4.3.6 The **Specific Assemblage Types (SATs)** identified by ISIS

2005 data only

SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
scrub edge	9		5	
rich flower resource	11		5	
open short sward	6		3	147
litter-rich fluctuating marsh	1		3	
reedfen and pools	3		3	163
moss and tussock fen	1		2	163
seepage	1		2	
heartwood decay	2		1	
dung	1		1	
bark & sapwood decay	4		1	
scrub-heath & moorland	1		0	
bare sand & chalk	1		0	147

2013 data only (includes butterfly data)

SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
epiphyte fauna	2		10	
scrub edge	8		4	
rich flower resource	7		3	
litter-rich fluctuating marsh	1		3	130
open short sward	4		2	150
bark & sapwood decay	9		2	
heartwood decay	1		1	

2005 & 2013 data combined (includes butterfly data)

SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
epiphyte fauna	2		10	144
scrub edge	13	fav	7	
rich flower resource	14		6	
litter-rich fluctuating marsh	2		5	133
open short sward	9		4	157
reedfen and pools	3		3	159
moss and tussock fen	1		2	159
bark & sapwood decay	11		2	144
seepage	1		2	
heartwood decay	2		1	144
dung	1		1	
Sphagnum bog	1		1	159
saltmarsh and transitional brackish marsh	1		1	
bare sand & chalk	2		0	157
scrub-heath & moorland	1		0	

5 CONCLUSIONS

5.1 It should be borne in mind that the invertebrate ecology has been interpreted using recorded species as a tool and it is this broader ecology, not necessarily any individual species, that has the highest ranking in terms of significance in an overall site assessment. Specific locations for rarer invertebrate species are not presented in this report because they are of no particular significance and may well be different in a different year.

5.2 The identification of BATs and SATs by the software is not a matter of interpretation by any report writer and it is not practical to attribute any particular BAT or SAT to any particular area of the overall site. The identified assemblage types affect the entire site and will inevitably be impacted upon negatively if there is loss or damage to the habitat structure that supports the particular assemblage type.

5.3 For example, the arboreal canopy has been identified as a Broad Assemblage Type at Gavray Drive. This implies, at the "broad" level, that all trees are important. The software does not allow for the mapping of areas of greatest value – indeed it positively prevents such an action.

5.4 At the more detailed level of Specific Assemblage types the same principal applies. At Gavray Drive, the scrub edge has been identified as important – the only assemblage type that achieves "favourable" condition (which means that it is well-managed and does not require intervention to improve it). This means all of the scrub edge habitats, along all of the hedges and other boundaries across the entire or the site and no leeway is given, again deliberately, to allow for grading of the habitat in different areas.

5.5 The flower-rich resource is also flagged. It falls marginally short of "favourable", suggesting that it could be improved slightly, but wherever there are flowers growing these provide an important input to the overall ecological value of the site.

5.6 Although truly aquatic habitats are poor in quality, the ISIS software has drawn attention to "litter-rich fluctuating marsh". This refers to the dried and drying ponds (perhaps including invertebrates from the excluded ponds outside the surveyed area), which present a habitat aprtly described in the SAT designation.

5.7 It is clear from these three analyses that the same four BATs identified in 2005 remain present in 2013. These are

- grassland & scrub matrix
- unshaded early successional mosaic
- arboreal canopy
- permanent wet mire

4.3.7 From this we can conclude that there has been little overall change since 2005. Whilst some adjustments are evident, the grassland and scrub matrix attains poll position in all three analyses.

4.3.8 The additional survey work in 2013 has identified two additional BATs that were not identified in 2013. These are

- mineral marsh & open water
- wood decay

4.3.9 These both might suggest that invertebrates from habitat areas outside the site are moving through the site; certainly the saproxylic (wood decay) resource is low on site. This almost certainly emphasises the high value of the hedgerow network that is continuous across the site (and which is an integral part of the scrub edge habitat identified as in favourable condition).

4.3.10 In conclusion, we advise you as follows:

- that there is a high incumbent invertebrate ecology interest at Gavray Drive;
- This is expressed in the overall biodiversity and in results of assemblage-type analysis as well as in the presence of some key species of high individual nature conservation importance;
- ISIS analysis shows that there is no significant change since 2005 and this in turn suggests a stable and established community structure;
- The interest is evenly spread across the site so that no particular area can be determined as making a greater contribution than any other;
- Loss of or damage to a part of the site will, therefore, likely prove to have a negative impact on invertebrate ecology;
- The high value of the invertebrate interest encountered together with the reliance of individual species upon more than one physical area and in particular the presence of a continuous network of established and well-structured hedgerows suggests that the complete loss of the site, or the loss of a major part of the site, would have a negative impact at the highest level. Given the presence of certain species of raised individual value this negative impact would apply at regional level or higher.

4 REFERENCES USED IN THE CREATION OF THIS REPORT AND ITS APPENDICES

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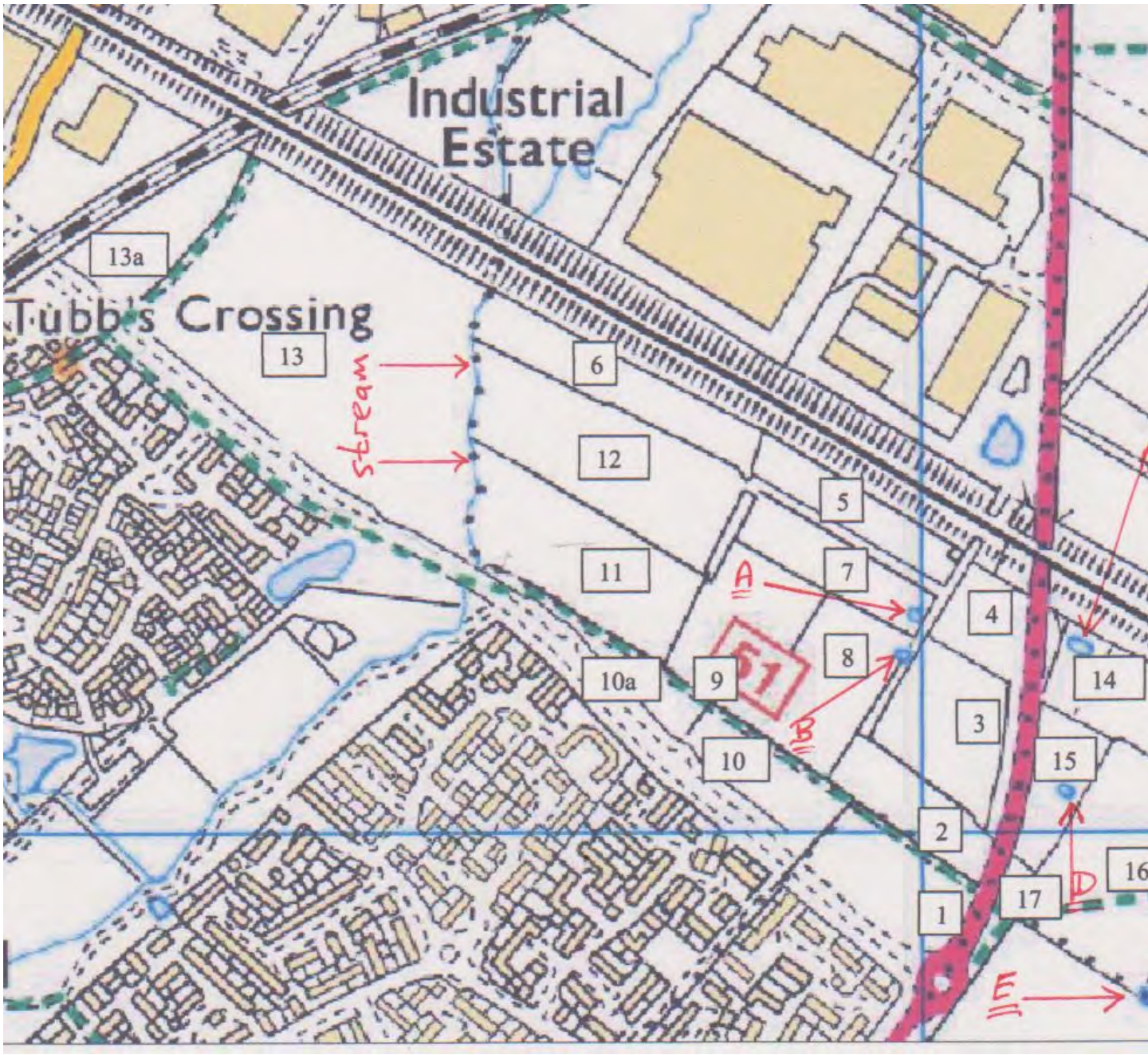
APPENDICES

MAP 1. THE SURVEYED AREA

MAP 2. SURVEY AREA – water bodies (arrowed) & field numbers (boxed)

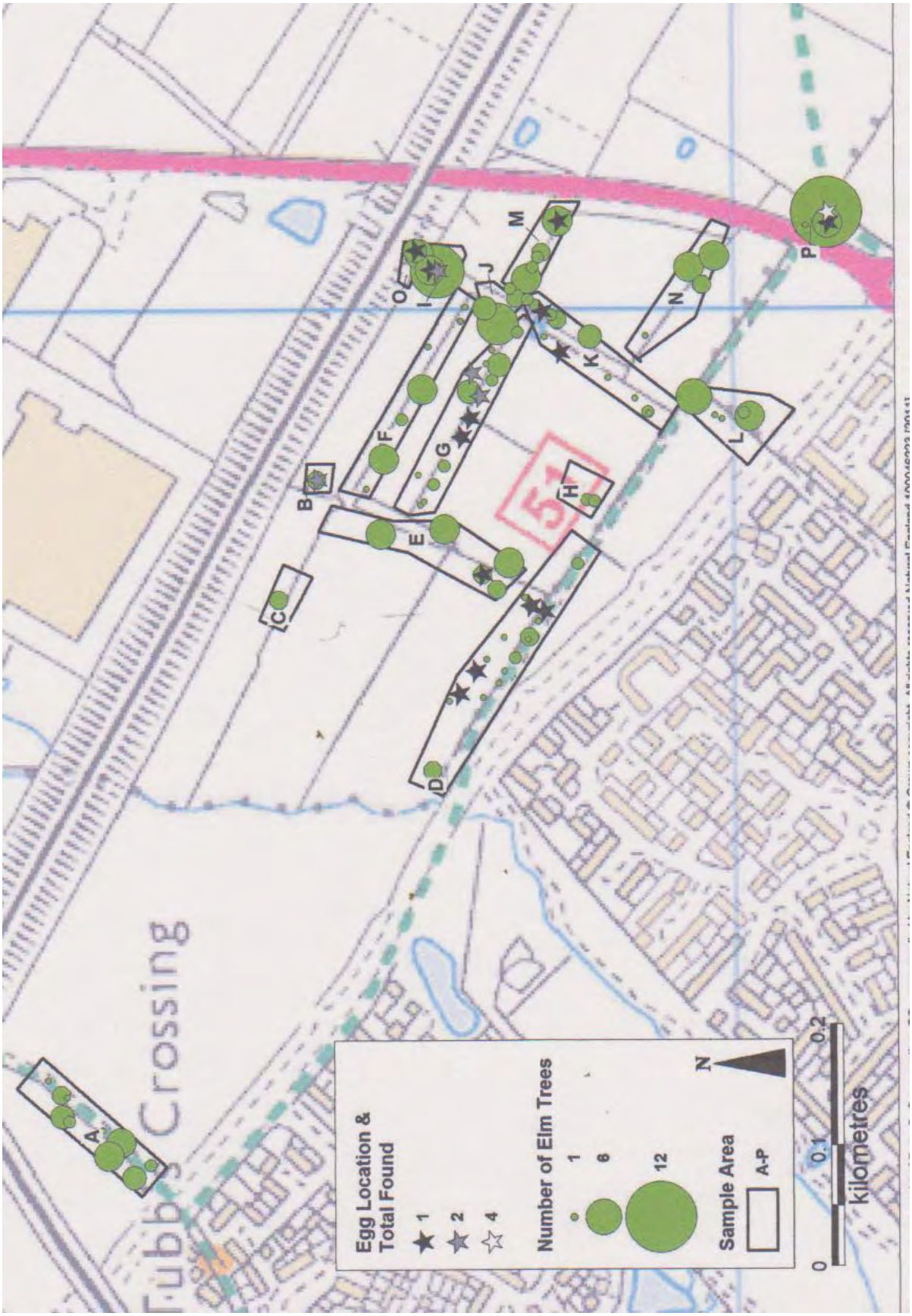


Field numbers shown in this map were applied by another party and adopted by us.

