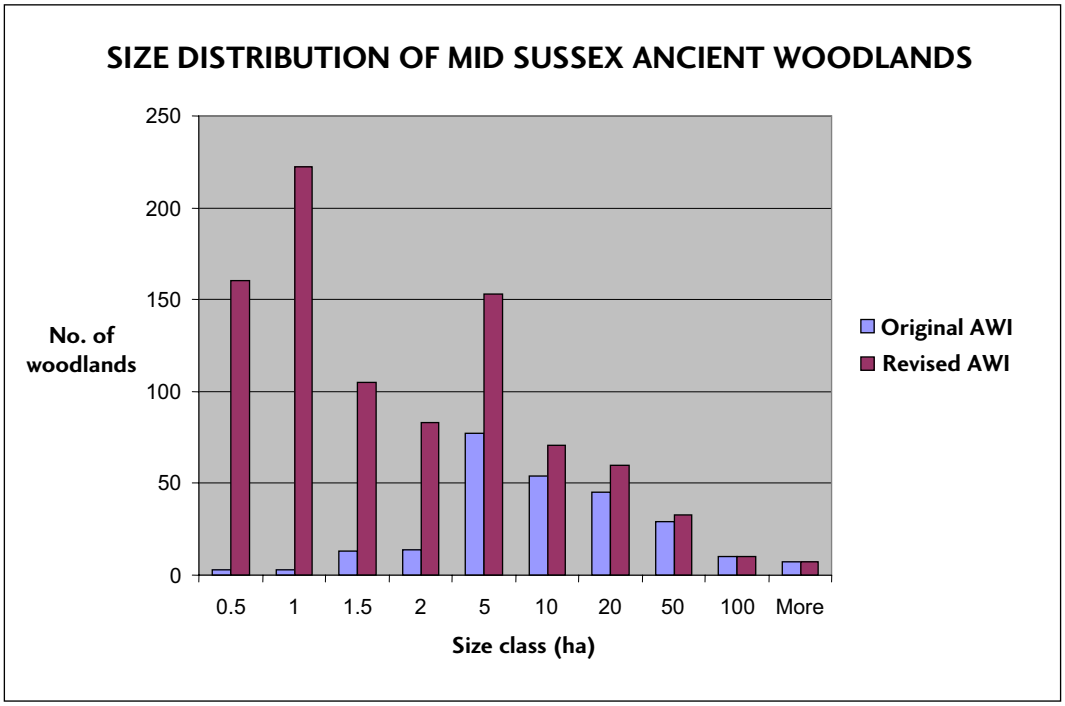


Figure 3. Histogram of the size class distribution for the original and the revised AWI Inventories.

The majority of the 470 hectares removed from the existing Inventory were due to inaccuracies in the initial mapping process, removed following re-examination of the historic map evidence and re-alignment with modern OS mapping.

Mid Sussex District's ancient woodland resource is highly fragmented with approximately two thirds of the woods on the revised Inventory occurring as small woodland parcels of less than 2 hectares in size. Less than 10% of all ancient woodlands in the district are larger than 20 hectares and only 7 woods are greater than 100 hectares. The average size of woodland in the revised AWI is 5.9 hectares (woodlands greater than 0.25 hectares).

4.1.2 Plantations on Ancient Woodland Sites

Approximately 200 ancient woodlands in Mid Sussex District have some degree of replanting, amounting to 2,035 hectares of woodland. Such areas are known as Plantations on Ancient Woodland Sites (PAWS). Most of the PAWS in Mid Sussex are made up of conifer species such as Scots pine *Pinus sylvestris*, Sitka spruce *Picea sitchensis*, Japanese larch *Larix kaempferi* or Western hemlock *Tsuga heterophylla*. The Inventory draws no distinction between different types of plantation, there are some areas of broadleaf plantation in Mid Sussex District which are recorded as PAWS, but these areas are less readily identifiable.

Table 2. Ancient woodland types.

Revised AWI	Area (ha)	% of revised AWI
Ancient semi-natural woodland	3,247	61.5
Plantations on Ancient Woodland Sites	2,035	38.5
Total	5,282	100.0

4.1.3 Accuracy of the Inventory

Within the limitations outlined in section 6.1, the revised Inventory is considered to be as accurate as possible. More ground survey work and in-depth archive searches will add to the data already collected and allow the Inventory to be further refined.

4.2 Results from woodland survey work

A total of 135 woods were surveyed between April and July 2006, of these 75%, 101 woods, were included in the revised Inventory. A summary table of the main survey findings is appended. Survey data is held by the Sussex Biodiversity Record Centre.

The majority of these sites were less than two hectares, and thus not considered in the original Inventory. The average size of wood surveyed was 1.1 hectares.

The main reason for excluding woods from the revised Inventory following survey work was because they were severely degraded. For example, by garden encroachment, or where most of the tree cover had been removed and there was extensive disturbance of the soil profile by earthworks or heavy livestock usage. Other reasons included evidence from further archive research, wood size and structural composition.

4.2.1 Damage

Damage was taken to mean any use of the woodland or any external force causing a detrimental imbalance in the ecology of the woodland.



Photograph 1. Site damage from mountain bike use

The largest cause of damage, recorded in 36.6% of all woods surveyed, was the presence of one or more invasive species, predominantly rhododendron *Rhododendron ponticum* and cherry laurel *Prunus lauroserasus*. Both species are highly invasive casting a dense

shade and acidifying soils. Sycamore *Acer pseudoplatanus* invasion was also recorded in 9.9% of woodlands.

Woodland uses recorded that were also causing significant damage included livestock grazing and trampling, extensions to landowner's gardens or curtilage, waste dumping and heavy recreational use.

