An ecological survey
of the
Mid Arun Valley

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SUMMARY

- This report was commissioned by MAVES (Mid Arun Valley Environmental Survey).

- This aim of this report is to give a preliminary assessment as to the habitats and species that are present within the Mid Arun Valley. The term 'mid' refers to the location of this distinctive dip slope and River Valley landscape lying between the River Arun's main catchment area to the north of the town of Arundel and the larger coastal plain area south of the railway line.

- Background information regarding the present and historical ecological interest of the site and within a 1 km radius, was requested from the Sussex Biodiversity Records Centre (SxBRC).

- Surveys have been undertaken by range of professional and amateur experts (some within recording societies such as the Sussex Botanical Recording Society), university students and locals.

- Wildlife Splash Ltd. has completed the Phase 1 habitat surveys, in addition to collating all data from additional surveys and ad-hoc records. The information has been knitted together in order to give a detailed picture of the landscape, the habitats and the diversity of species therein.

- This report outlines the initial findings of these surveys, however, as recording is on-going, the intention is that it will be periodically updated.

- The Mid Arun Valley landscape is one of ancient semi-natural woodland, floodplain grassland, small grassy and tussocky fields, arable fields with wide, grassy margins, valley streams surrounded by swamp, fen and marsh and a scatter of ponds and ancient trees. These habitats are both linked and delineated by a dense network of wet ditches, streams, shaws, hedgerows and treelines.

- The majority of the land is either UK BAP priority habitat or land in agri-environment schemes. Much of the remaining land is managed in a low-key way with sensitivity to wildlife. The land in agri-environment schemes links directly to land in agri-environment schemes to the south and the west, as well as a continuation of UK BAP priority habitat to the north and south providing connectivity of wildlife habitat throughout the landscape.

- This land is in proximity to one statutory designated nature conservation site Arundel Park Site of Special Scientific Interest, and three non-statutory designated sites, Binsted Wood Complex Local Wildlife Site (LWS), Rewell Wood Complex LWS and Arun Valley LWS. Two other sites of importance are the Slindon Common Gravel Pit (Geological site) and the Arundel Wetland Centre.

- The site supports the following UK BAP priority habitats: arable field margins, chalk stream, coastal and floodplain grazing marsh, fens, hedgerows lowland heathland,

lowland mixed deciduous woodland, ponds, reedbed, traditional orchard, wood pasture and parkland / veteran trees.

- This initial scoping survey has shown that the Mid Arun Valley has a higher diversity of species and many more protected species than previously thought. It is severely under-recorded and with greater survey effort may well merit stronger protection.

- During just one survey session (31.07.2016) within and around the margins of the Binsted Wood Complex, a remarkable 13 bat species were recorded representing a very high level of bat fauna and diversity that is comparable with some of the best sites in the country.

- Notably two Annex II species were caught; both females and roosts of both were identified within the woodland along with breeding Alcathoe bats, a rare data deficient species. A maternity colony of Bechstein's bats, a woodland specialist, within the Binsted Woods Complex, makes this site of National interest.

- Records were returned for 177 species of bird within the search area, of which over 60% are Schedule 1, Red List or Amber List species. This is further enforced by recent records of less common species such as Snipe (Amber List) and Lapwing (Red List and Schedule 1) breeding in the area. Many are farmland and wetland species.

- Significant populations of groups such as Badger, bats, birds, Common Toad and reptiles have been recorded in 2015 / 2016. Additionally, over the same time frame rapidly declining UK BAP species such as Water Vole, Brown Hare, Hedgehog and Harvest Mouse have been recorded. The Binsted Wood Complex forms part of the National Dormouse Monitoring Programme and this species has also been recorded in surrounding hedgerows.

- Historical records for invertebrates are mostly associated with the Slindon Wood Complex to the north; however, relatively recent recording in the area (2006) has revealed an additional 27 scarce and threatened beetle species (including 2 RDB species) in the Binsted Wood Complex.

- In 2015 a total of 27 species of butterfly were recorded in Binsted Woods, Binsted Village, and the surrounding field margins and hedgerows, which is just under a half of the total British species. Moreover, it included two additional Red Data Book species. This compares well to Arundel Park SSSI, which supports 25 breeding species of butterfly.

- A two-hour invertebrate survey along Binsted Rife (2015) found 130 species including three Nationally Scarce and a UK BAP species; and during a three-minute standard net in water freshwater sampling survey undertaken in Binsted Rife seventeen genera were found.

- Two recent moth surveys (2016) found a total of 75 species of which 7 are UK BAP species and 4 are Local species.

- It has been demonstrated that this is an area of good quality habitat with strong linkages to other areas of good quality habitat. The high numbers of species present demonstrates the value of a diverse and relatively large and uninterrupted landscape.

- Many species migrate across the landscape on a diurnal or seasonal basis, Bats forage daily using hedgerows, tree-lines and woodland edges as flight-lines for navigation and safety from predators. Badgers travel from their setts to good foraging areas. Common Toad habitually migrates to ancestral breeding ponds each year, regardless of barriers. Grass Snake and Adder make seasonal movements to and from hibernation, breeding and foraging sites over significant distances, notably between woodland and open habitats. The European Eel (UK BAP) travels from ditches in the Binsted area to the Sargasso Sea to spawn. Other species may migrate across the landscape for dispersal purposes.

- Landscape connectivity means that in the event of a local extinction of a given population, natural recolonisation of the available habitat can occur. The ability of a given species to migrate across a landscape becomes extremely important in the face of fluctuations and changes in the environment.

- The Mid Arun Valley is a working landscape and yet one that works for both farmers and biodiversity. In the context of species, the Mid Arun Valley is extremely diverse.

This report has been prepared by Wildlife Splash Limited, with all reasonable skill, care and diligence within the terms of the Contract with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

1 INTRODUCTION

1.1 AIMS AND OBJECTIVES

This aim of this report is to give a preliminary assessment as to the habitats and species that are present within the Mid Arun Valley. The term 'mid' refers to the location of this distinctive dip slope and River Valley landscape lying between the River Arun's main catchment area to the north of the town of Arundel and the larger coastal plain area south of the railway line. The boundary of the Mid Arun Valley is shown in Figure 1.

This report presents the results of the following:

- Desktop Biodiversity Report;
- Phase 1 Habitat Survey;
- Protected Species Walkover Survey; and
- Surveys completed by professionals, county recorders and specialists.

The historical data and various surveys are knitted together in order to give a detailed picture of the landscape, the habitats and the diversity of species therein. This report outlines the initial findings, however, as recording is on-going, the intention is that it will be periodically updated.

1.2 BACKGROUND TO THE SURVEY

This report was commissioned by MAVES (Mid Arun Valley Environmental Survey). MAVES is a community based not-for-profit charity. Partner organisations include the Sussex Wildlife Trust and Arundel Agenda 21.

MAVES was formed to understand, conserve and enhance the local environment. Its public benefit charitable purpose is environmental protection and improvement in the diverse and beautiful landscape of the Arundel area. MAVES has became involved in recording species, but required a greater understanding of the links and interactions between species, habitats and the environment that makes this area an important and integral part of the greater landscape. As a result, Wildlife Splash Ltd. was commissioned to coordinate survey activity and results, and to report on them.

MAVES policy allows information to be shared appropriately with other interested people, communities and organisations. The gathering of information is on going, and MAVES will consider requests for bespoke reports subject to time and financial resources available and to any confidentiality restrictions that may exist for wildlife protection or landowner confidentiality reasons.

1.3 ECOLOGICAL CONTEXT

The Mid Arun Valley landscape is one of ancient semi-natural woodland, floodplain grassland, small grassy and tussocky fields, arable fields with wide, grassy margins, valley streams surrounded by swamp, fen and marsh and a scatter of ponds and ancient trees. These habitats are both linked and separated by a network of wet ditches, streams, shaws, hedgerows and treelines. The majority of the habitat is included in UK BAP priority

habitats or environmental stewardship schemes. It has excellent connectivity to similar habitat along the Arun, Local Wildlife Sites (LWS), a privately owned wildlife site and Sites of Special Scientific Interest (SSSI). This has resulted in an extremely high number of rare and threatened species in the area.

Figure 1: The Mid Arun Valley boundary

1.4 HISTORICAL CONTEXT

The 1880 Ordnance Survey map (Figures 2 and 3) shows that much of the landscape, particularly the west part of the area, is remarkably unchanged since that time. A small area of Binsted Wood (Ash Piece) was cleared (now woodland again) and some former field boundaries in three arable fields have been removed. However, the following are of note:

- The visible linear woodland corridors to the south of Tortington Common, which are exactly as when surveyed one hundred and forty years ago in 1875 / 76.
- The network of small fields around Binsted Rife, Binsted and Tortington Rife, which remains unchanged, as does the network of small fields along the southern part of the area just to the north of the railway line.
- The small size of the fields in comparison to the field size within the South Downs National Park.
- The locations of a number of trees on the 1880 maps correspond to the locations of notable / veteran trees on the Phase 1 Habitat Map (Appendix I).
- The very low level of development within the area with just a handful of buildings having appeared around Binsted Village since that time.

This is a remnant tranquil and unspoilt part of Sussex along the heavily developed coastal zone. The extremely high diversity of habitats and species within the area can, in part, be attributed to the lack of development and infrastructure.

Figure 2: OS map of part of the Binsted Wood Complex and a current image from Google

Map taken from a copy of Sussex LXII (includes: Aldingbourne; Barnham; Eastergate; Walberton; Yapton.) Surveyed: 1875 to 1876 and published: 1880

Figure 3: OS map of the west side of the Mid Arun Valley and a current image from Google

Map taken from a copy of Sussex LXII (includes: Aldingbourne; Barnham; Eastergate; Walberton; Yapton.) Surveyed: 1875 to 1876 and published: 1880

1.5 HUMAN CONTEXT

Of relevance is the way in which the local people of Binsted, Walberton and Fontwell (all part of Walberton Parish) as well as Arundel residents, act as custodians of the landscape with a number of past and present projects.

Background

The Walberton Action Group (WAG) was founded in 1995 to achieve practical solutions to issues in ways that would complement the work of the Parish Council. Environmental issues were high on the agenda and it was one of the first parishes to complete a Phase 1 Habitat Survey (undertaken by 16 local community volunteers) in order to understand the environment and landscape. This base-line survey enabled projects to be targeted where most needed across the parish. The aim of the projects is to maintain and increase the wildlife value, and to enhance public knowledge and enjoyment of the area.

WAG dissolved in 2012 and the Walberton Task Force continued with the environmental work. In 2015 this ethos was formalised into the Mid Arun Valley Environmental Survey with aims to understand, conserve & enhance the environment. MAVES is recognised by Walberton Parish Council in its Neighbourhood Plan and it is seen locally as a successor to WAG's Walberton Parish Landscape & Wildlife Enhancement Project.

In Arundel, environmental interests have been developed in the community through Arundel Agenda 21 and through its associated Community Orchard Group at Herrington's Field Arundel, and the popularity of Arundel's Wildfowl and Wetlands Trust. Individuals with these interests have come together with the western villagers with environmental interests, with the support of the Sussex Wildlife Trust, to jointly form and develop MAVES as a community based environmental organisation.

Projects

The organisation of local people and interested parties into formal groups has resulted in the ability to target conservation and enhancement projects into areas of the highest benefit. Past projects include:

- 2003-2006 - Walberton and Binsted Parish landscape and wildlife enhancement project completed fourteen projects around Walberton, Fontwell and Binsted. Projects included tree planting, hedgerow planting removing invasive species from three ponds and pond surveys, footpath creation, putting benches in suitable spots for enjoyment and local talks on wildlife in the area.

- 2000-2002 - Binsted Book Group research and publication of 'Binsted & Beyond' (still in print). This gives community access to land use and environmental, historical and natural history information.

- 2002-2006 - Binsted and Walberton churchyard flora surveys leading to production of Binsted churchyard flora tea-towel (still on sale locally).

- 2005 – present - WAG litter-picking initiatives around the village footpaths, lanes and countryside.

- 2007 - WAG Binsted Wildflower Walks Booklet published.

- 2008 – WAG Bird Survey of Walberton and Binsted.

- 2015 – MAVES tree and hedge planting in with a grant from the Woodland Trust and a donation of additional plants from the Binsted Nursery.

- 2015 – MAVES planting Black Poplar trees in suitable locations around south Binsted.

Ongoing and future projects:

- The monitoring and eradication of the non-native and invasive species, particularly those listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) such as Indian Balsam *Impatiens glandulifera* and Parrot's-feather *Myriophyllum aquaticum* (on going).

- Plans to lay another section of hedge in the winter (2016 / 2017) along Muddy Lane.

- Extending current Dormouse monitoring and ultimately the understanding of how this mammal uses the landscape. This will involve the monitoring Lake Copse and the interconnecting hedgerow corridors around central and southern Binsted. The South Downs National Park (SDNP), local landowners and supporters of Peoples Trust for Endangered Species (PTES) have sponsored this.

- The purchase and erection of Barn Owl boxes in suitable locations across the Mid Arun Valley landscape (currently nesting in a converted barn in the centre of Binsted and a tractor shed at Lake Copse) and the potential inclusion in the Barn Owl Recovery Network. This was set up as a response to plummeting Barn Owl numbers from 12,000 breeding pairs in 1932 to 3,800 breeding pairs in 1985.

Education

The area supports such a diverse and varied assemblage of habitats that it lends itself to research projects. Undergraduate and post-graduate students from Brighton and Sussex universities routinely complete projects in the area.

2 METHODS

2.1 DESKTOP BIODIVERSITY SURVEY

Background information additional to the field survey regarding the present and historical ecological interest of the site and within a 1 km radius, was requested from the Sussex Biodiversity Records Centre (SxBRC).

2.2 HABITAT SURVEY

2.2.1 Phase 1 habitat survey

An Extended Phase 1 Habitat Survey was carried out in areas with landowner permission based on the standard methodology produced by the Joint Nature Conservation Committee (2010), and included searches for signs of protected species, as described in the Guidelines for Preliminary Ecological Assessment (IEEM, 2012). This involves habitat mapping using a set of standard colour codes to indicate habitat types on a Phase 1 Habitat Map (Appendix I). Due to time constraints, just the western side of the survey area has been mapped.

Plant nomenclature in this report follows Stace (2010) for native and naturalised species of vascular plant. Plant names in the text are given with English names first followed by the scientific name.

2.2.2 Notable tree survey

Notable, veteran and ancient trees were recorded when seen. Notable trees are large trees without veteran features or those that are showing the beginnings of veteran features. They are the next generation of veteran trees. Veteran trees are those that are displaying veteran features such as decay, decorticated wood, broken branches, splits, rot holes or hollowing. Ancient trees tend to have significant hollowing and may have a shrinking crown.

For rapidity of recording the trees have been categorised according to diameter at breast height (DBH), which generally serves as a good indication of age.

DBH - metres	Classification
1 – 1.4	Notable
1.5 – 1.6	Veteran
1.7 +	Ancient

2.2.3 Hedgerow assessment

A rapid assessment was carried out on the hedgerows throughout the landscape. This involves recording the average number of woody species present per 30 m stretch and the other features present.

To qualify as ‘important’, hedgerows need to have an average of seven species in a 30 m section; or an average of six woody species with three associated features; or five woody

species and four associated features. Associated features include less than 10 % gaps, banks, ditches, the presence of standard trees and of woodland ground flora.

'Ancient and / or species-rich hedgerows' as listed in Section 74 of the Countryside and Rights of Way Act 2000 (as amended) (JNCC, 2007), are those that have five native species in a 30 m section of hedge, though they may lack associated features.

2.3 PROTECTED SPECIES SURVEY

2.3.1 General

An assessment was made of habitat suitability for those protected vertebrates that occur in the region, and for habitats likely to support protected or notable invertebrate species. Obvious signs and incidental sightings of protected species would have been noted had they been encountered, but walkover surveys do not usually confirm species presence or absence.

Species names are given with the English name first followed by the scientific name, which is given just once. The scientific name only is used for species that lack an English name such as in the case of many invertebrates.

Taking into consideration the geographical region, available habitats and information from the Desktop Biodiversity Survey, species and groups that could be encountered are:

- Amphibians (including Great Crested Newt);
- Badger;
- Bats;
- Biodiversity Action Plan Species (e.g. Hare / Hedgehog);
- Breeding birds;
- Dormouse;
- Fish;
- Invertebrates;
- Otter;
- Reptiles; and
- Water Vole

2.3.2 Amphibians

Initial surveys centre on assessing breeding ponds within the area and identifying suitable terrestrial habitat. Great Crested Newt *Triturus cristatus* will disperse up to 500 m from breeding ponds (that are not isolated by unsuitable habitat or physical barriers). Additionally amphibians such as Common Toad *Bufo bufo* will habitually return to ancestral ponds to breed.

2.3.3 Badger

The area was searched for signs of Badger *Meles meles* including setts, foraging signs, paths (runs) and latrines.

2.3.4 Bats

Trees and buildings are assessed for their potential to house roosting bats and for possible access points. Bats will roost in cavities created by woodpeckers, rot or storm damage, but they prefer cavities that go upwards into the tree. In buildings they make use of internal undisturbed cavities and spaces beneath tiles.