Ponds A to A and a watercourse (stream) are arrowed in red.

Ponds C, D and E fall outside our surveyed area, which is shown in Map 1.

MAP 3. THE SURVEYED AREA – White-letter Hairstreak butterfly results (third party data).



APPENDIX 1: TERRESTRIAL INVERTEBRATE SPECIES RECORDED

National status codes are explained in Appendix 2.

Group / species	English name if available	National status	Ecological associations and comments	Latest report
ARACHNIDA	**SPIDERS**			
Araneidae				
Araneus diadematus	the garden spider		ubiquitous	2013
Araneus quadratus			rough grassland	2013
Araniella opisthographa			trees and bushes	2013
Hypsosinga pygmaea		Local	grassland (especially calcareous) and low vegetation	2013
Clubionidae				
Cheiracanthium erraticum			low plants amongst rough vegetation	2013
Clubiona reclusa			low, scrubby vegetation and rough grassland	2013
Dictynidae				
Dictyna arundinacea			field edges etc amongst dry or dead vegetation	2013
Lycosidae				
Pardosa prativaga			lives on open ground and amongst herbage	2013
Philodromidae				
Philodromus cespitum			herbage and scrub - very occasionally on trees or in houses	2013
Philodromus dispar			wooded habitats, overwintering in leaf litter under hedges etc	2013
Tibellus oblongus			prefers taller herbage, in either wet or dry habitats	2013
Tetragnathidae				
Tetragnatha montana		Local	trees and bushes	2013
Theridiidae				
Enoplognatha ovata			bushes and low plants in more open habitats	2013
Neottiura bimaculata			low vegetation, bushes and low tree branches	2013
Theridion sisyphium			spins a tangle web on bushes, amongst scrub etc	2013
Thomisidae				
Xysticus cristatus			found in most non-shaded situations	2013
COLEOPTERA	**BEETLES**			
Apionidae	**Seed weevils**			
Apion cruentatum			Rumex, especially Rumex acetosella	2013
Apion frumentarium			broad-leaved docks	2005
Ceratapion carduorum		Local	Thistles	2005
Ceratapion gibbirostre			thistles - in the stems	2013
Ceratapion onopordi			thistles, burdocks, knapweeds and other Compositae	2005
Eutrichapion ervi			Lathyrus pratensis, and also on Viccia vetches	2005
Ischneroapion loti			Lotus corniculatus and L. tenuis, the larvae gallingthe seeds	2013
Malvapion malvae			Malvaceae - especially Malva	2005

Group / species	English name if available	National status	Ecological associations and comments	Latest report
			sylvestris	
Oxystoma pomonae			vetches - both Viccia and Lathyrus	2013
Oxystoma sabulatum			Associated with vetches etc	2013
Perapion curtirostre			Rumex, Acetosa and Acetosella species	2013
Perapion hydrolapathi			dock plants - in the stems	2013
Perapion violaceum			dock plants, the larvae mining the stems; widespread and common	2013
Protapion apricans			bird's-foot Trefoil and perhaps other legumes; widespread and common	2013
Protapion assimile			clover, especially red clover; widespread and common	2013
Protapion dichroum			Trifolium - widespread and almost ubiquitous	2005
Protapion fulvipes			various clovers	2013
Protapion trifolii			various clovers; widespread and common	2013
Pseudapion rufirostre			Malva sylvestris and M. neglecta; widespread and common	2013
Taeniapion urticarium		Local	nettles - larvae feed inside stem nodes	2005
Bruchidae				
Bruchus loti			Larvae on seeds of Lotus, Lathyrus & Vicia; adults at various flowers	2013
Bruchus rufimanus	Broad Bean Weevil		larva on Viccia (vetches); adults at flowers	2013
Buprestidae				
Agrilus sinuatus		NS(Na)	larvae tunnel under the bark of old hawthorn branches	2005
Byturidae				
Byturus tomentosus	the raspberry beetle		Brambles and raspberries	2013
Cantharidae	**Soldier beetles**			
Cantharis cryptica			tall vegetation, especially at the woodland/grassland interface	2013
Cantharis decipiens			adults in grassland but larvae associated with woodland	2013
Cantharis lateralis			damp grasslands and wetlands	2005
Cantharis nigra			lowland marsh, rushy pastures, damp hay meadows etc	2013
Cantharis nigricans			poorly known, perhaps likes rank grassland, especially if damp	2005
Cantharis pallida			widespread wetland species	2013
Cantharis pellucida			largely restricted to woodland	2013
Cantharis rustica			lowland grassland - but always in association with scrub	2013
Rhagonycha fulva			tall, rank vegetation in lowland areas	2013
Rhagonycha limbata			dry grasslands	2013
Rhagonycha testacea			wet woodland and scrubby marshes	2013
Carabidae	**Ground beetles**			
Acupalpus dubius		Local	damp moss, damp litter and similar habitats	2013
Agonum (Paranchus) albipes			a wide range of waterside habitats	2005
Amara (Amara) familiaris			Phytophagous species of gardens and other open, dry and sunny habitats	2013
Amara (Amara) similata			phytophagous on ruderal vegetation,	2005