4.2.2 Woodland management

The most common type of management recorded was a coppice or coppice with standards, still evident to some extent in 66.3% of all woodlands surveyed. However, the majority, 83.7%, of this coppice woodland was found to be neglected, with an unmanaged understorey of over-mature coppice. Predominant coppice species were hazel, hornbeam and sweet chestnut, with mature oak and ash standards. Other signs of previous management recorded included pollards and stubbed trees



Photograph 2. Recently coppiced woodland

Some form of recent woodland management, in the form of recent coppicing, marked trees or new planting, was evident in 16.8 of woods surveyed.

4.2.3 Habitat features

Areas of wet woodland or wet marshy areas were recorded in around 10% of all sites surveyed, usually in low-lying areas adjacent to streams. Wet woodland is a UK BAP habitat. 19.8% of the woodlands surveyed contained a stream usually following a natural course. Roughly a fifth of these were deep cut gill streams, a particular feature of the Weald. Other habitat features recorded included veteran trees, sandstone outcrops, open rides and heathy glades.



Photograph 3. Ancient hornbeam pollard

4.2.4 Archaeological and boundary features

The majority of woodlands surveyed showed evidence of some sort of boundary feature on at least part of the wood edge. The remnants of an external wood bank, sometimes with an outgrown hedge and/or a ditch, were recorded in over three quarters of all woods. Streams and ditches were also common boundary features found in 31% of woods. The extent and quality of these boundary features varied. Often features had been damaged.

Many of the woods surveyed were formed around or contained old mineral extraction pits, ponds and water-filled pits and depressions. These were found in 45% of woods. Unclassified, small embanked-pits were also recorded in around 3% of woodlands.

Evidence of some sort of internal drainage system was recorded in roughly a quarter of all woods, and internal bank and ditches one third of woods. Drainage ditches are a common feature of older woods on clay [28]. These ditch systems range from simple systems linking up existing small streams to well-planned and laid-out ditches feeding into the main natural drainage network of the wood. The shape and extent of these systems can indicate the age of a wood.

Other archaeological features recorded included evidence of sunken and/or embanked tracks, found in 10% of woodlands. The remnants of a Roman hearth was also noted in one woodland, brought to the survey's attention by a keen woodland owner.



Photograph 4. Wood bank and ditch

4.2.5 Species data

The mean number of vascular plant species recorded per site was 33, and of these roughly a third were ancient woodland indicator species. Pedunculate oak *Quercus robur*, holly *Ilex aquifolium*, hazel *Corylus avellana* and bluebell *Hyacinthoides non-scripta* were the most commonly recorded species, all found in over 90% of sites surveyed. This reflects the main woodland type found in Mid Sussex District, the oak, bracken and bramble community of NVC W10 [24].



Photograph 5. Typical ancient bluebell-dominated woodland, West Hoathly

Wood anemone *Anemone nemorosa* was recorded in 58% of sites. Wood anemone is known to be an ancient woodland specialist [22]. It is very slow to colonise new areas, making it a good indicator of the antiquity of a wood, especially where it occurs in abundance. In total 60 out of the 100 vascular plant indicator species thought to be indicative of ancient woodland in South East England were recorded at least once.

The number of ancient woodland indicator species recorded ranged between 2 and 22, with a mean figure of 10.5 species per site. The South East ancient woodland indicator species list is appended along with an indication of the proportion of woods surveyed in which species were recorded.

5. Outputs

Maps 3 to 5 at the end of this report show the revised Ancient Woodland Inventory on an OS 1:50,000 base map. Due to the map scale and the volume of small woods added to the Inventory this map should be used as indicative only. The paper maps also only represent a snapshot in time and will not show any subsequent revisions. Digital boundaries will be available to download on line (www.magic.com) or alternatively printed copies can be obtained on request from Mid Sussex District Council or from Natural England.

By its nature, the revised Inventory is still provisional, but represents an important advance in establishing ancient woodland status using a wide range of evidence and making full use of advances in modern technology. There will however be facts that come to light in the future that may alter or reinforce the decisions taken in this survey. The database is set up in such a way as to incorporate any future modifications or additional information.

The revised Inventory is an important information base on which to inform planning policy, and will enable planning decisions relating to wooded areas within Mid Sussex District to be made in the light of an improved evidence base.

Planning Policy Statement 9 [25] strengthens the protection granted to areas of ancient woodland. The guidance requires local authorities to identify all areas of ancient woodland within their administrative area. The identification of 607 new ancient woodland parcels in Mid Sussex District not only affords these woodlands a higher degree of protection, but also emphasises the need for a review of the Inventory in other heavily wooded areas.

The revised Inventory provides a more complete picture of the location of the District's ancient woods within a habitat network and will help to identify areas of opportunity for environmental enhancement, allowing more strategic distribution of funding for woodland management programmes, such as the England Woodland Grant Scheme (EWGS) or the new government agri-environment schemes, which now include small farmland woods. The survey data and revised Inventory will also be useful to inform the Sussex woodland Habitat Action Plans (HAPs) and BAPs. It can also feed into other work being carried out in the area.

6. Discussion

Mid Sussex district contains one of the highest proportions of ancient woodland of all English local authorities, making woodland an important ecological resource and landscape characteristic of the district.

1,599 hectares of ancient woodland have been added to the Mid Sussex District Inventory, when compared to the original Inventory. The completion of the revised Inventory and identification of a significant additional ancient woodland resource have increased the value placed on ancient woodlands within the district.

The project completed a survey of 135 woods falling within potential development sites within Mid Sussex District. This provided an opportunity to study the ecology, history, management practices and uses of these woods. The timescale the project was carried out

over meant that although a smaller number of woodlands was surveyed in Mid Sussex, the survey work was more directed than the Wealden survey, focussing on priority areas around potential development sites.

Although not completely removed, seasonal restriction in species recording was also less of a factor as the work was carried out more intensively over a shorter period.

