Woodland Habitat Action Plan

1. Introduction

The total woodland cover in the UK is 3.17 million hectares or 13% of the total land area (Forestry Commission, 2018). Around 2% of this is ancient semi-natural woodland (ASNW). The following woodland habitats included within this Action Plan were listed as priority habitats within the UK BAP and subsequently in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006: Lowland Beech and Yew Woodland and Lowland Mixed Deciduous Woodland.

2. Current Status

2.1 Description of habitat

The woodlands of Worcestershire reflect the relicts of the wildwood that developed over much of Britain after the last ice age. Much of this habitat was cleared during Neolithic times for settlement and agriculture and removal has continued, at varying rates, to the present day. The fragments that have survived have been altered through man's activities such as clearance, conversion to commercial forestry plantation and removal or introduction of animal species that impact upon the habitat, such as native, non-native or naturalised species of deer, pheasant *(Phasianus colchicus)* and grey squirrel *(Sciurus carolinensis).*

Woodland can be described according to its origins: planted or natural, ancient or secondary; its silvicultural management e.g. coppice with standards, high forest or continuous cover forest; or its ecological type, determined by local conditions of soil, geology, hydrology and climate and to some degree by management if replanting has taken place. Management may also affect hydrology and soil-nutrient status, which will trigger community changes.

The woodlands of Worcestershire can be grouped in terms of origin:

- Ancient Woodland Sites (AWS) including:
  1. Ancient Semi-Natural Woodland (ASNW)
  2. Plantations on Ancient Woodland Sites (PAWS)
- Recent or maturing secondary woodland including:
  1. Other Semi Natural Woodland (OSNW)
  2. Recent secondary woodland
  3. Broadleaved plantations
  4. Mixed deciduous / coniferous woodland
  5. Coniferous plantations

The ecological woodland types found in Worcestershire are:

- Beech and yew woodland
- Ash with field maple woodland
- Oak woodland with bracken
- Oak woodland with birch
- Wet woodland (see Worcestershire Wet Woodland Habitat Action Plan)
- Mixed woodland plantation
- Coniferous plantation

2.1.1 Woodland Origins

Ancient semi-natural woodland (ANSW) and Plantations on Ancient Woodland Sites (PAWS)

ASNW are woods that have been continuously wooded since at least 1600 and may be remnants of the ancient wildwood. Due to being long established they can hold a high diversity and abundance of woodland species. Management can affect this to varying degrees although much of the unseen diversity within an under-managed wood will remain in the seed bank and lie dormant until conditions become favourable for growth.

PAWS are those sites where the original native woodland has been felled to make way for new planting of non-native commercial species, frequently conifer but also other native or non-native broadleaved species. Examples of sites with native species on AWS include the Wyre Forest where much of the native broadleaved forest was managed towards oak monoculture to support the tannin industry. Other PAWS have developed where non-native and often invasive shrub planting has occurred within woodland for the purpose of providing game cover and to a lesser extent as a fashion through the Victorian era and before. Some species used for this, such as cherry laurel *(Prunus laurocerasus)*, rhododendron (*Rhododendron ponticum)* and snowberry (*Symphoricarpos albus)* can quickly spread through a wood and adversely affect the native floral diversity of a woodland. See also Forestry Commission Practice Guide: *Restoration of Native Woodland on Ancient Woodland Sites*.

Other Semi Natural Woodland (OSNW)

OSNW is naturally regenerated native woodland or that planted with native species using a planting matrix that mimics naturally regenerated woodland habitat. Most grant aided woodland creation projects of this nature will look to follow the Forestry Commission's Bulletin 112 '*Creating New Native Woodland*'.

Recent and maturing secondary woodland

Secondary woodland has largely evolved through changes in land use over the last 400 years where woodland has managed to establish on unused agricultural ground through natural succession. However, where land has been grazed or felled and wooded intermittently for many hundreds of years, secondary woodland will also be found. Some such habitats may offer interesting diversity in terms of ground flora due to what has survived in the soil seed bank. Since the development of grant schemes for woodland planting, secondary woodland has largely been created through grant-aided projects although some has been planted through landowners' desire alone. A proportion of projects have involved non-native plantation mixes but in more recent times only native broadleaved species planted in a way that mimics naturally regenerated woodland have been able to attract grant aid. New woods can also naturally regenerate, particularly in areas where grazing has been relaxed. Ash *(Fraxinus excelsior)*, sycamore *(Acer pseudoplatanus)* and birch *(Betula pendula)* seed prolifically and readily invade open areas if the opportunity arises; for instance, secondary sycamore woodland is prominent in parts of the Malvern Hills.