Group / species	English name if available	National status	Ecological associations and comments	Latest report
			especially on waste ground	
Amara (Curtonotus) aulica			dry, well-vegetated sites, the adults climbing stems of Compositae at night to feed on the seed heads	2005
Bembidion aeneum			damp clay soils on the coast and at inland woods and grassland near water	2013
Bembidion assimile				2013
Bembidion biguttatum			usually near water or in damp grassland	2013
Bembidion gilvipes		NS(Nb)	marshland and damp riverbanks	2005
Bembidion guttula			found most habitats that are not excessively dry	2013
Bembidion harpaloides			damp places such as leaf litter or under bark	2005
Bembidion lunulatum			coastal, and in damp inland areas	2013
Bembidion mannerheimi			Damp grasslands and shaded habitats	2013
Clivinia fossor			open, partly vegetated ground, mainly in lowland grasslands	2013
Demetrias atricapillus			amongst leaf litter and in grasslands	2005
Loricera pilicornis			ubiquitous, but especially near water and in damp grassland; feeds on springtails	2013
Nebria (Nebria) brevicollis			ubiquitous late summer and autumn species	2005
Notiophilus biguttatus			most open ground habitats	2013
Notiophilus palustris		Local	damp habitats are preferred	2005
Paradromius linearis			dry tussocky grassland and coastal dunes	2013
Poecilus cupreus	copper ground beetle	Local	open grassy habitats - usually where damp	2013
Pterostichus (Argutor) strenuus			most habitats that are not too dry	2013
Trechus quadristriatus			ubiquitous in most open habitats during autumn	2005
Cerambycidae	**Longhorn beetles**			
Agapanthia villosoviridescens		Local	larvae feed internally in plant stems, including in thistles	2013
Clytus arietis			in dead wood - usually birch or willow, adults at flowers	2013
Grammoptera ruficornis			larvae in twigs and small branches; adults at flowers	2013
Molorchus minor			naturalised species, the larvae under conifer bark and adults at hawthorn flowers	2013
Phytoecia cylindrica		NS(Nb)	larvae feed in stems of Umbelliferae	2013
Tetrops praeustus			feed on a wide variety of deciduous trees and mature bushes	2013
Chrysomelidae	**Leaf beetles**			
Altica lythri			Associated with various willow-herbs (Onagraceae)	2013
Altica oleracea		Local	widely polyphagous	2013
Altica palustris			widespread on many plant species	2013
Aphthona euphorbiae		Local	widely polyphagous	2013
Cassida flaveola				2013
Cassida rubiginosa			various thistles, burdock and other	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
			Asteraceae	
Cassida vibex		Local	knapweed, thistles etc	2013
Chaetocnema confusa				2013
Chaetocnema hortensis			feeds on various grasses	2005
Chrysolina polita	Knotgrass flea-beetle		Lamiaceae - especially species of mint. Often found near water	2013
Crepidodera aurata			willows - rarely on poplars	2013
Crepidodera fulvicornis			Salix species	2013
Crepidodera plutus		Local	Willows, especially Crack Willow - rarely on poplars	2013
Epitrix pubescens		Local	associated with woody nightshade	2013
Galerucella pusilla				2013
Gastrophysa polygoni			Polygonum species	2005
Lochmaea crataegi			Hawthorn - larvae mine the berries. Occasionally on Blackthorn or Rowan	2013
Longitarsus dorsalis		NS(Nb)	Ragworts (Senecio species) - a southern species	2005
Longitarsus luridus			widely polyphagous	2013
Longitarsus parvulus		NS(Na)	feeds on many plant species	2013
Lythraria salicariae	loosestrife flea beetle	NS(Nb)	yellow loosestrife	2005
Neocrepidodera ferruginea			polyphagous	2005
Neocrepidodera transversa			polyphagous	2013
Oulema melanopa			feeds on grasses - very common	2013
Phyllotreta atra			various Brassicaceae	2013
Podagrica fuscicornis		NS(Nb)	mallow (Malva species)	2005
Psylliodes affinis			Solanaceae - especially S. dulcamara (woody nightshade)	2013
Psylliodes dulcamarae			Woody nightshade (Solanum dulcamara)	2013
Psylliodes picina				2013
Sphaeroderma testaceum			mainly on thistles	2013
Coccinellidae	**Ladybirds**			
Adalia bipunctata	2-spot ladybird		predatory on other insects	2013
Adalia decempunctata	10-spot ladybird		predatory on other insects	2013
Anisostica novemdecimpunctata	19-spot ladybird		wetland habitats	2005
Coccidula rufa	Spotless ladybird		reed beds and other marshy places	2013
Coccinella septempunctata	7-spot ladybird		predatory on other insects	2013
Exochomus quadripustulatus	Pine ladybird		aphid predator on both pines and broad-leaved trees	2013
Halyzia sedecimguttata	Orange ladybird		predatory on other insects	2005
Harmonia axyridis	Harlequin ladybird		a recent colonist in Britain	2013
Propylea quattuordecimpunctata	14-spot ladybird		predatory on other insects	2013
Psyllobora vigintiduopunctata	22-spot ladybird		feeds on mildews	2013
Rhyzobius litura			predatory on other insects	2013
Scymnus frontalis			predatory on other insects in grassland and herbaceous vegetation	2005
Subcoccinella vigintiquattuorpunctata	24-spot ladybird		predatory on other insects	2013
Tytthaspis sedecimpunctata	16-spot ladybird		predatory on other insects	2013
Cucujidae				
Psammoecus bipunctatus				2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Curculionidae	**Weevils**			
Anthonomus rubi			flowers of brambles and raspberries	2013
Ceutorhynchus pallidactylus			ecology unclear	2013
Ceutorhynchus pyrrhorhynchus		Local	Sisymbrium	2005
Cionus scrophulariae			Figworts (Scrophularia species)	2005
Cionus tuberculosus			Figworts (Scrophularia species) and Verbascum	2013
Curculio glandium		Local	Oak trees - in developing acorns	2013
Magdalis ruficornis		Local	rosaceous trees and shrubs. Widespread but in the north confined to old woods	2013
Mecinus pascuorum			feeds on flowers of Plantago lanceolata - Ribwort Plantain	2005
Nedyus quadrimaculatus			nettles - feeding on the flowers	2013
Notaris acridulus			Fens, marshes and similar, feeding on or in the stolons of semi-aquatic grasses	2013
Orchestes signifer			larva mines the leaves of oaks	2013
Parathelcus pollinarius			Nettles	2005
Pelonomus quadrituberculatus			various Cruciferae	2013
Phyllobius pomaceus			Nettles	2013
Phyllobius pyri			Larvae develop in the ground an adults feed on a variety of herbage and tree leaves	2013
Phyllobius roboretanus			nettle - feeding on the leaves and flowers	2013
Phyllobius vespertinus			Polyphagous. Was thought rare and restricted to *Artemisia maritima* in saltmarsh, but now more widespread	2013
Phyllobius viridiaeris			typically in hedges and other edge habitats	2013
Rhinocyllus conicus	Thistle Head Weevil	NS(Na)	associated with seed heads of thistles	2013
Rhinoncus pericarpius			knotgrass and docks - mainly in damp places	2013
Rhinoncus perpendicularis			Polygonum amphibium, in wet places - but almost certainly on other species	2013
Sitona cambricus			On Lotus, in ruderal and other habitats	2013
Sitona hispidulus			larvae feed in the root nodules of clover and other legumes	2005
Sitona lineatus			various legumes	2013
Sitona puncticollis			grassland, wasteland, open places etc on light or stony soils	2013
Sitona suturalis			Lathyrus and Viccia in ruderal habitats	2013
Thamiocolus viduatus		NS(Nb)	on Stachys palustris in marshy places	2013
Trichosirocalus troglodytes			Plantains, usually in grassy places	2013
Tychius picirostris			various Leguminosae	2013
Dermestidae				
Anthrenus verbasci	museum beetle		feeds on dead animal and plant matter, including dry carcasses	2013
Elateridae	**Click beetles**			
Agriotes acuminatus			larvae feed on grass roots	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Agriotes lineatus			larvae feed on grass roots, often in damp areas	2013
Agriotes obscurus			larvae feed on grass roots, often in damp areas	2013
Agriotes pallidulus			larvae feed on grass roots	2005
Agriotes sputator			larvae feed on grass roots	2005
Athous haemorrhoidalis			the larva feeds on the roots of grasses	2013
Dalopius marginatus			Damp habitats	2005
Denticollis linearis			larvae feed in decaying wood	2013
Kibunea (Cidnopus) minuta			a species of dry grasslands	2013
Kateretidae				
Brachypterus glaber			Nettles	2013
Brachypterus urticae			Nettles	2013
Latridiidae				
Cartodere bifasciatus			litter, compost, tussocks etc - more or less ubiquitous	2013
Cartodere nodifer			leaf litter, vegetable detritus - more or less ubiquitous	2013
Corticaria impressa			amongst plant litter	2013
Cortinicara gibbosa			amongst plant litter	2013
Malachiidae				
Cordylepherus viridis		Local	a common grassland species	2013
Malachius bipustulatus			grasslands	2013
Mordellidae				
Mordellistena pumilla			larvae in dead wood; adults at hawthorn flowers	2013
Mordellistena variegata		Local	unknown ecology	2013
Nanophyidae				
Nanophyes marmoratus			feeds in developing seeds of Purple Loosestrife	2005
Nitidulidae	**Pollen beetles**			
Meligethes aeneus			various flowers	2013
Meligethes atratus			various flowers, especially of trees and shrubs	2005
Meligethes rotundicollis		NS(Nb)	Mainly found in the south. The ecology of this beetle is currently unclear	2013
Pria dulcamarae			various flowers - especially of woody nightshade	2013
Oedemeridae				
Oedemera lurida		Local	a common grassland species	2013
Oedemera nobilis			a common grassland species	2013
Pselaphidae				
Brachygluta fossulata			usually in grass tussocks, feeding on moulds	2013
Bythinus burrelli			in woodland moss and in grassland tussocks, feeding on moulds	2013
Rybaxis longicornis				2013
Pyrochroidae				
Pyrochroa coccineus		NS(Nb)	larvae feed in dead timber	2005
Pyrochroa serraticornis	Cardinal beetle		Larvae predatory under loose tree bark	2013
Scirtidae				
Microcara testacea				2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Scraptiidae				
Anaspis (Nassipa) rufilabris			larvae feed in oak and other twigs and branches; adults at blossoms	2013
Anaspis fasciata (= humeralis)			larvae in twigs of oak and other trees; adults at hawthorn blossom	2013
Anaspis frontalis			larvae in twigs of oak and other trees; adults at hawthorn blossom	2013
Anaspis maculata			larvae in dead branches and twigs	2013
Silphidae				
Silpha (Phosphuga) atrata			associated with carrion	2013
Staphylinidae	**Rove beetles**			
Aloconota gregaria			plant litter - ubiquitous	2005
Anotylus inustus			leaf litter, carrion, dung and similar	2013
Anotylus rugosus			a detritus-feeding rove beetle	2013
Atheta (Atheta) crassicornis			amongst detritus etc - ecology unclear	2005
Atheta (Mocyta) fungi			a detritus-feeding rove beetle	2013
Atheta (Mycetota) laticollis			a detritus-feeding rove beetle	2005
Hygronoma dimidiata		Local	amongst moss and litter in marshy places	2013
Lathrobium brunnipes			grass tussocks, litter, dung etc	2013
Mycetoporus lepidus			amongst low vegetation and litter	2005
Ocypus olens	Devil's Coach-horse beetle		carrion	2013
Philonthus carbonarius (= varius)			ubiquitous - in moss, litter, carrion, dung etc	2005
Philonthus cognatus			under stones, litter etc, usually in woodland or scrub	2013
Philonthus fumarius		NS(Nb)	ecology unclear - probably a scavenger	2005
Philonthus marginatus			rotting vegetation etc	2013
Sepedophilus nigripennis			grass tussocks, leaf litter, mosses and similar places	2013
Sepedophilus pedicularius		NS(Nb)	fen and bog habitats - mostly in the fenland of Cambridgeshire and Huntingdonshire	2005
Stenus aceris			predatory in both wet and dry habitats	2005
Stenus bifoveolatus				2013
Stenus bimaculatus			mostly found in wetland habitats	2013
Stenus brunnipes			leaf litter, flood debris, tussocks etc	2013
Stenus cicindeloides		Local	usually in marshy places	2013
Stenus clavicornis			disturbed grasslands	2013
Stenus flavipes			found in a wide range of habitats	2013
Stenus fulvicornis			damp habitat, especially grazed grassland with Juncus	2013
Stenus juno			a common species in wet habitats	2013
Stenus oscillator		NS(Nb)	amongst moss and litter in marshy places	2013
Stenus pallipes			in the litter of marshes, fens, swamps etc	2013
Stenus solutus			wet habitats generally	2005
Tachyporus dispar			a detritus-feeding rove beetle	2013
Tachyporus formosus		NS(Na)	amongst moss and litter	2013
Tachyporus hypnorum			leaf litter, grass tussocks and similar micro-habitats	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Tachyporus nitidulus			leaf litter, grass tussocks and similar micro-habitats	2013
Tachyporus obtusus			leaf litter and similar microhabitats	2013
Tachyporus pusillus			detritus feedr	2013
Tachyporus solutus			leaf litter, carrion, dung and similar	2005
Xantholinus longiventris			leaf litter, grass tussocks and similar micro-habitats - very common	2013
DERMAPTERA	**EARWIGS**			
Forficulidae				
Forficula auricularia			generalist species	2013
DIPTERA	**TRUE FLIES**			
Agromyzidae				
Agromyza anthracina			larva makes mines in nettle leaves	2013
Agromyza filipendulae			larva mines the leaves of meadowsweet	2005
Agromyza idaeina			mines in leaves of Filipendula spp.	2005
Agromyza potentillae			mines leaves of Potentilla reptans and other rosaceous plants	2005
Agromyza reptans			larva makes mines in nettle leaves	2005
Agromyza vicifoliae			larva makes mines in leaves of vetches	2005
Amauromyza flavifrons			larva mines leaves of white campion	2005
Amauromyza labiatarum			mines leaves of Lamium album and other labiates	2013
Chromatomyia ramosa			larva mines the leaves of teasels	2005
Liriomyza amoena			mines leaves of elder	2013
Phytomyza chaerophylli			Larva mines in leaves of cow parsley	2005
Phytomyza lappae			mines leaves of Burdock (Arctium species)	2005
Phytomyza ranunculi			larva mines the leaves of Creeping Buttercup	2005
Phytomyza spondylii			mines leaves of Heracleum spondylium	2005
Asilidae	**Robber flies**			
Dioctria atricapilla			predatory -mainly in edge habitats	2005
Dioctria baumhaueri			predatory -mainly in edge habitats	2005
Dioctria rufipes			predatory -mainly in edge habitats	2005
Leptogaster cylindrica			grassland predator	2013
Machimus atricapillus			grassland predator	2005
Bibionidae				
Dilophus febrilis			associated with dung	2013
Calliphoridae	**Blowflies**			
Melanomya nana			larvae parasitise terrestrial woodlice	2013
Conopidae				
Conops quadrifasciatus		Local	Parasitic on bumble bee Bombus lucorum - wherever the host bee is found	2005
Physocephala rufipes		Local	parasitic fly on various species of bee	2005
Sicus ferrugineus		Local	parasitic fly on bumble bees	2005
Thecophora atra		Local	a parasite of solitary bees	2005
Dolichopodidae	**Dance flies**			
Argyra leucocephala			typically around puddles or ponds in woodland	2005
Dolichopus pennatus			larvae require damp places	2005

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Dolichopus wahlbergi		Local	larvae require damp habitat	2013
Poecilobothrus nobilitatus			aquatic larvae	2013
Scellus notatus		Local	predatory species in woodland and scrub, the adults predatory	2013
Sciapus platypterus			predatory in woodland and scrub, the larvae under bark	2005
Empididae	**Assassin flies**			
Empis (Kritempis) livida			predatory on other flies	2013
Hybotidae				
Bicellaria vana			predatory in edge habitats such as hedges etc	2013
Lauxaniidae				
Sapromyza opaca			saprophagous species	2013
Lonchopteridae				
Lonchoptera bifurcata			a more or less ubiquitous species in edge habitats	2005
Lonchoptera lutea			ubiquitous species in edge habitats, saprophagous larvae	2005
Micropezidae	**Stilt-legged flies**			
Micropeza corrigiolata		Local	Larva feeds in root nodules of Pisum sativum, Trifolium pratense and Medicago sativa	2005
Micropeza lateralis		NS(N)	rough herbage/edge habitats - rarely far from water	2005
Neria (=Calobata) cibaria			lush vegetation - especially at water margins	2005
Muscidae				
Helina depuncta				2013
Mesembrina meridiana			larvae in dung, especially cattle dung	2005
Opomyzidae				
Geomyza balachowskyi			larvae feed inside the stems of grasses	2005
Opomyza germinationis			larvae feed inside the stems of grasses	2013
Opomyza petrei			larvae feed inside the stems of grasses	2013
Pallopteridae				
Palloptera quinquemaculata			larvae feed in the stem bases of grasses	2013
Palloptera umbellatarum			larvae feed inside stems of false oat-grass	2005
Toxoneura (Palloptera) muliebris		Local	larva develops under bark	2005
Psilidae				
Loxocera albiseta			eggs are inserted into plants, upon which the larvae feed	2005
Rhagionidae	**Snipe flies**			
Rhagio lineola			woodland and scrub - especially at the edges	2005
Rhagio scolopaceus			woodland edge and other wooded areas - in clearings and at edges	2013
Rhagio tringarius			damp habitats	2013
Scathophagidae				
Scathophaga stercoraria			animal dung	2013
Sciomyzidae	**Snail-killing flies**			
Coremacera marginata		Local	dry habitats, especially grasslands	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Ilione albiseta			predatory on water snails in non-acidic wetland habitats	2005
Limnia unguicornis			predatory on water snails	2013
Pherbellia cinerella			predatory on terrestrial and exposed pulmonate aquatic snails	2005
Sepedon sphegea		Local	predatory on water snails	2013
Tetanocera arrogans		Local	predatory on a range of terrestrial and aquatic snails in marshy habitats	2005
Tetanocera elata			predatory on slugs in a range of habitats	2013
Trypetoptera punctulata			ecology unclear, but found in a range of habitat types	2013
Sepsidae				
Sepsis cynipsea			Larvae feed in animal dung	2005
Sepsis fulgens			the most ubiquitous member of this group, feeding in mammal dung	2013
Sepsis punctum			widespread in various habitats	2005
Sepsis violacea			animal dung	2005
Sphaeroceridae				
Lotophila atra			animal dung	2013
Stratiomyidae	**Soldierflies**			
Beris chalybata			associated with the scrub/grassland interface	2013
Beris vallata			saprophagous larvae	2005
Chloromyia formosa			ubiquitous	2013
Chorisops tibialis			saprophagous larvae	2013
Microchrysa polita			larvae require decomposing organic matter	2013
Pachygaster atra			woodland edge & scrubland species - larvae under dead bark of trees	2013
Pachygaster leachii			woodland edge & scrubland species - larvae under dead bark of trees	2013
Sargus bipunctatus			associated with the scrub/grassland interface	2013
Stratiomys potamida		NS(N)	well-vegetated water-bodies	2005
Syrphidae	**Hoverflies**			
Cheilosia albitarsis s. str.			larvae feed in the roots of Ranunculus repens	2013
Cheilosia bergenstammi			larvae feed in the stems and roots of ragwort on dry chalky or sandy sites or in ruderal areas	2005
Cheilosia impressa			damp woodland and carr	2013
Cheilosia lasiopa (= honesta)			larvae unknown; adults feed at flowers including Anthriscus sylvestris	2013
Cheilosia pagana			larvae are thought to feed in the roots of Anthriscus sylvestris	2005
Cheilosia vernalis			thought to feed in the stems of plants such as Achillea, Matricaria, Tragoponon and Sonchus	2013
Episyrphus balteatus			ubiquitous species, partly immigrant, and a predator of aphids	2013
Eristalis arbustorum			Larvae require damp habitats but adults are more or less ubiquitous	2013
Eristalis lineata (= horticola)			damp habitats, especially margins of ponds and woodland streams	2005