Nearly one quarter of woods surveyed were excluded from the revised Inventory following survey, mainly due to their degraded status. This highlights the importance of the survey in identifying and mapping these woods. However, it also implies that a significant proportion of un-surveyed woods on the revised Inventory may have been damaged or degraded in a similar manner, especially where they occur near to urban areas.

Both the survey and mapping findings were similar to those in the Wealden project. With the key issues identified from the survey work problems with invasive species, lack of management and garden encroachment the same for both districts.

As with the Wealden survey the most common management type was unmanaged coppice - this suggests a neglected resource. There are few economic advantages to owning small woodlands today and management can be an expensive or time-consuming undertaking. Many farmland woods remain only as game bird-rearing sites, as shelters for livestock or simply because the woodland is a landscape feature and has always been there. Unless fenced and managed, these small farm woods will continue to fall into a state of decline.

Although ancient woodlands are well documented as having higher biodiversity value than recent woods [(27)], the biodiversity value of a woodland is often also linked to current management practices and not just ancient or recent status. In densely-wooded landscapes with a long history of woodland cover, such as the Sussex Weald, secondary woodlands can gain woodland species rapidly [(28)]. The ancient woodland resource provides a reservoir from which to obtain these species, therefore knowledge of the location of ancient woodlands is important when planning habitat reconnection and management initiatives.

Plantations on Ancient Woodland Sites (PAWS) make up 38.4% of the total area of Mid Sussex District's ancient woodland resource. There has been an increasing focus in the forestry and conservation sector on the restoration of PAWS, particularly with the publishing in July 2005 of the joint Defra/ Forestry Commission 'Keepers of Time' policy [(29)]. Though reduced in their species diversity, many replanted ancient woods still retain a high conservation value, particularly in rides and clearings.

The revised Inventory has remapped PAWS in Mid Sussex District, this will help to identify key sites for restoration. The project has also re-examined the map evidence and identified a sub category of "pasture woodland". This category will help to inform PAWS restoration programmes, recognising that the historic map evidence for these ancient woodland sites indicates a pattern of shifting habitat mosaics with open and more densely wooded areas moving over time.

The importance of semi-natural ancient woodland is widely acknowledged [(29, 30, 31)]. This resource is increasingly threatened by development pressures and lack of appropriate

management. It is hoped that the work outlined here will make a useful contribution towards the long-term protection and appropriate management of this irreplaceable resource.

6.1 Limitations of the survey

The Mid Sussex project built on the methods trialled in Wealden and was able to use lessons learnt in this project. This mainly involved a tightening up of the methodology. The main project constraints were again the time available to carry out both site surveys and full archive searches, it was impossible to carry out a full archaeological survey or a NVC woodland survey for each site.

There are, however, always going to be limitations with the types of evidence used in assessing ancient woodland status which need to be considered:

- Field survey evidence varies in its value as a guide to site origin [28].
- Ground survey work is less revealing in heavily disturbed woods and PAWS sites which often have impoverished vascular plant floras and may also have damaged archaeological remains. Woodland archaeology features are also less easy to recognise in the summer months as the vegetation is more dense.
- Individual plant species cannot be used as evidence that a particular wood is ancient - several 'indicators' used collectively will be far more reliable. Although counts of ancient woodland indicator species may be able to separate larger ancient and secondary woods, a greater degree of cross-over has been found in smaller ancient and secondary woods [27]. The use of indicator species is therefore less useful for small woods.

Other limitations include the inaccuracies often associated with early map sources, especially where small woodlands are concerned, and the fact that wood names and shapes can change throughout history. For example, a straight edge may actually indicate a more recent woodland clearing rather than woodland planting.

6.2 The future of the Inventory

It is hoped to that this project will encourage a wider take-up of the survey with other local authorities. To help facilitate this, the Weald Ancient Woodland Survey is producing a toolkit, based on lessons learnt in both the Wealden District and the Mid Sussex Inventory revisions. This will provide a detailed methodology for the survey, as a guide to future revisions of the Inventory.

7. Acknowledgements

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8. References

1. Spencer, J. & Kirby, K. (1992) An Inventory of ancient woodland for England and Wales. *Biological Conservation,* 62, 77-93.

2. Drewett, P. (1999) First farming communities and communal monuments. Chapter 8 Leslie, K. and Short, B. *An historical atlas of Sussex*. Phillimore, Chichester.

3. Sussex Downs Landscape Assessment (2001) Sussex Downs Conservation Board, Ford, West Sussex.

4. Brandon, P. (2003) *The Kent and Sussex Weald*. Phillimore and Co. Ltd.

5. Hodgkinson, J. (2002) Wealden Iron Research Group. www.wealdeniron.org.uk

6. Cleere, H. & Crossley, D (1995) *The iron industry of the Weald*. Merton Priory Press.

7. Rackham, O. (2003) *Ancient Woodland: Its history, vegetation and uses in England*. Castlepoint Press.

8. Bannister, N.R. (2006) *The Cultural Value of Woodlands in the South East AONBs*. SE AONBs Woodlands Programme. In preparation.

9. Evelyn, J. (1664) Sylva, or a discourse on forest trees and the propagation of timber in his majesties dominions. London.

10. Forestry Commission (2006) History of the Forestry Commission. www.forestry.gov.uk

11. Whitbread, A., Barton, J. & Hutton, D. (1989) West Sussex Inventory of Ancient Woodlands (provisional). Nature Conservancy Council, Peterborough.

12. McKernan, P. & Whitbread, T. (2003) Proposed extension to the ancient woodland definition for the Weald. Unpublished.