Broadleaved plantations

Small plantations of broadleaved woodland are scattered throughout the county, planted over time for a variety of purposes. There are significant old plantations of sweet chestnut *(Castanea sativa)* in the sandstone country around

Kidderminster and in the west of the county small ash beds grown for hop poles can frequently be found: a remnant of the hop growing industry from the 18th to the 20th century. In the post war period there was also a desire for planting poplar (*Populus* sp*)*. on wet ground to produce timber for the match industry and, whilst this would not now be recommended because of the risk of destroying existing areas of valuable habitat, a plantation will occasionally develop an interesting flora as poplar casts only a very light shade. The last few decades have also seen a large number of small farm woodlands planted as part of various initiatives by forestry and conservation organisations.

Mixed deciduous/coniferous woodland
Mixed woodlands in Worcestershire can comprise a broad range of species including pedunculate oak *(Quercus rober)*, ash, beech *(Fagus sylvatica)*, poplar, Scots pine *(Pinus sylvestris)*, Corsican pine *(Pinus nigra subsp. Laricio)*, Norway spruce *(Picea abies)*, larch (*Larix* sp*)*. and Douglas fir *(Pseudotsuga menziesii)*. Shrub layers and ground flora are often less rich in these woods largely due to their short history. Depending on the percentage of coniferous trees, heavy shade and acidic leaf litter (needles) can suppress ground flora.

Mixed woodland planting was also a key element of the design of estates and parklands, particularly during the 17th century, with many plantations created primarily for aesthetic purposes.

Coniferous plantations
All coniferous woodlands in the county are non-native, with the majority planted in the last 100 years. The principal coniferous species planted in Worcestershire are Scots pine, Corsican pine, Norway spruce, larch species, Douglas fir and occasionally Sitka spruce *(Picea sitchensis)*. Coniferous plantations typically have a species poor ground flora due to the dense shade produced by maturing trees although they can support scattered ferns, fungi, mosses and liverworts as well as providing valuable breeding habitat for hawks.

2.1.2 Woodland ecological types
The National Vegetation Classification (NVC) for Woodland was developed by Rodwell in 1991 and is the accepted method of classifying woodland types. The species of the field layer and shrub-layer tell us most about the woodland community as the canopy layer may be much altered by management. Ancient woodlands will hold more species characteristic of a particular woodland type but recent woodlands can also be described by their NVC community.

Pedunculate oak and ash dominate the two most typical types of woodland found in Worcestershire in ecological terms, with the composition of the field layer the determining factor between individual community types. Although it is arguable whether beech is native to the county, beech woodlands (or remnants) do occur and yew (*Taxus baccata)* woodland is found at one site. Wet woodland comprising willow (*Salix* sp*)*. or alder (*Alnus glutinosa)* or a mixture of the two may be located in seasonally inundated areas or on soils that are permanently or regularly waterlogged.

The species composition of any habitat is dictated by a combination of local conditions (soil and geology, hydrology and climate) and activities on or near the site. The often rich and diverse communities of ancient woodland have taken

hundreds and sometimes thousands of years to develop. The species composition of new woodlands is determined in part by the habitat into which the woodland has developed or been planted and will slowly change as species that cannot tolerate the new conditions (such as reduced light levels) are lost and other species favoured by the new conditions become established. The timescale in which this occurs is dictated by species recruitment from the surrounding area (from hedgerows, old copses and other woodlands).

In Worcestershire the following lowland woodland vegetation types occur:

Beech and Yew woodland
Beech is probably not native to Worcestershire although long established plantations of high biodiversity value are found in the south east of the county: Bredon Hill has a number of beech stands of considerable age that contribute to the importance of the site as a wood pasture habitat with a range of tree species.

