An ecological survey of the Mid Arun Valley and the potential impacts of the A27 Arundel Bypass 'Binsted Option'

March 2017 Supplement

to the October 2016 report

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Cover Photograph: A MAVES project - hedge laying

SUMMARY

- This report was commissioned by the Arundel Bypass Neighbourhood Committee (ABNC) as a supplement to the October 2016 report (Wildlife Splash 2016). The information within this supplement has been gathered since that preliminary assessment as to the potential impact of the proposed Binsted A27 Option.

- New / additional information has been gathered on bryophytes, fungi, notable trees, Badger, Common Toad, Dormouse, Harvest Mouse, freshwater invertebrates, terrestrial invertebrates and beetles.

- During a half-day recording session in Binsted Rife and Lake Copse (following the stream into the Binsted Wood Complex) and Binsted Park sixty-one species of moss and liverwort were found. This included three species listed on the Sussex Rare Species Inventory.

- Originally 112 notable trees were recorded in the Binsted area and in 2016 a further 52 have been added to the list, totalling 174 notable trees recorded to date. The most frequently recorded species are Oak, Ash, Beech and Hazel with a variety of features of importance to wildlife.

- The impact of the loss of such trees is far reaching for these trees are important for bats, birds, saproxylic invertebrates and fungi providing habitat and niches that have become relatively uncommon.

- Fungal surveys have just begun with seventeen species found in just a few hours, which include the Zoned Rosette *Podoscypha multizonata*, a Section 41 species (NERC 2006) and BAP species. *Mycena flavescens* is another uncommon species.

- Previously identified Badger setts have been confirmed as active in the Binsted Wood Complex, Hundred House Copse, Lake Shaw at the edge of Binsted Park and the higher land along Binsted Rife. A Brighton University student has mapped the approximate home ranges for three major setts by bait marking and plotting the latrines. In 2016 to 2017 signs of frequent Badger activity have been observed along the length of Binsted Rife, Binsted Lane, Paines Wood and Lake Copse such as fresh excavations to setts, airing nesting material, well-used tracks and actual sightings.

- A variety of less common birds continue to be recorded in the area such as the Red-listed Yellowhammer and Amber-listed Kingfisher, Snipe, Little Owl and Tawny Owl. The presence of owls, and particularly Barn Owls, resulted in the placing of four Barn Owl nesting sites around the parish of Binsted. Three are nesting boxes and one is in a barn.

- The Barn Owl Trust state that in a typical year, Britain's 4,000 pairs of Barn Owls produce roughly 12,000 young and it is estimated that a staggering 3,000 – 5,000 of these are killed on roads. Moreover, 90% of those killed are killed on major roads i.e. dual carriageways and motorways (which amount to just 2% or all our roads). Given

the excellent hunting grounds and the presence of nest sites in the area, the proposed road would have a highly negative impact on this one bird species alone.

- Common Toad has been found breeding in four locations in relatively close proximity around Binsted. The different breeding locations protect this species from events such as pond and ditch clearance or unseasonably dry weather, and provide a strong nucleus for dispersal across the Mid Arun Valley landscape.

- Paines Wood, Ash Piece, Noor Wood (added in 2015) and Lake Copse and the Shaw (added 2016) are part of the National Dormice Monitoring Programme. Good (though fluctuating) populations of Dormice have been recorded consistently at Paines Wood and Ash Piece for fifteen years. A Brighton University student calculated the habitat suitability for Dormice throughout the remainder of the Binsted Woods Complex. The indicators chosen were based on the current literature, and those associated with the most frequently occupied nest boxes at Paines Wood and Ash Piece.

- The study concluded that all the other woodlands in the Binsted Wood Complex had even higher HSI scores even than Ash Piece and Paines Wood with the exception of the Pine Plantation. From this it can be inferred that Dormice will be present throughout the Binsted Woods Complex and that it may be an important source population for the surrounding areas.

- In the initial ecological report (Wildlife Splash 2016), it was suggested that the landscape with its areas of rough, tall grassland, linear reedbeds, patches of bramble, hedgerows with tall grassy margins and arable field margins provides ideal habitat for Harvest Mice with ample scope for dispersal across the landscape.

- The Harvest Mouse is mostly restricted to the south of England and Wales and within this distribution has been lost from approximately 70% of its original sites. A survey in a suitable field in Binsted of tall wetland and meadow species found eleven Harvest Mice nests. Other suitable areas are throughout the landscape with strong linkages and corridors.

- A beetle survey of just two hedgerows and a linear arm of woodland called Lake Copse found 230 beetle species, including one Red Data Book species and eleven Nationally Scarce species. Moreover, each location also produced a beetle not previously recorded in Sussex. The surveyor commented that the notable factor about this survey is that despite being restricted in time and size, it should yield so much.

- Fifty-two saproxylics (dependent on dead or decaying wood) were identified and measured against the Saproxylic Quality Index. The SQI rates the importance of the dead wood habitat, a habitat that is becoming scarcer as rotten branches on trees are removed for safety reasons. The overall SQI score of 434 places the parish of Binsted about halfway down the list and just behind Petworth Park.

- A general invertebrate survey was undertaken in 2016 around the parish of Binsted along Binsted Lane and public footpaths with a small foray to Binsted Rife. A total of 249 species were recorded during the survey, including three Section 41 species (NERC 2006) and an additional nine nationally scarce species. Three of these species are also Red Data Book species. A further three species are listed on the Sussex Rare Species Inventory.

- The diversity of niches was responsible for the number and rarity of species with species-rich damp grassland, ancient hedge banks, sheltered woodland edges, species-rich hedgerows and field margins, all of which have slightly different aspects / vegetation length etc. giving a good range of microclimatic variation.

- The Section 41 Bumblebee species *Bombus ruderatus* was recorded along the newly-created hedgerow (a MAVES project). The surveyors say that this is the first record for this species that they are aware of in this part of West Sussex since the early 20th Century.

- Ad hoc sightings continue to be recorded with a range of species such as Hedgehog, Adder, Slow Worm, Wood Mouse, Yellow-necked Mouse, newts (Smooth and Palmate) a range of butterflies and an additional two species of dragonfly – the Emperor *Anax imperator* and the Southern Hawker *Aeshna cyanea*.

- Surveys documented in this 2017 Supplement wholly support the initial ecological survey (Wildlife Splash 2016) in the key finding that the area supports an extremely high diversity of species and a high proportion of rare and threatened species from all groups. It also supports the original findings that the A27 Binsted Option is likely to have a strong negative impact on many protected species from all the major groups.

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INTRODUCTION

1.1 AIMS AND OBJECTIVES

The aim of this report is to add to the 2016 Wildlife Splash report 'A survey of the Mid Arun Valley and the potential impacts of the Arundel Bypass Binsted A27 Option.' Since the original report several surveys have been undertaken and ad hoc sightings continue to be recorded. This report summarises the additional information.

The proposed route of the Binsted A27 Option is shown in Figure 1, although there may be minor variations in the routing shown. The proposed Binsted A27 Option would traverse an area to the south of Arundel and along the southern boundary of the South Downs National Park. This landscape is referred to as the Mid Arun Valley.

1.2 BACKGROUND TO THE SURVEY

This report was commissioned by the Arundel Bypass Neighbourhood Committee (ABNC) as a significant amount of data has been collated since the publication of the 2016 survey. MAVES is a community based not-for-profit charity.

Figure 1: The likely route of the proposed Binsted A27 Option cutting through the Mid Arun Valley

Map taken from the 2006 report by Highways England consultants Faber Maunsell.

2 METHODS

2.1 DATA COLLECTION

Since the production of the initial ecological appraisal (Wildlife Splash 2016), a range of professional and amateur experts, university students and locals have continued to record ad hoc sightings and undertake specific surveys and university projects for dissertations. All records by non-professionals have been verified by professionals before inclusion in this report and submission to the Sussex Biodiversity Records Centre. Species that still require verification are clearly indicated in the lists given.

2.2 SURVEYS

All surveys have followed best practice guidelines that are dependant upon the group being surveyed. University students have been accompanied and mentored by professional ecologists and their tutor, Dr. Dawn Scott, who is very familiar with the area. Ad hoc sightings have been recorded with grid references by local residents, many of whom are keen birders or amateur recorders. Notable trees have been recorded using guidelines based on those issued by the Woodlands Trust.

Recent surveys have covered the following groups:

- Bryophytes
- Fungi
- Notable trees
- Badger
- Common Toad
- Dormouse
- Harvest Mouse
- Fresh water invertebrates
- Invertebrates – beetle survey
- Invertebrates – general survey

2.3 PRESENTATION OF DATA

Only the relevant data from recent surveys is presented in this report. Where surveyors have produced independent reports these have been cited within the text and the report referenced.

Abbreviations used in tables for species of conservation importance are explained in Appendix II.

3 RESULTS

3.1 NOTABLE TREES, BRYOPHYTES AND FUNGI

3.1.1 Bryophytes

The desktop biodiversity report received from the Sussex Biodiversity Records Centre in 2016 returned twenty-one bryophyte species that, with the exception of a single species recorded from Binsted Church, were all from Slindon and the Rewell Wood Complex.

During a half-day recording session in Binsted Rife, Lake Copse (following the stream into the Binsted Wood Complex) and Binsted Park sixty-one species of moss and liverwort were found (Appendix I). These included three species listed on the Sussex Rare Species Inventory, *Orthotrichum striatum* and *Orthotrichum tenellum*, both found along Binsted Rife and *Syntrichia laevipila* found at Lake Copse.

3.1.2 Fungi

The desktop biodiversity report received from the Sussex Biodiversity Records Centre in 2016 returned just seven species of fungi, all of which were recorded in the Rewell Wood Complex. The Mid Arun Valley area together with the surrounding landscape is likely to support a good range of fungi due to the diversity of habitats and the amount of dead wood throughout in the woodlands, shaws and hedgerows. A number of fungal species have now been recorded in the Binsted area and are given in Table 1.