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Eristalis nemorum (= interrupta)			Larvae require damp habitats but adults are more or less ubiquitous	2013
Eristalis pertinax			Larvae require damp habitats but adults are more or less ubiquitous	2013
Eristalis tenax			Larvae require damp habitats but adults are more or less ubiquitous	2013
Eumerus funeralis (= tuberculatus)			larvae feed inside bulbs - especially of bluebells	2005
Eupeodes corollae			Grassland	2013
Eupeodes latifasciatus		Local	Damp grassland	2005
Eupeodes luniger			Grassland	2013
Helophilus pendulus			Larvae require damp habitats but adults are more or less ubiquitous	2013
Melanogaster hirtella			larvae feed in mud amongst roots of emergent vegetation, mainly by running water	2013
Melanostoma mellinum			Grassland	2013
Melanostoma scalare			Grassland	2005
Myathropa florea			larvae are semi-aquatic	2013
Neoascia podagrica			edge-habitat species	2005
Pipizella viduata			Larvae feed on root aphids on Umbelliferae	2013
Platycheirus albimanus			ubiquitous - larvae prey on aphids	2005
Platycheirus angustatus			damp habitats	2013
Platycheirus clypeatus			Damp habitats	2013
Platycheirus manicatus			aphid predator amongst vegetation	2005
Platycheirus scutatus			an edge-habitat species	2013
Rhingia campestris			Cow dung	2005
Scaeva pyrastri			immigrant from overseas - feeds on aphids	2005
Sphaerophoria scripta			Grassland - larvae prey on aphids	2013
Syritta pipiens			larvae in decaying vegetation; adults at flowers	2013
Syrphus ribesii			larvae are aphid predators on trees and bushes	2013
Syrphus vitripennis			larvae are aphid predators on trees and bushes	2013
Volucella bombylans			inquiline in nests of bumble bees	2005
Volucella pellucens			inquiline in nests of social wasps/hornet	2005
Xanthogramma pedisequum s.str.		Local	larvae feed in ants nests	2013
Xylota segnis			Damp, dead wood	2013
Tabanidae				
Chrysops relictus			damp habitats - adult females are blood sucking horseflies	2005
Haematopota pluvialis			damp habitats - adult females are blood sucking horseflies	2005
Tabanus autumnalis			damp habitats - adult females are blood sucking horseflies	2005
Tachinidae				
Eriothrix rufomaculata			larva parasitises moth larvae	2005
Phasia pusilla		Local	Parasite of plant bugs in Europe but British hosts unknown.	2005
Thelaira solivaga			larvae are parasites of caterpillars of the Garden Tiger moth	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Tephritidae	**Picture-winged flies**			
Acidia cognata		Local	Tussilago and Petasites plants - mining the leaves	2005
Euleia heraclei			larvae feed in the seed heads of white-flowering Umbelliferae	2005
Merzomyia westermanni		NS(N)	various ragwort species	2005
Oxyna parietina		NS(Nb)	mugwort - the larvae boring inside the stems	2005
Sphenella marginata		Local	on various ragwort species, in late summer and autumn	2005
Tephritis bardanae			larvae gall the flowers of burdock	2005
Tephritis cometa		Local	larvae gall the flowers of creeping thistle	2005
Tephritis neesi			larvae gall the flowers of Leucanthemum species	2005
Terellia ruficauda			larvae gall the flowers of thistles	2005
Urophora cardui			larvae gall the flowers of thistles	2013
Urophora quadrifasciata		Local	larva galls the flowers of Centaurea nigra	2005
Urophora stylata			larvae form galls on thistle stems	2005
Xyphosia miliaria			larvae gall the flowers of thistles - ubiquitous	2013
Therevidae				
Thereva nobilitata			biology uncertain	2005
Tipulidae				
Tipula oleracea			ubiquitous, larvae feeding on roots of grasses	2013
Tipula paludosa			ubiquitous, larvae feeding on roots of grasses	2013
HETEROPTERA	**PLANT BUGS**			
Acanthosomatidae				
Acanthosoma haemorrhoidale	hawthorn shield bug		hawthorn	2013
Anthocoridae				
Anthocoris confusus			trees and shrubs	2013
Anthocoris nemoralis			trees and shrubs	2013
Anthocoris nemorum			low vegetation	2013
Cardiastethus fasciiventris			Gorse and sometimes other plants	2013
Orius vicina			predatory amongst low growing vegetation	2013
Berytinidae				
Cymus melanocephalus			Juncus (rush) in a wide variety of habitats in the south-east region	2013
Coreidae				
Coreus marginatus			Develops on a variety of Polygonaceae in open habitats	2013
Coriomeris denticulatus			various legumes	2005
Syromastus rhombeus			feeds on Polygonum species in ruderal and other open sites	2005
Lygaeidae				
Drymus sylvaticus			amongst vegetation litter, moss etc in many habitats	2005
Heterogaster urticae			Nettles	2013
Ischnodemus sabuleti			associated with reeds (Phragmites)	2013
Kleidocerys resedae			trees and shrubs generally	2013
Peritrechus geniculatus			ground bug of dry open soils, mainly	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
			southern	
Scolopostethus affinis			usually on nettles	2013
Scolopostethus thomsoni			usually on nettles	2005
Stygnocoris sabulosus			disturbed ground amongst ruderal plants	2013
Microphysidae				
Loricula elegantula			predatory amongst trees and bushes	2005
Miridae				
Adelphocoris lineolatus			leguminous plants	2005
Apolygus lucorum		Local	low plants	2013
Apolygus spinolai			Polyphagous amongst low vegetation	2013
Campyloneura virgula			broad-leaved trees and shrubs	2013
Capsus ater			Grassland	2005
Closterostomus norvegicus			polyphagous	2013
Cyllecoris histrionicus			associated with oak	2013
Deraeocoris flavilinea			predatory amongst trees and bushes	2013
Deraeocoris lutescens			predatory amongst trees and bushes	2013
Deraeocoris ruber			nettles, brambles and similar rough vegetation	2005
Dicyphus epilobii			Epilobium hirsutum	2013
Dryophilocoris flavoquadrimaculatus			associated with oak	2013
Grypocoris stysi			Nettles	2013
Harpocera thoracica			Oaks -solitary and in woods	2005
Heterotoma planicornis			edge habitats - especially in association with nettles	2005
Leptoterna dolabrata			found in a wide range of grassland habitats	2005
Leptoterna ferrugata			grassland species	2005
Liocoris tripustulatus			stinging nettle	2013
Lopus decolor			open grasslands, especially dry calcareous ones but also colonises ruderal sites	2005
Lygocoris pabulinus			Polyphagous amongst low vegetation	2013
Lygus rugulipennis			polyphagous - especially common in ruderal communities	2013
Miris striatus			associated with oak	2005
Notostira elongata			grasslands	2013
Orthops kalmii			on various umbelliferous flowers	2013
Phylus melanocephalus			restricted to oak trees	2013
Phytocoris tiliae			predatory on trunks and branches of deciduous trees	2005
Phytocoris varipes			dry, open grasslands are preferred. Partly vegetarian and partly a predator	2013
Pilophorus perplexus		Local	predatory on deciduous trees	2013
Plagiognathus arbustorum			polyphagous, but usually associated with stinging nettles	2013
Plagiognathus chrysanthemi			polyphagous	2013
Psallus haematodes			sallow trees	2013
Psallus perrisi				2013
Psallus varians			predatory species on oak trees	2013
Rhabdomiris striatellus				2013
Stenodema calcarata			grasslands	2013
Stenodema laevigata			grasslands	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Stenotus binotatus			grasslands	2005
Nabidae				
Himacerus apterus	a damsel bug		a tree-dwelling species	2013
Nabis limbatus	marsh damsel bug		marshy places	2013
Nabis rugosus			common predator amongst long grass and herbs	2013
Pentatomidae				
Aelia acuminata			Thistles	2013
Dolycoris baccarum			polyphagous species of dry habitats	2013
Eysarcoris venutissimus (= fabricii)			probably polyphagous	2013
Palomena prasina			trees and shrubs	2013
Pentatoma rufipes	The Forest Bug		tree-dwelling predator that often flies far from woodland	2005
Picromerus bidens				2013
Podops inuncta	the Turtle Bug		dry places, especially ruderal sites. A markedly southern species	2013
Rhopalidae				
Rhopalus subrufus		Local	St John's Wort (Hypericum perforatum)	2013
Saldidae				
Saldula saltatoria			predatory species of most damp habitats	2013
Scutelleridae				
Eurygaster testudinaria			rushes, sedges and other tall vegetation in damp places	2013
Tingidae				
Physatocheila dumetorum			hawthorn	2013
Tingis ampliata			creeping thistle	2013
Tingis cardui			spear thistle - Cirsium vulgare	2013
HOMOPTERA: AUCHENORHYNCHA	**PLANT HOPPERS**			
Aphrophoridae				
Aphrophora alni			larvae feed under froth on a wide range of trees and shrubs	2013
Neophilaenus lineatus			grasslands	2013
Philaenus spumarius	spittle-bug/Cuckoo-spit bug		larvae feed under froth on a wide range of herbaceous plants	2013
Cercopidae				
Cercopis vulnerata			woodland edge, other edge habitats and damp ditches	2013
Cicadellidae				
Adarrus ocellaris			grassland and rank vegetation	2013
Alebra albostriella			oak	2013
Allygus mixtus			grasses	2013
Anoscopus flavostriatus			grassland	2013
Aphrodes makarovi			on nettles, thistles and other plants in grasslands	2013
Arboridia ribauti			arboreal species, mainly on oaks	2013
Arthaldeus pascuellus			grasses	2013
Balclutha punctata			widespread on grasses etc - overwinters in conifer trees	2013
Cicadella viridis			grasses and rushes in marshy places	2013
Cicadula frontalis			marshy places with tall Carex or Scirpus,inland and coastal	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Cicadula quadrinotata			on Carex (sedges) in wet and dry locations	2013
Edwardsiana crataegi			associated with hawthorns	2013
Eupteryx aurata			low growing plants	2013
Eupteryx urticae			Usually on nettles	2013
Eurhadina pulchella			oaks and sometimes other trees	2013
Euscelis incisus			grasses	2013
Iassus lanio			usually on oak, occasionally on other trees	2013
Idiocerus lituratus			Salix species	2013
Lamprotettix nitidulus				2013
Lindbergina aurovittata			various trees and bushes	2013
Macrosteles sexnotatus			grassland species often associated with clovers	2013
Macrosteles viridigriseus			marshy areas, often at the margins of ponds	2013
Macustus grisescens				2013
Mocydia crocea			grasses	2013
Notus flavipennis			marshy placesd with Carex	2013
Paluda flaveola		Local	tall grassland in mosit and usually shaded sites	2013
Populicerus confusus			various trees and bushes	2013
Psammotettix confinis			grasses, including on post-industrial sites	2013
Streptanus sordidus			grasses in a range of habitats	2013
Zonocyba bifasciata				2013
Zygina angusta			on various trees - overwinters in conifers	2013
Zyginidia scutellaris			grasses	2013
Cixiidae				
Cixius nervosus			most frequent in woodlands	2013
Tachycixius pilosus			grasses	2013
Delphacidae				
Conomelus anceps			Juncus species	2013
Hyledelphax elegantulus			open, dry grassland with Deschampsia cespitosa in the sward	2013
Javesella pellucida			grasses in a range of habitats	2013
Kelisia guttulifera		Local	on sedges in dry grassland	2013
Kelisia ribauti		Local	associated with marshes, espacially if base-poor	2013
Megamelus notula			in marshy places - associated with sedges	2013
Muellerianella fairmairei			damp grasslands	2013
Stenocranus major		Local	Phalaris arundinacea in marshy places	2013
Stenocranus minutus			grasses in a range of habitats	2013
Membracidae				
Centrotus cornutus		Local	oak, aspen and other sapling trees	2013
HOMOPTERA: PSYLLOIDEA	**PLANT LICE**			
Psyllidae				
Cacopsylla peregrina			associated with hawthorns	2013
HOMOPTERA: STENORHYNCHA	**PLANT LICE**			
Triozidae				