13. Thomas, R.C. (1994) Ancient Woodland Inventory: database documentation. English Nature Research Report 131.

14. Sussex Biodiversity Partnership (2000) Habitat Action Plan for Sussex: Woodlands. Sussex Biodiversity Partnership.

15. Spencer, J. (2002) Ancient woodland on the Forestry Commission Estate in England: survey report. Forestry Commission.

16. Harding, P.T. & Rose, F. (1986) *Pasture-Woodlands in lowland Britain*. Institute for Terrestrial Ecology, Huntingdon.

17. Westaway, S. (2005) Weald Ancient Woodland Survey: A revision of the Ancient Woodland Inventory for Wealden District. High Weald AONB Unit, Flimwell, East Sussex.

18. Greenaway, T., Roper, P. & Ryland, K. (2004) Wooded heaths in the High Weald. Sussex Biodiversity Record Centre Survey Unit.

19. ArcMap 8.3 (2002) ESRI.

20. JNCC (2002) Recorder 2002. Joint Nature Conservancy Committee, Peterborough.

21. Smith, S. (2000) The National Inventory of Woodland and Trees – England. Forestry Commission.

22. Rose, F. (1999) Indicators of Ancient Woodland – the use of vascular plants in evaluating ancient woodland for nature conservation. *British Wildlife*, 10(4), 241-251.

23. Isaac, D. & Reid, C.M. (1997) Inventory of ancient woodland (provisional) Surrey. English Nature, Peterborough.

24. Rodwell, J. (1991) *British plant communities 1. Woodland and scrubs*. Cambridge University Press.

25. Office of the Deputy Prime Minister (2005). Planning Policy Statement 9: Biodiversity and Geological Conservation. The Stationery Office, London.

26. Taylor, M.J. (1979) Woodlands in the Weald – a study of woods in Wealden District Council's administrative area in East Sussex. MSc Thesis, Wye College, University of London.

27. Peterken, G. (2000) Identifying ancient woodland using vascular plant indicators. *British Wildlife*, 11, 153-158.

28. Peterken, G. (2000) Rebuilding networks of forest habitats in lowland England. *Landscape Research*, 25, 291-303.

29. Keepers of time: A statement of policy for England's ancient and native woodland (2005) DEFRA and Forestry Commission, England.

30. English Nature (2002) Position statement: Environmentally sustainable forestry and woodland management.

31. Ellis, J. (2004) Seeing the wood for the trees: a forestry and woodlands framework for South East England. Forestry and Woodlands Framework Steering Group, Alice Holt, Farnham, Surrey.

9. Appendices

Appendix 1: Ancient woodland vascular plant 'indicator species' in the South East with % occurrence in sites surveyed.

	%		%		%
GRASSES, SEDGES, RUSHES & FERNS		Black bryony	37.6	Stinking iris	
Bearded couch		Bluebell	91.1	Three-veined sandwort	20.8
Common polypody	1.0	Broad-leaved helleborine		Toothwort	
Creeping soft-grass	3.0	Bush vetch	1.0	Tutsan	1.0
Giant fescue		Chaffweed		Violet helleborine	1.0
Great wood-rush		Columbine*		Wild daffodil*	
Hairy brome		Common Solomon's-seal		Wood vetch	
Hairy wood-rush	4.0	Common cow-wheat		Wood spurge	5.9
Hard shield fern	1.0	Early dog-violet	2.0	Wood speedwell	50.5
Hard fern	7.9	Early-purple orchid	1.0	Wood anemone	57.4
Hart's-tongue fern*	6.9	Goldenrod		Wood-sorrel	30.7
Hay-scented buckler fern		Goldilocks buttercup		Woodruff	
Lemon-scented fern		Greater butterfly orchid		Yellow archangel	28.7
Narrow buckler fern		Greater burnet-saxifrage		Yellow pimpernel	18.8
Pale sedge		Green hellebore		**TREES & SHRUBS**	
Pendulous sedge*	35.6	Herb-paris		Alder buckthorn	
Remote sedge	32.7	Ivy-leaved bellflower		Aspen	8.9
Scaly male fern	13.9	Lady orchid		Bilberry	
Smooth-stalked sedge		Large bitter-cress	3.0	Black currant*	3.0
Soft shield fern	6.9	Lesser skullcap		Butcher's-broom	2.0
Southern wood-rush		Lily-of-the-valley*		Crab apple*	
Thin-spiked wood sedge		Marsh violet		Field maple*	68.3
Wood melick	34.7	Moschatel	6.9	Field rose	16.8
Wood meadow-grass	5.9	Narrow-leaved everlasting-pea		Guelder-rose	17.8
Wood small-reed		Nettle-leaved bellflower		Holly	92.1
Wood sedge	46.5	Opposite-leaved golden saxifrage	12.9	Hornbeam*	20.8
Wood millet	1.0	Orpine		Midland hawthorn	14.9
Wood club-rush		Pignut	20.8	Red currant*	23.8
Wood horsetail	2.0	Primrose*	53.5	Sessile oak*	
WILD FLOWERS		Ramsons	23.8	Small-leaved lime*	1.0
Allseed		Sanicle	7.9	Wild cherry	39.6
Barren strawberry	27.7	Saw-wort		Wild service tree	4.0
Betony	4.0	Slender St John's-wort	2.0	Wych elm	6.9
Bird's-nest orchid		Small teasel			
Bitter vetch		Spurge-laurel			

Only where these species occur well within a wood and do not appear to have been planted.