Table 1: Fungi recorded in the Mid Arun Valley

Latin name	Common name	Location	Substrate
Agaricus campestris	Field Mushroom	Church Lane Field	On the ground
Bolbitius titubans	Yellow Fieldcap	Binsted Park	Rotting hay field margin
Coniophora puteana	Wet Rot	Binsted Woods Complex	Pedler's Croft - on twig in woodland
Cylindrobasidium laeve		Binsted Woods Complex	On small fallen branch in woodland
Geastrum sp.	Earthstar	Binsted Woods	On the ground
Hebeloma crustuliniforme	Poison Pie	Pedler's Croft	Amongst grass by footpath
Hericium sp.	Tiered Tooth	The Shaw	Growing on a notable Cherry tree
Laccaria amethystine	Amethyst Deceiver	Paines Wood	Woodland floor
Mycena epipterygia	Yellowleg Bonnet	Pedler's Croft	Amongst grass by footpath
Mycena inclinata	Clustered Bonnet	Pedler's Croft	On log in woodland
Mycena flavescens		Pedler's Croft	On leaf litter in woodland
Mycena galericulata	Common Bonnet	Pedler's Croft	On log in woodland
Mycena polygramma	Grooved Bonnet	Pedler's Croft	On log in woodland
Mycena pura	Lilac Bonnet	Pedler's Croft	On leaf litter in woodland
Podoscypha multizonata	Zoned Rosette	Broad Green	Under the Oak in pasture
Sarcoscypha coccinea	Scarlet Elf Cap	The Shaw	Plentiful around Kent's Cottage and the Shaw
Trametes versicolor	Turkey Tail	The Shaw	On a fallen branch

Within this list the Tiered Tooth is most likely to be *Hericium cirrhatum*, which is uncommon with a limited distribution and on the Sussex Rare Species Inventory. The Zoned Rosette *Podoscypha multizonata* (Photograph 1) is a Section 41 species (NERC 2006), a BAP species and also on the Sussex Rare Species Inventory. *Mycena flavescens* is another uncommon species.

Photograph 1: The Zoned Rosette *Podoscypha multizonata*

Photographed by Ian Powell 2016

The Tiered Tooth fungus together with another species pictured below (Photograph 2) could not be identified due to a lack of necessary features and getting an expert to the site at the right time.

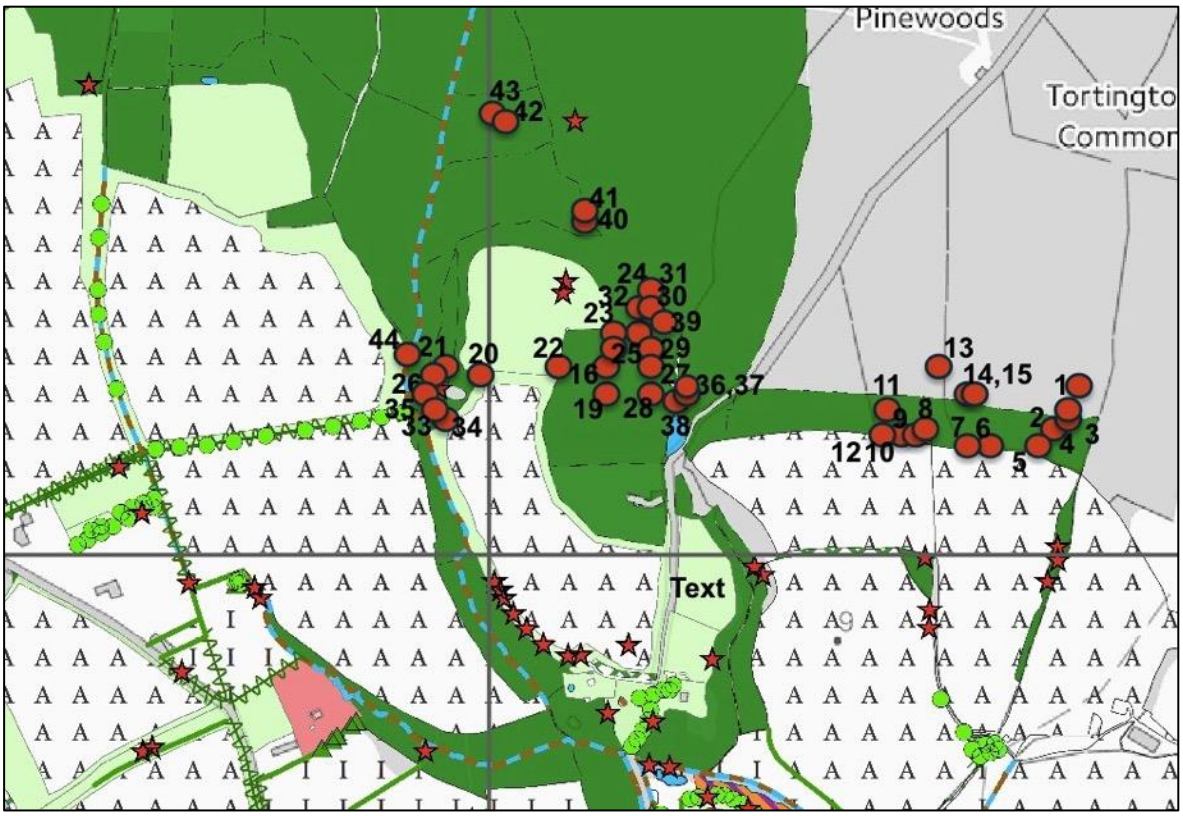
Photograph 2: Unidentified funnel-shaped fungus

Photographed by Tony Elphick 2016

3.1.3 Notable Trees

Originally 112 notable trees were recorded in the Binsted area (Wildlife Splash 2016) and a further 52 have now been added to the list, totalling 174 notable trees recorded to date. The majority of the recording took place in the Binsted Woods Complex and Figure 2 shows the approximate locations of the majority of the additional notable trees (red circles) with the numbers corresponding to descriptions and grid references that are given in Appendix I. Eight trees were recorded in Hundred House Copse and two at Tortington (not shown but grid references given in Appendix I). Note the red stars in Figure 2 represent the locations of some of the trees previously recorded. The recorder in Hundred House Copse commented that there were far more notable coppiced Ash trees than they could count. Photograph 3 shows one of the coppiced Ash trees in Hundred House Copse.

Figure 2: The locations of the additional notable trees recorded to date



Photograph 3: A notable coppiced Ash stool in Hundred House Copse

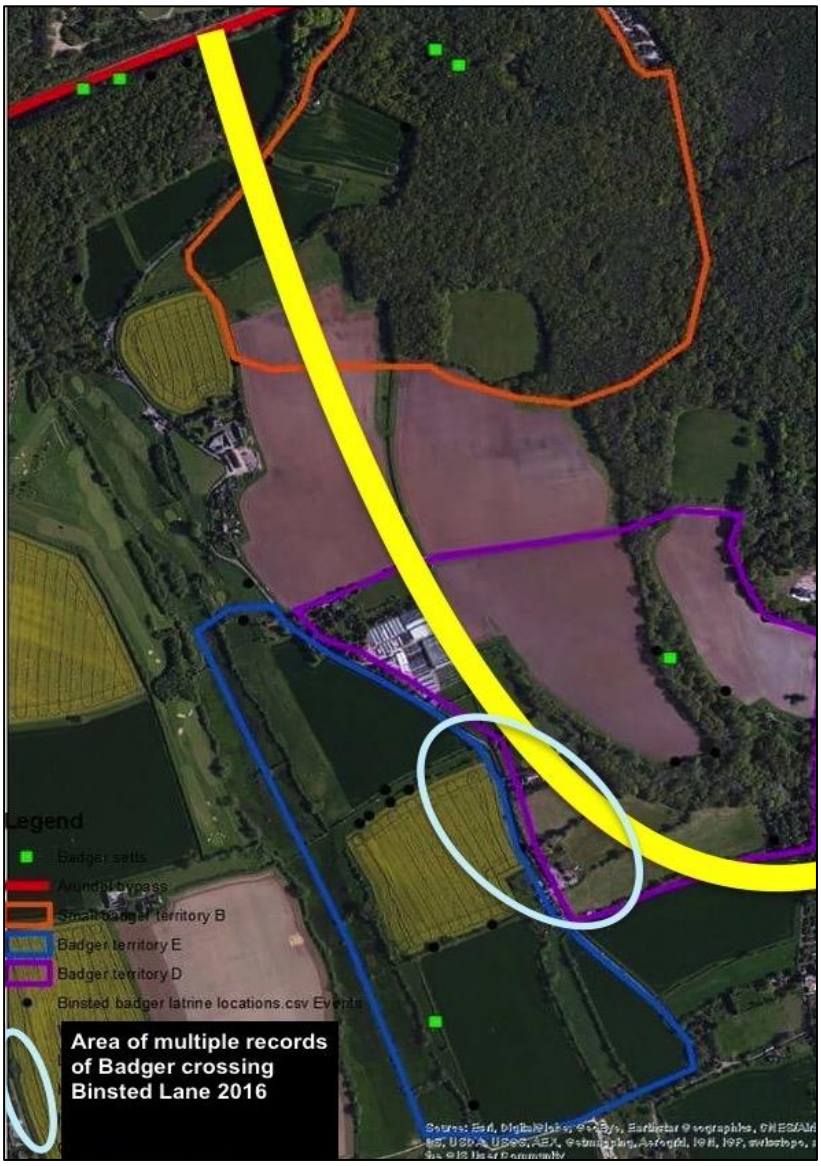
3.2 PROTECTED VERTEBRATES / INVERTEBRATES

3.2.1 Badger

In 2016 Badger activity was reported to be extremely high and this has now been re-confirmed with numerous sightings, sett expansion, feeding signs, latrines and well-worn tracks.