Suitable bat foraging habitat includes areas where aerial invertebrates gather such as watercourses and damp and sheltered fields. Bats utilise hedgerows and tree-lines to access foraging grounds and to provide cover whilst foraging.

2.3.5 Biodiversity Action Plan species

The habitats on the site were assessed for the likelihood of presence for species of regional and national importance.

2.3.6 Breeding birds

Habitats were assessed for their suitability for nesting birds, giving consideration to factors such as cover, food, disturbance and habitat requirements. This could include ground-nesting species such as Skylark *Alauda arvensis* or those that nest in buildings such as House Sparrow *Passer domesticus*.

2.3.7 Dormouse

An initial assessment was carried out to identify areas that might be used by Dormouse *Muscardinus avellanarius*. Connectivity to other areas of woodland and habitat quality (such as the likely availability of flowers and fruit to provide food) is taken into account in order to consider the quality of the wider habitat for Dormouse.

2.3.8 Invertebrates

Habitats are assessed for their likelihood to support large numbers or less common invertebrates. Ideal habitats include species rich fen and meadow habitat, ponds and ditches with abundant water margin vegetation, ancient trees with dead wood and south facing partially vegetated banks.

2.3.9 Otter

Otter *Lutra lutra* is extremely elusive and so signs of Otter are searched for on and around the banks of suitable riparian habitat. Suitable habitat includes rivers, streams and ditches with a good vegetative cover of scrub and herbaceous vegetation. Holts (Otter dens) are sited within tree roots, holes in river banks and under piles of rocks. Other signs include spraint and footprints.

2.3.10 Reptiles

The area was assessed for reptiles, with particular attention paid to those features that could be used as basking areas (*e.g.* south-facing slopes), hibernation sites (*e.g.* banks and walls) and opportunities for foraging (rough grassland and scrub).

2.3.11 Water Vole

Water Vole *Arvicola amphibius* typically inhabits slow-moving streams, ditches, dykes and rivers and feed mostly on waterside vegetation. Should riparian habitats support dense water margin vegetation then these areas may support Water Vole.

2.4 Additional surveys and recording

A range of professional and amateur experts (some within recording societies such as the Sussex Botanical Recording Society), university students and locals undertook additional surveys and recorded ad-hoc sightings. All records by non-professionals have been verified by professionals before inclusion in this report and submission to the Sussex Biodiversity Records Centre.

2.5 Limitations

Walkover surveys were carried out in 2015 and 2016 by a suitably qualified ecologist Jacqueline Thompson BSc (Hons), MSc, MCIEEM. It should be noted that whilst every effort was made to provide a full and comprehensive assessment of the site, no survey of this type could ensure a complete evaluation of the natural environment, as it is only able to act as a ‘snapshot’ in time.

3 RESULTS

3.1 DESKTOP BIODIVERSITY SURVEY

The Sussex Biodiversity Record Centre provided much of the following information regarding the present and historical ecological data within the area.

For a summary of the legislation and the categories of threat referred to in this report please see Appendix III.

3.1.1 Protected species

Amphibians

- Great Crested Newt *Triturus cristatus*. Records were returned for this species in Lazy W Pond in Walberton.
- Common Toad *Bufo bufo* is a Biodiversity Action Plan species. There are records for this species in Walberton, Barnham and at the Madonna Pond at Binsted.

Bats

The data search returned records for the following bat species shown in Table 1

Table 1: Bat species recorded within the search area

Common Name	Scientific Name	Location
Bat sp.	*Chiroptera*	Walberton, Arundel, Lazy W, River Arun, Mill Ball Binsted
Serotine	*Eptesicus serotinus*	Lyminster, Binsted Woods, Binsted Wood Complex
Unidentified Bat	*Myotis*	St Mary's (Village Church), Walberton
Whiskered/Brandt's	*Myotis mystacinus/brandtii*	Land off Lyminster Road, Lyminster, Binsted Woods
Daubenton's Bat	*Myotis daubentonii*	Lyminster, River Arun near Ford, Binsted Woods
Natterer's Bat	*Myotis nattereri*	Binsted Wood Complex, Binsted Woods, near Lyminster
Noctule Bat	*Nyctalus noctula*	Binsted Wood Complex, near Lyminster, SE of Arundel
Pipstrelle sp.	*Pipistrellus*	St Mary Magdelene Church, Tortington, Walberton, Lyminster
Pipistrelle Bat (species aggregate)	*Pipistrellus pipistrellus*	Walberton, Arundel, Binsted Woods, Slindon, Arundel, Binsted Wood Complex, North of Lyminster
Soprano Pipstrelle (55 kHz)	*Pipistrellus pygmaeus*	Land off Lyminster Road, Lyminster, Binsted Woods
Nathusius's Pipistrelle	*Pipistrellus nathusii*	Land off Lyminster Road, Lyminster
Brown Long-eared Bat	*Plecotus auritus*	Walberton Church, Tortington, Rustington, Binsted Wood Complex
Long-eared sp.	*Plecotus*	Tortington, Paines Wood

Birds

Records were returned for 177 species of bird within the search area. 45 species are Birds of Conservation Concern (BoCC) Red List species and 51 are on the Amber List. 26 Red List and Amber List species and an additional 12 species are given the added protection of being listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as

amended). 149 species are protected under various European conventions, 36 species have Biodiversity Action Plans and 36 species are included in the Farm Environment Plan. These are shown in Table 2.

Table 2: Birds species recorded within the search area and their various designations

Common Name	Scientific Name	BoCC	Sch 1	EU DES	BAP	FEP
Avocet	*Recurvirostra avosetta*	Amber	✓	✓		✓
Bar-tailed Godwit	*Limosa lapponica*	Amber		✓		
Barn Owl	*Tyto alba*		✓	✓		✓
Barnacle Goose	*Branta leucopsis*	Amber		✓		✓
Bearded Tit	*Panurus biarmicus*		✓	✓		
Bewick's Swan	*Cygnus columbianus subsp.*	Amber	✓	✓	✓	
Bittern	*Botaurus stellaris*	Amber	✓	✓	✓	✓
Black Redstart	*Phoenicurus ochruros*	Red	✓	✓		
Black Swan	*Cygnus atratus*					
Black-headed Gull	*Chroicocephalus ridibundus*	Amber		✓		
Black-tailed Godwit	*Limosa limosa*	Red	✓	✓	✓	✓
Blackbird	*Turdus merula*			✓		
Blackcap	*Sylvia atricapilla*					
Blue Tit	*Cyanistes caeruleus*			✓		
Brambling	*Fringilla montifringilla*		✓			
Brent Goose	*Branta bernicla*	Amber		✓		✓
Bullfinch	*Pyrrhula pyrrhula*	Amber			✓	✓
Buzzard	*Buteo buteo*			✓		
Canada Goose	*Branta canadensis*			✓		
Carrion Crow	*Corvus corone*			✓		
Cetti's Warbler	*Cettia cetti*		✓			
Chaffinch	*Fringilla coelebs*					
Chiffchaff	*Phylloscopus collybita*					
Coal Tit	*Periparus ater*			✓		
Cockatiel	*Nymphicus hollandicus*					
Collared Dove	*Streptopelia decaocto*			✓		
Arctic Tern	*Sterna hirundo/paradisaea*	Amber				
Common Crossbill	*Loxia curvirostra*		✓	✓		
Common Gull	*Larus canus*	Amber		✓		
Common Sandpiper	*Actitis hypoleucos*	Amber		✓		
Common Shelduck	*Tadorna tadorna*			✓		
Common Tern	*Sterna hirundo*	Amber		✓		
Coot	*Fulica atra*			✓		
Cormorant	*Phalacrocorax carbo*			✓		
Corn Bunting	*Emberiza calandra*	Red			✓	✓
Corncrake	*Crex crex*	Red	✓	✓	✓	✓
Crane	*Grus grus*	Amber		✓		
Cuckoo	*Cuculus canorus*	Red			✓	
Curlew	*Numenius arquata*	Red		✓	✓	✓
Dartford Warbler	*Sylvia undata*	Red	✓	✓		✓
Dunlin	*Calidris alpina*	Amber		✓		✓
Dunnock	*Prunella modularis*	Amber		✓	✓	
Eider	*Somateria mollissima*	Amber		✓		

Common Name	Scientific Name	BoCC	Sch 1	EU DES	BAP	FEP
Fieldfare	*Turdus pilaris*	Red	✓	✓		
Firecrest	*Regulus ignicapilla*		✓	✓		
Gadwall	*Anas strepera*	Amber		✓		
Garden Warbler	*Sylvia borin*		□	□		
Garganey	*Anas querquedula*	Amber	✓	✓		
Glossy Ibis	*Plegadis falcinellus*			✓		
Goldcrest	*Regulus regulus*			✓		
Golden Oriole	*Oriolus oriolus*	Red	✓	✓		
Golden Pheasant	*Chrysolophus pictus*			✓		
Golden Plover	*Pluvialis apricaria*			✓		
Goldeneye	*Bucephala clangula*	Amber	✓	✓		
Goldfinch	*Carduelis carduelis*			✓		
Goosander	*Mergus merganser*			✓		
Grasshopper Warbler	*Locustella naevia*	Red			✓	
Great Black-backed Gull	*Larus marinus*	Amber		✓		
Great Crested Grebe	*Podiceps cristatus*			✓		
Great Spotted	*Dendrocopos major*			✓		
Great Tit	*Parus major*			✓		
Great White Egret	*Ardea alba*			✓		
Green Sandpiper	*Tringa ochropus*	Amber	✓	✓		
Green Woodpecker	*Picus viridis*			✓		
Greenfinch	*Carduelis chloris*			✓		
Greenshank	*Tringa nebularia*	Amber	✓	✓		
Grey Heron	*Ardea cinerea*			✓		
Grey Partridge	*Perdix perdix*	Red		✓	✓	✓
Grey Wagtail	*Motacilla cinerea*	Red		✓		
Greylag Goose	*Anser anser*	Amber	✓	✓		
Herring Gull	*Larus argentatus*	Red		✓	✓	
Hobby	*Falco subbuteo*		✓	✓		
Honey-buzzard	*Pernis apivorus*	Amber	✓	✓		
House Martin	*Delichon urbicum*	Amber		✓		
House Sparrow	*Passer domesticus*	Red			✓	
Jack Snipe	*Lymnocryptes minimus*			✓		
Jackdaw	*Corvus monedula*			✓		
Jay	*Garrulus glandarius*			✓		
Kestrel	*Falco tinnunculus*	Amber		✓		✓
Kingfisher	*Alcedo atthis*	Amber	✓	✓		✓
Lapwing	*Vanellus vanellus*	Red		✓	✓	✓
Leach's Petrel	*Oceanodroma leucorhoa*		✓	✓		
Lesser Black-backed Gull	*Larus fuscus*	Amber		✓		
Lesser Redpoll	*Acanthis cabaret*	Red			✓	
Lesser Spotted	*Dendrocopos minor*	Red		✓	✓	✓
Lesser Whitethroat	*Sylvia curruca*					
Linnet	*Linaria cannabina*	Red		✓	✓	✓
Little Egret	*Egretta garzetta*			✓		
Little Grebe	*Tachybaptus ruficollis*			✓		
Little Owl	*Athene noctua*			✓		
Little Ringed Plover	*Charadrius dubius*		✓	✓		
Long-eared Owl	*Asio otus*			✓		

Common Name	Scientific Name	BoCC	Sch 1	EU DES	BAP	FEP
Long-tailed Tit	*Aegithalos caudatus*					
Magpie	*Pica pica*			✓		
Mallard	*Anas platyrhynchos*	Amber		✓		
Mandarin Duck	*Aix galericulata*			✓		
Marsh Harrier	*Circus aeruginosus*	Amber	✓	✓		✓
Marsh Tit	*Poecile palustris*	Red		✓	✓	
Meadow Pipit	*Anthus pratensis*	Amber		Y		
Mediterranean Gull	*Larus melanocephalus*	Amber	✓	✓		
Merlin	*Falco columbarius*	Red	✓	✓		✓
Mistle Thrush	*Turdus viscivorus*	Red		✓		
Mistle Thrush	*Turdus viscivorus*	Red		✓		
Moorhen	*Gallinula chloropus*			✓		
Muscovy Duck	*Cairina moschata*					
Moorhen	*Gallinula chloropus*			✓		
Muscovy Duck	*Cairina moschata*					
Mute Swan	*Cygnus olor*	Amber		✓		
Nightingale	*Luscinia megarhynchos*	Red		✓		
Nightjar	*Caprimulgus europaeus*			✓	✓	✓
Nuthatch	*Sitta europaea*			✓		
Oystercatcher	*Haematopus ostralegus*	Amber		✓		
Pale-bellied Brent Goose	*Branta bernicla hrota*					
Peregrine	*Falco peregrinus*		✓	✓		
Pheasant	*Phasianus colchicus*			✓		
Pied Flycatcher	*Ficedula hypoleuca*	Red		✓		
Pied Wagtail	*Motacilla alba*			✓		
Pintail	*Anas acuta*	Amber	✓	✓		
Pochard	*Aythya ferina*	Red		✓		
Purple Heron	*Ardea purpurea*		✓	✓		
Quail	*Coturnix coturnix*	Amber	✓	✓		
Raven	*Corvus corax*					
Red Kite	*Milvus milvus*	Red	✓	✓		✓
Red-backed Shrike	*Lanius collurio*	Red	✓	✓	✓	
Red-breasted Merganser	*Mergus serrator*			✓		
Red-legged Partridge	*Alectoris rufa*			✓		
Redshank	*Tringa totanus*	Amber		✓		✓
Redstart	*Phoenicurus phoenicurus*	Red		✓		
Redwing	*Turdus iliacus*	Red	✓	✓		
Reed Bunting	*Emberiza schoeniclus*	Amber		✓	✓	✓
Reed Warbler	*Acrocephalus scirpaceus*					
Ring Ouzel	*Turdus torquatus*	Red		✓	✓	✓
Ringed Plover	*Charadrius hiaticula*	Red		✓		
Robin	*Erithacus rubecula*			✓		
Rock Dove	*Columba livia*			✓		
Rook	*Corvus frugilegus*			✓		
Sand Martin	*Riparia riparia*			✓		
Sanderling	*Calidris alba*	Amber		✓		
Sedge Warbler	*Acrocephalus schoenobaenus*					
Shoveler	*Anas clypeata*	Amber		✓		
Siskin	*Spinus spinus*			✓		

Common Name	Scientific Name	BoCC	Sch 1	EU DES	BAP	FEP
Skylark	*Alauda arvensis*	Red		✓	✓	✓
Smew	*Mergellus albellus*	Amber		✓		
Snipe	*Gallinago gallinago*	Amber		✓		✓
Song Thrush	*Turdus philomelos*	Red		✓	✓	✓
Sparrowhawk	*Accipiter nisus*			✓		
Spotted Flycatcher	*Muscicapa striata*	Red		✓	✓	✓
Spotted Redshank	*Tringa erythropus*	Amber		✓		
Starling	*Sturnus vulgaris*	Red		✓	✓	✓
Stonechat	*Saxicola rubicola*			✓		
Swallow	*Hirundo rustica*			✓		
Swift	*Apus apus*	Amber				
Tawny Owl	*Strix aluco*	Amber		✓		
Teal	*Anas crecca*	Amber		✓		
Tree Pipit	*Anthus trivialis*	Red		✓	✓	
Tree Sparrow	*Passer montanus*	Red			✓	✓
Treecreeper	*Certhia familiaris*	Amber		✓		
Tufted Duck	*Aythya fuligula*			✓		
Tufted Duck	*Aythya fuligula*			✓		
Turnstone	*Arenaria interpres*	Amber		Y		
Turtle Dove	*Streptopelia turtur*	Red		✓	✓	✓
Water Pipit	*Anthus spinoletta*	Amber		✓		
Water Rail	*Rallus aquaticus*			✓		
Wheatear	*Oenanthe oenanthe*			✓		
Whimbrel	*Numenius phaeopus*	Red	✓	✓		
Whinchat	*Saxicola rubetra*	Red		✓		
White-fronted Goose	*Anser albifrons*	Red		✓	✓	
Whitethroat	*Sylvia communis*					
Wigeon	*Anas penelope*	Amber		✓		
Willow Tit	*Poecile montana*	Red		✓	✓	✓
Willow Warbler	*Phylloscopus trochilus*	Amber				
Wood Sandpiper	*Tringa glareola*	Amber	✓	✓		
Wood Warbler	*Phylloscopus sibilatrix*	Red			✓	
Woodcock	*Scolopax rusticola*	Red		Y		
Woodlark	*Lullula arborea*		✓	✓	✓	✓
Woodpigeon	*Columba palumbus*			✓		
Wren	*Troglodytes troglodytes*			✓		
Wryneck	*Jynx torquilla*		✓	✓	✓	
Yellow Wagtail	*Motacilla flava*	Red		✓	✓	✓
Yellow-browed Warbler	*Phylloscopus inornatus*					
Yellowhammer	*Emberiza citrinella*	Red		✓	✓	✓

Mammals

The following records were returned for protected and Biodiversity Action Plan mammal species.

- West European Hedgehog *Erinaceus europaeus*. Records were returned from around the Binsted Wood Complex, Arundel, in and around Walberton, Fairmile, Slindon, Wick and Lyminster.

