Epsom & Walton Downs

Habitat Management Plan 2015-2020

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1.0 INTRODUCTION

1.1 2015-2020 MANAGEMENT PLAN

The Countryside Team of Epsom and Ewell Borough Council has been commissioned to review and update the previous management plan 2008-12. Since the previous plan a borough wide review of Site of Nature Conservation Importance (SNCI) was carried out in 2013. As a result of this review the whole of the Epsom and Walton Downs was assessed as being SNCI quality. This was confirmed by the local sites partnership and adopted by Epsom and Ewell Borough Council. The need to have a management plan for an SNCI is set out in the Epsom and Ewell Local Biodiversity Action Plan 2010. In addition Natural Environment and Rural Communities Act 2006 (NERC) places a requirement in law on all public bodies to take reasonable measures to enhance the aesthetic, cultural, historical and biological interest of its open spaces, which could include the production and implementation of a management plan.

The importance of the site is indicated by the fact the site includes two habitats chalk grassland and woodland that are both habitats of principal importance as set out in NERC 2006 and the Epsom and Ewell Local Biodiversity Action Plan 2010.

1.2 BACKGROUND TO PREVIOUS PLAN

Epsom and Walton Downs Conservators commissioned Surrey Wildlife Trust Consultancies to write a habitat management plan for Epsom and Walton Downs in 2003. This document featured conservation and management objectives for the site and set out an annual work programme detailing what management should take place, where and when over 5 years. This came to an end in 2008. Therefore the Conservators asked Surrey Wildlife Trust Consultancies to review the document. In order to gather more information on specific management requirements for a variety of wildlife a number of specialist surveys were recommended. It was decided that a rolling future programme of surveys would be considered including birds and bats. During 2007 an invertebrate survey was carried out to gain baseline data for terrestrial invertebrates over the site. As a result of these surveys a new 5 year plan was written 2008- 2012.

1.3 ACKNOWLEDGEMENTS

There have been a number of people who have assisted with the writing of this plan, including EEBC Countryside Manager Stewart Cocker, Downskeeper Pete Murray and Surrey County Ecologist John Edwards. In addition there are a variety of experts and specialists who have invested time in managing and recording on the site and were asked for their management advice and species records. Conor Morrow has also worked the site for many years. He commented on the proposals and has taken time

to attend meetings. The site has in the past been important for a rare and beautiful butterfly called the Small Blue and Gail Jeffcoate from Surrey & SW London Branch of Butterfly Conservation has written a Species Action Plan for the species. Some of this information has been incorporated into this report. Information from a local coppice worker, John Sinclair, has also been included in the report

1.4 REPORT LAYOUT

The overall report and habitat section was previously completed by Isobel Girvan BSc (Hons) MIEEM, Consultancy Manager at Surrey Wildlife Trust Consultancy. Much of what was written in the previous report remains relevant and consequently is retained in the 2015-20 Habitat Management Plan.

Section 2 provides an overall picture of the ecological importance of Epsom and Walton Downs.

Section 3 gives a general description of the site.

Section 4 contains the botanical survey with detailed target notes on vegetation habitats and information on the National Vegetation Classification (NVC) communities.

Section 5 presents the invertebrate survey report, which provides a baseline of the invertebrate species found over the site.

Section 6 evaluates the site using the Radcliffe criteria, looking at a variety of different aspects of the site.

Section 7 details the factors that could affect conservation management, either directly or indirectly such as climate, funding and labour.

Section 8 supplies the management recommendations in practical terms with explanation as to why it is important to carry them out for the wildlife and habitats involved. This takes into account the information provided in the above sections. This is then summarised in a table.

Maps referred to in the text are then presented in the back of the document as Figures 1-8. Appendices 1-7 provide additional information.

1.5 DESK TOP RESEARCH

- Copies of the soils and geology sheets were examined for information.
- Previous survey work undertaken by the Sites of Nature Conservation Importance (SNCI) Surveyors was evaluated prior to the field site visits in 2014. The SNCI information is included in the Site Evaluation section under Position in an Ecological Unit.
- The Surrey Inventory of Ancient Woodland 2011 was checked for information on the woodlands present.

- A review of the records held by Surrey Wildlife Trust was also made in 2008 to identify any habitats of importance within the vicinity of Epsom & Walton Downs and any previous species records. Information was included in the overall species list in Appendix 3.

2.0 EXECUTIVE SUMMARY

2.1 MANAGEMENT REVIEW

The management of the majority of the site is mainly focused on the amenity and racing uses of the site. This has been both positive and negative for maintenance of the valuable chalk grassland habitat. The positive is that the regular mowing of the grasslands has prevented shrub encroachment which is a great threat to chalk grassland and has led to the complete loss of large areas of chalk grassland in other places. In some areas such as the grassland opposite the Derby stables frequent mowing prevented the dominance of rank grasses and allowed orchid species such as Autumn Lady's Tresses to thrive. The negative is the too frequent mowing and grassland improvement has led to the decline in the quality of the grassland in the main areas of the site. In some areas there is not enough cutting which has led to scrub encroachment, which has detrimental effects, such as butterflies declining including the loss of the Small Blue from Juniper Hill.

As part of the management plan review a condition assessment of the grasslands was carried out. Overall the grasslands were found not be in favourable condition(see details below)The best solution to improve this would be to introduce grazing, however as an alternative the next best solution to this problem is for the cutting to be carried out to the specification as set out in the management plan with special attention being paid to the collection and removal of the arisings.

The grassland of Juniper Hill bears special attention as is mentioned in the previous plan this grassland is considered to be the best of its type in Surrey. It is regarded by the Epsom and Ewell Local Biodiversity Plan working group as top priority to conserve and enhance. The comparison of aerial photographs from 1949 and 2013 show the extent of the loss of the grassland. The management recommendations for this area if carried out should ensure the maintenance and restoration of this nationally scarce and important habitat.

2.2 CHALK GRASSLAND RARITY

Epsom & Walton Downs covers 177 hectares (437 acres). This represents a substantial area of open space within a predominately urban context and represents a significant proportion of the Counties chalk grassland resource. Nationally it is within the North Downs Natural Area. Written in the Chalk Biodiversity Action Plan for Surrey it states that both Epsom & Walton Downs and the Golf Course 'have actually contributed to helping conserve large areas of chalk grassland and scrub'.

Following a survey by Surrey Wildlife Trust, it was noted that during the ten year period between 1975 and 1985, 212.2 hectares of unimproved grassland in the chalk region of the county were lost. Today,

areas of chalk downland that survive in Surrey are scattered across the Downs. There are approximately 9,500 hectares of chalk grassland in south east England that is approximately 21% of the UK resource. Only around 323.9 hectares of chalk grassland remain in Surrey (NCC, 1980). Such fragments of plants and animal communities that were once common through the Downs are now extremely rare and threatened by a range of land use changes. Its rarity gives this habitat a special value. The combination of plants and animals found here are effectively irreplaceable if damaged. The habitat cannot be recreated if lost. Chalk grasslands are undoubtedly a nationally and internationally rare habitat.

There are 12 Sites of Special Scientific Interest (SSSI) within the Downs Natural Area of Surrey. 9 have a chalk grassland component. The series goes some way to protecting the chalk grassland resource of Surrey. However, important areas exist outside the SSSI's, which have potential for enhancement (Chalk BAP, 1999) including Epsom Golf Course and Juniper Hill.

Hedley (1998) Chalk Grassland NCC report referred to Juniper Hill when he commented that 'the site is clearly important with only its size and fragmented nature preventing its recommendation as SSSI. An appraisal of the surrounding scrub and woodland may be worthwhile if the site be deemed worthy on inclusion within a proposed Epsom golf course SSSI.' In addition Joyce Smith from the Surrey Flora Committee commented after a visit in 1986 to Juniper Hill and Walton Downs that 'we do not know of another site in the County where so many Round-headed Rampion are contained in so small an area.'

2.3 RARE PLANTS

Confined to chalk grassland are the Fragrant Orchid and Pyramidal Orchid (Chalk BAP, 1999), both have been recorded on Juniper Hill, the latter has not been seen for some time. Currently in Surrey Pyramidal Orchid is only recorded in 20 sites and Fragrant Orchid even less at 11.

Juniper found on Juniper Hill is on the BAP2/3 Conservation Concern list (see Appendix 6 for definition). In Southern counties Juniper is in a critical state of decline with evidence of habitat fragmentation. There are only 5 known sites in Surrey, see Appendix 5 for the National Distribution of this plant.

On Juniper Hill three Nationally Scarce plant species reside (see Appendix 6 for definition and Appendices 2,3,4 &5 for National Distributions). They are Bastard-toadflax, Chalkhill Eyebright and Round-headed Rampion (also found in excellent quantities on Walton Downs).

2.4 UNUSUAL BIRDS

The mosaic of habitats provides breeding and feeding habitat for a number of declining bird species such as Skylark, a BAP 1 Species of Conservation Concern and RSPB Red list bird (see **Appendix 6** for definitions) and when RSPB surveyed the area some years ago they commented that '*the Skylark population was one of the best in the County*.' Peter Murray is a Groundsman on the Racecourse staff and a keen birder. He has been monitoring the bird populations for many years and provided some interesting information on Skylarks and an overall bird species list. These have been appended as **Appendix 8**. Further breeding birds survey work is recommended to evaluate the species using the site, where they are and providing management suggestions. In order to highlight the decline in populations the RSPB have come up with a Red and Amber list of birds, definitions are in **Appendix 6**. In addition the

Biodiversity Action Plan series have highlighted many birds as either BAP 1 or BAP2/3, again see the appendix for definitions. The birds found on the site which qualify have been put in a table below.

Bird Name	BAP 1	BAP2/3	RSPB Red	RSPB Amber
Skylark	⓾		⓾	
Meadow Pipit		⓾		⓾
Linnet	⓾		⓾	
Goldfinch		⓾		
Greenfinch		⓾		
Cuckoo				⓾
Great Spotted Woodpecker			⓾	
Yellowhammer		⓾	⓾	
Kestrel		⓾		⓾
Swallow		⓾		⓾
Herring Gull		⓾		⓾
Black-headed Gull		⓾		
Pied Wagtail		⓾		
Wheatear		⓾		
Blue Tit		⓾		
Great Tit		⓾		
House Sparrow			⓾	
Tree Sparrow	⓾		⓾	
Chiffchaff		⓾		
Willow Warbler		⓾		⓾
Green Woodpecker		⓾		⓾
Dunnock		⓾		⓾
Bullfinch	⓾		⓾	

2.5 DECLINING BUTTERFLIES

Since 1990, 28 species of butterfly have been recorded at Epsom & Walton Downs and Golf Course. Of particular concern are Small Blue and Chalkhill Blue and other butterflies confined only to chalk grassland including Green Hairstreak, Brown Argus, Marble White and Dark Green Fritillary. Due to its rapid local decline at the end of the twentieth century, the Small Blue is given High Priority in Butterfly Conservation's Regional Action Plan. This butterfly is declining nationally and by 2000 only about 15 populations remained in Surrey. At Epsom and Ewell it survives in 5 or 6 small areas where the larval food plant, Kidney Vetch is found. Since 2005, conservation work on Epsom Downs has created patches of more suitable habitat and the butterfly has responded by colonising these. A Species Action Plan (SAP) for the Small Blue has been written by Gail Jeffcoate and information from that is included in this report.

2.6 RARE INVERTEBRATES

The 2007 invertebrate survey recorded 118 species of which 7 are classed as rare or notable species including one beetle, one fly, four bees/wasps and one grasshopper. In addition there were 13 local species found, whose distribution is restricted to chalk grassland.

2.7 REASONS FOR DECLINE

These declines and losses can be attributed to the cut back of appropriate management, scrub encroachment and increased habitat fragmentation. Also changing priorities and difficulties in funding are to blame. However there is a great potential for restoring this area for nature conservation and enhancing its value for landscape, public access and heritage. The open nature and large size of the site is unusual and offers more potential for nature conservation than normally found.

2.8 ENORMOUS POTENTIAL

As Nick Owen formely from LMCP states '*My own view as a Countryside Manager is that, as one of the few truly large areas of open grassland remaining on the North Downs, the possible nature conservation potential of Epsom & Walton Downs is enormous* .'

2.9 GRASSLAND CONDITION ASSESSMENT

When the grassland of the downs were assessed in the summer of 2014 it was found that they were not in a favourable condition. The main grass areas of the site failed due to the herb ratio being too low, too few positive indicator species and too frequent occurrence of negative indicator species. Some the areas managed for nature conservation failed due to too high a frequency of scrub.

Extent. This attribute is on that is measured as the condition monitoring continues. The first time an area is monitored sets a base line

Sward composition – grass/herb ratio. In general semi-natural swards that are in good condition have a much greater broad-leaved herb component than agricultural grassland. It is thought that for neutral and calcareous grassland the broadleaved herb component should fall within the range 40-90%. It should be bourne in mind that some of the broadleaved plants such as creeping thistle that may be present are not a good indicator of positive condition.

Sward composition – frequency of positive indicators. There are for the type of grassland examined a list of species that are regard as positive indicators. The site in traversed and these species are recorded. In is recommended at 2 to 6 of these species should be frequent, found 41-60% of the time.

Sward composition – frequency of negative indicators. These should not make up more than 10% of an area individually and combined not more than 20% of the area.

Sward composition – frequency of shrub/trees. This attribute is set at there should be no more than 5% cover of woody species

CG2 positive Indicator species

Anthyllis vulneraria – Kidney Vetch

Asperula cynanchica – Squinancywort

Campanula glomerata – Clustered Bellflower

Carex spp – Sedge species

Centaurea nigra – Common Knapweed

Cirsium acaule – Dwarf Thistle

Filipendula vulgaris – Dropwort

Helianthemum spp – Rock-rose spp

Hippocrepis comosa – Horseshoe Vetch

Leontodon hispidus – Rough Hawkbit

Leontodon saxatilis – Lesser Hawkbit

Lotus corniculatus – Common Bird's-foot Trefoil

Pilosella officinarum – Common Mouse-ear

Polygala spp – Milkwort spp

Potentilla erecta – Tormentil

Primula veris – Primrose

Sanguisorba minor – Salad Burnet

Scabiosa columbaria – Small Scabious

Serratula tinctoria – Saw-wort

Stachys officinalis – Hedge Woundwort

Succisa pratensis – Devil's-bit Scabious

Thymus spp – Thyme spp

CG3/4positive Indicator species

Anthyllis vulneraria – Kidney Vetch

Asperula cynanchica – Squinancywort

Campanula glomerata – Clustered Bellflower

Carex flacca – Glaucous Sedge

Cirsium acaule – Dwarf Thistle

Filipendula vulgaris – Dropwort

Galium verum – Lady's Bedstraw

Helianthemum nummularium – Common

Leontodon saxatilis – Lesser Hawkbit

Lotus corniculatus – Common Bird's-foot Trefoil

Pilosella officinarum – Common Mouse-ear

Polygala spp – Milkwort spp

Primula veris – Primrose

Sanguisorba minor – Salad Burnet

Scabiosa columbaria – Small Scabious

Serratula tinctoria – Saw-wort

Stachys officinalis – Hedge Woundwort

Rock-rose

Hippocrepis comosa – Horseshoe Vetch

Leontodon hispidus – Rough Hawkbit

Anthriscu sylvestris – Cow parsley

Bellis perennis – Daisy

Cirsium arvense – Creeping Thistle

Cirsium vulgare – Spear Thistle

Carduus spp – Thistles spp

Chamerion angustifolium – Rosebay Willowherb

Galium aparine – Cleavers

Plantago major – Greater Plantain

Rumes crispus – Curled Dock

Rumex obtusifolius – Broad-leaved Dock

Senecio jacobaea – Common Ragwort

Sonchus spp – Sow Thistles

Urtica dioica – Common Nettle

Negative indicator species

Succisa pratensis – Devil's-bit Scabious

Thymus spp – Thyme spp

Lolium perenne – Perrienal Rye-grass

Holcus lanatus - Yorkshire Fog

Cynosurus cristatus – Crested Dogs-tail

Trisetum flavescens – Yellow Oat-grass

Arrhenatherum elatius – False Oat-grass

Dactylis glomerata – Cocks-foot

3.0 SITE DESCRIPTION

3.1 LOCATION

Epsom & Walton Downs are situated on the dip slope of the North Downs just south of Epsom town on the southern boundary of the Borough of Epsom and Ewell in Surrey. The grid reference for Epsom Downs is TQ 218582 and Walton Downs is TQ 220574. It is included in the OS Explorer 146 covering Dorking, Box Hill and Reigate, see **Figure 1 -Location**.

3.2 ALTITUDE

The lowest point on Epsom & Walton Downs is approximately 85m in the south-west rising to 150m in the north-east. This gives a gentle to moderate west facing slope. There is a moderate to steep south-east facing slope over Walton Downs.

3.3 LAND TENURE

Walton Downs is owned by the estate of the late Mr Stanley Wootton and is leased to the Horserace Betting Levy Board. Epsom Downs and Racecourse are owned by United Racecourse Limited (URL). Both are managed by the Epsom and Walton Downs Conservators.

3.4 RIGHTS OF WAY/ACCESS

There are a number of on-site car parks present. One is located just south of The Hill, two at Tattenham Corner and others along Grandstand Road. The nearest railway station is at Tattenham Corner Station. The Rights of Way comprise of several footpaths and bridleways, numbers are indicated on **Figure 2 – Rights of Way**.

3.5 GEOLOGY

The geological map relevant for this area is Sheet 286 Reigate printed in 1978. The entire area is Upper Chalk. The 1983 Soil Survey of England and Wales 'Soils of England and Wales Sheet 6 – South East England soil map', published 1983, describes the resulting soil type as a brown rendzina called Andover 1. This is a shallow well-drained calcareous silty soil over chalk and found on slopes and crests.

4.0 BOTANICAL SURVEY

4.1 METHODOLOGY

4.1.1 COLLECTION OF FIELD DATA

A review of the original Phase II vegetation survey was conducted during the summer 2014. It adopts the national standard for surveying vascular plants, by identifying and characterising the principal wildlife habitats.

Those vascular plant species that were recorded (see **Appendix 1** for the overall species list including historical records), were given an abundance rating using the DAFOR scale, and is used to describe how often a plant was seen over the site and is employed in the Target Note description stage. It used the following key as a guide:

(**L**ocally) **D**ominant, **A**bundant, **F**requent, **O**ccasional, **R**are

Target Notes were used to highlight any differences in communities and habitats and other habitat features of interest were noted and refer to named areas and habitats on the site, see **Figure 3 – Location References**. The target note numbers are detailed on the associated map, **Figure 4.** Plants ranked as 'rare' means that they were not found often over this site and does not necessarily indicate that they are a County Rarity.

4.1.2 NATIONAL VEGETATION CLASSIFICATION (NVC) 2008

During the summer visits the NVC classifications were checked and reviewed. NVC classifications were made by –

- Field data obtained from walkover survey was analysed using MAVIS plot analyser software as a tool in the analysis and categorisation of NVC plant communities. This software enabled NVC communities (including sub-communities where possible) to be identified to a best fit from the data.
- The data was also compared against the field data against the characterisation published in the NVC descriptions (source: "*British Plant Communities"* Rodwell 1991.) making particular use of target notes made in the field.
- The expertise and knowledge of the surveyors.

4.2 RESULTS 2014

Target Note 1: Area nr car park, Semi-improved mesotrophic grassland. This grassland contains a diverse mix of plants including the county rarity and nationally scarce, Rounded Headed Rampion. Other herbs included Agrimony, Black knapweed, Common Sorrel, Lady's Bedstraw, abundant False Oat grass, Gorse, Perennial Rye Grass, Salad Burnet, locally abundant Upright Brome, Restharrow, occasional Dropwort, Burnet Saxifrage, Wild Basil, Marjoram, Common Rock Rose, Chalk False Brome, Cypress Spurge. This list of plants show an interesting flora that has developed on the chalk soil but plants such as Perennial Rye Grass show a degree of disturbance and 'improvement'.

Target Note 2: This is a small triangle of semi-natural broadleaved woodland. The canopy was composed of abundant English Oak, abundant Ash, rare Silver birch, concentrated along the northern edge and rare Wild Cherry. The canopy was mostly quite open, with the trees even aged. There are scattered larger trees to be found mostly English Oak. The shrub layer is generally sparse composed of rare Elder, occasional Hawthorn, rare English Elm, Holly, Yew and some coppiced Hazel and some dense areas of Bramble. In some places the vegetation was dominated by young Ash regeneration. There was a small amount of fallen and standing dead wood present. The epiphytic bryophytes were sparse, dominated by Rhynchostegium confertum. The herb was composed of Lords and Ladies, Hogweed, Herb Robert, Wall Lettuce, Hedge Woundwort, Dog Mercury, Ground Ivy and extensive patches of Ivy. The ground layer is patchy with some areas of Atrichum undulatum, Eurhynchium striatum, Fissidens taxifolius, Barbula unguiculata and Dicranella varia. On the edge of the woodland was a dense patch of the non-native shrub, Snowberry.

Target Note 3: Warren grassland. Mesotrophic grassland, with abundant False Oat grass, rare Upright Brome, Cocksfoot, Creeping Bent and herbs including Hogweed, Agrimony, Black Knapweed and Birds foot Trefoil.

Target Note 4: This is a thin strip of trees with a dense scrub layer along the edge closest to the path. The canopy is composed of dominant English Oak, with rare Ash, Silver Birch and Scots pine. The scrub is composed of abundant Hawthorn, frequent Wild privet and rare English Elm, Dog rose, Buckthorn, Dogwood and Blackthorn. The trees and the dense scrub cast a dense shade with little growing underneath with mainly Ivy found.

Target Note 5: Juniper Hill Woodland. This is a mixed area of semi-natural broadleaved woodland with areas were the canopy is dominated by Ash, and some Pedunculate Oak.. The scrub layer is dominated locally by Hawthorn and Blackthorn. There is an area of older woodland with larger Beech and Oak and a shrub layer composed of coppiced Hazel and Hawthorn. There is also an area of developing woodland with abundant Whitebeam present. Some of the trees and shrubs had Orthotrichum affine, Zygodon conoides, Cryphaea heteromalla, Neckera complanata and uncommon Metzeria temperate on them. The herb layer is composed of abundant Ivy. Areas of ground flora are dominated by the moss Eurhynchium striatum. As the grassland is approached there is a large area of scrub dominated by Hawthorn. Along an open path through this area herbs such as Wild Marjoram and Basil are found. If the 1950's aerial photograph is examined this area along with most of the rest of the now wooded area was open grassland.

Target Note 6: Juniper Hill grassland. This contains an area of very diverse calcareous grassland with a low rabbit grazed sward. Grasses include Sheep's fescue, Crested Hair-grass, Chalk False Brome, Upright Brome, Hairy Oat Grass, Meadow Oat Grass and Glaucous Sedge. Herbs include Harebell, the national scarce Bastard Toadflax, Round headed Rampion, Autumn Gentian, Clustered Bellflower, Squinancywort, Fairy Flax, Eyebright, Marjoram, Wild Basil, Horseshoe Vetch, Kidney Vetch, Wild Thyme, Salad Burnet, Burnet Saxifrage and Carline Thistle. In amongst the turf can be found the mosses Psuedoscleropodium purum, Calliergonella cuspidata and in the scrapes are found chalk specialist bryophytes including Fissedens dubious, Trichostomum crispulum, Wessia brachycarpa, Wessia longifolia, Microbryum curvicolle and Ctenidium molluscum. In some areas the grassland is coarser with

a taller sward. In these areas the overall abundance of the herbs is less and grasses are more dominant especially Chalk False Brome. In areas there is scattered scrub encroachment, including Dogwood, Hawthorn and Blackthorn which in some areas becomes extensive. In the grassland and the surrounding woodland there are a number of young Juniper bushes. Along the path as you enter the area from the Gallop, there is a scattering of the robust plant Ploughman's Spikenard.

Target Note 7: This is an area of broadleaved semi-natural woodland and dense scrub. This area was composed of frequent Hawthorn, occasional Buckthorn, occasional Wild Privet, rare Ash, rare Yew, rare Elder and rare Spindle. The ground flora was more developed than in other areas with patches of Oxyrrhynchium hians and Eurhynchium striatum. The epiphytes was also good with Metzgeria furcata, Frullania dilatata, Radula complanata, Zygodon conoideus, Cryphaea heteromalla amongst those found. An active Rabbit warren was found in this area.

Target Note 8: Walton Downs B grassland, Area of sloping calcareous grassland forming a tall sward with rare but extensively distributed Hawthorn scrub encroachment. The sward was composed of frequent Upright Brome, False Oat Grass, patches of Chalk False Brome occasional Cocksfoot, and Quaking Grass. Also found are Round Headed Rampion a national scarce plant, Lady's Bedstraw, Agrimony, rare Salad burnet. The ground flora is limited to small amounts of Kindbergia praelonga and Brachythecium rutabulum.

Target Note 9: Southern boundary woodland strip. This is linear strip of woodland of various widths along its length. It contains a large number of woody species. These include Hazel, Buckthorn, Blackthorn, Elder, Field Maple, Dogwood, Dog-rose, Hawthorn, Oak and Spindle. There were also the climbers White Bryony, Black Bryony, Clematis and Ivy. Along the base of this wood strip are herbs including Upright Hedge Parsley, Creeping Thistle, Dogs Mercury, Agrimony, Hedge Woundwort (along with the Woundwort bug), Common Couch and Cocksfoot.

Target Note 10: Southern bridleway: a linear strip of rough unmown grassland along the southern boundary following a pathway and gallop. It is composed of mesotrophic and ruderal species such as Hedgerow Cranesbill, Yarrow, Ribwort Plantain, Common Nettle, Silverweed, Cocksfoot, White Nettle. Less commonly found are plants more indicative of calcareous grassland including Upright Brome, Salad Burnet, Restharrow, Wild Parsnip, Wild Basil and Wild Marjoram. In addition there is some scrub encroachment including, Hawthorn, Buckthorn, Hazel, Ash and Oak.

Target Note 11: Langley Vale Copse: This is semi-natural broadleaved woodland. The canopy is composed of abundant Ash, frequent English Oak and rare Beech. The shrub layer is reasonably well developed with abundant coppiced Hazel, occasional Hawthorn, rare Holly, rare yew and rare Wild Privet. The herb layer was dominated by abundant Ivy with rare Herb Bennet and rare Dogs Mercury. The ground layer was very sparse with lots of bare ground; there was a patch of the moss Barbula sardoa. Generally the coverage of epiphytes was low. The amount of fallen dead wood was good. In some areas the canopy is very open with dense coppiced Hazel. On other areas there were patches of young age regrowth. Most of the canopy trees are the same age and size, with the exception on number of larger more mature Beech trees, some of which were multi-stemmed. In this area there is an active badger sett.

Target Note 12: A small stretch of species rich hedge, the hedge is composed of abundant hawthorn, occasional Buckthorn, rare Bramble, Dog Rose, Wild Privet, Spindle, Holly, Wayfaring Tree, Dogwood, Hazel, Blackthorn, Yew, Sycamore. There was also found the occasional lager tree mainly Oak and Ash. Also covering some of the trees and scrub were the climber Ivy and Clematis.

Target Note 13: Warren woodland. The woodland here is semi-natural broad-leaved woodland. The canopy layer is made up of abundant Pedunculate Oak, with frequent Ash, rare Sycamore, rare Whitebeam and rare Beech. The scrub layer is composed of abundant Hazel including old and recent coppice stools, Holly, Buckthorn, Privet, Dogwood and frequent Bramble. The field layer is made up of Hogweed, Cow Parsley, Hairy St John's Wort, Nettle, Wood false brome, Wood sedge, Dog's Mercury, Wood Avens, Bearded Couch and Sanicle. The ground layer was sparse dominated by Kindbergia praelonga and Brachythecium rutabulum, Atrichum undulatum and Fissidens bryoides. The epiphytic bryophytes were generally poor mostly just Rhynchostegium confertum. There was a good amount of fallen dead wood found in this area. In the updated inventory of ancient woodland (2011) in Surrey this woodland is included as an 'ancient' woodland.

Target Note 14: The Warren Meadow West Semi-improved mesotrophic grassland which is regularly mown and tends to be more herb rich closer to the woodland, where the management is not as intense. Grasses present include frequent Perennial Rye-grass, Rough Meadow-grass, Yorkshire-fog, False Oat-grass, Upright Brome and occasional Red Fescue and Soft-brome. Herbs are occasional to frequent with Agrimony, Cat's-ear, Red Bartsia, Red Clover, Ribwort Plantain, Common Birds's-foot Trefoil, Wild Carrot, Silverweed, Yarrow, Lesser Stitchwort, Creeping Buttercup, Creeping Thistle, Dandelion and Broad-leaved Dock.

Target Note 15: The Warren Meadow East. Similar to above although with fewer herbs in the sward, probably because of past improvement and use as a paddock. There is much potential to increase the number of species and encourage calcareous loving species too. It becomes much more diverse in the north west corner with good populations of Selfheal and Common Knapweed. The western field tends to be a little more species rich with frequent Common Knapweed, Perforate St John's-wort, Yarrow and occasional Germander Speedwell, Ladies Bedstraw, Meadow Vetchling, Oxeye Daisy and locally frequent patches of Tufted Vetch and Field Scabious. There is a rich hedgerow scrub edge around both of the fields with a mature mix of Traveller's Joy, Hawthorn, Blackthorn, Ash, Hazel, Sycamore and Pedunculate Oak.