Active setts have been confirmed in the Binsted Wood Complex, Hundred House Copse, the Shaw, at the edge of Binsted Park and the higher land along Binsted Rife. A bait marking survey to estimate territories / home ranges from the various setts was carried out by a Brighton University student Dominic Walding. The home ranges for three major setts are shown in Figure 3. In some cases, the territories have been taken to natural edges to estimate the range, though in reality the ranges may be larger than those estimated / shown.

Figure 3: Badger territories from the Binsted Woods Complex, Lake Shaw and Binsted Rife



In 2016 Binsted residents recorded much activity along the Binsted Lane with Badgers frequently crossing from west to east at dawn (location shown in Figure 3). This would suggest that there is much interchange between Badger territories D and E possibly due to rich foraging grounds, or that D and E may be one large group with a much bigger range.

In 2016 to 2017 signs of frequent Badger activity have been observed along the length of Binsted Rife and the Shaw such as fresh excavations to setts, airing nesting material and well-used tracks. There are also numerous signs of Badger activity in Paines Wood, such as well-used tracks and paw-prints in wet mud, which falls within the territory of group B.

The main reason that Badgers are thriving is that the countryside around Binsted provides woodlands, shaws and scrubby banks that are higher and drier then the surrounding damp fields offering multiple sett-building opportunities in a landscape that provides optimal foraging habitat.

3.2.2 Breeding Birds

A variety of less common birds continue to be recorded in the area such as the Red-listed Yellowhammer and the Amber-listed Tawny Owl, Little Owl, Kingfisher and Snipe. Four Ravens were observed circling and calling over a small field in Binsted in November 2016.

Owls

Owls are frequently recorded in the area, which can be attributed to ample good quality foraging habitat. Owl density in a given area is often restricted by suitable nesting opportunities, particularly for larger species such as Barn Owl. As a result of this, over the years and as part of on-going MAVES work, residents have erected Barn Owl boxes in the Binsted area as shown in Figure 4. One of these nesting areas is built in to a relatively new building.

Figure 4: The location of Barn Owl boxes / nesting sites around the parish of Binsted

3.2.3 Common Toad

An estimated one thousand plus toads were seen breeding in Madonna Pond (Figure 5, number 1) on the 13th March 2017 by Paul Stephens from the Arundel Wildfowl and Wetlands Centre. There was already a good deal of spawn already laid at this time. Strings of toad spawn were found during a survey (21st March 2017) in a garden pond at the edge of the woodland (Figure 5, number 2) and tadpoles were found in the garden pond, again at the edge of woodland (Figure 5, number 3). The latter pond is in close proximity to the ditch that had thousands of toad tadpoles in the spring of 2016 (Figure 5, number 4), though this ditch had just been cleared and so had no tadpoles this year.

Figure 5: Common Toad breeding sites around the parish of Binsted

3.2.4 Dormouse

Paines Wood, Ash Piece and recently Noor Wood (Tortington Common), are part of the National Dormice Monitoring Programme (NDMP). Good (though fluctuating) populations of Dormice have been recorded consistently at Paines Wood and Ash Piece for fifteen years. Dormice and their nests are now routinely recorded at Noor Wood, within which nest boxes were erected when it was added to the programme in 2015.

In 2015 / 2016 Brighton University undergraduate student James Burford undertook a project whereby the habitat suitability for Dormouse throughout the Binsted Woods Complex was calculated. The Complex was divided into similar parcels of woodland (Figure 6) and a suite of habitat factors was considered for each. The habitat variables chosen were based on the current literature, and those associated with the most frequently occupied nest boxes in Ash Piece and Paines Wood since recording began

(fifteen years ago). Variables included scrub and canopy cover, dead wood availability, species diversity and connectivity.

Figure 6: The ten parcels of woodland used for the Dormouse habitat suitability index

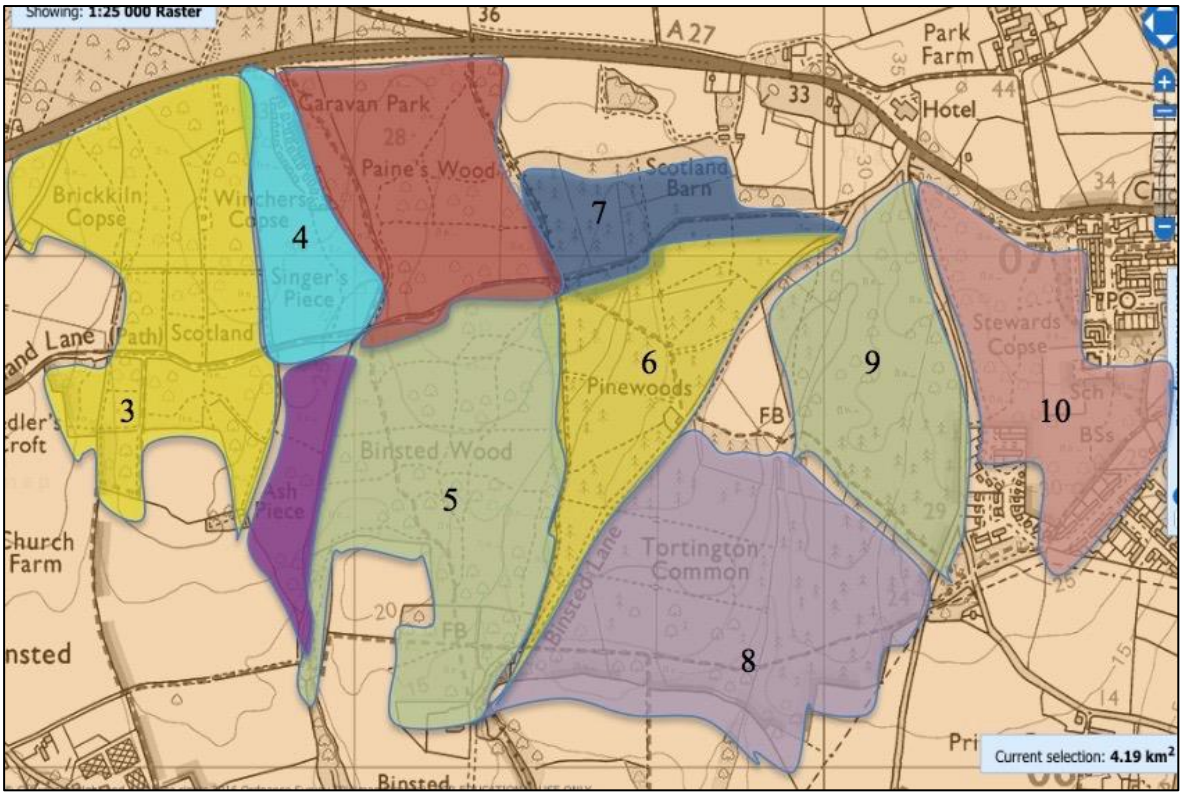


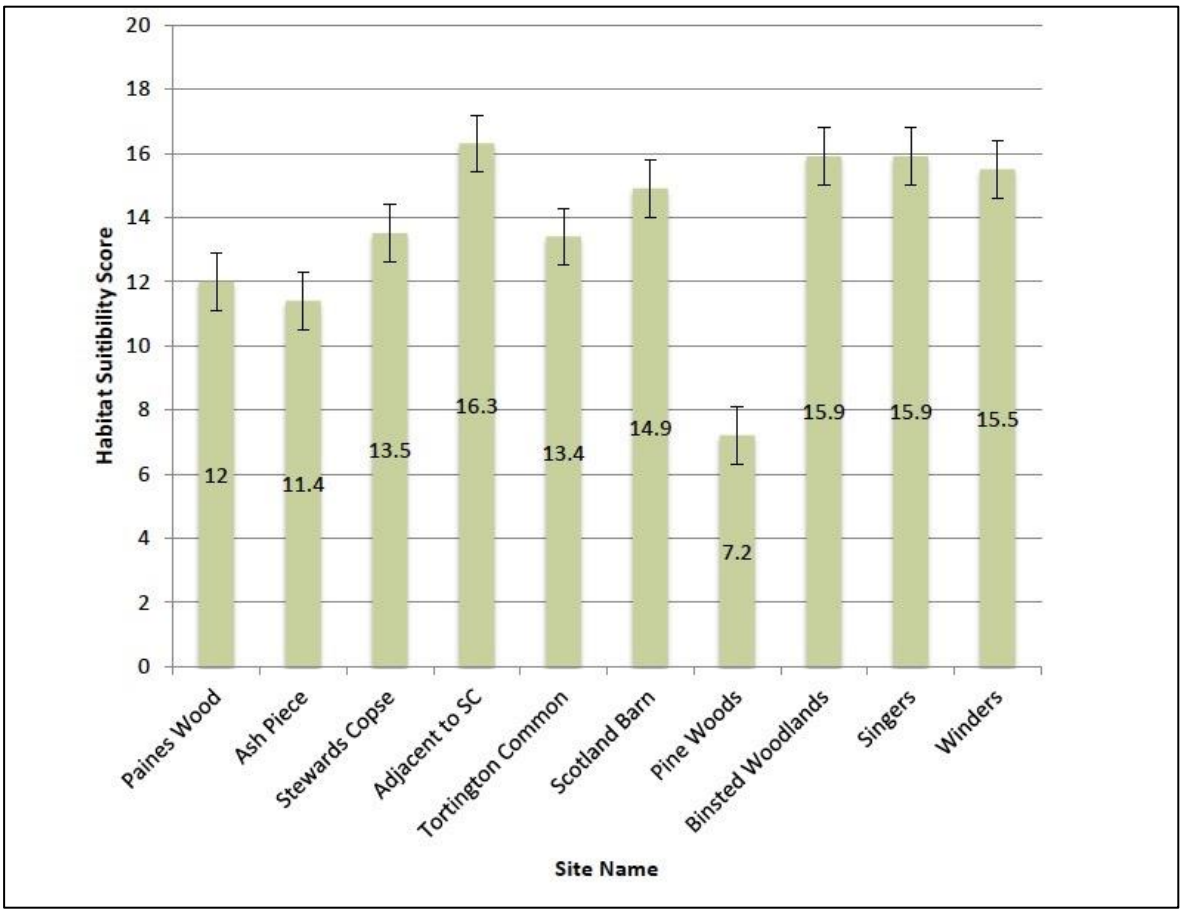
Image copied with permission from Brighton University