- Water Vole *Arvicola amphibious* has been recorded in Arundel, around Binsted Rife, the golf course, Tortington Priory, Black Ditch Lyminster, Poling, Ford and Arundel.
- Brown Hare *Lepus europaeus* has been recorded in the arable fields to the north-east of Yapton.
- Hazel Dormouse *Muscardinus avellanarius*. Paines Wood and Ash Piece within the Binsted Wood Complex, and part of the Rewell Wood Complex are part of the National Dormouse Monitoring Programme (NDMP) and therefore there is a history of Dormice in the area with abundant records. This species has also been recorded in Yapton and a hedgerow near Walberton.
- Harvest Mouse *Micromys minutus*. This species has been recorded in the Binsted Wood Complex (including in a Dormouse box) and the Rewell Wood Complex.

Invertebrates

A total of 169 rare and threatened invertebrates were returned from the BDS. This included a wide range of groups such as wasps, bees, ants, sawflies, true flies, beetles bugs, spiders, moths, butterflies and molluscs. Of these, 72 species are Nationally Scarce, 31 are listed in the Red Data Book and 12 have a Biodiversity Action Plan.

Beetles

Records were returned for 32 species of beetle of which 17 are Nationally Scarce. A further 5 are Red Data Book species. Several of the rare and threatened beetles returned are aquatic species such as *Gyrinus urinator* listed on the Sussex Rare Species Inventory (SxRSI) and *Ochthebius (Hymenodes) nanus* (Nationally Scarce).

Butterflies

Four species listed in the Red Data Book are in the area. The Pearl-bordered Fritillary *Boloria euphrosyne* which is listed as Endangered (E); the Small Pearl-bordered Fritillary Boloria selene and the Purple Emperor *Apatura iris*, both listed as Near Threatened (NT); and the Brown Hairstreak *Thecla betulae* which is listed as Vulnerable (V).

Moths

A total of 49 rare and threatened moth species were returned in the BDS. This included 5 Nationally Scarce species, and two Red Data Book species Scarce Merveille du Jour *Moma alpium* and the Triangle *Heterogenea asella*, which are both listed as Rare. A further four species have BAP's.

Dragonflies and damselflies

The BDS returned two species of dragonfly and one damselfly, all of which are associated with the floodplain grassland and ditches. The Variable Damselfly *Coenagrion pulchellum* is a Red Data Book species (NT) as is the Common Club-tail *Gomphus vulgatissimus.* The Downy Emerald *Cordulia aenea* is listed on the SxRSI.

Fish

The European Eel, which is a BAP species, has been recorded in Lake Copse at Binsted and the Black Ditch at Lyminster.

Reptiles

Records were returned for the following species of reptiles. These have all declined dramatically and are therefore given protection wherever they occur.

- Adder *Vipera berus*. Recorded in Binsted Wood Complex, in Binsted and Paines Wood and Walberton.
- Grass Snake *Natrix natrix*. Records for the Madonna Pond, Binsted, Binsted Wood Complex, Walberton and Arundel.
- Slow-worm *Anguis fragilis.* Recorded in Binsted and Paines Wood, Binsted Wood Complex, Slindon Common, Slindon Sandpit, Yapton, Lyminster and Arundel.
- Common Lizard *Zootoca vivipara*. Records for Binsted and Paines Wood, Binsted Wood Complex, Lyminster and Slindon Common.

3.1.2 Plant species

Records were returned for 39 species of flowering plant that have some form of protection / rarity status (Table 3). 16 species are listed in the Red Data Book, of which Corn Buttercup *Ranunculus arvensis* is classed as Critical. 3 species are listed as Nationally Rare and 13 species are Nationally Scarce. 5 species have Biodiversity Acton Plans and all are listed on the SxRSI.

Table 3: Rare plant species in the area showing their status of threat

Common Name	Latin name	Location	National Status	IUCN RDB	BAP	FEP
Arum	*Arum italicum subsp. neglectum*	Arundel, Binsted	NS	NT		
Box	*Buxus sempervirens*	Binsted Wood Complex, Arundel Park, Furzefield Copse, Tortington	NR	DD		✓
Broad-leaved Osier	*S. x smithiana*	Barnham				✓
Broad-leaved Spurge	*Euphorbia platyphyllos*	Lyminster area				✓
Club-rush	*S. x kuekenthalianus*	Arun near Arundel	NR	VU		
Corn Buttercup	*Ranunculus arvensis*	Tortington Common		CR	✓	✓
Corn Chamomile	*Anthemis arvensis*	Ford, Binsted Woods,		EN		✓
Corn Parsley	*Petroselinum segetum*	Arundel, Warningcamp, near Crossbush, Barnham				✓
Corncockle	*Agrostemma githago*	Lyminster area, Barnham, Ford				✓
Cornflower	*Centaurea cyanus*	Ford			✓	✓
Divided Sedge	*Carex divisa*	Tortington, Ford, Arun south of Arundel	NS	VU	✓	
Frogbit	*Hydrocharis morsus-ranae*	East of Arundel		VU		
Greater Water-parsnip	*Sium latifolium*	South of Arundel	NS	EN	✓	
Green Figwort	*Scrophularia umbrosa*	Tortington Common				
Hairlike Pondweed	*Potamogeton trichoides*	Lyminster, Tortington Brooks				
Hay-scented Buckler-fern	*Dryopteris aemula*	Binsted Wood Complex				
Heath Cudweed	*Gnaphalium sylvaticum*	Rewell Wood Complex, Arundel		EN		
Ivy-leaved Crowfoot	*Ranunculus hederaceus*	Binsted Wood Complex				
Large-leaved Lime	*Tilia platyphyllos*	Fairmile Bottom	NS			✓
Lesser Butterfly-orchid	*Platanthera bifolia*	Rewell Wood		VU	✓	
Long-stalked Yellow-sedge	*Carex viridula* subsp. *brachyrrhyncha*	Scotland Lane, Binsted Woods				
Marsh-mallow	*Althaea officinalis*	Banks of Arun	NS			

Common Name	Latin name	Location	National Status	IUCN RDB	BAP	FEP
Narrow-leaved Everlasting-pea	*Lathyrus sylvestris*	Tortington area				
Oak-leaved Goosefoot	*Chenopodium glaucum*	Rewell Wood Complex	NS	VU		
Opposite-leaved Pondweed	*Groenlandia densa*	Arundel, Black Ditch, Lyminster		VU		
Round-headed Rampion	*Phyteuma orbiculare*	South-east of Arundel	NS			
Royal Fern	*Osmunda regalis*	Binsted Park, Binstead				
Sea Clover	*Trifolium squamosum*	Binsted Wood Complex	NS			
Small Cudweed	*Filago minima*	Nr Slindon, Rewell Wood Complex				
Small Teasel	*Dipsacus pilosus*	Rewell Wood Complex, Tortington area, banks of Arun				
Small Water-pepper	*Persicaria minor*	Lyminster South, Tortington Brooks		VU		
Smooth Cat's-ear	*Hypochaeris glabra*	Coates Common		VU		
Stinking Hellebore	*Helleborus foetidus*	SE of Arundel, Rewell Wood Complex	NS			
Tasteless Water-pepper	*Persicaria mitis*	Rewell Wood Complex	NS	VU		
Water Avens	*Geum rivale*	Binsted and Paines Wood				
Water-soldier	*Stratiotes aloides*	Sandy Hole pond	NR	NT		
Welsh Poppy	*Meconopsis cambrica*	North of Tortington	NS			
White Mullein	*Verbascum lychnitis*	Danes Wood, Rewell Wood Complex	NS			
Woad	*Isatis tinctoria*	Lyminster	NS			

3.1.3 Sites of Local or National importance

There is one statutory designated nature conservation site and three non-statutory designated sites within 2 km of the area. Two other sites of relevance are included and shown in Table 6.

Statutory designated sites

Sites of Special Scientific Interest are areas notified under the Wildlife and Countryside Act 1981 as being of special interest for nature conservation. They are the finest sites for wildlife and natural features supporting many characteristic, rare and endangered species, habitats and natural features. One SSSI is located within 2 km as shown in Table 4 below.

Table 4: Statutory designated sites

Site Name	Grid Ref.	Area (Ha)	Reason for Designation
Arundel Park SSSI	TQ 015082	140.46	An old deer park consisting of a series of spurs and deep dry valleys on the upper chalk of the South Downs. One of the most important sites in the country for invertebrates; supports a particularly diverse breeding bird community and is important for overwintering species; and has a number of chalk grassland plants that are rare in Sussex.

Non-statutory designated sites

Local Wildlife Sites (formally known as Site of Nature Conservation Importance (SNCI)) are non-statutory designations, which are identified at a county level. They typically form a network of sites that are recognised of being of conservation importance locally and are often included in Local Authority development plans. There are three SNCI's within the search area as shown in Table 5 below.

Table 5: Non-statutory designated sites

Site Name	Grid Ref.	Area (Ha)	Reason for Designation
Binsted Wood Complex LWS	SU995068	217.3	A large complex of woodland sites to which Tortington Common was added in 2003. A mixture of ancient woodland, conifer plantation and species-rich pasture with a rich and diverse flora including a high number of Ancient Woodland Indicator Species, orchids in their hundreds and rare and threatened invertebrates.
Rewell Wood Complex LWS	SU985080	678.7	A large ancient woodland complex lying on two distinct geological formations, Upper Chalk and Valley Gravel. The vegetation is reflective of the geology with calcicoles and calcifuges. There is diversity of habitats including disused gravel pits which are of entomological importance. Wide glades support a rich flora and butterfly fauna.
Arun Valley LWS	TQ020070 to TQ022156	782.3	Extending south from Watersfield to Arundel the River and its floodplain form an extensive network of wetlands, supporting many rare and declining species. The wet grassland is important for breeding and wintering waders and wildfowl. The unimproved meadows of Watersfield Brooks are of great botanical interest and the network of ditches support rare and declining plants, dragonflies, beetles and snails.

Table 6: Other important sites

Site Name	Grid Ref.	Reason for Designation
Slindon Common Gravel Pit	SU979073	This is a Local Geological Site. It is a disused sand and gravel quarry exposing Middle Pleistocene raised beach deposits in faces up to 3 m high, mostly Eartham Formation solifluction deposits with flint gravels.
Arundel Wetland Centre	TQ021080	The wetland centre supports significant numbers native and non-native threatened species of bird in its large area of reedbed and wetland habitat. It also has a thriving population of Water Voles.

3.1.4 Priority habitats and connectivity

Priority habitats (and species) are those that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP).

The proposed dual carriageway would have an impact on ten out of the eleven different types of UK BAP priority habitat (Table 7), of which some are shown in the Habitat and Natural Features map (Figure 4). Priority habitats not shown here are the numerous hedgerows, notable trees, additional swamp, fen and reedbed habitat and an additional orchard, all of which have been found and mapped in recent surveys; these are shown in the Phase 1 Habitat Map in Appendix 1. The hedgerows, notable trees and to an extent, the swamp and reedbed habitat are throughout the area providing corridors and connectivity throughout the landscape.

When the extent of the priority habitats is viewed in combination with the land in agri-environment schemes (Figure 5), this shows the total extent of the good quality habitat in the Mid Arun Valley area.

Agri-environment schemes vastly increase the carrying capacity for protected species compared to intensively farmed land. The land in agri-environment schemes links directly to land in agri-environment schemes to the south and the west, as well as a continuation of UK BAP priority habitat to the north and south providing connectivity of wildlife habitat throughout the landscape.

The land not in agri-environment schemes west of the River Arun is not generally intensively farmed, but much of it is in smallholdings and under conservation grazing or hay meadow management or in traditional orchards or woodland of conservation value. East of the Arun, the land not in agri-environment schemes is managed with sensitivity to its wildlife such as breeding Lapwing and Water Voles.

In addition, this land is in proximity to the Arun Valley Local Wildlife Site, the Arundel Park SSSI and the Arundel Wetlands Centre providing 'stepping stones' for a number of rare and threatened species. Apart from the range of important habitats within the Mid Arun Valley area, the proximity to other important habitats contributes to the superb diversity of species found. These areas and the reserves, when considered as a whole, form an important landscape for wildlife, and each component area is required to sustain the high species diversity within the landscape.

Figure 3: Map of habitats and natural features (courtesy of SxBRC)

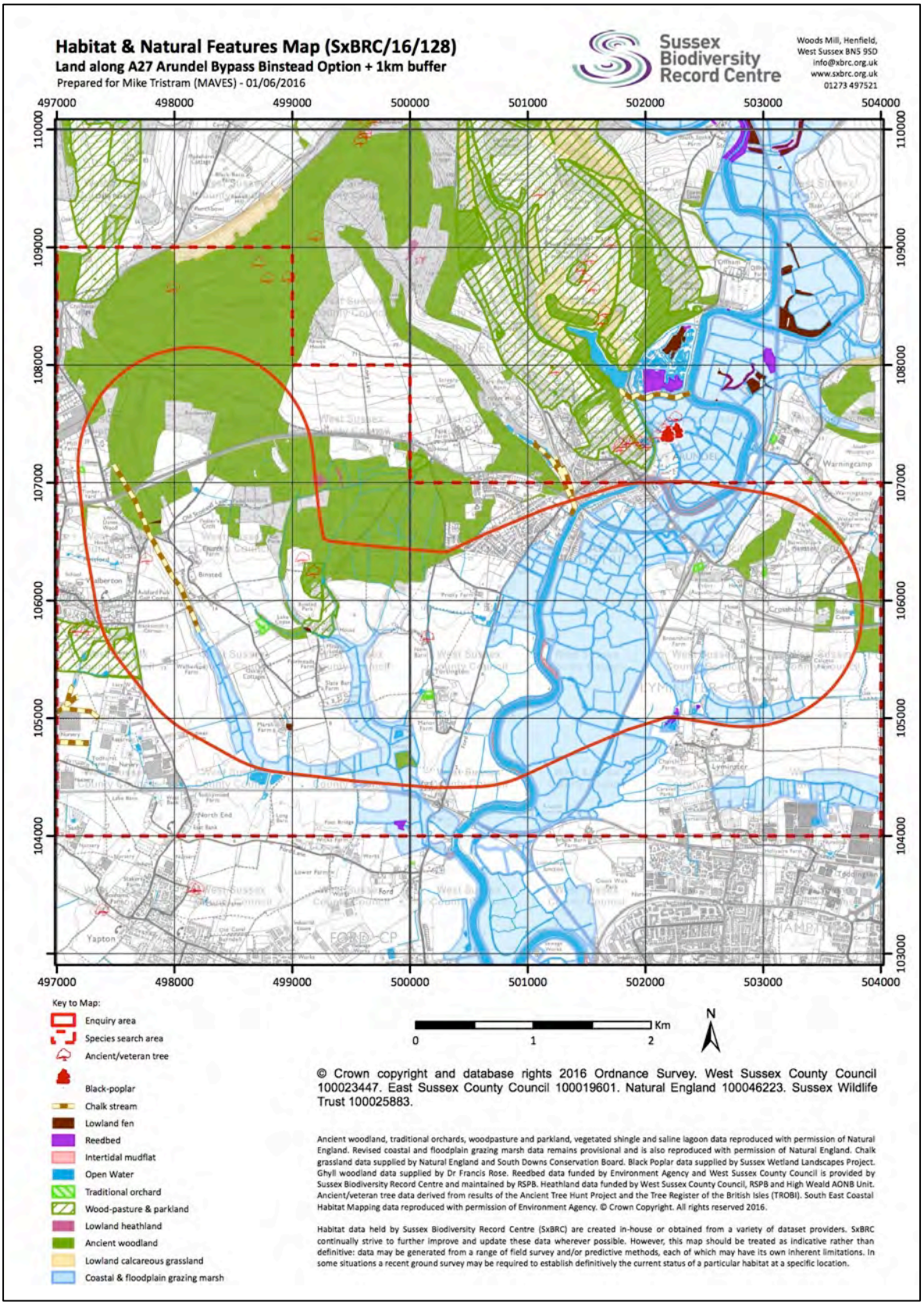
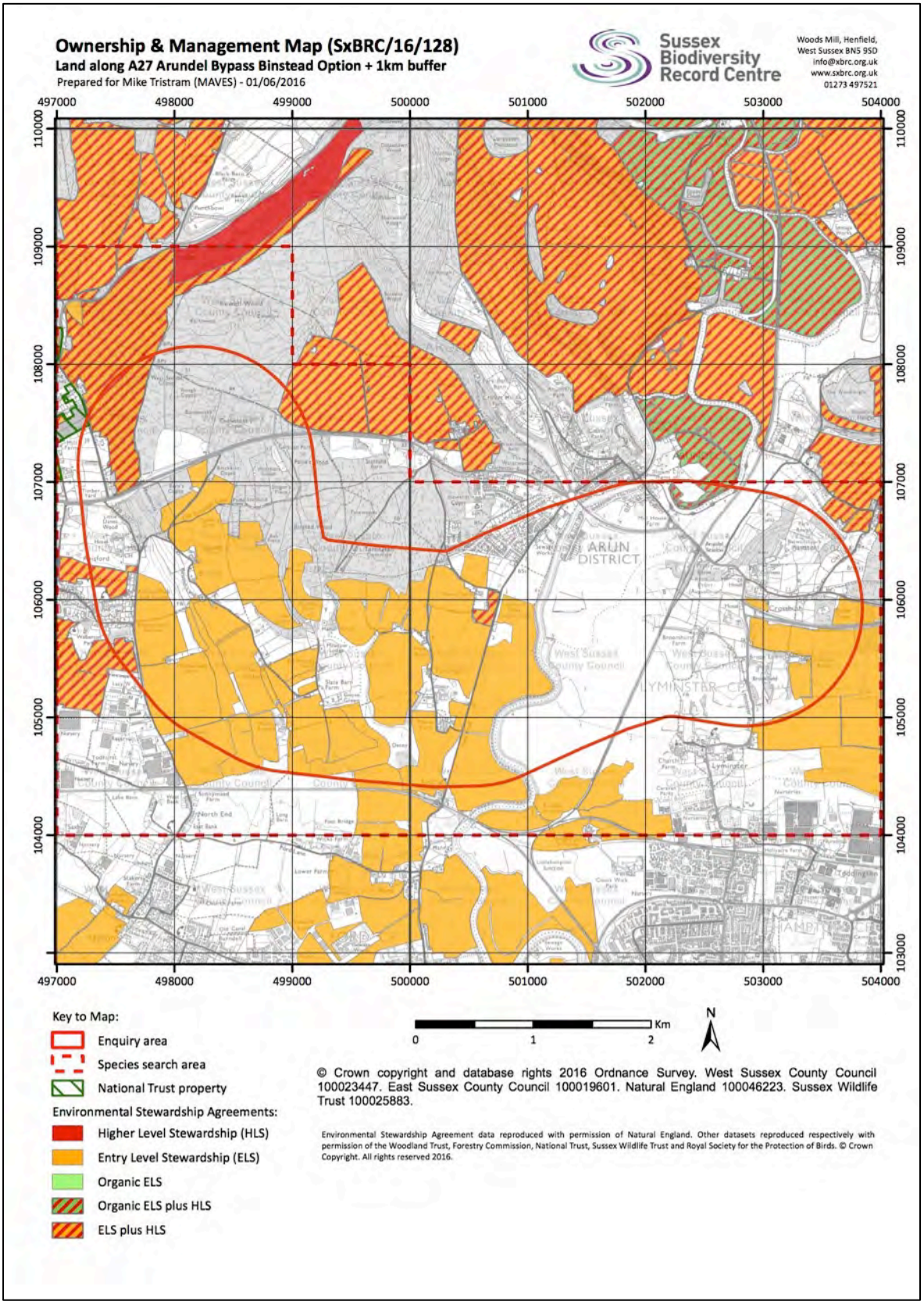