Beech is often planted either amongst existing woodland, usually of the ash-field maple *(Acer campestre)* type, or as new plantations. The dense shade created by a beech canopy and the dense and decay-resistant leaf litter creates a characteristically bare ground flora although dog's mercury *(Mercurialis perennis)* and bramble *(Rubus fruiticosus)* are often frequent. There are a number of variants of beech woodland in the country, but the most important type in Worcestershire is NVC W12 *Fagus sylvatica-Mercurialis perennis* woodland.

Worcestershire has a single example of yew wood (W13 *Taxus baccata* woodland).

Calcareous to neutral soils: Ash-field maple woodland (NVC W8).
NVC W8: *Fraxinus excelsior-Acer campestre-Mercurialis perennis.*
This type of woodland is extremely variable in terms of species composition. Ancient semi-natural stands of ash-field maple woodland often support a rich diversity of flora and fauna. The canopy is usually characterised by ash, field maple, hazel *(Corylus avellana)*, pedunculate oak and wych elm *(Ulmus glabra)*. Small-leaved lime *(Tilia cordata)*, wild service *(Sorbus torminalis)*, hornbeam (*Carpinus betulus)* and yew are other components that can be prominent in certain stands. This community is also the stronghold for large-leaved lime *(Tilia platyphyllos)*, which has a restricted distribution in Britain. The ground flora is often rich in herbs such as bluebell *(Hyacinthoides non-scripta)*, dog's mercury, wood anemone (*Anemone nemorosa)* and violets *(Viola* sp.).

Historically, ash-field maple woodland was frequently managed as coppice although high forest stands became more common during the twentieth century. Replanting and the selection of particular species through management, for example hazel coppice with oak standards, has also been common practice within this woodland type in the past.

Neutral soils: Pedunculate oak woodland (NVC W10).
NVC W10: *Quercus robur – Pteridium aquilinum – Rubus fruticosus.*
Both pedunculate and sessile oak (*Quercus petraea)* and their hybrids occur in this woodland type in Worcestershire. Pedunculate oak is dominant in the south and east with sessile oak becoming more common in the north and west of the county. Silver birch and downy birch *(Betula pubescens)*, small-leaved lime and

the non-natives sycamore and sweet chestnut are also commonly associated species. This woodland type includes most of the county's small-leaved lime woods, such as the nationally important Shrawley Wood. The ground flora is generally not as rich as W8 woodlands, characterised by bluebell, bracken (*Pteridium aquilinum)* and bramble.

Acid soils: Oak-birch woodland (NVC W16).
NVC W 16: *Quercus spp- Betula spp-deschampsia flexuosa*
This woodland is characterised by a canopy dominated by either downy or silver birch with pedunculate or sessile oak (mostly the latter in Worcestershire, where it occurs largely in the north of the county). Other canopy species are uncommon although holly *(Ilex aquifolium)*, rowan (*Sorbus aucuparia)* and hazel occur. The ground flora is typically species poor, dominated by grasses, bracken and other ferns, and mosses. Heather (*Calluna vulgaris)* and bilberry (*Vaccinium myrtillus)* are often prominent. Oak and birch woodlands located around the Wyre Forest are similar to the oak-birch woodlands of the uplands (W11, W17).

Wet soils: Alder-willow woodland (NVC W1, W6 and W7).
A separate Habitat Action Plan within the Worcestershire BAP covers wet woodland.

The dominant woodland communities in Worcestershire show highest affinity with W8 and W10 woodland types.

2.2 Distribution and extent

Historical influences on woodland cover

The pattern of woodland today is very much a reflection of the evolution of the landscape, a process subject to physical, economic and cultural influences. Worcestershire is a county of contrasting landscape evolution: much of it retains a wooded character and strong associations with the ancient wooded land cover, most notably in the west, north and north east. Even where woodland has since been lost in such areas, the 'ghost' of the wildwood remains in hedgelines and woodland remnants, providing a vital reservoir of species for colonisation and expansion should new planting link together and expand these fragments. Worcestershire was once also the focus of a large concentration of royal hunting forests: by the 13th century, seven such forests were known in the county – Wyre, Feckenham, Ombersley, Horewell and Malvern, together with Kinver and Arden that extended from neighbouring counties.