The numbered and coloured woodlands are as follows:

Red – Paines Wood
Purple – Ash Piece
3 – Winchers Wood
4 – Singers Wood
5 – Binsted Woods
6 – Pine Woods
7 – Scotland Barn
8 – Tortington Common
9 – Woodland adjacent to Stewards Copse
10 – Stewards Copse

Based on the environmental parameters selected, all the other woodlands in the Binsted Wood Complex had even higher HSI scores than Ash Piece and Paines Wood with the exception of the Pine Plantation (Figure 7). From this it can be inferred that Dormice will be present throughout the Binsted Woods Complex and that it may be an important source population for the surrounding areas.

Figure 7: Mean HSI for all variables across the sites



In 2016 Lake Copse and the Shaw were added to the National Dormouse Monitoring Programme and Dormouse nests have already been found in both arms of woodland, as was expected, due to the ideal habitat.

3.2.5 Harvest Mouse

In the ecological scoping survey (Wildlife Splash 2016), it was suggested that the landscape with its areas of rough, tall grassland, linear reedbeds, patches of bramble, hedgerows with tall grassy margins and arable field margins provides ideal habitat for Harvest Mice with ample scope for dispersal across the landscape. A Harvest Mouse had previously been recorded in a Dormouse box in the Binsted Woods Complex.

This species is generally restricted to the south of England and Wales with a few scattered colonies further north. A national survey aimed to determine if there had been substantial changes in the distribution of Harvest Mice since a survey conducted for The Mammal Society in 1979 (Harris, 1979a, 1979b) found a steep decline. At the end of its first year 300 of the original 800 sites had been resurveyed. Harvest Mouse nests were only found in 29% of these sites of which only 24% still had suitable habitat (Battersby 2005) showing a very steep decline in this species.

In October 2016 Sam Buckland, Lucy Groves and Ian Powell conducted a survey for Harvest Mouse in a suitable field in Binsted. Photograph 4 shows the ideal Harvest Mouse habitat with two of the surveyors searching for nests.

Photograph 4: Surveying for Harvest Mice nests in a Binsted field

Photographed by Sam Buckland 2016

A total of eleven nests were found throughout the field with the data and locations given in Table 2. Photograph 5 shows one of the nests found.

Table 2: Harvest Mouse data collected in October

LOCATION	NEST DIMENSIONS			
	Diameter cm	Height cm	Height above ground cm	Height of vegetation cm
SU 99449 05600	7	6	41	110
SU 99445 05607	9	9	61	135
SU 99440 05611	8.5	7.5	86	130
SU 99438 05612	6.5	6.5	71	130
SU 99425 05626	9	10	86	130
SU 99425 05625	6	6	72	110
SU 99423 05628	10	8	46	120
SU 99423 05631	10	8.5	71	130
SU 99403 05645	6.5	6	53	129
SU 99401 05651	7	6.5	108	200
SU 99402 05653	8.5	8	57	200

Photograph 5: One of the Harvest Mouse nests found

Photographed by Sam Buckland 2016

3.2.6 Fresh-water Invertebrates

During a three-minute standard net in water freshwater sampling survey undertaken in the pond at Lake Copse (25.08.16) thirteen genera were found (Table 3). This number is fewer than recorded in Binsted Rife (Wildlife Splash 2016), though it is a pond with fish rather than part of a connected ditch network.

Table 3: Fresh water genera and species found in Lake Copse

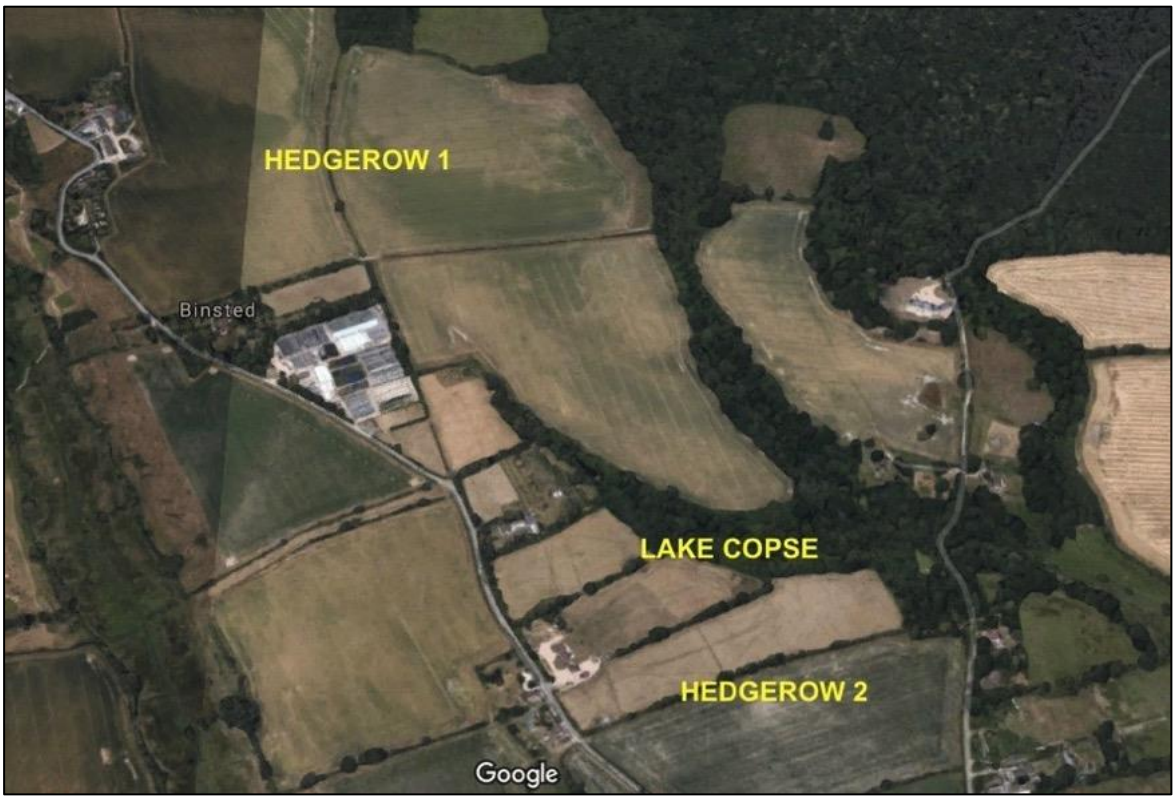
Species	Common name	Number
Gerris sp.	Pond Skater	2
Corixa sp.	Lesser Water Boatman	13 (includes nymphs)
Chaoborus sp.	Ghost Midge Larva	1
Daphnia sp.	Water Fleas	numerous
Notonecta glauca	Greater Water Boatman	5
Gammarus pulex	Freshwater Shrimp	8
Cloeon dipterum	Mayfly (Pond Olive)	5
Cyclops sp.	a copepod	numerous
Diaptomus sp.	a copepod	numerous
Chironomus sp.	a bloodworm (Midge larva)	5
Dugesia lugubris	a flatworm	5
Asellus aquaticus	Freshwater Hoglouse	2
Ischnura elegans	Blue-tailed Damselfly (nymph)	1

3.2.7 Invertebrates - beetles

The original report (Wildlife Splash 2016) stated that the Binsted Woods Complex was important for beetles having had access to a survey (Grove 2006), which recorded 400 different species from 46 different families including 25 Nationally Notable species, and 2 Red Data Book species.

A new beetle survey was conducted from May to October (Grove 2016) sampling three areas - two hedgerows and an arm of wet woodland, Lake Copse, extending south from the Binsted Wood Complex shown in Figure 8.

Figure 8: Three areas surveyed for beetles



The survey found 230 beetle species, including one Red Data Book species and eleven Nationally Scarce species (shown in Table 4). Moreover, each location also produced a beetle not previously recorded in Sussex.

Table 4: Beetles of conservation importance found in two hedgerows and Lake Copse

Species name	Hedgerow 1	Hedgerow 2	Lake Copse	No. found	Dates	Status
Scaphisoma boleti			✓	1	14.9.16	NB
Melasis buprestoides		✓	✓	6-20	08.06.16-20.07.16	NB
**Dorcatoma serra*			✓	1	20.07.16	NA
Cryptarcha strigata			✓	2-5	08.06.16-05.08.16	NB
Lycoperdina bovistae			✓	1	05.08.16	RDB 3
Prionychus melanarius			✓	1	20.07.16	NS
Pyrochroa coccinea	✓			1	23.05.16	NB
Conopalpus testaceus		✓		1	20.07.16	NB
Longitarsus parvulus			✓	1	30.08.16	NA
Trachodes hispidus			✓	1	28.09.16	NB
Kyklioacalles roboris			✓	1	20.07.16	NB
Kissophagus hederae			✓	1	20.07.16	NB

The species with an asterisk is awaiting verification

Fifty-two saproxylics (dependent on dead or decaying wood) were identified and measured against the Saproxylic Quality Index (SQI). The SQI rates the importance of the dead wood habitat, a habitat that is becoming scarcer as rotten branches on trees are

removed for safety reasons. Despite the small area covered by this survey, many species found were uncommon or even rare, and they produced a high score on the SQI.