Target Note 16: Semi-natural broadleaved woodland. This is one of the larger blocks of woodland on the site. The woodland mostly has an open canopy composed of frequent Ash, frequent English Oak, occasional Sycamore, rare Silver Birch and rare Beech. In places the shrub layer is dominated by Hazel and in other Yew and Holly. In addition was found rare Blackthorn, Hawthorn, Buckthorn, Spindle and frequent Bramble. The herb layer was made up of mainly Ivy with occasional Dogs Mercury. In addition to the Ivy on the ground some of the trees had dense coverage of Ivy as a climber. There are areas which were dominated by young Ash. There was a good amount of fallen dead wood found throughout the wood. There was found a small amount of non-native trees in the wood including Cherry Laurel and a Spirarer. Also near to the path was a small area dominated by Rose-bay Willowherb.

Target Note 17: Downshouse (Small blue scrape) grassland. This is an area of calcareous grassland forming a tall sward, with frequent Upright Brome and occasional Quaking Grass. Also found here is Salad Burnet, Agrimony and the Small Blue's larval food plant Kidney Vetch. This are is similar in composition to a lot of the grassland of the site, it has a more developed flora simply due to the more appropriate cutting regime.

Target Note 18: Downs House Woodland. The woodland is composed of a fairly open canopy of frequent English Oak, Ash and Wild Cherry. The Wild Cherry was generally found together in one stand. On the edge of the wood was found some Turkey Oak. The shrub layer overall is sparse composed or rare Hawthorn and Hazel and rare Holly which in places occurs in dense patches. The herb layer is poor dominated by Ivy with rare Wood False Brome

Target Note 19: Calcareous grassland, nr above, This is an area of calcareous grassland forming a tall sward, with frequent Upright Brome and occasional Quaking Grass and patches of locally abundant Chalk False Brome. Herbs include Lady's bedstraw, Salad burnet and Dropwort

Target Note 20: Epsom Downs West scrub. This area is a mosaic of woodland and scrub. The scrub areas include areas of dense Blackthorn with a herb layer dominated by Dogs Mercury, Ivy and Ground Elder. Mixed scrub made up of Hazel, Blackthorn, Crab Apple, Dogwood, Elder, Buckthorn and Wayfaring tree. The herb layer was also dominated by Dogs Mercury and Ivy with rare Lords and Ladies. Throughout the areas of scrub were scattered taller trees including Ash and Turkey Oak. Also within the scrub were open areas with abundant Common Nettle, Bramble and Large Bindweed. Alongside the path was a grassy margin made up of Chalk False Brome, Cocksfoot and False Oat Grass with Burnet Saxifrage, Wild Basil, Rest Harrow, Common Field Scaboius, Yarrow, Wood False Brome, Hoary Ragwort. There are areas of more developed woodland with large Oaks, Ash and Beech. The scrub layer is made up of Elder, Spindle, Dogwood and local dominant Holly and Privet. The Elders support abundant epiphytic bryophytes including Orthotrichum affine, Zygodon Conoides, Cryphaea heteromalla and uncommon Metzeria temperata. The herb layer is made up abundant Dogs Mercury and Ivy with occasional Wood Melick.

Target Note 21: Epsom Downs West grassland. This is an area of calcareous grassland forming a tall sward, with frequent Upright Brome and occasional Quaking Grass and patches of locally abundant Chalk False Brome. Herbs include Lady's bedstraw, Salad burnet and Dropwort

Target Note 22: This is a thin strip of scrub running alongside a path. It is composed of dominant Blackthorn, occasional Buckthorn, rare Spindle, Elder, Hawthorn, one large Field Maple. Also found were the invasive species the shrub Snowberry and Turkey Oak. The strip had a dense ivy dominated herb layer and the climber Clematis.

Target Note 23: Short mown grass areas nr Grandstand, calcareous grassland, with Sheep's Fescue, Upright Brome, Wild Thyme, Small Scaboius, Salad Burnet, Burnet Saxifrage, rare Autumn Lady's Tresses. Although the Autumn Lady's Tresses is rare as described by the DAFOR index. It is in fact there in great numbers with on some years there are 1000 plants. This plant is classed as near threatened in the draft Surrey rare plant register

Target Note 24: The Hill -Tattenham Corner Roadside Verge . Species rich verge with Wild Mignonette , Common Vetch, Field Wood-rush, Sweet Vernal-grass, Burnet Saxifrage, Creeping Cinquefoil, Greater Knapweed, Dove's-foot Crane's-bill, Common Toadflax, Small Flowered Crane's-bill, Sticky Mouse-ear, Cow Parsley, White Dead-nettle and Bulbous Buttercup.

Target Note 25: Grassland general. There are large areas of the grassland across Epsom Downs that is improved grassland with in places abundant Perennial rye grass. However, there are also numerous areas across the site, some extensive of Upright Brome these can be seen both on the ground and in aerial photographs as pale whitish patches. Although these area are dominated by the grasses there are rare but widely scattered herbs including Salad burnet, Burnet Saxifrage, Sainfoin, Lady's Bedstraw, Agrimony, Small Scaboius, Birdsfoot trefoil and Quaking Grass. This is also true of Walton Downs with areas scattered with Upright Brome and a large area towards the lower half of the sloping site dominated by Upright Brome with scattered herbs including Lady's Bedstraw, Common Field Scabious, Bird's foot trefoil, Black Knapweed, isolated but extensive patches of Common Rock Rose, Salad Burnet.

4.2.2 NATIONAL VEGETATION CLASSIFICATION (NVC)

The following information has also been translated into map form, see **Figure 5 – NVC Habitats**.

National Vegetation Classification System (NVC)

NVC has become the standard classification used for describing vegetation in Britain. The NVC aims to describe all the vegetation of Great Britain. Successional or treatment related changes from conservation management in the vegetation, for example between open glades, shaded rides and the vegetation of clear fells can be more easily described that is possible using other classifications.

NVC breaks down each broad vegetation type eg woodland into communities, designated by a number and a name, some then also contain several sub -communities, designated by a letter.

Woodland NVC

W8 Fraxinus excelsior – Acer campestre – Mercurialis perennis woodland (Ash – Field Maple – Dog's Mercury)

- The Warren Woodland (Target Note 2)
- Juniper Hill Woodland (Target Note 5)
- Downs House Woodland (Target Note 18)

This is abundant in the warm, dry, lowlands of southern Britain. Ash, field maple and hazel are characteristic of W8, with hawthorn and also sycamore in disturbed or secondary stands. The sub communities are based chiefly on the dominant field layer species.

W8d *Hedera helix* sub-community (Ivy)

- The Warren Woodland (Target Note 16)
- Downs House Woodland (Target Note 18)

In this community the field layer contains an abundance of Ivy and often False Wood Brome and is overall species poor.

There is a distinct relationship the W8d sub-community and W10c which is also relatively specie spoor and characterised by abundant Ivy.

W8a *Primula vulgaris – Glechoma hederacea* sub-community (Primrose – Ground-ivy)

This sub-community is particularly common woodland which has been managed as coppice with standards and is the most common. Hazel tends to be the more prevalent shrub, although hawthorn is common. The field layer contains frequent Dog's Mercury with some Bugle, Ground-ivy, Rough Meadow Grass and Primrose.

W8a/d transition

The Warren Woodland (Target Note 2) Areas that have been hard to distinguish between W8a and W8d have been concluded as a transition between the two and marked as W8a/W8d. Most often found with a fairly closed canopy giving a dense and gloomy appearance. Signs of past coppicing are frequent, but as is the case most places coppicing is now neglected with resulting overstood Hazel stands. Ivy is dominant as ground carpet with Dog's Mercury. The undisturbed period of canopy closure seems to be important for the spread of Ivy. Distinct areas of Ground-ivy can be attributed to the *Primula vulgaris-Glechoma hederacea* sub-community.

W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland (Pedunculate Oak – Bracken – Bramble)

Epsom Downs West Woodland (Target Note 20)

Oak is the most common tree with Silver Birch abundant. Ash is not so common here, but Sycamore is often common. Hazel is generally the most abundant shrub with Hawthorn.

The field layer lacks Dog's Mercury and instead Bluebell and Wood Anemone are often spring dominants with Bramble, Bracken and Honeysuckle.

W10c *Hedera helix* sub-community

The most distinctive feature is the carpet of Ivy, Bracken, Bramble and Honeysuckle, but Bluebell is less common and therefore can be difficult to distinguish between this sub community and W8.

W10c/W8a/W8d

The Warren Woodland (Target Note 3)

An area woodland which shows characteristics of both W10 and W8.

<u>Scrub Communities</u>

W21 *Crataegus monogyna – Hedera helix* scrub

- The Warren Hedgerow (Target Note 12)

- Walton Downs Scrub (Target Note 7)

This is a large community encompassing mostly of the seral thorn scrub and many hedges. The vegetation is always dominated by various mixtures of smaller trees and shrubs with woody climbers and sprawlers. It is a varied and species diverse community. Hawthorn is generally the most frequent shrub present, as it tends to be the first invader on grassland. The other common thorny tree is Blackthorn, which in places can be the dominant component through suckering. Bramble is also common, with a sparse field layer because of the dense canopy, although Ivy can be abundant.

W22 Prunus spinosa – Rubus fruticosus scrub

Downs House Woodland/scrub (Target Note 20)

Whilst Blackthorn is frequent in W21 scrub here is the sole woody constant and mostly overwhelmingly so.

<u>Grassland Communities</u>

MG1a Arrhenatherum elatius grassland Festuca rubra sub-community

- The Warren Grassland (Target Note 3)
- The Warren Meadow (Target Note 14)
- Tattenham corner roadside Verge (Target Note 24)

This grassland type is a community in which coarse-leaved tussock grasses such as False Oat grass with Cock's-foot and Yorkshire-fog are always conspicuous and generally dominant. Umbel lifers are often present with Creeping Thistle, Common Knapweed and Common Nettle although in MG1a Nettle is less common. Finer grasses are underneath especially Red Fescue along with Rough Meadow grass and Perennial Rye-grass along with Red Clover, White Clover, Yarrow and Dandelion.

MG1a/CG3

The Hill, East of Car Park (Target Note 1)

This sward represents a community which shows a strong correlation with an MG1a sward, but is transitional with a more calcareous sward. This calcareous grassland community is called ***Bromus erectus* grassland**, where Upright Brome is dominant with other grasses such as Tor grass not being represented. It is often associated with ungrazed or only lightly grazed swards.

CG2a Festuca ovina – Avenula pratensis grassland, Cirsium acaule – Asperula cynanchica sub community

Juniper Hill (Target Note 6)

This tends to be a short close cropped grassland rich in species. The grasses are mostly fine grasses such as the Sheep's Fescue. Herbs found here can include Ribwort Plantain, Common Bird's-foot Trefoil, Ladies Trefoil as well as others more commonly associated with calcareous grasslands such as Thyme, Fairy Flax and Eyebright.

CG2/3

- Walton Downs Grassland (Target Note 8)
- Southern Bridleway (Target Note 10)

This community type is a transition between the two swards mentioned above.

CG2a/3/4

- Downs House Grassland (Target Note 17)
- Epsom Downs West Grassland (Target Note 21)

A transition between three different types including **CG4 *Brachypodium pinnatum* grassland**. Upright Brome is dominant in the sward and is often a bulky tussocky sward associated with relaxed grazing. Sheep's Fescue is also consistent here with few herbs present.

5.0 TERRESTRIAL INVERTEBRATE SURVEY

5.1 INTRODUCTION

Lowland calcareous grassland supports a large number of scarce and highly local invertebrate species. A high proportion of these are species with pronouncedly southern distributions in Britain, many of which at British latitudes appear to require sunny situations on well-drained soils. These conditions are often particularly well met on lowland calcareous grassland. The principal threat to most specialist invertebrate species is likely to be from encroachment of scrub and the development of rank vegetation that may result from a lack of grazing. Maintenance of grazing regimes, by rabbits or by livestock, and holding back or setting back succession by other means are probably the main management tools to be used to benefit invertebrates. However, whilst botanists have tended to put priority on short turf, important invertebrate faunas also occur in intermediate or long sward, and calcareous scrub. Many invertebrates require a mosaic of vegetation structure and composition so are very vulnerable to a management strategy that results in uniformity, as can happen with single objective grazing or mowing.

Management should aim to achieve a good mosaic of sub-habitats, including areas of short turf, bare ground, long grass and a limited amount of scrub. The more open areas attain high temperatures in summer and support many species restricted to the south of England. Small patches of bare soil can be enough for these species, but the adjacent plants may need to be a few centimetres in growth or longer. The richest invertebrate faunas are in intermediate length turf with a reasonably open structure and floristic diversity (such as *Bromus erectus* grassland). A few invertebrate communities are restricted to the longer turf. Over -wintering invertebrates will require the protection of tussocky vegetation in which to shelter at this stage.

Sward height is of crucial importance to many of the rarest species of chalkland butterfly, which require very specific conditions. Some calypterate fly species are also very choosy about sward height - a

knowledge of the species present on a site will allow land managers to formulate an appropriate management plan.

Since 1990, 28 species of butterfly have been recorded at Epsom & Walton Downs and Golf Course. Since 1998, Martin Ellis and other members of Surrey and SW London Branch of Butterfly Conservation has been monitoring butterfly numbers at Juniper Hill on a regular weekly basis during the summer months, using a widely recognised standard method. About half of the species recorded are butterflies that are common and widespread and likely to be encountered in many places, including urban parks and gardens. The others are grassland butterflies that live in discrete colonies. A few of these are specialist of chalk grassland and are scarce and declining in Surrey and in other parts of Britain. Species of particular importance at Epsom are:

The Small Blue is a UK BAP Priority Species. Due to its rapid local decline it is given High Priority in Butterfly Conservation's Regional Action Plan. This small, inconspicuous butterfly, which flies in June, is declining nationally and in Surrey it declined at the end of the twentieth century until only about 15 populations remained in the county. At Epsom and Ewell it survives in 5 or 6 small areas where the larval foodplant, Kidney Vetch is found. The plant is in decline here, especially at Juniper Hill. The entire Epsom Downs area is of great importance because adults are still able to move regularly between patches of Kidney Vetch here. Populations in many other areas are more isolated. Monitoring of this species involves searching for eggs in the flowers of Kidney Vetch during the flight period in June, as well as recording numbers of adults seen. Monitoring of Kidney Vetch, especially the presence and number of young seedlings, is also important. Eggs are laid, and larvae develop, only in the flowers of Kidney Vetch. Conservation measures are aimed at increasing the amount of Kidney Vetch and involve small-scale ground disturbance in carefully chosen spots.

Since 2005 conservation work carried out at Epsom Downs and at other sites in Surrey has improved the status of the Small Blue in the county. There have been two or three colonisations by the butterfly of newly created habitat, notably in the Guildford area, and the Small Blue now occurs at about 20 sites in Surrey.

At Epsom Downs, work has been carried out by the Lower Mole Countryside Partnership, working in partnership with local staff, on the Golf Course, Racecourse and at Juniper Hill. On the Golf Course, since 2006, habitat has been created and maintained by management of scrub and creation of patches of bare chalk (scrapes) in the area around TQ22165914. These have been seeded with Kidney Vetch from nearby. This has been successful, with the population of Small Blue now being able to breed in habitat patches that were previously dense scrub. On the Racecourse, scrapes were created in 2005 and 2010 at TQ21695792. The older scrapes continued to provide Kidney Vetch after ten years, though Tor-grass growth was reducing their effectiveness. The population at Juniper Hill died out in about 2002, as a result of scrubbing over of the grassland. Work carried out by local staff and the Lower Mole Countryside Partnership has included creation of scrapes as well as scrub removal, and Kidney Vetch has grown from seed here, but rabbits find Kidney Vetch palatable, and by 2014 there was not enough suitable habitat with flowering Kidney Vetch to enable the Small Blue to return. Monitoring of the Small Blue by using egg counts has the advantage that the counts can be carried out in dull weather or in the

evening when the adults are not active. Those site managers who are interested in learning can be shown on request. This exercise only has to be carried out once a year and it is not time consuming.

The Chalkhill Blue is on the wing in July and August and is more conspicuous that the Small Blue. Its larval foodplant is Horseshoe Vetch and at Epsom the Chalkhill Blue is restricted to the few small areas where this plant still grows. Both plant and butterfly declined as coarse grass and overgrown scrub spread, especially at Juniper Hill. Although Horseshoe Vetch persists in an overgrown sward for longer than Kidney Vetch, once it is lost it does not return, and cannot be grown from seed as easily as Kidney Vetch, and conservation measures to improve the habitat for both plant and butterfly are needed. Scrub work at Juniper Hill from 2011 has led to the partial recovery of grassland, along with cutting and removal of Tor-grass. In 2013 Horseshoe Vetch could be seen in several places in the sward.

Other butterflies found at Epsom & Walton Downs that in Surrey are confined mainly to chalk grassland are the Green Hairstreak, Brown Argus, Marble White and Dark Green Fritillary. Only a single specimen of the last of these has been recorded at Epsom in recent years and this was probably a vagrant from one of the few remaining populations in Surrey, although it is possible that it breeds in low numbers at the site in some years. In 2012-14 damper conditions encouraged the strong growth of Hairy Violet, the larval food plant of the Dark Green Fritillary, and it is more likely that breeding occurred on Epsom Downs then. Provision of good quantities of Hairy Violet, by an appropriate cutting regime on the grassland across the Downs should encourage this nationally declining species.

The grassland at Epsom supports a good range of butterflies (nearly half the British list has been seen here in recent years). Juniper Hill is especially valuable as a habitat for chalk grassland specialist, but populations have fallen here due to encroachment of scrub and Tor grass. Scrub control and especially grazing would halt the decline and benefit the butterflies and many plants. Where mowing is carried out few butterflies will be found, although this form of management is better than none. It is important that headlands are left around edges of grassy areas and that not all mowing is carried out a once. Some areas should be left uncut all year and cut on rotation. Work carried out since 2011 by local staff and the Lower Mole Countryside Partnership has helped to reverse the decline, and it is important that this input continues.

General Invertebrates

Valuable features for invertebrates have been summarised by Kirby (2001) *as 'complete succession from bare ground to patchy scrub; topographical variation; some south -facing slopes; structural variation maintained by limited grazing; a large proportion of plants able to flower and set seed; additional habitats at the margins and within the grassland to provide shelter, hibernation sites and structural variation.*'

South-facing slopes are especially important because they warm up quickly in the sun and rarer species are more likely to use them. Bare ground is also important for the same reason and some solitary wasps and bees dug their burrow in or use it for hunting and egg laying. In general the rarer invertebrate species will be found in the shorter turf. More common invertebrates will be found in the longer grass; therefore priority should be given to the shorter turf.

5.2 METHODOLOGY

A total of five visits to the survey site were undertaken between July and early September 2007. These visits took place on; 25 July 2007; 08 August 2007; 29 August 2007; 10 September 2007. On the 08 August 2007 David Baldock was also employed. He is an expert in aculeate hymenoptera (bees, ants & wasps) from BWARS (Bees Wasps and Ants Recording Society).

The majority of the visits were general assessments to give a broad overview of the range of invertebrates present in the open habitats. The visit on 08 August 2007 targeted bees and wasps that fly at that time of year and in some cases are strongly linked to the habitat and its flora.

Entomological work was focused predominantly on open habitats, including:

- Herb-rich chalk downland, scrub/woodland edge habitat, woodland rides, dead -wood and bare earth scrapes at Juniper Hill (TQ223572).
- Tall vegetation (esp. *Pastinaca sativa*), scrubby chalk grassland and track-edge erosion at Walton Downs (TQ220572).
- Rank grassland and scrub around The Warren and Downs House area (TQ220576 & TQ217578). Standard entomological techniques where used during the visits. These include:
- Manual and visual searching of vegetation.
- Investigation of dead wood using a stout knife.
- Beating of tree branches, shrubs and tall vegetation over a beating tray.
- Sweeping of vegetation and targeted plants with a calico-bag sweep net.
- Netting of individuals in flight or feeding at flowers with a fine mesh net.

Once secured in a clear tube the individuals were either identified in the field and subsequently released or dispatched in an ethyl acetate killing jar for later microscopic examination. Field notes were taken wherever possible to describe where an individual was found and what it was doing. Voucher specimens of notable species have been retained.

5.3 TAXONOMIC COVERAGE

The survey focused on the major groups of British insects: Coleoptera (beetles), Diptera (flies), Hemiptera (bugs and leaf hoppers), Hymenoptera (bees, wasps, ants etc), and Lepidoptera (butterflies and moths), but other groups were noted if seen.

5.4 CONSTRAINTS

In order to present a more complete picture of the sites invertebrate fauna visits should be scheduled to coincide with periods of peak invertebrate activity throughout the year from early spring to late summer. As this survey was commissioned more than half way through the recording season I can only give an overview of the late summer invertebrate species encountered.

Weather is an important factor in invertebrate recording success. Although I endeavoured to visit the site during favourable weather optimum recording conditions were sporadic. Most insects do not fly readily when the weather is overcast and breezy. During these less favourable periods time was spent manually searching (grubbing), investigating dead wood and searching flowers and foliage for sheltering individuals.

5.5 STATUS CATEGORIES FOR UNCOMMON SPECIES

Criteria for allocation of Red Data Book (nationally rare) and Nationally Scarce (notable) statuses are varied and complex. I have followed the British Red Data Book for insects (Shirt, 1987) with reference to the revised JNCC reviews which also include notable species. The Red Data Book and its subsequent reviews are already in need of upd ating and I have made reference to this in the text for individual species where it is applicable as many species have had range expansions or contractions in recent years.

- **RDB1** (Endangered). In danger of extinction in Great Britain; species with very few recorded localities or living in especially vulnerable habitats.
- **RDB2** (Vulnerable). Likely to move into the RDB1 category if causal factors continue; species declining in their range.
- **RDB3** (Rare). Species estimated to occur in 15 or fewer of the 10km squares in the national Ordnance Survey grid since 1970.
- **RDBK** (Insufficiently known). Species thought to be very rare in Britain, recorded from less than 15 of the 10km squares of the national Ordnance Survey grid since 1970, and which warrant RDB classification of some sort, but for which there is a recognized lack of accurate information.
- **Nationally Scarce A** (Notable A). Very local species, thought to occur in 16 to 30 of the 10km squares of the national Ordnance Survey grid since 1970.
- **Nationally Scarce B** (Notable B). Very local species, thought to occur in 31 to 100 of the 10km squares of the national Ordnance Survey grid since 1970.
- **Local**. Species which are restricted in distribution. e.g. restricted to chalk downland.

5.6 RESULTS

5.6.1 SUMMARY TABLE

Order	Total Number of Species Recorded	Rare or Notable species	Local Species
Hemiptera:Heteroptera (True Bugs)	11	-	2
Hymenoptera (Aculeate)	29	4	4
Hymenoptera:Symphyta (Sawflies)	2	-	1
Hymenoptera (Parasitica)	2	-	-
Lepidoptera (Butterflies)	5	-	1
Lepidoptera (Moths)	3	-	-
Mecoptera (Scorpion-flies)	1	-	-
Odonata (Dragonflies)	1	-	-
Orthoptera and allies (Grasshoppers, Bushcrickets, Earwigs etc)	5	1	-
Acarina (Mites)	5	-	2
Arachnida (Spiders)	2	-	-
Isopoda (Woodlouse)	2	-	-
Pulmonata (Snails)	6	-	-
Total	**118**	**7**	**13**

Order	Total Number of Species Recorded	Rare or Notable species	Local Species
Coleoptera (Beetles)	13	1	2
Diptera (2-winged Flies)	26	1	-
Hemiptera (Leaf-hoppers, Plant Lice etc)	4	-	1

Nationally Scarce & Local species

Species are listed in capitals by taxonomic ORDER. The text in brackets refers to the Family group. The text in *italics* is the scientific name of the species. The following name and date refers to the author who originally described the species. A common name, if applicable, is given at the end.

COLEOPTERA

(Mordellidae) *Variimords villosa* (Schrank, 1781) A Tumbling Flower Beetle [Formerly Known as *Mordella villosa* (Schrank); *M. fasciata* F.,1775] *Status:* Nationally Scarce B. Mainly southern distribution.

Habitat and ecology: Saproxylic. Larvae develop in either dead wood or plant stems (Hyman, 1992). Females observed egg-laying on stumps of Beech and Pine (Denton, 1999) Adults attracted to flowers, particularly umbellifers. Woodland, parkland and open, flower -rich grassland. *Management and conservation:* Control of excessive scrub in flower rich grassland to maintain open structure of site. Maintain scrub-edge habitat. Retention of dead-wood habitat in all its forms; standing, elevated, log piles, stumps etc. Ensure continuity of dead wood habitat.

(Chrysomelidae) *Cryptocephalus moraei* (Linnaeus, 1758) A Pot Beetle *Status:* Local. *Habitat and ecology:* A leaf beetle which feeds solely on species of St Johns Wort *Hypericum* spp. Restricted to chalky and sandy sites. Larvae feed in leaf litter on the ground and develop

in a 'pot' provided by the mother from her own dung. Adults can be locally frequent on their food-plant. *Management and conservation:* Many of the *Cryptocephalus* beetles are very rare and restricted. I have observed that these species seem to thrive in sheltered sites. Perhaps shelter from wind breaks prevents the larval food source, usually dead leaves from the host plant, from blowing away?

(Chrysomelidae) *Pyrrhalta viburni* (Paykull, 1799) Viburnum Leaf Beetle *Status:* Local. *Habitat and ecology:* Adults feed on the leaves of *Viburnum* spp. Particularly Wayfaring Tree *V.lantana*, and Guelder Rose *V.opulus*, on the chalk. *Management and conservation:* Retain *Viburnum* spp., as both scrub and mature bushes, within the site.

DIPTERA

(Syrphidae) *Volucella zonaria* (Poda, 1761) A Hoverfly *Status:* Nationally Scarce B. Increasing? First recorded in Britain during 1901. Fluctuating populations probably boosted by European migrants.

Habitat and ecology: Essentially a south-eastern species with a few outlying records in Devon etc. The larvae develop as commensals in the nests of social wasps, probably feeding on organic debris at the bottom of the nest. Adults bear a close resemblance to worker Hornets *Vespa crabro* and feed on a range of flowers. *Management and conservation:* Control of excessive scrub in flower rich grassland. Opening up of woodland rides and glades.

HEMIPTERA

(Heteroptera:Acanthosomatidae) *Cyphostethus tristriatus* (Fabricius, 1787) Juniper Shieldbug [Formerly known as *Elasmosthethus tristriatus*] *Status:* Local. Increasing?

Habitat and ecology: Formerly restricted to Juniper *Juniperus communis* but has now adapted to garden varieties of Lawson's Cypress and related conifers (Hawkins, 2003). *Management and conservation:* Maintain and enhance stands of Juniper *Juniperus communis*.

(Heteroptera:Rhopalidae) *Rhopalus subrufus* (Gmelin, 1788) A Rhopalid Bug *Status:* Local. *Habitat and ecology:* Fairly common in Surrey, esp. on flower rich chalk downland. Probably feeds on a range of plants but Marjoram *Origanum vulgare*, Common Nettle *Urtica dioica* and Dog's Mercury *Mercurialis perennis* may play an important dietary role (Hawkins, 2003). *Management and conservation:* Maintain open areas of herb rich downland. Retain scrub edge habitat with rank herbage such as nettles etc. Open up woodland rides and glades for Dog's Mercury. Rotationally disturb areas of ground to promote pioneer plants, such as Marjoram.

(Sternorrhyncha:Psylloidea) *Trichochermes walkeri* Förster, 1848 A Jumping Plant Louse [Formerly known as *Trichopsylla walkeri*] *Status:* Local.

Habitat and ecology: Nymphs cause a gall on the leaves of Purging Buckthorn *Rhamnus cathartica*. Usually on downland in southern England. Scarce in the north (Redfern et al, 2002). *Management and conservation:* Retain Purging Buckthorn, as both scrub and mature bushes, within the site.

HYMENOPTERA

(Andreninae) *Andrena minutuloides* Perkins, R.C.L.,1914 A Mining Bee *Status:* Nationally Scarce A. *Habitat and ecology:* Grasslands on light soils, esp. downland. Ground nesting in warm, sunny situations with sparse vegetation (often rabbit grazed). Double brooded. Sources pollen and nectar from a range of plants, though the 2nd brood seems to favour white umbellifers such as Wild Carrot *Daucus carota*. *Management and conservation:* Maintain open structure of site. Rotationally disturb areas to create bare ground.

(Halictinae) *Lasioglossum pauxillum* (Schenck, 1853) A Mining Bee *Status:* Nationally Scarce A. (Became much commoner during the 1990s). *Habitat and ecology:* Locally common. Ground nesting in warm, sunny situations with sparse vegetation (often rabbit grazed), a marked preference for sandy clay soils and tracks. Pollen sources unknown though will visit a range of plants for nectar. Unsocial. *Management and conservation:* Maintain open structure of site. Rotationally disturb small areas to create bare ground.