Table 7: Priority habitats in the Mid Arun Valley area

Habitiat	Description
Arable field margins	The field margin is the area between the crop and the field boundary providing a vital haven for the many farmland species that have declined over recent years due to agricultural intensification. Tall vegetation offers cover for a range of species such as small mammals and birds, and the flowering plants provide a nectar source for a range of invertebrates.
Chalk stream	A chalk river or stream is a watercourse that flows across chalk bedrock, and/or is influenced by local chalk geology. All chalk rivers are fed from groundwater aquifers, which means they have clean, clear water and relatively stable water temperatures. These unique conditions support a rich diversity of wildlife including important fish populations such as Brown Trout, native Crayfish and many other specialist species. Binsted Rife is a chalk stream.
Coastal and floodplain grazing marsh	Grazing marsh is periodically inundated pasture, with ditches that maintain the water levels, containing standing brackish or fresh water. Sites may contain seasonal water-filled hollows and permanent ponds with emergent swamp communities. This habitat is important for wading birds and the drainage ditches support a wide range of flowering plants and invertebrates as well as a number of fish species. Mammals such as Water Vole and Otter may use the ditches. The aims of the Sussex Biodiversity Action Plan for this habitat include maintaining the condition and the extent of the existing resources of coastal and floodplain grazing marsh in Sussex with no net loss.
Fens	Lowland fens are permanently waterlogged wetlands which receive water and nutrients from soil, rock and groundwater as well as rainfall. This habitat supports a wide diversity of flowering plants and associated invertebrates, as seen along Binsted Rife. It has declined dramatically.
Hedgerows	The UK Biodiversity Action Plan (2007) defines a hedgerow as any boundary line of trees or shrubs over 20 m long and less than 5 m wide, and where any gaps between the trees or shrub species are less than 20 m wide. All hedgerows consisting predominantly (i.e. 80 % or more cover) of at least one woody UK native species are included in this priority habitat. Specific aims for this priority habitat include maintaining the net extent of hedgerows and the numbers of hedgerow trees.
Lowland mixed deciduous woodland	Lowland mixed deciduous woodland now only covers 1-2 % of its original range and has declined by around 40 % since 1935. These woodlands are home to almost half of the world's Bluebells and are important for wide range of birds including Nightingales and Spotted Flycatchers as well as hibernating amphibians and reptiles. It is also the main stronghold of the protected Dormouse, once widespread, but now extinct from around half of its former haunts. Sussex is one of the most wooded parts of lowland Britain with ancient woodland covering approximately 10 % of the county. Much of this woodland is ancient in origin with a continuous woodland cover since at least 1600 AD. Such woodland has a wealth of features of historical and archaeological importance little altered by modern cultivation or disturbance. The soils retain their ancient features such as mycorrhizal fungi and the diversity of fungi, bryophytes, plants and invertebrates can be exceptionally rich. The BAP mainly focuses on the protection, expansion and restoration of woodlands in Sussex.
Lowland heathland	Heathland is a largely open landscape occurring on impoverished, acidic soils and is often a mosaic of bare ground, acid grassland, gorse, bracken, bog and scattered trees. A diversity of invertebrates is found with rare species including wasps, beetles and spiders. Several uncommon birds thrive on heathland including Nightjar and Stonechat.
Ponds	Ponds are important because they have declined in number, and yet they are home to over 1000 native species. Priority ponds are those that have habitats or species of high conservation importance, or they may be recognised for their age, rarity or type.
Reedbed	Reedbeds are amongst the most important habitats for birds in the UK. They support a distinctive breeding bird assemblage including 6 nationally rare Red List Birds including Bittern, Marsh Harrier, Cetti's Warbler and Bearded Tit. They provide roosting and feeding sites for migratory species and are used as roost sites for several raptor species in winter. Five GB Red Data Book invertebrates are also closely associated with reedbeds including Red Leopard Moth *Phragmataecia castanaea* and a rove beetle *Lathrobium rufipenne*.

Habitiat	Description
Traditional orchard	Traditional orchards are areas of land on which a range of fruit trees are managed in a low intensity way. The bark is suitable for a wide range of bryophytes and lichens and the dead and decaying wood is important for invertebrates and fungi. Holes and crevices in old trees provide habitat for bats and nest sites for birds such as Redstart and Bullfinch.
Wood pasture and parkland / veteran trees	Many parks were established in medieval times for aesthetic reasons, to provide grazing for farm animals or deer and to provide wood from pollarded trees. In later centuries, new landscaped parks were created from these medieval parks or by enclosing ordinary farmland. Typically wood pasture consists of veteran trees with wide, spreading crowns growing in a matrix of grazed grassland. The trees have often been pollarded; this management technique extends their life and creates rot holes and crevices, which are used by bats, hole-nesting birds and invertebrates. Rotten wood within ancient tree trunks supports saproxylic invertebrates (those that rely on dead wood for all or part of their life cycle) and are amongst the most threatened group of species in Europe.

Figure 4: Land in agri-environement schemes (courtesy of SxBRC)



3.2 HABITATS AND FEATURES

The following habitats and features will be directly impacted upon:

- ancient semi-natural woodland;
- arable field margins;
- grassland;
- hedgerows;
- notable and veteran trees;
- orchard;
- plantation woodland;
- ponds;
- river corridors, small streams and ditches;
- ruderals and scrub;
- scattered trees and tree-lines; and
- swamp, fen and reedbed.

Habitats are shown on Phase 1 Habitat Map in Appendix I.

3.2.1 Ancient semi-natural woodland

Binsted Woods is a complex of woodland sites and the largest section of the largest area of broad-leaved woodland along the Sussex coastal plain. The site supports ancient woodland, conifer plantation, species-rich pasture and ancient tracks. This mixture of habitats coupled with the geology has resulted in the extremely diverse flora resulting in its LWS (formerly SNCI) designation.

The woodland varies greatly in nature, though the main National Vegetation Communities found in the areas surveyed at the western end of the woodland block were W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland and W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland with a small pocket of W16 *Quercus* spp. – *Betula* spp. – *Deschampsia flexuosa* woodland occurring locally in an area with a more acidic substrate. The main canopy species are Pedunculate Oak *Quercus robur* and Ash *Fraxinus excelsior* with localised stands of tall Birch *Betula* spp. and occasional Beech *Fagus sylvatica* and Hornbeam *Carpinus betulus*. The structure of the woodland is extremely variable with a shrub layer sometimes dominated by over-stood coppiced Hazel *Corylus avellana* with Sweet Chestnut *Castanea sativa* in places or with dense thickets of Holly *Ilex aquifolium* and even vigorous growth of Field Maple *Acer campestre*.

The field layer is dissected by streams, banks, craters and ancient tracks and is, in places, breathtakingly diverse, particularly around Furzefield Copse and the western end of the woodland, extending into Ash Piece. Stands of Bluebells *Hyacinthoides non-scripta* are intermixed with a great variety of woodland plants including less common species such as Southern Wood-rush *Luzula forsteri* and Orpine *Sedum telephium* as well as a range of species indicative of ancient woodland. A 1992 assessment by the Environmental Advisory Unit Ltd. noted that over 250 plant species had been found in the past, with the wooded areas holding between 150 and 170 plant species. This was put to the test in 2015 by recorders from the Sussex Botanical Recording Society who found a total of 261 native species, which includes 53 Ancient Woodland Indicator species (past surveys have

found 52). The 1992 assessment also commented on the diversity of sedges found along Old Scotland Lane with 11 species found. So far, 14 species have been found in the woodland with 9 along Old Scotland Lane. It had also been reported on the SNCI citation that Early-purple Orchids *Orchis mascula* occur in remarkable abundance, and these were recorded in their hundreds in 2015.

More robust species in the field layer include ten species of ferns from a variety of habitats including Narrow Buckler-fern *Dryopteris carthusiana* found in wet woodland and fens; Soft Shield-fern *Polystichum setiferum*, which is a moderate calcicole; and Polypody *Polypodium vulgare*, a rhizomatous species of well-drained, predominantly acidic substrates.

There is great variation in the size classes of trees, but there are some stands dominated by mature Pedunculate Oak *Quercus robur* (with a diameter of 0.9 m – 1 m) and some ancient Ash *Fraxinus excelsior* and Sweet Chestnut *Castanea sativa* coppice stools as well as a scatter of notable, ancient and veteran trees throughout, but particularly frequent around Lake Copse and The Shaw where Pedunculate Oak *Quercus robur* and Ash *Fraxinus excelsior* trees frequently have a trunk diameter of over 1.4 m.

A number of areas within the Binsted woodland complex hold Tree Protection Orders (TPO's) including a block in Little Danes Wood, one at Brickkiln Piece and a number of areas around Steward's Copse.

3.2.2 Ancient woodland remnants and shaws

Wooded corridors (shaws) radiate out from the Binsted Wood Complex across the surrounding countryside and, on occasion, these widen into small pockets of woodland. These areas of woodland are likely to be ancient in origin and can be seen on the 1880 OS map (Figures 2 & 3, pages 13 & 14). Many support a diverse assemblage of native species and good numbers of mature / bordering notable Oaks *Quercus robur.* Some are associated with ditches and watercourses and have wet flushes with localised growth of Grey Willow *Salix cinerea* and a wetland ground flora. These wooded areas tend to have a good shrub layer and a high number of Ancient Woodland Indicators such as Butcher's-broom *Ruscus aculeatus*, Pignut *Conopodium majus*, Primrose *Primula vulgaris* and Hart's-tongue *Phyllitis scolopendrium.*

These woodlands are important reservoirs of woodland species and this enables colonisation of such species in the young blocks of woodland. These wooded areas tend to have the structure and diversity necessary to support small populations of Dormouse. They serve as habitat linkages / green corridors and provide nesting habitat for farmland birds. In 2016 three Nightingales were heard singing in the once such area of woodland at SU 9976 0587.

3.2.3 Arable fields margins

Many of the arable fields have wide margins of up to 20 m supporting a good range of vegetation. Some areas have tall rough grassland with robust plants such as Cow Parsley *Anthriscus sylvestris* and Common Nettle *Urtica dioica*. Other areas support a good range of smaller grassland herbs such as Smooth Tare *Vicia tetrasperma*, White Clover *Trifolium repens*, Cut-leaved Crane`s-bill *Geranium dissectum*, Common Mouse-ear *Cerastium fontanum*, Lesser Stitchwort *Stellaria graminea* and Lesser Trefoil *Trifolium*

dubium. Orchids such as Common Spotted-orchid *Dactylorhiza fuchsii,* Southern Marsh-orchid *Dactylorhiza praetermissa* and Early-purple Orchid *Orchis mascula* are locally abundant. The fields themselves support occasional arable weeds such as Common Poppy *Papaver rhoeas*, Red Dead-nettle *Lamium purpureum* and Cornflower *Centaurea cyanus*, which is scarce in Sussex and listed on the Sussex Rare Species Inventory (SxRSI).

3.2.4 Grassland

Grassland habitat varies from the large expanses of floodplain grassland and the smaller sheltered fields, bounded by a network of hedgerows, that surround Binsted Village. The fields around the village were surveyed and range from a sward mostly dominated by Perennial Rye-grass *Lolium perenne* to damp grassland and rough tussocky grassland. The most dominant grasses found are Perennial Rye-grass *Lolium perenne*, Yorkshire-fog *Holcus lanatus* and Creeping Bent *Agrostis stolonifera.* Herbaceous species include Yarrow *Achillea millefolium*, Common Knapweed *Centaurea nigra*, Daisy *Bellis perennis*, Common Bird's-foot-trefoil *Lotus corniculatus*, Common Sorrel *Rumex acetosa* and Creeping Buttercup *Ranunculus repens*. Damper fields support species of such conditions such as Marsh Thistle *Cirsium palustre* and Soft-rush *Juncus effusus* and bryophytes such as *Pseudoscleropodium purum.*

Some of the fields surveyed would be classified as improved grassland of the NVC type MG7 *Lolium perenne* leys and related grasslands, which are often sown for high productivity swards and therefore of little botanical interest.

In some areas where herbaceous species are more frequent, the grassland approaches the NVC type MG6 *Lolium perenne-Cynosurus cristatus* grassland, although this is patchy in extent. In areas where the grassland is damp it approaches the NVC type MG10 *Holcus lanatus-Juncus effusus* rush-pasture. Both these communities support a more diverse range of species, which is of importance to grassland invertebrates.

The damp floodplain grassland has not been surveyed to the east of the Ford Road. It surrounds the River Arun and is dissected by wet drainage ditches. It is often the case in such habitats that the drainage ditches hold the main botanical interest.

3.2.5 Hedgerows

Hedgerows heavily dissect the landscape to the south of the Binsted Wood Complex and that surrounding the village of Binsted. Approximately sixty hedgerows were surveyed in the Binsted Village area of which nearly half supported an average of four or more woody species in a 30 m stretch. A third of the hedgerows surveyed qualify as 'Ancient and / or species-rich hedgerows' of which at least half would classify as 'important' under the Hedgerow Regulations 1997.

The hedgerows surveyed support a good range of woody species with Hawthorn *Crataegus monogyna*, Hazel *Corylus avellana* and Blackthorn *Prunus spinosa* being the most frequently occurring species. Other species include Field Maple *Acer campestre*, English Elm *Ulmus procera*, Ash *Fraxinus excelsior* and Pedunculate Oak *Quercus robur* as well as those indicative of base-rich soils such as Spindle *Euonymous europaeus*, Wayfaring-tree *Viburnum lantana* and Guelder-rose *Viburnum opulus*. Many of the hedgerows have standard trees including notable and veteran trees, and some have

some old coppiced stools of Hazel *Corylus avellana.* Woody climbers such as Dog-rose *Rosa canina* and Field-rose *Rosa arvensis* also contribute to the structure and diversity of the hedgerows.

The main structure of the hedgerows ranges from clipped and dense to overgrown and defunct and becoming invaded by Bramble *Rubus fruticosus* agg. Other hedgerows have developed into tree-lines with natural shrub invasion at the base of the trees. Approximately half of the hedgerows surveyed had features of importance to wildlife such as banks, ditches and standard trees.

3.2.6 Notable trees

A total of 112 notable trees were recorded in the Binsted area (though there are many more), of which 70 were classified as notable, 23 as veteran and 19 as ancient. Such trees are throughout the landscape, some in Binsted Woods, others in the shaws extending from the woodland and many in fields and hedgerows. The most frequently occurring species are Pedunculate Oak *Quercus robur* occurring as single-stemmed trees and Ash *Fraxinus excelsior*, which is usually multi-stemmed. Other species include Sweet Chestnut *Castanea sativa*, Hazel *Corylus avellana*, Field Maple *Acer campestre* and, uncommonly a single tree of Wild Cherry *Prunus avium.*

3.2.7 Orchard

There are two orchards in the search area, one of which at Lake Copse has 350 trees of mixed varieties in sheep-grazed grassland. The orchard at Meadow Lodge is smaller with older trees of Apple *Malus sylvestris s.l.*, Pear *Pyrus communis s.l.* and Cherry *Prunus* sp., again in grassland that is occasionally grazed by sheep. Some of these trees have hollows and are gnarled and twisted.