The overall SQI score of 434 places Binsted about halfway down the list of sites recorded in Southern England. At the top, with a rating of about 850 are sites such as the New Forest and Windsor Forest, while Petworth Park is only just above Binsted. Most of these sites are much bigger and have been studied for much longer. Binsted also scores much higher than the Binsted Wood Complex, which came in four fifths down the list.

The author compares the 400 species that were collected from the Binsted Wood Complex to the 230 from this survey and noted that the woodland survey was carried out over a longer period, one year, with other species added later especially from the wood edge. The area of woodland studied was much larger with more varied habitats. The notable factor about this survey is that despite being restricted in time and size, it should yield so much.

3.2.8 Invertebrates – general survey

A general invertebrate survey was undertaken in 2016 sampling a number of invertebrate groups from around the parish of Binsted (Edwards 2016). Much of the survey route was along Binsted Lane and public footpaths with a small foray to Binsted Rife (Figure 9).

A total of 249 species were recorded during the survey, including twelve, which have been listed as being of conservation importance and a further three that are on the Sussex Rare Species Inventory (shown in Table 5).

Figure 9: Route taken around Binsted parish for invertebrate survey

Image from 'An Entomological survey within Binsted Parish' (Edwards 2016)

Table 5: Invertebrates of conservation importance found around Binsted

Species	Family	Binsted Park	Binsted Rife	Status
Tyria jacobaeae	Arctiidae (Tiger Moths)		✓	S41
Anobium inexspectatum	Anobiidae(Woodworm Beetles)	✓		NB, SxRSI
Cantharis fusca	Cantharidae (Soldier Beetles)	✓		NS, SxRSI
Pseudovadonia livida	Cerambycidae (Long-horn Beetles)	✓		SxRSI
Chrysolina oricalcia	Chrysomelidae (Leaf Beetles)		✓	NB, SxRSI
Pilemostoma fastuosa	Chrysomelidae (Leaf Beetles)	✓		RDB, NR, SxRSI
Podagrica fuscicornis	Chrysomelidae (Leaf Beetles)	✓		NS
Isochnus populicola	Curculionidae (Weevils)	✓		SxRSI
Drilus flavescens	Drilidae	✓		SxRSI
Zophomyia temula	Tachinidae (Parasite Flies)	✓		NN, SxRSI
Dorycera graminum	Ulidiidae	✓		RDB-R, S41, BAP
Bombus ruderatus	Apidae (Bees)	✓		NB, S41, BAP
Pemphredon morio	Crabronidae (Solitary Wasps)	✓		NB
Lasioglossum malachurum	Halicitidae (Mining Bees)	✓		NB
Lasioglossum pauxillum	Halicitidae (Mining Bees)	✓		NA

The old trackway of Old Scotland Lane (shown as 2.4 in Figure 9) between two arable fields on gravelly soils which have considerable areas not under cultivation supporting a good range of flower species, including stands of Common Knapweed, which was being heavily visited by several Bumblebee species. The Nationally Scarce Snail-hunting Beetle *Drilus flavescens* was also found here.

The hedgerow (shown as 2.6 in Figure 9) was found to have good physical quality features. It faces south and has a south-facing sloping foot (probably a result of earlier ploughing to the hedge). The development of a rather scrubby layer at the base of the hedge includes sucker Blackthorn, a favoured egg-laying situation for Brown Hairstreak butterflies as well as providing good over-wintering habitat for a range of insect species and nesting habitat for bumblebees. This hedgerow supports the fly *Dorycera graminum,* a Section 41 species more normally associated with damp, but drained, grasslands in the Thames Corridor. It is likely that the larva of the fly feed in the elongating flower head of grasses; the warm, south-facing aspect, with the correct humidity level being the less easily provided part of its habitat.

The sheltered damp woodland edge (shown as 2.8 in Figure 9) revealed the RDB 3 Soldier Beetle *Cantharis fusca*. This species was previously also recorded at the nearby Black Ditch to the east of Arundel, but a survey there in 2014 failed to find it.

The Section 41 Bumblebee species *Bombus ruderatus* (Photograph 6) was recorded along the newly created hedgerow (shown as 2.13 in Figure 9). The authors of the report say that this is the first record for this species that they are aware of in this part of West Sussex since the early 20th Century.

Photograph 6: Worker *Bombus ruderatus* on Red Clover

Photographed by Mike Edwards in Binsted during the 2016 survey

3.3 AD HOC SIGHTINGS

Ad hoc sightings continue to be recorded with a range of species such as Hedgehog, Adder, Slow Worm, Wood Mouse, Yellow-necked Mouse, Common Toad, newts (Smooth and Palmate) a range of butterflies and an additional two species of dragonfly – the Emperor *Anax imperator* and the Southern Hawker *Aeshna cyanea*.

4 POTENTIAL IMPACTS

4.1 BRYOPHYTES, FUNGI AND NOTABLE TREES

4.1.1 Bryophytes

The proposed A27 Binsted Option would lead to the loss of much habitat and the general degradation of the surrounding habitat with the associated pollutants and particulates.

The impacts of pollutants, dust and particulates on the growth patterns of different plant and bryophyte species have been discussed previously (Wildlife Splash 2016). In short, this results in differential growth rates and therefore changes in interspecific competitive interactions. This results in shifts in communities that generally favour the more widespread and common species.

4.1.2 Fungi

The proposed Binsted A27 Option would directly destroy habitat such as a high number of notable trees along with hedgerows, pasture and field edges. The importance of such habitats and the interactions of trees and plants with fungi and mycorrhizal fungi in maintaining a healthy ecosystem is gradually becoming better understood. However, this is a relatively recent area of research and there is very little literature on the impact of major road developments on this diverse group.

4.1.3 Notable trees

Notable trees are throughout the landscape – the woodlands, shaws, hedgerows and, very occasionally in fields. The impact of the loss of such trees is far reaching for these trees are important for bats, birds, saproxylic invertebrates and fungi providing habitat and niches that have become relatively uncommon.

MAVES surveys in the area have perhaps demonstrated the importance of such trees by the high number of dependant groups that have been recorded. To date thirteen species of bat have been recorded (AEWC 2016), a proportion of which roost in trees. Two surveys (Grove 2006 and Grove 2016) have documented the high number of saproxylic beetles (some of which are uncommon) not only in the woodlands but also in notable trees in hedgerows. Fungi are just beginning to be surveyed in the area and already less common species associated with rotting wood are beginning to be found. Birds, such as the Tawny Owl, that nest in tree cavities are frequently recorded in the area.

4.2 PROTECTED VERTEBRATES / INVERTEBRATES

4.2.1 Badger

The proposed Binsted A27 Option would have a very high negative impact on the territories shown. Badgers are creatures of habit following well-worn paths in the same

way as humans follow roads, footpaths and pavements. Surveys and observations have shown very high levels of Badger activity and movement across and between territories. As a consequence it is likely that an extremely high number of Badgers would be killed directly on the proposed road without fencing to keep them out. Such fencing would be required along the entire length through the areas of active setts and high Badger activity.

4.2.2 Breeding birds

Within the high diversity of birds that the Mid Arun Valley supports are a number of owl species and particularly Barn Owls and Tawny Owls, which are seen and recorded most frequently.

The Barn Owl Trust state that in a typical year, Britain's 4,000 pairs of Barn Owls produce roughly 12,000 young and it is estimated that a staggering 3,000 – 5,000 of these are killed on roads. Moreover, 90% of those killed are killed on major roads i.e. dual carriageways and motorways (which amount to just 2% or all our roads). Given the excellent hunting grounds and the presence of nest sites in the area (Figure 3), the proposed road would have a highly negative impact on this one bird species alone.

Photograph 7: A Barn Owl Killed on a road (taken by David Ramsden, Barn Owl Trust)

4.2.3 Common Toad

The importance of a good number of sites for a species is demonstrated by the absence of Common Toad tadpoles in the cleared ditch (Figure 5, number 4). This species was breeding in three other locations in close proximity to this ditch, which guarantees its survival when ditches and ponds are cleared in the future, a necessity to maintain such habitats.