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Trioza urticae			stinging nettle	2013
HYMENOPTERA: ACULEATA	**BEES, WASPS AND ANTS**			
Apidae	**Bees**			
Apis mellifera	honey bee		flowers in general	2005
Bombus hypnorum	The Tree Bee		A recent colonist, first seen in 2001 in Dorset, now spreading rapidly	2013
Bombus lapidarius	red-tailed bumble bee		ubiquitous	2005
Bombus lucorum	white-tailed bumble bee		ubiquitous	2013
Bombus pascuorum	common carder bee		ubiquitous	2013
Bombus pratorum	a bumble bee		ubiquitous	2013
Bombus terrestris	buff-tailed bumble bee		ubiquitous	2013
Halictus tumulorum			ground-nesting solitary bee in a range of habitats	2005
Hylaeus communis			nests inside dead stems of bramble, dock etc	2013
Hylaeus cornutus		NS(Na)	nests in stems of herbaceous plants	2005
Lasioglossum calceatum			nests in burrows on steep sandy banks	2013
Lasioglossum malachurum		NS(Nb)	ground nesting species - prefers soils with a clay component	2005
Lasioglossum morio			excavates nest burrows in level ground	2005
Nomada flavoguttata			nest parasite of small-sized Andrena species of bee	2005
Eumenidae	**Solitary wasps**			
Ancistrocerus gazella			nests in broken plant stems and other hollows	2005
Formicidae	**Ants**			
Lasius brunneus	banded tree ant	NS(Na)	nests on old oaks and perhaps other trees	2005
Lasius flavus	yellow ant		grassland. A high nest density indicates long term grassland continuity	2005
Lasius niger	common black ant		generalist species	2013
Myrmica rubra	a red ant		ubiquitous	2013
Myrmica scabrinodis			grassland - preferring shorter, damp turf	2013
Sphecidae	**Digger wasps**			
Pemphredon lugubris			nests in holes in dead wood (trees) and preys on aphids	2005
Trypoxylon attenuatum			preys on spiders. Nests in plant stems, beetle tunnel or other cavities	2005
Vespidae	**social wasps**			
Vespula germanica			ubiquitous	2005
Vespula rufa	the red wasp		usually nesting below ground in a mouse hole or similar	2005
Vespula vulgaris			ubiquitous	2013
HYMENOPTERA: PARASITICA				
Cynipidae	**Gall wasps**			
Andricus quercuscalicis			forms galls in acorns	2013
Neuroterus anthracinus			causes galls on oaks	2013
Neuroterus quercusbaccarum			forms the hairy spangle gall on oak leaves	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Mymaridae	**Parasitic wasps**			
Mymar pulchellum				2013
HYMENOPTERA: SYMPHYTA	**SAWFLIES**			
Argidae				
Arge cyanocrocea			larvae feed on Rubus (bramble, raspberry etc)	2005
Arge gracilicornis			larvae feed on Rubus idaeus	2013
Arge ochropus			larvae feed on wild rose	2005
Arge pagana		Local	host plant associations are currently unclear	2005
Cephidae				
Cephus cultratus			larvae mine the stems of grasses	2013
Cephus pygmaeus			larvae mine the stems of grasses	2005
Tenthredinidae				
Athalia cordata			ubiquitous sawfly species	2013
Athalia rosae			phytophagous species	2013
Empria liturata				2013
Hoplocampa crataegi			larvae mines the flesh of hawthorn berries	2013
Profenusa pygmaea			larva mines the leaves of oak trees	2013
Rhogogaster viridis			larvae on a variety of plant species	2005
Tenthredo arcuata			larvae feed on Trifolium repens leaves	2005
LEPIDOPTERA	**BUTTERFLIES**			
Hesperiidae				
Ochlodes faunus	Large skipper		grassland	2005
Thymelicus sylvestris	Small skipper		grassland	2013
Lycaenidae				
Lycaena phlaeas	Small copper		common sorrel and sheeps sorrel - adults nectar at ragwort	2013
Polyommatus icarus	Common blue		various legumes, especially Bird's-foot Trefoil	2013
Nymphalidae				
Aglais urticae	Small tortoiseshell		larvae feed on Stinging Nettle	2013
Aphantopus hyperantus	Ringlet		woodland edge and clearings, hedges and other edge habitats	2005
Coenonympha pamphilus	Small Heath	NT	grassland	2005
Euphydryas aurinia	Marsh Fritillary	BAP	Succisa pratensis in boggy meadows or chalk grassland	2005
Inachis io	Peacock		nettles	2005
Maniola jurtina	Meadow brown		grassland species	2013
Melanargia galathea	Marbled White	Local	tall calcareous grassland	2005
Pararge aegeria	Speckled wood		grasses in light woodland or scrub	2013
Polygonia c-album	Comma		nettles	2013
Pyronia tithonus	Gatekeeper		larvae feed on coarse grasses	2013
Pieridae				
Gonepteryx rhamni	Brimstone		buckthorn	2005
Pieris brassicae	Large white		various Cruciferae	2013
Pieris napi	Green-veined white		ubiquitous	2013
Pieris rapae	Small white		ubiquitous	2013
LEPIDOPTERA	**MOTHS**			
Choreutidae				
Anthophila fabriciana	Nettle-tap		nettles	2013
Coleophoridae				

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Coleophora paripennella				2013
Elachistidae				
Elachista albifrontella				2013
Gelechiidae				
Helcystogramma rufescens			grasses	2013
Geometridae				
Abraxas grossulariata	Magpie		Ribes species	2013
Camptogramma bilineata	Yellow Shell		herbaceous plants	2013
Epirrhoe alternata	Common Carpet		bedstraws	2013
Scotopteryx chenopodiata	Shaded Broad-bar	BAP(R)	vetches and clovers	2013
Timandra comae	Blood-vein	BAP(R)	Polygonaceae	2013
Xanthorhoe montanata	Silver-ground Carpet		herbaceous plants - especially bedstraws	2013
Glyphipterigidae				
Glyphipterix forsterella				2013
Glyphipterix simpliciella			caterpillar feeds on the seeds of Dactylis and Festuca species of grasses	2013
Gracillariidae				
Phyllonorycter esperella			mines leaves of hornbeam	2013
Phyllonorycter harrisella			mines leaves of oak	2013
Phyllonorycter quercifoliella			mines leaves of oak	2013
Incurvariidae				
Adela fibulella				2013
Lymantriidae				
Orgyia antiqua	Vapourer		deciduous trees and shrubs	2013
Micropterigidae				
Micropterix aruncella			probably on sedges	2013
Nepticulidae				
Ectoedemia subbimaculella			larva mines leaves of oak	2013
Noctuidae				
Callistege mi	Mother Shipton	BAP(R)	coarse grasses, including reeds	2013
Euclidia glyphica	Burnet Companion		Medicago, Trifolium and Lotus corniculatus	2013
Mythimna impura	Smoky Wainscot		grasses	2013
Rivula sericealis	Straw Dot		grasses - especially Brachypodium species	2013
Notodontidae				
Phalera bucephala	Buff-tip		deciduous trees	2013
Pyralidae				
Agriphila tristella			grasses	2013
Tortricidae				
Celypha lacunana			herbaceous plants	2013
Hedya pruniana			Prunus, especially blackthorn	2005
Pseudargyrotoza conwagana			ash and privet in the fruits and seeds	2005
Zygaenidae				
Adscita statices	Forester Moth	BAP	Rumex acetosa	2013
MECOPTERA	**SCORPION FLIES**			
Panorpidae				
Panorpa communis			edge habitats	2013
NEUROPTERA	**LACEWINGS**			
Chrysopidae				
Chrysopa perla			aphid predator amongst herbage	2013
Chrysoperla carnea			aphid predator of trees and bushes	2013

Group / species	English name if available	National status	Ecological associations and comments	Latest report
Cunctochrysa albolineata			predatory on aphids in tree foliage	2005
Dichochrysa prasina			aphid predator on various plant species	2013
Nineta flava			thought to be associated with oak, feeding on aphids on the leaves	2005
Coniopterygidae				
Coniopteryx tineiformis			predatory on aphids in tree foliage	2005
Conwentzia psociformis			arboreal on deciduous trees	2005
Hemerobiidae				
Hemerobius humulinus			trees and bushes, hedges, etc	2013
Hemerobius lutescens			trees and bushes, hedges, etc	2013
Hemerobius micans			oak	2005
Micromus paganus			ubiquitous, but usually in association with wood or scrub	2013
Micromus variegatus			probably a predator of root aphids	2013
Wesmaelius subnebulosus			larvae are aphid predators on trees and bushes	2013
ORTHOPTERA	**GRASSHOPPERS AND CRICKETS**			
Acrididae	**Grasshoppers**			
Chorthippus brunneus	Field grasshopper		grassland	2013
Chorthippus parallelus	Meadow grasshopper		grassland	2013
Omocestus viridulus	Common Green Grasshopper		tall, undisturbed calcareous grassland	2013
Tetrigidae	**Ground hoppers**			
Tetrix undulata	Common Ground-hopper		bare ground habitats, including dunes	2013
Tettigoniidae	**Crickets**			
Conocephalus discolor	Long-winged Cone-head	NS(Na)	coarse vegetation on the coast - recently it has colonised inland sites	2013
Conocephalus dorsalis	Short-winged Cone-head	Local	formerly at damp coastal sites it is now found in a variety of inland habitats	2005
Leptophyes punctatissima	Speckled Bush-cricket		rough herbage and scrub	2013
Meconema thalassinum	Oak Bush-cricket		oak trees, especially when at the woodland edge	2013
Metrioptera roeselii	Roesel's Bush-cricket	NS(Nb)	long grassland	2013
Pholidoptera griseoaptera	Dark Bush-cricket		scrub and edge habitats	2013
PSOCOPTERA	**BARK LICE**			
Stenopsocidae				
Graphopsocus cruciatus			associated with broad-leaved trees	2013

APPENDIX 2: INVERTEBRATE STATUS CODES

Earlier published reviews of scarce and threatened invertebrates employed the Red Data Book criteria used in the British Insect Red Data Book (Shirt 1987) with the addition of the category RDBK (Insufficiently Known) after in 1983. In addition, the status category Nationally Notable (now termed Nationally Scarce) was used from 1991. The original criteria of the International Union for the Conservation of Nature (IUCN – now called the World Conservation Union) for assigning threat status used in these publications had the categories *Endangered, Vulnerable,* and *Rare,* which were defined rather loosely and without quantitative parameters. The application of these categories was largely a matter of subjective judgment, and it was not easy to apply them consistently within a taxonomic group or to make comparisons between groups of different organisms. The deficiencies of the old system were recognised internationally, and in the mid-1980s proposals were made to replace it with a new approach which could be more objectively and consistently applied. In 1989, the lUCN's Species Survival Commission Steering Committee requested that a new set of criteria be developed to provide an objective framework for the classification of species according to their extinction risk. The first, provisional, outline of the new system was published in 1991. This was followed by a series of revisions, and the final version adopted as the global standard by the IUCN Council in December 1994. The guidelines were recommended for use also at the national level. In 1995, the Joint Nature Conservation Committee (JNCC) endorsed their use as the new national standard for Great Britain, and subsequent British Red Data Books have used these revised IUCN criteria. These criteria are used in this present report and are as follows:

EXTINCT (EX) A species is *Extinct* when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD A species is *Extinct* in the wild when it is known to survive only in cultivation, in captivity or as a naturalised population (or populations) well outside the past range.