(Collegian) *Hiatus signets* (Panzer, 1798) A Yellow-faced Bee *Status:* Nationally Scarce B. *Habitat and ecology:* Strongly associated with the flowers of *Reseda* spp. Nests in woody stems of *Rubus* and *Rosa* spp. Occasionally in banks and masonry. Single brooded. Pollen collected exclusively from *Reseda* spp., *R.lutea* on the chalk. *Management and conservation:* Prevent scrub from encroaching into open habitats whilst retaining scrubby edge habitat, particularly with Bramble and Dog Rose, as an ecotone, solitary clumps etc. Note the importance of bramble clumps. To prevent Bramble from encroaching it can be cut back periodically. However, this is best done with hand tools rather than a mechanized cutter. Mechanical cutters tend to smash up the stems and leave untidy ends which are thought not to be as attractive as a nesting site.

(Melittinae) *Melitta tricincta* (Kirby, 1802) A Mining Bee *Status:* Nationally Scarce B. Southern distribution. *Habitat and ecology:* Restricted to Red Bartsia *Odontites verna*. Southern distribution, esp. on chalk downland. Probably nests in compacted soils in warm, sunny situations with sparse vegetation. Single brooded with a late summer flight period timed to coincide with the flowering of *O.verna* from which it seems pollen is exclusively obtained. *Management and conservation:* Maintain good stands of *O.verna*, which favours some disturbance. Maintain open structure of site. Rotationally disturb small areas to create bare ground. Push back woodland rides to promote growth of forage plant and provide open structure.

(Megachilinae) *Hoplitus spinulosa* (Kirby, 1802) A Solitary Bee

Status: Local. *Habitat and ecology:* Mainly in SE England on chalk downland and open grasslands with Compositae flowers in the sward. Nesting in old snail shells. *Management and conservation:* Control of excessive scrub in flower rich grassland to maintain open structure of site.

(Megachilinae) *Chelostoma campanularum* (Kirby, 1802) Bellflower Bee *Status:* Local. *Habitat and ecology:* Commonly found on chalk downland, though may occur in other habitats with Bellflowers Campanula spp. present. Will utilise flowers from unrelated genera as nectar sources. Nests in small beetle holes in dead-wood. *Management and conservation:* Control of excessive scrub in flower rich grassland to maintain open structure of site. Retention of dead-wood habitat in all its forms; standing, elevated, log piles, stumps etc. Ensure continuity of dead wood habitat.

(Halictinae) *Lasioglossum fulvicorne* (Kirby, 1802) A Mining Bee *Status:* Local, almost restricted to chalk. Usually very common where present. Recent distribution maps produced by BWARS suggest that this species is more widespread and common than previously thought. *Habitat and ecology:* On more alkaline soils, esp. chalk downland visiting a wide range of flowers. Ground nesting in short turf. *Management and conservation:* Maintain open structure of site. Rotationally disturb small areas to create bare ground.

(Symphyta:Tenthredinidae) *Tenthredo thomsonii* (Curtis, 1839) A Sawfly [Formerly known as *Tenthredo marginella* Fabricius, 1793] *Status:* Local.

Habitat and ecology: Larvae develop on Marjoram *Origanum vulgare* on chalk downland. Also found on various plants in wetlands. *Management and conservation:* Rotationally disturb areas of ground to promote pioneer plants, such as Marjoram.

LEPIDOPTERA

(Lycaenidae) *Polyommatus coridon* (Poda, 1761) Chalkhill Blue Butterfly [Formerly known as *Lysandra coridon*] *Status:* Local. UK BAP Species of Conservation Concern (low priority). Declining in some areas of Britain. *Habitat and ecology:* Restricted to chalk downland with larval food plant Horseshoe Vetch *Hippocrepis comosa* in short turf, south or west facing. *Management and conservation:* Maintain open structure of site. Increase extent of food plant.

ORTHOPTERA

(Tettigoniidae) *Metrioptera roeselii* (Hagenbach, 1822) Roesel's Bush-cricket *Status:* Nationally Scarce B. First found in Surrey at Cheam, 1944 (I.Menzies). Range greatly expanded in recent years. No longer considered notable.

Habitat and ecology: Rough, rank grassland with tall herbs such as Ragwort and thistles from which the male calls (Baldock, 1999). A range of habitats, including roadside verges. Thought to have expanded range due to a series of hot summers. *Management and conservation:* Leave chunks of grassland un-topped. Manage scrub to prevent succession.

ACERINA (Mites)

(Eriophyoidae) *Aceria macrochelus (*Nalepa, 1891) A Gall Mite *Status:* Local. *Habitat and ecology:* Mites cause rounded galls on the leaves of Field Maple *Acer campestre.* Often common where present but never numerous on an individual leaf. *Management and conservation:* Maintain diversity of scrub species.

(Eriophyoidae) *Aceria origani* (Nalepa, 1891) A Gall Mite *Status:* Local. *Habitat and ecology:* Restricted to chalk downland. Mites cause thickened galls on the leaves of shoot tips on Marjoram *Origanum vulgare*. Often common where present. *Management and conservation:* Maintain open areas of herb rich downland. Rotationally disturb small areas of ground to promote pioneer plants, such as Marjoram.

Other species of note:

[Coleoptera:Anthribidae (ex-Urodontidae)] *Bruchela rufipes* (Olivier, 1790) A Weevil *Status*: None. First recorded in Surrey, 1996. Naturalised. Formerly RDB3 in Shirt,1987. De-notified in the JNCC review,1992. *Habitat and ecology*: Rapid increase in range -recently recorded in Yorkshire! On Wild Mignonette *Reseda lutea,* downland and waste ground. *Management and conservation:* Maintain open areas of herb rich downland.

5.7 ENTOMOLOGICAL ASSESSMENT 2007

The main entomological interest of the site is the chalk downland of Juniper Hill and the adjacent grassland area of Walton Downs bordering the man-made substrate horse track. Nearly 30% of the species recorded in these areas were very strongly associated with open chalk downland. Around 20% of the species recorded were largely restricted to chalk downland in Surrey.

The areas of rank grassland around The Warren were of less value for invertebrates and produced mainly generalist species which had already been noted throughout the site. The woodland compartments were not surveyed.

The range of habitats present is fair but these would benefit from the provision of 'habitat corridors', as areas of good habitat are fairly isolated from each other and effectively cut-off by dense woodland or routinely mown amenity areas with little botanical or entomological interest.

The widening of tracks and bridleways through woodland compartments should be considered to improve the general structure for invertebrates. This would effectively increase the area of available woodland edge/scrub habitat, or the ecotone, between climax woodland and open habitat. Scalloped edges and glades should also be incorporated. Graduating vegetation is important and should not be close mown up to the scrub/woodland edge. Care should also be taken not to render the sheltered areas exposed to the wind.

This management would also benefit the remaining Juniper bushes that are currently being lost under the canopy.

Consideration should also be given to linking up areas of open grassland habitat dissected by large scale amenity mowing. Some of the scrub in the grassland areas of The Warren is becoming over-mature and an agreed percentage should be coppiced or removed to maintain the openness of the area. Some mature shrubs should also be retained.

The bare ground scrapes created to promote the growth of Kidney -vetch (*Anthyllis vulnerina)* for the population of Small Blue Butterfly (*Cupido minimus),* also provide excellent habitat for the ground nesting Hymenoptera. This occasional disturbance also creates the ideal situation for plant succession as many plants respond well to disturbance but gradually lose dominance as the sward matures. It is worth noting that several of the more notable species recorded are associated with plants that respond to occasional disturbance.

There is a stark paucity of dead-wood habitat in the open areas surveyed and consideration should be given to its creation. Standing dead-wood, log piles and stumps etc should be retained in a variety of situations.

The woodland compartments were outside the remit of this survey; however it has come to my attention that a team of expert Coleopterists (beetle specialists) have made a thorough survey of the site's beetle fauna, including saproxylic (dead-wood and fungus associates) species. This will be sent on to the site managers in the near future.

Ideally, future surveys would include data from spring and early summer. I woul d also recommend that a specialist in Lepidoptera be employed to survey nocturnal moths.

Please refer to the species accounts for information on management for individual species.

5.8 SPECIES LIST

See **Appendix 7** for full list.

6.0 SITE EVALUATION

6.1 INTRODUCTION

A Nature Conservation Review was written by Derek Ratcliffe of the Nature Conservancy Council in 1976. The publication includes a set of criteria for the assessment of sites with nature conservation importance. The criteria are still widely used for the nature conservation assessment of areas proposed for wildlife management *to 'get a proper appreciation of the site as a prerequisite to defining the objectives of management'*. The first five categories hold the most weight in the evaluation process.

6.2 SIZE

Generally the larger the site, the more potential there is for diversity. It is more likely to be self regenerating and also survive catastrophic events such as extreme weather conditions. The total area covered by Epsom & Walton Downs covers 177 hectares (437 acres). This represents a substantial area of open space within a predominately urban context and represents a significant proportion of the Counties chalk grassland resource.

6.3 DIVERSITY

Sites with the greatest diversity of habitats and species are generally of greater conservation value than uniform ones. Over 400 plant species have been recorded and a similar number of fauna. Whilst a great deal of the site is devoted to gallops and hacks on the racecourse with habitats present including unimproved calcareous grassland, rough semi -improved calcareous grassland, secondary woodland with associated scrub.

Referring to Juniper Hill Hedley (1989) commented that*, 'what little grassland remains is of excellent quality*' and '*was the most species rich stand of its type found in the County*'.

6.4 NATURALNESS

There are few, if any areas left in Great Britain, which can be described as entirely natural. In parts areas have been reseeded, fertilisers used and development taken place. Car parks have been built as well as roads and buildings associated with the racecourse. Due to the close proximity of residential houses there are a number of garden escapees, non-native species and invasive plants

However, other areas such as Juniper Hill are excellent examples of unimproved chalk grassland. These small fragmented pockets of species rich grassland have remained in this state for hundreds of years. In fact Smith (1980) lists several species of plants researched by Terry Wells and Francis Rose which were thought to be restricted to turf, undisturbed for at least 130 years. These include Squinancywort, Dropwort, Burnet-saxifrage, Horseshoe Vetch, Chalk Milkwort and Bastard-toadflax, all of which are found here.

6.5 RARITY

A good assemblage of rare plant species still occur at Juniper Hill and Walton Downs grassland. Three National Scarcities present– Round-headed Rampion, Bastard-toadflax and Chalk Hill Eyebright. Joyce Smith from the Surrey Flora Committee commented after a visit in 1986 to Juniper Hill that 'we do not know of another site in the County where so many Round headed Rampion *are contained in so small an area*.'

Bluebell and Meadow Clary (the latter thought to be lost to the site) are on the BAP 2/3 Conservation Concern list. The former may be surprising, but the British Isles and especially South England is the strong hold, compared to other countries in Europe. Meadow Clary, also listed as Vulnerable, had been recorded by Arthur Cook in the 1970s. Other losses from Juniper Hill include the Nationally Scarce Dwarf Mouse-ear.

Confined to chalk grassland are the Fragrant Orchid and Pyramidal Orchid (Chalk BAP, 1999), both have been recorded on Juniper Hill, the latter has not been seen for some time. Currently in Surrey Pyramidal Orchid is only recorded in 20 sites and Fragrant Orchid even less at 11.

Juniper found on Juniper Hill is on the BAP2/3 Conservation Concern list. In southern counties Juniper is in a critical state of decline with evidence of habitat fragmentation. There are only 5 known sites in Surrey.

These declines and losses can be attributed to the cessation of appropriate management, scrub encroachment and increased habitat fragmentation.

The mosaic of habitats provides breeding and feeding habitat for a number of declining bird species such as Skylark and when RSPB surveyed the area they commented that ' *the Skylark population was one of the best in the County*.'

BAP 1 Priority bird species found on Epsom & Walton Downs are Skylark, Linnet, Bullfinch and Mistle Thrush. There are 19 BAP 2/3 species of Conservation Concern. Birds on the RSPB Red list are Linnet, Yellowhammer, House Sparrow, Tree Sparrow, Bullfinch, Starling and Song Thrush. There are a further 13 listed on the Amber list.

Of the invertebrate species that have been recorded here over the years, not just in 2007, two are Notable Na species, 18 are Notable Nb species, one is an RDB3 and a further 6 are in other RDB categories. Five are also found in the BAP 1 Priority list and 24 on the BAP 2/3 Conservation Concern list. Important populations of BAP 1 Priority Small Blue butterfly and BAP2/3 Conservation Concern Chalk Hill Blue butterfly are present. In addition the moth Chalk Carpet, a BAP 1 Priority species and Notable Nb was recorded in 1953. Also associated with chalk grassland are such as Rufous grasshopper, Roman Snail and Orange tailed Clearwing as well as some hoverflies and bees.

In addition Juniper Hill is on the Invertebrate Site Register as grade B (for the Juniper) and grade C respectively. This register was developed to raise the profile of invertebrate conservation. They can be site based or taxon based. Grade B is given when a site is judged to be regionally important and possible candidates for SSSI. Grade C sites are potentially important sites, but have insufficient information on which to judge.

6.6 FRAGILITY

This section usually relates to how susceptible a habitat or species is to degradation or loss. Without some degree of conservation management, habitats would eventually lose their biodiversity. The woodlands by their very nature do not require such regular management to maintain and enhance the biodiversity. Grassland on the other hand does require regular management or it will soon be invaded by undesirable species such as coarse grasses that will out-compete finer grasses. Then scrub species such as Hawthorn and Blackthorn will begin to arrive and eventually it turns into woodland. Whilst a mosaic of habitats is desirable and scrub is extremely important, this should not to the detriment of valuable unimproved calcareous grassland so very rare in this County. The priority then should be for the areas with most potential, namely Juniper Hill.

Such fragments of plants and animal communities that were once common throughout the Downs are now extremely rare and threatened by a range of land use changes. Its rarity gives this habitat a special value. The combination of plants and animals found here are effectively irreplaceable if damaged. The habitat cannot be recreated if lost.

6.7 TYPICALNESS

In contrast to rarity, this criterion is often used to assess the value of more common assemblages of habitats and species. Often the criterion is used to highlight "classic" examples of habitat-types or populations. The rough semi-improved calcareous grassland, secondary woodland and associated scrub is typical of the Upper Chalk and this region. However the exceptional species rich calcareous grassland, the open nature and large size of the site is less usual and offers more potential for nature conservation than is usual.

6.8 RECORDED HISTORY

The following is taken from 'The Epsom and Walton Downs – A strategy for their management and use' by D Smith (1993):

'*The Epsom Grandstand Association was founded in 1828 when it obtained a 90 -year lease of an acre of the Downs for the purpose of building a stand from the then Lord of the Manor. In the 1960s the Association became a subsidiary of United Racecourse Limited and in 1969 the Horserace Betting Levy Board, through its wholly owned subsidiary Metropolitan and Country Racecourse Management and Holdings Limited, acquired the freehold interest of Epsom Downs*.'

Mr Stanley Wootton purchased Walton Downs from the Epsom Grandstand Association on 5th July 1926 and also acquired a lease of part of Epsom Downs as winter training gallops. The 1936 Act empowered Mr Wootton to train racehorses on Walton Downs and to grant leases or licences to train horses there. In 1969, Mr Wootton granted a lease of Walton Downs to the Horserace Betting Levy Board for the Period of 999 years at a peppercorn rent in order to secure the future of the Downs for the purpose of training racehorses in Epsom. In 1970 a Management Trust was formed to administer these training gallops and the Management Board comprises representatives from the Betting Levy Board, Epsom Racecourse Trainers Association, the Borough Council and the County Council. The area is managed by

the Epsom and Walton Downs Conservators, whose primary duty is '*to maintain the natural beauty and diversity of the Downs… and the relationship between the various users* .'

Common Rights no longer exist, but subject to the 1984 Act, the public are entitled to access for air and exercise. Racehorses use the site and local public can ride out on the Downs. The Downs are very popular with the public for walks. Dog walking, kite flying, model aircraft flying are amongst the many activities permitted by the Bylaws.

Cultural significance is provided through archaeological features on the Downs. Documentation from Dr D Bird, Principal Archaeologist at Surrey County Council reveals that several Roman artefacts have been found. For example pottery found during WWII close to Downs House and a Roman coin from 3rd Century, Constantine period found in 1925. South of Tattenham Corner a Roman coin from the 4th Century, Claudius II was found in 1937. Around Buckles Gap and to the east, 11 round barrows from the Bronze Age or Saxon burial mound ware shown on a 17th Century map and Early Iron Age pottery has been found. 19th Century coal tax posts are found along the boundaries. These are points where tax was paid, often in wine.

Dr Bird summaries by saying' *there is enough evidence here from finds to show that there will have been prehistoric and Roman Period settlement in this area, and I expect that there will be surviving earthworks*.'

6.9 ECOLOGICAL HISTORY

There have been a number of ecologists employed by the Conservator s over the years including Barry Goldsmith who was the Botanical Recorder on behalf of the Conservators and prior to this was Peter Moore.

Nature Conservancy Council (NCC) surveyed the site in 1988 as part of the 'Chalk grassland survey'. Surrey Wildlife Trust (SWT) surveyed the site for the Sites of Nature Conservation Importance (SNCI) project during 1998, of which 3 SNCIs have been selected on Epsom & Walton Downs and all of Epsom Golf Course is an SNCI. Reasons for selection are given in the next criteria. (The prevoius reports are appended.)

Martin Ellis and other members from Surrey & SW London Butterfly Conservation collected transect records for many years. Graham Collins an invertebrate specialist has also been recording in the area for several years. In addition beetles were studied over a three year period on a grass compost heap on the racecourse during 1993 -1995 inclusive.

6.10 POSITION IN AN ECOLOGICAL UNIT

This criterion can be particularly important in sites that may be degraded and/or very small. In such cases the surrounding habitats can give great potential for species migrations and ecological buffering. In a local context the site is set in a large open area. Nationally it is within the North Downs Natural Area, which supports nationally significant calcareous grassland.

The reasons for selection of the Sites of Nature Conservation Importance (SNCI)in 1998 on Epsom & Walton Downs and the Golf Course are listed below.

Epsom and Walton Downs SNCI

The first three SNCI below have been combined along with the rest of the semi natural areas of the site to form one SNCI. The reasons for the inclusion of the existing sites remains the same, with the addition of the recognition of further areas of chalk grassland across the site and an area of ancient woodland.

Walton Downs A SNCI (called 'Epsom & Walton Downs - Juniper Hill' in this report). (4 hectares) Good remnant of unimproved calcareous grassland next to Walton Downs B. Supports Nationally Scarce species.

Walton Downs SNCI. (3 hectares) Selected for good remnant of unimproved calcareous grassland next to Walton Downs

A. Supports a County Rarity.

Epsom Downs West SNCI. (3 hectares) The north part was selected because of the valuable unimproved calcareous grassland habitat.

There are several SNCIs and SSSI's within a radius of 1-5km of Epsom & Walton Downs.:

Epsom Golf Course SNCI & pSSSI. (63 hectares) Selected for areas of unimproved calcareous grassland. Rare and valuable in both County and National terms. Approximately 46 hectares of unimproved and semi-improved calcareous grassland and 12 hectares of species rich semi -natural woodland. It is of such high quality that it is considered a potential Site of Special Scientific Interest (pSSSI)

Epsom Downs Covered Reservoir (candidate SNCI). This small site has a varied diverse calcicole flora, including Man Orchid and a colony of the Small Blue butterfly.

Nork Park SNCI. (52 hectares) Open grassland, parkland trees, mixed woodland and amenity grassland.

Banstead Downs SSSI. (124 hectares) It comprises of dense scrub, woodland and areas of open chalk grassland, which is nationally important for breeding and overwintering birds, several groups of invertebrates and locally rare plants.

Burgh Heath SNCI. (31 hectares) Semi-natural broad-leaved woodland with areas of scrub, grassland and four ponds.

Chipstead Downs SSSI. (152 hectares) Includes areas of steeply sloping chalk grassland with associated scrub and secondary woodland as well as large areas of ancient semi-natural woodland.

Banstead & Walton Heath SNCI. (404 hectares) Banstead Heath – Broad-leaved woodland, scrub, grassland, small areas of heather and ponds. Walton Heath – grassland with area of acid grass and woodland.

Sandhill Wood SNCI. (7 hectares) Ancient semi-natural woodland.

Great Hurst Wood & Little Hurst Wood SNCIs. (28 & 6 hectares) Ancient semi-natural woodland.

Downs View Wood SNCI. (10 hectares) Two semi-natural ancient woodland with some broadleaved replanting.

Addlestead Wood SNCI. (7 hectares) Ancient semi-natural woodland, formerly managed as Hazel coppice with Oak standards. Bluebell dominates the ground flora.

Epsom Common South SNCI. (45 hectares)

Selected as it is a large site with secondary native broad-leaved woodland, scrub, underscrub and unimproved rough meseotrophic & acid grassland as well as wet grass and ponds.

Epsom & Ashtead Commons SSSI. (358 hectares)

Notified for its wide diversity of habitat types including four nationally rare invertebrates

and several others, which are uncommon in Surrey. The range of habitats present

promotes a rich community of breeding birds.

Epsom Cemetery SNCI (7 hectares)

Selected for its unimproved calcareous grassland with typical unimproved calcareous

grassland species.

In conclusion both Epsom Racecourse are well placed within an ecological unit with several valuable sites within a short distance.

6.11 POTENTIAL VALUE

This can be used to describe how the conservation value of a site can be enhanced. Lowland calcareous grasslands probably occupy an area less than 30,000 hectares (Willems 1990). With concentrations in Wiltshire, Dorset and the South Downs. Fuller (1987) states that of the area of unimproved grassland in England and Wales in 1930, only 3% remained in 1984. Chalk grassland is the richest habitat in terms of species diversity, but it is still being lost at an alarming rate. Keymer and Leach (1990) estimated a decline nationally of 21% in area of chalk grassland between 1966 and 1980. Chalk grassland has also become highly fragmented, with Blackwood and Tubbs (1970) for example, finding that 83% of sites surveyed were less than 40 ha in area (Baxter & Farmer, 1994).

Following a survey by the Surrey Wildlife Trust, it was noted that during the ten year period between 1975 and 1985, 212.2 hectares of unimproved grassland in the chalk region of the county were lost. Today, areas of chalk downland that survive in Surrey are scattered across the Downs. There are approximately 9,500 hectares of chalk grassland in south east England that is approximately 21% of the UK resource. Only around 323.9 hectares of chalk grassland remain in Surrey (NCC, 1980). Such fragments of plants and animal communities that were once common through the Downs are now extremely rare and threatened by a range of land use changes. Its rarity gives this habitat a special value. The combination of plants and animals found here are effectively irreplaceable if damaged. The

habitat cannot be recreated if lost. Chalk grasslands are undoubtedly a nationally and internationally rare habitat.

There are 12 SSSI's within the Downs Natural Area of Surrey. 9 have a chalk grassland component. The series goes some way to protecting the chalk grassland resource of Surrey. However, important areas exist outside the SSSI's, which have potential for enhancement (Chalk BAP, 1999) including Epsom Golf Course and Juniper Hill.

Hedley (1998) referred to Juniper Hill when he commented *that 'the site is clearly important with only its size and fragmented nature preventing its recommendation as SSSI. An appraisal of the surrounding scrub and woodland may be worthwhile if the site be deemed worthy on inclusion within a proposed Epsom golf course SSSI.'*

Careful management of the unimproved calcareous grassland, taking further control of the encroaching scrub and Tor grass and suitable management of the woodland, would enhance the site. This would enhance the biodiversity, helping to safeguard important species such as Small Blue butterfly population. However, economics and reduced resources are limiting factors.

6.12 INTRINSIC APPEAL

This covers the evaluation of the site for wider visual appeal. The site is valued for its recreation and public open space where people can walk dogs, ride horses, fly kites and model aeroplanes or just sit and enjoy the magnificent views.

7.0 FACTORS AFFECTING MANAGEMENT

Under-resourced nature conservation management is the major factor influencing the vegetation changes over Epsom & Walton Downs, allowing scrub encroachment onto nationally important unimproved calcareous grassland.

Generally there has been a lack of livestock grazing as a result of changing agricultural practices and economic pressures have had a significant effect on the chalk grass resource of the North Downs. There is often a lack of graziers and suitable stock.

High rabbit populations have contributed to grazing problems by creating over grazed areas and erosion. They also eat flowering plants before they have had a chance to flower and set seed, in turn effecting butterfly species which are dependant on a single food source. However, in some situations rabbit grazing has been paramount in keeping areas of chalk grassland open (Chalk BAP, 1999).

Fragmentation is where areas of habitat have been destroyed often through development, agriculture and so on. This creates separate isolated habitats. Larger areas are better able to provide a variety of niches for a wide variety of species and able to cope better with natural disasters such as fire. The fragmented areas of habitat such as on Juniper Hill means that it is much more difficult for species to thrive. Smaller areas can also be more difficult to manage.

Light pollution will effect the site from the nearby roads and street lights. This will affect night flying moths and other invertebrates. In addition noise and air pollution from the roads will have an influence.

Atmospheric pollution may also be contributing to changes in species composition with particular regard to the spread of Tor grass on Juniper Hill and on Walton Downs. There has been some research that indicated nitrogen oxide is a contributing factor in the increase.

Climate change is also likely to have an influence in the next 50-100 years, with hotter summers and milder winters being predicted for the south east of England. Monitoring the site will help establish historical records.

Financial resources will also affect any management, as the proposed habitat management will incur costs. The continued work on Juniper Hill is essential and therefore continued support for the LMCP by way of funding is essential. Using outside contractors for larger part of the management must also be considered.

8.0 MANAGEMENT RECOMMENDATIONS

Use in conjunction with Figures 7 & 8 Management Objectives

8.1 GRASSLAND MANAGEMENT

8.1.1 SOIL SCRAPES

Create new hand made scrapes around existing scrapes and areas of Kidney Vetch

8.1.2 MOWING

Follow variety of conservation grassland management principals

8.1.3 INVASIVE GRASSES

Control of invasive grass species eg Tor grass

8.1.4 GRAZING

Consider grazing on Juniper Hill

Consider grazing on Warren Meadow

8.1.5 SCRUB CLEARANCE

A substantial scrub clearance programme to be established on Juniper Hill

8.1.6 JUNIPER MANAGEMENT

Ensure Junipers are open, not to encroached by scrub

8.2 WOODLAND MANAGEMENT

8.2.1 LANGLEY VALE COPSE & SOUTHERN SECTION OF THE WARREN WOODLAND

Coppice on 7 year rotation

8.2.2 REST OF WARREN WOODLAND

Preferentially thin Sycamore, create glades and rides

8.3 HEDGEROW MANAGEMENT

Continue to cut hedgerows on rotation

8.4 OPEN WATER

Investigate creation of Dew Pond

8.5 MONITORING

Organise breeding bird survey Commission bat survey work Consider further survey and monitoring work including veteran trees.

Consider the possibility of using fixed point photography to monitor vegetation change, especially at Juniper Hill

Objective 8.1 Grassland Management

Objective 8.1.1 Scrapes

On Juniper Hill scrapes using the mechanical excavators where created, based on 4m x 4m, were created in 2001/2. Scrapes have gone down to chalk base. Now Tor grass is coming back in abundance and generally it tends to be floristically poor. However part of the original intention was to encourage the growth of Kidney Vetch, which likes soils disturbance on open bare ground and is a key food source for the rare Small Blue butterfly. Many seeds, seedlings, and rosettes as well as eggs from the Small Blue have been observed in these scrapes and are also proving very popular with solitary bees and wasps.

Connor Morrow from the LMCP visited some of the scrapes during 2007 with Gail Jeffcoate a representative from Butterfly Conservation. They concluded that the scrapes had been a success and that there was a good representation from the Small Blue food source Kidney Vetch. This has been supported by a dissertation carried out in 2011 by a student from the University of Greenwich, Alison Gilry. This study concluded that 'scrape creation is a successful tool for conserving Kidney Vetch and Small Blue, providing that Kidney Vetch seeds of local provenance are added to newly created scrapes'.

Hand scrapes are also be beneficial and contribute in the same was as small rabbit scrapes do. Areas for hand scraping should concentrate adjacent to the existing scrapes, by Juniper bushes on Juniper Hill and near known locations of Kidney Vetch on Juniper Hill, Walton Downs and Downs House.

Pete Murray has been trialling a number of methods for re-introduction Kidney Vetch including creating scrapes. Through this experimenting a successful method of establishing Kidney Vetch has been developed, involving the hand digging of a scrape 1.3m by 1.3m, the sowing of seed and the fencing of the area.

Four new scrapes were excavated in areas of Chalk False Brome at Down House Grassland in January 2010.

The recommendation is to carry on creating mechanical and handmade scrapes every two years, although avoiding the flight period of the Small Blue during May to July. There are plans for more scrapes to be created in 2015 by the LMCP funded by money from a SITA grant.

The existing scrapes on the southern edge of Juniper Hill, by the farmland should be opened up further from the ride down to close to the farmland edge. The spoil should be piled into the woodland edge by the farmland or permission sought to plough into the farmland. Scrub margins and woodland margins should be left to create shelter and an ecotone into the surrounding woodland habitat.

This would include cutting back some of the Dogwood shrubs. Dogwood stumps will need to be treated, particularly to the north of this farmland edge section, where Dogwood is quite abundant, spreading and out competing smaller plants. It would be interesting to do a deep scrape of Dogwood to include roots and another patch just to top soil and then treat dogwood roots. Then leave and monitor effectiveness of each treatment.