4.2.4 Dormouse

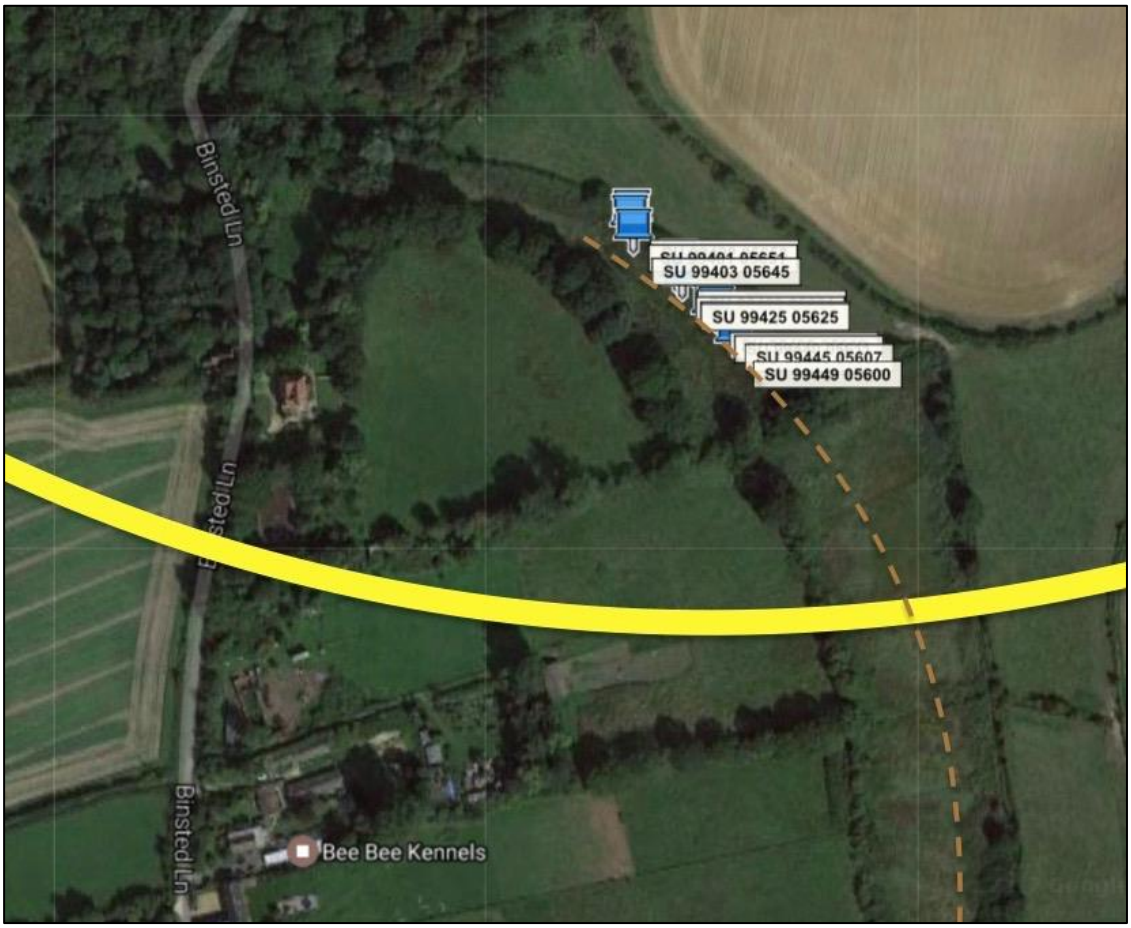
Regular monitoring, the inclusion of new sites within the Binsted Woods Complex as part of the National Dormouse Monitoring Programme and the habitat suitability study conducted by Brighton University points to the Binsted Wood Complex as an important site for Dormouse. National monitoring shows that this species has fallen by 55% in the last 25 years and this is certainly reflected in Paines Wood where Dormouse numbers have dropped by half over the last few years (Ian Powell pers comm). The main reasons cited for this fall are habitat fragmentation, changes in woodland and hedgerow management and a more unpredictable climate (Wembridge *et al.* 2016).

The Binsted Woods Complex is a large area likely to support Dormouse throughout. Dormice are able to move across the Mid Arun Valley area for numerous shaws and hedgerows extend from the Binsted Woods Complex to the wider landscape to the south across arable and pasture and to smaller pockets of woodland. This is of vital importance for the movement of the Dormouse as well as all other species with the Binsted Woods Complex providing source populations for many species over the entire Mid Arun Valley landscape. The road would sever these important connections, and whilst the Binsted Woods Complex may be able to hold its own, as Dormice are now believed to be throughout, should smaller populations in shaws, woodland pockets and hedgerows become extinct they would no longer be replaced.

4.2.5 Harvest Mouse

The population of Harvest Mice was discovered in an unmanaged field of rough grassland and wetland vegetation from which there is a corridor of suitable habitat to the south, though this has not yet been investigated for nests. It must be noted that the field investigated (and potentially the fields to the south) together with the tall wetland vegetation of Binsted Rife, provide the best and most extensive areas of habitat for this species. Corridors connecting these two areas are extremely important. This corridor of suitable habitat gives access across the landscape through the arable field margins to tall rough and marshy grassland to the south, and along the northern part of the railway line and to Binsted Rife Valley to the west. Figure 10 shows the locations of the nests in relation to the location of the proposed Binsted A27 Option (shown in yellow). The Binsted A27 Option would sever the habitat corridor, which is shown by the dashed line.

Figure 10: Harvest Mouse nest locations in relation to the habitat corridor and the proposed road



4.2.6 Fresh Water Invertebrates

With the exception of the River Arun, the majority of fresh-water habitats that are throughout the area to be impacted upon by the proposed Binsted A27 option comprise ditches, ponds and very shallow and slow-moving chalk streams. Pollutants will more seriously impact upon smaller water-bodies with limited or no water flow than the faster flowing river.

The fresh-water invertebrates in a given water body have evolved a habitat-specific physiology and morphology, and distinct communities form along environmental gradients. Pollutants from roads are numerous for tyres and brakes are associated with copper and zinc corrosion, lead comes from petroleum additives and emissions, copper and nickel from moving parts in engines. De-icing systems, and metal objects washed by the rain are potential sources for metals in surface runoff. Various studies have shown that pollutants change the species assemblage in lotic systems favouring stress tolerant taxa. Others have found that particular families, mainly from the orders Ephemeroptera (mayfly), Plecoptera (stonefly) and Tricoptera (caddisfly) displayed metal sensitivity and are absent from metal polluted streams (Beasley and Kneale 2003)

It is likely that the high number of ditches and ponds that are in close proximity to the proposed road will undergo similar changes in species assemblages favouring stress tolerant taxa and losing some groups.

4.2.7 Invertebrates - beetles

Hedgerows 1 and 2 yielded an astonishing 205 different species of beetle. This is a barometer of the invertebrate diversity of the surrounding area with the hedgerows acting as shelter, habitat and corridors for beetles and all the other invertebrates not recorded in this survey. Hedgerow 1 will disappear, wiping all species and the corridor out, and a chunk of Hedgerow 2 will be lost with a highway in the middle. This will have an extremely negative impact on species within the remainder of the hedgerow.

Lake Copse yielded 99 different species during the survey with the highest number of rare species. This is an area of wet and dry woodland with a small lake, a watercourse and many notable trees. It is likely to become very much degraded with a major road in close proximity, by means of pollutants, particulates, dust and invasive species along the woodland edge. The habitat will deteriorate and the species that rely on such habitat are likely to be severely impacted upon and many may gradually disappear.

All these areas support notable trees with dead wood habitat (not yet recorded and mapped) with a good diversity of saproxylic beetles as shown by the high Saproxylic Quality Index (Section 3.2.7). These will largely be lost.

4.2.8 Invertebrates - general

The general invertebrate survey produced 249 species (in just two sampling days) of which 12 are of conservation importance and a further three listed on the Sussex Rare Species inventory. This survey covered many groups of invertebrates and gives an insight as to the type of species and the quality of habitat in the area in general. It shows the great range of niches present to support such diversity with some unexpected finds such as the fly *Dorycera graminum* (Section 41 species) associated with damp, but drained, grasslands in the Thames Corridor.

The habitat has remained little changed over time and species are able to persist such as the RDB 3 Soldier Beetle *Cantharis fusca* which can no longer be found in the nearby Black Ditch to the east of Arundel.

The proposed Binsted A27 Option would vastly alter this landscape impacting upon shelter, hedgerows, field banks and ultimately the microhabitats that are of such importance to invertebrates. Moreover, many invertebrates spend part of the lifecycle in the soil and studies have shown that virtually all measures of soil biotic diversity and function decline in soil contaminated by roads, including abundance, number of species, species composition, index of species diversity, index of equability, and bulk soil respiration (Krzysztofiak 1991). Rare species are likely to be replaced by widespread and common species.

5 CONCLUSIONS

5.1.1 Populations, species diversity and rarity

A limited number of surveys have been undertaken since the initial ecological survey, yet each supports the original findings that the area has a higher diversity of species and many more protected species than previously thought.

Population Size

Large populations have a more secure future, as they are more likely to be able to withstand environmental fluctuations and demographic stochasticity.

Such fluctuations have been seen in the area with the National Dormouse Monitoring Programme with the environmental fluctuations impacting upon population size. However, thanks to Brighton University research and the expansion of the NDMP into two additional sites, it has been shown that this species is likely to be throughout the Binsted Woods Complex and dispersing throughout the surrounding area.

Likewise, the ditch clearance that has resulted in no Common Toads breeding in that location this year (Figure 5, number 4) will not cause a local extinction as other breeding sites are in close proximity. Events such as routine clearance, or an unseasonably dry season causing the drying of a pond or ditch, or a random pollution event would not destroy the entire population. Currently, Common Toad can disperse from this strong nucleus to other suitable water bodies across the entire Mid Arun Valley Landscape.

The Badger monitoring by local residents and Brighton University has revealed the extent of the activity and the size and extent of the Badger territories, again pointing to large and stable populations. An impoverished habitat with poor soil biota etc. would not be able to support expanding populations of a relatively large mammal.

In 2016 (Wildlife Splash) it was suggested that Harvest Mice are likely to be in the area due to habitat availability. Again, a good population was found in just one small field. Similar habitat is available in other areas with no barriers to dispersal and so the population is likely to be healthy.

Species diversity

A diverse range of species continues to be recorded in the Mid Arun Valley. Each survey produces a wide range of species, such as the general invertebrates survey (Edwards 2016) recording 249 species from 52 different families such as Dance Flies (Empididae), Pollen Beetles (Nitidulidae), Woodworm Beetles (Anobiidae), Capsid Bugs (Miridae), Bush Crickets (Tettigoniidae), Social and Potter Wasps (Vespidae).

The survey specialising on beetles alone (Grove 2016) recorded 230 species from 47 different families including Ground Beetles Carabidae, False Skin Beetles (Biphyllidae), Ladybirds Coccinellidae, Longhorn Beetles (Cerambycidae) and False Darkling Beetles (Melandryidae).