Appendix 2: Summary of findings from the woodland survey work

Feature		% Occurrence
Damage		
invasive species		36.6
rubbish, rubble or garden waste dumping		23.8
garden extensions/ landscaping		15.8
livestock and deer damage		12.9
edge effects from surrounding land use		10.9
clearance/ earthworks		7.9
recreation		6.9
Damage - invasive species		
cherry laurel (Prunus laurocerasus)		18.8
Rhododendron (Rhododendron ponticum)		15.8
Sycamore (Acer pseudoplatanus)		9.9
bamboo (Sasa sp.)		2.0
Japanese knotweed (Fallopia japonica)		2.0
Himalayan balsam (Impatiens glandulifera)		1.0
Management		
unmanaged coppice or coppice-with-standards		66.3
some recent management, planting or felling		16.8
part or whole coniferous/ broadleaf plantation		3.0
high forest		3.0
pollarded trees		2.0
Boundary features		
remnants of bank and ditch		50.5
stream or ditch		30.7
remnants of bank		16.8
pollards, stubs or standard trees		12.9
remnants of bank & ditch with an outgrown hedge		8.9
remnants of bank with an outgrown hedge		4.0
remnants of an outgrown hedge		1.0
Internal habitat features		
stream through wood		19.8
wet marshy areas		7.9
part gill woodland		4.0
areas of wet woodland		3.0
sandstone outcrops		3.0
rides or glades		2.0
	Internal archaeological features	**% Occurrence**
pits	ponds and water filled pits	30.7
	hollows/ extraction pits	14.9
	small embanked pits	3.0
bank/ditch	internal banks/ bank & ditch	32.7
	drainage ditches	25.7
other	built structure	3.0
	sunken/ embanked track-ways	10.9
	mounds	1.0

10. Maps

Map 1. Location of Mid Sussex District showing the Joint Character Areas

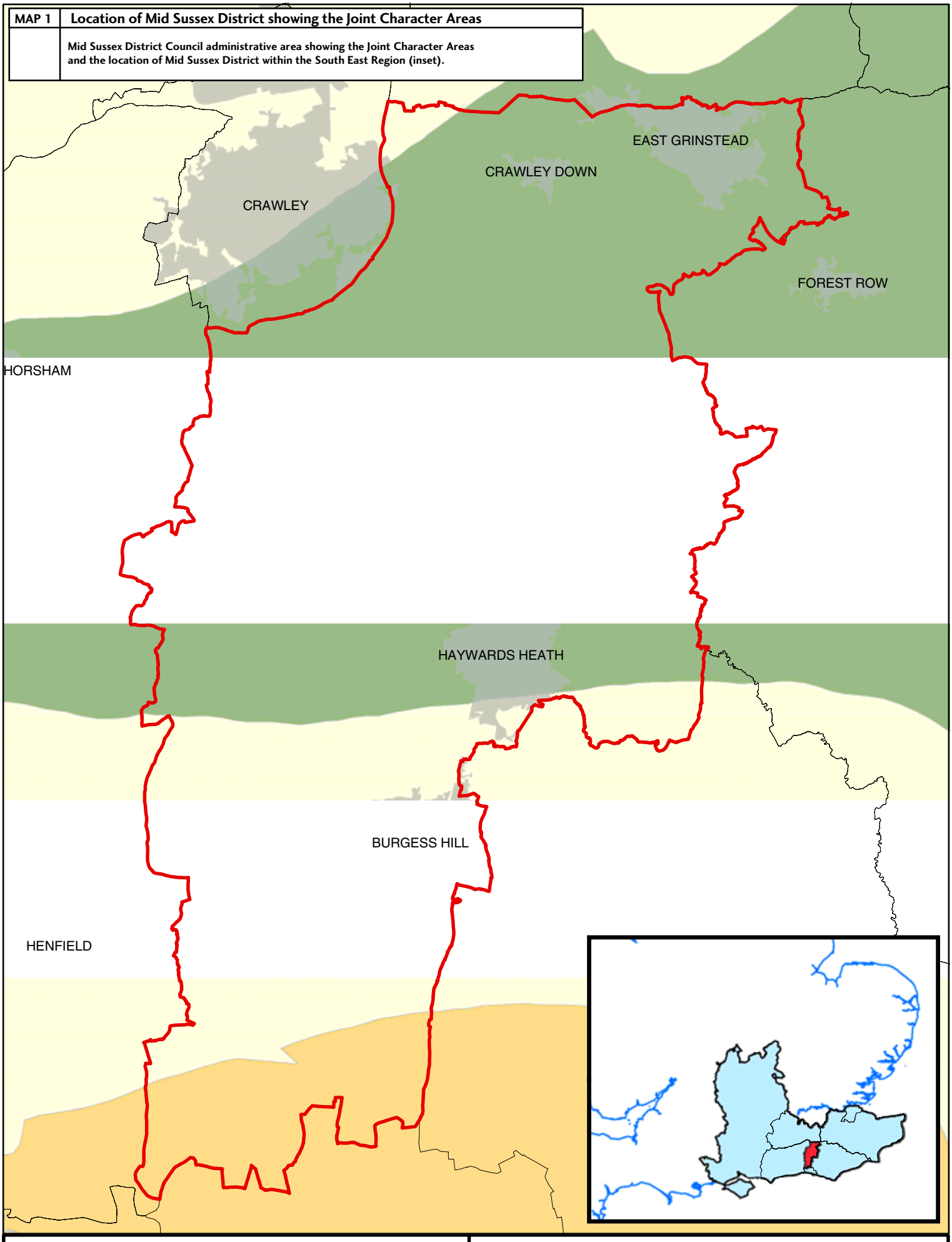
Map 2. Comparison of the Ancient Woodland Inventories for Mid Sussex

Map 3. The Revised Ancient Woodland Inventory for Mid Sussex District (North)

Map 4. The Revised Ancient Woodland Inventory for Mid Sussex District (Central)

Map 5. The Revised Ancient Woodland Inventory for Mid Sussex District (South)

MAP 1	Location of Mid Sussex District showing the Joint Character Areas
	Mid Sussex District Council administrative area showing the Joint Character Areas and the location of Mid Sussex District within the South East Region (inset).



