
# THE STATUS OF THE HAZEL DORMOUSE (*Muscardinus avellanarius*) IN WARWICKSHIRE, COVENTRY & SOLIHULL IN 2016

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**FOREWORD**

*It is a pleasure to write this foreword and a privilege to work with its author. I requested Ruth Moffatt to write this as I felt it was important to document information known about dormice in Warwickshire, Coventry and Solihull, following the search for more populations between 2009 and 2016; these surveys were initiated by the author whilst Local Biodiversity Action Plan Co-ordinator. Ruth's enthusiasm has been the catalyst to energise the survey effort and to record the information in this excellent review. Her work has exceeded all my expectations and original purpose'*.

**Gina Rowe, August 2016 (Chair of the Local Biodiversity Action Plan)**

**PROLOGUE**

The dormouse is referred to in Shakespeare's Twelfth Night as an adjective only: Fabian says to Sir Andrew Aguecheek *'Awake your dormouse valour'*, meaning 'sleepy, dozing, slumbering'. However, the dormouse is probably most famous in literature as a character in "A Mad Tea-Party", in Alice in Wonderland (Carroll, 1865): Dormouse sleeps between March Hare and the Hatter who are using him as a cushion when Alice arrives at the tea table. *'You might just as well say', said the dormouse, who seemed to be talking in his sleep, that "I breathe when I sleep" is the same thing as "I sleep when I breathe"!'* As recently as 100 years ago their tiny size and adorable appearance made dormice perfect pets; the lazy, hopeless nature depicted in the book only enhanced their popularity.

The dormouse is distinguished from other 'mice' by its furry tail and by its habit of sleeping, strictly hibernating, through the winter months which leads to its name, coming perhaps from the French '*dormir*', to sleep, or from the Middle English word '*dormous',* sleepy. Regional names reflect this 'sleepiness': dory mouse, derry mouse, dozing mouse, sleep-mouse, the sleeper and seven-sleeper (Hurrell, 1980). In the north of England 'dozy mouse' may come from the Old Norse word *'dusa'* and more curious is the Devon name '*chestlecrumb*' (Burton, 2016).

**A 'sleeping' dormouse at Windmill Naps Wood**
© James Littlemore

Once a common animal, the dormouse has disappeared from about half its previous range, mostly in the north (Morris, 2004); contributing to this decline is the loss of coppiced woodland and hedgerows, and the fragmentation and deterioration of remaining woods and hedges. Numbers of dormice have also declined, with a 33% reduction since 2000 (White, 2016a). In addition, the introduced North American grey squirrel (*Sciuris carolinensis*) has increased competition for food resources.

It is thought that climate change can disrupt the hibernation cycle, causing dormice to wake too often in warmer winters, using up additional fat reserves; they can also be short of food in cloudier summers when the availability of insects, fruits and flowers is reduced (Morris, 2004).

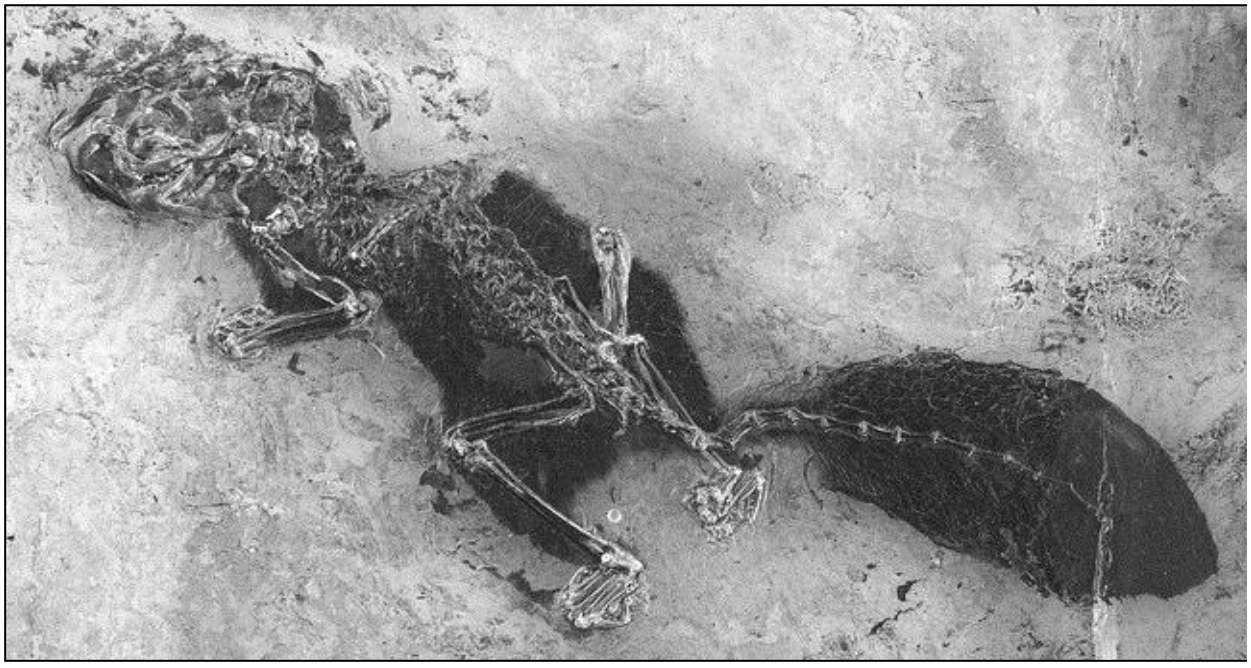
## 1. DORMICE

### 1.1 CLASSIFICATION

The *Gliridae (*dormice) is a small family of 29 species in 9 genera in the suborder *Sciuromorpha* (squirrel-like rodents) of the mammalian order *Rodentia* (Wilson & Reeder, 2005). This systematic position differs from the earlier opinion that placed dormice in the *Myomorpha* (rat-like rodents) with true mice and rats (*Muridae*) and voles (*Cricetidae*) (Nowak, 1991). Glirids are the most ancient group of rodents, dating back to the Eocene epoch 50 million years ago (mya) when they were the dominant rodents in Europe, long before the evolution of the *Muridae* (Harris & Yalden, 2008). We know that the earliest mammals coexisted with the dinosaurs, presumably surviving the catastrophe that caused the extinction of the dinosaurs 65 mya, perhaps developing then the ability to avoid adverse conditions by hibernation.

The genus *Muscardinus*, of which the hazel dormouse is the single contemporary species, is confined to the Western Palaearctic and is known from the mid-Miocene, circa 14 mya (Juškaitis & Buchner, 2013).

Fossil dormice are not normally found whole but an exception is at Messel in Germany where early middle Eocene sediments (circa 45 mya) have yielded a perfectly preserved specimen of *Eogliravus wildii,* pickled in a bed of oily tar-like material (see photograph below). Represented by a completely articulated skeleton and soft body outline of pelage over body and bushy tail, the gut contents reveal that it fed predominantly on seeds, fruits and buds (Juškaitis & Buchner, 2013).



**The fossil of an *Eogliravus wildii* clearly shows a characteristic bushy dormouse tail**
(photo by Storch, 2007, reprinted by permission of the Society of Vertebrate Palaeontology*)*

**1.2 DESCRIPTION**

Most species of dormice have a furred bushy tail; they are '*small mouse-rat sized rodents, mostly arboreal, ecologically like small nocturnal squirrels'* (Harris & Yalden, 2008). They lack a caecum, part of the small intestine present in other rodents that consume a lot of fibrous material, although dormice will eat seeding heads of grasses, veins of leaves and perhaps new bud growth (Hurrell, 1980). Dormice are dependent on more nutritious foods than other rodents such as nectar, insects, fruit and nuts; a specialist feeder, it is unable to survive on grass and seeds like voles and mice. Other differences are in the molars (cheek teeth): four upper and lower, not three, with transverse ridges instead of the zigzag ridges of the herbivorous bank vole (*Clethrionomys glareolus*) or the knobbly lumps of the more omnivorous wood mouse (*Apodemus sylvaticus*).

**Molars of hazel dormouse**
© Bright *et al*. 2006

**Molars of bank vole**
© Southern, 1964 (reprinted by permission of the Mammal Society**)**

**Molars of wood mouse**

Feet are slender, with large pads and capable of much lateral movement at wrist and ankle (Harris & Yalden, 2008). '*The feet* (of the hazel dormouse) *have gripping pads and a gap between the first digit and the other four, adapting the dormouse for grasping and climbing. The hind feet can be rotated at the ankle, allowing the animal to hang downwards, suspended by its hind claws, an ability shared with squirrels'* (Morris, 2004).

**A dormouse being weighed during a box check at Ribbesford Wood** © Steven Falk

## 2. THE HAZEL DORMOUSE (*Muscardinus avellanarius*)

### 2.1 STATUS

The hazel dormouse is native to Britain but is nationally scarce. It is protected under both UK and European legislation: Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), the CROW Act 2000, Schedule 2 of the Conservation of Habitats and Species Regulations 2010, Annex IV (EC Habitats Directive), and the Bern Convention, Appendix 3. It is a priority species under Section 41 of the NERC Act 2006, and is on the IUCN Red List of Threatened Species, under the category of 'least concern'.

### 2.2 THREATS

Hazel dormice are sensitive to weather and climate, both directly and indirectly, through their specialised feeding requirements. They are particularly affected by habitat deterioration and fragmentation and also by inappropriate habitat management; the presence of deer may reduce the quality of the habitat if numbers are high (Goodwin, 2016). For all these reasons, they are highly vulnerable to local extinction (Bright *et al*. 2006).

The greatest threat to the dormouse, however, is winter mortality, with 60-80% of marked animals lost in some years (Juškaitis, 2005). Dormice are sensitive to change on any scale and mortality tends to be weather related; cool summers influence the abundance of food and warm winters can affect their survival of hibernation. If winter weather is mild and a dormouse wakes, reserves of energy are used up more quickly and not replenished as there is no suitable food around.

Predation is not a major pressure on dormice although they are taken by a range of opportunistic predators including wood mice and probably woodpeckers; during hibernation they are at risk of being dug up by foraging badgers. They only make up a small part of an owl's diet, although this could be due more to rarity than preference; likewise the occasional predation of nest sites by weasels presents only a small pressure unless weasel populations are particularly high. Although not known to predate dormice or their young, the grey squirrel may be a threat by inter-specific competition for food resources; there is no evidence of this although it is likely (White, 2016b).

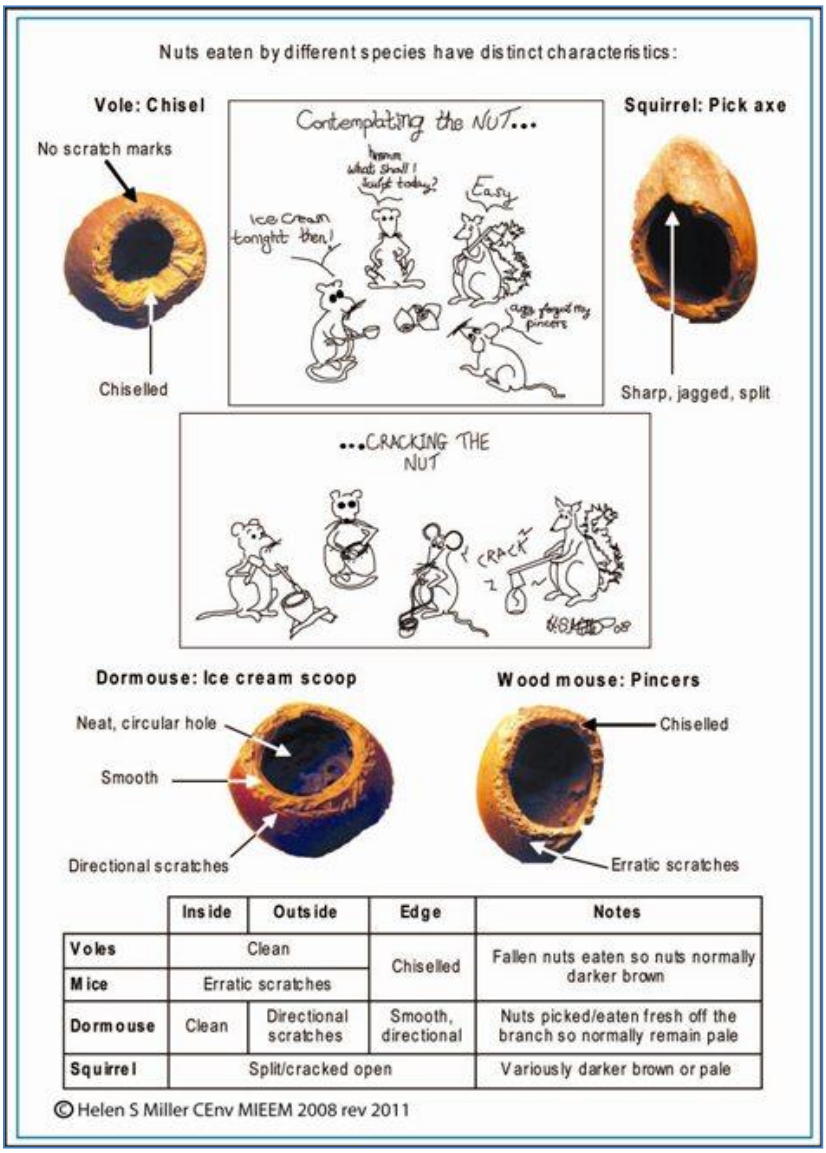
### 2.3 BEHAVIOUR

The dormouse is nocturnal and largely arboreal and solitary except when breeding. Its dispersal distance is probably up to 1km, particularly in hedgerows, with a home range of up to 0.5ha for females and 0.75ha for males (White, 2016b). It is a low density species even in the best habitats, with only three to five (but sometimes up to ten) adults per hectare in early summer in deciduous and coniferous habitats (Bright *et al.* 2006). A study of 24 sites in 11 different ancient woods found a density of seven to eight in coppiced areas, i.e. where the understorey was unshaded (Bright & Morris, 1990). Dormice do not appear to hold territories but occupy a range of habitats containing

available food sources and with the correct physical structure of contiguous woodland and multiple height connections (see **2.4**) (Smith, 2004). Details of breeding can be found in the literature and on websites (Young People's Trust for the Environment, 2015; British Wildlife Centre, 2012).