8.1.2 Mowing & 8.1.3 Invasive Grasses

Mowing is widely used on all grassland types, but with mixed effectiveness. It differs from grazing in four aspects: it is relatively unselective, it is sudden and does not return nutrients in the form of dung and urine and does not break up the sward in the way that trampling by hooves does (Duffey et al, 1974).

In general the height of the cut should be approximately 10-12 cm high with a wavy margin edge to increase microhabitats for invertebrates. The use of a forage harvester and small baler will help with the work. The pattern of cut should avoid a spiral as this drives mammals and birds into the centre and instead mow from the centre outwards.

It is essential that all the clippings are taken off site or they will cause enrichment, smother smaller plants and prevent seeds from reaching the soil surface and germinating. Failing to take the clippings off site will also produce a 'thatch' of material, which may make cutting difficult the following year and could also lead to excessive bare patches (Crofts et al. 1999). Having said that a small number of clippings should be left in piles in the rough grassland margins, next to hedges and woodlands to provide refugia for reptiles, small mammals and so on.

A wavy edge will increase the microhabitats for invertebrates and will help to encourage small mammals such as Field Voles and provide cover for reptiles and in turn food for carnivorous mammals and birds such as Kestrels and Owls. At the top of the gallops it is clearly less well used by the horses indicated by the diversity including several calcareous species such as Salad Burnet, Common Rock Rose and Small Scabious.

Getting the timing of the cut right is essential, too early and the plants will not be able to set their seeds and will have severe effects on the botanical composition. To illustrate this Well & Cox have produced an interesting report on 'The long term effects of cutting on the yield, floristic composition and soil nutrient status of chalk grassland'. This is based on a 23 year experiment at Knocking Hoe, National Nature Reserve in Bedfordshire.

In summary, using a variety of different management techniques for different areas of grassland will produce a variety of swards. It is therefore recommended that whilst important areas of species rich turf are managed primarily for its potential and actual botanical diversity i.e. at Juniper Hill. Other areas such as Downs House and The Warren Grassland can be treated differently.

Walton Downs Grassland (8)

The grassland at Walton Downs should be cut in a late summer 2 year rotation, i.e. one half cut in the first year, followed by another half and so on. It is recommended that there is some overlap between the section with an area cut every year, this with ensure the needed variation in the habitat. The cuttings should be collected and removed. Some of the Hawthorn and other scrub has been removed and should be kept down by regular cutting.

The linear scrub on Walton Downs grassland also needs some radical management. Either by scalloping the edges every 2-3 years, or punching through clearing all vegetation with a view to letting it grow back as young scrub and cut regularly. This ultimately will reduce the number of large trees here. This would not only help reduce the number of rabbits that hole up here, it would also create a valuable scrub interface and shelter for the grassland and provide better views from Juniper Hill over to the top of the gallops.

It is in this area that hacker riders would like access. As this is valuable and species rich calcareous grassland that hosts many insects during the summer, access could be arranged for during the winter only. Although this is not ideal as some insects will be affected as they will over winter in the grassland nevertheless it provides a compromise.

Warren Meadow (14)

There is a rich diversity of robust grass species and tall herbaceous plants here and although the majority are relatively common, the diversity of species packed into a small area of grassland of this type is high (Moore, 1992). Its secluded nature reduces the wind so that it is warmer here and attracts more insects. It should be maintained as a tall grass meadow.

Mowing twice a year, once in early spring (April) and once in autumn (October) on two yearly rotation (i.e. cut the west area one year, and the east area the following year) to prevent scrub invasion but allow flowering, fruiting of grasses and herbs. It has been mentioned that Nettle leaved Bellflower occurs in the rough grassland margins here and this type of management will encourage its growth. This area is ideal as a holding pen for any stock should the Conservators decide to purchase any. The surrounding scrub should be cut back by 2-3 m and the paths should be regularly mown for visitors and general access. In addition a diagonal informal path has been created by dog walkers, thus creating some short vegetation, which adds to the variety here.

The Warren Grassland (3)

This area is to be cut twice a year in spring and late summer to maintain a tidy appearance whilst allowing flowers to set seed. 2-3m edge to woodland should be left or cut in the autumn.

Epsom Downs West Grassland (21)

Long grass habitat provides a haven for birds and small mammals disturbed and deprived of habitat during the major race meetings. Currently it is left to grow throughout the summer with a topping to length of about 20cm in late September. This ensures a good seed drop into the sward provide a food

source during winter for ground feeding birds and small mammals. Some rare butterflies also use this area.

Downs House Grassland (17)

This area of species rich short and rough grassland is present along both sides of the path. The grassland is cut with the arisings left on. This is having a detrimental effect on the floristic quality of the sward as the cuttings are adding unwanted nutrients to the soil and therefore the more coarse grasses are beginning to dominate. This is evident from the amount of Tor grass present. It is recommended that this area be cut on a 2 year rotation with one half cut each year. The areas should overlap resulting in an area being cut every year to give diversity to the grassland. As the Tor grass is a problem this will need an early spring and autumn cut. Given that grazing is only in the consideration stages, it is recommended that the Tor grass is strimmed and the rest is left overwinter on rotation. If the edges absolutely need to be cut during the summer then they should be cut to a height of 10-20cm. The scrub is a useful inclusion into the grassland sward, but should not be allowed to expand or encroach any further into the grassland. Additional hand scrapes close to the existing scrapes will ensure that there is suitable substrate for further Kidney Vetch and other seedlings to take hold.

The scrub here, leading into Downs House Woodland is extremely valuable. It is a dense ecotone between the grassland and woodland and makes an attractive habitat for a variety of wildlife including nesting birds. In order that there is new recruitment scrub and a diverse age range of scrub the edge should be cut back into shallow scallops of about 5m wide every 10m. The area would then be left for the scrub to regrow, in the meantime it would provide a sheltered hot spot for insects and so on.

Southern Bridleway (10)

Here there are various horse tracks and linear strips in-between. The bank closest to the woodland has a good range of flowers and whilst it is in the most part shaded by the woodland is in a south facing location, therefore where the sun does come in it creates a hotspot for invertebrates. These banks are left to grow and periodically topped in autumn on a rotational basis. The clippings must be taken off to encourage a diverse range of species. Further east Creeping Thistle and Common Nettle tend to dominate perhaps because of a combination of nutrient enrichment and shading. They will gradually spread if left unchecked, hence the recommendation of topping in rotation.

The Hill (main part of the northern section of the Racecourse)(25)

This is where the Derby is held each year. The management for this grassland over the years has been designed with this in mind and also provides a successful breeding territory for Skylarks. To this end the first grass cut should continue to be delayed as long as possible before it has to be cut in preparation of the Derby (mid May), cutting centre out to allow wildlife time to escape. This then allows the first brood of Skylarks to fledge. Successive cuts are then left as far apart as possible and consist of a topping. The RSPB have stated that the Skylark population is one of the healthiest in South of England, but this was many years ago. Some areas have been left uncut, including an area near Epsom Downs West Grassland these should be as large as possible and cut with the arising collected and removed. A map of potential areas with the best remaining calcareous flora is included in the plan.

The Gallops (main grassland area to the south)

A linear buffer zone is left long during the summer, then cut and used as green hay. Cutting late summer i.e. mid to late August would be most beneficial to the flora here. Ensure that they are as wide as possibly i.e. 2-5 metres. Currently it only seems to be half a metre, the wider the better for wildlife.

East of the car park (1)

This area has been encouraged to regrow as it is trying to be chalk heath a rare habitat in Surrey. Old photographs of the Downs show dense gorse here and there is a poem written about it in 1857, which refers to the beauty of the gorse. There is a good population of Dropwort here and as this does not like regular mowing, it is recommended that this area is cut only once every two years. It is also suggested that the fencing is improved to discourage people entering with dogs and disturbing breeding birds. Perhaps an interpretation panel or simple sign would get the message across.

Derby Stables Road Grassland(23)

The regular close cutting currently being carried out is ideal in stopping coarser species from becoming dominant and crowding out the more delicate chalk grassland plants and Orchids. This applies to the Northern 3/4 of the strip between Ashley Road and Derby Stables Road, plus the banks leading down to Langley Vale Road on both East & West sides from the traffic lights at Ashley Road to the Racecourse underpass.

Ideally, close cutting should cease from start of July to the end of September in order not to cut the Autumn Lady's-tresses when they are starting send out a flower spike, & then in flower/seeding. The exact timing of this is a little variable from year to year, so the start of the no-cut period in some years could be later. A higher "tidying" cut (c100mm, but min 75mm) could probably be done safely during first two weeks of July, but certainly not after that in most years.

Juniper Hill (6) – Tor Grass

Tor-grass is recognised as a significant problem on chalk and limestone grasslands, where it can form dominant and low-diversity stands. There are a number of options available to manage and control it. The recently published second edition of *The Lowland Grassland Management Handbook* (Crofts, A, & Jefferson, R G, 1999) lists grazing, mowing with the removal of cuttings, burning and herbicide treatment.

Generally the option of herbicide application such as Round-up can be effective in the short term, however the rhizomes are difficult to locate, spraying damages other grasses in the sward and it is labour intensive on a large scale (Baxter & Farmer, 1994). And in this instance using herbicide is not allowed on the racecourse therefore an alternative method is required.

Encroachment of Tor grass is a major problem on Juniper Hill. Grazing is helping, but the use of brushcutters to mow the grass would also help to keep it in check and allow other species to come through. Spring cutting to about 7cm can be used as a pre-treatment to grazing and also enables rabbits to move in as they tend to graze vegetation less than 10cm high. Bobbink & Willems found in 1993 that cutting twice a year, once in early summer (May) before it has a chance to seed and again in autumn (September) was the optimum treatment for Tor grass. Winter cuts are effective in reducing the height of the Tor grass, but not the spreading of patches. Brushcutters

and Allen scythes have been used to cut areas of Tor grass and scrub regrowth on Juniper Hill with success. However brushcutters may not be practical as there are stumps here. This needs to be assessed. Arisings should be deposited somewhere other than Juniper Hill, where it is less interesting botanically.

The small area of exceptionally rich is calcareous plant species on the south west side of Juniper Hill requires special consideration as it is the only area with the rare Bastard Toadflax. It is not grazed by the sheep, and indeed this is not recommended owing the delicate nature of the grassland components. The advantage of the small sheltered nature is that instead it is continuously and steadily grazed by rabbits. Having said that the surrounding scrub is beginning to encroach and some slow gradual cutting back of the scrub edge should be carried out. But as it is small open area very slowly back the scrub edge back. In addition some of the marginal edges are not rabbit grazed as they are heavily infested with Tor grass. In this area the Tor grass should be strimmed.

Scrub clearance should continue with the clearance of dense scrub in the centre of Juniper Hill to link up the current grazing area with the short turf by the horseride. However, some retention of scrub in this area will help to protect the orchid populations from grazing. The LMCP have specifically left a ring of scrub around the main Early Purple Orchid colony. This has also had the cover of trees immediately above it thinned as they are aware that they do best in dappled shade. They have also retained tree cover over the majority of the Twayblade and orchid colony for the same reason. Neither area should be grazed.

8.1.4 Juniper Hill (6) – Grazing/cutting

Conservation grazing has always been and is likely to remain, the preferred management option on Juniper Hill as it has been responsible for creating and maintaining the biological interest. Grazing using either cows, sheep or goats enables low growing and less competitive plants to compete with coarse vigorous species, such as the Tor grass. In addition the trampling action of hooves breaks up litter and opens up the sward to allow species in to re-colonise, such as Kidney Vetch, which is used by the Small Blue butterfly. Ideally all of the open area of grassland would be fenced and grazed. However this is not possible because of the Enclosures Act, which prohibits permanent fencing.

However currently there are no plans to continue grazing on Juniper Hill. Therefore whilst the possibility grazing is investigated cutting should be carried out. The aim will to cut the grassland on juniper Hill on a two year rotation, with one half cut on alternate years. The cutting should be carried out in late summer early autumn and the arisings removed. As with most of the grassland areas a small cut and collecting machine such as a forage harvester could be used.

Rabbit populations have recovered to almost their pre-1954 levels and provide additional valuable grazing pressure. However, heavy rabbit grazing can be damaging to a site. Particularly if only small areas of short turf are available as on Juniper Hill and Walton Downs grassland. In amongst the short turf there are plenty of rabbit scrapes which encourage Kidney Vetch seedlings. However rabbits are viewed as a problem in the gallops. In order to maintain a good Kidney Vetch population small man-made scrapes should be created in late winter each year, to enhance the vetch population on Juniper Hill (11) and Downs House grassland (14).

8.2 Woodland Management

8.2 Woodland/Scrub Clearance Juniper Hill (5/6)

The 1987 hurricane took down several trees on Juniper Hill and it was not until 1989 that scrub clearance began here. Where the objective was to create an open sward on the Downs, with a mosaic of sufficient diversity to support species of both short and tall grassland communities, as well as to encourage Juniper. Work has been carried out by the LMCMP volunteers. The vast majority of the work has been done using manual tools and chainsaws by cutting larger trees and stumps down to the ground. The clearance in volved enlarging the remaining grass areas, creating bays alongside the horseride and opening up the south western slope once more. Dogwood has been repeatedly cut back using a brushcutter on Juniper Hill by LMCP and spot treated with herbicide with much success. Areas recently cleared should have the new growth topped in spring to supress excessive undesirable 'weed' species.

Having spoken at great length with Nick Owen from the LMCP the following recommendations have been put together. To date a lot of the work carried out on this species rich grassland area has been small scale owing to the number of work parties and people volunteers involved. In order to make significant progress, with valuable results long term, some radical management is required to build upon the excellent work done so far and extend the amount of important, rare and species rich grassland.

It is strongly recommended that a large section of the woodland and scrub along the north edge of the existing grassland be cleared. Up to the path, with some areas on the path to be coppiced. Cutting back to the ride edge leave other side where it is over stood beech, little scrub underneath. Perhaps after 5 years next time cut back further into woodland

However, it is important to achieve a balance between maintaining open sunny areas whilst retaining scattered scrub on sites. Some rare invertebrates are associated with invading scrub species and some local craneflies on this habitat type are dependent on the leaf litter beneath scrub. Clearance of scrub from calcareous grassland may thus be detrimental to these species both by allowing the soil to be too exposed for larvae and by reducing shelter for adults. Therefore it will be very important to leave 'tongues' of scrub around the calcareous grassland.

Along edge ring bark some tree to die and take off crown, also known as 'halo release'. To be done on a small, gradual scale using volunteers not contractors. Leave moderate amount of log piles in shade on edge and in sun for bees and wasps. On southern ride, take out trees and scrub along the edge on one side only. Also scallop the edges and leave some Ivy. On the south west end along the path some of the younger scrub should be thinned principally the Bramble cut back up to 1-2m, but leave Elder. Prevent scrub from encroaching into open habitats whilst retaining scrubby edge habitat, particularly with Bramble and Dog Rose, as an eco-tone, solitary clumps etc. Note the importance of bramble clumps. To prevent Bramble from encroaching it can be cut back periodically. However, this is best done with hand tools rather than a mechanized cutter. Mechanical cutters tend to smash up the stems and leave untidy ends which are thought not to be as attractive as a nesting site.

Along the northern boundary edge of Juniper Hill woodland overlooking Walton Downs grassland. It is recommended here that the edges are scalloped in 20 -30m stretches. This would help to open up some of the woodland, encourage scrub growth and create an important ecotone between the woodland and the grassland which does not exist at the moment.

8.2 Juniper Management Juniper Hill (5/6)

Although its centre of distribution lies within the highlands of central and eastern Scotland. Juniper also occurs at scattered localities in parts of southern England, northern England and Wales (Rodwell, 1991). Nationally Juniper is not a scarce plant. In England, however, there is concern that it is becoming increasingly scarce as a semi-natural vegetation type. In southern counties Juniper is in a critical state of decline with evidence of habitat fragmentation. There are only 5 known sites in Surrey.

Juniper supports a comparatively small, yet characteristic, native invertebrate fauna, including many species with specialised habitat requirements and a restricted distribution in the UK (Ward 1977). There are a range of rare insects that only feed on Juniper like the Juniper Pug moth, recorded here in 1998. It also provides ideal nesting sites for small birds like Linnet and Yellowhammer.

Juniper stands tend to be restricted by age structure. The inhibition of seedling establishment creates very evenly aged Juniper populations characterised by old and senescent bushes which eventually die. The even age Juniper populations have obvious implications for their long-term continuity. Juniper has male and female bushes and the production of viable berries in the female bushes is affected by age. Fruit capacity is diminished as bushes grow older and even then the seed requires a combination of frosts over winter to break the dormancy before it will germinate. Ward (1992) found that 80% of seed produced by you ng stands were viable, compared with just 5% from older populations. Knocking off some of the berries and placing some in more protected long vegetation may help with the regeneration. The resulting seedlings will need to be protected from nibbling rabbits and later on deer. Senescent bushes also become increasingly susceptible to disease. Nevertheless these old populations may well persist for a very long period of time. Junipers in northern stands can reach 200 years of age (Clifton et al, 1995).

The Juniper bushes have been cleared of shade and staked and fenced to protect them from damage by deer. Clearance should be monitored and maintained. More substantial fencing for smaller bushes would be more effective. Halo/scallop around large Juniper bushes.

The Warren Woodland / Downs House Woodland & Epsom West Woodlands (2, 13 ,16,18,20)

Generally these woodlands are overgrown with much regrowth following damage caused by winds. Ground flora is less badly damaged and trampled than at Langley Vale Woods. Some re-coppicing of the hazel is required and thinning the dense canopy (preferentially the Sycamore) in small manageable areas will allow more light in by providing glades.

Dead wood should also be retained wherever possible as it is a greatly under appreciated resource. It is gradually eaten or digested by a wide variety of invertebrates. Typical inhabitants of rotting wood include beetles, fungi, woodlice, millipedes, centipedes, harvestmen, spiders, false scorpions, earwigs, springtails, fly larvae, molluscs, mites and thrips (Steele, 1972).

When creating dead wood piles using lopped branches and logs (as large as possible) some should be in the shade, some in the sunlight and others randomly strewn on the ground. It may look a little untidy, but it provides a better habitat for a variety of fungi.

A couple of rides have been punched through this woodland by members of the Racecourse. Dead wood has also been left. This now provides a hot spot for butterflies and birds. Other rides could also be included in this woodland.

Langley Vale Copse (11)

This old linear Hazel coppice was until recently the subject of a 7 year coppicing cycle in 7-9 coups, but at the completion of the 4th year, work was suspended in order not to intrude upon and destroy the habitat of a badger sett. Dave Williams from West Surrey Badger Group has been contacted and agrees that coppicing can still carry on. The removal of vegetation cover is temporary and in the long term will create dense cover for the badgers. However, care must be taken that the work does not destroy the sett or that the brash and branches do not destroy or block any of the entrances.

The current situation is that there has been vigorous re-growth of underwood (mostly hazel) checked only by shading from canopy trees in places. Since completion of work, maintenance has been limited to ride surfaces and cutting back of vegetation encroaching on rides. This is mostly coppiced hazel, which seems to be cut back with bow saws leaving cut stems next to rides (safety hazard) and cut material dumped wherever convenient on ride edges (unsightly). Planted trees (in tubes) have not been maintained and are now mostly dead, due to overshading. Note that if re-coppicing had been carried out at five or seven years (as appropriate to growth rates and end-use of stems) work to clear encroaching vegetation would not now be necessary and more planted trees would have survived. Note also that possibilities for the efficient end-use of hazel has been compromised by deer damage in the first two or three growing seasons.

It was hoped that the coppicing could restart using local coppice workers. However due to a variety of reasons it was felt that this area would not be financially viable. Therefore it would be a task for the Downs keepers to restart the coppicing. This should be again done in a seven year rotation.

SW corner of the Warren Woodland(13)

This section of the much larger Warren Woodland has been chosen as it shows abundant signs of having been worked as hazel coppice in the not-too-far past. There are large numbers of large hazel stools with large numbers of small stems per stool. Spacing between stools is fairly close on average and numbers of canopy trees are fairly low. These are two key requirements for high quality regrowth necessary for efficient/economically usable material of potential interest to coppice workers.

The size and density of the stools suggest that there will be strong regrowth and only minimal gapping-up or layering required. As with any site deer fencing would be a must to protect the regrowth. There will need to be a certain amount of thinning and the removal of non -native invasive species with some stump treatment to eradicate the latter. Work to bring this area back in the coppice rotation started with LMCP as part of the 'living woodlands' scheme. Working with a local coppice worker access has been improved by the constructing a hard surface trackand a kiln was installed. Coppicing began in 2012, with the area divide in to seven coupes. The hazel is coppiced on a 7year rotation and the ash on either a 14 or 21 year rotation

8.3 Hedgerow Management Hedgerows

Hedgerows greatly add to the diversity of a site and provide homes for a number of birds, mammals, and bats and create suntraps for invertebrates. For example Blackthorn is tolerant of most soils and forms dense thickets providing excellent nesting cover. Hawthorn is often used in hedges and the flowers are much used by insects, the fruits by birds and mice in the winter. Hazel is also tolerant of most soil conditions; the nuts are eaten by small mammals including Yellow Necked Mouse and Bank Vole.

Trimming alternate sides and sections every third year between January and February would produce the best results, as most berries on Hawthorn and Blackthorn tend to be on the outer most twigs and cutting these before they are eaten deprives birds and mammals of a valuable food source. Trimming should be done in a way that limits the damage on the stems and therefore allows them to recover much quicker.

South of the car park Hedgerow

South of the car park are some hedgerows that have been left to grow. There is concern that they are obscuring the views of the Downs. They should be cut on a 3-4 year rotational basis.

Epsom Lane North Hedgerow

There have been some issues in the past with neighbours who would like to see the views the Downs affords, and would therefore like to keep the height of the hedgerow down. Rotational trimming every 2-3 years will help to keep the hedgerow in check, whilst allowing views onto the Racecourse.

8.4 Open Water Dew Pond

There are no ponds or any other form or water feature on this site. However a dew pond was constructed several years ago adjacent to Juniper Hill. It survived for a number of years before developing a leak. A pond would help to enhance the site by introducing a new habitat type and increasing the biodiversity to the area. It has been estimated the creation of a dew pond would take between one and two weeks with an excavator and dumper truck. The costs would be for the liner, machinery and material. LMCP have got the relevant expertise and volunteers to hand to make this project possible.

General – Nutrient Enrichment

Avoid the application of artificial fertilisers, which will reduce the plant species diversity of a site and encourage denser foliage to over-shade the ground.

General -Bonfires

In one recently cleared patch Rosebay Willowherb dominates probably indicating where a previous bonfire has been. Whilst generally bonfires are not preferable and to be avoided, in this case the willowherb attracts butterflies such as the Elephant Hawk moth as well as other invertebrates. If bonfires are necessary to dispose of brash they should be carefully sited away from any rare species and positioned so that nutrient run-off is avoided into the species rich sward. Perhaps using corrugated iron sheets to prevent soil enrichment from the ash.

General -Signs

There are no interpretation signs explaining the nature conservation value of the site only bylaws. Options should be looked into for conservation interpretation panels to explain to the public what is going on and why the site is important.

Perhaps consideration should go into creating a summary leaflet to explain the management of the site and so on and could be given out to Derby visitors and so on to encourage support. In addition the EECB website coule be used to raise awareness of the site

General -Grants

Chalk grassland is a priority habitat and it worth exploring the possibility of gaining grant money to help with management of the site

General – Fixed Point Photography

This section highlights some ideas on future monitoring. Further details can be provided on techniques or names of specialists for further advice. Fixed point monitoring should be established over both Epsom & Walton Downs and to be repeated on a yearly basis. Also photo monitoring of before and after management to be used for a visual comparison of achievements and also useful for historical and educational purposes and talks

General – Vegetation Monitoring

Suggestions for vegetation monitoring include regular surveys to monitor developing grasslands in different seasons, species comparison and relative abundance and so on to ascertain if management techniques are suitable. This will provide up to date information on how the habitats are progressing over the years and what types of wildlife are being drawn to the site. Whatever monitoring and research programmes are used they will help establish changes over time and provide a valuable historical record.

Other monitoring could include setting up permanent quadrats in the different vegetation (NVC) communities.

General – Breeding Bird Survey

Yearly surveys on the bird populations will also be of extreme importance and will help to build up a useful picture over time. This is best done by repeating the same bird census techniques and using the same transect routes year on year. Pete Murray, a Downskeeper has been monitoring birds since 2002. This list provides useful data as a baseline for further work. Kestrel, Tree Creeper and Nuthatch bird boxes will help to assess what species are using the various woodlands. Their location should be mapped exactly.

A presence/absence survey will record all species seen during the site visits. However a breeding survey walking a line transect will estimate populations in more detailed and beneficial technique that can be designed to be repeatable in future years to allow comparison of data, using a series of territory maps. This, then, would add to the valuable work started by Peter Murray, Groundsman at the Racecourse.

This type of survey estimates abundance and examines the distribution of birds in relation to habitat. A series of mapped registrations for a particular species, gathered over several visits, will usually show signs of clustering, indicating the location of territories (Hill, 2005). The scheme commonly used now is the Breeding Bird Survey (BBS). This is where each site is visited a minimum of 5 times during the breeding period and the information collected will enable the surveyor to map the distribution, relative abundance and give records of rarer species of conservation interest. Tables will also be provided to show which recorded birds are Red or Amber under the

RSPB Conservation Concern list and if they are a Priority Species under the Biodiversity Action Plan (BAP) list. All birds and their activities are recorded on a separate map for each visit and this is how the information on territories builds up. The transect line that the surveyor follows will also be mapped for future reference.

General – Bat Survey

Several site visits are required to check for bat emergence, identify any species present and to assess the overall importance of the site as a foraging habitat for bats. This will also be weather dependant. A Tranquility II ultrasonic time expansion bat box detector will be used to record their ultrasonic echolocation calls and to facilitate identification.

Survey methods include finding roosts by direct observation and locating dispersal routes and feeding habitats, often with the aid of bat detectors. Day searches would be used to look at structures including trees with potential for roosting and looking for field signs such as droppings. Dusk observations watch emergence of bats, also dispersal commuting routes and flight paths from routes and indicates where foraging habitats are likely to be. Surveys are done between May and end of August and several visits, generally three counts approximately a week apart to include the birth period but before flight of juveniles. The weather is a key factor and should be warm and windless.

General – Other Surveys

Other future surveys to be considered are fungi, veteran trees, lichen and mammals (including small mammals, bats and badgers).

General – Archaeology

Dr D Bird, Principal Archaeologist at Surrey County Council states that in his opinion*, 'It seems to me that this area is of sufficient interest to warrant a proper historic landscape survey by someone suitably qualified*.' He goes on to say '*It will not be possibly to take proper account of the historic landscape issues in any management plan unless a proper survey has been undertaken*.'