3.2.8 Plantation woodland

Small stands of plantation woodland are scattered throughout the area such as around the golf course at SU 97824 06489, SU 981 060, SU 98054 05917, SU 98162 06036 and SU 98039 06316. These tend to be reasonably young and support species such as Ash *Fraxinus excelsior*, Field Maple *Acer campestre*, lime *Tilia* sp., cherry *Prunus* sp., Hornbeam *Carpinus betulus* and Pedunculate Oak *Quercus robur.* The field layers support mostly robust herbaceous species such as Cow Parsley *Anthriscus sylvestris* and Red Campion *Silene dioica* with species indicative of nutrient enrichment such as Common Nettle *Urtica dioica*. Woodland plants occur in areas near mature woodland or hedgerows and include Lords-and-Ladies *Arum maculatum*, Dog's Mercury *Mercurialis perennis* and ferns such as Hart's-tongue *Asplenium scolopendrium.*

Other small wooded areas are scattered around such as at SU 98478 06057 and at Marsh Farm (SU 98936 04834). The largest area of plantation woodland is just to the north of the railway line at SU 99023 04455 around the reservoirs. This is mixed deciduous woodland that is approximately 15 years old with a very varied field layer

3.2.9 Ponds

A great diversity of ponds litter the landscape and vary from those that are winter wet seasonal ponds in woodland and in fields to large ponds with a good diversity of species.

Several of the ponds in the Binsted Wood Complex are heavily shaded and lack wetland vegetation, although there are ponds within the woodland that hold water all year and support aquatic, emergent and water margin vegetation.

A number of ponds are around Binsted Village along the edges of the woodland or in gardens. These tend to be more diverse and are likely to be of importance to a range of invertebrates as well as amphibians. Two of the ponds have recently been colonized by the non-native perennial Parrot's-feather *Myriophyllum aquaticum.* MAVES has organized the clearance of this in order to stop it from increasing in extent and colonizing other water bodies in the area.

The pond adjacent to Barn's Copse at SU 9818 06946 is particularly notable for it supports the Nationally Scarce and Sussex Scarce (SxRSI) Water Soldier *Stratiotes aloides*. Other aquatic vegetation includes less common duckweeds such as Greater Duckweed *Spirodela polyrhiza* and Ivy-leaved Duckweed *Lemna trisulca*. It is surrounded by a good diversity of water margin wetland vegetation with Reed Sweet-grass *Glyceria maxima*, Water Mint *Mentha aquatica*, Hemlock Water-dropwort *Oenanthe crocata* and Creeping Forget-me-not *Myosotis secunda*.

3.2.10 River corridor, small streams and ditches

The margins of the River Arun support species of brackish conditions including frequent Sea Aster *Aster tripolium,* Sea Beet *Beta vulgaris* subsp. *maritima* and Sea-purslane *Atriplex portulacoides*. Other species found on an occasional basis include Sea Plantain *Plantago maritima* and Sea Arrowgrass *Triglochin maritima* and the Nationally Scarce Marsh-mallow *Althaea officinalis.* Much of the upper margin and flood defence bank is dominated by rough vegetation, largely composed of typical species of coarse coastal grassland, such as Wild Carrot *Daucus carota,* Bristly Oxtongue *Helminthotheca echioides,* Mugwort *Artemisia vulgaris* and Common Fleabane *Pulicaria dysenterica*. Less common species include Corn Parsley *Petroselinum segetum*. Grasses include False Oat-grass *Arrhenatherum elatius,* Sea Couch *Elytrigia atherica* and Meadow Barley *Hordeum secalinum* with scattered stands of Common Reed *Phragmites australis.*

The path along the west side of the bank has a varied and colourful grassland flora, which includes locally frequent Common Broomrape *Orobanche minor*. Occasional patches of damp mud support plants of brackish habitats such as Divided Sedge *Carex divisa* (NS, RDB VU, SxRSI), Saltmarsh Rush *Juncus gerardii*, Reflexed Saltmarsh-grass *Puccinellia distans,* Common Saltmarsh-grass *Puccinellia maritima,* sea-spurreys *Spergularia* spp., and Hard-grass *Parapholis strigosa.*

The vegetation along the ditches is variable with some areas dominated by reedbed, others with robust species such as Hemlock Water-dropwort *Oenanthe crocata* and Great Willowherb *Epilobium hirsutum*. Others are poached by cattle leaving bare mud for colonisation by less common species such as Whorl grass *Strigosa Paraphilias* (SxRSI).

The ditches also support rare beetles and molluscs (Section 3.3.8), provide spawning areas for Common Toad (Section 3.3.1), hunting grounds for Grass Snake and birds such as Hobby and Grey Heron (Section 3.3.5) and constitute one of the three remaining strongholds in the county for the Water Vole (Section 3.3.11).

3.2.11 Ruderals and scrub

Ruderals are scattered throughout the area, mostly forming small stands in copses or at the edges of arable fields. The most common species are Common Nettle *Urtica dioica*, Curled Dock *Rumex crispus* and Broad-leaved Dock *Rumex obtusifolius*. Common Nettle *Urtica dioica* is the larval food plant for butterflies such as the Peacock and the Small Tortoiseshell, and is also eaten by the larvae of moths such as the Small Angle Shades and the Grey Pug. The seeds of rumices are an important food source for a range of birds in the autumn.

Pockets of scrub mostly dominated by Bramble *Rubus fruticosus* agg. and Grey Willow *Salix cinerea* are scattered throughout the area along ditches, fence lines and field corners. Scrub is an important habitat especially when it is intermixed with grassland, ruderals and tall vegetation. It offers protection from predators for a range of species from invertebrates and amphibians to small mammals. It offers nesting opportunities and foraging for a wide range of breeding birds and is a food plant for the larvae of a number of moths such as the Emperor Moth.

3.2.12 Scattered trees and tree-lines

Aside from notable, veteran and ancient trees, trees are scattered throughout the area mostly in hedgerows. Species include Ash *Fraxinus excelsior*, Pedunculate Oak *Quercus robur* and Wild Cherry *Prunus avium*. Some of the tree lines around Binsted Village support mature trees of Pedunculate Oak *Quercus robur* with a trunk diameter of 0.7 m to 0.9 m, which will serve as the next generation of veteran trees. Some trees are reasonably young such as those along the hedgerows at grid references SU 98451 06330 and SU 98691 06171. There are also clusters of trees that have been planted around the golf course and in small fields such as those at grid references SU 98502 06073, SU 98637 05961 and SU 99361 05429, the last of which includes a range of fruit trees.

As part of a MAVES community project, Black Poplar *Populus nigra* saplings have been planted at SU 986 059 (30 trees), SU 987 058 (14 trees), SU 904 055 (3 trees), SU 991 058 (a single tree) and SU 993 058 (4 trees).

3.2.13 Swamp, fen and reedbed

There are three main areas of swamp, reedbed and fen vegetation at the western side of the survey area which are along Binsted Rife, around the reservoirs to the south of Binsted Rife and in fields in Binsted Village to the west of Tortington Rife. In addition, linear reedbed habitat traverses and links the Arundel water meadows.

Binsted Rife is the most notable of these areas with a wide range of National Vegetation Classification communities shown on an NVC map in Appendix II. It is a mosaic of rush pasture, damp grassland and swamp and fen communities where the ground is permanently or seasonally very wet. The northern end of the rife is extremely diverse with the main community, MG10 *Holcus lanatus-Juncus effusus* rush-pasture, interrupted by mosaics of various communities such as S5 *Glyceria maxima* community, S6 *Carex riparia* swamp, S7 *Carex acutiformis* swamp and S14 *Sparganium erectum* swamp, all forming mostly single-species stands. These communities sometimes fringe the rife itself, though the main community along the watercourse is S4 *Phragmites australis* swamp and reedbeds.

Intermixed with this there are some more diverse areas that are more accurately described as fen, with communities such as S26d *Phragmites australis-Urtica dioica* tall-herb fen, *Epilobium hirsutum* sub-community and S28b *Phalaris arundinacea* tall-herb fen, *Epilobium hirsutum-Urtica dioica* sub-community. These communities are extremely diverse with a good range of associates such as Lesser Water-parsnip *Berula erecta,* Ragged-robin *Silene flos-cuculi*, Hedge Bindweed *Calystegia sepium*, Water Mint *Mentha aquatica*, Bog Stitchwort *Stellaria alsine*, Cuckooflower *Cardamine pratensis*, Celery-leaved Buttercup *Ranunculus sceleratus*, Wild Angelica *Angelica sylvestris*, False Fox-sedge *Carex otrubae*, Water Forget-me-not *Myosotis scorpioides*, Greater Bird's-foot-trefoil *Lotus pedunculatus*, Water Horsetail *Equisetum fluviatile* and Plicate Sweet-grass *Glyceria notata.*

This vegetation grades into short grassland on higher ground up the banks, with some small areas of relatively species-rich rabbit-grazed grassland of the NVC type MG6 *Lolium perenne-Cynosurus cristatus* grassland.

At the southern end of the rife, the robust swamp vegetation gives way to a shorter sward and the rush grassland becomes less dominant. Here the main communities are Mg7d *Lolium perenne – Alopecurus pratensis* grassland, MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland, S19 *Eleocharis palustris* swamp and S22 *Glyceria fluitans* water-margin vegetation.

Aquatic and emergent species indicative of the calcareous conditions include *Ranunculus circinatus* Fan-leaved Water-crowfoot, which is declining throughout its range, Flowering-rush *Butomus umbellatus* and Mare`s-tail *Hippuris vulgaris*.

Whorl-grass *Catabrosa aquatic,* listed on the SxRSI, was found in the muddy margins of two ditches and the Nationally Scarce aquatic Frogbit *Hydrocharis morsus-ranae* was found within the rife. Fen Bedstraw, also listed on the SxRSI, was growing amongst the wetland vegetation.

The reservoirs to the south of Binsted Rife are fringed with a wide margin of reedbed vegetation of the NVC type S4 *Phragmites australis* swamp and reedbeds. Other wetland associates include Great Willowherb *Epilobium hirsutum*, Hemlock Water-dropwort *Oenanthe crocata,* Common Fleabane *Pulicaria dysenterica* and Hard Rush *Juncus inflexus.* This vegetation grades into tall, species-rich grassland of the NVC type MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* subcommunity and stands of tall herbaceous species and ruderals. Species indicative of more base-rich conditions include Southern Marsh-orchid *Dactylorhiza praetermissa,* Weld *Reseda luteola* and Wild Parsnip *Pastinaca sativa.*

A marshy field to the west of Tortington Rife supports a good diversity of flowering plants intermixed with areas of swamp of the NVC types S4 *Phragmites australis* swamp and reedbeds and S7 *Carex acutiformis* swamp. The fields to the south of this lack the diversity but are very wet with areas of swampy vegetation variously dominated by *Carex nigra* Common Sedge and *Carex disticha* Brown Sedge.

3.2.14 Plant species of note

The following notable species, listed in Table 8, were found in 2015. They are all on the Sussex Rare Species Inventory and four are Red Data Book species of which two are listed as Nationally Rare. An additional species is listed as Nationally Scarce.

Table 8: Notable plant species found in the Binsted area in 2015

Common Name	Latin Name	Location	National status	RDB	SxRSI
Blunt-flowered Rush	*Juncus subnodulosus*	Binsted Rife			✓
Box	*Buxus sempervirens*	Binsted Wood	NR	DD	✓
Cornflower	*Centaurea cyanus*	Arable field, Binsted			✓
Fen Bedstraw	*Galium uliginosum*	Binsted Rife			✓
Fritillary	*Fritillaria meleagris*	Binsted Park		VU	✓
Frogbit	*Hydrocharis morsus-ranae*	Binsted Rife		VU	✓
Ivy-leaved Crowfoot	*Ranunculus hederaceus*	Binsted Rife			✓
Marsh-mallow	*Althaea officinalis*	Banks of Arun	NS		✓
Narrow-leaved Everlasting-pea	*Lathyrus sylvestris*	Binsted			✓
Royal Fern	*Osmunda regalis*	Binsted			✓
Water-soldier	*Stratiotes aloides*	Sandy hole pond	NR	NT	✓
Whorl Grass	*Catabrosa aquatic*a	Binsted Rife			✓

A summary of each species found is given below, though it should be noted that seven of the eleven species recorded are those of wetland habitats, three of which had not been recorded in the area before.

- Blunt-flowered Rush *Juncus subnodulosus* was found along both the west and east sides of Binsted Rife. This is a rhizomatous perennial herb growing in dense stands in fens, marshes and wet meadows. Land drainage has caused this species to decline.

- Box *Buxus sempervirons* – recorded in Binsted Wood Complex. This species is thought to be native in a handful of locations and planted elsewhere.

- Cornflower *Centaurea cyanus* was recorded in an arable field in Binsted and formerly occurred as an annual weed of arable habitats. Since 1986 it has been recorded in very few arable fields, but it is now found in waste places as a casual arising from gardens and wild-flower seed mixtures.

- Fen Bedstraw *Galium uliginosum* was found in fen communities along Binsted Rife It is a perennial herb of base-rich marshes and fens. It has been over-recorded in the past.

- Fritillary *Fritillaria meleagris* was found at the edge of Binsted Park, where a small group of plants appear each year. It is a bulbous perennial herb of damp, sometimes winter-flooded, neutral grasslands that has been cultivated in Britain since 1578. It was habitually found in floodplain meadows in central and south-east England, though many such populations have been lost through habitat destruction.

- Frogbit *Hydrocharis morsus-ranae* was found in Binsted Rife. This is an aquatic floating perennial of shallow, calcareous, mesotrophic or meso-eutrophic water. It has suffered declines due to the conversion of grazing marshes to arable, and from eutrophication.

- Ivy-leaved Crowfoot *Ranunculus hederaceus* was found along the east side of Binsted Rife. It grows on bare mud at the edges of streams, ditches, ponds and tracks. It has declined due to agricultural improvement and urbanisation.

- Marsh-mallow *Althaea officinalis*, found on the banks or the Arun, is perennial herb of coastal habitats, growing on the banks of ditches containing brackish water and in brackish pastures. It has declined throughout most of its British range, due to drainage and development in the coastal zone.

- Narrow-leaved Everlasting-pea *Lathyrus sylvestris* is a scrambling perennial herb found in hedges, wood-borders, scrub, and on rough banks and sheltered sea-cliffs. Its distribution is thought to be stable.

- Royal Fern *Osmunda regalis* is uncommon throughout much of its range. It is likely to have been planted in Binsted.

- Water Soldier *Stratiotes aloides* was found in Sandy Hole pond. Native populations of this perennial herb are found in calcareous, meso-eutrophic lakes, ponds and ditches. Alien colonies occur in a range of other habitats, including canals.

- Whorl Grass *Catabrosa aquatic*a was found along Binsted Rife. It is a stoloniferous herb of muddy pond margins, cattle-poached ditches, canals and sluggish streams that is in decline due the drainage and infilling of ponds, and the canalisation of lowland watercourses.

Local or uncommon species

- Orpine *Sedum telephium* – Several patches in Binsted Woods – it is an uncommon ancient woodland indicator, though no longer classified as Nationally Scarce as it was in 1992.

- Southern Wood-rush *Luzula forsteri* - found in Binsted Woods and near the east end of Church Lane is a less common species only occurring in the south.

- *Luzula forsteri x pilosa* = *L*. x *borreri.* This is a local species and was recorded at Tortington Common.

- Bogbean *Menyanthes trifoliata* (EC CITES Annex D). This species has decreased in south-east England because of the drainage of wetlands in both historic and recent times.

3.2.15 Non-native invasive species

The following non-native invasive species were recorded in the area.

- Rhododendron *Rhododendron ponticum* found growing in the Binsted Wood Complex in several areas.
- Cherry Laurel *Prunus laurocerasus* recorded growing near the Madonna Pond and in Hundred House Copse.
- Indian Balsam *Impatiens glandulifera* occupying a small area at Marsh Farm.
- Parrot's Feather *Myriophyllum aquaticum* in the pond at Meadow Lodge.

Rhododendron *Rhododendron ponticum*, Parrot's-feather *Myriophyllum aquaticum* and Indian Balsam *Impatiens glandulifera* are all listed on Schedule 9 of the Wildlife and Countryside Act 1981. As such, it is illegal to plant or otherwise knowingly cause these species to grow in the wild or spread to adjacent land owned by others.

Cherry Laurel *Prunus laurocerasus* is listed as an invasive species in Sussex. Its growth form and impact on wildlife is very similar to that of Rhododendron *Rhododendron ponticum*, forming dense thickets and excluding all other species from woodlands.

MAVES is aware of the presence of such species and the Parrot's-feather and Indian Balsam have been removed this year (2016) as part of on-going community projects. There is the intention to tackle the problem of the woody species, however, this will take longer as it requires a management plan to be implemented.