**2.4 DIET**

Dormice are selective feeders, in spring eating nectar and fresh flower stamens from hawthorn (*Crataegus monogyna* and *C. laevigata*), honeysuckle (*Lonicera periclymenum*) and bramble (*Rubus fruticosus*); they supplement this diet with insects, most frequently moth caterpillars (White, 2016b). Later, as plants begin to fruit the dormice consume berries of bramble (*Rubus fruticosus*), and yew (*Taxus baccata*) and nuts of hazel (*Corylus avellana*) and beech ( *Fagus silvatica*) , also ash keys (*Fraxinus excelsior*). Of diagnostic use in recording their presence is their particular way of opening hazel nuts. *'Nuts opened by dormice have a characteristically neat, round hole over a smoothly chiselled edge. Those opened by bank voles and wood mice, however, have a rough corrugated edge to the hole'* (Hurrell & McIntosh, 1984), although there are differences too between the way these two animals open nuts (see below, Miller, 2011):




| | Inside | Outside | Edge | Notes |
|---|---|---|---|---|
| Voles | Clean | | Chiselled | Fallen nuts eaten so nuts normally darker brown |
| Mice | Erratic scratches | | | |
| Dormouse | Clean | Directional scratches | Smooth, directional | Nuts picked/eaten fresh off the branch so normally remain pale |
| Squirrel | Split/cracked open | | | Variously darker brown or pale |

**2.5 HIBERNATION**

Hibernation is a survival strategy used by some mammals in response to a lack of food during the winter, its success depending on stable weather (White, 2016a). In dormice this takes place between October/November and March/April, although it may be interspersed with short periods of activity: '*As the autumn proceeds the dormouse becomes very fat, eating plenty of autumn fruits and hazel nuts. The latter are extremely important as they contain a large amount of protein and fat*' (Hurrell, 1980). Dormice put on weight at a remarkable speed, eating high sugar and protein materials to almost double their weight in less than a month (Morris, 2004). During hibernation physiological changes reduce energy needs and during this time body fat is the only source of energy; on emergence from hibernation the body weight can have halved but a 30% weight loss is more usual*. 'The dormouse is especially vulnerable during the hibernation period and one study has suggested a population loss of as much as 80% during the winter*' (Hurrell, 1980).

Due to their small size (average weight 20g), dormice are sensitive to changes in temperature and, in particular, long winters that stretch the amount of fat reserves used up; once a dormouse population falls below 20 individuals there is little chance of long term population survival (Smith, 2004). During their active season they may be found in a state of temporary hibernation called torpor, showing all the signs of hibernation; this is to maximise energy conservation during periods of cold, stress or shortage of food and water (Juškaitis, 2005).

**2.6 NEST BUILDING**

Nests are another diagnostic feature of the dormouse. Three types are built: for breeding, shelter and hibernation. The breeding nest is typically of shredded honeysuckle bark, though they will build with whatever is available, tightly woven to form a ball, surrounded with a layer of fresh leaves; in coniferous woodland, nests have been found made entirely of pine needles (Trout, 2016). The nest can be up to 15cm in diameter and is usually approximately a metre off the ground. *'A breeding female mouse may have more than one nest and if she is severely disturbed will move the young to one of the other nests. Once the young are old enough to scatter from the breeding nest they construct their own shelter nests; these may be fairly close together but are usually occupied singly and are smaller in size…….. .....Hibernation nests may be sited inside a tree hollow , in a hole under the ground or under a thick carpet of leaves on the ground itself'* (Hurrell, 1980). The advantage of hibernating on or under the ground is that the moisture reduces water loss and thus the need to wake up and drink; in addition the temperature is low and fairly constant, between 1°C and 4°C in leaf litter and soil in the winter, the temperature at which least energy is consumed, thus maximising fat stores (Morris, 2004).

**A dormouse nest at Weston & Waverley Woods**
© Steven Falk

In comparison, wood mice build looser nests, often of dry leaves and grasses, and with a distinct smell since they urinate within the nest. The presence of nut shells is another distinguishing feature as, unlike dormice, they cache food. However, it can be difficult to distinguish the two on structure alone, as some wood mice produce a somewhat woven centre; these 'look alike' nests have been found at two sites in Warwickshire.

**Wood mouse nest at Bubbenhall Wood** ©Ruth Moffatt

**Wood mouse 'look-alike' nest at Clowes Wood** © Bob Roberts

**Wood mouse nut cache at Bubbenhall Wood** © Ruth Moffatt

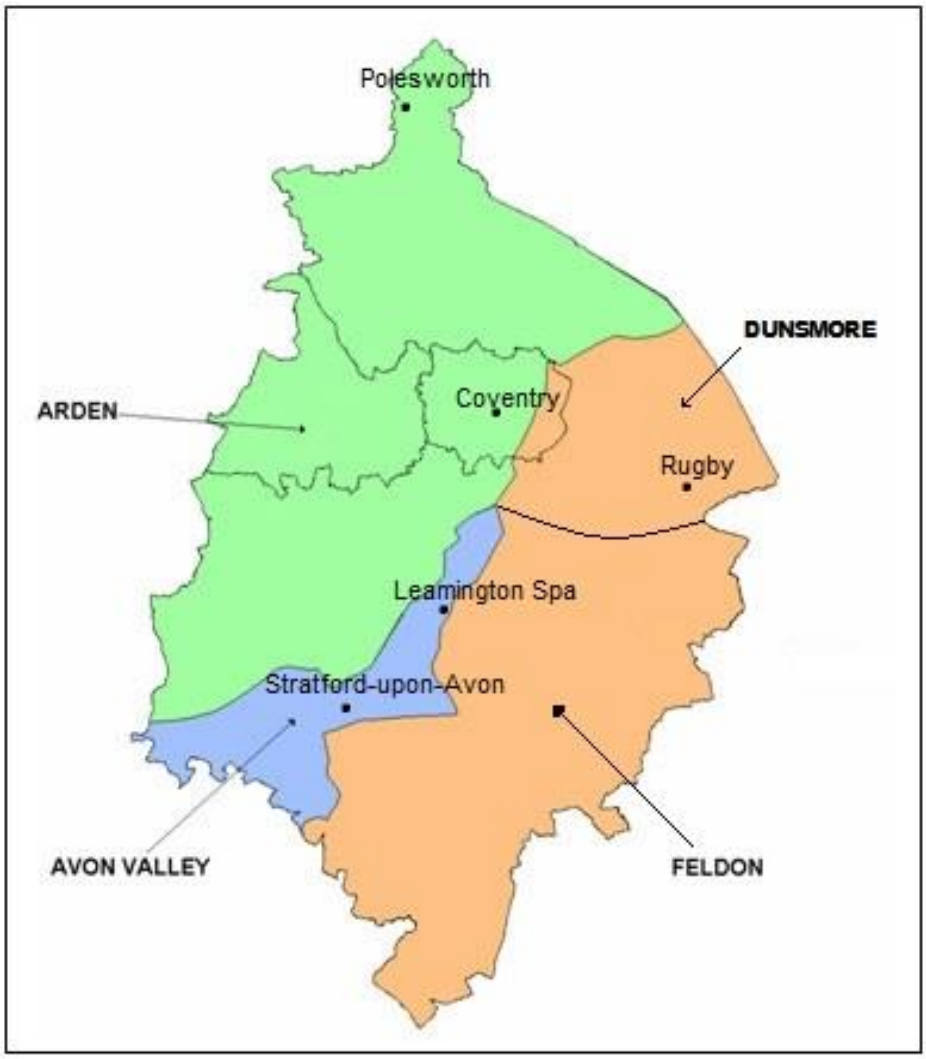
**Harvest mouse nest** © Debbie Wright

The nest of the harvest mouse (*Micromys minutus*) may be confused with that of the dormouse as it is ball-shaped and woven. However, it is usually smaller and found in tall, stiff-stemmed grasses, reeds, hedgerows and scrub, rather than woodland. It is generally made of shredded grass leaves, which are sometimes still attached to the stem, and lacks the deciduous tree leaves that a dormouse incorporates (Wright, 2016).

Although not at all like a dormouse nest, the nest of the wren (*Troglodytes troglodytes*) may be found in a dormouse box, a ball of moss usually packed right up to the lid. Several are built by the male wren and dormice will then use the spare nests by lining them with honeysuckle (Bucklitch, 2016).

**3. HISTORICAL PERSPECTIVE OF WOODLAND IN WARWICKSHIRE** (extracted from Tasker, 1990).

When the last ice age ended approximately 12,000 years ago, most of Britain became wooded - the 'wildwood' of Rackham (1986). This complex mosaic of woodland types, with small-leaved lime (*Tilia cordata*) dominant, remained largely intact for thousands of years until the coming of man. From 3000BC, Neolithic people began to clear the land for farmland and it seems likely that, by the time of the Romans (1st-5th centuries AD), at least half of Warwickshire had been cleared of woodland. This was greatest in the south-east half of the county, later known as the Feldon, but even in the more heavily wooded Arden area of the north-west the evidence of Roman pottery and tile-making suggests the surviving woodlands were used for fuel.




**The broad division of Warwickshire into the Arden, Feldon and Avon Valley**
© Warwickshire Museum Time Trail (adapted by Annie English, Warwickshire Wildlife Trust, 2016)

Tasker states that: *'The Domesday Book in 1086 provides the first reasonably accurate picture of woodland distribution and shows only 19% of Warwickshire was wooded. This was concentrated in the north-west with the south-east virtually devoid of woods'*. Wager (1998) , however, disagrees

with this picture of Warwickshire, south and east of the Avon, as being 'woodless' in 1086, suggesting that the '*silva*' of Domesday Book was probably wood pasture and that the survey seems to have omitted groves which were small private manorial woods.

Nevertheless, the woodland that remained would have been managed in two ways: coppicing where understory shrubs were cut on a rotational basis, and wood pasture where domestic animals were grazed within a wood. Even the hedges separating fields were used for wood and timber production, such was the need for woodland products. The majority of woodlands that survive today have been managed and are referred to as 'semi-natural'. Some of these woods are 'secondary woodland', meaning that the land was not always wooded; evidence for this is the presence of ridge and furrow (a ploughing method of cultivation) within the wood. It is more difficult to prove that a site is 'primary' woodland and therefore this term is used for woodland that has existed since before 1600.

Most of the ancient woods remaining in medieval Warwickshire persisted up to the 19th century although in 1885 this amounted to only 3.5% of the county (including plantations). By 1920 there were 12,000 acres of intact ancient semi-natural woodland but by 1985 this had been halved. Thus the entirely natural deciduous forest which colonised Warwickshire after the last Ice Age is almost entirely gone. Only 3% of the county remained wooded by 1990 with half of this being conifer plantation.

Today the historic 'Arden' landscape of the north-west comprises farmland and former wood-pasture, with sessile oak (*Quercus petrea*) and pedunculate oak (*Q. robur),* small-leaved lime, silver birch (*Betula pendula)* and downy birch (*B. pubescens*) the dominant trees.

In the south-east in the historic 'Dunsmore & Feldon' landscape, ash (*Fraxinus excelsior*) is often dominant, with pedunculate oak less frequent and sessile oak absent; it is an area of large arable fields and improved pasture. In the north of the Feldon the wooded area of the Dunsmore retains a character of historic heathland and woodlands such as the Princethorpe Woodlands, most important cluster of ancient woodlands in Warwickshire and an outstanding example of a large area of semi-natural habitat in the county (Natural England, 2014a).

## 4. THE HABITAT OF THE HAZEL DORMOUSE

*'Dormice live at low numbers even in the best habitats.....Across the country, including sub-optimal habitats, the average population density is only about 2.2 per ha. Thus small woods will contain few dormice….. Small woods of less than 20ha often provide excellent habitat (because of lack of shading and large areas of shrubby habitat) but if they are not linked to other sites nearby they probably contain too few dormice to sustain a permanently secure population. Fragmentation of sites is therefore damaging …. Dormice have been found in small woods (even down to 2ha where other suitable habitat is adjacent) and in woodland traditionally considered as unsuitable, for example, conifer plantations on new sites' (*Bright *et al., 2006).*

### 4.1 COPPICE WOODLAND

In this 4,000 year old woodland practice, trees are cut down every 5-20 years to stools which regrow, producing a crop of poles of the same size. Coppicing areas of a wood in rotation gave a continuous supply of wood that was used historically for fuel and agricultural purposes, while maintaining some single trunk trees for 'timber'. This 'coppice with standards' system was a sustainable way of producing woodland products without the need for replanting.

This system of woodland management which represents only 20,000ha of the 700,000ha of ancient or semi ancient woodlands in England (Bright *et al*., 2006) is generally perceived as potentially optimal for dormice as it allows light to penetrate a wood, encouraging the growth of a shrub layer, flowers, fruits and insects. A thick shrub layer is very important with bramble forming a major component; dormouse nests are often found in bramble at an average height of just over a metre from the ground.