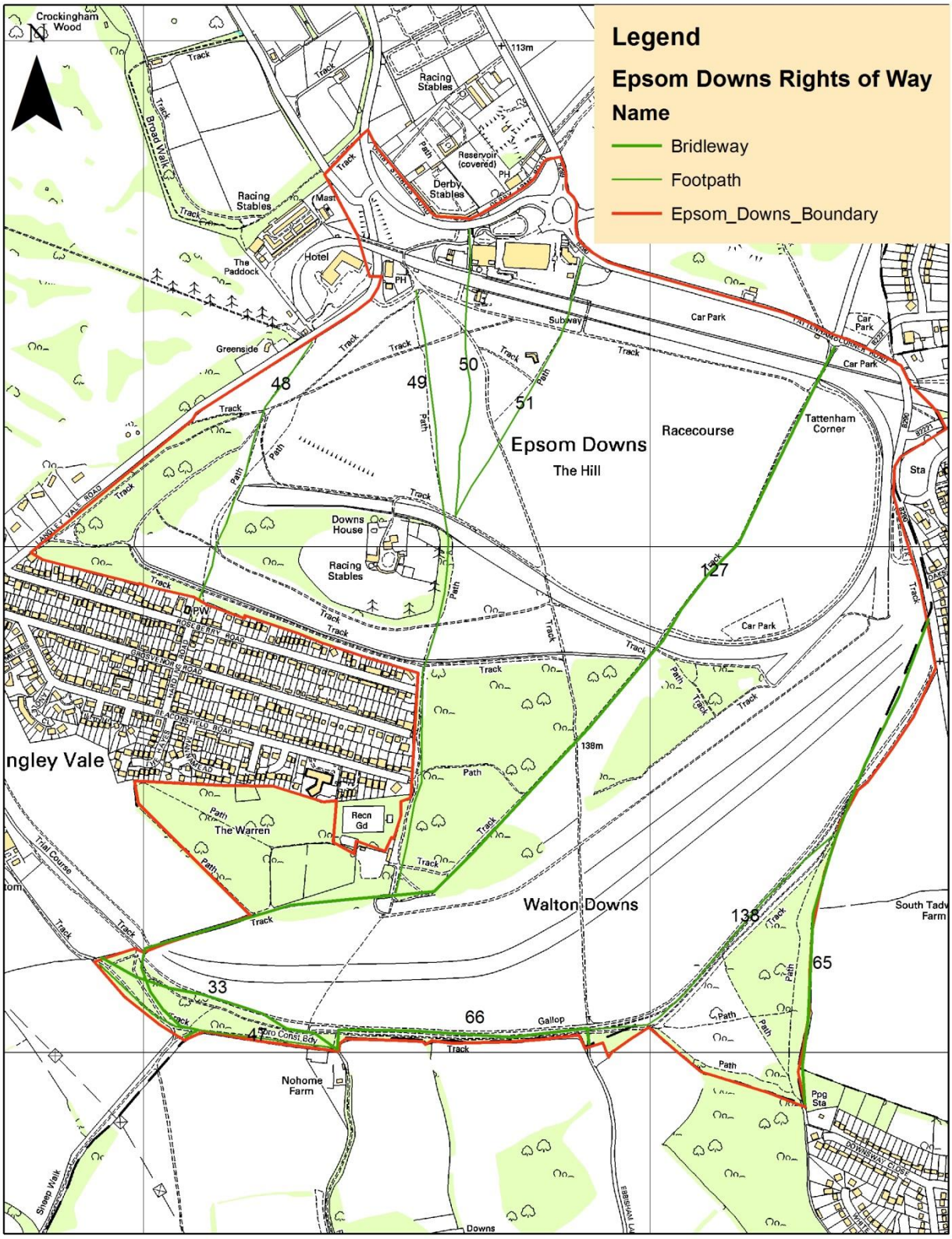
Area (Target Note)	Description of Work	Who	Timing	15	16	17	18	19
Juniper Hill Grassland - Main grass area	Cut and cleared on two year rotation	Downs keepers	Late Sept	*	*	*	*	*
Juniper Hill & Downs House grassland	Scrapes - Concentrating on areas adjacent to existing scrapes, by Juniper bushes and near known sites of Kidney Vetch • Hand (75 by 75cm) & excavator scrapes (1-2m), down to bare chalk & some soil.	Hand scrapes – Downs keepers LMCP volunteers. Machinery scrapes	Winter task, yearly, avoid May – July.	*			*	
Southern edge of Juniper Hill	• Open up existing large scale scrapes from the ride down to the farmland. • Spoil to be piled into the wood at farmland edge or permission sought to plough into farmland. • Scrub and woodland edges to be left. • Cut back Dogwood shrubs, concentrate to the north of this area. Treat stumps. Opportunity to experiment by doing a deep scrape to include roots and another just to top soil and then treat stumps.	LMCP volunteers.	Winter task, yearly, avoid May – July.	*			*	
Juniper Hill and Downs House Grassland	Tor grass • Spring (May) and Autumn (September) strimmed to 7cm. • Arisings not to be deposited on Juniper Hill. • Use brushcutters or scythes. • Include patches of Tor grass along the edges of small shaded species rich area of rabbit grazed grassland.	Downs keepers	Spring/Autumn	*	*	*	*	*
Juniper Hill	**Scrub and woodland** • Major cutting back of scrub and woodland from centre of Juniper Hill north towards the path. • Some areas along the path to be coppiced. • Up to 30% of scrub to be left in patches and linking 'tongues'. • Some trees to be ring barked, crown taken off and left, 'haloed'. • Leave 8-12 log piles in variety of conditions, shaded, sunny, under scrub or woodland. • Slow, gradual pushing back of scrub around small shaded species rich area of rabbit grazed grassland, but leave a band of scrub between this area and the current area of grazing grassland. • Continue leaving a ring of scrub and scattered trees around the orchid and twayblade colony. This area should not be included into the grazing regime. • On southern ride,	LMCP Downs keepers	Autumn/Winter	*	*	*	*	*

	take out trees and scrub along the edge on one side only. Also scallop the edges and leave some Ivy. • On the north east end along the path some of the younger scrub to be thinned. Principally bramble cut back by 1-2m. Elder to be left. Use hand tools here. • Along northern edge overlooking Walton Downs edges 3-4 scalloped in 20-30m stretches. • Take out the non-native Cotoneaster bush north end, at bottom of slope in grazed open area. • Create more substantial fencing around smaller Juniper bushes. Halo/scallop around larger Juniper bushes.								
Walton Downs grassland (12)	**Mowing** • To be cut on a 2 year rotation ie one half cut in the first year, followed by another half and so on. • Continue removing Hawthorn bushes. • If hackers require access, arrange winter access only	Downs keepers	Autumn	*	*	*	*	*	
Walton Downs scrub band (6)	**Scrub** • Scalloping the edges every 2-3 years OR ideally punching 3-5 'views' through scrub band and clearing all vegetation.	Downs keepers	Autumn/Winter	*	*	*	*	*	
Warren Meadow (8)	**Mowing** • Cut twice a year, once in early spring and again in autumn on two yearly rotation ie cut the west area twice in one year and the east area twice in the following year. • Maintain paths regularly. **Scrub** • Cut surrounding scrub back by 2-3m.	Downs keepers	Spring/Autumn	*	*	*	*	*	
Warren Grassland (7)	**Mowing** • Cut twice a year in spring and later summer. • Buffer zone of 2-3m edge around woodland left uncut in spring and cut with the rest in late summer.	Downs keepers	Spring/Autumn	*	*	*	*	*	
Epsom Downs West Grassland (16)	**Mowing** • Topped late September to 20cm height.	Downs keepers	Autumn	*	*	*	*	*	
Downs House Grassland (14)	**Mowing** • Should be cut on a 2 year rotation with one half cut each year. If edges have to be cut, then to a height of 10-20cm. • Ideally the whole area should be grazed, constraints such that winter grazing only. • Additional hand scrapes adjacent to existing scrapes. • Do not allow scrub to encroach past existing scrub line. Ideally edge should be cut back into shallow scallops of about 5m wide by 3m deep every 10m. • Should be cut more often (twice per year) for Racehorses and Hack Riders as it poses health & safety issues to leave long. • Recommend to cut more often, maintain short & slow removal of scrub.	Downs keepers	Autumn	*	*	*	*	*	
Derby Stables Road Grassland(23)	**Mowing.** Continue regular short cutting until beginning of July. A higher cut (min10cm) could be carried out in first two weeks of July. Then cease cutting until late September.	Downs keepers	Spring/Summer	*	*	*	*	*	

Southern Bridleway (9)	**Mowing** • For the safety of riders this should be cut back twice per year. Leave banks during summer and top in Autumn. Collect clippings.	Downs keepers	Summer/Autumn	*	*	*	*	*
General grassland	Mowing • Cut to height of 10-12cm with wavy margin. • Avoid spiral pattern. • All clippings to be taken off. • Small number of clippings to be left in piles in the rough grassland margins, next to hedges & in woodlands. • Use forage harvester & baler.	Downs keepers	Autumn	*	*	*	*	*
The Hill	**Mowing** • First cut to be delayed until just before Derby during mid May. • Successive cuts to be left as far apart as possible and topped only to 10-20cm	Downs keepers	Spring/Summer/Autumn	*	*	*	*	*
The Gallops	**Mowing** • Leave wide 2-5m buffer zone during summer, cut autumn for green hay. This is not possible as the Trainers need it cut weekly during growth	Downs keepers	Summer/Autumn	*	*	*	*	*
East of car park (18)	**Mowing** • Cut only once every two years, clippings taken off. Gorse needs to be kept down to avoid disturbance of racing views •	Downs keepers	Autumn	*	*	*	*	*
The Warren woodland/Downs House Woodland & Epsom West Woodland (1,2,3,13 &15)	**Dead wood** • To be retained where possible. • Create 2-3 east/west rides, link one with the glade to the north.	Downs keepers	Winter	*	*	*	*	*
Langley Vale Copse (pt 5)	**Coppice** • Continue with the 7 year coppicing regime, . • Care to be taken not to damage or destroy sett. Brash and branches are not to block any holes.	Downs keepers	Winter	*	*	*	*	*
South west corner of Warren Woodland (3)	**Coppice** • Coppice and woodland work using self employed coppice worker.	Coppice workers	Winter	*	*	*	*	*
Hedgerows	**Hedgerows** • Trim alternate sides and sections every three years between	Downs keepers	Winter	*			*	

	January and February.					
South of car park hedgerow	**Hedgerows** • Cut on a 3-4 year rotation, one side each time only.	Downs keepers	Winter			*
Epsom Lane North hedgerow	**Hedgerows** • Rotational trimming every 2-3 years to allow views onto Racecourse.	Downs keepers	Winter			*
Dew Pond north of Juniper Hill	**Open Water** • Consider creating a new dew pond to replace lost one. LMCP have relevant experience.	LMCMP	Winter	*		
General – Nutrient enrichment	Avoid application of artificial fertilisers.	All				
General – Bonfires	Avoid where possible.	All				
General – Signs	Consider some conservation based interpretation boards.	All				
General – Fixed point photography	**Surveys & Monitoring** • Fixed points established on Epsom & Walton Downs in key habitat areas. Also continue photo monitoring of areas before and after conservation management.	Volunteers	All year			
General – Vegetation monitoring	**Surveys & Monitoring** • Suggestions include – NVC vegetation surveys with possible inclusion of permanent quadrats, species comparison and relative abundance surveys,	Contractor	Spring/Summer			*
General – Breeding Bird survey	**Surveys & Monitoring** • Commission further bird survey work to build on the work done by Peter Murray, using BTO survey techniques to provide a picture on breeding territories and provide management recommendations. Peter Murray to be consulted.	Contractor	Spring/Summer	*		*

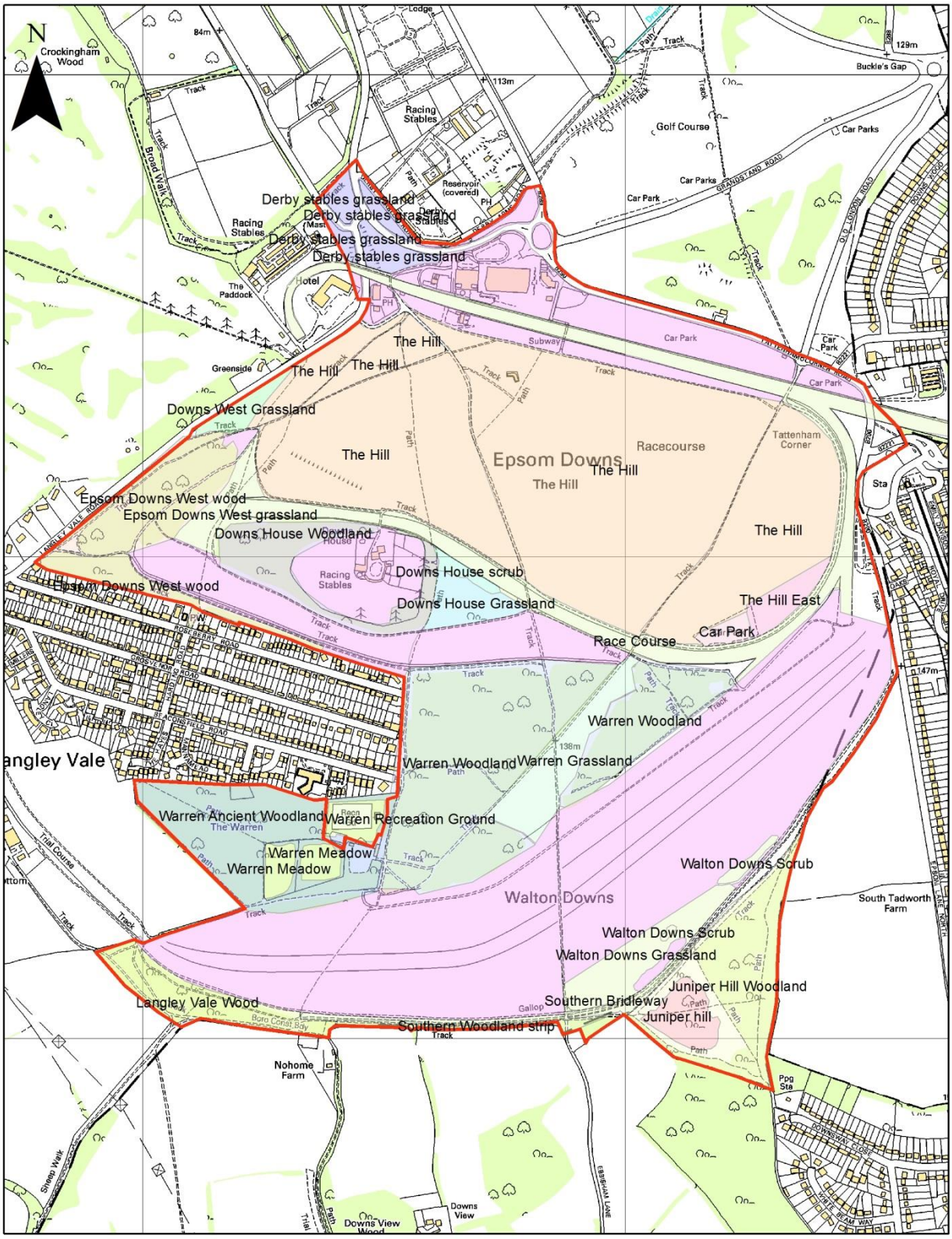
General – Bat survey	**Surveys & Monitoring** • Bat survey to check for presence, identify species and assess overall Importance of the site for foraging habitat with management recommendations.	Contractor	Spring/Summer	*
General – Further surveys	**Surveys & Monitoring** • Other surveys to be considered to build up a more comprehensive picture include additional invertebrate work with particular reference to spring and early summer work and a specialist survey in the nocturnal moths. • Fungi, veteran trees lichen and small mammals including badgers.	Contractor	As appropriate	
General – Archaeology	**Surveys & Monitoring** • Survey to take account the historic landscape, management recommendations would then be incorporated into the overall management of the site.	Contractor	As appropriate	



Epsom Downs Rights of Way

Created by Pete Howarth, December 2014

0 125 250 500 Meters



Epsom Downs management compartments

Created by Pete Howarth, December 2014

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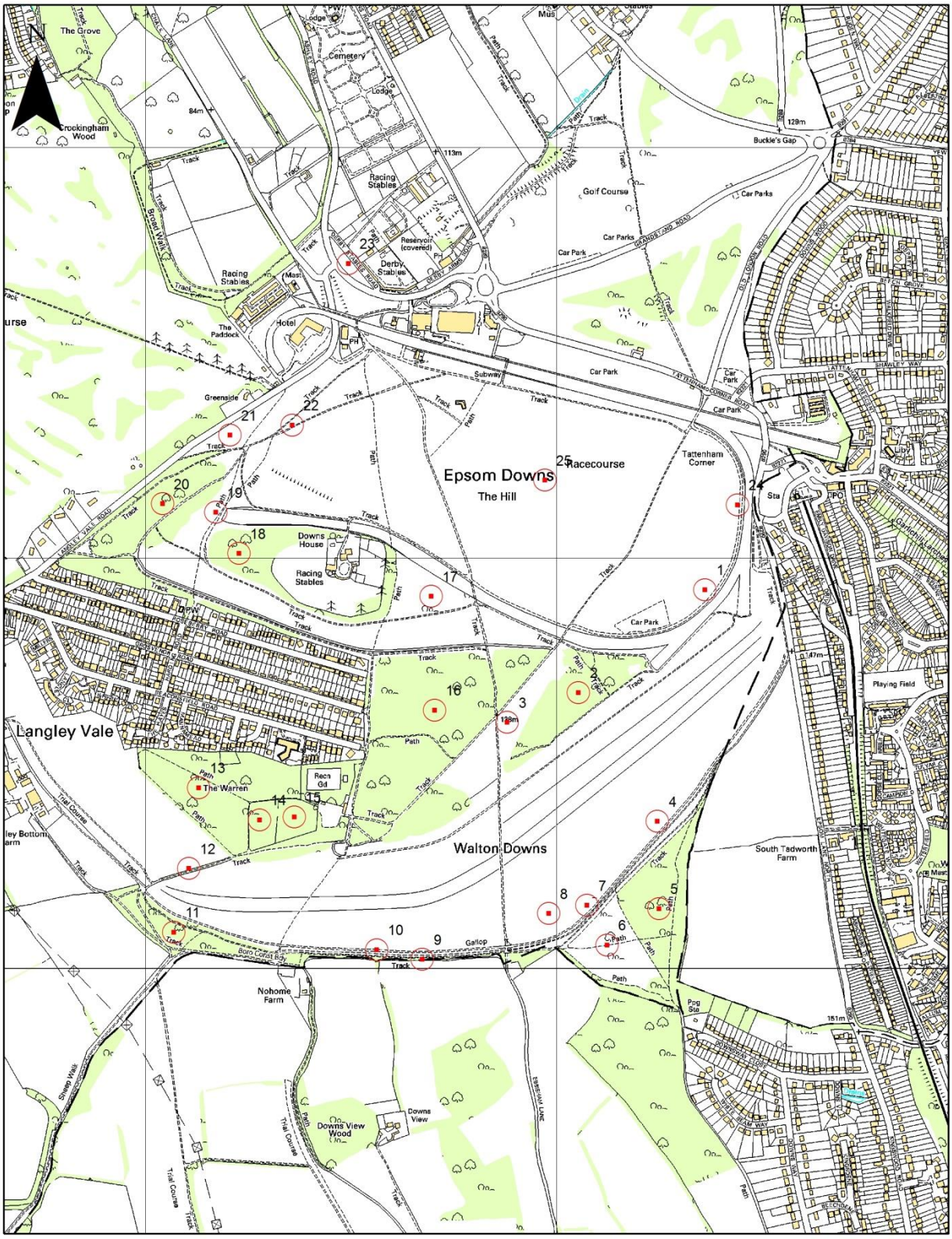

Epsom Downs Target Notes

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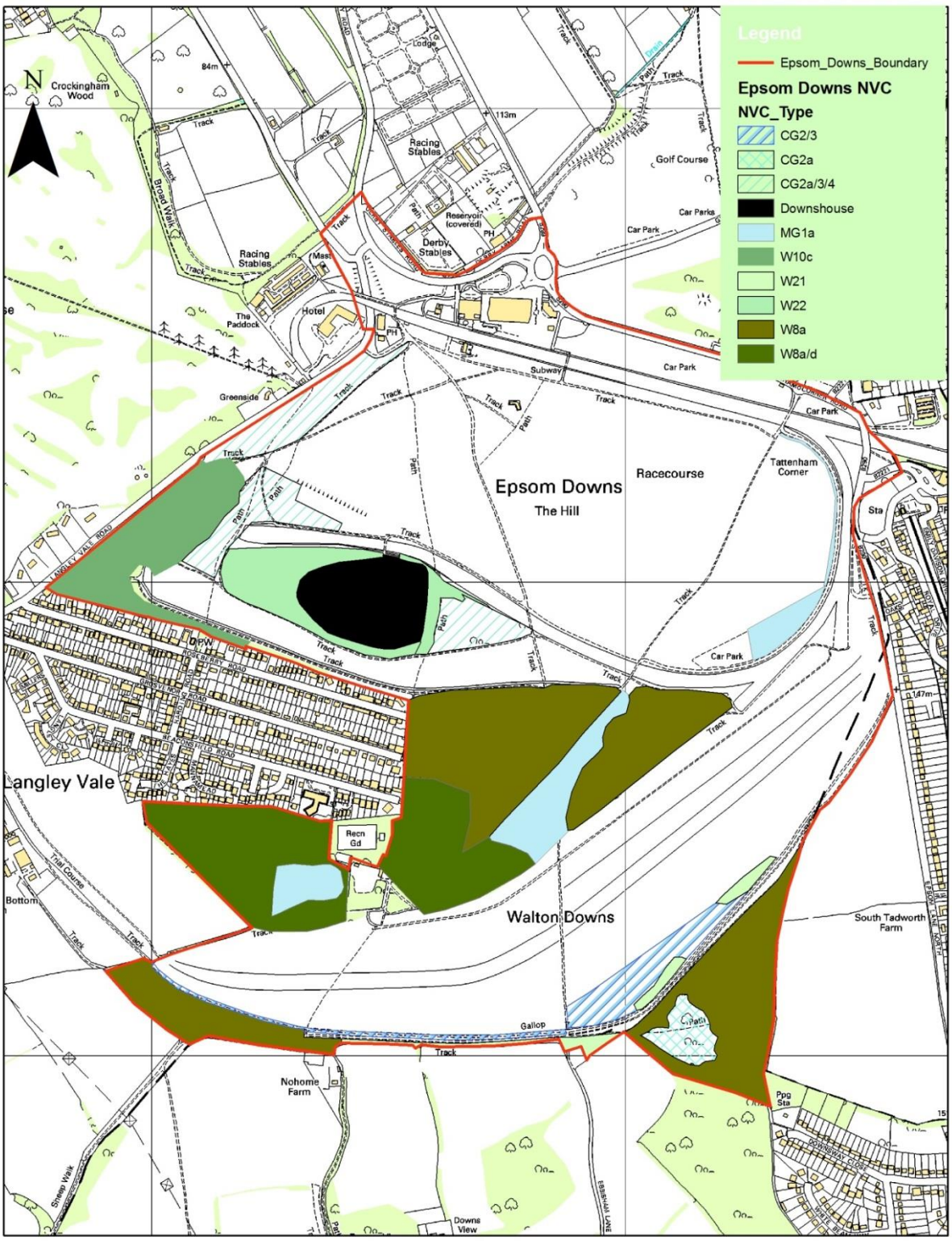


Epsom Downs NVC Habitats

Created by Pete Howarth, December 2014

0 125 250 500 Meters

APPENDIX 1 – VASCULAR PLANT SPECIES LIST

Scientific Name	Common Name	Date Last Recorded
Acer campestre	Field Maple	2014
Acer platanoides	Norway Maple	2014
Acer pseudoplantanus	Sycamore	2014
Achillea millefolium	Yarrow	2014
Adoxa moschatellina	Moschatel	2002
Aegopodium podagraria	Ground-elder	2014
Aesculus hippocastanum	Horse-chestnut	2014
Agrimonia eupatoria	Common Agrimony	2014
Agrostis capillaris	Common Bent	2014
Agrostis stolonifera	Creeping Bent	2014
Ajuga reptans	Bugle	2014
Alliaria petiolata	Garlic Mustard	2014
Anacamptis pyramidalis	Pyramidal Orchid	1905
Anagallis arvensis	Scarlet Pimpernel	2002
Anisantha sterilis	Barren Brome	2014
Anthoxanthum odoratum	Sweet Vernal Grass	2014
Anthriscus sylvestris	Cow Parsley	2014
Anthyllis vulneraria	Kidney Vetch	2014
Antirrhinum majus	Snapdragon	1998
Aquilegia vulgaris	Columbine	2007
Arctium minus	Lesser Burdock	2014
Arenaria serpyllifolia	Thyme-leaved Sandwort	2007
Arrhenatherum elatius	False Oat-grass	2014
Artemisia vulgaris	Mugwort	2014
Arum maculatum	Lords-and-ladies	2014
Asperula cynanchica	Squinancywort	2014
Ballota nigra	Black Horehound	2014
Bellis perennis	Daisy	2014
Betula pendula	Silver Birch	2014
Blackstonia perfoliata	Yellow-wort	1998
Brachypodium pinnatum	Tor-grass	2014
Brachypodium sylvaticum	False Brome	2014
Brachythecium rutabulum	a moss	2014
Brassica napus	Rape	2002
Briza media	Quaking Grass	2014
Bromopsis erecta	Upright Brome	2014

Bromus hordeaceus	Soft-brome	2014
Bryonia dioica	White Bryony	2014
Buddleja davidii	Butterfly Bush`	2014
Buxus sempervirens	Box	2014
Calystegia sepium	Hedge Bindweed	2014
Campanula glomerata	Clustered Bellflower	2014
Campanula rotundifolia	Harebell	2014
Campanula trachelium	Nettle-leaved Bellflower	1998
Capsella bursa-pastoris	Shepherd's-purse	2014
Carex caryophllyea	Spring-sedge	
Carex flacca	Glaucous Sedge	2014
Carex hirta	Hairy Sedge	2014
Carex sylvatica	Wood-sedge	2002
Carpinus betulus	Hornbeam	1998
Castanea sativa	Sweet Chestnut	2014
Centaurea nigra	Common Knapweed	2014
Centaurea scabiosa	Greater Knapweed	2007
Cerastium fontanum	Common Mouse-ear	2007
Chaerophyllum temulum	Rough Chervil	2007
Chamerion angustifolium	Rosebay Willowherb	2007
Chenopodium album agg.	Fat Hen	1998
Cichorium intybus	Chicory	2014
Cirsium acaule	Dwarf Thistle	2014
Cirsium arvense	Creeping Thistle	2014
Cirsium palustre	Marsh Thistle	2007
Cirsiurn vulgare	Spear Thistle	2014
Clematis vitalis	Traveller’s-joy	2014
Clinopodium vulgare	Wild Basil	2014
Convolvulus arvensis	Field Bindweed	2014
Conyza canadensis	Canadian Fleabane	2014
Cornus sanguinea	Dogwood	2014
Corylus avellana	Hazel	2014
Cotoneaster lacteus	Late Cotoneaster	2007
Crataegus monogyna	Hawthorn	2014
Crepis capillaris	Smooth Hawk’s-beard	2014
Cynosurus cristatus	Crested Dog's-tail	2014
Cytisus scoparius	Broom	1998
Dactylis glomerata	Cock’ s-foot	2014
Dactylorhiza fuchsii	Common Spotted-orchid	2014
Daucus carota	Wild Carrot	2014
Deschampsia caespitosa	Tufted Hair-grass	1998

Dryopteris filix-mas agg.	Male Fern	1998
Elymus caninus	Bearded Couch	1998
Elytrigia repens	Common Couch	2014
Epilobium hirsutum	Great Willowherb	2014
Epilobium montanum	Broad-leaved Willowherb	2007
Epilobium parviflorum	Hoary Willowherb	2007
Euonymus europaeu Spindle		2014
Eupatorium cannabinum	Hemp-agrimony	1914
Euphorbia cyparissias	Cypress Spurge	2014
Euphorbia helioscopia	Sun Spurge	1998
Euphrasia nemorosa	an eyebright	2014
Euphrasia pseudokerneri	an eyebright	2014
Eurhynchium praelongum	a moss	2014
Fagus sylvatica	Beech	2014
Festuca arundinacea	Tall Fescue	2002
Festuca gigantea	Giant Fescue	2014
Festuca ovina agg.	Sheep's Fescue [agg.]	2014
Festuca rubra sens.str	Red Fescue	2014
Filipendula ulmaria	Meadowsweet	1905
Filipendula vulgaris	Dropwort	2014
Fraxinus excelsior	Ash	2014
fruticans) Prunus laurocerasus	Cherry Laurel	2002
Fumaria officinalis	Common Fumitory	1998
Galega officinalis	Goat's-rue	2002
Galium aparine	Cleavers	2007
Galium mollugo	Hedge Bedstraw	2014
Galium odoratum	Woodruff	2002
Galiurn verum	Lady’s Bedstraw	2014
Gentianella amarelle	Autumn Gentian	2014
Geranium dissectum	Cut-leaved Crane's-bil	2002
Geranium molle	Dove's-foot Crane's-bill	2002
Geranium pyrenaicum	Hedgerow Crane's-bill	2014
Geranium robertianum	Herb Robert	2014
Geum urbanum	Wood Avens	2014
Glechoma hederacea	Ground Ivy	2014
Gymnadenia conopsea	Fragrant Orchid	1905
Hedera helix	Ivy	2014
Helianthemum nummulariun	Common Rock-rose	2014
Helictotrichon pratense	Meadow Oat-grass	2014
Heracleum mantegazzianum	Giant Hogweed	2002

Heracleum sphondylium	Hogweed	2014
Hesperis matronalis	Dame's Violet	2002
Hippocrepis comosa	Horseshoe Vetch	2014
Holcus lanatus	Yorkshire Fog	2014
Hordeum murinum	Wall Barley	2014
Hyacinthoides hispanica x non-scripta	a bluebell	2002
Hyacinthoides non-scripta	Bluebell	2002
Hypericum androsaemum	Tutsan	2007
Hypericum hirsutum	Hairy St John's-wort	2014
Hypericum perforatum	Perforate St John's-wort	2014
Hypnum cupressiforme sens. lat.	a moss	2014
Hypochaeris radicata	Cat's-ear	2002
Ilex aquifolium	Holly	2014
Inula conyzae	Ploughman's -spikenard	2014
Iris foetidissima	Stinking Iris	2002
Juniperus communis	Juniper	2014
Knautia arvensis	Field Scabious	2014
Koeleria macrantha	Crested Hair-grass	2014
Lactuca serriola	Prickly Lettuce	2007
Lactuca virosa	Greater Prickly Lettuce	2007
Lamiastrum galeobdolon	Yellow Archangel	2014
Lamium album	White dead nettle	2014
Lamium purpureum	Red Dead-nettle	2014
Lapsana communis	Nipplewort	2014
Lathyrus nissolia	Grass Vetchling	2014
Lathyrus pratensis	Meadow Vetchling	2014
Leontodon autumnalis	Autumn Hawkbit	2014
Leontodon hispidus	Rough Hawkbit	2014
Leontodon saxatilis	Lesser Hawkbit	2014
Leucanthemum vulgare	Ox-eye Daisy	2007
Ligustrum ovalifolium	Garden Privet	2002
Ligustrum vulgare	Wild Privet	2014
Linaria vulgaris	Common Toadflax	2014
Linum catharticum	Fairy Flax	2014
Listera ovata Common	Twayblade	2007
Lolium perenne	Perennial Rye grass	2014
Lonicera periclymenum	Honeysuckle	2014
Lotus corniculatus	Common Bird's-foot Trefoil	2014
Luzula campestris	Field Wood-rush	2002
Mahonia aquifolium	Oregon- grape	2007