CRITICALLY ENDANGERED
A species is *Critically Endangered* when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria:

A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on direct observation, an index of abundance appropriate for the species, a decline in area of occupancy, extent of occurrence and/or quality of habitat, actual or potential levels of exploitation or the effects of introduced species, hybridisation, pathogens, pollutants, competitors or parasites.
2. A reduction of at least 80%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based any of these parameters.

B. Extent of occurrence estimated to be less than 100 Km^2 or areas of occupancy estimated to be less than 10 Km^2 and estimates indicating any <u>two</u> of the following:

1. Severely fragmented or known to exist at only a single location.
2. Continuing decline, observed, inferred or projected, in any of the following: a. extent of occurrence b. area of occupancy c. area, extent and/or quality of habitat d. number of locations or sub-populations e. number of mature individuals
3. Extreme fluctuations in extent of occurrence, area of occupancy, number of locations or sub-populations or number of mature individuals.

C. Population estimated to number less than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within 3 years or one generation, whichever is longer or
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either severely fragmented *(i.e.* no sub-population estimated to contain more than 50 mature individuals) or all individuals are in a single sub-population

D. British population estimated to number less than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild of at least 50% within 10 years or 3 generations, whichever is the longer.

ENDANGERED (Formerly RDB category 1)

A species is Endangered when it is not *Critically Endangered* but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria:

A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on direct observation, an index of abundance appropriate for the species, a decline in area of occupancy, extent of occurrence and/or quality of habitat, actual or potential levels of exploitation or the effects of introduced species, hybridisation, pathogens, pollutants, competitors or parasites.
2. A reduction of at least 50%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based any of these parameters.

B. Extent of occurrence estimated to be less than 5,000 Km^2 or areas of occupancy estimated to be less than 10 Km^2 and estimates indicating any <u>two</u> of the following:

1. Severely fragmented or known to exist at no more than five locations.
2. Continuing decline, observed, inferred or projected, in extent of occurrence, area of occupancy, area, extent and/or quality of habitat, number of locations or sub-populations or the number of mature individuals.

C. Population estimated to number less than 2500 mature individuals and either:

1. An estimated continuing decline of at least 20% within 5 years or 2 generations, whichever is longer or
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either severely fragmented *(i.e.* no sub-population estimated to contain more than 250 mature individuals) or all individuals are in a single sub-population

D. British population estimated to number less than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild of at least 20% within 20 years or 5 generations, whichever is the longer..

VULNERABLE (Formerly RDB category 2)

A species is *Vulnerable* when it is not *Critically Endangered or Endangered but* is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on direct observation, an index of abundance appropriate for the species, a decline in area of occupancy, extent of occurrence and/or quality of habitat, actual or potential levels of exploitation or the effects of introduced species, hybridisation, pathogens, pollutants, competitors or parasites.
2. A reduction of at least 20%, projected or suspected to be met within the 10 years or three generations, whichever is the longer, based any of these parameters.

B. Extent of occurrence estimated to be less than 20,000 Km^2 or areas of occupancy estimated to be less than 20,000 Km^2 and estimates indicating any <u>two</u> of the following:

1. Severely fragmented or known to exist at no more than ten locations. Continuing decline, observed, inferred or projected, in extent of occurrence, area of occupancy, area, extent and/or quality of habitat, number of locations or sub-populations or the number of mature individuals.
2. Extreme fluctuations in extent of occurrence, area of occupancy, number of locations or sub-populations or number of mature individuals.

C. Population estimated to number less than 10,000 mature individuals and either:

1. An estimated continuing decline of at least 10% within 10 years or 3 generations, whichever is longer or
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either severely fragmented *(i.e.* no sub-population estimated to contain more than 1000 mature individuals) or all individuals are in a single sub-population

D. Population very small or restricted in the form of either of the following:

1. Population estimated to number less than 1,000 mature individuals.
2. Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km) or in the number of locations (typically less than 5). Such a species would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming *Critically Endangered* or even *Extinct* in a very short period.

E. Quantitative analysis showing the probability of extinction in the wild of at least 10% within 100 years.

LOWER RISK (Formerly RDB category 3)

A species is Lower Risk when it has been evaluated but does not satisfy the criteria for any of the categories *Critically Endangered, Endangered* or *Vulnerable.* Species included in the Lower Risk category can be separated into three sub-categories:

• **Conservation Dependent** species which are the focus of a continuing species -specific or habitat-specific conservation program targeted towards the species in question, the cessation of which would result in the species qualifying for one of the threatened categories above within a period of five years.

• **Near Threatened** Species which do not qualify for *Lower Risk (Conservation Dependent),* but which are close to qualifying for *Vulnerable.*

• **Least Concern**
Species which do not qualify for *Lower Risk (Conservation Dependent)* or *Lower Risk (Near Threatened).*

DATA DEFICIENT A species is *Data Deficient* when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A species in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. *Data Deficient* is therefore not a category of threat or Lower Risk.

LOWER RISK (NATIONALLY SCARCE – FORMERLY NATIONALLY NOTABLE)

Species which are not included within the IUCN threat categories and are estimated to occur less than 100 hectads of the Ordnance Survey national grid in Great Britain. It should be noted that Lower Risk (Nationally Scarce) is not a threat category, but rather an estimate of the extent of distribution of these species. Lower Risk species are subdivided as follows:

Na species estimated to occur within the range of 16 to 30 10-kilometre squares of the National Grid System.

Nb species estimated to occur within the range 31 to 100 10-kilometre squares of the National Grid System.

N Diptera (flies) not separated, falling into either category Na or Nb.

NATIONALLY LOCAL (L)

Species which, whilst fairly common, are evidently less widespread than truly common species, but also not qualifying as Nationally Notable having been recorded from over one hundred, but less than three hundred, ten-kilometre squares of the UK National Grid.

ASSOCIATED DEFINITIONS

Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a species, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of species (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

Area of occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a species, excluding cases of vagrancy. The measure reflects the fact that a species will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a species *(e.g.* colonial nesting sites, feeding sites for migratory species). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the species. The criteria include values in km^2, and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small.

APPENDIX 3: THIRD PARTY REPORT ON SURVEYS UNDERTAKEN FOR BROWN AND BLACK HAIRSTREAK BUTTERFLIES

********** Report starts **********

Butterfly Conservation
Saving butterflies, moths and their habitats

Upper Thames Branch

A Report on Branch records for

(a) the Brown Hairstreak Butterfly (*Thecla betulae*)
(b) the Black Hairstreak Butterfly (*Satyrium pruni*)

on land to the north of Gavray Drive, Bicester, Oxon.

Prepared by David Redhead (Upper Thames Branch)
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For The Environmental Dimension Partnership
Date 18th July 2011

Number of pages = 7

BUTTERFLY CONSERVATION
Company limited by guarantee, registered in England (22064688)
Registered Office: Manor yard, East Lulworth, Wareham, Dorset, BH20 5QP
Charity registered in England (254937) and in Scotland (39268)

Land North of Gavray Drive, Bicester, Oxfordshire

1. Brown Hairstreak Records.

1.1 Adult Brown Hairstreak sightings.

Date	Number of recorders	Purpose of visit	Brown Hairstreak seen	Number of other butterfly species recorded
26/08/05	6	Marsh Fritillary larval web	No	10
29/08/05	1	Marsh Fritillary larval web	No	4
01/09/06	4	Brown Hairstreak	No	6
04/09/06	1	Brown Hairstreak	No	1
06/09/07	1	Brown Hairstreak	Yes – 1 female	2
08/08/08	1	Brown Hairstreak	Yes – 1 male	8
18/09/09	1	Brown Hairstreak	No	2
02/08/10	1	Brown Hairstreak	Yes – 1 male	?

Details of 3 adult sightings.

06/09/07 – 1 female nectaring on brambles flowers growing in NW face of hedge EH (Field 12)

08/08/08 – I male flying in ash on north side of Field 7.

02/08/10 – 1 male nectaring on thistle in Field 13.

1.2 Brown Hairstreak egg surveys.

Table 1.1 – Summary of surveys

Date	Eggs found	Search hours	Locations searched	Find Rate (eggs/hour)
Winter 2002/03	0	2	Various parts of SW facing hedges – exact locations not recorded.	0.0
Winter 2003/04	Not searched.			
Winter 2004/05	Not searched.			
Winter 2005/06	16	20	All SW & SE facing hedges east of the Langford Brook. All blackthorn west of the Langford Brook.	0.8
Winter 2006/07	74	17	SW face of hedges MN, NP & RS. NW face of hedges BE, EH & HN. Field 5 accessible hedgerows and scrub.	4.4
Winter 2007/08	33	7	SW face of hedges MN & NP	4.7
Winter 2008/09	No survey*.			
Winter 2009/10	No survey*.			
Winter 2010/11	478	40	All accessible hedges east of the Langford Brook. All blackthorn west of the Langford Brook.	12.0

*During these winters rapid checks were carried out to confirm the continuing use of the site by the Brown Hairstreak for egg laying purposes. The searches were not done on a timed count basis and were terminated when a few eggs had been found.

Table 1.2 – Detailed egg counts by hedgerow (see annotated map for location of hedgerows and fields. Field numbers used are those designated when most of the site was designated as a County Wildlife site in 2002).
Table 1.2a – East of Langford Brook - Fields 1-7

Field	Boundary	Aspect	Eggs found				Estimated blackthorn
			2005/06	2006/07	2007/08	2010/11	
1	RS	SW	3	2	Not searched	16[$]	80%
	SV	W	Inaccessible				?
	UV	NE	Inaccessible				?
	RU	SE	Not searched	Not searched	Not searched	6[$$]	20%
	Scrub		Not searched	Not searched	Not searched	10[$$]	
2	PQ	SW	Inaccessible				?
	QS	W	Inaccessible				?
	RS	NE	1	Not searched	Not searched	6[$$]	20%
	PR	SE	Inaccessible				?
	Scrub		No scrub				
3	KL	SW	1			11[$$]	20%
	LQ	W	No blackthorn				0%
	PQ	NE	Not searched	Not searched	Not searched	0[$$]	20%
	KP	SE	0	Not searched	Not searched	5	20%
	Scrub		No scrub				
4		SW	Inaccessible				?
		W	No hedge				
		NE	Inaccessible				?
		SE	Inaccessible				?
	Scrub		0	Not searched	Not searched	0[$$]	
5	BC	SW	No hedge				
	CF	NW	Inaccessible				?
	EF	NE	2	1	Not searched	2[$$]	20%
	BE	SE	No blackthorn				0%
	Scrub		4	4	Not searched	24[$$]	
6	AB	SW	0	Not searched	Not searched	2	10%
	BE	NW	Not searched	Not searched	Not searched	2	50%
	DE	NE	Not searched	Not searched	Not searched	7	30%
	AD	E	No hedge				
	Scrub		Not searched	Not searched	Not searched	14[$]	
7	EF	SW	2	Not searched	Not searched	43[$]	80%
	FK	NW	Inaccessible				?
	IJK	NE	Inaccessible				?
	EI	SE	0	Not searched	Not searched	0[$]	20%
	Scrub		Not searched	Not searched	Not searched	1[$$]	

Table 1.2b – East of Langford Brook - Fields 8-13

Field	Boundary	Aspect	Eggs found				Estimated blackthorn
			2005/06	2006/07	2007/08	2010/11	
8	JK	SW	0	Not searched	Not searched	9[$]	30%
	KP	NW	Not searched	Not searched	Not searched	1[$$]	30%
	PO	NE	Not searched	Not searched	Not searched	1[$]	10%
	JO	SE	0	Not searched	Not searched	27[$$]	30%
	Scrub		No scrub				
9	IJ	SW	0	Not searched	Not searched	6[$]	30%
	JO	NW	Not searched	Not searched	Not searched	14[$$]	30%
	NO	NE	Not searched	Not searched	Not searched	0[$]	10%
	IN	SE	0	Not searched	Not searched	37[$]	30%
	Scrub		No scrub				
10	NP	SW	0	3	5	91[$]	90%
	PU	NW	Not searched	Not searched	Not searched	0[$$]	20%
	TU	NE	No blackthorn				
		SE	No hedge				
	Scrub		No scrub				
11	GH	SW	3	Not searched	Not searched	37	30%
	HN	NW	Not searched	Not searched	Not searched	8	50%
	MN	NE	Not searched	Not searched	Not searched	9	50%
	GM	E	No hedge				
	Scrub		0	Not searched	Not searched	9	
12	DE	SW	4	Not searched	Not searched	29[$]	40%
	EH	NW	Not searched	Not searched	Not searched	14[$]	50%
	GH	NE	3	Not searched	Not searched	15	30%
	DG	E	0	Not searched	Not searched	1	10%
	Scrub		No scrub				
13	MN	SW	0	30	28	21	90%
		NW	No hedge				
	MT	NE	Inaccessible and probably no blackthorn				0%?
		E	No hedge				
	Scrub		No scrub				

Table 1.2c – West of Langford Brook

Field	Boundary	Aspect	Eggs found				Estimated blackthorn	
			2005/06	2006/07	2007/08	2010/11	2002/03	2010/11
Perimeter								
	WX	SW	0	Not searched		0$	50%	No hedge*
	XA	SW	0	Not searched		0$	10%	No hedge*
	ADGM	NW	No hedge					
	MY	NE	0	Not searched		0$	50%	No hedge*
	YX	NE	0	Not searched		0$	0%	0%
	WX	SE	0	Not searched		0$	0%	0%
Cross hedge								
	XY	W	0	Not searched		0$	10%	10%
	XY	E	0	Not searched		0$	10%	10%
Note: * = hedge cut down to ground during 2010 by Network Rail during fence construction.								