**Bramble on a frosty day at Print Wood** © Ruth Moffatt

In their survey for the Mammal Society, Hurrell & McIntosh (1984) found that: *'As a result of looking at many potential areas, a picture began to emerge of what constituted a typical dormouse habitat…..a kaleidoscope of varying habitats comes to mind …. Although these habitats appear to be very different, when examined more closely there are certain factors they share. The main factor is the presence somewhere ….of a thick tangle of vegetation. This may be a hedge or bramble clumps or gorse bushes; these provide the security needed by the dormouse both for nesting and for lying up during the day as well as often being the source of a rich food supply. This, no doubt, is why the dormouse has often been referred to as a woodland edge animal or as an animal of developing woodland. Once the wood has become mature, the shrub layer is often shaded out and the dormice move on….'.*

The edges of woodland can also be of considerable significance because lack of management in the main blocks of woodland leaves the edges as the only good areas for dormice after the rest of the canopy has closed up. The woodland edge provided by managed rides is less valuable as it is likely to create only a small amount of suitable habitat for dormice, with a high risk of isolation for small populations as dormice are reluctant to cross the rides (Bucklitch, 2016).

**4.2 HEDGEROWS**

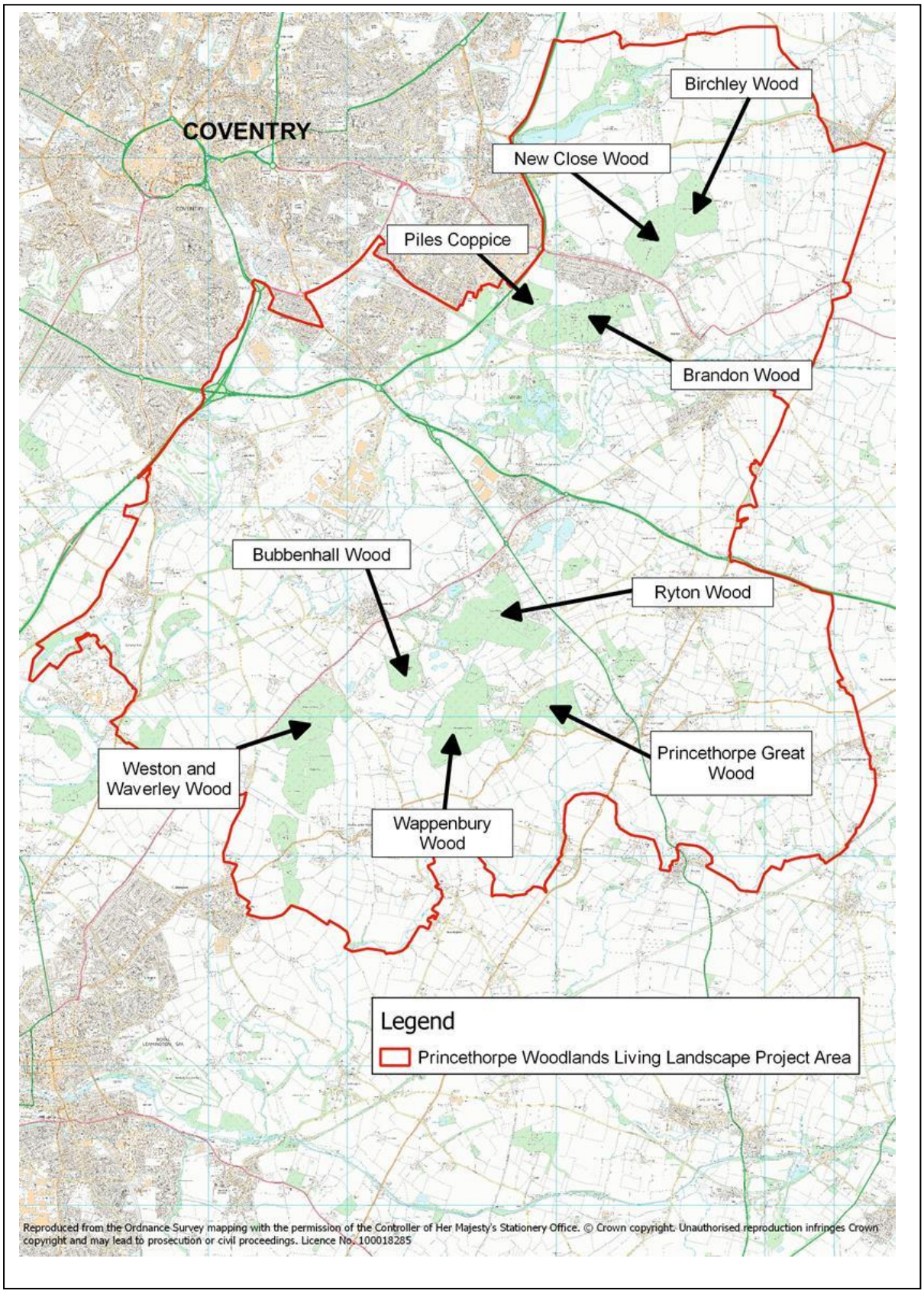
Hedgerows are an important habitat for dormice in some parts of England, particularly in the south-west where they are a substantial feature of the countryside, in essence a linear woodland. Not only do dormice use them for moving between woodlands but strong populations can live in hedges throughout the year. Radio-tracking has revealed that a dormouse may forage along a total length of 200m of hedge in a week, travelling back and forth at night over 300m (Devon County Council, 2009). A population of dormice needs an ample food supply together with safe nesting places, and large, thick and species-rich hedges will meet these needs, particularly those with bramble or rose margins.

**A species rich hedge with bramble margin** © Rob Wolton (Hedgelink**)**

An Institute of Terrestrial Ecology (ITE) survey of hedgerow changes revealed that between 1984 and 1990, hedgerow length in England had declined by 20% (Barr *et al*., 1991); Warwickshire's hedges have suffered even more, with an estimated 36% of hedges in the area being removed between 1950 and 2000 (Nixon, 2001). Habitat Biodiversity Audit records (2017) show 10,869m of hedgerow in Warwickshire, Coventry and Solihull, with a higher density of hedgerows in the Arden owing to the traditional small, irregular field pattern. This contrasts with the planned landscape of the Feldon, of larger rectangular fields and more recent enclosure hedgerows; although 200 years old at the most (Tasker, 1990), the removal of these hedgerows has nevertheless reduced the network between woodlands. The only county record of a dormouse in a hedge is anecdotal, from the north of Warwickshire (Martin, 2008).

One of the aims of the Princethorpe Woodlands Living Landscape Partnership Scheme (see **11.1**) is to restore this continuity in the block of woodland to the west of Princethorpe (see map below). This wide partnership began in 2004 to manage and restore the ancient and semi-natural woodlands and hedgerows and since 2012 has delivered 6.2km of hedgerow restoration and 13.4ha of woodland management. Led by Warwickshire Wildlife Trust, in 2016 the partnership won a major funding bid to Heritage Lottery Fund for a 4 year delivery project. The linking of Ryton

(84ha), Wappenbury (72ha), Weston & Waverley (145ha) and Bubbenhall (24ha) Woods would create a tract of woodland of over 320 ha, not present in the county for over 2000 years.




**The Princethorpe Woodlands** © Annie English, Warwickshire Wildlife Trust, 2016

**4.3 CONIFER PLANTATIONS**

Conifer plantations can also provide good habitat for dormice: '*Even mature conifer blocks, provided they have deciduous shrub edges, can retain a population of dormice'* (Hurrell & McIntosh, 1984). Dormice have been recorded since 1994 in Ribbesford Wood, south of Bewdley in Worcestershire, once part of the Wyre Forest. It is not known what they eat in this coniferous wood but it is most likely to be aphids, caterpillars and pollen, all high calorie foods (Rudlin, 2011); presumably the presence of hazel is not essential to their survival.

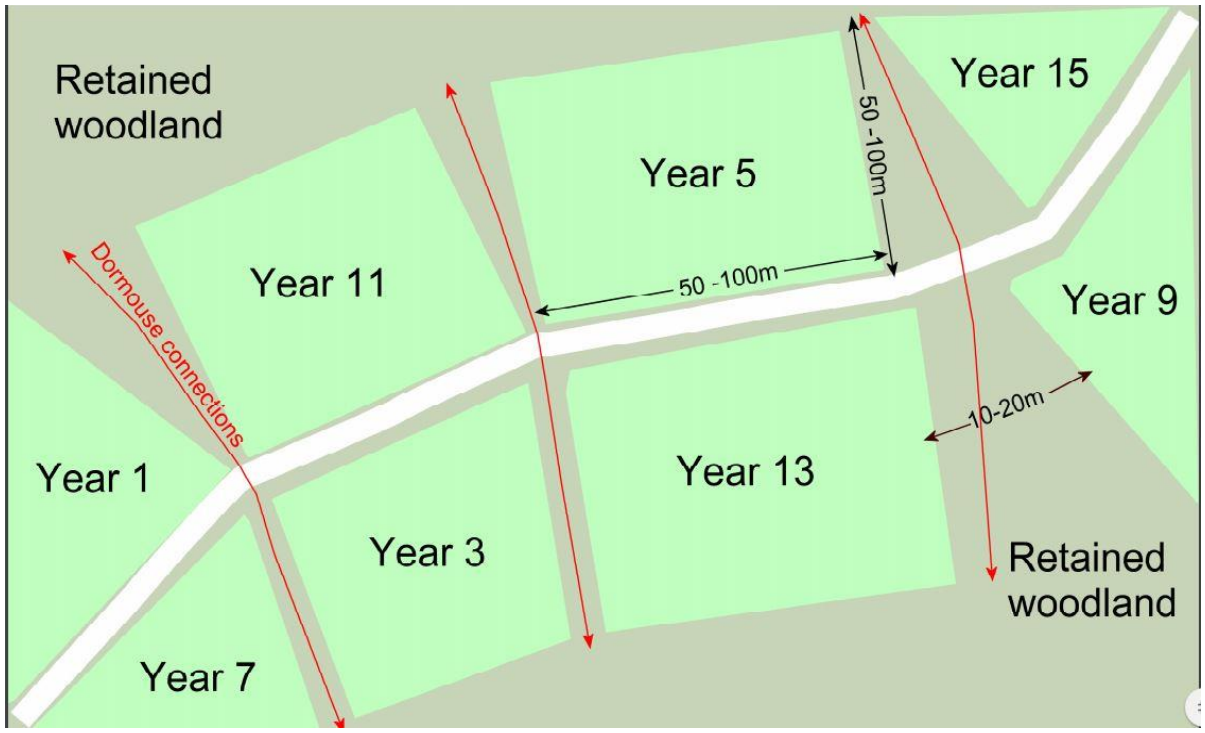
**Active dormouse nest in box at Ribbesford Wood, Worcestershire**
© Steven Falk

Compared with other counties Warwickshire has a relatively low proportion of coniferous woodland to total woodland (Irving, 2016), 10% according to the Phase 1 survey (HBA, 2017). However, one of the woods found to be positive for dormice in 1999 (see **8.1**) was Great Brandon Wood (Bodnar, 2000), recorded in the Domesday Book and now a designated Planted Ancient Woodland site (PAWS). The dormouse record was from an area of mixed woodland where 'dormouse' nuts were found either side of a main track. To avoid this gap in the canopy being a barrier to the movement of the dormice across the open track a rope bridge was installed (Warwickshire Wildlife Trust, 2000-1) but this disappeared soon after it was put in (Smith, 2016). Under management by the 'Friends' since 1981, and purchased from the Forestry Commission in 2000, Great Brandon Wood is gradually being reverted to mainly broad-leafed woodland by thinning which has brought the proportion of Corsican pine (*Pinus nigra*) down to 40% of the total trees compared with the original 48%. Further reduction to 32% will be achieved by the end of the next 5-year management programme, conforming to good forestry practice by careful felling so as not to expose weakened trees suddenly to strong winds (Ireland, 2016).

Austy Wood and the Ragley estate, both recorded as ' *highly coniferised*' (Bodnar, 2000), were not surveyed in 1999 because of *'unsuitable habitat'*.

**5. HABITAT MANAGEMENT FOR HAZEL DORMICE** (Bucklitch, 2016)

Best practice woodland management for dormice is a mosaic of 0.5-1ha coupes (small areas of woodland cleared to enable the understorey and ground flora to re-establish), created on a 10-20 year rotation with good connectivity between them. This can be fitted in as part of a ride management regime (see diagram below) but it is important to ensure good arboreal connectivity across the rides. Ideally aerial 'pinch points' should be left every 50-100m or so with strips of older growth retained between each coupe. The canopies of the old growth trees meet across the ride and create 'dormouse corridors' across the woodland as well as increasing overall age structure and diversity. The deep and wide coupe compartments are then sheltered by the old growth, maintaining good humidity for woodland plants. As these compartments are quite large they are not excessively shaded and so create good conditions for regeneration and for other woodland species such as butterflies and reptiles at the various ages of the regrowth. The old growth strips also increase the amount of standing deadwood, hollow trees, etc. creating invertebrate habitat and nesting sites for dormice, birds and bats.




**Woodland ride management regime** © Andy Bucklitch, 2016

This is very similar to traditional woodland management as practised for the last 2000 years. This size of coppice coupes is about as much as one man could coppice in a year; if you can 'read' the signs in an old woodland you can often pick out the ancient coppice coupes. This management also fits in well with modern mechanised forestry as timber can easily be extracted to ride sides and out of the wood without disturbing other compartments.