Malus domestica	Apple	2014
Malus sylvestris	Crab Apple	2014
Malva sylvestris	Common Mallow	2014
Matricaria discoidea	Pineapple Weed	2014
Medicago lupulina	Black Medick	2014
Medicago sativa ssp. sativa	Lucerne	2014
Melica uniflora	Wood Melick	2014
Melilotus officinalis Ribbed	Melilot	2014
Mentha arvensis	Corn Mint	2007
Mercurialis perennis	Dog's Mercury	2014
Myosotis arvensis	Field Forget-me-not	2007
Myosotis laxa	Tufted Forget-me-not	1998
Myosotis sylvatica	Wood Forget-me-not	2007
Narcissus agg.	a garden daffodil	2002
Odonites vernus	Red Bartsia	2014
Onobrychis viciifolia	Sainfoin	1998
Ononis repens	Common Restharrow	2014
Orchis mascula	Early Purple Orchid	2014
Origanum vulgare	Majoram	2014
Papaver argemone	Prickly Poppy	1998
Papaver hybridum	Rough Poppy	1990
Papaver rhoeas	Common Poppy	1998
Papaver rhoeas	Corn Poppy	2007
Papaver somniferum	Opium Poppy	1998
Pastinaca sativa	Wild Parsnip	2014
Pentaglottis sempervirens	Green Alkanet	2002
Phleum bertolonii	Smaller Cat’s-tail	2014
Phleum pratense	Timothy	2007
Phyllitis scolopendrium	Hart's-tongue	2002
Phyteuma orbiculare	Round-headed Rampion	2014
Picris echioides	Bristly Ox-tongue	2014
Pilosella officinarum	Mouse-ear-hawkweed	2014
Pimpinella saxifraga	Burnet Saxifrage	2014
Pinus sylvestris	Scots Pine	2002
Plantago lanceolata	Ribwort Plantain	2014
Plantago major	Greater Plantain	2014
Plantago media	Hoary Plantain	2007
Poa annua	Annual Meadow-grass	2014
Poa nemoralis	Wood Meadow-grass	2002
Poa pratensis	Smooth Meadow-grass	2007

Poa trivialis	Rough Meadow-grass	2014
Polygala calcarea	Chalk Milkwort	2014
Polygala vulgaris	Common Milkwort	2014
Populus alba	White Poplar	2002
Populus tremula	Aspen	2014
Potentilla anserina	Silverweed	2014
Potentilla reptans	Creeping Cinquefoil	2002
Potentilla sterilis	Barren	2002
Primula veris	Cowslip	2007
Primula vulgaris	Primrose	2014
Prunella vulgaris	Self-heal	2007
Prunus avium	Wild Cherry	2014
Prunus cerasus var. pisardii	Cherry Plum	2007
Prunus domestica	Wild Plum	2002
Prunus domestica ssp. domestica	Plum	2002
Prunus domestica x spinosa (	*P. x* a cherry	2002
Prunus spinosa	Blackthorn	2014
Pulicaria dysenterica	Common Fleabane	2007
Quercus cerris	Turkey Oak	2014
Quercus robur	Pedunculate Oak	2014
Ranunculus acris	Meadow buttercup	2014
Ranunculus bulbosus	Bulbous Buttercup	2014
Ranunculus ficaria	Lesser Celandine	2014
Ranunculus repens	Creeping Buttercup	2014
Reseda lutea	Wild Mignonette	2014
Rhamnus cathartica	Buckthorn	2014
Ribes rubrum	Red Currant	2007
Ribes uva-crispa	Gooseberry	2002
Rosa arvensis	Field Rose	2002
Rosa canina	Dog Rose	2007
Rosmarinus officinalis	Rosemary	2007
Rubus caesius	Dewberry	2007
Rubus fruticosus	Bramble	2007
Rubus idaeus	Raspberry	2007
Rumex acetosella	Sheep's Sorrel [agg.]	2014
Rumex obtusifolius	Broad-leaved Dock	2014
Rumex sanguineus	Wood Dock	2014
Salix caprea	Goat Willow	2007
Sambucus nigra	Common Elder	2014
Sanguisorba minor	Salad Burnet	2007

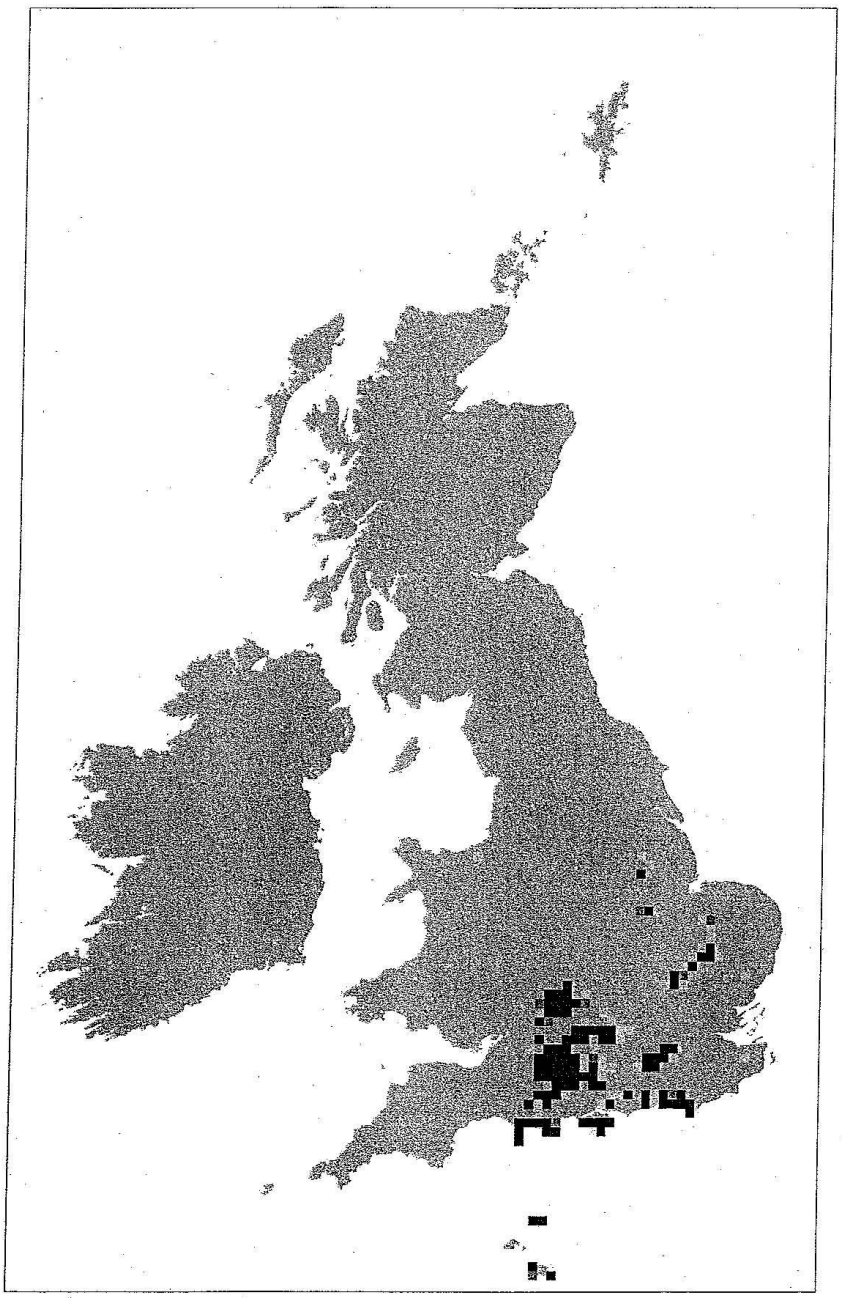
Sanicula europaea	Sanicle	2014
Sasa sp.	a bamboo	2002
Scabiosa columbaria	Small Scabious	2007
Senecio jacobaea	Common Ragwort	2014
Silene latifolia	White Campion	2014
Silene vulgaris	Bladder Campion	2014
Sisymbrium officinale	Hedge Mustard	2014
Solanum dulcamara	Bittersweet	2007
Solanum nigrum	Black Nightshade	2014
Solidago canadensis	Canadian Goldenrod	2007
Sonchus asper	Prickly Sow-thistle	2014
Sonchus oleraceus	Smooth Sow-thistle	2014
Sorbus aria	Whitebeam	2014
Sorbus aucuparia	Rowan	
Stachys sylvatica	Hedge Woundwort	2014
Stellaria graminea	Lesser Stitchwort	2014
Stellaria media agg.	Chickweed	2014
Symphororicarpos albus	Snowberry	2014
Tamus communis	Black Bryony	2014
Tanacetum vulgare	Tansy	2014
Taraxacum officinale	Dandelion	2014
Taxus baccata	Yew	2014
Teucrium scorodonia	Wood Sage	2014
Thesium humifusum	Bastard-toadflax	2014
Thymus polytrichus	Wild Thyme	2014
Tilia cordata x platyphyllos	*(T. x* Lime	2002
Torilis japonica	Upright Hedge-parsley	2007
Tragopogon pratensis	Goat's-beard	2014
Trifolium dubium	Lesser Trefoil	2014
Trifolium pratense	Red Clover	2014
Trifolium repens	White Clover	2014
Tripleurospermum inodorum	Scentless Mayweed	2002
Tussilago farfara	Colt's-foot	2014
Ulex europaeus	Gorse	2014
Ulmus glabra	Wych Elm	2014
Urtica dioica	Common Nettle	2014
Valeriana officinalis	Common Valerian	2014
Verbascum thapsus	Great Mullein	2014
Veronica arvensis	Wall Speedwell	2014
Veronica chamaedrys	Germander Speedwell	2014
Veronica persica	Common Field-speedwell	2014
Veronica serpyllifolia	Thyme-leaved Speedwell	2002

Viburnum lantana	Wayfaring Tree	2014
Viburnum opulus	Guelder Rose	2014
Vicia cracca	Tufted Vetch	2002
Vicia sativa	Common Vetch	2014
Vicia sepium	Bush Vetch	2002

APPENDIX 2 – NATIONAL DISTRIBUTION OF BASTARD TOADFLAX

New Atlas 10km Census Dataset Map

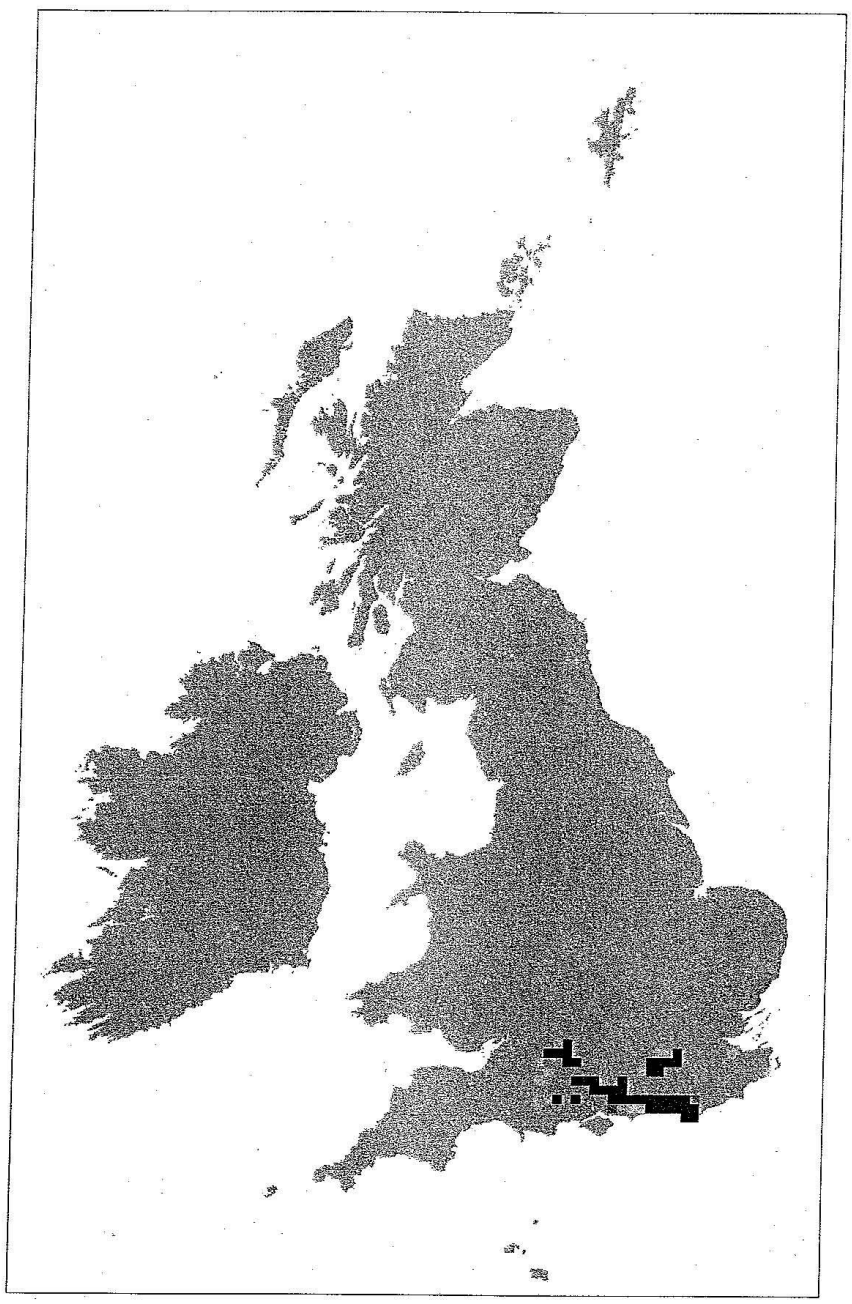
Dataset Title: Bastard-toadflax
Print date: Thu Aug 30 14:02:10 2007



APPENDIX 3 – NATIONAL DISTRIBUTION OF ROUND-HEADED RAMPION

New Atlas 10km Census Dataset Map

Dataset Title: Round-headed Rampion
Print date: Thu Aug 30 14:02:27 2007



APPENDIX 4 – NATIONAL DISTRIBUTION OF CHALKHILL EYEBRIGHT

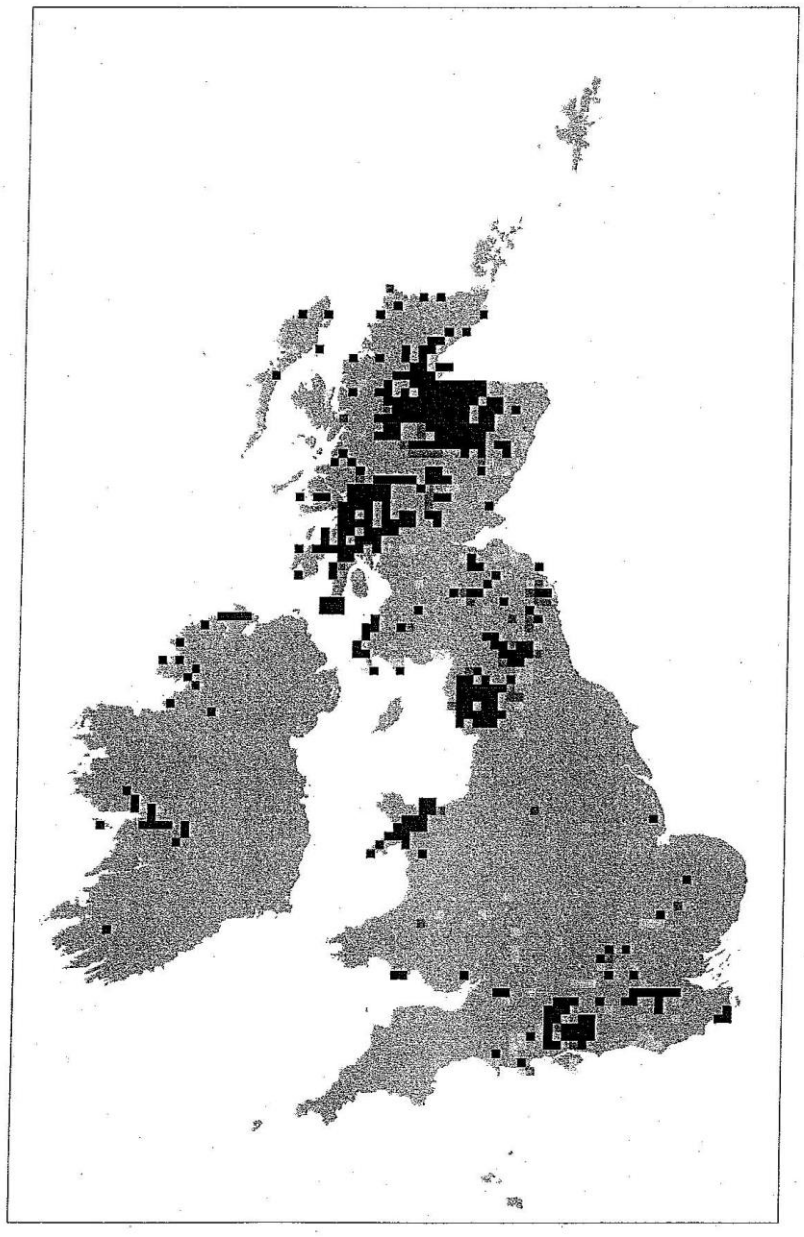
New Atlas 10km Census Dataset Map

Dataset Title: Euphrasia pseudokerneri
Print date: Wed Mar 26 16:40:34 2008

APPENDIX 5 – NATIONAL DISTRIBUTION OF JUNIPER

New Atlas 10km Census Dataset Map

Dataset Title: Juniperus communis subsp. communis
Print date: Thu Aug 30 14:03:03 2007



APPENDIX 6 – SPECIES DEFINITIONS

Vascular Plants

Threatened – Critically Endangered; A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future. For more information on the criteria used see Wigginton, M.J., (1999); British Red Data Books: 1 Vascular Plants, Joint Nature Conservation Committee, Peterborough.

Threatened – Endangered; a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future. For more information on the criteria used see Wigginton, M.J., (1999); British Red Data Books: 1 Vascular Plants, Joint Nature Conservation Committee, Peterborough.

Threatened – Vulnerable; a taxon which is not Critically Endangered or Endangered but is facing high risk of extinction in the wild in the medium term future. For more information on the criteria used see Wigginton, M.J., (1999); British Red Data Books: 1 Vascular Plants, Joint Nature Conservation Committee, Peterborough.

Lower Risk – Near Threatened; Taxa which do not qualify for Lower Risk (conservation dependant) but which are close to qualifying for Vulnerable. For more information on the criteria used see Wigginton, M.J., (1999); British Red Data Books: 1 Vascular Plants, Joint Nature Conservation Committee, Peterborough.

Lower Risk – Conservation Dependant; Taxa which are the focus of a continuing taxon specific or habitat specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. For more information see Wigginton, M.J., (1999); British Red Data Books: 1 Vascular Plants, Joint Nature Conservation Committee, Peterborough.

Nationally Scarce; species estimated to occur within 16-100 10 kilometre squares of the National Grid system. For more information see Stewart, A., Pearman, D.A., & Preston, C.D., (1994); Scarce Plants in Britain, Joint Nature Conservation Committee, Peterborough.

Data Deficient – A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution an/or population status. A taxon in this category in this category may be well studied, and its biology well known, but appropriate data on abundance an/or distribution are lacking. Data Deficient id therefore not a category of threat or Lower Risk. Listing of this taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that a threatened category is appropriate. For more information see Wigginton, M.J., (1999); British Red Data Books: 1 Vascular Plants, Joint Nature Conservation Committee, Peterborough.

Birds

The Red and Amber lists have been drawn up RSPB. The Red list species are those that are Globally Threatened according to the IUCN criteria; those whose population or range h as declined rapidly in recent years and those that have declined historically and not shown a substantial recent recovery.

Amber list species are those with an unfavourable conservation status in Europe; those whose populations or range has declined moderately in recent years; those whose population has decline historically but made a substantial recent recovery; rare breeders and those with internationally important or localise populations.

Invertebrates

RDB 1 – Endangered; Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. For more information on the criteria see Shirt, D.B., Ed., (1987); British Red Data Books: 2, Insects, Joint Nature Conservation Committee, Peterborough or Bratton J.H. Ed., (1991); British Red Data Books: 3, Invertebrates Other Than Insects, Joint Nature Conservation Committee, Peterborough.

RDB 2 – Vulnerable; Taxa believed likely to move into the Endangered (RDB 1) category in the near future if all the causal factors continue operating. For more information on the criteria see Shirt, D.B., Ed., (1987); British Red Data Books: 2, Insects, Joint Nature Conservation Committee, Peterborough or Bratton J.H. Ed., (1991); British Red Data Books: 3, Invertebrates Other Than Insects, Joint Nature Conservation Committee, Peterborough. This category also includes taxa which subsequent research has shown to be Vulnerable. This designation should be considered provisional until the publication of a fully revised and updated red data book (designated pRDB 2).

RDB 3 – Rare; Species which exist in only fifteen or fewer 10 Kilometre Squares of the National Grid system. These are Taxa with small populations that are not at present Endangered (RDB 1) or Vulnerable (RDB 2), but are at risk. For more information on the criteria see Shirt, D.B., Ed., (1987); British Red Data Books: 2, Insects, Joint Nature Conservation Committee, Peterborough or Bratton J.H. Ed., (1991); British Red Data Books: 3, Invertebrates Other Than Insects, Joint Nature Conservation Committee, Peterborough. This category also includes taxa which are believed to be rare but are too recently discovered or recognised to be certain of placing (designated pRDB 3).

RDB K – Insufficiently Known; Taxa suspected to fall within the RDB categories but with too little information to allow confident assignment to particular category. For more information on the criteria used see the published JNCC Review for each group e.g. Falk, S., (1991); A Review of the Scarce and Threatened Bees, Wasps an Ants of Great Britain, Research and Survey in Nature Conservation, No. 35, Nature Conservancy Council, Peterborough.

Nationally Notable/Na; species estimated to occur within 16-30 10-kilometre squares of the National Grid system. For more information on the criteria used see Eversham, B., (1983);

Defining Rare and Notable Species – a discussion document, Invertebrate Site Register Report No 49, Nature Conservancy Council and Ball, S.G. (1986); Terrestrial and Freshwater Habitats with Red

Data Book, Notable or Habitat Indicator Status, Invertebrate Site Register Internal Report Number 66, Nature Conservancy Council.

Nationally Notable/Nb; species estimated to occur within 31-100 10 kilometre squares of the National Grid system. For more information on the criteria used see Eversham, B., (1983);

Defining Rare and Notable Species – a discussion document, Invertebrate Site Register Report No 49, Nature Conservancy Council and Ball, S.G. (1986); Terrestrial and Freshwater Habitats with Red Data Book, Notable or Habitat Indicator Status, Invertebrate Site Register Internal Report Number 66, Nature Conservancy Council.

Nationally Local; species estimated to occur within 101-700 10 kilometre squares of the National Grid system. For more information on the criteria used see Eversham, B., (1983);

Defining Rare and Notable Species – a discussion document, Invertebrate Site Register Report No 49, Nature Conservancy Council See Ball, S.G. (1986); Terrestrial and Freshwater Habitats with Red Data Book, Notable or Habitat Indicator Status, Invertebrate Site Register Internal Report Number 66, Nature Conservancy Council.

Biodiversity Action Plan (BAP) definitions

BAP1 – Priority Species; Species which are globally threatened; species which are rapidly declining in the UK, i.e. by more than 50% in the last 25 years.

BAP2&3 – Species of Conservation Concern; threatened endemic and other globally threatened species; species where the UK has more than 25% of the world population; species where numbers or range have declined by more than 25% in the last 25 years; where some species are found in fewer than 15 ten km squares in the UK; species which are listed in the EU Birds or Habitats Directives, the Bern, Bonn or CITES Conventions, or under the Wildlife and Countryside Act 1981.

Historical Data

Scientific Name *Arion intermedius Candidula intersecta*	**Common Name** Hedgehog Slug a snail	**Date last recorded** 2002 2002	**Status** Common Local	**BAP status**
Ceciliodes acicula	a blind snail	2002	Local	
Cepaea hortensis Cepaea nemoralis Cochlicopa lubricella Discus rotundatus	a snail Brown Lipped Snail a moss snail a discus snail	2002 2002 2002 2002	Common Common Common Common	
Ena obscura	a bulin snail	2002	Common	
Helix aspersa Limax maximus Pomatias elegans	a snail Great Grey Slug a land winkle	2002 2002 2002	Common Common Local	
Lumbricus terrestris	Common Earthworm	2002	Common	
Aeshna cyanea Aeshna mixta Coenagrion puella Erythromma najas Ischnura elegans Sympetrum striolatum	Southern Hawker Migrant Hawker Azure Damselfly Red-eyed Damselfly Blue-tailed Damselfly Common Darter	1905 1905 1905 1905 1905 1905	Common Local Common Local Common Common	
Chorthippus brunneus Conocephalus discolor Leptophyes punctatissima Metrioptera roeselii Omocestus viridulus	Common Field Grasshopper Long-winged Conehead Speckled Bush Cricket Roesel's Bush Cricket Common Green Grasshopper	2002 2002 1998 2002 2002	Common Notable/Na Common Notable/Nb Common	
Chrysopa carnea Hemerobius humulinus Hemerobius stigma	a green lacewing a brown lacewing a brown lacewing	1998 1998 1998	Common Common Common	
Agonum fuliginosum Amara familiaris Bembidion gilvipes Bembidion properans Calathus melanocephalus sens. str. Carabus problematicus Nebria brevicollis Perigona nigriceps Pterostichus diligens Trechus quadristriatus	a ground beetle a ground beetle a ground beetle a ground beetle a ground beetle a ground beetle a ground beetle a ground beetle a ground beetle a ground beetle	1995 1995 1995 1995 1995 1995 1995 1995 1995 1995	Common Common Notable/Nb Common Common Common Common Naturalised Common Common	

Scientific Name	**Common Name**		**Date last recorded**	**Status**	**BAP status**
Cercyon analis	a scavenger water beetle		1995		
Cercyon atomarius	a scavenger water beetle		1995	Common	
Cercyon atricapillus	a scavenger water beetle		1995	Notable/Nb	
Cercyon haemorrhoidalis	a scavenger water beetle		1995	Common	
Cercyon lateralis	a scavenger water beetle		1995	Local	
Cercyon melanocephalus	a scavenger water beetle		1995	Common	
Cercyon pygmaeus	a scavenger water beetle		1995		
Cercyon quisquilius	a scavenger water beetle		1995		
Cercyon terminatus	a scavenger water beetle		1995	Local	
Cercyon unipunctatus	a scavenger water beetle		1995	Local	
Cercyon ustulatus	a scavenger water beetle		1995	Notable/Nb	
Cryptopleurum minutum	a scavenger water beetle		1995	Common	
Cryptopleurum subtile	a scavenger water beetle		1995	Local	
Megasternum obscurum	a scavenger water beetle		1995	Common	
Sphaeridium scarabaeoides	a scavenger water beetle		1995	Common	
Abraeus globosus	a carrion beetle		1995	Local	
Acritus homoeopathicus	a carrion beetle		1995	RDB3	
Acritus nigricornis	a carrion beetle		1995	Local	
Atholus duodecimstriatus	a carrion beetle		1995	Local	
Carcinops pumilio	a carrion beetle		1995	Local	
Kissister minimus	a carrion beetle		1995		
Onthophilus striatus	a carrion beetle		1995	Common	
Peranus bimaculatus	a carrion beetle		1995	Local	
Acrotrichis atomaria	a featherwing beetle		1995	Common	
Acrotrichis cognata	a featherwing beetle		1995	Naturalised	
Acrotrichis fascicularis	a featherwing beetle		1995	Common	

Acrotrichis grandicollis	a featherwing beetle		1995	Common	
Acrotrichis insularis	a featherwing beetle		1995	Naturalised	
Acrotrichis montandoni	a featherwing beetle		1995	Local	
Acrotrichis sericans	a featherwing beetle		1995	Common	
Nephanes titan	a featherwing beetle		1995	Local	
Ptenidium laevigatum	a featherwing beetle		1995	Common	
Ptenidium pusillum	a featherwing beetle		1995	Common	
Ptiliola kunzei	a featherwing beetle		1995	Common	
Ptiliolum marginatum	a featherwing beetle		1995	RDB K	
Cephennium gallicum	a small antlike beetle		1995	Local	
Scydmaenus rufus	a small antlike beetle		1995	pRDB2	
Scydmaenus tarsatus	a small antlike beetle		1995	Local	
Aleochara lanuginosa	a rove beetle		1995	Common	
Amischa analis	a rove beetle		1995	Common	
Amischa forcipata	a rove beetle		1995		
Anotylus sculpturatus	a rove beetle		1995	Common	
Anotylus tetracarinatus	a rove beetle		1995	Common	
Astenus pulchellus	a rove beetle		1995	Local	
Atheta aterrima	a rove beetle		1995	Common	
Atheta atramentaria	a rove beetle		1995	Common	