In contrast, the south east of the county has long lost its ancient woodland and remains largely un-wooded today. The Vale of Evesham in particular, with its easily cultivated soils, was cleared of its ancient woodland cover at a very early stage in the deforestation of England and by Roman times was an important corn growing area: it has been an area notable for cultivation ever since. Elsewhere more recent designed woodland planting, associated with estates and parkland such as Croome, provides an additional range of woodland character.

Woodland Extent

The Worcestershire Habitat Inventory (WHI) records 16,800 ha of woodland ***outside of urban areas*** (excluding wet woodland), about 9.5% of the county area. This figure is slightly higher than some of the surrounding counties, for example Warwickshire has around 6.6% woodland cover and Shropshire 9.3%

(Woodland Trust, 2016), and just slightly below the England average of 10% (Forestry Commission, 2018).

The national Ancient Woodland Inventory records 5336ha of ancient semi-natural woodland within Worcestershire (3% of the county area, slightly higher than the UK figure of 2%), of which 2167ha is PAWS (1.2% of county area). According to these data ancient semi-natural woodland represents 31.7% of all the woodland in the county.

Current distribution of woodland types

Of the woodland types described in section 2.1, ash-field maple woodland is the predominant woodland type on the more base-rich and calcareous soils in the county, occurring most commonly in the south and west.

Pedunculate oak woodland is the predominant semi-natural woodland on neutral and moderately acid brown earths. It occurs throughout the county and is the dominant type in the Severn Vale.

Oak-birch woodland is common on acidic and sandy soils and is particularly frequent in the north and west: in the Wyre Forest, the Teme valley and around Kidderminster.

There are considerable numbers of beech plantations on the edge of the Cotswolds in the south east of the county.

Worcestershire has a single example of yew woodland on the Abberley Hills.

The influence of topography – the Malvern Hills

The composition of woodland will reflect the local physiographical character. The topography of the Malvern Hills has played a part in the distribution of woods in the district with woodland remaining in areas where the topography has impeded access and therefore management of the woodland by man. The north and north-west of the district is undulating with brooks frequently flowing through steep, incised, wooded valleys known as dingles. These have been managed in a much more ad hoc and less intrusive way, with the steepest probably escaping management entirely (though they can still be invaded by non-native species such as sycamore and impacted upon by activities on adjacent land). The topography further south and towards Worcester is generally flatter and brooks do not, as a rule, flow through steep incised valleys. Here there are fewer woodlands; although a few large woods still remain such as Shrawley Wood and Monkwood.

A history of intensive management has a major effect on the structural diversity of the woodland canopy. In the dingle woods, structural diversity is created by trees regularly toppling over on the steep slopes and also by the greater age range and species diversity. Woods on less steep ground (and the plateaux between dingle valleys) have in the main been intensively managed forming even-aged stands, and sometimes mono-species stands. The result is an even canopy with little structural diversity and little light reaching the field-layer. This prevents the growth of some species and prevents the flowering of others, such as meadowsweet, bramble and shrubs such as hawthorn, so reducing the availability of nectar and fruit that are vital food resources for invertebrates, birds and small mammals. This is exacerbated where these stands are of species forming particularly dense canopies or particularly decomposition-resistant leaves – sycamore, sweet chestnut, beech and any conifer. The majority of the diversity of woodland ground flora species in these woods is restricted to tracks and the woodland edge.

2.3 Protection of the habitat

During the 1992 United Nations Earth Summit in Rio the UK Government signed up to a suite of key environmental caveats including the Biodiversity Convention and a Statement of Forest Principles. At the Helsinki Ministerial Conference in 1993 European Governments built on these principles by adopting a set of sustainable forest management guidelines with a specific focus on the conservation of European biodiversity. The UK Government responded by publishing four interrelated documents including *Sustainable Forestry – the UK Programme* and *Biodiversity – the UK Action Plan.* As part of a reaction to this the *UK Forestry Standard* was conceived in 1998 (fourth edition published 2017), which was deemed the Government's approach to sustainable forestry and woodland management.