Rare Species

Each survey, whether it is bryophytes, invertebrates or fungi, has produced a number of species that are rare, of conservation concern or legally protected. This again reflects on the quality of the landscape with a good range of habitats including notable trees, ponds, ditches, chalk streams, hedge banks and small fields. Each similar habitat varies with size, orientation, aspect, height, and shelter making them all slightly different and able to support different assemblages of species and species, a proportion of which are rare.

5.1.2 The Mid Arun Valley

The new findings support the original conclusion that the Mid Arun Valley is a special place that still supports a huge diversity of species that are on various conservation lists because numbers have fallen drastically or they are simply uncommon. Every group (i.e. birds, mammals, flowering plants, invertebrates) is extremely well represented in the area and there is good reason to believe that many species are not just surviving but thriving.

The key reasons for this are the presence of a variety of good quality habitats. If a busy road were to separate the woodland from the immediate landscape and the numerous corridors leading to adjacent habitats, the connectivity across the landscape and to other good quality habitats would be, in part, severed. Species would start to fall away, killed directly be the road or as a result of habitat destruction, fragmentation of populations, pollutants and competition from invasive species amongst other things. Surrounding habitats would lose species too as casualties from local extinctions may not be replaced. The result would be the irreversible degradation of habitats and the irreplaceable loss of species diversity. There is no mitigation that would be appropriate for such loss.

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APPENDIX I – TABLES

Appendix 1 Table 1: Bryophyte species recorded by Tom Otterly and Jacqueline Thompson

Accepted Name	Field Guide Name	Locality	Gid Ref
Pohlia melanodon	*Pohlia melanodon*	Binsted Rife	SU981059
Funaria hygrometrica	*Funaria hygrometrica*	Binsted Rife	SU981059
Leptodictyum riparium	*Leptodictyum riparium*	Binsted Rife	SU981059
Brachythecium rivulare	*Brachythecium rivulare*	Binsted Rife	SU981059
Oxyrrhynchium hians	*Oxyrrhynchium hians*	Binsted Rife	SU981058
Brachythecium rutabulum	*Brachythecium rutabulum*	Binsted Rife	SU982057
Oxyrrhynchium speciosum	*Oxyrrhynchium speciosum*	Binsted Rife	SU98290565
Cryphaea heteromalla	*Cryphaea heteromalla*	Binsted Rife	SU983056
Orthotrichum affine	*Orthotrichum affine*	Binsted Rife	SU983056
Orthotrichum diaphanum	*Orthotrichum diaphanum*	Binsted Rife	SU983056
Frullania dilatata	*Frullania dilatata*	Binsted Rife	SU983056
Ulota bruchii	*Ulota bruchii*	Binsted Rife	SU983056
Metzgeria furcata	*Metzgeria furcata*	Binsted Rife	SU983056
Orthotrichum tenellum	*Orthotrichum tenellum*	Binsted Rife	SU983056
Ulota phyllantha	*Ulota phyllantha*	Binsted Rife	SU983056
Zygodon conoideus var. conoideus	*Zygodon conoideus*	Binsted Rife	SU983056
Orthotrichum striatum	*Orthotrichum striatum*	Binsted Rife	SU983056
Cololejeunea minutissima	*Cololejeunea minutissima*	Binsted Rife	SU983056
Orthotrichum pulchellum	*Orthotrichum pulchellum*	Binsted Rife	SU983056
Mnium hornum	*Mnium hornum*	Binsted: Lake Copse	SU987058
Lunularia cruciata	*Lunularia cruciata*	Binsted: Lake Copse	SU987058
Brachythecium rutabulum	*Brachythecium rutabulum*	Binsted: Lake Copse	SU987058
Kindbergia praelonga	*Kindbergia praelonga*	Binsted: Lake Copse	SU987058
Oxyrrhynchium pumilum	*Rhynchostegiella pumila*	Binsted: Lake Copse	SU987058
Leptodictyum riparium	*Leptodictyum riparium*	Binsted: Lake Copse	SU987058
Lophocolea bidentata	*Lophocolea bidentata*	Binsted: Lake Copse	SU987058
Pellia epiphylla	*Pellia epiphylla*	Binsted: Lake Copse	SU987058
Amblystegium serpens var. serpens	*Amblystegium serpens*	Binsted: Lake Copse	SU987058
Cratoneuron filicinum	*Cratoneuron filicinum*	Binsted: Lake Copse	SU987058
Hygroamblystegium varium	*Amblystegium varium*	Binsted: Lake Copse	SU98730586
Oxyrrhynchium hians	*Oxyrrhynchium hians*	Binsted: Lake Copse	SU987058
Ulota bruchii	*Ulota bruchii*	Binsted: Lake Copse	SU987058
Orthotrichum tenellum	*Orthotrichum tenellum*	Binsted: Lake Copse	SU987058
Hypnum cupressiforme var. resupinatum	*Hypnum resupinatum*	Binsted: Lake Copse	SU987058
Brachythecium rutabulum	*Brachythecium rutabulum*	Binsted: Lake Copse	SU987058
Zygodon conoideus var. conoideus	*Zygodon conoideus*	Binsted: Lake Copse	SU987058
Bryum capillare	*Bryum capillare*	Binsted: Lake Copse	SU987058
Metzgeria furcata	*Metzgeria furcata*	Binsted: Lake Copse	SU987058
Ulota crispa	*Ulota crispa*	Binsted: Lake Copse	SU987058
Orthotrichum affine	*Orthotrichum affine*	Binsted: Lake Copse	SU987058

Accepted Name	Field Guide Name	Locality	Gid Ref
Frullania dilatata	*Frullania dilatata*	Binsted: Lake Copse	SU987058
Homalothecium sericeum	*Homalothecium sericeum*	Binsted: Lake Copse	SU987058
Syntrichia laevipila	*Syntrichia laevipila*	Binsted: Lake Copse	SU987058
Orthotrichum diaphanum	*Orthotrichum diaphanum*	Binsted: Lake Copse	SU987058
Dicranoweisia cirrata	*Dicranoweisia cirrata*	Binsted: Lake Copse	SU987058
Hypnum cupressiforme var. cupressiforme	*Hypnum cupressiforme*	Binsted: Lake Copse	SU987058
Grimmia pulvinata	*Grimmia pulvinata*	Binsted: Lake Copse	SU987058
Cryphaea heteromalla	*Cryphaea heteromalla*	Binsted: Lake Copse	SU987058
Amblystegium serpens var. serpens	*Amblystegium serpens*	Binsted: Lake Copse	SU987058
Orthotrichum lyellii	*Orthotrichum lyellii*	Binsted: Lake Copse	SU987058
Rhynchostegium confertum	*Rhynchostegium confertum*	Binsted: Lake Copse	SU987058
Platyhypnidium riparioides	*Platyhypnidium riparioides*	Binsted: Lake Copse	SU988058
Thamnobryum alopecurum	*Thamnobryum alopecurum*	Binsted: Lake Copse	SU988057
Didymodon sinuosus	*Didymodon sinuosus*	Binsted: Lake Copse	SU988057
Fissidens taxifolius var. taxifolius	*Fissidens taxifolius*	Binsted: Lake Copse	SU989057
Atrichum undulatum var. undulatum	*Atrichum undulatum*	Binsted: Lake Copse	SU989057
Rhizomnium punctatum	*Rhizomnium punctatum*	Binsted: Lake Copse	SU989057
Fissidens bryoides var. bryoides	*Fissidens bryoides*	Binsted Park	SU991057
Oxyrrhynchium hians	*Oxyrrhynchium hians*	Binsted Park	SU991057
Kindbergia praelonga	*Kindbergia praelonga*	Binsted Park	SU991057
Leptodictyum riparium	*Leptodictyum riparium*	Binsted Park	SU991057
Pohlia melanodon	*Pohlia melanodon*	Binsted Park	SU991057
Fissidens taxifolius var. taxifolius	*Fissidens taxifolius*	Binsted Park	SU991057
Atrichum undulatum var. undulatum	*Atrichum undulatum*	Binsted Park	SU990059
Neckera complanata	*Neckera complanata*	Binsted Park	SU990059
Isothecium myosuroides var. myosuroides	*Isothecium myosuroides*	Binsted Park	SU990059
Pseudotaxiphyllum elegans	*Pseudotaxiphyllum elegans*	Binsted Park	SU989059
Plagiothecium succulentum	*Plagiothecium succulentum*	Binsted Park	SU989059
Dicranella heteromalla	*Dicranella heteromalla*	Binsted Park	SU989059
Plagiomnium undulatum	*Plagiomnium undulatum*	Binsted Park	SU989059
Thamnobryum alopecurum	*Thamnobryum alopecurum*	Binsted Park	SU989062
Eurhynchium striatum	*Eurhynchium striatum*	Binsted Wood	SU989064
Thuidium tamariscinum	*Thuidium tamariscinum*	Binsted Wood	SU989064
Atrichum undulatum var. undulatum	*Atrichum undulatum*	Binsted Wood	SU989064
Kindbergia praelonga	*Kindbergia praelonga*	Binsted Wood	SU989064
Isothecium myosuroides var. myosuroides	*Isothecium myosuroides*	Binsted Wood	SU989064
Plagiothecium succulentum	*Plagiothecium succulentum*	Binsted Wood	SU989064
Mnium hornum	*Mnium hornum*	Binsted Wood	SU989064
Metzgeria furcata	*Metzgeria furcata*	Binsted Wood	SU989064
Calypogeia arguta	*Calypogeia arguta*	Binsted Wood	SU989065
Radula complanata	*Radula complanata*	Binsted Wood	SU989066
Isothecium alopecuroides	*Isothecium alopecuroides*	Binsted Wood	SU989066
Ulota crispa	*Ulota crispa*	Binsted Wood	SU989067
Zygodon conoideus var. conoideus	*Zygodon conoideus*	Binsted Wood	SU989067
Microlejeunea ulicina	*Microlejeunea ulicina*	Binsted Wood	SU989067
Frullania dilatata	*Frullania dilatata*	Binsted Wood	SU989067
Cololejeunea minutissima	*Cololejeunea minutissima*	Binsted Wood	SU989067
Rhytidiadelphus triquetrus	*Rhytidiadelphus triquetrus*	Binsted Wood	SU989068