3.3 PROTECTED VERTEBRATES / INVERTEBRATES

3.3.1 Amphibians

Amphibians require both aquatic and terrestrial habitats in order to breed and survive. Favoured terrestrial habitats are those that are likely to stay damp during the hottest days and the driest seasons providing moist refuges in which to shelter such as rotting wood, logs and accumulations of leaf litter. Many of the ponds, rifes and ditches throughout the landscape offer good quality potential breeding habitat for amphibians. These are linked by numerous corridors in the form of the rough grassland along field edges and hedgerows, the tall wetland vegetation fringing the numerous ditches and the areas of swamp, fen and marshy vegetation (also providing damp refuges). Binsted Woods and the areas of plantation woodland also provide excellent habitat that will remain damp all year.

Madonna Pond (at grid reference SU 99263 06171) is a breeding pond for Common Toad (a BAP species) that was seen in high numbers in spring 2015. Common Toad was also seen during the spring of 2016 in Sandy Hole Pond (SU 98188 06943) and 1000's of tadpoles were seen in Tortington Rife at SU 9942 0564.

Newts such as Palmate Newt and Smooth Newt have been observed during the spring of 2016 in the Madonna Pond, Sandy Hole Pond and the pond at Meadow Lodge SU 99253 05685.

Great Crested Newt has not been recorded in the area with the nearest current record (2005) at Lazy W Pond (SU 974130 5378) which is approximately 850 m to the west of Binsted Rife. As there are no barriers to dispersal the presence of this species in the area cannot be disregarded.

3.3.2 Badger

Badger activity is extremely high in the area with large and possibly very old setts in the Binsted Wood Complex (including Hundred House Copse). Additional setts are in Lake Copse, Binsted Wood and the higher land along Binsted Rife. Signs of foraging and sett expansion / creation are throughout the area extending into fields. Badgers are frequently seen along Binsted Lane (*pers. comm.* with several locals 2015 / 2016), which is a quiet lane, and so there are currently no road mortalities in this area.

It is estimated that the Badger population is extremely high due to undisturbed nature of the landscape providing plentiful sett-building opportunities. There are also extensive foraging opportunities with the wide field margins, a high number of small and undisturbed fields around Binsted Village and the extensive diverse habitat around Binsted Rife.

3.3.3 Bats

Bats, as with many other species, are under-recorded with the background data search returning records for just eight species in the area. An additional species, Alcathoes bat *Myotis alcathoe* was recorded in Binsted Park in 2015. However, in just one night in 2016 an astonishing thirteen species of bat were recorded (listed in Table 9) within and along the periphery of the Binsted Woods Complex

Table 9: Bat species recorded in the Binsted Woods complex on the 31.07.16

Common name	Latin name
Barbastelle	*Barbastella barbastellus*
Serotine	*Eptesicus serotinus*
Alcathoe bat	*Myotis alcathoe*
Bechstein's bat	*Myotis bechsteinii*
Brandt's bat	*Myotis brandtii*
Daubenton's bat	*Myotis daubentonii*
Natterer's bat	*Myotis nattereri*
Whiskered bat	*Myotis mystacinus*
Noctule bat	*Nyctalus noctula*
Common Pipistrelle	*Pipistrellus pipistrellus*
Nathusius's Pipistrelle	*Pipistrellus nathusii*
Soprano Pipstrelle	*Pipistrellus pygmaeus*
Brown Long-eared bat	*Plecotus auritus*

Thirteen species represents a very high level of bat fauna and diversity, which is comparable with some of the best sites in the country. Moreover, to find thirteen species, which represents the majority of species routinely found in the county, through very low survey effort would suggest a very important site. Additionally, a notable number of species are breeding within or near the site, which further shows the importance of the area.

Notably two Annex II species were caught; both females and roosts of both were identified within the woodland along with breeding Alcathoe bats, a rare data deficient species. A maternity colony of Bechstein's bats, a woodland specialist, within the Binsted Wood Complex, makes this site of National interest.

The four rarest British bat species are listed in Annex II of the Habitats Directive. The Habitats Directive was adopted in 1992 by EU governments in order to ensure the survival of Europe's most endangered and vulnerable species. For species listed in Annex II of the

Habitats Directive, core areas of their habitat must be protected under the Natura 2000 Network and the sites managed in accordance with the ecological requirements of the species. The presence of two Annex II bat species within the Binsted Woods complex gives the area potentially qualifying criteria for a Special Area of Conservation (SAC).

Thirteen bat species amounts to fractionally below three quarters of the entire British species, but given the landscape and habitats, more may be present. Bats will roost in a variety of habitats such as mature trees, buildings and bridges. Old buildings such as churches, farm buildings and big houses that are in the area are of particular importance as they are more likely to have larger internal spaces that may be used by less common species. Additionally, surveys have demonstrated that the area is littered with trees with features suitable for roosting bats such as splits, cracks, woodpecker holes and rot holes. The full extent of these trees present in the Binsted Wood Complex has only just been touched upon and certainly not recorded.

The landscape provides an ideal dark area for foraging. Open spaces within the Binsted Wood Complex such as the wayleave and Old Scotland Lane, as well as the woodland edge, woodland extensions such as Lake Copse, and the shaws extending from the woodland to the south of Tortington Common, provide ideal sheltered foraging habitat in areas of still air. The low-lying floodplain landscape with the river, water bodies, wet ditches and damp fields surrounded and sheltered by hedgerows and tree-lines attracts insects such as midges, moths and micro-moths. This abundant habitat is readily accessible, for the numerous hedgerows, scrub-lines and tree-lines provide flight-lines and protective cover whilst foraging.

This landscape provides a variety of roost sites and foraging areas relatively close together and a dense commuting network with no barriers to dispersal. This combination of factors means that there are likely to be lower metabolic demands on commuting bats and lower predation, which would result in increased breeding success and therefore stable populations.

3.3.4 Biodiversity Action Plan species

Brown Hare

This species was recorded near Lake Copse in 2016 and has also been recorded in Ford. It is a species of an open landscape where it occupies arable fields and pasture, both abundant in the Mid Arun Valley area. It is not usually seen unless disturbed for it is a nocturnal species spending most of the day in small depressions in the grass known as forms.

Harvest Mouse

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. There is also ample scope for dispersal across the landscape with the network of suitable linear habitat.

Hedgehog

The Hedgehog is a good indicator of the abundance of ground-dwelling invertebrates and of varied habitat features, such as hedges and copses (Reeve, 1994). The fact that Hedgehogs are seen throughout the area (Section 3.1.1), including sightings during a walkover survey (2015), would suggest that the area is suitable for this species.

Hedgehogs are thought to have been plentiful in the early 20th Century and are thought to have declined considerably since then. Various studies indicate that Badger predation is one of the main causes of Hedgehog mortality (Doncaster *et al.,* 1992, Hof and Bright 2010). This was further demonstrated by Trewby *et al*., (2013) who found that the numbers of Hedgehogs caught in amenity grassland fields increased by approximately 100 % in the areas where Badgers were culled, but not in the control areas where culling did not take place. Given the data, it appears probable that the habitats in the Mid Arun Valley have the diversity and complexity to support viable populations of Hedgehogs despite a high population of Badgers.

Common Toad

This species is included in Section 3.3.1 Amphibians.

3.3.5 Breeding Birds

As of the 16th May 2016, the total number of species on the British List (Categories A, B and C) is 601. This makes the total of 177 species recorded within a buffer of just 1 km extremely high representing just under one third of the total.

There are a number of reasons for this as follows:

- The diversity of habitats of which the vast majority are either UK BAP priority habitats and / or in environmental stewardship schemes. This has resulted in a good mix of wetland, farmland and woodland species with a good representation of birds of prey such as Buzzard, Barn Owl (Schedule 1) and Merlin (Red List and Schedule 1).
- The damp fields and network of ditches provide aerial forage for summer visitors such as Swallows, Swifts (Amber List) and House Martins (Amber List). Undisturbed buildings, barns and stables provide nesting opportunities.
- The farmland supports large numbers of winter visitors such as Redwings and Fieldfares and declining species such as Linnet and Yellowhammer (all Red List species).
- The river Arun provides hunting corridors for the Hobby and nesting opportunities for Kingfishers (Amber List), which are both Schedule 1 species.
- Undisturbed, scrubby woodland above dense and tall vegetation is ideal for Nightingales (Red List).
- The vast area of floodplain grassland is of importance to a wide range of wetland species; many of which have declined substantially and therefore have various layers of protection.
- The juxtaposition to the Arun Valley SNCI, which comprises extensive wetlands, supporting breeding wintering birds, waders and wildfowl such as Snipe (Amber List) and Lapwing (Red List and Schedule 1), which also breed in the Mid Arun Valley area.

- The proximity of the Arundel Wetlands Centre which provides a haven for a high number of passage waders such as Green Sandpiper (Amber List, Schedule 1), Whimbrel (Red List, Schedule 1) and Curlew (Red List), all of which are recorded in the Mid Arun Valley area. Breeding species include Oystercatcher and Redshank (both Amber List) also present in the Mid Arun Valley.
- The landscape linkage from the coast through the Mid Arun Valley area and along the Arun into mid Sussex to areas of the Arun Valley such as Pulburough Brooks, Amberley Wildbrooks and Waltham Brooks. These form the Arun Valley Special Protection Area (for rare and threatened birds), Special Area of Conservation (for habitats and non-bird species) and Ramsar site (important wetlands). The main interest is its ornithological importance due to very high numbers of over-wintering waterfowl (averaging over 27,000 individuals in a 5 year period in the 1990's) including Shoveler, Teal and Wigeon, It also has a regular wintering population of Bewick's Swan, which represents at least 1.6 % of the wintering population in Great Britain.
- A high number of species recorded in the SAC / SPA / Ramsar (such as those mentioned above) have been recorded in the Mid Arun Valley, and this uninterrupted corridor may contribute to the high numbers of birds in the area.
- The extensive reedbeds of the Arundel Wildfowl and Wetlands Trust reserve and along the River Arun and ditches extending into the Mid Arun Valley are a major stronghold of breeding Reed Warblers in West Sussex. This is an important species for the Cuckoo (Red List), which is a brood parasite of this species.

Local bird surveys consistently record a high number of species and would suggest that the number of birds in the area is stable.

The British Trust for Ornithology (BTO) has conducted annual bird surveys on the same square kilometer at Marsh Farm for approximately twenty-five years (1989 – 2013). While farmland birds underwent massive declines in the wider countryside, the number of birds and species of birds recorded at Marsh Farm stayed constant with sixty-four species recorded during the first year and sixty-three during the last.

During a WAG survey in 2008 of land around Walberton, Binsted and Binsted Rife eighty-six species were recorded, of which seventeen species were on the BoCC Red List and eighteen on the Amber List. Some of these were passage migrants such as Fieldfare, Redwing, Pied Flycatcher, Red kite and Osprey making use of the variety and expanse of good-quality foraging habitat. Other species recorded are summer visitors such as Nightjar, Turtle Dove and Spotted Flycatcher. Some were residents that have undergone population declines such as Lesser Spotted Woodpecker and Tree Sparrow. All these species mentioned are on the BoCC Red List.

Several species were of special interest such as Lapwing nesting near Marsh Farm. In the year of this survey there were only 132 nests from Eastbourne to Winchester. This species is still nesting in the survey area. Snipe was also recorded near Marsh Farm and only 15 nests were recorded in Sussex the year prior to this survey. Snipe was seen in 2015 during the walkover survey. Additionally, a Wryneck was found killed by a car. This is an extremely uncommon species with only 280 seen in England over 10 years up to the survey.

3.3.6 Dormouse

Paines Wood, Ash Piece and, recently, Noor Wood (Tortington Common) are part of the National Dormice Monitoring Programme. Paines Wood and Ash Piece have populations of Dormice breeding annually and Noor Wood, which has recently been added to the programme, is beginning to show results. There is some evidence that this species disperses through the area with a record of a Dormouse in a hedgerow to the east of Binsted Rife (SU 978 058) and a verbal record of a Dormouse nest found in a garden hedge at Oakleys Cottages along Binsted Lane (SU 98764 05453) in 2013. The landscape is ideal for dispersal with arms of woodland and shaws extending from the main woodland of the Binsted Wood Complex which are linked to the wider landscape by outgrown and undermanaged hedgerows and tree-lines. Pockets of woodland litter the landscape and all have a variety of species providing a varied food source that would be able to support viable populations of Dormouse.

3.3.7 Fish

The Arun is one of the fastest flowing rivers in the country and very popular amongst anglers. A wide range of fish is found in this river including Sea Trout and Mullet. Of relevance is the European Eel, which has a Biodiversity Action Plan due to a dramatic decline in numbers in recent years, possibly due to pollution, overfishing and habitat degradation.

European Eel elvers migrate along the coastline and into our Sussex river estuaries in order to grow. After 5–20 years in fresh water, the eels become sexually mature and they begin their migration back to the Sargasso Sea to spawn. The connectivity of the landscape is demonstrated by the presence of this species in the lake in Lake Copse and a ditch in Lyminster.

3.3.8 Invertebrates

The diversity of habitats across this landscape has the potential, which is beginning to be shown by surveys, to support a wide variety of invertebrates. In just two hours of collecting (22.08.15), a local entomologist found 130 invertebrate species along the edge of Binsted Rife including approximately 29 hoverflies, 29 bugs, 18 beetles and a variety of other groups such as gall flies, bumblebees and bush crickets. It also included a UK BAP species, two Nationally Notable hoverflies *Volucella inanis* and *Volucella zonaria* and a Nationally Scarce Beetle *Anthocomus fasciatus*.

During a three-minute standard net in water freshwater sampling survey undertaken in Binsted Rife (07.07.16) seventeen genera were found. Simpson's Diversity Index was used to measure the diversity of the rife. This method of measuring species richness takes evenness as well as diversity into account and gave an index of 8 indicating that Binsted Rife supports a diverse assemblage of aquatic invertebrates.

The expanse of floodplain grassland offers opportunities for large numbers of common invertebrates such as midges and gnats that are of immense importance to aerial foragers such as bats, Barn Swallow, House Martin and Common Swift (all of which are present).

Part of this habitat is the numerous flower-rich corridors along the river and the associated network of ditches which are likely to support high numbers of aquatic invertebrates, some

of which have been discovered and are shown to be rare and threatened. Many such invertebrates also have a terrestrial phase in their life cycle, such as the mayflies and dragonflies. These corridors also extend to the hedgerow and arable field margins which, together, form a grid-work of corridors across the entire landscape providing shelter, cover and a plentiful nectar source for a variety of invertebrates such as bees, bumblebees, wasps, flies and butterflies.

The veteran and notable trees that are present in the Binsted Wood Complex and across the landscape have features such as splits, holes and dead wood that are of importance to a number of rare and threatened invertebrates.

Beetles

The Bullen Report (2004) states that Rewell Wood complex is noted for its beetle populations, and a total of 22 scarce and threatened species were returned from the data search in the area of Rewell Wood that was included. This compares with just 6 species returned from the Binsted Wood Complex. However, the Binsted Wood Complex appears to be under-recorded, for a fairly recent beetle survey (Grove 2006) found 22 Nationally Notable Category B species, 3 Nationally Notable Category A species, and 2 Red Data Book species. Beetles were collected from five sites in the Binsted Wood Complex amounting to 400 different species from 46 different families. It was stated that more species were being found at the end of the survey showing that many more are present.

The Stag Beetle *Lucanus cervus*, a BAP species due to significant National (and European) declines, was recorded in Binsted Woods in 2015. This species also requires wood that is the texture of balsa, but at ground level.

The Glow-worm, *Lampyris noctiluca*, is another iconic beetle in the area. This is frequently seen along Old Scotland Lane and was observed in July 2016 in a garden in Binsted at SU 9915 0583. Although this species is not listed as rare, it is not common.

Butterflies

Of the four Red Data Book species of butterfly in the area, the Purple Emperor *Apatura iris* is seen frequently around Binsted Woods and extending into gardens of the houses in Binsted Village at the southern end of the woodland. In 2015 a total of 27 species of butterfly were recorded in Binsted Woods, Binsted Village, and the surrounding field margins and hedgerows, which is just under a half of the total British species. Moreover, it included two additional Red Data Book species, the White Admiral *Limenitis camilla* (VU), seen on three occasions in different locations, and the Wood White *Leptidea sinapis* (EN) seen once. This compares well to Arundel Park SSSI, which supports 25 breeding species of butterfly.

Moths

The majority of the moth species returned in the BDS came were from the Slindon Wood Complex and the Binsted Wood Complex. However, the greater area appears to be under-recorded, for the variety of habitats is suitable for a high number of moth and micro-moth species. A survey carried out at Beam Ends (1993) at the north end of Binsted Rife (SU 977 064) found 71 moth species. This included a Local species Marbled Green

Cryphia muralis and 5 UK BAP species, all of which are found in a range of habitats and not restricted to woodland. These are not included in the BDS results.