The Forestry Act 1967 (as amended) regulates the felling of all trees over licensable size and volume and it is an offence under the Act to fell trees over and above that threshold without a licence from the Forestry Commission. There are limited exceptions to this including felling trees in gardens and churchyards and where the duties of statutory undertaking must be carried out such as those activities conducted by the railway authorities or the electricity board.

Further protection is afforded to woodlands under the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000, which allow for Site of Special Scientific Interest (SSSI) designation and enforcement. Protection is afforded to non-designated trees or woodlands under the *Town and County Planning Act 1991* (as amended) and in the *Town and Country Planning (Tree Preservation) (England) Regulations 2012* where works to trees in a Conservation Area or those subject to a Tree Preservation Order (TPO) requires written consent from the Local Planning Authority. Lowland beech and yew woodland and lowland mixed deciduous woodland are listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (as are wet woodland and wood pasture and parkland – these habitats have their own Action Plan within this BAP).

Sites not meriting SSSI status can be listed as a Local Wildlife Site (LWS). Although not a statutory designation LWS status does confer some protection through the planning system.

A limited degree of protection is offered to many ancient woodland sites through Government planning policy and their identification and protection by policies in county and district Local Plans.

A voluntary standard has been adopted after the introduction of the UK Woodland Assurance Scheme (UKWAS). This involves woodland owners and managers adopting set principles and criteria conforming to the sustainable management of UK woodlands under a Forest Stewardship Council-approved certification standard.

Several woodland species are protected under the Wildlife and Countryside Act 1981 (as amended), the Countrysied and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006. These include the dormouse *(Muscardinus avellanarius)*, pearl-bordered fritillary (*Boloria euphrosyne)* and all 18 species of bat found in the UK. In addition, dormice and bats are European

protected species under The Conservation of Species and Habitats Regulations 2017 (as amended).

Woodland managers will need to consider the presence of protected species and follow good practice guidance to avoid committing an offence. In some cases management practices may need to be modified or rescheduled to a less sensitive time of year, and where this is not possible or adequate then operators may need to apply for a licence to remain within the law. Most activities will be able to continue without the need for a licence through the following of good practice guidance.

The Forestry Commission will be able to provide support in relation to guidance needed where protected species are present, and will process any applications for licences to carry out work where they are needed. The licences will be issued by Natural England's National Licensing Unit.

'Keepers of Time: A statement of policy for England's Ancient and Native Woodland' was published by Defra in 2005. The latest 'Government Forest and Woodlands Policy Statement' was published by Defra in 2013.

2.4 Summary of important sites

The Wyre Forest, which extends into Shropshire, is the third largest area of ASNW in England. The plateau soils are generally acidic but the valleys and slope bottoms are more base-rich. Sessile and pedunculate oak are common with ash, English elm *(Ulmus minor 'Atinia')*, small-leaved lime, the nationally rare true service tree (*Sorbus domestica)* and common alder in the valleys. Large-leaved lime, narrow-leaved helleborine *(Cephalanthera longifolia)*, soft-leaved sedge (*Carex montana)* and columbine (*Aquilegia vulgaris)* are amongst the scarcer species found. The Wyre Forest is, perhaps, the most important area for woodland biodiversity in the county because of its extent and because of the geographical and plant community links of its upper slopes with the oak coppices of Wales, its valleys with the woodlands of the south Welsh borderlands, and local patches of ash/hazel woodland reminiscent of East Anglian woods.

Important areas of PAWS and ASNW are found on the West Malvern to Abberley Hills ridge north from the Malvern Hills and across to the Teme Valley woodlands. The Malvern Hills woodlands are remnants of Malvern Chase, a Royal Forest that was disafforested by Charles I in 1644. The woods of the Teme Valley form an interesting series of limestone woodlands with a species-rich shrub and ground flora layer. Small-leaved lime and wild service tree are frequently present, as well as a wide variety of ancient woodland indicator species such as toothwort *(Lathraea squamaria)*, greater butterfly-orchid *(Platanthera chlorantha)*, stinking iris (*Iris foetidissima)* and nettle-leaved bellflower *(Campanula trachelium)*. These woodlands are very similar to, if not identical with, the *Tilio-Acerion* ravine forest community listed under the EU Habitats and Species Directive (1992) as a priority habitat for protection. Consideration needs to be given to this.