Mid Sussex District
District Boundaries
Urban Areas (selective)
South East region

Joint Character Areas

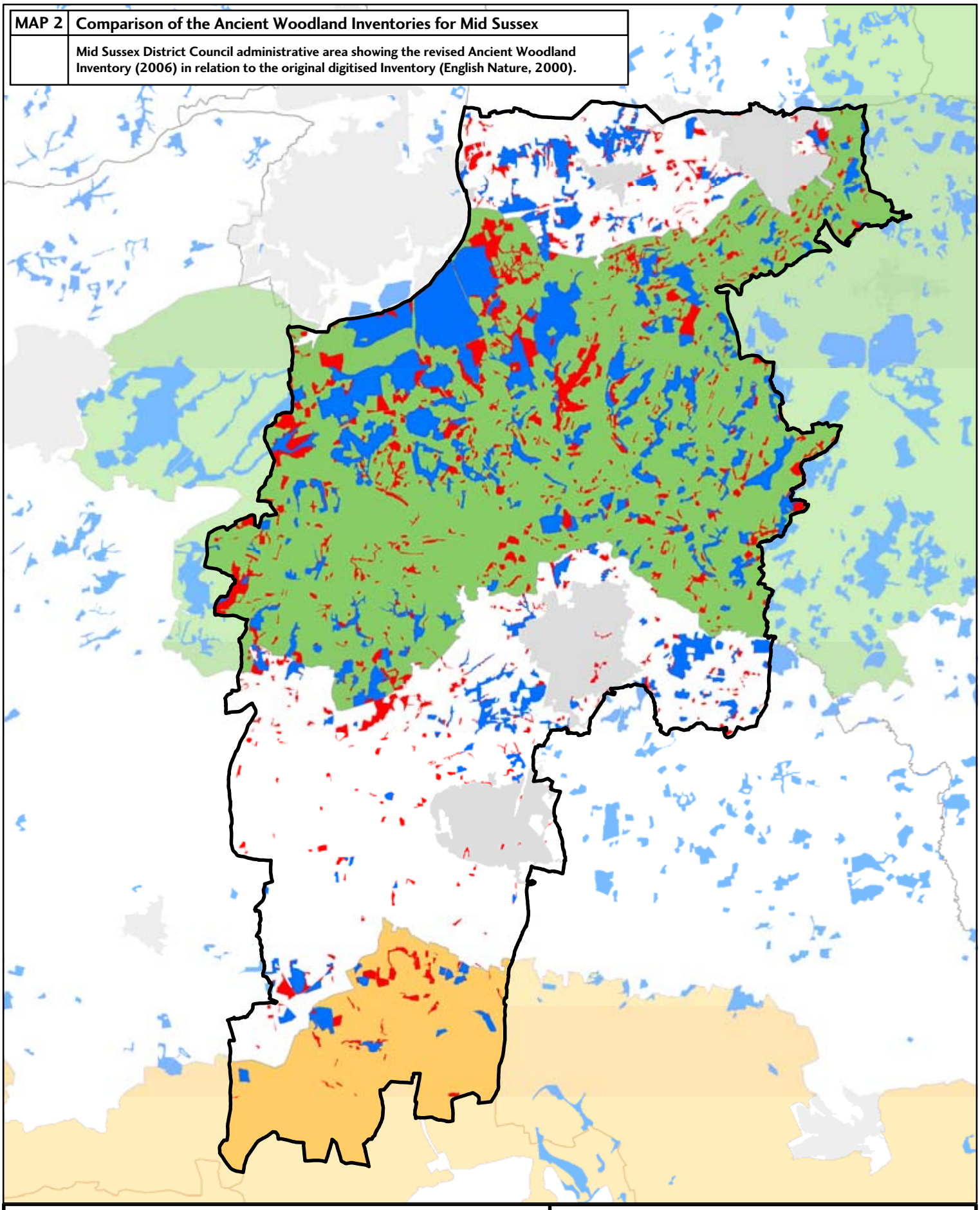
High Weald
Low Weald
South Downs

N
W E
S

0 2.5 5 10 Kms

OS data reproduced with the permission of The Controller of Her Majesty's Stationery Office. Crown copyright reserved. West Sussex County Council No. 100018485, 2006.
Map produced 17/09/06 M.Grose at the High Weald AONB Unit.

MAP 2	Comparison of the Ancient Woodland Inventories for Mid Sussex
	Mid Sussex District Council administrative area showing the revised Ancient Woodland Inventory (2006) in relation to the original digitised Inventory (English Nature, 2000).



Mid Sussex District

Urban Areas (selective)