The importance of the area to moths is further shown by the results of two surveys carried out in 2016. A survey at Lake Copse at SU 990 057 (29.07.16) found 47 moth species including one UK BAP species, the Yellow-tail *Euproctis similis*. An additional survey relatively nearby at SU 986 065, along the hedgerow bounding the south of Scotland field (06.08.16), found 40 moth species. This included 6 UK BAP species including Ghost Moth *Hepialus humuli* and Rosy Rustic *Hydraecia micacea* and 4 with Local status such as Rosy Footman *Miltochrista miniata.*

Dragonflies and damselflies

The Arun Valley, Watersfield to Arundel SNCI is important for dragonflies and damselflies (amongst other groups). The Mid Arun Valley section of the Arun, together with the ditch network and scattered ponds, also has the potential to support a good range of dragonflies and damselflies. Records were returned for just three species and yet in 2015 seven species were found around the Binsted area alone and this year (2016) the uncommon White-legged Damselfly (found at Binsted Rife) has been added to the list.

3.3.9 Otter

This landscape can be accessed along the Arun and offers areas of habitat that are relatively undisturbed that would be suitable for Otter to live and breed. Such areas include the wetland vegetation around Binsted Rife, the area of reedbed and woodland adjacent to ditches just to the north of the railway line and the undisturbed wetland to the east of Binsted Village.

3.3.10 Reptiles

Four species of reptile are frequently seen in the area – Adder, Grass Snake, Slow-worm and Common Lizard. These species require the good diversity of habitat structure that this landscape provides such as areas of lush grassland for hunting, field edges, hedgerows and ditches for dispersal, banks and arable field margins for basking and abundant mammal burrows and gaps beneath tree roots for hibernation. Ponds and ditches increase the available foraging habitat for Grass Snake and rotting wood and compost piles are ideal egg-laying substrates for this species. Additionally, the open areas in Binsted Woods provide ideal habitat for Adder.

Reptiles also need access to humid and sheltered environments to help them to cope with extremely hot, dry weather. Wind can also have a detrimental drying effect and it agitates vegetation, making it more difficult for reptiles to detect approaching predators. A varied topography and diverse vegetation structure create pockets of microhabitat sheltered from the wind. Trees, scrub, woodland edges and hedgerows, all in abundance in the area, often provide important windbreaks on reptile sites. Moreover Binsted Rife offers a sheltered valley environment with a mixture of scrub, short rabbit-grazed grassland and lush grassland, swamp and fen (suitable for Grass Snake, Slow-worm and Common Lizard). Footpaths adjacent to hedgerows provide a succession of habitat types in a small space with protection of shrubs and scrub, foraging areas in longer herbaceous vegetation / grassland / ruderals, and basking opportunities on short and trampled grassland and areas of exposed hedge-bank.

The habitat also provides plenty of forage with the numerous ponds and ditches providing the amphibians and fish for Grass Snakes. The damp grassland, field edges, small fields and floodplain grassland are full of soft-bodied invertebrates such as slugs and worms for Slow-worm and spiders and other invertebrates for Common Lizard. Moreover, the abundant small mammals provide a ready meal for Adder.

3.3.11 Water Vole

The Mid Arun Valley area has an extensive ditch network interconnected by ponds, a chalk stream and pockets of fen, marsh and reedbed along Binsted Rife, around Binsted Village to the west of Tortington Rife and around the reservoirs to the south (SU 9874 0449). This offers a more complex habitat than just a linear network of ditches with breeding refuges for Water Voles where they are less likely to be predated upon by American Mink.

In 2015 spot checks were carried out for Water Vole feeding remains and latrines. Feeding remains and latrines were found along Binsted Rife at SU 9839 0453 and at the reservoirs to the south of Binsted Rife at SU 98698 04497. Additionally, potential burrows were observed on an island in the larger reservoir (SU 98740 04490). Possible Water Vole footprints were observed at Lake Copse (SU 98828 05782) and the distinctive sound of a Water Vole dropping into water was heard.

Water Voles have been recorded in 2016 at Binsted Nursery Lake Lane site, which is linked by ditches to the Binsted Rife as well as the Aldingbourne Rife.

4 THE IMPORTANCE OF THE LANDSCAPE AND CONNECTIVITY

4.1.1 General

The uninterrupted varied and good quality landscape is of immense importance to a number of protected species. Many species require more than one habitat type in order to survive and a good number of species must move across large areas of habitat in order to forage.

Local populations of a given species are scattered across the landscape and may become extinct for a number of reasons such as localised flooding, drying, freezing, predation etc. Without the ability to move about the landscape and recolonize such areas, populations would disappear from these patches and eventually from the larger area. Landscape scale extinction would then occur.

4.1.2 Amphibians

Amphibian populations are especially prone to local extinction and re-colonisation processes and landscape issues are critical to their survival. Important considerations are:

- Distance between breeding ponds;
- Nature of intervening habitat; and
- Major barriers to dispersal.

Common Toad (a BAP species), Common Frog and all newts have limited powers of dispersal, however, they utilise different habitats at different stages of the life-cycle. They breed in ponds and ditches and start life as aquatic creatures. Damp grassland is ideal for adults foraging, and woodlands, copses, hedgerows and tree-lines provide ideal damp refuges and hibernation sites. As a consequence, in the adult stage amphibians shuttle between aquatic and terrestrial habitats on a seasonal basis. The timing of these migrations varies between species, populations and individuals. Because of this, habitat links between the populations that allow movement of individuals is essential to ensure long-term viability and to allow natural re-colonisation of areas if a species becomes extinct in any locality. Linked terrestrial habitats are therefore important for the following:

- Sustaining individual animals during part of their life cycle;
- Allowing movement to breeding ponds and ditches; and
- Ensuring that animals can move between populations over time.

Common Toad is very particular about where it breeds and habitually migrates to ancestral breeding ponds each year. Common Toad breeds in some of the ponds and ditches around Binsted Village and migrates to the Binsted Wood Complex for hibernation. This seasonal movement is important for survival and will continue despite any obstacles.

Newts tend to favour the terrestrial habitat offered by woodland and were found breeding in ponds throughout the landscape. They are likely to return to the woodland for much of the year.

Great Crested Newt (GCN) has been recorded 850 m from the area, and as there are no barriers to dispersal, there is the possibility that this species could be breeding in the ditches and rifes to the south of Binsted Woods. If GCN is not in the area, then it may have undergone a local extinction at some point in the past, and there is no good reason why this species cannot once again occupy the suitable habitat in the Binsted area.

4.1.3 Badger

Badgers tend to construct setts in woodlands and copses on banks and in drier habitats. Setts may be of a considerable size with numerous entrances and support significant populations. There are several major setts in the area and signs of new sett-building activity.

Badgers will forage some distance from setts favouring open sites and damp grassland that can easily be dug. Once a good foraging area is found, Badgers will regularly return to the same spot. This regular movement is clear within the landscape, for mammal runways, which resemble footpaths, dissect it.

4.1.4 Bats

Bats tend to use large areas of the landscape, often roosting in one habitat type and foraging in another. Bats must travel from roost sites to foraging areas, and this landscape has both, coupled with a dense commuting network. This combination of factors means that there are likely to be lower metabolic demands on commuting bats and lower predation, which would result in increased breeding success and therefore stable populations. Work by Frank Greenaway (2008) found that in 1998 Barbastelles commuted up to 17.8 km from Ebernoe Common in West Sussex to suitable foraging habitat. In 2008 this had reduced to a maximum-recorded distance of 10.46 km, which was largely attributed to improving the flight lines and habitat linkages to better foraging habitat nearby. As the Mid Arun Valley area has an excellent network of flight lines in the form of hedgerows, tree-lines, shaws and woodland edge, it is likely to support high and stable populations of bats.

Bats roosting in the Binsted Wood Complex may forage throughout the woodland or follow the protection of tree-lines and hedgerows in order to forage in the damp floodplain grassland. Likewise, bats roosting in the old barns and buildings scattered throughout the Mid Arun Valley area may commute to the Binsted Woods Complex to forage. Bats may also commute from roost locations outside the area in order to access the excellent foraging habitat that the Mid Arun Valley area offers.

Serotine bats are present in the Binsted Wood Complex (recorded in 2016) with a known maternity colony in Barnham (Daniel Whitby *pers. comm.* 27.08.16). This colony, for example, commutes to the Binsted Wood Complex in order to forage.

Bechstein's bats (found breeding in the Binsted Wood Complex 2016) are woodland specialists and can be greatly affected by habitat isolation and fragmentation. The Binsted Wood Complex provides a large block of woodland that can support this species for roosting and foraging needs. Additonally, Barbastelles, found roosting in the Binsted Wood Complex (Daniel Whitby *pers. comm.* 01.08.16), forage over wide areas using woodland as well as open grassland habitats.

Brown Long-eared bats are present in the Binsted Wood Complex, recorded in 2016, and have previously been recorded there as well as at Walberton Church and Tortington. Common Pipistrelles are roosting in Binsted Village at Lake Copse (recorded in 2016) and have recorded in the Binsted Wood Complex in 2016. Both these species routinely commute between different habitats.

4.1.5 Biodiversity Action Plan Species

Many species such as Brown Hare, Harvest Mouse and Hedgehog rely on large areas of uninterrupted countryside in order to feed, breed and disperse.

Areas of the landscape to the south of the Binsted Wood Complex are not intensively managed, such as the arable field margins, some of the wet ditch margins, the fields around Binsted Village, the land around Binsted Rife and the land to the north of the railway line. Larger areas are suitable for Brown Hare and the linear habitats provide safe refuges for species such as Harvest Mice and Hedgehog and so should one area become unsuitable due to a change in management, increased predation etc., there is currently the scope to move about the landscape.

4.1.6 Breeding birds

Many bird species require a diverse and productive landscape in order to feed and hunt. Schedule 1 birds associated with an open greensward with scattered scrub, trees and hedgerows include Barn Owl, Woodlark, Brambling (stubble fields) and two winter thrushes, the Fieldfares and Redwings. Fieldfares and Redwings form loose flocks with Starlings and forage in damp fields for invertebrates. Once this food source has been expended, or if the soil becomes frozen, they take to the hedgerows feeding on haws and berries, which are abundant in this area.

Some species require buildings for nest sites, such as the House Sparrow and Swallows, and yet these must be situated within in a landscape that offers suitable foraging opportunities such as the Mid Arun Valley area.

Barn Owls hunt over large areas of the landscape. This species is totally reliant on the large expanses of wetland vegetation and pasture and the ample field margins for foraging. There is a human low population density and so this is a quiet and dark landscape, which are other factors advantageous to the species.

There is a largely uninterrupted landscape corridor from the coast, through the Mid Arun Valley area and along the Arun into mid Sussex to areas such as Pulburough Brooks, Amberley Wildbrooks and Waltham Brooks. These form the Arun Valley Special Protection Area (for rare and threatened birds), Special Area of Conservation (for habitats and non-bird species) and Ramsar site (important wetlands). Though the main interest is its ornithological importance due to very high numbers of over-wintering waterfowl. Many species in these areas have been recorded in the Mid Arun Valley, and this largely uninterrupted landscape corridor may contribute to the high numbers of birds in the area.

4.1.7 Dormouse

Dormice have declined in both distribution and abundance in the 20th Century as a result of woodland loss and habitat fragmentation. Climate can have a big impact on the Dormouse; firstly altering the time of emergence from hibernation, but also on the

availability of it's food. The low population density of Dormice and its extremely slow rate of population increase make the Dormouse highly vulnerable to any change in its environment.

The impact of unseasonably wet and warm winters on the local population has been witnessed first hand through the National Dormouse Monitoring Programme at Paines Wood and Ash Piece (within the Binsted Wood Complex). There have been high fluctuations in numbers year on year with a lack of breeding in the summer, producing litters into October and nest building in January. Additionally, cold snaps during the breeding season have been seen to greatly affect the insects and caterpillars that Dormice require (Ian Powell *pers. comm.* 22.05.16).

This year (2016) the Sussex Wildlife Trust hopes to raise funds (£40,000) in order to improve woodlands on their nature reserves providing ideal habitat for Dormouse to breed and thrive.

It was reported in the West County Times (17.07.16) that James Power, Head of Land Management at Sussex Wildlife Trust said: "I am concerned about the future of dormice in Sussex unless we can improve management of their habitats. Dormice are now mainly found only in Southern England but even here they have a very patchy distribution and we need to extend our areas of habitat recovery to reverse this trend of falling numbers without delay hopefully this autumn……. These tiny mammals are reluctant to cross open country and if a wood or hedgerow becomes isolated or too small to provide for its needs there is a real danger that Dormice can become locally extinct".

The Mid Arun Valley has a substantial area of woodland (the Binsted Wood Complex), which is known to support viable populations of Dormice, as well as smaller areas of woodland littered across the landscape. These are usefully linked by shaws, hedgerows and tree-lines, for this species is unlikely to cross open areas. With such good habitat linkages, should the Dormouse population become extinct in one area, re-colonisation can occur.

4.1.8 Fish

The European Eel is a good species with which to demonstrate the connectivity of the freshwater habitat in the area and the quality of this habitat. Eels are found in rivers and ditches but leave the freshwater to breed in the Sargasso Sea in the West Atlantic. The young eels (elvers) migrate along the coastline and into freshwater, such as the River Arun and associated ditches, in order to develop and grow.

The connectivity of the landscape is demonstrated by the presence of this species in the lake in Lake Copse and a ditch in Lyminster. As there are records in these two separate places, the European Eel is likely to be throughout the area.

4.1.9 Invertebrates

Beetles

Most of the threatened species on the Binsted Wood Complex list are either from young open woodland or decaying trees and dead wood, both of which are scarce habitats. Of course, such species need to disperse and there are a number of standing and fallen trees in the area with significant amounts of dead wood habitat to be exploited throughout

the landscape. Two fallen trees found in a field at the eastern edge of Binsted at SU 99330 05700 (02/06/16) had the texture of balsa in places and were riddled with beetle larvae. Moreover, there were a number of female Lesser Stag Beetles *Dorcus parallelipipedus* in the vicinity, presumably egg-laying.

Many beetles, such as the Stag Beetle and the Glow-worm are active at dusk when light-levels are falling; this is often when the males set off in search of females. They will move across the landscape in this quest covering significant areas of suitable habitat.

Butterflies

The State of the UK's Butterflies 2015 report contains new long-term (since 1976) and 10-year analyses of butterfly trends from the UK Butterfly Monitoring Scheme (UKBMS) and the Butterflies for the New Millennium (BNM) recording scheme.

Multi-species indicators show that both habitat specialist butterflies and wider countryside species decreased significantly in abundance and occurrence. Indeed, a number of wider countryside species (e.g. Wall and Small Heath) now rank among the most severely declining UK butterflies.

Moreover, the latest research into UK butterfly responses to climate change suggests that it should no longer be assumed that southerly-distributed species would necessarily benefit in the future. Species' responses are much more variable than previously realised and the increasing frequency of extreme climatic events, already seen and predicted in many climate change scenarios, may have serious implications for butterfly populations.

The Mid Arun Valley landscape has a network of different habitats within which a substantial number of butterfly species were found. Moreover, the large area of interrupted landscape is able to support large and viable populations.

Moths

The picture for moths is as bleak as that for butterflies for *The State of Britain's Larger Moths* (2013) report shows clearly that moths are in decline. Forty-year national population trends were generated for 337 species of widespread and common moths. Two-thirds (227 species) showed decreasing population trends over the forty-year study and over one-third (37%) of the species decreased by more than 50%.

They indicate that the widespread decline of Britain's moths is a clear signal of potentially catastrophic biodiversity loss caused by human impacts on the environment. Moths comprise a substantial part of Britain's biodiversity and play important roles in food chains and as pollinators. Their decline will have knock-on effects on the birds, bats and mammals, which depend on them for food, and is a reflection of the widespread degradation of our environment.

Dragonflies and damselflies

The landscape offers a diversity of ponds and ditches from shallow and partially shaded to deep and open. Different species of dragonfly and damselfly have differing habitat requirements and so a diversity of habitats results in a more diverse range of species.

Moreover, the habitat connectivity means that as populations increase, dispersal across the landscape to areas of similar habitat is possible.

4.1.10 Otter

Eurasian Otter populations throughout Western Europe declined over the 20th Century, with the decline in the UK attributed to the introduction of cyclodiene pesticides (dieldrin and related compounds) in the mid-1950s (Chanin 2003) and their subsequent bioaccumulation in the aquatic food chain. Legislation restricting or banning the use of certain pesticides and improvements in water quality have led to an increase in Otter abundance and range.

There have been no definite Otter records along the Arun, however this species is just across the West Sussex border in Hampshire where there was a sighting along the West Rother at the end of 2015 (Fran Southgate, Sussex Wetlands Officer *pers. comm.* 31.05.16). As its range is increasing it is likely to be just a matter of time before this species appears along the Arun as there are no significant barriers to dispersal.

4.1.11 Reptiles

The Grass Snake is the most mobile of our reptiles. Individuals disperse from hibernation sites relatively rapidly and may move over several kilometres during the course of the active season. It wouldn't be unreasonable to suggest that this species may use areas of Binsted Woods for hibernation and migrate to the lower-lying land with wet ditches and ponds for the summer. Additionally, egg-laying sites tend to be communal and traditional, with many females habitually using the same precise location year after year.

Adders often use separate spring breeding and summer foraging areas, sometimes as much as two kilometres apart. After mating activity, Adders disperse and may migrate to a wetter habitat for the summer such as offered around the rifes and the floodplain grassland. Adders are faithful to particular hibernation sites and will return for the winter, tending to use communal hibernation dens, or hibernacula, with as many as several dozen snakes using an especially suitable site.