A notable group of PAWS are the woods collectively known as the 'Harris Brush Company Woods'. These are all sited on large ancient woodland sites in the centre and south of the county within easy reach of the company's factory at Stoke Prior. Whilst owned and managed by Harris these woodlands were often planted with exotic species for specific wood products, such as grey alder *(Alnus*

incana) or sycamore to produce white wood poles for turnery or sweet chestnut for fencing. Plantations on new sites can be difficult to classify using NVC but the Harris Woods and others on ancient woodland sites can be classified using surviving ancient woodland species. The shrub layer and ground flora of plantation woodlands is often less diverse than ancient sites growing on similar soil types. However, these woodlands are often important for particular species of birds, plants and invertebrates with high individual nature conservation value. Such woodlands, including Trench Wood and Monkwood, raise the national conservation value of plantation woodlands. Most of the woodlands in the central Worcestershire plain are typically pedunculate oak over hazel coppice. Many support rich ground floras such as herb-paris *(Paris quadrifolia)*, early-purple orchid (*Orchis mascula)* and greater butterfly-orchid. Trench Wood was once famed for its nightingales but, along with other woodlands in Worcestershire, they have all but disappeared in recent years. Roundhill Wood, Grafton Wood and surrounding woodlands are at the core of the only brown hairstreak (*Thecla betulae)* butterfly population in the West Midlands.

Shrawley Wood SSSI was selected as it consists of a large tract of ancient woodland dominated by coppiced small-leaved lime, a habitat unusual in the West Midlands. Other standard trees include occasional pedunculate oak, downy birch, rowan and ash with alder in the wetter areas. On the slightly acidic soils of the plateau the ground flora is dominated by bracken, foxglove *(Digitalis purpurea)* and bluebell. On the more alkaline slopes dog's mercury, enchanter's-nightshade *(Circaea lutetiana)* and ramsons (*Allium ursinum)* become more abundant. Many interesting and locally uncommon plants occur within the ground flora, including herb-paris, giant bellflower *(Campanula latifolia)*, broad-leaved helleborine (*Epipactis helleborine)* and lily-of-the-valley *(Convallaria majalis)*. Two rarities, wood fescue *(Festuca altissima)* and spreading bellflower *(Campanula patula)* are also present. opposite-leaved golden-saxifrage *(Chrysosplenium oppositifolium)* and large bitter-cress *(Cardamine amara)* are present in the waterside communities and wet flushes and the rare soft hornwort *(Ceratophyllum submersum)* occurs in one of the pools. The latter is nationally uncommon and restricted in distribution in the UK. Over 400 species of fungi have been recorded and the wood is also important for its breeding birds. The woodland is part managed by Forestry Commission England.

Chaddesley Wood NNR is managed by Worcestershire Wildlife Trust on behalf of Natural England. This 59 hectare site (believed to be a remnant of the former Royal Forest of Feckenham) is predominantly oak woodland with occasional hazel, holly, ash and rowan with areas of plantation, scrub and grassland. Uncommon plants include bluebell, early-purple orchid and herb-paris. Crossbills (*Loxia curvirostra)* breed in the conifers of the plantations. The grassland is a wet meadow with a rich flora and invertebrate fauna.

Tiddesley Wood has been wooded since before the preparation of the Domesday Book in 1086. Most of the site is broadleaved woodland dominated by ash and pedunculate oak, with field maple and coppiced hazel in the shrub layer. In some areas the canopy also contains small-leaved lime and silver birch, and in places there are stands of invasive suckering English elm. Wild service tree, spindle *(Euonymus europaeus)* and wayfaring tree (*Viburnum lantana)* are also present. In the past there have been unsuccessful attempts to replant parts of the wood with conifers and in most places native broadleaved trees and shrubs have re-

established. The ground flora is rich and dominated by bramble, dog's mercury or bluebell. Wood anemone and primrose *(Primula vulgaris)* are abundant in places, and a number of locally uncommon species occur, such as meadow saffron *(Colchicum autumnale)*, bird's-nest orchid *(Neottia nidus-avis)*, herb-paris, broad-leaved helleborine and violet helleborine *(Epipactis purpurata)*. The site is also notable for its butterflies and dragonflies and noble chafer (*Gnorimus nobilis)* beetle is found in the orchard adjacent to the wood.