**5.1 COPPICING OF WOODLAND**

**Coppicing at Great Brandon Wood** © Andrew Ireland

The decline of the dormouse in England is undoubtedly related to the decline in coppicing in the 20th century; coppice products ceased to be economically worthwhile, including a reduced demand for firewood, and managed woodlands were largely abandoned. *'Between 1900 and 1970 there was a 90% reduction at least in the area of coppiced woodland in Britain .....Once active management has ceased, the coppice becomes self-shaded and.....results in the destruction of the understorey, removing the main food shrubs needed by dormice'* (Morris, 2004).

When managing woodland for dormice it is necessary to maintain this shrub layer, hazel being a most valuable asset together with plants like bramble and honeysuckle; bramble is regularly found in dormouse habitats and should not be shaded out or destroyed. *'When woodland trees are left as standards, they must be sufficiently widely spaced to endure that light can penetrate the canopy. Careful rotational coppicing too can provide a type of openness in which shrubs and brambles thrive. The areas coppiced need to be kept in proportion to the size of the wood so that the disturbance is relatively small at any one time. This allows adequate undisturbed areas in which dormice can maintain viable populations'* (Hurrell & McIntosh, 1984).

**A 'good' wood for dormice** © PTES

Conditions for dormice may be improved by appropriate planting, coppicing, thinning and felling, the aim being to create woodland with a mix of age classes and a multi-storied canopy. There should also be links via managed hedgerows and other scrubby habitats across the whole woodland landscape: *'Dormice fare best where there is a high degree of species diversity among trees and shrubs and a fully three-dimensional physical structure with plenty of links between woody vegetation at all levels'* (Bright *et al*. 2006). Bodnar (2000) recorded the presence or absence of management in the Warwickshire woods he surveyed (see **8.1**) and made recommendations in his subsequent report (2001).

For commercial coniferous woodland containing dormice, management is essential but the traditional rack-and-thin style of management results in the lowest populations. Small group-fells or larger felled areas similar to coppice coupes allows larger numbers to survive as it maintains connectivity; however, on average only 36% of both males and females survive more than 12 months (Trout, 2016).

**5.2 HEDGEROW MANAGEMENT**

The best hedges for dormice are those with high biodiversity, a feature of ancient hedgerows; however, recent hedges can also be very diverse, particularly those in stewardship schemes where recommendations for new planting/management is high diversity of woody species. While hedges need to be cut regularly if they are to remain tight and stock proof, annual cutting drastically reduces the supply of flowers and fruits that are borne on new wood; even cutting at five-year intervals may remove most of the fruiting hazel. Conversely, totally unmanaged hedges become outgrown and gappy, reducing their value as dispersal routes. The compromise is to cut only sections of a hedge at any one time, or opposite sides of the hedge, at three to five year intervals where practical (Bright *et al*. 2006).

**A traditionally layed hedge**
© Warwickshire Wildlife Trust

**An example of conservation hedging** © Nigel Adams

Rejuvenation to promote vigorous basal growth is necessary in order for a hedge to maintain its dense structure and to prevent it becoming leggy and gappy. Hedge-laying (or layering) has for many centuries been the traditional form of management: *'Layed hedges have tended to show the greatest diversity and abundance of species ranging from plants and invertebrates to birds and mammals'* (British Wildlife, 2016). Conservation hedging is a quicker alternative to traditional hedge-laying in which fewer branches are removed, stakes used sparingly and binders omitted; whether this type of hedgerow rejuvenation is directly beneficial to dormice has not been tested (Staley, 2016).

**6. NATIONAL DISTRIBUTION OF THE HAZEL DORMOUSE**

In Great Britain dormice were originally widespread over most of England and Wales but entirely absent from Scotland (Bright *et al*., 2006). Warwickshire is one of a NW-SE band of six counties from Staffordshire to Hertfordshire where dormice are now 'rare' (PTES, 2016). In Leicestershire & Rutland, whose last record is in 1987, a survey in 2009 of seven woods, positive for dormice in the past or relatively close to records of dormice, found no evidence of their presence; the county is believed now to have none (O'Brien & Ingram, 2009).

In 1885 G.T. Rope published a paper: '*On the range of the dormouse in England and Wales'*, a summary of all the notes relating to dormice in the natural history column of 'The Field' in the previous year. He reported that dormice were considered 'common' in many of the southern counties and known localities were recorded in many midland and northern counties as well as in Wales. Although his paper is mainly concerned with distribution, it also indicates the status of the dormouse in 1885, with reports of children bringing scores of dormice to school and of woodmen finding them 'frequently' as they thinned the trees in winter (Hurrell & McIntosh, 1984). However, by the time Barrett-Hamilton & Hinton summarised the situation in 1910 it was changing: *'Where there is plenty of undergrowth, it is a common animal in England, south of the Midlands... it is rare in the Midlands. ....The dormouse is quite unknown in Ireland*'.

The species was known from almost every English and Welsh county in the 19th century but by the beginning of the 20th century it seemed to be becoming scarce in the northern counties, where naturalists were reporting that the animal had vanished in some places. In contrast, in the south in the 1930s all local mammal reports mentioned dormice but by the 1950s the same decline was becoming apparent, with only 63% of mammal reports recording them; by the 1970s the proportion was down to 46%. *'Nevertheless, despite evidence of considerable decline, the hazel dormouse remains widespread and relatively numerous in some counties..... Overall it seems clear that the dormouse has disappeared from about half its previous range, mostly in the north. Where it does still occur its distribution is distinctly patchy and it is nowhere common..... The general picture is of scarcity or absence across a broad swathe of Central England, running diagonally from Devon to the Wash. This corresponds remarkably with what Oliver Rackham (1986) called 'managed countryside'. Here the ancient forest was cleared in the past, leaving open country. The few woods that exist there now are usually isolated*' (Morris, 2004).

In 1984 the results of a national survey initiated by the Mammal Society between 1975-1979 found that overall there had been a decline in the status of the dormouse in Britain. '*There seem to be no areas where dormice can be said to 'commonly occur' or be 'easily found' – words often used in Rope (1885). Indeed in some areas the dormouse seems to have disappeared altogether ….The most*

*severe cases of decline seem to have occurred in the north of England and the Midlands'* (Hurrell & McIntosh, 1984). In 1993 a public survey, The Great Nut Hunt, was organised by Royal Holloway College, London, to find and identify hazelnuts eaten by dormice; this was repeated in 2001. The results confirmed that in less than 100 years dormice had been lost from many counties and were predominantly concentrated in southern England and Wales. Nationally, 63% of the hazel nuts that people thought had been eaten by dormice proved to have been opened by grey squirrels, highlighting the impact of this non-native mammal on dormouse food supplies (Morris, 2004).

In a programme of releases since 1993 to reverse this downtrend, the dormouse has been reintroduced by the People's Trust for Endangered Species (PTES) to 12 counties where it is very rare or absent. In 1993 and 1994 English Nature (predecessor of Natural England) allowed the first release, of 49 dormice, a mix of captive bred and wild caught individuals, into Brampton Wood in Cambridgeshire; at least 36 young were born in the first summer, probably the first born in Cambridgeshire for nearly 100 years. Since then there has been a total of 26 reintroductions, involving more than 750 animals, to 22 sites in Buckinghamshire, Bedfordshire, Cheshire, Derbyshire, Lincolnshire, Northamptonshire, North Yorkshire, Nottinghamshire, Staffordshire, Suffolk and Warwickshire. *'At five of these release sites the introduced population has died out. At the others, populations have achieved varying criteria of success, such as breeding or dispersing beyond the site to new areas'* (PTES, 2016b).

**6.1 REASONS FOR THE DECLINE IN DORMOUSE NUMBERS**

One very significant factor leading to the decline in the dormouse population is the rate at which suitable habitat has been destroyed. A survey for the Mammal Society (1978-82) showed that the most important habitat types for dormice are deciduous woodland with scrub, hedgerow and old coppice: *'30-50% of all ancient semi-natural woodland in Britain has been lost since 1947……140,000 miles of hedgerow have been lost since 1945…….coppicing woodland has become a thing of the past. This removal of habitats has inevitably had an adverse effect on the dormouse population of Britain'* (Hurrell & McIntosh, 1984).

In addition to the reduction and fragmentation of habitat, and the cessation of traditional woodland management, the loss of the dormouse from half its former range in England is also believed to be due to two factors: the inappropriate management of the remaining hedgerows and climatic change causing variable weather, with cooler mean temperatures and higher rainfall in the summer when the dormice are active (Harris & Yalden, 2008). The monitoring of populations is extremely important since dormice are *'sensitive to weather and climate, both directly and indirectly, through their specialised feeding requirements. They are particularly affected by habitat deterioration and fragmentation….. For these reasons they are highly vulnerable to local extinction and are good bio-indicators of animal and plant diversity. Where dormice are present, so are many*

*less sensitive species. The successful maintenance of viable dormouse populations is a significant indicator of an integrated and well-managed countryside'* (Bright *et al*. 2006).

## 7. THE DISTRIBUTION OF THE HAZEL DORMOUSE IN WARWICKSHIRE

Within the county dormouse populations are rather sporadic both in spatial and temporal terms despite several apparently suitable sites being available (Smith, 2004).

### 7.1 RECORDS PRE - 1991

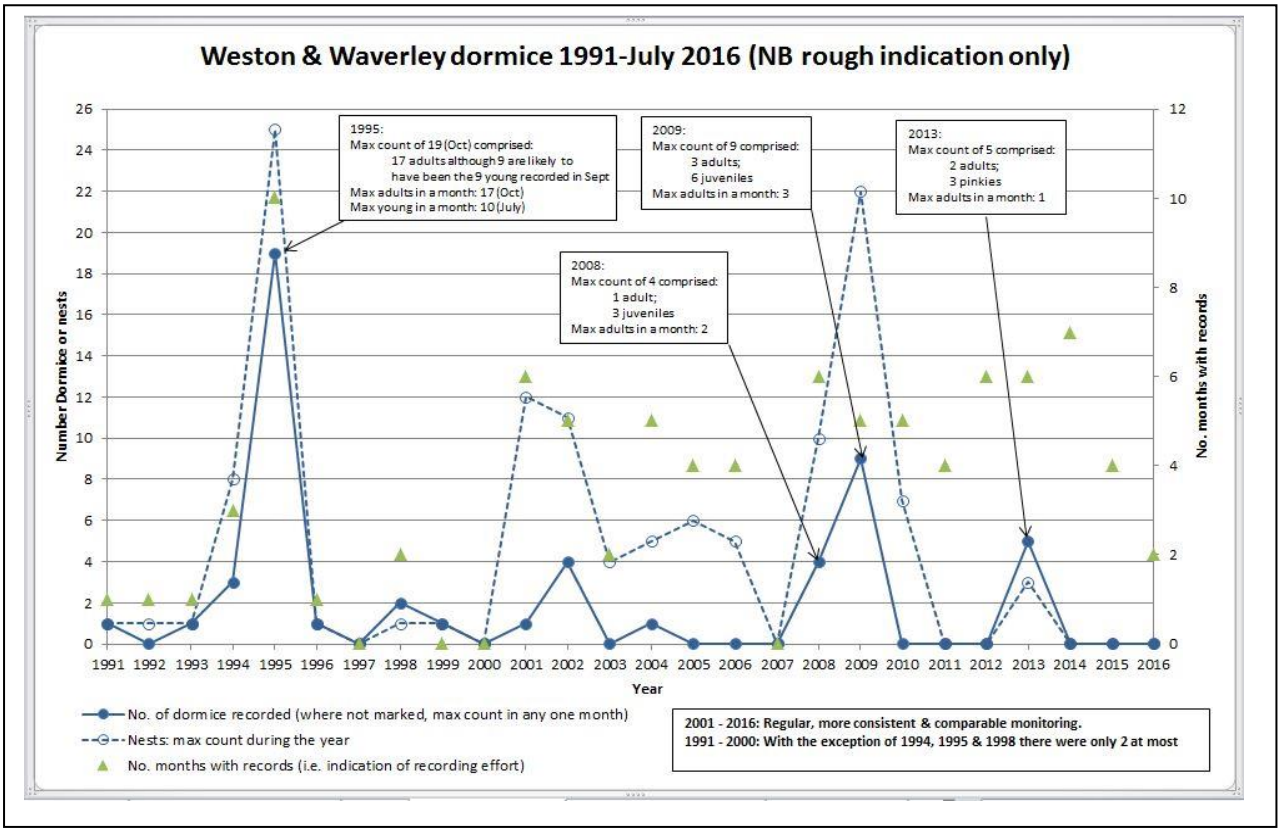
The Local Biological Record Centre records for dormice in Warwickshire begin in 1871 with the report of an individual in the Rugby area, now the centre of the town. In 1885 Rope was '*informed by the Rev. H.A. Macpherson that Mr. O.V. Aplin has a stuffed specimen caught at Edge Hill',* and says that '*two notes from anonymous contributors to 'The Field' testify to its occurrence in Warwickshire, in one of which the writer speaks of having seen and watched one in April 1883, near Yardley Wood* (now part of Birmingham). There is another record of dormice in the 'Rugby area' in 1900 (Bodnar, 2000) and a record in 1949 at Goodyers End, now part of Coventry. The Victoria County History for Warwickshire states: '*The dormouse has been said to occur in the county though the writer has not met with it'* (Doubleday & Page, 1904).

A survey carried out for the Mammal Society between 1975-9 failed to find any recent evidence of dormice in Warwickshire or in six other counties, including adjoining Staffordshire, where it was recorded by Rope, (Hurrell & McIntosh, 1984). However, in 1985 a National Trust Biosurvey at Farnborough Hall recorded a dormouse, or evidence of the species, but this was not verified.