In Tables 2a, 2b & 2c:-

$ = This hedgerow will be affected by the proposed development by either being partially destroyed or directly abutted by the development.

$$ = This hedgerow/scrub will be totally destroyed by the development.

Thus it can be concluded from the 2010/11 survey that the egg carrying capacity of the hedgerows within the proposed development will be reduced by 19% at best and 83% at worst.

Comparing the various surveys shows that the number of eggs laid on most hedges has increased dramatically over the period between the summer of 2005 and the summer of 2010. The possible exception to the rule is the SW face of hedge MN which is one two hedge faces that has been included in every survey. This showed its maximum count in 2006/2007 since when it appears to have deteriorated with the 2010/11 count being 21. This is due to the growth of scrub and trees in field 13 which has resulted in shading of the hedge. The recent footpath clearance has improved this situation. It is actually one of the few hedge faces that should benefit from the proposed development as the area to the south will be totally cleared and occupied by the new newt ponds.

Overall it is anticipated that the proposed development, as it stands, will halve the egg carrying capacity of the existing hedgerows.

1.3 Other relevant Brown Hairstreak egg surveys.

1.3.1 Railway embankment north of Gavray Drive Meadows.

This is inaccessible. The south side of the embankment is mainly trees and non-blackthorn scrub. What little blackthorn there was at the bottom of the embankment was cut down when Network Rail installed their new fence in 2010. There is more blackthorn on the north side of the embankment and in places its extremities are accessible where it has grown beyond the fence. This was searched in the winter of 2005/06 and 2007/08 and no eggs were found. Probably not used because it is north-facing. To the east of Bicester ring road the embankment was totally cleared and there is no blackthorn as far as and beyond where the footpath crosses the railway line.

1.3.2 County Wildlife Site to east of Bicester ring road.

Overall this contains a lower density of blackthorn than the proposed development site and much of it is contained in two large thickets of mature blackthorn. The accessible blackthorn here was surveyed in the winter of 2005/06 and 2 eggs were found in 2 hours of searching.

1.3.3 Bicester Fields.

This is the green space in Langford Village either side of the Langford Brook and immediately to the south of the proposed development site. There is a considerable amount of blackthorn in the northern quarter of the site but very little elsewhere. The blackthorn here has been surveyed twice –
Winter of 2007/08: 0 eggs found in 3 hours of searching.
Winter of 2008/09: 12 eggs found in 10 hours of searching (Find rate = 1.2 eggs/hour.
The site is considered to contain too little blackthorn and too few ash and oak trees to develop into a core site in its own right. The blackthorn in the north of site should be considered as a useful extension to the ideal habitat to be found in the land north of Gavray Drive and to the east of the Langford Brook.

1.3.4 Bicester Airfield.

This site lies 1.5km due north of Gavray Drive Meadows. It contains a very large stand of blackthorn in its southern quarter but no ash or oak trees. Permission was obtained from the MoD to survey the blackthorn in the winter of 2009/10.
Winter of 2009/10: 10 eggs found in 15 hours of searching. Find rate = 0.7 eggs/hour.
This site does not have the potential to develop into a core site for the Brown Hairstreak owing to the lack of ash and oak trees. Its current usage prohibits the planting of ash or oak trees in appropriate areas.

1.3.5 Other locations in and around Bicester.

We are having increasing success in finding eggs in the Bicester area and finding eggs further north and west. In a northerly direction we added Stratton Audley Quarry to the portfolio in the winter of 2009/10. To the west we have been visiting Bure Park in Bicester on an annual basis since the winter of 2006/07. The first eggs were found there in the winter of 2008/09 and further egg finds have occurred in the subsequent two winters. We hope to carry out a more extensive survey of Bure Park in the winter of 2011/12. Eggs have now been found to the NW of Bicester and just into the site for the proposed NW Bicester Ecotown. However, none of these locations rival Gavray Drive Meadows to the east of the Langford Brook in their suitability as a core site for the Brown Hairstreak. None have the density of blackthorn that Gavray Drive Meadows has and many lack the essential ash and oak trees.

2. Black Hairstreak Records.

Date	Number of recorders	Purpose of visit	Black Hairstreak seen	Number of other butterfly species recorded
18/06/05	1	Butterflies & day flying moths	No	4
08/06/06	1	Marsh Fritillary	No	7
10/06/06	1	Marsh Fritillary	No	3
20/06/06	3	White-letter Hairstreak	Yes - 2	8
25/06/06	1	Black Hairstreak	No	8
27/06/06	2	Black Hairstreak	Yes - 3	11
15/06/07	6	Black Hairstreak	Yes - 3	8
15/06/08	5	Black Hairstreak	Yes - 2	1
24/06/08	1	Black Hairstreak	No	6
18/06/09	1	Black Hairstreak	No	8
22/06/10	6	Black Hairstreak	Yes -1	?

03/06/11	1	Black Hairstreak	No	2
10/06/11	1	Black Hairstreak	No	?

Details of Black Hairstreak sightings.

20/06/06 – Both seen nectaring on bramble flowers growing in NW face of hedge EH at east end of Field 12.

27/06/06 – Two seen nectaring on bramble flowers growing in NW face of hedge EH at east end of Field 12. Third flying over blackthorn scrub in Field 1.

15/06/07 – Two flying over blackthorn at very eastern end of hedge GH separating Fields 11 & 12. One nectaring on bramble flowers growing in hedge HN at east end of Field 12.

15/06/08 – One seen nectaring on bramble flowers growing in SW face of hedge EH. One flying in oak tree growing on north side of hedge NP – about third of the way along the hedge.

22/06/10 – One settled on blackthorn comprising SW face of hedge NP – just to west of oak tree where one of sightings made on 15/06/08 (see above).

Summary of locations of Black Hairstreak sightings.

Total number of sightings = 11.

Associated with hedge EH and east end of hedge GH = 8 (73%)

Associated with hedge NP = 2 (18%)

Seen in field 1 = 1 (9%)

Hedge EH will be severely affected by the proposed development with a service road being driven through it and much of it directly abutted by the development. Hedge NP will be abutted by the development on both sides. Nearly all the blackthorn associated with field 1 will be destroyed by the development.

********** **end of third party report** **********

APPENDIX 4: AQUATIC INVERTEBRATE SPECIES RECORDED

National status codes are explained in Appendix 2.

Group / species	National status	Location	
		stream	ditches & wheel ruts
COLEOPTERA			
Dytiscidae			
Agabus bipustulatus		+	+
Agabus paludosus			+
Agabus uliginosus			+
Hydroporus memnonius			+
Hydroporus nigrita			+
Hydroporus palustris		+	+
Hydroporus pubescens		+	+
Hydrophilidae			
Helophorus aequalis			+
Helophorus alternans			+
DIPTERA			
Syrphidae			
Eristalis species larvae		+	
Tipulidae			
Larvae		+	
HETEROPTERA			
Gerridae			
Gerris spp. nymphs		+	
Naucoridae			
Ilyocoris cimicoides			+
Notonectidae			
Notonecta glauca			+

Annex EDP 5
Survey and Evaluation of the Night-Flying Macro and Micro-Moth Fauna of Land at Gavray Drive, Bicester
Jon Mellings and Peter Cranswick JMed10112014_Final

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Survey and evaluation of the night –flying macro and micro-moth fauna of Land at Gavray Drive, Bicester

Land northeast of Gavray Drive, Bicester, Oxfordshire.

A report by Jon Mellings and Peter Cranswick for EDP Ltd, 23rd October, 2014

1. Contents

2. Summary

Jon Mellings was commissioned by the Environmental Dimension Partnership Ltd to undertake a survey and evaluation of the night-flying macro and micro moth fauna on Land at Gavray Drive, Bicester, Oxfordshire.The moth survey was commissioned in early June, 2014 and subsequent fieldwork was carried out over five sampling events between mid-June and early October 2014.

The survey area comprising fields to the east of Langford Brook, and including Gavray Drive Meadows LWS, was found to support a moth population of Regional Importance. 24 Species of Principal Importance, Nationally Scarce species and a SAT Epiphyte Fauna achieving Favourable Condition Status.

If the recorded invertebrate fauna for the site is considered as a whole, however, including the species reported in Plant (2013) and Redhead (2011) the Gavray Drive Meadow site to the south east of Langford Brook was found to support an invertebrate fauna of at least Regional Importance.

As part of the study, the conservation value of the site was considered in relation to the wider landscape as well as on a within site habitat scale.

Gavray Drive Meadows is subject to the non-statutory designation of Local Wildlife Site and comprises part of the River Ray Conservation Target Area (CTA), implemented at a county level in response to paragraph 117 of the National Planning Policy Framework.

Key habitat features on site include the wealth of mature, species-rich hedgerows, supporting many standard trees, such as Pedunculate Oaks as well as historic wet meadowland supporting a flora characteristic of habitat which has become fragmented in the wider landscape, due largely to agricultural intensification.

In view of the intrinsic conservation value of the site, the moth and other invertebrate assemblages it supports, its habitat and position within the wider landscape, it is recommended that the approach to any development on the site is considered with extreme care in order to minimise any loss and that adequate compensation for any loss is undertaken through mitigation.

3. Introduction

A survey and assessment of the conservation value of night-flying moths has been requested to inform an Ecological Impact Assessment (EcIA) of an area of habitat to the north of Gavray Drive, Bicester. The survey area comprises a network of old pasture and wet grassland divided by mature hedgerows with native broadleaved standard trees. The survey area includes land to the east of Langford Brook, part of which is currently occupied by Gavray Drive Meadows Local Wildlife Site (LWS) and forms part of the River Ray Conservation Target Area (CTA), one of a network of landscape scale areas targeted for wildlife conservation in accordance with the National Planning Policy Framework paragraph 117 (BBOWT, 2014).

The main purpose of the survey was to adequately record the diversity of night-flying moths occurring on site for the purpose of informing the EcIA in relation to a proposed residential development on site. The survey will be used to supplement existing ecological data collected for the purpose of the project including a general entomological survey report conducted on behalf of EDP by Colin Plant Associates (2013).

In order to fulfill the aims of the project, sampling was undertaken over five survey events distributed throughout the summer of 2014. Sampling was undertaken within a sufficient habitat range to maximise the chances of obtaining a representative species list from the site.

As the sampling did not commence prior to mid-June, 2014, certain early season moth species will have been missed by the survey. However, the largest number of British moth species (more than half the UK fauna) are on the wing between May and September (Fry and Waring, 2001), and therefore the survey results are not considered to have been significantly seasonally constrained.