3. Current factors affecting the habitat

- Deer have increased significantly in the English countryside and populations of fallow deer *(Dama dama)*, roe deer (*Capreolus capreolus)* and muntjac (*Muntiacus reevesi)* all affect the woodlands of Worcestershire to varying degrees. Deer browsing results in bark stripping, prevention of woodland regeneration, damage to ground zone plants and damage to young tree stock.

- Damage caused by grey squirrel via bark stripping results in significantly reduced longevity of native trees. Bark stripping also reduces sustainable timber management options and may jeopardise the viability of new native woodlands and PAWS restoration projects.

- Invasion of semi-natural woodlands by non-native plant species such as rhododendron, Japanese knotweed *(Fallopia japonica)*, sycamore, Turkey oak *(Quercus cerris)*, Himalayan balsam *(Impatiens glandulifera)*, snowberry and cherry laurel.

- Tree diseases such as acute oak decline and ash dieback (Chalara) have the potential to severely impact the native tree stock. Chalara in particular could lead to the death of a significant percentage of the UK's ash trees over the next decade.

- Scrub clearance may reduce the potential for woodland in some areas. In others, the speed of reversion following abandonment of management reduces tree growth.

- Influence of surrounding land-use and the management of boundary features and woodland edges.

- Air pollution and other environmental influences originating from distant sources.

- Fly-tipping of organic matter can influence the field layer.

- Economic considerations will often influence the desire to perform essential management. PAWS restoration may not be a priority despite grant incentives due to commercial returns, viability of forest operations, trade deficit in forest products, the influence of the strength of sterling on European and world markets, imported forest produce (timber, particle board, pulp, paper etc) and market stability.

- The growth of the woodfuel market should have a positive impact on the management of both existing AWS and woodlands that are currently unmanaged or under-managed.

- The use of heavy machinery in some forestry operations can cause damage through soil compaction etc and this must be addressed if currently neglected or under-managed woodlands are to be brought back into management.

- Skewed age class distribution and structural diversity of trees in managed and production woodlands. The biodiversity value of a single-age, monoculture woodland is greatly reduced.

- Excessive recreational use of woodlands, for example paint-ball, all-terrain vehicles or excessive visitor disturbance including dog walking.

- Use of woodlands for intensive game rearing, hunting and shooting has been a reason to retain woodland. However, some operations for game management may conflict with biodiversity.

- Fragmentation of woodland due to development or clearance for other land uses.

- Baseline data kept in relation to woodland activities and species composition are dispersed and can be difficult to access. There is often a deficiency in the species-specific information and plant community structure data for woodlands that may hinder conservation management and sustainability monitoring.

4. Current Action

4.1 Local protection

Much of the Wyre Forest is designated as a SSSI and part as a National Nature Reserve (NNR). Forestry Commission and Natural England together manage around 45% of the forest, with the remaining land being owned privately.

Chaddesley Wood is a NNR and part of the site is included within the Feckenham Forest SSSI designation along with Randan and Pepper Woods. Other woodland SSSIs include Aileshurst Coppice, Areley Wood, Crew's Hill Wood, Grafton Wood, Monkwood, Rabbit Wood, Tiddesley Wood and Trench Wood. Other notable SSSIs are Pipershill Common, an area of remnant wood pasture, and Shrawley Wood, a locally rare example of small-leaved lime coppice woodland.

The Worcestershire Local Sites Partnership has identified many other ancient woodland sites as LWS.

4.2 Habitat management and programmes of action

Government has given the Wyre Forest high priority for PAWS restoration, including Ribbesford Wood to the south of the Wyre Forest. This aims to restore sites to native woodland and ensure the retention of remnant ancient semi-natural woodland features that survive. The Forestry Commission is responsible for implementing the restoration works.