### 7.2 THE NATURAL POPULATION AT WESTON & WAVERLEY WOODS SP 354706 (Miller, 2014).

In 1991 a hibernating dormouse was found during fence construction within Weston Wood, owned by the Forestry Commission, following which a nest box scheme was established in both woods and surveyed undertaken (see graph below).

In 1995 19 individuals were recorded in the boxes but this figure was not a true indication of population since it was the October count and highly likely that some were the young recorded in September. Records were erratic and irregular until 2001 when more constant monitoring began. Following a productive year with 25 nests over the year and nine dormice in one month in 2009, there were only six nests and one individual recorded in 2010, no records at all in 2011 and two possible nests in 2012. Dormice were last recorded at this site in 2013 when a mother with a litter of 'pinkies' (new born young) were found in September, and in October a male was recorded in the same box. It is hoped that this population decline is just a natural dip; in 2013 the number of boxes was doubled to see if the population had moved within the wood. Managed by the Forestry Commission as one unit, Weston & Waverley Woods remains the only confirmed natural population in Warwickshire although there are anecdotal records from other woods (see **7.4**).




**Trends in number of dormice and nests recorded at Weston & Waverley Woods 1991- July 2016.**

NB. Caution should be applied when interpreting the data presented since survey effort and data recorded was not consistence over this 25 year period. However, data have been standardised as far as possible although in some cases needs further verification.

### 7.3 THE GREAT NUT HUNT OF 1993

In this national survey, only negative records were received from Warwickshire, from 13 sites, suggesting that the animal had become locally extinct in a county where it had been recorded as common a century earlier (Morris, 2004).

| Sites found negative by the public in the 1993 Great Nut Hunt | Grid reference |
|---|---|
| **Bentley Park Wood** | SP290952 |
| **Church Pool Covert, Hams Hall** | SP204928 |
| **Crackley Woods** | SP290738 |
| **Heydon's Furze** | SP278342 |
| **Little Wolford Heath** | SP 270348 |
| **Ryton Wood** | SP 382725 |
| **Sutton Park, Birmingham** | SP 100970 |
| **Palmers Rough, Solihull** | SP121801 |
| **Chantry Heath Wood, Stoneleigh** | SP343732 |
| **Chesterton Wood / Roland's Break** | SP342573 |
| **Whichford Wood** | SP 305342 |
| **The Dell, Coventry** | SP3564 |
| **Monks Park Wood** | SP292960 |
| **Watery Lane, Baddesley** | SP266986 |
| **1 other site – Gospel Oak - location unverifiable** | |

## 7.4 INDIVIDUAL RECORDS from 1991-2016

| DATE | LOCATION | GRID REFERENCE | COMMENTS |
|---|---|---|---|
| **POSITIVE RECORDS** | | | |
| **1990s and 2008** | **Ryton Wood** | SP 382725 | Anecdotal records of dormice in the 1990s, never verified, another in 2008, again not verified (Warwickshire Biological Record Centre, WBRC). |
| **1995** | **Chesterton Wood** | SP341592 | 'Dormouse' nuts (Bright, 1995, National Dormouse database, NDD, 2016a). |
| **1995** | **Itchington Holt** | SP371558 | 'Dormouse' nuts (Bright, 1995, NND). |
| **1995** | **Long Itchington,** between Print Wood and Snowford | SP382654 | Unreliable record (PTES, 1995). |
| **1995** | **Weston Park -** between Whichford and Little Wolford Heath | SP289348 | Individual in calf pen litter (WBRC). |
| **1997** | **Cherington -** 2km north of Weston Park | SP284362 | Individual sleeping in a nest in straw bales at Home Farm (WBRC). |
| **1999** | **Wappenbury Wood** | SP375710 | 2 records of individuals (WBRC). Monitored by PTES for 4 months in 2003. |
| **1999** | **Snowford -** 500m from Print Wood | SP382654 | Individual chased by a weasel in garden (Warwickshire Wildlife Trust). |
| **2002** | **Little Wolford Heath** | SP270348 | 'Dormouse' nuts (surveyed by Warwickshire Mammal Group (WMG) following record from nearby Home Farm). |
| **2002 and 2008** | **Print Wood** (see photograph below) | SP3869064910 | 'Dormouse' nuts (WM, 2002) ; in 2008 an individual hibernating in a log pile (Blythe). |
| **2013** | **Gorcott Estate -** east of Redditch | SP08636834 | 2 woven nests in tubes in one hedgerow (PTES, NE Licence Return data from EIA by Environ Consultants). A nearby strip of ancient woodland belonging to Redditch Council showed no evidence in 2 years of subsequent surveying (Bucklitch, 2016) |
| **2014 and 2016** | **Westwood Heath area -** west of the University | SP286762 and SP277762 | 4 records of 'possible dormouse nests' in tubes in hedgerows less than 1km apart (PTES, NE Licence Return data). Nests were loosely woven, some with fresh leaves. |
| **NEGATIVE RECORDS** | | | |
| During 2011 Individual nut hunts were carried out at sites surveyed by Bodnar in 1999/2000: **Hay Wood, Snitterfield Bushes, Hampton Wood and Rough Hill & Wirehill Wood** were again negative. | | | |

**Log pile at Print Wood where a dormouse was found hibernating in 2008** © Ruth Moffatt

### 7.5 INTRODUCED POPULATIONS OF HAZEL DORMICE

There have been three releases in Warwickshire since 1998, to sites with no previous known records of dormice. Only one of these introductions appears to be extant.

#### 7.51 1998: BUBBENHALL WOOD SP368717

Warwickshire's first introduction, of 60 dormice, took place in 1998 at Bubbenhall Wood as part of English Nature's Species Recovery Programme; this wood is south of Coventry, near the only natural population in Warwickshire (see **7.2**)**.** Half the individuals were captive bred and 30 were wild animals removed from woods in the path of the proposed Channel Tunnel Rail Link in Kent; a release of wild dormice had never been attempted before. The site was: *'selected as a site for release because of the good habitat, loss of dormice from Warwickshire, future potential for educational use and for habitat linkages to be established and monitored, a supportive landowner (Smith's Concrete) and secure and adjacent to other conservation sites'* (Morris, 1998). Nest boxes and tubes (70 in total) were installed and the site monitored by PTES; in the first year numbers had more than doubled. The presence of juveniles in September 2001 showed that the dormice continued to breed (Macpherson, 2013) but by 2003 only one individual was found and in 2005 monitoring ceased (Al-Fulaij, 2009). This apparent crash in numbers over five years from 60 individuals to only a single animal could suggest that the difficulties of recording dormice make the population size hard to estimate (see table):

| **The decline in dormice recorded at Bubbenhall Wood from 1998 to 2003** | | | | | |
|---|---|---|---|---|---|
| **In 1998: 60** | **In 1999: 138** | **In 2000: 8** | **In 2001: 29 including juveniles** | **In 2002: 3** | **In 2003: 1** |

#### 7.52 2009/2010: WINDMILL NAPS SP092723

Judged by Bodnar in 1999 to be negative for dormice, and following further survey by PTES, Windmill Naps**,** a privately owned wood south of Birmingham near Earlswood, became the second introduction site in Warwickshire when 20 dormice were released in 2009. After the relocation of the 100 nest boxes in 2010, into two parallel transects of 50 boxes making them easier to check, and the addition of a further 21 dormice, the population seemed to thrive. All the dormice came from the Common Dormice Captive Breeders Group, ensuring genetic diversity in the introduction. Both releases involved a tremendous amount of work by the owners and by members of the WDCG who helped with the box relocation and fed the mice in the large release cages; this was a daily job until the release cages were opened, and then gradually reduced until November when the dormice would hibernate. A rota for feeding was established, with a meticulous record kept for the next team of feeders (see chart below); for most members this was their first sight of a dormouse.

| *RECORDING DORMOUSE FEEDING AT WINDMILL NAPS JUNE - SEPTEMBER 2009* | | | | | |
|---|---|---|---|---|---|
| ***Date*** *5/9/12* | ***Recorder*** *Andy Bucklitch* | ***Weather*** *Dry, foggy, slightly chilly* | ***Yesterday's food was:*** *2 slices apple, 2 blueberries, 1 grape, 1 cherry, 1 hazel nut, handful of seed* | | ***Today's food was:*** *2 grapes, 2 cherries, handful of nuts and grains* |
| ***Cage*** | ***Comments*** | ***No. of dormice – male/female*** | ***Water*** | ***Dry food remaining*** | ***Fruit remaining*** |
| *1* | | *Nil* | *Replenished* | *All gone* | *1 x blueberry* |
| *2* | | *Nil* | *Replenished* | *All gone* | *All gone bar nibbled hazel nut* |
| ***And for cages 3-14……*** | | | | | |
| ***Recommendations for feeding changes:*** | | | | | |

Records of dormice at Windmill Naps have varied over the years but numbers have built up (see table). The numbers recorded may include repetition as dormice can be very mobile and found in more than one box in a checking session, hence the use of the term 'captures' (Bucklitch, 2016).

| **Numbers of 'captures' recorded at Windmill Naps (includes juveniles after 2009)** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **In 2009: 8** | **In 2010: 7** | **In 2011: 4** | **In 2012: 3** | **In 2013: 61** | **In 2014: 22** | **In 2015: 41** | **In 2016: 82** |

**Working party at Windmill Naps**
**© Derry Hanratty**

**Dormouse waiting to be fed in the release cage at Windmill Naps © Ian Tanner**

The success of this introduction must be due to the efforts of the owners, their woodman and a small group of volunteers who undertake all the management themselves:

*'What they have achieved in the woodland is incredible, with the eye being drawn to beautiful dead wood hedgerows snaking their way through the woods. In other areas trees have been coppiced/felled and thinned to reduce canopy cover and allow more light in. Windmill Naps Wood is such a successful dormouse wood because all these requirements are present ….including a superabundance of bramble providing a good all year round food source'* (Hobkirk, 2015).

**One of 23 juveniles found at Windmill Naps in 2013**
© Andy Bucklitch

**7.53 2012: ALNE WOOD SP108613** (Kerslake, 2010).

In 2010 a second potential dormouse release site, Alne Wood, north of Alcester, was identified as highly suitable for dormice. It is an ancient woodland, with large areas of hazel coppice as well as other species including bramble and honeysuckle, and it is linked to other woodlands in the area by well-established hedgerows. Although there were no historical records of dormice from the wood it was still necessary to establish their absence with the installation of 100 dormouse nest tubes and a search for gnawed hazelnuts; by subsequent DNA analysis of a few droppings from the tubes, one could be reasonably sure that no dormice were present. A management schedule for the wood was drawn up, including coppicing to be carried out in the winter in order to further increase its suitability for a release of dormice in 2012, and 200 nest boxes installed.

In 2012 41 dormice arrived at Alne Wood, half of them coming with a team of keepers from Paignton Zoo and the other half from the Zoological Society of London; most were captive-raised rescue animals, not captive-bred. The wood had undergone much restoration by the land owner to bring it back into suitable condition for a successful release. In the same ownership as the Heart of England Forest, the wood lies adjacent to an area of planting for the forest which will become a larger area for the dispersal of the dormice. Once again the WDCG provided the volunteers who fed and cared for the dormice whilst they remained in the cages; after two weeks the cage doors were left open and the dormice allowed access to the wood. Feeding was slowly reduced until it finally stopped as the dormice became accustomed to their new home.

**Introducing dormice to Alne Wood in 2012** © Casey Griffin

Despite several box checks every year since the release, the last dormice to be recorded here were two adults in 2013, both releases from the previous year; no 'born on site' animals have been found. Since then there have been no definitive signs of dormice despite relocation of half the nest boxes in 2015 to find out if the population had moved elsewhere in the wood.

It is possible that the dormice are still in Alne Wood as they can disappear for a couple of years and then turn up again. Their disappearance may, however, be genuine, explained by poor weather in 2012 preventing breeding that year and older animals in the original release cohort not making it to 2013 year to breed). Alternatively, the dormice may have moved to better habitat nearby as the whole area is generally quite well connected with hedges & small bits of woodland (Bucklitch, 2016); hence the planned installation of nest tubes at two nearby woods in 2017 (see **10.1**).

## 8. SURVEYING FOR WARWICKSHIRE'S HAZEL DORMICE

### 8.1 ENGLISH NATURE SURVEY 1999-2000

The Warwickshire Dormouse Survey was carried out for English Nature in 1999 in recognition of the fact that: '*in Warwickshire the dormouse is historically rare and known from only a few sites. It is on the northern edge of its range in the UK, between concentrations in Worcestershire and Northamptonshire'* (Bodnar, 2000). Bodnar's survey, which did not include Weston & Waverley Woods (see **7.2**) and Bubbenhall Wood (see **7.51**), found evidence of dormice by nut search in only five woodlands; while not as reliable a method of detection as installing nest tubes or boxes, clearly the latter would have been impractical in view of the many sites surveyed (see below).