Scientific Name	**Common Name**		**Date last recorded**	**Status**	**BAP status**
Atheta benicki	a rove beetle		1995	pRDBK	
Atheta celata	a rove beetle		1995	Local	
Atheta coriaria	a rove beetle		1995	Common	
Atheta fungi	a rove beetle		1995	Common	
Atheta harwoodi	a rove beetle		1995	Local	
Atheta laticollis	a rove beetle		1995	Common	
Atheta longicornis	a rove beetle		1995	Common	
Atheta luridipennis	a rove beetle		1995	Local	
Atheta nigra	a rove beetle		1995	Common	
Atheta nigricornis	a rove beetle		1995	Local	
Atheta sordidula	a rove beetle		1995	Local	
Atheta subsinuata	a rove beetle		1995		
Atheta trinotata	a rove beetle		1995	Common	
Autalia rivularis	a rove beetle		1995	Common	
Carpelimus bilineatus	a rove beetle		1995	Common	
Carpelimus fuliginosus	a rove beetle		1995	Notable/Nb	
Carpelimus pusillus	a rove beetle		1995	Local	
Cilea siphoides	a rove beetle		1995	Local	
Cordalia obscura	a rove beetle		1995		
Dinaraea aequata	a rove beetle		1995	Common	
Falagria concinna	a rove beetle		1995	Vagrant	
Gabronthus thermarum	a rove beetle		1995		
Gauropterus fulgidus	a rove beetle		1995	Naturalised	
Gyrohypnus fracticornis	a rove beetle		1995		
Leptacinus intermedius	a rove beetle		1995		
Leptacinus pusillus	a rove beetle		1995	Common	
Lithocharis nigriceps	a rove beetle		1995	Naturalised	

Lithocharis ochracea	a rove beetle		1995	Common	
Megarthrus affinis	a rove beetle		1995	Common	
Megarthrus denticollis	a rove beetle		1995	Common	
Megarthrus sinuatocollis	a rove beetle		1995	Common	
Metopsia retusa	a rove beetle		1995	Local	
Micropeplus fulvus	a rove beetle		1995	Local	
Nehemitropia sordida	a rove beetle		1995	Common	
Oligota parva	a rove beetle		1995	Local	
Oligota pumilio	a rove beetle		1995	Local	
Omalium caesum	a rove beetle		1995	Local	
Omalium italicum	a rove beetle		1995	Common	
Omalium rugatum	a rove beetle		1995	Notable/Nb	
Oxypoda haemorrhoa	a rove beetle		1995		
Oxypoda opaca	a rove beetle		1995	Common	
Oxypoda sericea	a rove beetle		1995		
Oxytelus sculptus	a rove beetle		1995	Common	
Phacophallus parumpunctatus	a rove beetle		1995		
Philonthus albipes	a rove beetle		1995	Local	
Philonthus debilis	a rove beetle		1995		

Scientific Name	**Common Name**	**Date last recorded**	**Status**	**BAP status**
Philonthus discoideus	a rove beetle	1995		
Philonthus fimetarius	a rove beetle	1995	Common	
Philonthus longicornis	a rove beetle	1995	Common	
Platystethus nitens	a rove beetle	1995	Local	
Proteinus ovalis	a rove beetle	1995	Common	
Quedius cinctus	a rove beetle	1995	Common	
Quedius cruentus	a rove beetle	1995	Common	
Quedius humeralis	a rove beetle	1995	Local	
Quedius mesomelinus	a rove beetle	1995	Common	
Rugilus orbiculatus	a rove beetle	1995	Common	
Rugilus similis	a rove beetle	1995	Notable/Nb	
Stenus crassus	a rove beetle	1995	Local	
Stenus fuscipes	a rove beetle	1995	Local	
Tachyporus hypnorum	a rove beetle	1995	Common	
Tachyporus nitidulus	a rove beetle	1995	Common	
Tachyporus pusillus	a rove beetle	1995	Common	
Tachyporus solutus	a rove beetle	1995	Common	
Trichiusa immigrata	a rove beetle	1995		
Xantholinus glabratus	a rove beetle	1995	Common	
Xantholinus linearis	a rove beetle	1995	Common	
Xantholinus longiventris	a rove beetle	1995	Common	
Xylodromus concinnus	a rove beetle	1995	Local	
Bryaxis puncticollis	a short-winged mould beetle	1995	Common	
Euplectus karsteni	a short-winged mould beetle	1995	Local	
Euplectus sanguineus	a short-winged mould beetle	1995	Local	
Aphodius fimetarius	a dung beetle or chafer	1995	Common	
Aphodius granarius	a dung beetle or chafer	1995	Local	
Aphodius lividus	a dung beetle or chafer	1995	pRDB1	

Oxyomus sylvestris	a dung beetle or chafer	1995	Local	
Calyptomerus dubius	an armadillo beetle	1995		
Clambus armadillo	an armadillo beetle	1995	Common	
Athous haemorrhoidalis	a click beetle	1995	Common	
Meligethes aeneus	Common Pollen Beetle	1995	Common	
Monotoma bicolor	a narrow bark beetle	1995	Common	
Monotoma longicollis	a narrow bark beetle	1995	Local	
Monotoma picipes	a narrow bark beetle	1995	Common	
Monotoma spinicollis	a narrow bark beetle	1995	Local	
Rhizophagus bipustulatus	a narrow bark beetle	1995	Common	
Ahasverus advena	Foreign Grain Beetle	1995		
Silvanus unidentatus	a beetle	1995	Local	
Atomaria atricapilla	a silken fungus beetle	1995	Common	
Atomaria lewisi	a silken fungus beetle	1995	Common	
Atomaria scutellaris	a silken fungus beetle	1995	RDB K	
Atomaria testacea	a silken fungus beetle	1995	Common	
Cryptophagus distinguendus	a silken fungus beetle	1995		
Cryptophagus pilosus	a silken fungus beetle	1995		

Scientific Name	**Common Name**		**Date last recorded**	**Status**	**BAP status**
Cryptophagus scanicus	a silken fungus beetle		1995	Common	
Cryptophagus scutellatus	a silken fungus beetle		1995	Local	
Ephistemus globulus	a silken fungus beetle		1995	Common	
Olibrus aeneus	a smut beetle		1995	Common	
Anommatus duodecimstriatus	a cerylonid beetle		1995	Notable/Na	
Exochomus quadripustulatus	Pine Ladybird		1994	Common	
Tytthaspis sedecimpunctata	16-spot Ladybird		1995	Local	
Coccinella septempunctata	Seven-spot Ladybird		1997	Common	
Psyllobora vigintiduopunctata	22-spot Ladybird		2002	Common	
Holoparamecus caularum	a merophysid beetle		1993 -1995	Synanthropic	
Aridius bifasciatus	a mould beetle		1993 -1995	Naturalised	
Aridius nodifer	a mould beetle		1993 -1995	Common	
Corticaria elongata	a mould beetle		1993 -1995	Common	
Dienerella elongata	a mould beetle		1993 -1995	Local	
Enicmus histrio	a mould beetle		1993 - 1995		
Enicmus transversus	a mould beetle		1993 -1995	Common	
Lathridius anthracinus	a mould beetle		1993 -1995	Local	
Lithostygnus serripennis	a mould beetle		1993 -1995		
Typhaea stercorea	Hairy Fungus Beetle		1993 -1995	Local	
Myrmechixenus vaporariorum	a narrow timber beetle		1993 -1995	pRDB3	
Anaspis frontalis	a tumbling flower beetle		1993 -1995	Common	
Anthicus bifasciatus	an antlike beetle		1993 -1995	Notable/Nb	
Anthicus floralis	an antlike beetle		1993 -1995	Common	
Anthicus formicarius	an antlike beetle		1993 -1995	Common	
Bruchus rufimanus	Bean Beetle		1993 -1995	Local	
Longitarsus luridus	a leaf beetle		1993 -1995	Common	
Cassida flaveola	Pale Tortoise Beetle		1993 -1995	Local	

Cassida viridis	Green Tortoise Beetle		1993 -1995	Common
Phyllobius pyri	Common Leaf Weevil		1993 -1995	Common
Phyllobius viridiaeris	Green Nettle Weevil		2002	Local
Sciaphilus asperatus	Strawberry Root Weevil		1995	Common
Sitona lineatus	Pea and Bean Weevil		1995	Common
Tychius picirostris	a weevil		1995	Common
Panorpa cognata	a scorpion fly		1998	Local
Adela fibulella	a longhorn moth		1962	Local
Aglais urticae	Small Tortoiseshell		1905	Common
Allophyes oxyacanthae	Green-brindled Crescent		1986	Common
Anthocharis cardamines	Orange Tip		2002	Common
Argynnis aglaja	Dark Green Fritillary		1905	Local
Aricia agestis	Brown Argus		1905	Local
Callistege mi	Mother Shipton		1998	Common
Callophrys rubi	Green Hairstreak		1905	Local
Camptogramma bilineata bilineata	Yellow Shell		1994	Common

Scientific Name	**Common Name**		**Date last recorded**	**Status**	**BAP status**
Celastrina argiolus britanna	Holly Blue		1905	Local	
Coenonympha pamphilus	Small Heath		1905	Common	
Colias croceus	Clouded Yellow		1905	Migrant	
Cucullia absinthii	Wormwood		1994	Notable/Nb	
Cupido minimus	Small Blue		1905	Local	BAP 2/3
Cynthia cardui	Painted Lady		1905	Migrant	
Deilephila elpenor	Elephant Hawk-moth		2002	Common	
Eilema lurideola	Common Footman		1998	Common	
Ematurga atomaria	Common Heath		1997	Common	
Erynnis tages	Dingy Skipper		1905	Local	
Euclidea glyphica	Burnet Companion		2002	Local	
Eupithecia pusillata pusillata	Juniper Pug		1998	Local	
Gastropacha quercifolia	Lappet		1961	Common	
Gonepteryx rhamni	Brimstone		2002	Common	
Hadena bicruris	Lychnis		1905	Common	
Hemistola chrysoprasaria	Small Emerald		1994	Local	
Inachis io	Peacock		1905	Common	
Lasiommata megera	Wall		1905	Common	
Ligdia adustata	Scorched Carpet		1998	Local	
Lycaena phlaeas	Small Copper		2002	Common	
Lygephila pastinum	Blackneck		1965	Local	
Lysandra coridon	Chalk-hill Blue		1905	Local	BAP 2/3
Maniola jurtina	Meadow Brown		2002	Common	
Melanargia galathea serena	Marbled White		1905	Local	
Ochlodes venata faunus	Large Skipper		1905	Common	
Panemeria tenebrata	Small Yellow Underwing		1998	Local	
Pararge aegeria	Speckled Wood		2002	Common	
Philereme transversata	Dark Umber		1994	Local	

Phytometra viridaria	Small Purple-barred		1967	Local	
Pieris brassicae	Large White		1905	Common	
Pieris napi	Green-veined White		2002	Common	
Pieris rapae	Small White		1905	Common	
Polygonia c-album	Comma		1905	Common	
Polyommatus icarus	Common Blue		1905	Common	
Pyronia tithonus britanniae	Gatekeeper		1905	Common	
Quercusia quercus	Purple Hairstreak		1905	Local	
Scotopteryx bipunctaria cretata	Chalk Carpet		1953	Notable/Nb	BAP1
Scotopteryx chenopodiata	Shaded Broad-bar		1997	Common	
Scotopteryx luridata plumbaria	July Belle		1964	Common	
Synanthedon andrenaeformis	Orange-tailed Clearwing		1988	Notable/Nb	
Thymelicus lineola	Essex Skipper		1905	Local	
Thymelicus sylvestris	Small Skipper		1905	Common	
Triphosa dubitata	Tissue		1905	Local	
Vanessa atalanta	Red Admiral		1905	Migrant	
Zygaena filipendulae stephensi	Six-spot Burnet		1999	Common	

Scientific Name	**Common Name**	**Date last recorded**	**Status**	**BAP status**
Cheilosia illustrata	a hoverfly	1988	Common	
Cheilosia soror	a hoverfly	1985	Notable/Nb	
Cheilosia vernalis	a hoverfly	1988	Common	
Dasysyrphus venustus	a hoverfly	1999	Common	
Dioctria rufipes	a robber fly	1998	Local	
Epistrophe eligans	a hoverfly	1999	Common	
Epistrophe grossulariae	a hoverfly	1988	Local	
Episyrphus balteatus	a hoverfly	1988	Common	
Eristalis arbustorum	a hoverfly	1988	Common	
Eristalis intricarius	a hoverfly	1988	Common	
Eristalis pertinax	a hoverfly	1999	Common	
Eristalis tenax	a hoverfly	1985	Common	
Eristalis tenax	a hoverfly	1998	Common	
Leptarthrus brevirostris	a robber fly	1997	Local	
Machimus atricapillus	a robber fly	1999	Common	
Melangyna cincta	a hoverfly	1999	Common	
Melangyna labiatarum	a hoverfly	1999	Common	
Melanostoma scalare	a hoverfly	1985	Common	
Merodon equestris	Greater Bulb-fly	1998	Common	
Myathropa florea	a hoverfly	1998	Common	
Neocnemodon latitarsis	a hoverfly	1999	Notable/Nb	
Platycheirus albimanus	a hoverfly	1988	Common	
Scaeva pyrastri	a hoverfly	1988	Common	
Syritta pipiens	a hoverfly	1988	Common	
Syrphus ribesii	a hoverfly	1988	Common	
Volucella bombylans	a hoverfly	1988	Common	
Myopa tessellatipennis	a fly	1998	Local	
Chirosia albitarsis	a fly	1988	Common	

Ancistrocerus trifasciatus	a potter wasp or mason wasp	1999	Local	
Andrena bicolor	Gwynne's Mining Bee	1999	Common	
Andrena dorsata	a solitary bee	1999	Local	
Andrena haemorrhoa	Early Mining Bee	1999	Common	
Andrena scotica	a solitary bee	1999	Common	
Andrena subopaca	a solitary bee	1999	Common	
Bombus hortorum	Small Garden Bumble Bee	2002	Common	
Bombus lapidarius	Large Red Tailed Bumble Bee	1999	Common	
Bombus lucorum	White-tailed Bumble Bee	1999	Common	
Bombus pascuorum	Common Carder Bee	1999	Common	
Bombus terrestris	Buff-tailed Bumble Bee	1999	Common	
Cerceris rybyensis	Ornate Tailed Digger Wasp	1999	Local	
Chelostoma campanularum	Harebell Carpenter Bee	2002	Local	
Ectemnius continuus	a solitary wasp	1998	Common	
Ectemnius lituratus	a solitary wasp	1999	Local	
Hoplitis spinulosa	a solitary bee	1998	Local	
Hylaeus signatus	Large Yellow-faced Bee	1999	Notable/Nb	

Scientific Name	**Common Name**	**Date last recorded**	**Status**	**BAP status**
Lasioglossum albipes	a solitary bee	1999	Common	
Lasioglossum fulvicorne	a solitary bee	1999	Local	
Lasioglossum leucozonium	a solitary bee	1998	Common	
Megachile ligniseca	Wood-carving Leaf-cutter Bee	1999	Common	
Melitta haemorrhoidalis	a solitary bee	1999	Local	
Melitta tricincta	a solitary bee	1999	Notable/Nb	
Nomada flavoguttata	a nomad or mason bee	1999	Common	
Nomada fucata	a nomad or mason bee	1999	Notable/Na	
Nomada ruficornis	Red-horned Nomad Bee	1998	Local	
Osmia bicolor	Two Coloured Mason Bee	1998	Notable/Nb	
Osmia rufa	Red Mason Bee	1999	Common	
Pachyprotasis variegata	a sawfly	1994		
Pemphredon lugubris	Mournful Wasp	1999	Common	
Psithyrus rupestris	Hill Cuckoo Bee	1999	Notable/Nb	BPA 2/3
Psithyrus sylvestris	Four Coloured Cuckoo Bee	1999	Common	
Tenthredo schaefferi	a sawfly	1997		
Vespula vulgaris	Common Wasp	1998	Common	
Armadillidium vulgare	Common Pill Woodlouse	2002	Common	
Lacerta vivipara	Viviparous Lizard	2002		
Aegithalos caudatus	Long-tailed Tit	2002		
Alauda arvensis	Skylark	2002	Red	BAP 1
Anthus pratensis	Meadow Pipit	2002	Amber	BAP 2/3
Apus apus	Swift	2000		
Athene noctua	Little Owl	2002		
Carduelis cannabina	Linnet	2002	Red	BAP 1
Carduelis carduelis	Goldfinch	2002		BAP 2/3
Carduelis chloris	Greenfinch	2002		BAP 2/3
Columba livia (feral)	Feral Pigeon	2002		

Columba palumbus	Woodpigeon	2002		
Corvus corone corone	Carrion crow	2002		
Corvus frugilegus	Rook	2002		
Corvus monedula	Jackdaw	2002		
Cuculus canorus	Cuckoo	2000	Amber	
Dendrocopos major	Great Spotted Woodpecker	2002		BAP 2/3
Emberiza citrinella	Yellowhammer	2000	Red	BAP 2/3
Erithacus rubecula	Robin	2002		
Falco tinnunculus	Kestrel	2002	Amber	BAP 2/3
Fringilla coelebs	Chaffinch	2002		
Garrulus glandarius	Jay	2002		
Hirundo rustica	Swallow	2000	Amber	BAP 2/3
Larus argentatus	Herring Gull	2002	Amber	BAP 2/3
Larus ridibundus	Black-headed Gull	2002	Amber	
Motacilla alba	White/Pied Wagtail	2002		

Scientific Name	**Common Name**	**Date last recorded**	**Status**	**BAP status**
Motacilla alba yarrellii	Pied Wagtail	2002		BAP 2/3
Oenanthe oenanthe	Wheatear	2002		BAP 2/3
Parus caeruleus	Blue Tit	2002		BAP 2/3
Parus major	Great Tit	2002		BAP 2/3
Passer domesticus	House Sparrow	2002	Red	
Passer montanus	Tree Sparrow	2002	Red	BAP 1
Phasianus colchicus	Pheasant	2002		
Phylloscopus collybita	Chiffchaff	2002		BAP 2/3
Phylloscopus trochilus	Willow Warbler	2002	Amber	BAP 2/3
Pica pica	Magpie	2002		
Picus viridis	Green Woodpecker	2002	Amber	BAP 2/3
Prunella modularis	Dunnock	2002	Amber	BAP 2/3
Pyrrhula pyrrhula	Bullfinch	2002	Red	BAP 1
Saxicola torquata	Stonechat	2002	Amber	BAP 2/3
Sitta europaea	Nuthatch	2000		BAP 2/3
Streptopelia decaocto	Collared Dove	2002		
Sturnus vulgaris	Starling	2002	Red	
Sylvia atricapilla	Blackcap	2002		BAP 2/3
Sylvia borin	Garden Warbler	2002		BAP 2/3
Sylvia communis	Whitethroat	2000		BAP 2/3
Tringa totanus	Redshank	1998	Amber	BAP 2/3
Troglodytes troglodytes	Wren	2002		BAP

2007 Invertebrate Survey

Scientific Name Common Name Date last recorded

Bruchela rufipes (Olivier, 1790) a weevil 2007 Rhagonycha fulva (Scopoli, 1763) a soldier beetle

2007 a ground

Curtonotos (=Amara) aulica (Panzer, 1796)

2007

beetle Pterostichus madidus (Fabricius, 1775) Black Clock Ground Beetle 2007 Cryptocephalus moraei (Linnaeus, 1758) Pot Beetle 2007 Oulema sp. (melanopus/rufocyanea) a leaf beetle 2007 Pyrrhalta viburni (Paykull, 1799) a leaf beetle 2007 Coccinella septempunctata Linnaeus, 1758 7-spot Ladybird 2007 Exochomus quadripustulatus (Linnaeus, 1758) Pine Ladybird 2007 Variimorda villosa (Schrank, 1781) a tumbling flower beetle 2007 Oedomera lurida (Marsham, 1802) a beetle 2007 Ocypus olens (Műller, 1764) Devil's Coach Horse Beetle 2007 Tachyporus hypnorum (Fabricius, 1775) a rove beetle 2007 Forficula auricularia (Linnaeus, 1758) Common Earwig 2007 Chromatomyia aprilina (Goureau, 1851) a leaf mining fly 2007 Phytomyza agromyzina (Meigen, 1830) a leaf mining fly 2007 Phytomyza angelicastri (Hering, 1932) a leaf mining fly 2007 Phytomyza ilicis (Curtis, 1846) a leaf mining fly 2007 Phytomyza sphondylii (Goureau, 1851) a leaf mining fly 2007 Phytomyza vitalbae (Kaltenbach, 1872) a leaf mining fly 2007 Machimus atricapillus (Fallén, 1814) Kite-tailed Robberfly 2007 Dasineura urticae (Perris, 1840) a gall midge 2007 Jaapiella veronicae (Vallot, 1827) a gall midge 2007 Taxomyia taxi (Inchbald, 1861) Yew Artichoke Gall 2007 Sicus ferrugineus (Linnaeus, 1761) a parasitic fly 2007 Sarcophaga sp. (depressifrons?) a flesh fly 2007 Coremacera marginata (Fabricius, 1775) a snail-killing fly 2007 Limnia unguicornis (Scopoli, 1763) a snail-killing fly 2007 Cheilosia vernalis (Fallén, 1817) a hoverfly 2007 Helophilus pendulus (Linnaeus, 1758) a hoverfly 2007 Myathropa florea (Linnaeus, 1758) a hoverfly 2007 Volucella zonaria (Poda, 1761) a hoverfly 2007 Melanastoma mellinum (Linnaeus, 1758) a hoverfly 2007 Melanastoma scalare (Fabricius, 1794) a hoverfly

2007 Chrysotoxum bicinctum (Linnaeus, 1758) a hoverfly

2007 Episyrphus balteatus (De Geer, 1776) Marmalade Hoverfly

2007 Sphaerphoria scripta (Linnaeus, 1758) a hoverfly

2007 Xanthogramma pedissequum (Harris, 1776) a hoverfly

2007 Nowickia ferox (Panzer, 1809) a parasitic fly

2007 Chaetostomella cylindrica (Robineau-Desvoidy, 1830) a picture-winged fly

2007 Urophora stylata (Fabricius, 1775) a picture-winged fly

2007 Aphrophora alni (Fallén, 1805) a leaf-hopper

2007 Neophilaneus lineatus (Linnaeus, 1758) a leaf-hopper

2007

Scientific Name Common Name Date last recorded

Philaenus spumarius (Linnaeus, 1758) Cuckoo-spit Insect 2007 Cyphostethus (=Elasmosthesus) tristriatus (Fabricius, 1787) Juniper Shieldbug

2007 Closterotomus norwegicus [=Calocoris norvegicus (Gmelin, 1788)] a mirid bug

2007 Lygus rugulipennis Poppius, 1911 Tarnished Plant Bug

2007 Phytocoris varipes Boheman, 1852 a mirid bug

2007 Notostira elongata (Geoffroy in. Fourcroy) a grass bug

2007 Himacerus apterus (Fabricius, 1798) Tree Damsel Bug 2007 Himacerus mirmicoides (Costa, 1834) Ant Damsel Bug 2007 Nabis rugosus (Linnaeus, 1758) a damsel bug 2007 Palomena prasina (Linnaeus, 1761) Green Shieldbug 2007 Pentatoma rufipes (Linnaeus, 1758) Forest Shieldbug 2007 Rhopalus subrufus (Gmelin, 1788) a bug 2007 Trichochermes (=Trichopsylla) walkeri Förster, 1848 a jumping plant louse (bug) 2007 Andrena dorsata (Kirby, 1802) a mining bee 2007 Andrena minutuloides Perkins, R.C.L.,1914 a mining bee 2007 Nomada flavoguttata (Kirby, 1802) a cleptoprasitic bee 2007 Apis mellifera Linnaeus, 1758 Honey Bee 2007 Bombus lapidarius (Linnaeus, 1758) a bumblebee 2007 Bombus pascuorum (Scopoli, 1763) a bumblebee 2007 Hylaeus annularis (Kirby, 1802) a solitary bee 2007 Hylaeus communis Nylander, 1852 a solitary bee 2007 Hylaeus confusus Nylander, 1852 a solitary bee 2007 Hylaeus signatus (Panzer, 1798) a solitary bee 2007 Halictus tumulorum (Linnaeus, 1758) a mining bee 2007 Lasioglossum morio (Fabricius, 1793) a mining bee 2007 Lasioglossum pauxillum (Schenck, 1853) a mining bee 2007 Lasioglossum fulvicorne (Kirby, 1802) a mining bee 2007 Sphecodes geoffrellus (Kirby, 1802) a cleptoprasitic bee 2007 Chelostoma campanularum (Kirby, 1802) Bellflower Bee 2007 Hoplitus spinulosa (Kirby, 1802) a solitary bee 2007 Megachile ligniseca (Kirby, 1802) a leaf-cutter bee 2007 Melitta tricincta (Kirby, 1802) a solitary bee 2007 Crossocerus annulipes (Lepeletier & Brulle, 1835) a digger wasp 2007 Ectemnius continuus (Fabricius, 1804) a digger wasp 2007 Ectemnius lituratus (Panzer, 1804) a digger wasp 2007 Entomognathus brevis (Vander Linden, 1829) a solitary wasp

2007 Cerceris rybyensis (Linnaeus, 1771) Ornate Tailed Digger Wasp

2007 Andricus quercuscalicis Burgsdorf, 1783 Knopper Gall

2007 Diplolepis rosae (Linnaeus, 1758) Bedeguar Gall

2007 Lasius flavus (Fabricius, 1782) Yellow Meadow Ant

2007 Myrmica ruginodis Nylander, 1846 an ant

2007 Anoplius nigerrimus (Scopoli, 1763) a spider-hunting wasp

2007 Arge ustulata (Linnaeus, 1758) a sawfly

2007 Tenthredo thomsonii (Curtis, 1839) [=marginella Fabricius, 1793] a sawfly

2007 Tiphia femorata Fabricius, 1775 a parasitic wasp

2007 Vespula vulgaris (Linnaeus, 1758) Common Wasp

2007

Scientific Name Common Name Date last recorded

Polyommatus (=Lysandra) coridon (Poda, 1761) Chalkhill Blue Butterfly 2007 Polyommatus icarus (Rottemburg, 1775) Common Blue Butterfly

2007 Maniola jurtina (Linnaeus, 1758) Meadow Brown Butterfly

2007 Pararge aegeria (Linnaeus, 1758) Speckled Wood Butterfly

2007 Pyronia tithonus (Linnaeus, 1771) britanniae (Verity, 1914) Gatekeeper Butterfly

2007 Tyria jacobaeae (Linnaeus, 1758) Cinnabar Moth

2007 Stigmella aurella (Fabricius, 1775) a leaf mining moth 2007 Pyrausta aurata (Scopoli, 1763) a micro moth 2007 Panorpa germanica Linnaeus, 1758 a scorpion fly 2007 Sympetrum striolatum (Charpentier, 1840) Common Darter 2007 Chorthippus brunneus (Thunberg, 1815) Field Grasshopper 2007 Chorthippus parallelus (Zetterstedt, 1821) Meadow Grasshopper (Purple form) 2007 Chorthippus parallelus (Zetterstedt, 1821) f.explicatus (Sélys) Meadow Grasshopper (Long-winged form) 2007 Metrioptera roeselii (Hagenbach, 1822) Roesel's Bush-cricket 2007 Aceria macrochelus (Nalepa, 1891) a mite 2007 Aceria origani (Nalepa, 1891) a mite 2007 Eriophyes (=Phytopus) prunispinosae Nalepa, 1926 a mite 2007 Eriophyes convolvens (Nalepa, 1892) a mite 2007 Eriophyes viburni (Nalepa, 1889) a mite 2007 Pisaura miribalis (Clerck, 1757) Nursery-web Spider 2007 Tibellus oblongus (Walckenaer, 1802) a spider 2007 Pomatias elegans (Műller, 1774) Round-mouthed Snail 2007 Monacha cantiana (Montagu, 1803) Kentish Snail 2007 Cochlodina laminata (Montagu, 1803) Plaited Door Snail 2007 Discus rotundatus (Műller, 1774) Rounded Snail 2007 Cepaea nemoralis (Linnaeus, 1758) Brown-lipped Snail 2007 Helix aspersa (Műller, 1774) Garden Snail 2007 Armadillium vulgare (Latreille, 1804) Pill Woodlouse 2007 Platyarthrus hoffmannseggi Brandt, 1833 Ant Woodlouse 2007

Additional Invertebrate Data from Ian Menzies 2006/7

Epilachna argus (Geoffroy) Bryony ladybird: 30.08.2006 one; 04.09.2006 two; and 18.09.2006 four feeding on white bryony by south side of path TQ222/573; also 16.05.2007 locally plentiful on white bryony growing amongst shrubs at south margin of small clearing TQ222/570 (ISM)

Chilocorus bipustulatues (Linn.) Heather ladybird: frequent by beating junipers, TQ223/571; 30.08.2006 (eight from a rather sickly juniper at north margin of main clearing); 18.09.2006 (14 on beating tray); 01.03.2007 (about six seen); also 02.05.2007, 16.0 5.2007 (12), 10.07.2007 and 13.09.2007 (about 6 seen) (ISM).