In 2017 Forestry Commission and Natural England signed a Memorandum of Understanding to jointly manage the public forest estate in the Wyre Forest. This partnership will deliver carefully planned and implemented woodland management to bring about gradual changes to the structure and composition of the forest. A 50 year vision has brought together the best elements of the forest design plan, SSSI and NNR managing processes to create a 10 year management plan which details both the forestry and conservation work in the forest. In addition, Forestry Commission has signed a 5-year agreement with Butterfly Conservation the aims of which are to:

1. Continue to monitor and advise on habitat creation and maintenance
2. Run volunteer work parties and transect walks
3. Look at future funding for improvement works and possible (re)introductions of nectar plants and endangered species

Worcestershire Wildlife Trust own or manage a number of ASNW sites within the county including several of the Harris Brush woodlands such as Hornhill, Trench and Monkwood. The latter two, along with Grafton Wood, are owned and managed in partnership with Butterfly Conservation. The Trust also manages Chaddesley Wood and Tiddesley Wood, the largest continuous areas of woodland in the county outside of the Wyre Forest.

Assistance for woodland owners in the regeneration, improvement and management of existing woodland and the creation of new woodland is available through agri-environment schemes operated by Natural England. Under the Countryside Stewardship Mid-Tier scheme there are management options for the maintenance of wood pasture and woodland edge habitats. The Higher-Tier scheme has a range of options for the creation and management of woodland, wood pasture and scrub habitats.

The Malvern Hills Coppice Network is a group of coppice craftsmen, woodland owners, managers, conservationists and green woodworkers, all committed to the restoration of coppice woodlands in the Malvern Hills area. Members offer a wide range of coppice products and services, woodland craft courses and volunteering opportunities.

4.3 Survey, research and monitoring

Worcestershire Wildlife Trust completed a comprehensive review of the county's woodland LWS in 2009. The Worcestershire Local Sites Partnership continues to monitor all LWS and any new woodland sites that qualify for inclusion in the list will be considered by the Partnership's selection panel.

Dormice

Since 2000 Forestry Commission has been carrying out a dormouse research project in Ribbesford Wood to monitor populations during PAWS reversion. 380 boxes have been checked monthly between May and October as part of the PTES National Dormouse Monitoring Programme. Animals have been microchipped since 2002 to follow individuals throughout their lifespan. Survival rates and juvenile dispersals during the reversion process have been recorded to measure the success, or not, of four different methods of reverting conifers back to native woodland. Three such operations have taken place and the 4th and final, removal of conifers will be in 2020/21. This research will continue to monitor the population dynamics of the resident dormouse population until well after the

conifers have been removed. An annual update of this work is published in the Wyre Forest Study Group Review.

Lepidoptera
Butterfly Conservation volunteers carry out timed counts and transect monitoring at over 50 sites within the Wyre Forest on an annual basis.
Annual transects are carried out within several Worcestershire Wildlife Trust / Butterfly Conservation woodlands to monitor the butterfly populations. There is also an annual programme of egg counts to monitor the population of brown hairstreak within and around Grafton Wood.

5. Associated Plans
Wet Woodland, Ancient and Veteran Trees, Dormouse, Bats, Brown Hairstreak, Grizzled Skipper, Pearl-bordered Fritillary, Drab Looper, Common Fan-foot, Wood White, Nightingale, True Service Tree.

6. Conservation Aim
The native semi-natural woodland character of Worcestershire is protected, maintained and where possible enhanced, reflecting the characteristic variations in composition and pattern across the county.

7. Conservation Objectives
- Delivery of the Wyre Forest National Nature Reserve and Forest Plan 2016-2026
- Maintain extent of Ancient Semi-Natural Woodland in the county
- Restoration of PAWS woodland to a more semi-natural vegetative cover
- Promote the diversification of woodland age structure and vegetation structure for ecological benefit
- Promote the addition of shrub and ground flora layers characteristic of Ancient Semi-Natural Woodland to new plantations
- Increase overall woodland cover through sensitive and appropriate planting
- Take opportunities to re-link fragmented PAWS and ancient woodland sites
- Buffer existing high value sites from deleterious impacts arising from surrounding land use
- Monitor the emergence and progress of tree diseases within the county, in particular ash dieback (Chalara), and put in place action plans to manage resulting impacts

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