The five dormouse positive sites were Kingsbury Wood, Long Itchington & Ufton Wood, Whichford Wood, Wolford Wood and Great Brandon Wood, which also has a record of a dormouse on a rope bridge in 2001 (see **4.3**); thus in 1999 there were six sites in the county where the dormouse was believed to exist, plus the known population at Weston & Waverley Woods. Bodnar recommended resurveys of Hampton Wood and Ryton Wood, both of which, as in the 1993 Nut Hunt, were found negative for dormice. In a further study, (Bodnar, 2001), he proposed management for the five positive sites and carried out surveys at a further seven woods (see below). Bodnar seemed unaware of the records of 'dormouse' nuts by Bright in 1995 at Chesterton Wood and Itchington Holt as he did not survey these woods.

| **Woods surveyed by Bodnar in 1999/2000 and found to be positive** | **Grid Reference** | **Suitable habitat** | **Dormouse nuts?** |
|---|---|---|---|
| **Kingsbury Wood** | SP233976 | Structure and connectivity are good. | Yes |
| **Long Itchington & Ufton wood** | SP388628 | An ideal site for dormice. | Yes |
| **Whichford Wood** | SP305642 | A very likely site for dormice. | Yes |
| **Wolford Wood and Old Covert** | SP237335 | Vegetational structure is good overall. | Yes |
| **Great Brandon Wood** | SP394766 | There are some small areas of mature coppiced hazel, which appear to be cropping reasonably well. | Yes |
| **Woods surveyed by Bodnar in 1999/2000 and found to be negative** | **Grid Reference** | **Suitable habitat** | **Dormouse nuts?** |
| **Aston Grove & Withycombe Wood** | SP 147523 | Some | No |
| **Bannams Wood** | SP 114642 | Some | No |
| **Bentley Park Woods** | SP290952 | No | No |
| **Clowes Wood & New Fallings Coppice** | SP 102740 | No | No |
| **Hampton Wood** | SP 256598 | Lots | No |
| **Hoar Park Wood** | SP 265933 | Some | No |
| **Knavenhill Wood** | SP 246492 | No | No |
| **New Close & Birchley Wood** | SP 405780 | Lots | No |
| **Rough Hill & Wirehill Wood** | SP 052640 | Some | No |
| **Ryton Wood** | SP 381725 | Lots | No |
| **Snitterfield Bushes** | SP 199605 | Some | No |
| **Tilehill Wood** | SP 279790 | Some | No |
| **Wainbody Wood** | SP 345748 | Some | No |
| **Willenhall Wood** | SP 370762 | Some | No |
| **Windmill Naps Wood** | SP092723 | No | No |

| Further surveys in 2001 | Grid Reference | Presence of dormice? |
|---|---|---|
| **Oversley Wood** | SP 105563 | No evidence found by Forestry Commission |
| **Wappenbury Wood** | SP 377701 | Could not ascertain as not enough nuts collected |
| **Hay Wood** | SP 210714 | Unable to gather nuts but presence unlikely |
| **Print Wood** | SP 397648 | 2 or 3 nuts equivocal but not certain enough to conclude presence |
| **Upper Lark Stoke Wood** | SP 194433 | No evidence |
| **Little Wolford Heath** | SP 275347 | No evidence ( despite record from 1997) |
| **Bearley Bushes** | SP 186603 | No evidence |

| **The following 'unsuitable' or small (15-30ha) woodlands were not surveyed by Bodnar:** | | | |
|---|---|---|---|
| **Austy Wood** SP171628**:** poor habitat | | **Ragley Estate** SP0755: poor habitat, time restraints | |
| **All Oaks Wood** SP448785 | **Bericote Wood** SP320698 | **Binton Woods SP1353** | **Birchley Hayes Wood** SP270848 |
| **Bull & Butcher Wood SP400718** | **Close Wood** SP255844 | **Hanging Wood, Claverdon** SP186644 | **Hartshill Hayes** SP319944 |
| **Oakley Wood** SP305595 | **North Cubbington Wood** SP351693 | **Ryton Heath Wood** SP393732 | **South Cubbington Wood** SP352687 |
| **Wellesbourne Wood** SP270530 | Also **Chesterton Wood** SP341592 **and Itchington Holt** SP371558, despite records of 'dormouse' nuts ( Bright, 1995) see **7.4** | | |

## 8.2 WARWICKSHIRE DORMOUSE CONSERVATION GROUP (WDCG) SURVEY 2009-2016

The WDCG was established in 2009 by Ruth Moffatt in an attempt to find Warwickshire's 'lost ' dormice. As the Local Biodiversity Action Plan (LBAP) Coordinator for Warwickshire, Coventry & Solihull she had become aware of both the paucity of records for this species in the LBAP area and the lack of monitoring of the six sites believed positive at that time. Weston & Waverley Woods were being monitored by the Forestry Commission (see **7.2**) and in 2003 PTES monitored Wappenbury Wood for four months, perhaps in response to a record of dormice there in 1999. In the National Dormouse Database (PTES, 2016a) are listed two more positive sites in Warwickshire: Chesterton Wood and Itchington Holt, identified by Bright in 1995 (see **7.4**) but not monitored. Had the WDCG existed in 2005 when PTES ceased to monitor the introduced population at Bubbenhall Wood a better record might have been kept of the dormice there.

**Installing a Tetrapak tube at Whichford Wood**
© Jackie Underhill

**Installing nest boxes at Bubbenhall Wood**
©Ruth Moffatt

Fieldwork began in 2009 at Piles Coppice, a Woodland Trust property, and in 2010 at two of the woods identified as dormouse positive in 1999 **(**see **8.1),** moving on to other woods as resources allowed. Home-made nest tubes fashioned from painted Tetrapak cartons were used before a grant from PTES enabled the purchase of commercially made nest tubes**.**

Each WDCG site was surveyed in the autumn for hazel nuts and to determine which areas were most suitable for installing tubes. This was based on the presence and age of the hazel; only after seven years does it bear fruit, at which age the trunks are circa 8cm in diameter. In the following spring (February-April) a minimum of 50 nest tubes per site were installed, as far as possible in lines and circa 20 paces apart, to make them easy to find. However, since the tubes had to be attached to relatively horizontal branches, it was often not possible to adhere to this plan. At Bubbenhall Wood, with the possibility of still finding dormice there from the introduction in 1998, nest boxes were installed in addition to tubes, each tube roughly 5m away from a box to make it easier to find. With the highest probability of finding dormice being May, August and September (Bright *et al.* 2006) sites were visited up to three times a year, depending on how easy it was to get a work force together; in November/December tubes and boxes were cleaned out ready for the next season.

By the end of 2016, with a regular workforce of c.30 members (and four times that number receiving the twice-yearly newsletter) the WDCG had surveyed 16 woods, both for nuts and with nest tubes. Despite a work effort of circa 1000 nest tubes and 100 boxes, no new dormouse sites had been found with all five sites found positive for dormice in 1999 (see **8.1)** appearing to be negative. A comparison of the hedgerow connectivity of these woods in the past and today (see **10.1**) failed to reveal recent isolation that might have caused the apparent loss of dormice at these sites since that date (Kite, 2016).

| **SITES SURVEYED BY WDCG BETWEEN 2009- 2015** | | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **Site** | **Grid reference** | **Past status** | **Survey method** | **For how long** | **Status in 2015** |
| **2009** | **Piles Coppice** | SP386769 | Negative | 50 nest tubes | Removed 2010 | Negative |
| **2010** | **Whichford Wood** | SP305342 | Positive (Bodnar, 1999) | 80 nest tubes | Removed 2012 | Negative |
| | **Long Itchington & Ufton Wood** | SP388628 | Positive (Bodnar, 1999) | 80 nest tubes | Removed 2012 | Negative |
| | **Print Wood** | SP385649 | Positive 1999 (WWT) 2003 (PTES) 2008 (WDCG) | 80 nest tubes | Removed 2012 | Negative |
| | **Oversley Wood** | SP105563 | Negative | 70 nest tubes, a mix of plastic type and Tetrapak | Plastic tubes remain but checking ceased in 2015 | Negative |
| **2011** | **Kingsbury Wood** | SP233976 | Positive (Bodnar, 1999) | 100 nest tubes | Removed 2012 | Negative |
| | **Wolford Wood** | SP240335 | Positive (Bodnar, 1999) | 50 nest tubes and another 50 in 2014 | Still in place | Negative |
| **2012** | **Clowes Wood** | SP100740 | Negative | 80 nest tubes and 16 nest boxes | Tubes removed in 2015 but boxes relocated | Negative ( 3 'look- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | alike' nests 2015) |
| | **Ryton Wood** | SP380725 | Negative | 35 nest tubes, another 112 in 2013 | Still in place | Negative |
| **2013** | **Shrubs Wood** | SP376720 | Negative | 28 tubes | Removed 2016 | Negative |
| | **Hay Wood** | SP210714 | Negative | 80 old nest tubes, replaced with 104 new tubes + 10 boxes in 2014 | Still in place | Negative |
| | **Wappenbury Wood** | SP375710 | Negative | 140 nest tubes, another 80 in 2014 | Still in place | Negative |
| **2014** | **Little Brandon Wood** | SP400768 | Unknown | 70 nest tubes | Still in place | Negative |
| | **Bubbenhall Wood** | SP368717 | Introduction 1998 (NE/PTES) | 80 boxes, 80 tubes + 20 more boxes in 2015 | Still in place | Negative |
| | **Yarningale Common** | SP190660 | Negative | 21 nest tubes | Still in place | Negative |
| **2016** | **Great Brandon Wood** | SP394766 | Positive (Bodnar 1999) | 110 nest tubes | | Negative |

Nest box and tube checks revealed many 'time sharers' such as blue tits (*Cyanistes caeruleus*), great tits *(Parus major*), common shrews (*Sorex araneus*), and pygmy shrews (*S. minutus*), wood mice and yellow-necked mice (*Apodemus flavicollis)*, bees and hornet wasps (*Vespa crabro)*. Bird nesting can exclude the use of tubes and boxes by dormice for a considerable length of time and their use by mice excludes them all year round as they urinate within the nest; dormice seem particular about their living conditions and urinate outside it.

**A wood mouse at Bubbenhall Wood**
© Louise Sherwell

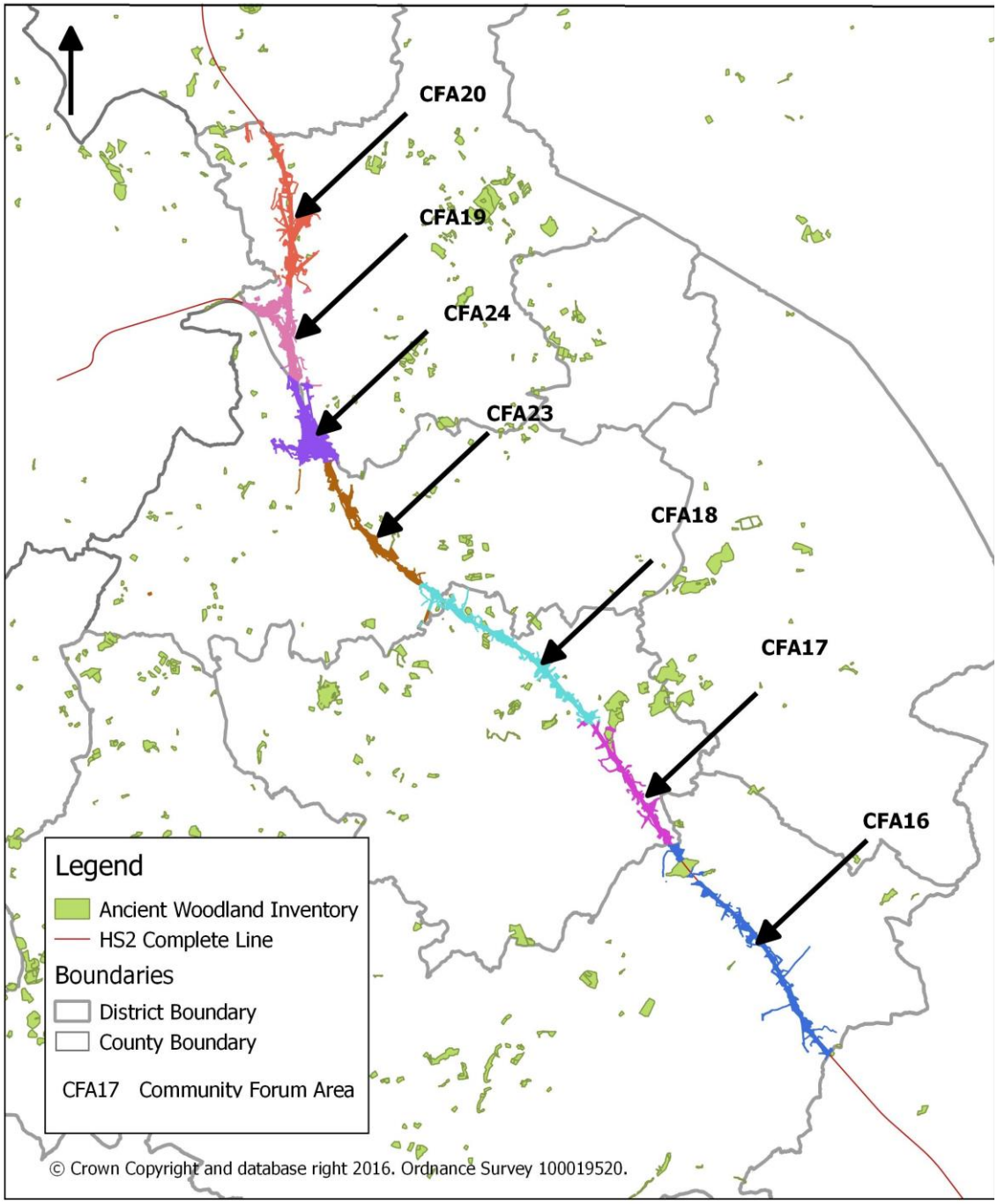
**A common shrew at Bubbenhall Wood** © Louise Sherwell

**A nestful of blue tits at Windmill Naps Wood**
© James Littlemore

### 8.3 HIGH SPEED RAIL (HS2) LONDON – WEST MIDLANDS SURVEY 2012-2014

Using aerial photography, a scoping exercise was undertaken by consultants to identify potential habitat for dormice within 100m of the land required for construction of the Proposed Scheme for HS2. This was followed by site visits to assess the suitability of these areas for supporting a dormouse population and, for all accessible areas, an initial habitat assessment carried out prior to a full survey. (Stanhope and Boath, 2016).