Accepted Name	Field Guide Name	Locality	Gid Ref
Calypogeia fissa	*Calypogeia fissa*	Binsted Wood	SU990068
Polytrichastrum formosum	*Polytrichastrum formosum*	Binsted Wood	SU989068
Lophocolea heterophylla	*Lophocolea heterophylla*	Binsted Wood	SU989068
Fissidens taxifolius var. taxifolius	*Fissidens taxifolius*	Binsted Wood	SU989068
Lophocolea bidentata	*Lophocolea bidentata*	Binsted Wood	SU989068
Bryum capillare	*Bryum capillare*	Binsted Wood	SU989068
Neckera complanata	*Neckera complanata*	Binsted Wood	SU986067
Chiloscyphus polyanthos	*Chiloscyphus polyanthos*	Binsted Wood	SU985068
Dicranella heteromalla	*Dicranella heteromalla*	Binsted Wood	SU985068

APPENDIX I – TABLES

The following is a list of codes used in the table below

HHC	Hundred House Copse
T	Tree
W	Woodland
WE	Woodland edge
B	Bank
C	Coppice stool
T	Maiden tree
MS	Multi-stemmed tree

Appendix I Table 2: Trees recorded in the Mid Arun Valley Area by Karen Whitehouse, Kay Wagland and Emma Tristram

Number	Species	Habitat	Grid reference	CMS	Form	% standing dead wood	Fallen dead wood	Decorticated	Loose / lifted bark	Fungi	Holes	Hollowing	Sap runs	Crevices
1	Hazel	W	SU99820618	350	C	2				Yes	Yes			Yes
2	Hazel	W	SU99810617	320	C	10	5	Yes	Yes	Yes	Yes	Yes		Yes
3	Hazel	W	SU99810616	420	C	2	1			Yes				
4	Hazel	W	SU99800616	370	C	20	2			Yes	Yes			
5	Beech	WE, B	SU99780615	370	T	10	30	Yes	Yes	Yes	Yes	Yes		Yes
6	Beech	WE, B	SU99700614	350	T	3	1				Yes	Yes		Yes
7	Oak	WE, B	SU99720614	360	T	3								
8	Fallen Yew	W	SU99640617	270	T	20	5		Yes		Yes	Yes		Yes
9	FallenBeech	WE, B	SU99630616	350	T		100	Yes	Yes	Yes	Yes	Yes		Yes
10	Beech	WE, B	SU99620616	400	T	1	2	Yes			Yes			Yes
11	Beech	W	SU99540619	375	T	5	10	Yes		Yes	Yes	Yes		
12	Beech	WE, B	SU99520617	390	T	1	1		Yes					Yes
13	Hazel	W	SU99650624	400	C	15	10			Yes	Yes	Yes		Yes
14	Willow	W	SU99720620	280	C, MS	5	20	Yes	Yes		Yes			Yes
15	Hazel	W	SU99710620	400	T, MS	15	30	Yes	Yes	Yes	Yes	Yes		Yes
16	Oak	W	TQ00240619	270	T	1			Yes		Yes			Yes
17	Oak	W, B	TQ00240631	370	T	5	?		Yes		Yes			Yes
18	Oak	W, PA	SU99170626	530			10.-70	Yes	Yes			Yes		
19	Beech	W	SU99170621	340			10							
20	Ash	H	SU98990625	400	burrs			Yes	Yes	Yes	Yes			
21	Sweet CN	W	SU9893506263	370		20	5-25	Yes	Yes					Splits
22	Oak	WE	SU99100628	530		20	2					Yes		
23	Oak	WE	SU99150632	420										
24	Beech	WE, B	SU99170632	330	ditch	10								
25	Beech	W, B	SU99150630	400		25				Yes		Yes		

Number	Species	Habitat	Grid reference	CMS	Form	% Standing dead wood	Fallen dead wood	Decorticated	Loose / lifted bark	Fungi	Holes	Hollowing	Sap runs	Crevices
26	Sweet	W	SU9893306250	365		20	5-30		Splits					
27	Beech	W	SU99200628	400		10			Yes	Yes	Yes	Yes	Yes	
28	Beech	W	SU99200626	293		5	1-2							
29	Beech	W	SU99190631	350		5	1-2							
30	Oak	W	SU99200634	443	MS	5	5				Yes	Yes		Yes
31	Oak	W	SU99200635	326	MS	20	5				Yes	Yes		Yes
32	Beech	W	SU99180634	407	MS							Yes	Yes	
33	Hazel	W	SU9892406218	470	C	10			Yes					
34	Hazel	W	SU9893706212	310	C									
35	Hazel	W	SU989220623	360	MS		2-5							
36	Hazel	W	SU99250624	300	C	5				Yes				
37	Hazel	W	SU99250625	300	C	35	15		Yes	Yes	Yes	Yes		
38	Hazel	W	SU99240624	360	C	25	10		Yes	Yes		Yes	Yes	Yes
39	Hazel	W	SU99210632	360	C									
40	Hazel	W	SU99140649	560	C									
41	Hazel	W	SU99140649	400	C									
42	Hazel	W	SU99050665	334	C	25	5	Yes	Yes	Yes				Yes
43	Hazel	W	SU99040666	300	C	20								
44	Hazel	W, B	SU98880628	300	C	10	5							
HHC	Ash	W	SU9789006729	950	MS	2		No	No	No	Yes	Yes	No	Yes
HHC	Ash	W	SU9789306721	1250	MS	10		No	No	Yes	Yes	Yes	No	Yes
HHC	Ash	W	SU9788106723	960	MS	1		No	No	No	Yes	Yes	No	Yes
HHC	Ash	W	SU9786606717	440	MS	1		No	No	No	Yes	Yes	No	Yes
HHC	Ash	W	SU9788506695	610	MS	0		No	No	No	Yes	Yes	No	Yes

Number	Species	Habitat	Grid reference	CMS	Form	% standing dead wood	Fallen dead wood	Decorticated	Loose / lifted bark	Fungi	Holes	Hollowing	Sap runs	Crevices
HHC	Oak	W	SU9788306688	310	S	70		Yes - 10%	No	No	No	No	No	No
HHC	Oak	W	SU9788206681	440	S	10		Yes - 5%	No	No	No	No	No	Yes
HHC	Oak	W	SU9788106674	360	S	30		Yes - 20%	No	No	No	No	No	Yes
T	Oak		TQ00240619	270	T	1			Yes		Yes			Yes
T	Oak		TQ00240631	370	T	5			Yes		Yes			Yes

APPENDIX II – LEGISLATION AND ABBREVIATIONS

Birds of Conservation Concern

Every five years the population statuses of the 247 species of bird that are regularly found in the UK are reviewed. There are three lists – Red, Amber and Green - into which each species is placed. The status decisions are based on several factors which include: the species' global and European conservation status; recent and historical decline; whether it is a rare breeder; if it is only confined to a few sites in the UK; and if the species is of international importance.

- Red List species are those that are Globally Threatened according to IUCN criteria such as those whose population or range has decline rapidly in recent years.
- Amber List species are those with Unfavourable Conservation Status in Europe such as those whose population or range has declined moderately in recent years; rare breeders; and those with internationally important or localized populations.
- Green List species do not fit any of the above criteria, although some are still protected by law.

Natural Environment & Rural Communities Act (NERC) 2006

This Act made amendments to the both the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way (CROW) Act 2000. The relevance for this report is that many of our rarest and most threatened species are listed under Section 41 (S41) of the 2006 Natural Environment and Rural Communities (NERC) Act.

Biodiversity Action Plans (BAPs)

The UK BAP (also implemented at a local level through Local BAPs) is the UK Government's response to the Convention on Biological Diversity, signed in 1992. It describes the UK's biological resources and commits a detailed plan for the protection of these resources through the implementation of Species and Habitat Action Plans. Priority Species and Habitats in the UK Biodiversity Action Plan (UK BAP) are each the subject of a dedicated action plan which seeks to reverse decline and to protect vulnerable habitats and populations.

Red Data Book (RDB)

The IUCN RDB criteria reflect the level of threat of extinction that a species faces and are based on population declines (in contrast to the previous RDB criteria, which were based on restricted distribution) (Cheffings and Farrell 2005). Those species that fall into the top categories of CR (critically endangered), EN (endangered) and VU (vulnerable) all have a high risk of extinction in the wild and declining population size of >80% over last 10 years for CR, >50% for EN and >30% for VU.

National status

Species highlighted in the survey as notable species were selected because they fall into one of the following categories:

- Nationally Rare is defined as species that are found in 15 or fewer hectads.
- Nationally Scarce (also termed Nationally Notable) relates to species that occur in between 16 and 100 10km squares throughout Britain.
- Nationally Notable A are species found in 16 to 30 hectads.
- Nationally Notable B are species found in 31 to 100 hectads.

- Local is a status sometimes used for species found in 101 to 300 hectads.
- Sussex Rare Species Inventory (SxRSI) lists species that are rare in Sussex or those that are declining locally.

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Whilst the concrete front of development advances through the Sussex Countryside, members of MAVES, locals, Arundel residents and those from further afield continue to discover and document the amazing diversity of wildlife that makes the Mid Arun Valley hum with life. Without knowing what life we have we cannot fight to protect it.

The core team at MAVES, particularly Mike and Emma Tristram, Julia Plumstead and Ian Powell continue to inform, educate and encourage with their website, talks, community projects, help and advice.

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