Chillocorus renipustulatus (Scriba) Kidney-spot ladybird: 01.03.2007 (one beaten from juniper); 01.04.2007 (two from juniper) TQ222/571 (ISM).

Exochomus quadripustulatus (Linn.) Pine ladybird. Plentiful by beating a range of shrubs, most numerous on the junipers; 22.08. 30.08, 18.09.2007 – as many as 40 on the beating tray! Also 01.03.2007, 02.05.2007, 16.05.2007, 10.07.2007 and 13.09.2007, but in diminishing numbers TQ222/571 (ISM).

Adalia decimpunctata (Linn.) Ten-spot ladybird: 01.03.2007 (one) and 23.04.2007 (four) by beating juniper TQ222.571 (ISM).

Coccinella septempunctata (Linn.) Seven-spot ladybird, frequent: 01.03.2007 (two), 23.04.2007 (one) and 18.09.2007 (one), mainly from the juni pers TQ222/571 (ISM).

Harmonia axiridis Pallas. Harlequin ladybird: 01.03.2007 (two) and 23.04.2007 (five) by beating junipers, TQ222/571 (ISM).

Calvia 14-guttata (Linn.) Cream-spot ladybird: 30.08.2006 (one) and 23.04.2007 (two) by beating junipers TQ222/571 (ISM).

Propylea 14-punctata (Linn) 14-spot ladybird: 04.09.2006 (one) and 23.04.2007 (two) by beating junipers TQ222/571 (ISM)

Halyzia 16—guttata (Linn). Orange ladybird: 01.03.2007 (one) and 23.04.2007 (one) by beating junipers TQ222/571 (ISM).

Psyllobora 22-punctata (Linn). 22-spot ladybird: by beating TQ222/571 (ISM).

Rhyzobius chrysomeloides (Herbst): 01.02.2007 (three) 10.07.2007 (one) and 13.09.2007 (one) by beating junipers TQ222/571 (ISM).

Rhyzobius lophanthae (Blaisdell): 22.08.2006 (one) 30.08.2006 (two) 23.04.2007 (seven) 10.08.2007 (one), 13.09.2007 (five) by beating junipers along north margin of clearing TQ223/572 (ISM). Nephus quadrimaculatus Herbst: 13.09.2007 (one) by beating ivy by path TQ223/569 (ISM)

Olibrus corticalis (Panzer): 30.08.2006 (five) by beating junipers TQ222/571 (ISM).

Olibrus aeneus fab: 01.03.2007 (one) by beating juniper, TQ222/571 (ISM).

Olibrus liquidus Erichson: 01.03.2007 (one) by beating juniper (ISM).

Lamprosoma concolor (Sturm): 23.04.2007 (four), by beating ivy by path TQ223/569 (ISM).

Epsom and Walton Downs Continuation Plan

General Bird Survey

Aim

With Epsom and Walton Downs consisting of varying habitats, open grassland, flower meadows, woodlands etc it supplies an ideal habitat for numerous species of bird life. By surveying these species we can assist in projects such as the habitat management plan in supplying vital information which could effect future decisions in the management of the Downs.

Example 1) In the first survey which was undertaken on the downs Kestrels were regular sightings. In an attempt to support this species 2 Nesting boxes specifically designed for this species were placed on the downs to support nesting.

Example 2) Treecreepers have been a species which have been a noticeable rarity, 4 nest boxes have been placed in suitable areas to encourage their residence.

Example 3) Ring Necked Parakeets were not recorded during the first survey, but now can be heard or seen on a daily basis, potentially this may be problematic due to there use of natural nesting holes in trees , this may well introduce further pressure on suitable nesting and food areas on native species if a colony resides on the Downs.

Survey Method

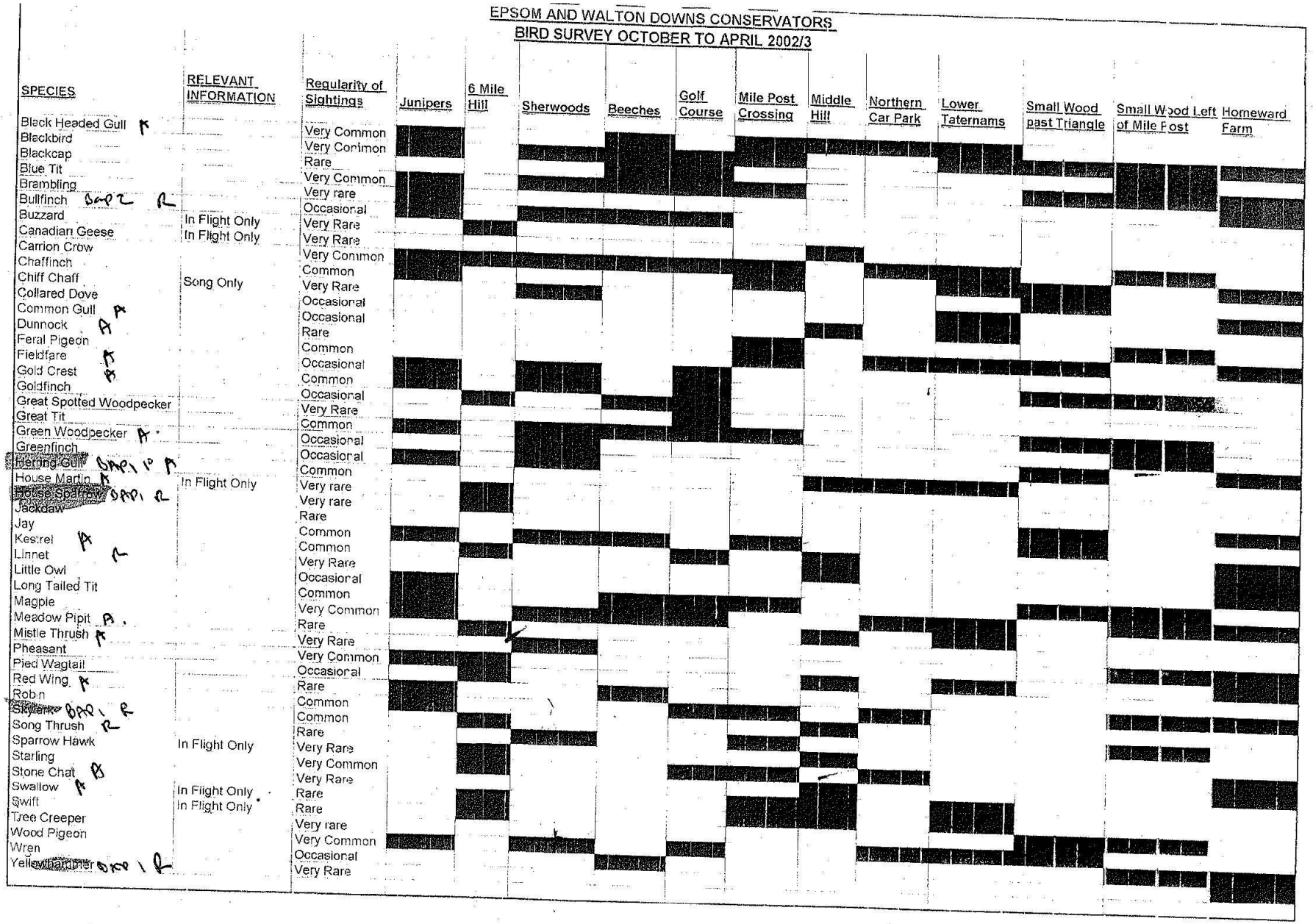
The general Bird Survey is undertaken once every 5 years, but is undertaken over a period of a whole year. During that year to ensure coverage of all migratory species, it is advisable once every 3 weeks to walk the downs and note all species. Due to the nature of the job there is no reason observations can not be made at any other times. For example if the surveyor is on unrelated duties, as long as he\she is confident of a positive identification it should be recorded. Another senario is if a species for example a cuckoo has been heard, but has not been seen it would be recorded as a Call Only observation. Often the Downs has species which are not necessarily using the downs but are passing over, for example during the 2002/2003 survey a Red Kite was positively identified flying over the Downs. This would be classified as an in flight only sighting.

Alongside noting species which are found on the downs the location of the sighting should also be noted. By separating areas during surveys eg, Sherwoods Wood, 6Mile Hill etc we can establish if through general Downs's maintenance we have encouraged species to new areas, good examples of these would be making glades or bird boxes.

It is also of great importance to establish the regularity of sightings, this will come with a little experience as certain species will tend to flock together, e.g. Goldfinches whilst others are more solitary. The key is to relate it to previous walks and whether it has been seen often (every walk e.g. Woodpigeon) or perhaps it is the first sighting in six months (Lapwing)

Results

At the end of the year a table showing all the species recorded, the regularity of sightings and there locations should be compiled as shown on the following page.


EPSOM AND WALTON DOWNS CONSERVATORS
BIRD SURVEY OCTOBER TO APRIL 2002/3
SPECIES
RELEVANT INFORMATION
Regularity of Sightings
Junipers
6 Mile Hill
Sherwoods
Beeches
Golf Course
Mile Post Crossing
Middle Hill
Northern Car Park
Lower Tatenams
Small Wood past Triangle
Small Wood Left of Mile Post
Homeward Farm
Black Headed Gull A
Blackbird Very Common
Blackcap Very Common
Blue Tit Rare
Brambling Very Common
Bullfinch Sept R Very rare
Buzzard Occasional
Canadian Geese In Flight Only Very Rare
Carrion Crow In Flight Only Very Rare
Chaffinch Very Common
Chiff Chaff Common
Collared Dove Song Only Very Rare
Common Gull Occasional
Dunnock A A Occasional
Feral Pigeon Rare
Fieldfare A Common
Gold Crest B Occasional
Goldfinch Common
Great Spotted Woodpecker Occasional
Great Tit Very Rare
Green Woodpecker A Common
Greenfinch Occasional
Herring Gull Sept 10 A Occasional
House Martin A In Flight Only Common
House Sparrow Sept R Very rare
Jackdaw Very rare
Jay Rare
Kestrel A Common
Linnet R Common
Little Owl Very Rare
Long Tailed Tit Occasional
Magpie Common
Meadow Pipit A Very Common
Mistle Thrush A Rare
Pheasant Very Rare
Pied Wagtail Very Common
Red Wing A Occasional
Robin Rare
Skylark Sept 1 R Common
Song Thrush R Common
Sparrow Hawk In Flight Only Rare
Starling Very Rare
Stone Chat B Very Common
Swallow A In Flight Only Very Rare
Swift In Flight Only Rare
Tree Creeper Rare
Wood Pigeon Very rare
Wren Very Common
Yellowhammer Sept 1 R Occasional
Very Rare

Epsom and Walton Downs Continuation Plan

Skylark Surveys

What is a Skylark

Most people's first initial introduction to the skylark is through its magnificent song, this may be slightly surprising as the bird it self is not brightly coloured but a combination of heavily streaked browns whites and blacks. The bird is approximately 17cm in length from the tip of its bill to the end of its tail.

Habitat

Skylarks can be found in a variety of different habitats but all of which will tend to have large open areas, e.g. grasslands, moors, heaths and farmland. The Downs provides a perfect habitat with areas of varying lengths of grass, occasional perches like chestnut fencing and course rails and good supplies of food either on the downs or the nearby fields.

Behaviour

Skylarks are an amazing species to watch, in there quieter moments they may well be seen weaving their way through grass on foot looking for insects or seeds, perhaps flying for a few yards landing and continuing their search. Or alternatively in early spring battles commence between the males when 4 or 5 can be seen chasing each other acrobatically across the downs. This can be seen in combination with one of natures most awe inspiring sites. In an attempt to secure a territory and reinforce its boundaries the male skylark will lift from the ground with its splendid song and rise with a combination of hovering and circular flight sometimes to a height were the bird can no longer be seen but still can be heard. With a little bit of patience the performance has not quite finished. At some point silence will ensue and the skylark will fall from the sky only flying again once a few feet from the ground. It is suspected that the length of time and the height it fly's at are both strong indicators to a possible female skylark of a good healthy match.
Once a match has been found the pair will proceed to make a nest in a small divot or cup in the ground and will lay 3 to 4 greyish blotched brown eggs. These eggs will be incubated by the female whilst the male supplies food and reinforces the territory, for approximately 11 days. Once hatched the chicks will be fed a diet of insects for the first week and then gradually shoots and seeds are introduced. After around 8 days they will leave the nest but they will not fledge until approx 20 days, finally becoming independent after 25 days.
During winter month's skylarks are seen a little less regularly on the Downs as they tend to flock together and feed on the nearby fields, but it is not uncommon to see flocks of 40 birds moving around the 6 mile hill area.

Conservation Status

The RSPB have classified the skylark as a red listed species. There are 3 classifications

Green....no currant threat to population.

Amber.... (In brief) Moderate threat to population.

Red....Globally threatened and more than 50% decline in UK breeding population over the last 25 years.

The Skylark is also protected under the Wildlife and Countryside Act, which makes it an offence to kill, injure or take an adult skylark or to take damage or destroy an active nest or its contents.

Why do we survey the skylarks

As Downskeepers we have a responsibility to ensure the well being of all aspects of nature conservation on the downs. Currently the skylarks are under more pressure than ever with an ever increasing number of downs users and events effecting nesting conditions. The aim is to establish what exactly these factors are having on numbers of nesting pairs.

What factors affect the skylarks

Unfortunately there are numerous threats, with the skylarks being ground nesting birds and doing so during the spring and summer months you have a huge volume of foot fall, and the majority of those own dogs. There is no evidence to suggest that dogs would specifically sniff out the nests but in all honesty I believe we may lose many young due to this.
Grass cutting is another factor, whether it is due to preparation for race meetings or preparing gallops. The habitat management plan does request late cutting which is undertaken but if there is a cold spring nesting may be put back a couple of weeks leaving fledging during Derby preparation or even the Derby its self.
Natural threats are also a factor whether it would be inclement weather, or natural feeding by Kestrels and Crows.

How Do We Survey The Skylarks

In order to insure any kind of consistency, a particular method should be used; by looking at the skylarks' behaviour we can establish a link between the time of year in relation to the breeding season and related behaviour traits. For example, if we were to look at middle hill during April we would be looking for males in flight display and song reinforcing there territory, by marking this on the downs map we can establish a territory. Once a male breaks in to song it is quite normal for other males to compete so they will take to flight in there own territories, again these would be marked on to the map. In relation to these sightings we are also looking for the female bird, these would be a little harder to see as they may well be incubating or feeding on the ground, but by listening out for there distinctive chirrup call there location can be established. With this there locations would also be added to the map with a particular symbol for clarity.

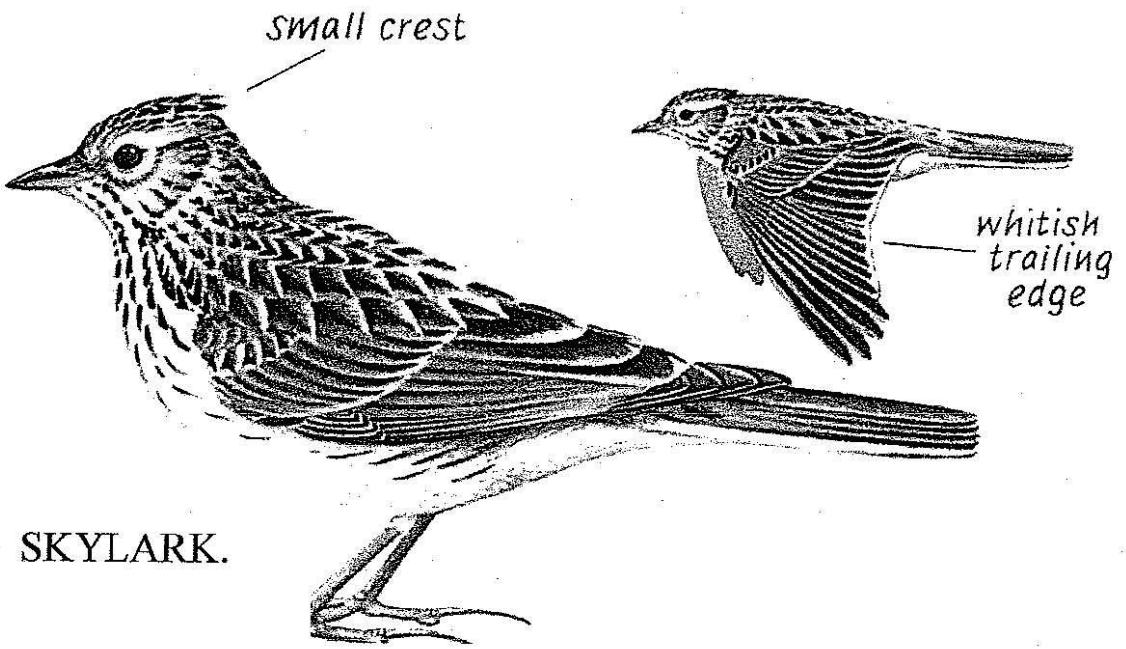
The three sighting categories would be,

1. (Circle) In flight, this can be a straight forward sighting of a bird moving around a territory this can be male or female.
2. (Square) In Song, this would specifically indicate a male's territory and would help to establish a nesting pair if related to a noted ground sighting.
3. (Triangle) Ground Sighting, we would perhaps be looking for pairs moving around the grass or perhaps individuals contacting partners.

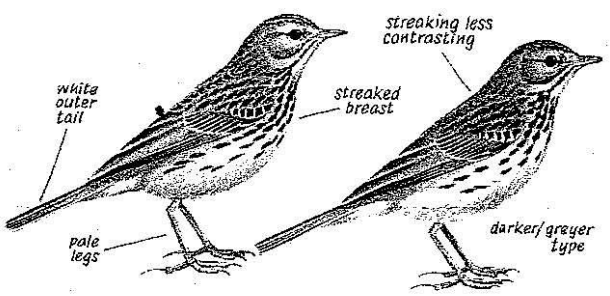
To ensure a form of control is undertaken with the survey a particular route should be taken, by doing this we lower the risk of counting the birds on more than one occasion. Please see page 5 for the route.

The survey should ideally undertaken once a month between April and July in favourable weather conditions, damp wet cold mornings will not produce many sightings. It is also in an ideal world worth while starting at day brake; care must be taken to avoid gallops during training days so Sundays are advisable.

Caution should be taken with identification of Skylarks as the Downs also offers a species called Meadow Pipits, this species offers very similar colours but is very slightly smaller, taking time to familiarise yourself with this species is advisable.



SKYLARK.



Meadow Pipit

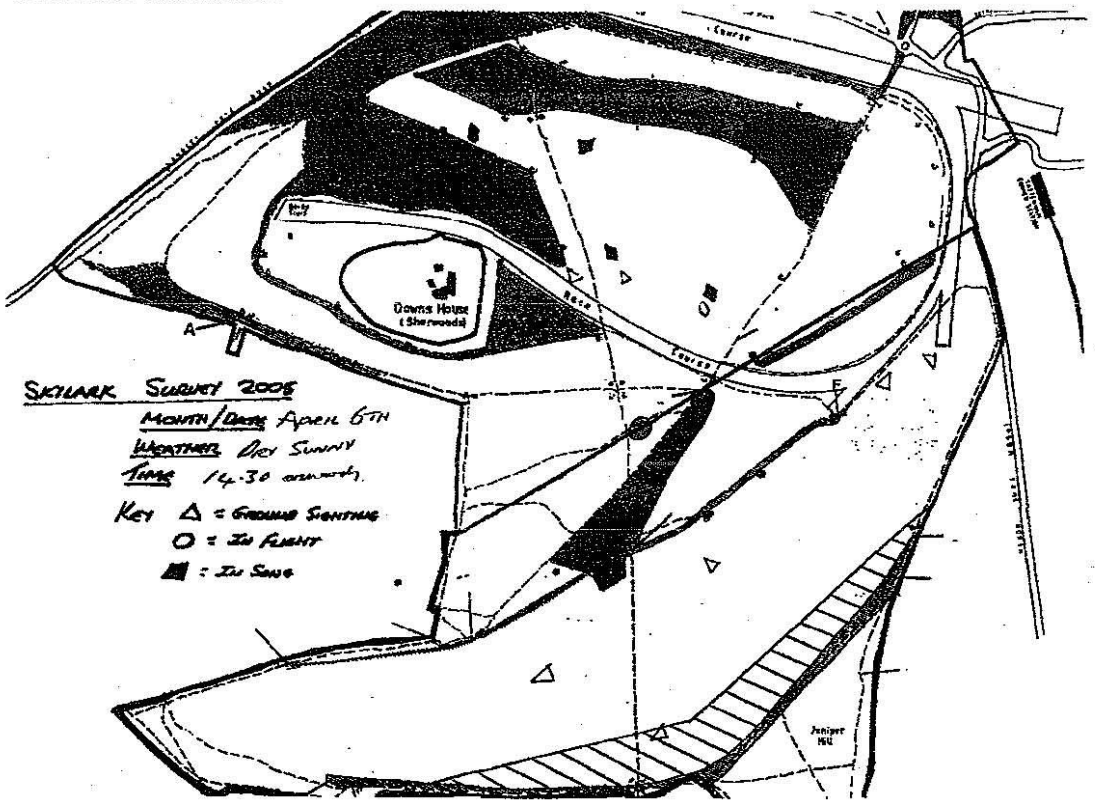
Conclusions

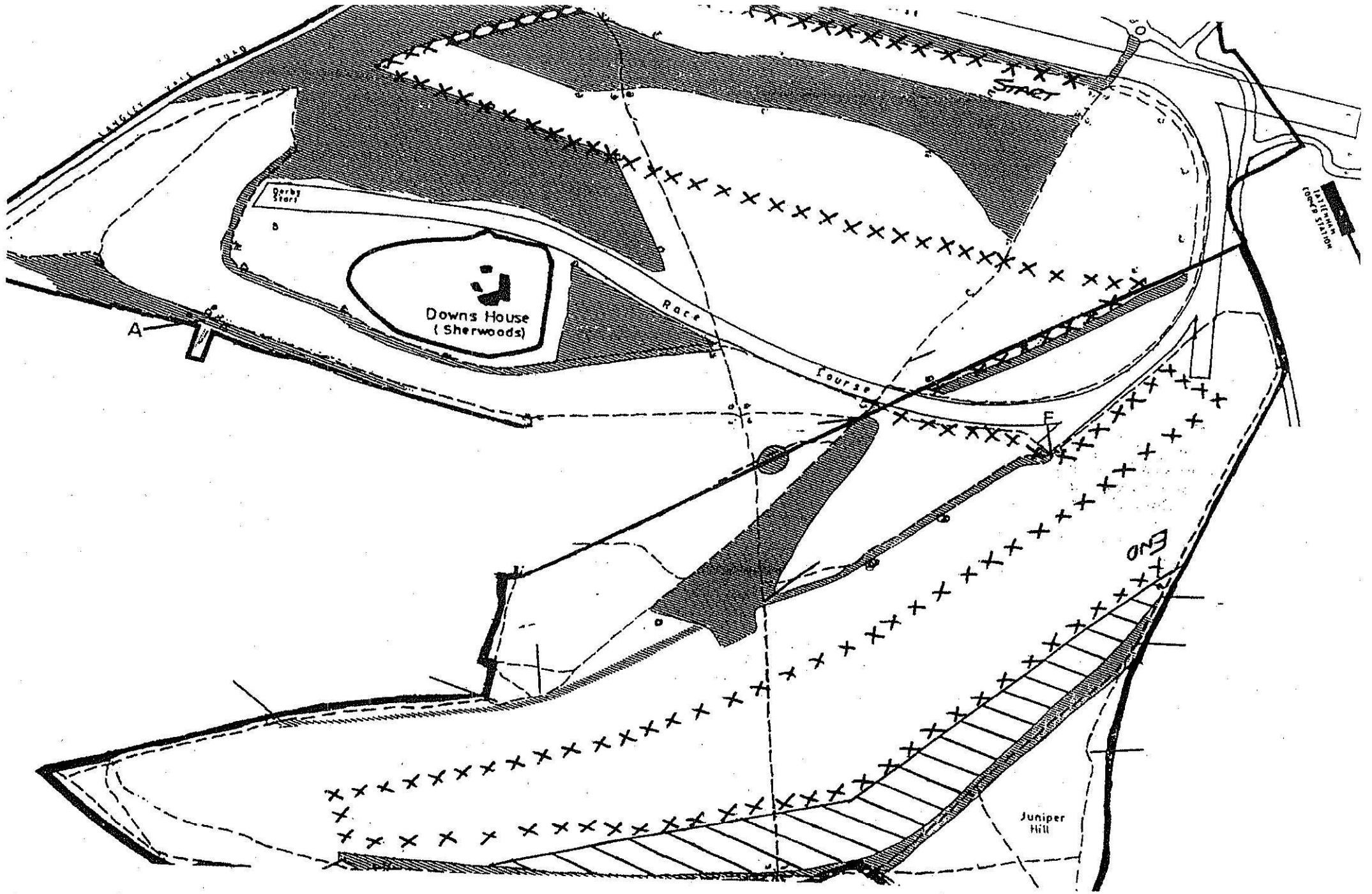
The skylark survey must be seen as a long term project as answers to questions relating to on going concerns about the species success on the Downs can only be seen by comparing year on year results. Previous surveys have assisted us in establishing areas of the Downs which are heavily used for nesting, for example the traveller site overflow. With this information we have changed our cutting regime to allow this area to be uncut through the whole summer allowing for good nesting and a safe fledging area.

Shown below is a simple comparison between 2005 and 2006 results, in time having many years of figures will help us to establish if we are fulfilling our responsibility to protect this species?

2006	Ground	Flight	Song
April	8	3	6
May	6 (2005 comp 13)	2 (2005 comp 11)	6 (2005 comp 19)
June	7	11	9
July	6 (2005 comp 13)	0 (2005 comp 15)	7 (2005 comp 13)

SAMPLE SURVEY.




Derby Start
Downs House
(Sherwoods)
A
Race
Course
F
Juniper
Hill

EPSOM AND WALTON DOWNS CONTINUATION PLAN

BIRDBOX OBSERVATIONS

Why do we have Bird Boxes?

The bird population of the Downs has to battle against numerous different factors throughout the year, whether it be the lack of food , icy cold weather or the daily fight for survival against there natural predators. In a small effort to help them regain some form of balance we have tried to assist certain species with artificial nest boxes. By trying to replicate natural nesting sites we can lesson the competition for natural nesting locations , for example a simple tit box which has a small entrance whole, approx the size of a two pence piece, could easily be adopted as a suitable nest place. By doing this we can ensure that if a pair of Blue Tits decide to nest in a particular box that the box is positioned in a manner which is not susceptible to cold north winds or extreme weather but also would have been disinfected at the beginning of the season.

What type of Bird Boxes?

Currently we are using 5 different types of bird boxes each of which are designed in a different manner to make them more suitable for a specific species.

1) Standard Tit Box, very common box which is found in many back gardens with a simple whole in the front. Most commonly used by Blue Tits.

2) Great Tit Box, very slightly larger than the standard box with a larger whole. Most commonly used by great Tits.

3) Tree creeper Boxes, Shaped like a wedge of cheese with two holes one either side. Most commonly used by Tree creepers.

4)Kestrel Boxes ,very large box about the size of a large microwave with a large front opening, used by Kestrels but can be adopted by Tawny Owls ,Jackdaws or Woodpigeons.

5) Open fronted, this box is the same design as the tit box but without the front panel allowing access without the hole. Most commonly used by Robins.

How do we Observe These Boxes

Each box is given a log sheet, this sheet can be found on the final page of this report. On this sheet a location is given, this must be given in a manner which allows the box to be easily located so not only the area i.e. Sherwood's Wood but also along which track. Also the type of box the height it has been placed and the type of tree.
During the spring from approximately early April regular visits should be taken to each of the boxes (approximately every three weeks), care must be taken as with all species as they can easily be disturbed. In my experience it is worth placing the boxes in areas which are relatively close to path ways so there is no need to go crashing through trees and leaves to get to its location. Once located position yourself say 30

Bird Nesting Site Records

Box Type: Tit Box	**Tree Species:** [illegible]	**Exact Location:** Bird Box 20 Yards In on Left Hand Side Along Path Which Leaves The Warren Rd. Just Before Main Bend. Recentley Repaired Box. (Small Wood Past Triangle)
Box Number: 002	**Height & Baring:** 3m	

Date of visit	Signs of occupancy	Weather conditions	Period of time @ location
4/05/03	No sign of any current occupation	Cloudy/Warm	5min.
16/05/03	Definate occupation, one Blue Tit seen entering box + leaving with fecal sack.	Cloudy/occasional sun shine.	5min
26/05/03	No longer any [illegible]	Hot Sunny	5min
20/06/03	No obvious signs of occupation Box Replaced with new box due to [illegible].	Warm/Sunny	5min
1?/08/03	No obvious signs of occupation once again [illegible] in close proximity to box visual at 10 yards	Warm Sunny	5min
22/05/04	Definite occupation Blue tit seen entering box.	Warm Cloudy	5min
28/05/05	Definate occupation by Blue Tits	Warm Sunny	5min
12/02/06	Box Disinfected ready for next season.		

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