Along the length of the route within Warwickshire (see map below) from the border with Northamptonshire in the south-east to Middleton on the border with Staffordshire in the north-west (Community Forum Areas 16–20 and CFA 23), 24 sites were surveyed between 2012 and 2014 (see **Appendix**). For some of the areas for which no access was available, surveys were carried out adjacent to them but are not recorded.




**Map of the proposed route of HS2** © Ben Wood, Warwickshire County Council, 2016

No hazel dormice or evidence of their presence was found by Atkins in CFAs 16-20 over two years, despite nut searches and a total effort of 2,580 nest tubes and 135 nest boxes at 20 sites in woodlands, spinneys, hedgerows, plantations and woody habitat (Dept. of Transport. 2013 and

2015). At all sites the tubes and boxes were left in situ for only one season, a practical necessity but not considered the best way of finding dormice as it can take an animal a season to find them (Bucklitch, 2016). However, dormice have been known to occupy a tube and build a nest within two weeks of installation (Miller, 2016).

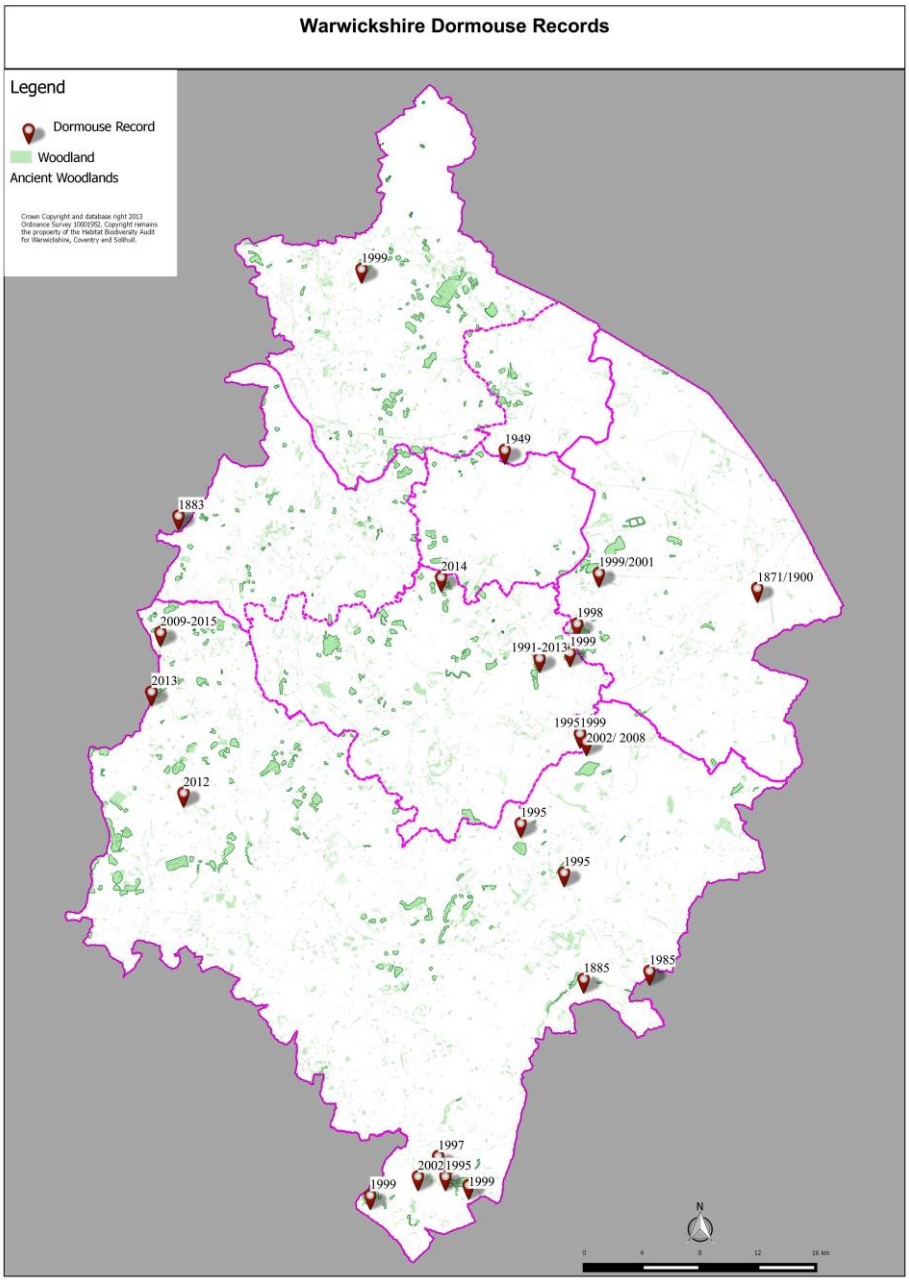
Similarly no evidence of dormice was found by Arup who surveyed CFA 23 with 175 tubes at four sites, with no hazel nut searches owing to limited access. They concluded that, although dormice can be difficult to detect particularly at low densities, their presence is considered unlikely given the lack of records and negative survey results, but cannot be ruled out. No sites within CFA 24 (Chelmsley Wood and Birmingham Interchange) were considered to be of sufficient quality to support dormice and therefore no further surveys were carried out within this area (Dept. of Transport, 2013).

This survey effort is vastly in excess of that carried out by the WDCG **(**see **8.2**); the lack of evidence of dormice found by the HS2 consultants could possibly be explained by the fact that only three of the woodland sites are of any size in 'dormouse' terms: '*Even with good habitat, surveys show that woods smaller than 20 ha are less likely to contain dormice than larger sites, unless they are linked to other areas of suitable habitat*' (Bright *et al*. 2006). The sites were chosen for their location within 100m of the HS2 works and, apart from the 80ha Long Itchington & Ufton Wood (surveyed and found positive for dormice by Bodnar in 1999 but subsequently negative by the WDCG in 2010-12), only two of the HS2 sites approach 20ha: South Cubbington Wood and Broadwells Wood, neither of which have historical records of dormice. None of the HS2 woodland sites are mentioned in Bodnar's list of 'sites too small for survey' except South Cubbington Wood.

## 9. CONCLUSIONS

### 9.1 KNOWN DISTRIBUTION OF HAZEL DORMICE IN THE COUNTY IN 2016

A map of all records for individuals, nests and chewed nuts, 'good' and unreliable, is shown below; for details of the sites see **7.1–7.53.** It shows a county-wide distribution of the dormouse during the past so it is possible that we still have dormice in Warwickshire, Coventry & Solihull, in addition to the known population at Weston & Waverley Woods and the introduced dormice at Windmill Naps. By 2008 three more 'nut positive' sites, plus sightings of individuals at 6 sites, added up to 23 sites in the county where dormice may exist; these include Bubbenhall Wood (the first introduction site in 1988) and the two later introductions in 2009 and 2012 by PTES. Two recent records in the west of the county (2012 and 2014) of nests found in tubes by consultants remain unconfirmed (Bucklitch, 2016).

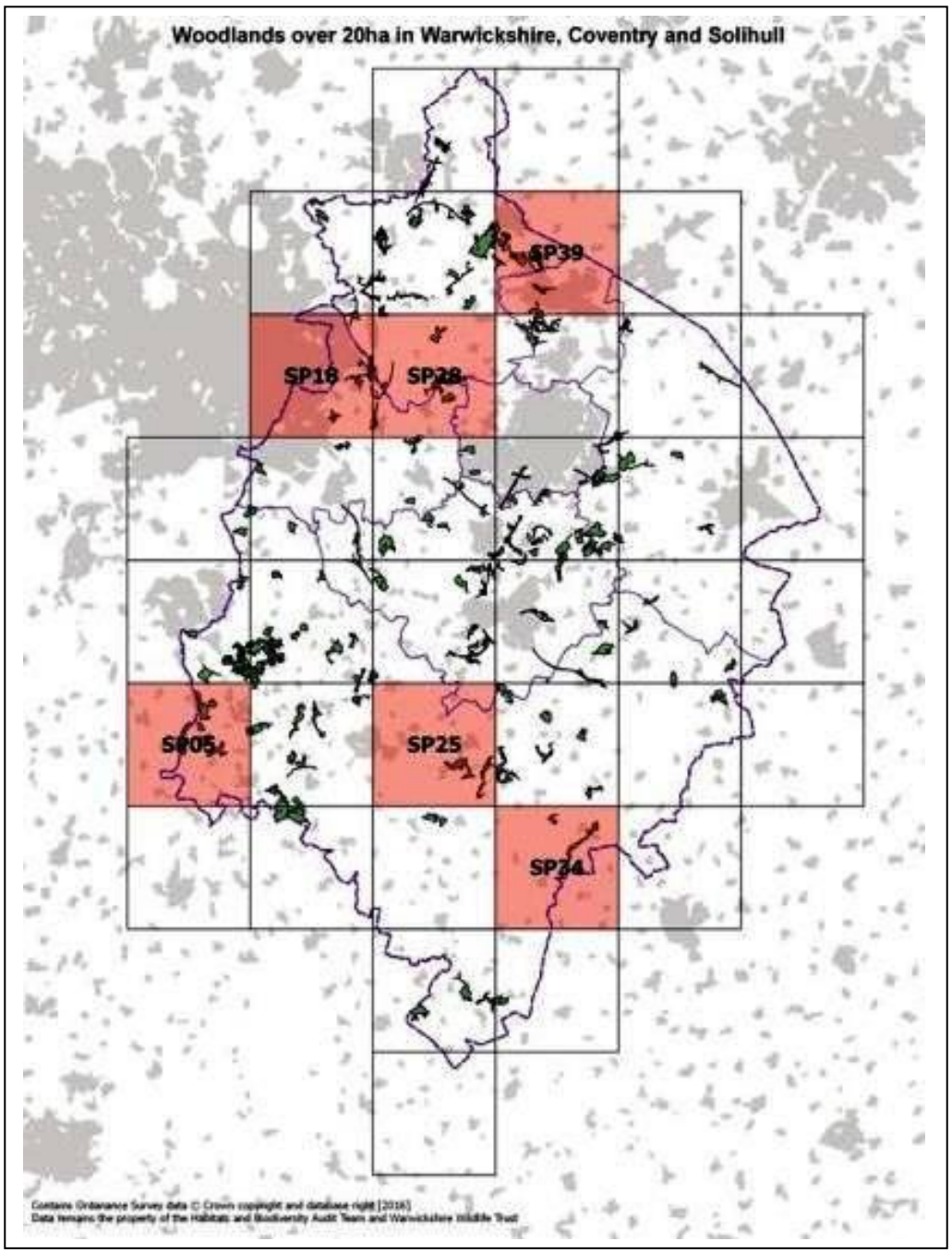



**All records of dormice since 1871 for Warwickshire, Coventry & Solihull**

© Chris Talbot, Habitat Biodiversity Audit Partnership, 2016

### 9.2 POTENTIAL DISTRIBUTION OF HAZEL DORMICE

The map below shows all areas of woodland of 20ha and over (considered the critical size of a suitable wood for the sustainable survival of a dormouse population by Bright *et al.,* 2006); many of the wooded areas are, however, agglomerations of very small woods and wooded strips along roads and canals. Nevertheless, having eliminated those sites which have been checked at some time for dormice (by WDCG, Great Nut Hunt, Bodnar (NE), HS2 and private consultants), it becomes clear that there are still some areas of woodland that should be surveyed despite a lack of records. Historical sites could also be investigated (see **10.2**).




**Clusters of woodland identified for future survey © Annie English, Warwickshire Wildlife Trust, 2016**

## 10. RESEARCH AND FUTURE FIELDWORK

### 10.1 HISTORICAL CONNECTIVITY OF WOODLANDS

in 2017 a desk study was carried out into the past connectivity of the five woodlands positive for dormice in 1999 (see **8.2)** in an attempt to explain their apparent disappearance of dormice from these sites. A comparison was made between the woods and hedgerows shown on the 1880 maps and the current distribution of woodland and remaining hedges (HBA, 2017)

Even with good habitat, surveys have shown that woods smaller than 20ha are less likely to contain dormice than larger sites, unless they are linked to other areas of suitable habitat (Bright *et al.,* 2006). The areas of all these five woods are well in excess of the 20ha, increased at Brandon, Kingsbury, Whichford and Wolford with immediate connection to adjacent smaller woods. However, the area of two of the woods has been substantially reduced: the effective area of Brandon Wood has been halved by the loss of adjacent Binley Common Wood and Wolford Wood has lost a third of the overall area of contiguous woodland with the removal of two adjacent woods. As woodland fragments often contain too few dormice to be considered viable populations (Bright *et al.,* 2006) this could be a factor in the loss of dormice from these two woods.

Isolated woods, even quite large ones, may lose their dormice in the long term (Bright, 2006); with no woodland or hedgerow connections for the dispersal and exchange of animals, populations can suffer from inbreeding. However, for four of these woods isolation goes back well over a century although this may not always have been the case. In 1880 Brandon, Kingsbury, Wolford and Long Itchington& Ufton were almost totally isolated from other woods other than immediately adjacent ones, with hedgerows running through open farmland. In contrast, Whichford was connected to many, also well-connected, small woods between itself and Little Wolford Heath, Weston Park and Cherington for which three records of dormice exist between 1995 and 2002; many of these hedges remain.