District Boundaries

High Weald AONB

Sussex Downs AONB

Original Provisional Ancient Woodland Inventory

Additional Areas on the Revised Inventory for Mid Sussex District

N

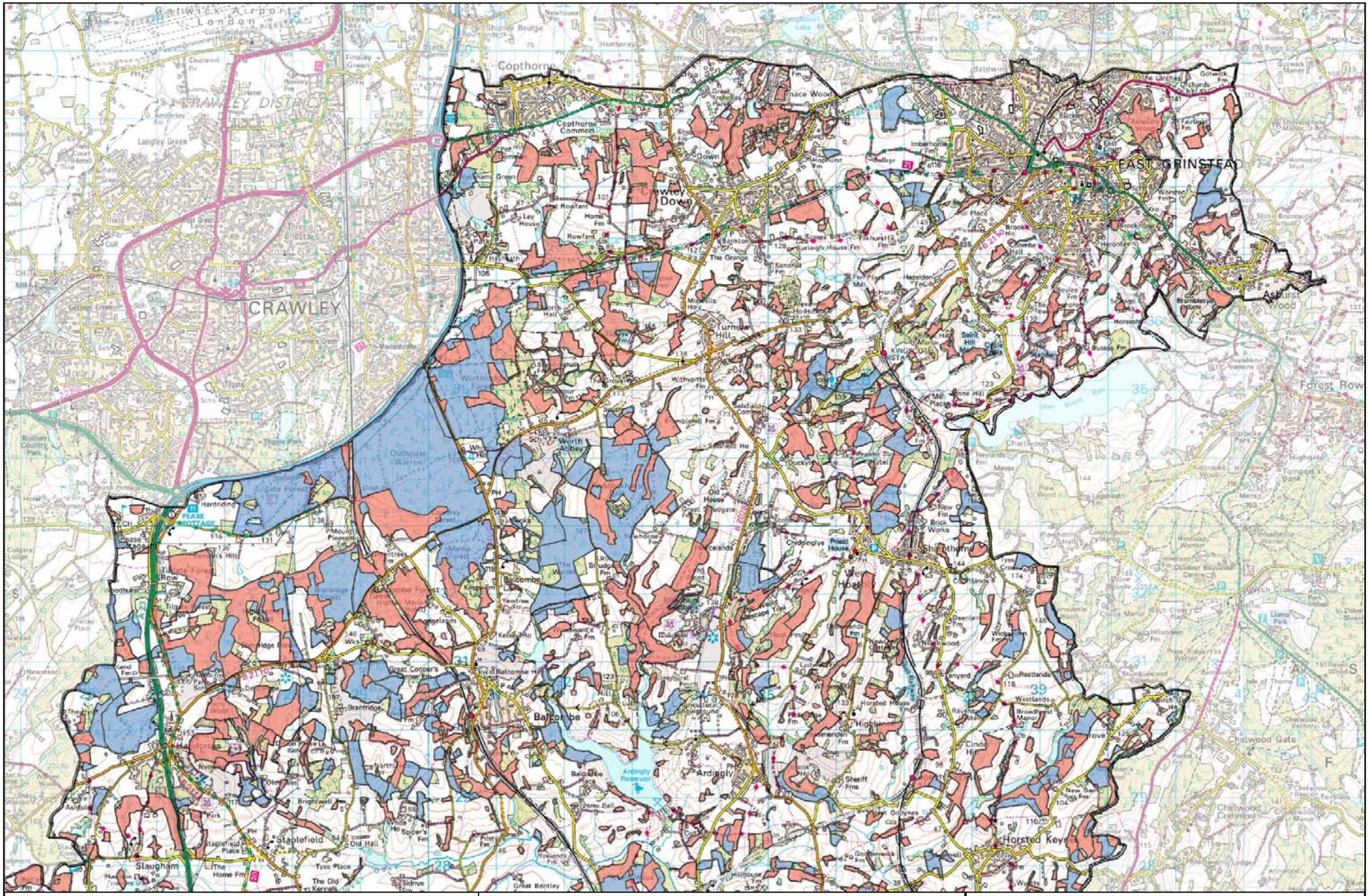
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0 2.5 5 10 Kms

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Map produced 17/09/06 M.Grose at the High Weald AONB Unit.



MAP 3 The Revised Ancient Woodland Inventory for Mid Sussex District (North)