4.1.12 Water Vole

Water Vole used to occur throughout Sussex but it is estimated that the population has declined by 99 % in the last 30 years. This is due to habitat loss, habitat modification and predation by American Mink. Now, only three core breeding populations remain in Sussex in the Chichester Coastal Plain, the Arun Valley and the Rye and Romney Marshes. Moreover, the populations in the Chichester Coastal Plain and the Arun Valley have been boosted by re-introductions.

Sussex Wildlife Trust believes that there is insufficient habitat at a landscape-scale to support viable populations of Water Vole in Sussex generally, and that the majority of our wetland species and habitats are still declining rapidly. Wetland habitats in Sussex are at 'critical' and yet they are regularly being destroyed, damaged and fragmented by development.

Ditch networks, though cited as being 'ideal' habitat for Water Voles, only provide marginalized wetland habitats within strict linear confines, which are more easily hunted by Mink. The more complex habitat in the Binsted area with the wetland surrounding

Binsted Rife, the fields to the west of Tortington Rife, the reservoirs to the south of the area (SU 98739 04496) and the wet woodland around Lake Copse and Binsted Park may provide refuges for the species.

The National Water Vole Steering Group suggests that Water Voles need a minimum of 6 km of linear watercourse for long-term population viability. This will equate to a network of inter-linked ditches, ponds, pools, wetland habitats and watercourses on a site that would need to be between 100 ha and 600 ha.

The Mid Arun Valley provides a large expanse of interconnected habitat, which can theoretically sustain a Water Vole population and allow dispersal and potentially re-colonisation if the population were to become extinct.

5 CONCLUSIONS

5.1.1 Protected species and species diversity

This initial scoping survey has shown that this area has a higher diversity of species and many more protected species than previously thought. During just one recording session (31.07.16) a remarkable 13 bat species (three-quarters of the National total) were found. Two of these 2 are Annex II species, of which one (Bechstein's) has a maternity colony, making the site of National interest. Records returned form the Sussex Biodiversity Records Centre showed that 177 bird species had been recorded in a relatively small area, which is nearly a third of the total species in the country. The number of additional protected and UK BAP species previously recorded in the area is extremely high. An additional survey of beetles in Binsted Woods, turned up 400 species of which 27 are scarce and threatened.

Additionally, nearly half of the butterflies in the UK were recorded in just a few days in 2015; over 250 species of plant were recorded in the Binsted Wood Complex including 53 Ancient Woodland Indicators; an NVC survey of Binsted Rife showed a number of fen, swamp and grassland communities to be present; a two hour invertebrate survey within this community found 130 species including three nationally scarce and a UK BAP species; and during a three-minute standard net in water freshwater sampling survey undertaken in Binsted Rife seventeen genera were found.

5.1.2 Habitat quality

It has been demonstrated that this is an area of good quality habitat with the majority of the land being UK BAP priority habitat or in environmental stewardship schemes. Agri-environment schemes vastly increase the carrying capacity for protected species compared to intensively farmed land. Additionally, the Mid Arun Valley land not in agri-environment schemes is managed in order to increase its value to wildlife (Section 3.1.3). Furthermore, there is much habitat variation with eleven different priority habitats identified within the area. The high numbers of species that it can support further demonstrates the quality of the habitat.

5.1.3 Position in the ecological / geographical landscape

Apart from the range of habitats and the good quality habitat resulting in high species diversity, it is the proximity to other good quality habitats and the lack of barriers to dispersal that has resulted in the diverse range of species observed in the Mid Arun Valley. This habitat links directly to land in agri-environment schemes and other land of significant habitat value to the south and the west, as well as a continuation of priority habitat to the north and south providing wildlife corridors throughout the area.

In addition, the presence of the Binsted Wood Complex LWS within the landscape, the proximity to the Arun Valley Local Wildlife Site, the Arundel Park SSSI and the Arundel Wildfowl and Wetlands Trust Reserve, as well as the undesignated areas such as the rife valleys and grazing marshes, the permanent grassland fields within the woodlands, and the flowering hay meadows of Binsted Village, provides 'stepping stones' for a number of

rare and threatened species. Further inland to the north the Arun Valley is designated a SAC, SPA and Ramsar with important numbers of overwintering waterfowl.

The course of the River Arun with a margin of associated floodplain grassland can be traced from the coast to its origin in mid Sussex with very few barriers. This, when compared to other mid-Sussex rivers such as the Adur and the Ouse, provides a corridor that is largely uninterrupted by urban areas and major road networks.

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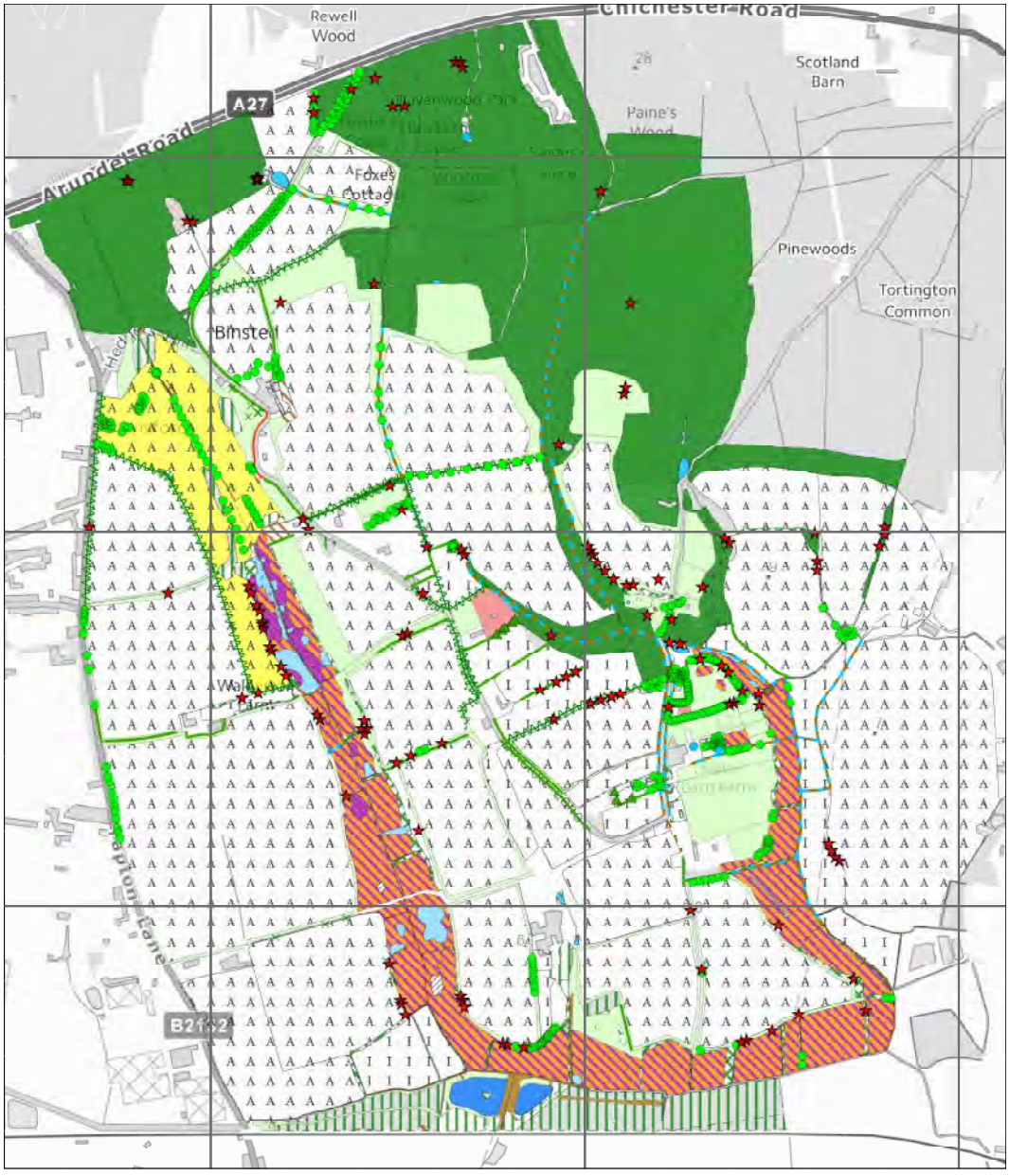
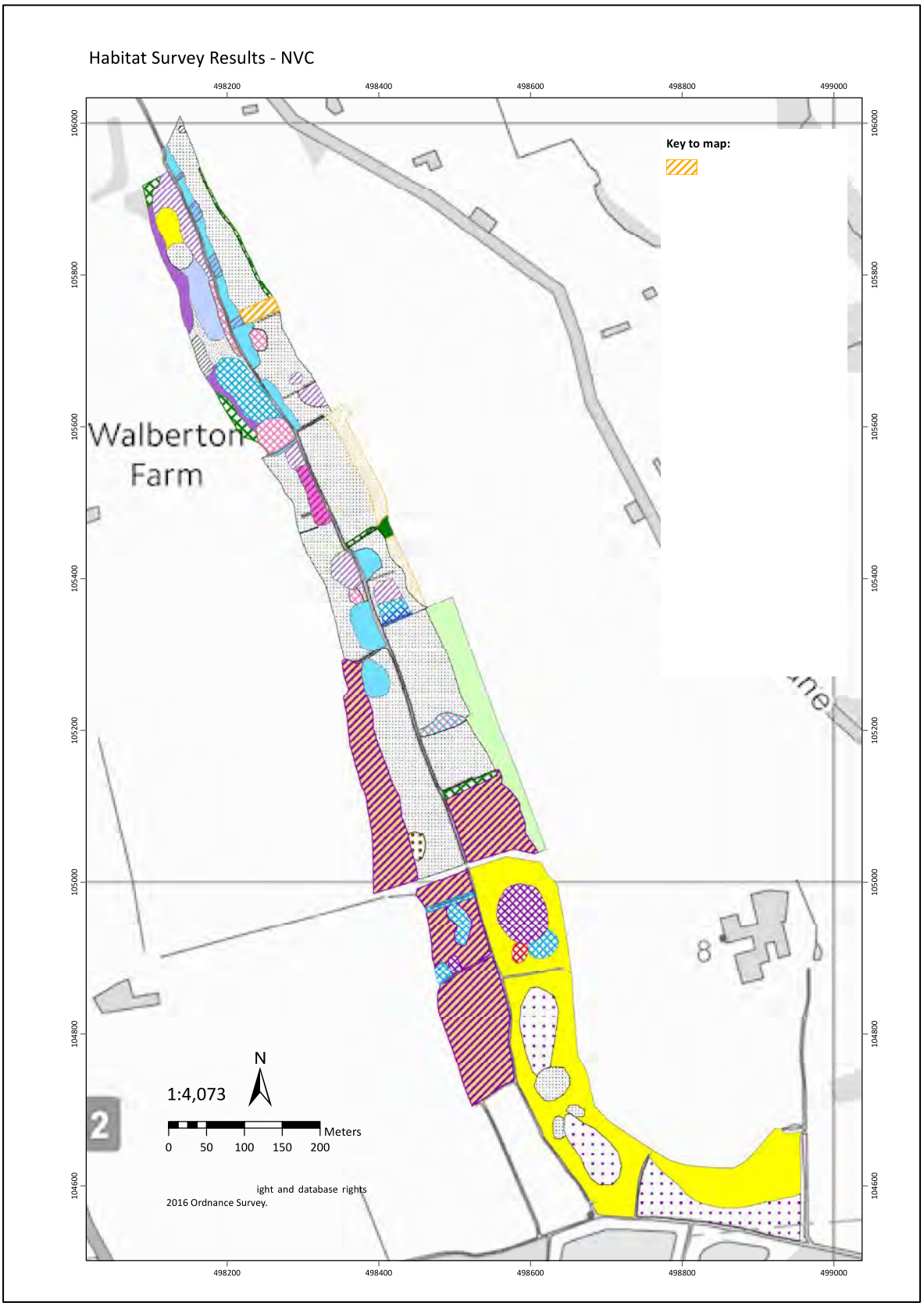
APPENDIX I – PHASE 1 HABITAT MAP



1:10,000

s 2016 Ordnance Survey.

APPENDIX II – BINSTED RIFE NATIONAL VEGETATION CLASSIFICATION MAP



APPENDIX III – LEGISLATION & CATEGORISATION OF THREAT

This section briefly describes the legal protection afforded to the relevant protected species mentioned in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice.

LEGISLATION AND POLICY

A brief summary of the key features of principal wildlife legislation, international and national, in respect of habitats and species in the UK is provided below.

Wildlife and Countryside Act 1981, as amended

The Wildlife and Countryside Act 1981 (as amended), consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive) in Great Britain. The Wildlife and Countryside Act 1981 is the principle mechanism for the legislative protection of wildlife in Great Britain. Part I gives protection to listed flora and fauna; Part II deals with the protection of Sites of Special Scientific Interest (SSSI) and Part III deals with Public Rights of Way.

The Countryside and Rights of Way Act 2000

This Act is built on the Wildlife and Countryside Act 1981, as amended. It affords greater protection to SSSIs and strengthens wildlife enforcement legislation and the legal protection for threatened species. In accordance with the Habitats Directive, the Act provides a specific list of habitats and species of principal importance for the conservation of biological diversity in England, and for which conservation steps should be taken or promoted. Action plans for these habitats and species have been implemented under the UK Biodiversity Action Plan process.

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.

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.

Schedule 1 Birds

Schedule 1 of the Wildlife and Countryside Act 1981 provides an additional tier of protection so that rare species are specially protected by increased penalties and cannot be intentionally or recklessly disturbed when nesting. Schedule 1 status also infers a right of arrest by a police officer if someone is suspected of committing certain offences against one of these species.

Farm Environment Plan

A Farm Environment Plan (FEP) is an essential part of the application process for Higher Level Stewardship (HLS) and provides a complete picture of the environmental interest of a farm. Some species are taken into consideration and included within the management objectives in the FEP.

PPS 9

PPS9 sets out current government policy on biodiversity and nature conservation and places a duty on planners to make material consideration to the effect of a development on legally protected species when considering planning applications. PPS9 also promotes sustainable development by ensuring that developments take account of the role and value of biodiversity and that it is conserved and enhanced within a development.

SPECIES LEGISLATION

Badger

Badger is protected in Britain under the Protection of Badgers Act 1992 and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended). Badgers are also listed in the Bern Convention Appendix III.

The legislation affords protection to Badger and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a Badger, or to attempt to do so;
- interfere with a sett by damaging or destroying it;
- obstruct access to, or any entrance of, a Badger sett; or
- disturb a Badger when it is occupying a sett.

Bats, Dormouse and Great Crested Newt

All these species are fully protected under The Conservation of Habitats and Species Regulations 2010 through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (e.g. all bats);
- Deliberate disturbance of bat species as:
  a) to impair their ability:
    (i) to survive, breed, or reproduce, or to rear or nurture young;
    (ii) to hibernate or migrate.
  b) to affect significantly the local distribution or abundance of the species;
- Damage or destruction of a breeding site or resting place; and
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats, Dormice and Great Crested Newt are also currently protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level);
- Intentional or reckless obstruction of access to any place of shelter or protection; and
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

Bechsteins and Barbastelle bats are also listed on Annex II of the Habitats Directive.

Breeding Birds

All species of bird are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). Protection was extended by the Countryside and Rights of Way (CRoW) Act 2000. Under the above legislation it is an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Certain species are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Sections 1(4) and 1(5). The protection was extended by the Countryside and Rights of Way (CRoW) Act 2000. There are special

penalties where the offences listed above are committed for any Schedule 1 species and it is also an offence to intentionally or recklessly:

- disturb any such bird when it is building its nest or while it is in or near a nest containing dependant young; or
- disturb the dependant young of any such bird.

Reptiles

Common Lizard *Lacerta vivipara*, Grass Snake *Natrix natrix*, Slow-worm *Anguis fragilis*, and Adder *Vipera berus* are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), in respect of Section 9(5) and part of Section 9(1). This protection was extended by the Countryside and Rights of Way (CRoW) Act 2000. Under the legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of these species; or
- sell or attempt to sell any part of these species either alive or dead.

All species of reptile are priority species in the UK BAP and have been adopted as Species of Principal Importance under Section 41 of the NERC Act (2006).

Water Vole

Water voles are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). As such it is an offence to:

- Intentionally kill, injure or take (capture) water voles;
- Intentionally or recklessly disturb water voles while they are occupying a structure or place used for shelter or protection; and
- Sell, offer or expose for sale, or have in his possession or transport for the purpose of sale, any live or dead water vole or part thereof.

Water Voles are species of principal importance under the Natural Environment and Rural Communities (NERC) Act 2006, and local authorities and other public bodies have a legal duty to take their conservation into account.

ADDITIONAL SPECIES LEGISLATION

Brown Hare, Common Toad, Hedgehog and Harvest Mouse

The Brown Hare, Common Toad, Hedgehog and Harvest Mouse all have UK BAP Species Action Plans. In addition the Brown Hare and the Hedgehog are listed in Appendix III of the Bern Convention and the Harvest Mouse is a Species of Principal Importance under Section 41 of the NERC Act (2006). The Hedgehog is given additional protection under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).

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