A comparison of the hedgerows present in 1880 and today reveals a considerable loss, ranging from half to 90% although even in 1880, apart from around Whichford, these hedgerows did not connect with other woods. It would therefore be difficult to ascribe the disappearance of dormice since 1999, over a hundred years later, to the loss of hedgerows. Perhaps the most likely wood to have retained its dormice would be Whichford where another survey could be undertaken.

There may be an alternative explanation, that we are looking for dormice in the wrong place. There is evidence that dormice spend more time in the woodland canopy than in the shrub layer where, for our convenience, we are installing the nest tubes and boxes. As these are all mature woods, perhaps the canopy is where the dormice are, which is why we are not finding them (pers.comm. Andy Bucklitch, 2017).

### 10.2 SURVEY WORK IDENTIFIED BY THE WDCG

Despite no new dormouse sites being found since 2009, the WDCG, which has joined forces with the Warwickshire Mammal Group (WMG) for fieldwork, plans to continue its current survey work at nine woods: Bubbenhall Wood, Clowes Wood, Great and Little Brandon Woods, Hay Wood, Ryton Wood, Wappenbury Wood, Wolford Wood and Yarningale Common. Two new woods near Alne Wood have been surveyed for the installation of nest tubes in 2018 and the table below shows other sites where survey work could be carried out in the light of current records:

| Site name/Area | Grid reference | History | Work required |
|---|---|---|---|
| **Heart of England Forest**<br>• **Spernall Park**<br>• **Moregrove Coppice** | **SP105629**<br>**SP098627** | Both woods are 1km away from Alne Wood with introduced population in 2012. | The installation of nest boxes and tubes at these two sites would aid the dispersal of any dormice still present in Alne Wood. |
| **Itchington Holt** | **SP371558** | 'Dormouse' nuts found in 1995 (Bright, NDMP site) | WDCG to contact owner re installation of nest tubes. |
| **Chesterton Wood** | **SP341592** | 'Dormouse' nuts found in 1995 (Bright, NDMP site) | WDCG to contact owner re installation of nest tubes. |
| **North Cubbington Wood** | **SP351693** | Not surveyed by HS2. | WDCG to contact owner re installation of nest tubes. |
| **Little Wolford Heath** | **SP270348** | Recorded as positive by nut hunt in 2002 (surveyed by Warwickshire Mammal Group following the record from Cherington – see below). | In 2016, no access due to new ownership. |
| **Cherington 2km north of Weston Park** | **SP284362** | 1997 record of a dormouse sleeping in a nest in straw bales at Home Farm | WDCG to contact owner re installation of nest tubes. |
| **Weston Park 1km east of Little Wolford Heath** | **SP289348** | 1995 individual in calf pen litter | WDCG to contact owner re installation of nest tubes. |
| **Westwood Heath - west of the University** | **SP286762 and SP277762** | Records of possible dormouse nests in tubes installed in hedgerows by consultants in 2014 and 2016. | Possible installation of nest tubes and boxes into hedgerows and The Pools Wood in 2017. The other two nearby woods, Broadwells and Big Waste Wood, were surveyed by HS2 and found negative in 2012-13 (see **Appendix**) but could be resurveyed. |

### 10.3 POTENTIAL SURVEY WORK

Based on the map of woodlands over 20ha (see **9.2**) there appear to be six potential 'dormouse friendly' areas that could be investigated, for which we have no records or only very old ones: the Ragley Estate (SP05), the Packington Park area (SP18 and SP28), Edgehill (SP34), the Wellesbourne area (SP25) and the Hartshill area (SP39). These are substantial areas of woodland not surveyed so far by the WDCG and include some woods dismissed by Bodnar as 'unsuitable habitat' (see **8.1**); this view should perhaps be revised in the light of more recent information on the use by dormice of coniferous woodland (see **4.3**)**.**

Initially these 10 km squares should be assessed for connectivity between the wooded areas by overlaying the mapping of woodland and hedgerow; any well-connected areas could then be investigated for evidence of dormice and the installation of nest tubes.

## 11. REINTRODUCTION TO THE PRINCETHORPE WOODLANDS 2017-2018

On June 20th, the PTES, , Warwickshire Wildlife Trust (WWT) and other partners released 38 dormice into one of the Princethorpe Woodlands, with the intention of a further release in 2018 in a second woodland. In April the nest boxes installed in 2015 had been cleaned by members of the WDCG and Warwickshire Mammal Group (WMG), now joining forces for fieldwork. In June 150 more nest boxes were installed and 18 large mesh release cages assembled in the woodland.

The 38 new dormice had been captive bred by members of the Common Dormouse Captive Breeders Group and quarantined prior to the release for 6 weeks at the Zoological Society of London and Paignton Zoo to conduct health checks and minimise any threat of disease. On their arrival, they were placed into the release cages in their nest boxes, in pairs or trios to encourage breeding. They were provided with food and water and left to acclimatise themselves to their new home. A daily feeding rota was set up and after 10 days, a small door was opened in the cages so the dormice could go into the woodland. Feeding will continue at a reduced frequency until it is thought that the dormice are self-sufficient, at which stage the cages will be removed. The dormice had been electronically tagged to enable their progress to be followed when they are found during the box checks. that will be conducted in the late summer and autumn.

### 11.1 BACKGROUND TO THE PROJECT (Brooks, 2015)

The Princethorpe Woodlands Living Landscape Partnership Scheme **(**see **4.2),** led by WWT, aims to improve woodland and hedgerow condition and connectivity in the wider landscape, with dormice being one of the species considered when designing a management plan. The Princethorpe Woodlands constitute the most important cluster of ancient woodlands in Warwickshire, including 20 woods covering 618ha, and represents more than 10% of the whole of the county's ancient woodland. The project covers over 1,000ha and a dormouse reintroduction, alongside focused woodland management, could make this Living Landscape one of the most significant for dormice in the Midlands.

WWT owns and manages two large woods in this cluster which can truly be termed 'reintroduction' sites as they both have records of dormice in the past, show high habitat suitability and fulfil the further recommendations for suitability of being over 20ha in area and having past and future management (Bright *et al*, 1994). *'Reintroduction sites should be clustered in small groups to create viable metapopulations, rather than one big one woodland*' (Natural England, 2014b), a criterion also met by these two woods.

Dormice thrive in diverse low growing woodland with a continuous arboreal route, typified by the long rotation hazel coppice which is taking place in these woods, creating over 150ha of 'dormouse

friendly' habitat, with a wide array of native flora and fauna and well connected by good quality hedgerows. Following the review of the dormouse reintroduction programme by Chanin (N.E., 2104b), the subsequent PTES report (in draft) and discussions with Natural England advisors, reintroduction will focus on areas where a long-term woodland strategy can be developed and implemented. Woodland priorities will differ from county to county, but areas where woodland improvement, restoration, creation and increased connectivity through hedgerow planting are particularly suitable as dormouse reintroduction areas.

**11.2 RATIONALE** (Talbot, 2016)

The release sites are at the heart of the Princethorpe Woodlands Living Landscape restoration scheme and consist of ancient woodland containing habitats of high suitability for hazel dormouse. Preliminary surveys were conducted, with 150 nest boxes of three different types installed in 2015 throughout each wood using a stratified random sampling design to test against use by other mammals and birds; they were monitored weekly between May and September for two years. No dormice were found and unsuccessful nut searches further indicated the absence of dormice in these woods.

It is hoped that the increased connectivity resulting from the Princethorpe Woodlands Living Landscape Partnership Scheme **(**see **11.1)** will bolster the natural population of dormice at Weston & Waverley Woods with gene flow between this and the new populations, and hopefully between three populations by 2018.

The reintroduction programme will engage volunteers in dormouse conservation through WWT, an organisation concerned with public engagement as well as conservation. Members of the public will be encouraged to become involved in practical management conservation on a regular basis, with training sessions to improve survey skills and allow regular volunteers to train towards dormouse handling licences. The development of this reintroduction scheme for Princethorpe Woodlands Living Landscape area will give a positive and practical boost to dormice in the county. All these elements will contribute to long-term conservation of the hazel dormouse in Warwickshire, Coventry and Solihull.

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**APPENDIX. HIGH SPEED RAIL (HS2) LONDON - WEST MIDLANDS: sites surveyed for hazel dormice between 2012 and 2014 by consultants for Arup and Adkins.**

| HABITAT | LOCATION | AREA ha | GRID REFERENCE | SURVEY EFFORT T:NEST TUBES B:NEST BOXES | SURVEY TIME |
|---|---|---|---|---|---|
| **COMMUNITY FORUM AREA 16: LADBROKE TO SOUTHAM** | | | | | |
| **WOODLAND** | Windmill Hill Spinney and surrounding hedges, east of Ladbroke. | 4.12 | SP 423592 | 77 x T (woodland)<br>115 x T (hedgerow)<br>10 x B (woodland)<br>5 X B (hedgerow) | Spinney: June 12- May 13<br>Hedges: Oct 12 - Aug 13 |
| | Long Itchington & Ufton Woods SSSI | 80 | SP 388627 | 150 x T and 15 x B | May - Sept 13 |
| **OTHER** | Hedges south of Harp Farm, south of Southam | n/a | SP 400625 | 150 x T and 5 x B | Mar - Aug13 |
| | Hedges near Long Itchington & Ufton Woods | n/a | SP 388627 | 115 x T and 5 x B | Oct 12 - Aug 13 |
| **COMMUNITY FORUM AREA 17: OFFCHURCH AND CUBBINGTON** | | | | | |
| **WOODLAND** | South Cubbington Wood, east of Cubbington | 17.17 | SP 351689 | 115 x T (west area)<br>58 x T (east Area)<br>5 x B added Oct 12 (both areas) | June 12 - May 13 (east area)<br>Oct 12 – Aug 13 (west area) |
| **OTHER** | Hedge along northern side of the Grand Union Canal | n/a | SP 373638 and SP 374639 | 115 x T and 5 x B along two Sections (230 x T and 10 x B in total) | Oct 12 - Aug 13 |
| **COMMUNITY FORUM AREA 18: STONELEIGH, KENILWORTH AND BURTON GREEN** | | | | | |
| **WOODLAND** | Woodlands and hedgerows within Stoneleigh Park (south) | n/a | SP 331707 | 112 x T and 5 x B (south) | June 12- May 13 |
| | Woodlands and hedgerows within Stoneleigh Park (north) | n/a | SP 318721 | 59 x T and 5 x B (north) | June 12 - May 13 |
| | Northern area of Crackley Wood, north-west of Crackley | 6.6 | SP 291743 | 60 x T and 5 x B | April – Sept 14 |
| | Green Wood – Crackley Wood, north-west of Crackley | 14.38 | SP 289740 | 86 x T and 5 x B | June 12- May 13 |
| | Roughknowles Wood, north-west of Crackley | 5.13 | SP 288749 | 93 x T and 5 x B | June 12 - May 13 |
| | Broadwells Wood, south-east of Burton Green | 17.48 | SP 281754 | 150 x T and 5 x B | Mar 13 - Aug 13 |
| | Black Waste Wood, Little Poors Wood, Kenilworth Greenway and nearby hedges, Burton Green | 7.59<br>+<br>1.5 | SP 270757 | 235 x T and 10 x B (Black Waste Wood, Little Poors Wood and nearby hedges)<br>150 x T (Kenilworth Greenway) | July 12 - May 13 (Black Waste Wood and adjacent hedges)<br>Mar - Aug 13 (Kenilworth Greenway)<br>Oct 12- Aug 13 (hedges nearby) |
| **OTHER** | Woody habitat west of Wainbody Wood near Crackley | n/a | SP 305745 | 150 x T and 5 x B | May – Sept 12 |

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| **COMMUNITY FORUM AREA 19: COLESHILL JUNCTION** | | | | | |
| **OTHER** | Coleshill Manor Office Campus | n/a | SP 185897 | 150 x T and 5 x B | Mar - Aug 13 |
| **COMMUNITY FORUM AREA 20: CURDWORTH TO MIDDLETON** | | | | | |
| **WOODLAND** | Dunton Wood, north-east of M42 Junction 9 | 1.79 | SP 194945 | 150 x T and 5 x B | Mar - Aug 13 |
| | North Wood | 7.23 | SP 190 958 | 115 x T and 10 x B | May - Sept 14 |
| | Plantation woodland around Cuttlemill Fisheries, north-west of M42 | 2.46 | SP 189950 | 60 x T and 5 X B | June 12 - May 13 |
| | Coneybury Wood and hedges near Middleton Hall, east of Middleton | 4.4 | SP 192975 | 150 x T | Mar - Aug 13 |
| **OTHER** | Hedges near Middleton | n/a | SP 176988 | 150 x T | Mar - Aug 13 |
| **COMMUNITY FORUM AREA 23 : BALSALL COMMON AND HAMPTON–IN–ARDEN** | | | | | |
| **WOODLAND** | Marlowes Wood | 10.2 | SP233790 | 50 X T | April 2013- August 2013 |
| | Wood at Park Lane, near Heart of England Way | 2.75 | SP236785 | 25 x T | April 2013- August 2013 |
| | Sixteen Acre Wood | 6.5 | SP 228 796 | 50 | April 2013- August 2013 |
| **OTHER** | Beechwood Farm | n/a | SP254771 | 50 x T | July 2012 - May 2013 (not checked in April 2013) |