Mid Sussex District

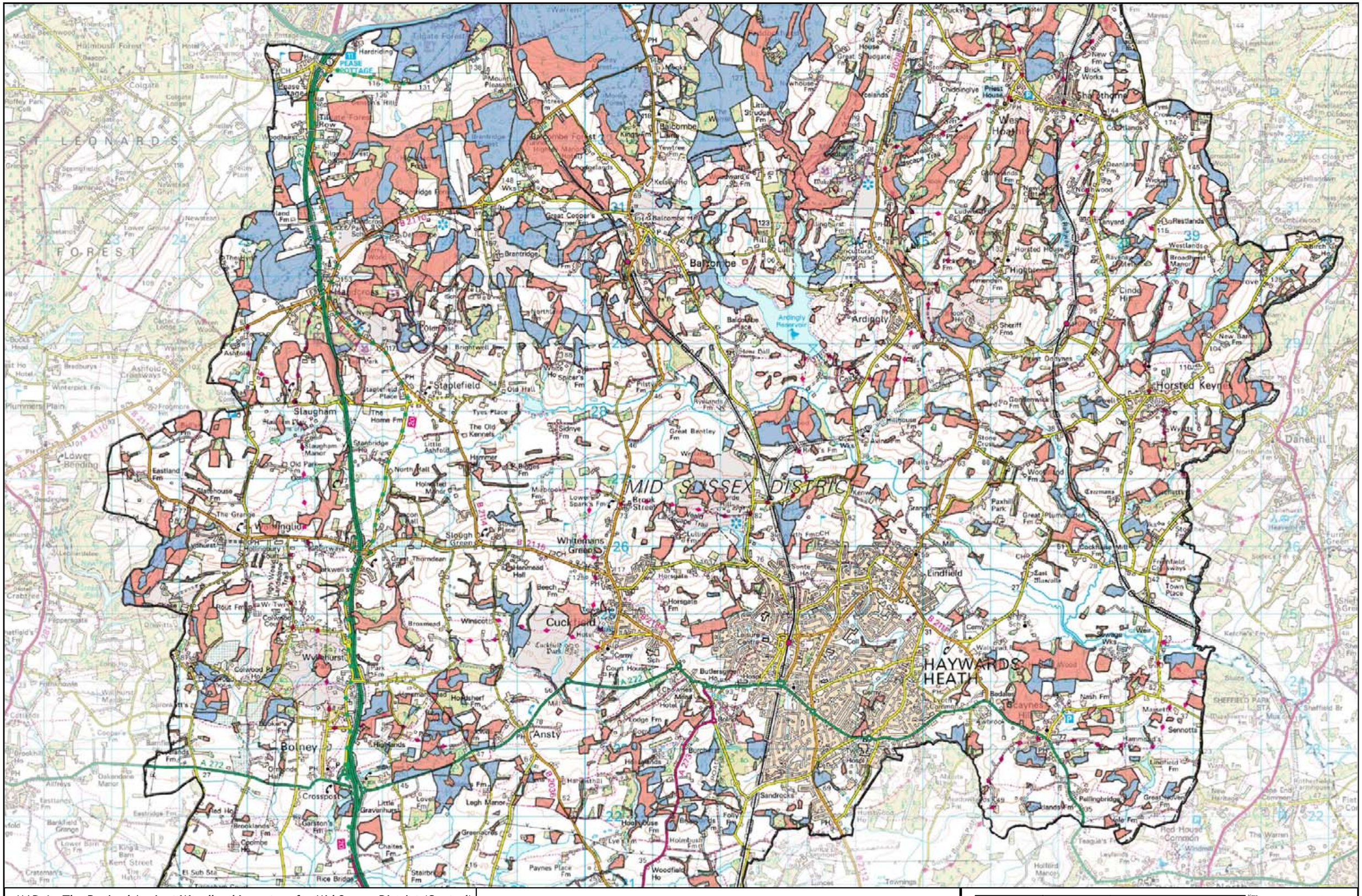
Plantations on Ancient Woodland Sites

Ancient Semi-Natural Woodland

0 1 2 4 Kms

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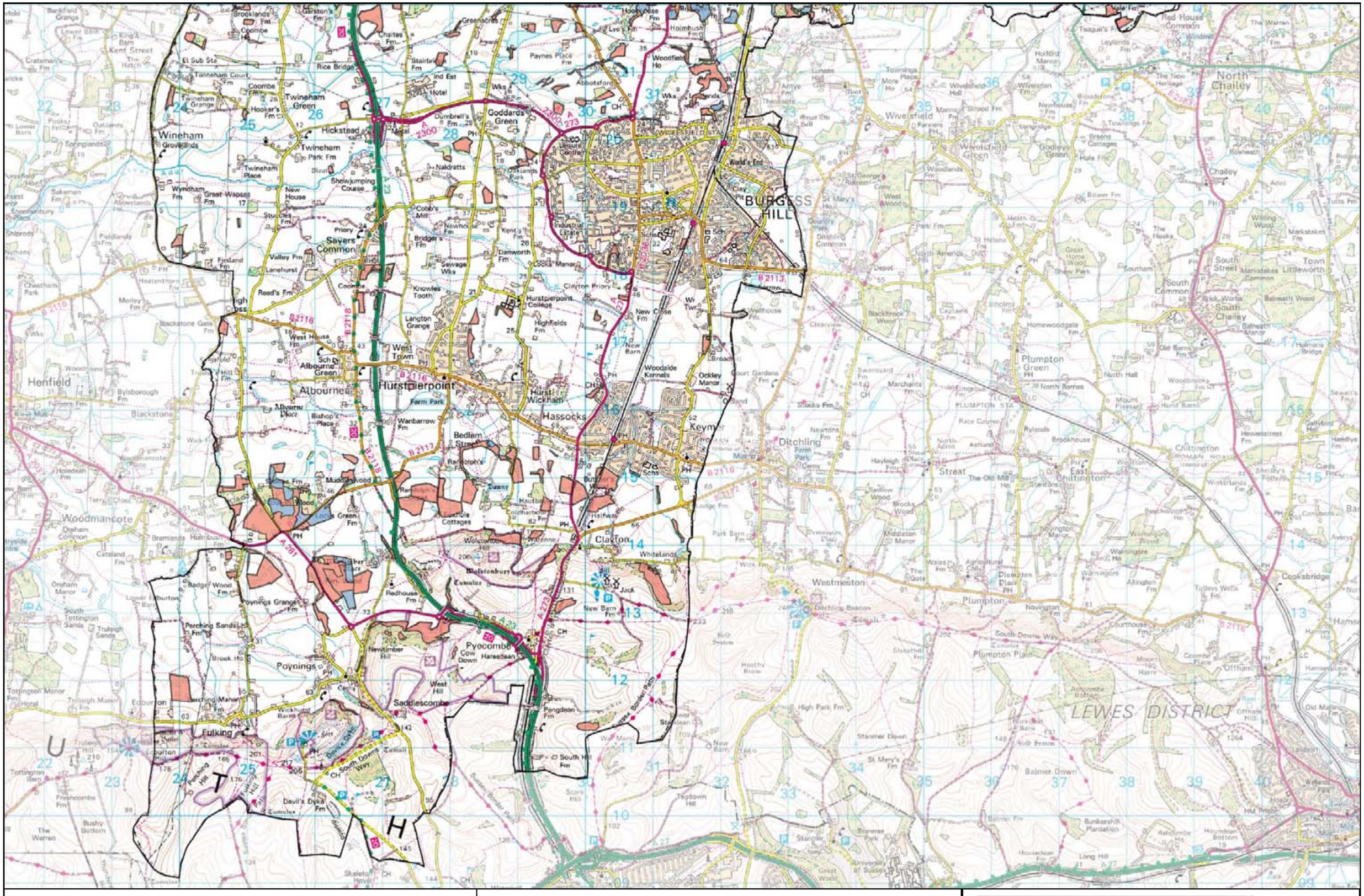
MAP 4 The Revised Ancient Woodland Inventory for Mid Sussex District (Central)

Mid Sussex District | Plantations on Ancient Woodland Sites | Ancient Semi-Natural Woodland

Kms 0 1 2 4

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N W E S



MAP 5 The Revised Ancient Woodland Inventory for Mid Sussex District (South)

Mid Sussex District | Plantations on Ancient Woodland Sites | Ancient Semi-Natural Woodland

0 1 2 4 Kms

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