Unlike the majority of invertebrate species groups, site lists for moths are frequently exhaustive, being derived from years of regular mercury vapour trapping events. Such long term data sets are not available for the purpose of this project. Analysis and evaluation of data for comparison purposes would, therefore, need to take this into account.

The following report includes a methodology, results section, discussion and evaluation of the conservation value of the site based on findings and existing site-specific and generic information of relevance to the broader context and conservation objectives. Recorded datasets, output of Invertebrate Species-habitats Information System (ISIS) and a site map showing moth trap locations are included within the Appendices.

4. Aims and objectives

The primary aim of the project was to evaluate the conservation value of the recorded moth population occurring on land to the northeast of Gavray Drive and immediately east of the Langford Brook, which defines the western boundary of the survey area, including Gavray Drive Meadows LWS. The aim has been fulfilled by completion of the following objectives:

Objectives

1. Completion of a desk study to evaluate the site's ecological position in a landscape context, especially in terms of habitat designations of neighbouring land and in relation to existing, invertebrate-specific, environmental records;
2. Completion of fieldwork comprising overnight light trapping of moths at an appropriate resolution to reasonably describe the site's night-flying macro and micro moth fauna;

3. *In situ* and *ex situ* identification and recording of moth species and subsequent analysis of data using standard indices;
4. Production of the following report including findings, an evaluation of key habitat and species assemblages and appraisal of the conservation value of the site for invertebrates.

5. Methodology

Desk study

The following generic and site-specific literature was consulted and used to add context to site specific moth data collected for the purpose of this project:

- Species records supplied to EDP by Thames Valley Environmental Records Centre (TVERC) in 2010, and updated in June 2013;
- Citations for international designations within 5km of the site, and statutory and non-statutory designations within 2km of the site;
- Existing survey reports including an entomological survey report produced to inform the EcIA by Colin Plant Associates (2013);
- Biodiversity and Planning in Oxfordshire – a PDF document available online at: https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/environmentandplanning/countryside/naturalenvironment/Wholedocument.pdf

The study aims to consider the moth fauna recorded on site at both a local landscape scale and UK wide context.

Fieldwork

The survey followed standard methods for the capture and recording of night-flying moth species as described in Fry and Waring (2001), and a manual recommended within Natural England Research Report NERR005, 'surveying terrestrial and freshwater invertebrates for conservation evaluation' (Drake *et al*, 2007). Both documents are recommended within the Chartered Institute of Ecology and Environmental Management (CIEEM)'s Technical Guidance Series for survey of terrestrial invertebrates.

The survey method involves the use of standard light traps designed specifically for the purpose of capturing moth species which are attracted to light. Many moths can be identified visually and without the aid of microscopic dissection, therefore, the majority of specimens can be released following *in situ* identification. However, collection of specimens of certain taxa for *ex situ* identification is necessary in some cases.

Survey area

At the outset of the initial June survey the entire site was walked to inform the optimal positioning of light traps. Decisions were based primarily on habitat quality and representativeness. Parameters such as proximity to street lighting and human thoroughfares were also taken into account (street lighting can compromise the effectiveness of light trapping).

The survey focused on the area of the site to the east of Langford Brook comprising rough, unmanaged grassland interspersed with scrub with wooded field boundaries; the survey area included, but was not limited to, the footprint of the Gavray Drive Meadows LWS so as to provide a representative assessment of the value of the whole site.

The area to the west of Langford Brook comprised intensive arable land with limited habitat opportunities for moths and was excluded from the survey area at the outset due to its low ecological value.

Trapping

Fieldwork comprised a series of five, evenly spaced trapping sessions undertaken on the nights of 21st June, 18th July, 1st August, 22nd August and 3rd October 2014. On each occasion traps were set at the onset of dusk and emptied and the species recorded in the early morning typically from approximately six am onwards. Identification was generally concluded by 11am at the latest.

Care was taken to undertake surveys only during predicted periods of optimal weather. Where possible, trapping was undertaken during nights when conditions appeared optimal as stated within Fry and Waring (2001) i.e. mild, still, cloudy nights with minimal moonlight. No trapping was undertaken during windy weather, however, showers were experienced during one or two of the survey nights. Fry and Waring (2001) state that 'moth activity is not necessarily affected by rain'.

Traps used included industry standard Robinson traps fitted with 125W mercury vapour (MV) bulbs. In addition, two actinic Heath traps were also deployed on one occasion. MV traps require a 240V power supply and therefore, petrol generators were required to run the traps in areas remote from a mains supply. Prior to operation, the base (catching chamber) of each trap was lined with 30cm x 30cm cardboard egg trays cut in half and arranged around the central axis of the base in accordance with recommendations in Fry and Waring (2001). After landing within the trap, moths crawl into the crevices of these boxes and remain stationary until the contents of the traps are examined.

In order to reasonably cover the representative habitats and key areas of the site, four MV traps were deployed on each survey occasion bar one, two running from each generator. Trap locations, and survey dates, are provided within Table 1 Appendix 1. The exception was the survey of the 18th July when due to the failure of one of the generators, only three MV traps were set, these being powered by a single generator. On this survey two actinic Heath traps were also deployed (see below). 1KVA generators, which are both portable, quiet and capable of running for sufficient time to cover the dusk to dawn period were used. However, generators were usually topped up with petrol at around midnight as insurance.

Generators were each located in suitable habitat at a central location, enabling two traps to be deployed in different positions within a 100 metre radius on either side of the generator. Typically a generator was located within a hedge boundary enabling each trap to be deployed within a separate field, therefore ensuring coverage of a greater range of habitat. Positioning the generator within a boundary hedge also enabled the generators to be secured with heavy duty bicycle locks to hedgerow trees to minimise the possibility of theft.

Power cables were fitted with RCD circuit breaker trip switches. And traps were checked after several hours of running to ensure lamps and generators were running effectively.

In addition to MV traps, two actinic Heath traps were deployed in more remote parts of the site on the survey of the 18th July survey. Actinic traps do not require a 240V supply and can be operated using a standard 12V car or motorcycle battery. Actinic traps are not as effective at producing large catches as MV traps, but are useful for sampling in inaccessible areas. During the July survey the Heath traps were located within close proximity to a group of mature/veteran hedgerow Pedunculate Oak *Quercus robur*.

Appendix 1, Table 1 provides a brief description of each trap location over the survey period and includes 10 figure grid references obtained using a basic Garmin Etrex Global Positioning System (GPS) device. Detailed habitat descriptions pertaining to each moth trap location are included in Appendix 1, Table 2. Approximate positions of traps over the survey period are detailed in the site map Appendix 2, Figure 1. For the most part the same trapping locations were reused over the survey period; however, traps producing relatively small catches during the earlier survey events were relocated during subsequent events.

Identification of specimens

During the early morning following a night of trapping, the contents of each trap was examined in turn. One operative relaying the species names as found to the other operative acting as scribe. A tally of the number of individuals of each species recorded per trap was also recorded. Initially the ground surrounding the trap and outside of the trap was examined for moths which had alighted within the grass, side of the trap etc. A collapsable cake cover inverted over the top of the trap was used to minimise loss of moths escaping from the trap once the lid had been removed. Where *in situ* identification was not practical, the specimen in question was contained within a coded specimen tube for *ex situ* identification. The code of the tube was then recorded enabling a tally of repeats of the species to be recorded.

Whilst the vast majority of macro moths were recorded on site without the need to consult reference material, occasionally reference sources including Waring and Townsend (2003) and Sterling and Parsons (2012) were consulted in the field.

Collected specimens were identified *ex situ* and retrofitted to the existing data set, these were killed humanely and retained as voucher specimens where necessary. Species identified in the field were released following identification. Care was taken to ensure specimens were reasonably distributed within the surrounding vegetation, ensuring that undue predation by birds was not an issue in accordance with recommendations outlined in Fry and Waring (2001).

Data analysis

Data was recorded in an Excel spreadsheet as well as a Mapmate (2010) database.

Species data from each trapping site was entered into a spreadsheet. Data recorded includes the species recorded, date, trap number, current conservation status and name of the recorder. The location of each trap was geo-referenced and marked on a map (Appendix 2, Fig 1).

Invertebrate Species-habitats Information System (ISIS)

ISIS is a computer based application developed by Natural England for the recognition and scoring of invertebrate assemblage types. This protocol is becoming a standard method for evaluating the conservation value and monitoring of invertebrate communities for the purpose of Common Standards Monitoring. Whilst it is mainly used for multi-taxa analysis, moths (Lepidoptera) are a target group for assessing Arboreal Canopy assemblages within ISIS.

A summary of ISIS is included below as a means of explaining the terms and interpretation in the subsequent sections of the report. The theory and practice of ISIS (2007 version) is explained in greater detail in Lott *et al*, 2007. The workings of the most recent available ISIS (2010) version are largely unchanged, however, explanations of refinements may be obtainable on request from Natural England.

ISIS recognises invertebrate assemblage types in species lists collected at scales ranging from management compartment to landscape character area. The assemblage types are labelled in terms that relate to their

favoured habitats in order to make them accessible to non-specialists. However, they are actually defined by lists of characteristic species that are generally found together in nature.

Two levels are recognised in the classification. Broad assemblage types (BATs) are a comprehensive series of assemblage types that are characterised by more widespread species. They can be expressed in lists from a wide range of sites. Specific assemblage types (SATs) are characterised by ecologically restricted species and are generally only expressed in lists from sites with conservation value. Since 2008 there has also been a third category of assemblage types that cut across this classification. They are mainly defined by lists of species dependent on a particular environmental resource, such as flowers as a source of pollen and nectar.

For any set of samples, ISIS scores each recognised assemblage type for representation and conservation value. Some of the scoring systems used in ISIS can be influenced by target group, sampling effort or seasonal factors. (Note an explanation of the scores used to define BATs and SATs is included in Appendix 1, Table 3).

In ISIS, a BAT is derived from a defined group of any species, both common and rare recognised within a species list due to exhibiting a shared affinity for a defined broad habitat.

For example, the Arboreal Canopy BAT includes species with a greater association with a tree canopy than for any other habitat, such as moths the larvae of which may only feed on one or more species of tree.

In addition to attributing a group of species to a given BAT assemblage, or series of BAT assemblages, Rarity Scores based on the species listed are also generated for each BAT. Rarity Scores in ISIS are based on Species Quality Indices (SQI) an index which has been historically used to define the conservation status of an assemblage based on rarity value.

In basic terms, an individual BAT with a large number of species attributed to it, may achieve a low rarity score if the species making up the community are largely common, conversely, a small sample size with a high proportion of rare and uncommon species may register a higher rarity score.

SATs are usually nested within a parent BAT, for example,

For the purpose of the current project ISIS analysis was undertaken as follows:

1) Firstly data collected only from the current (2014) moth survey were analysed as a stand alone dataset;
2) A second analysis was also undertaken in which the 2014 moth survey data was combined with general invertebrate survey datasets collected on site by third parties for the purpose of this project. These datasets included survey data collected by Colin Plant Associates in 2005 and 2013 and butterfly transect data included within Redhead, 2011.

The results of these separate ISIS analyses are discussed separately and a separate conservation evaluation is firstly based on the results of the current (2014 moth only) survey and secondly for the combined data specified in (2) above.

A qualitative approach described in a document by Colin Plant Associates – Criteria used to define significance of invertebrate habitat – was consulted in evaluating the conservation significance of the site. This document is available through the CIEEM website at:

http://www.cieem.net/data/files/Resource_Library/Technical_Guidance_Series/SoSM/Colin_-_Invertebrates.pdf

This categorises invertebrate populations on value of habitat and number and category of rare (RDB and Nationally Scarce) species and classes assemblages in terms of 'International', 'National', 'Regional', 'County', 'District', 'Local' and 'Low' significance.

It does not however take into account NERC Act (2006) Section 41, Species of Principal Importance which constitute material considerations in planning terms. Species of Principal Importance recorded during the survey are discussed.

6. Results

Landscape context

The site is not covered by any statutory designated sites, nor do any exist within the standard 2 km search area around the study area.

Sites of Special Scientific interest (SSSI)

The nearest SSSI designated for its nature conservation value is Arncott Bridge Meadows SSSI, which lies approximately 3.5 km south of the site. Arncott Bridge Meadows is designated primarily for supporting old floodplain ridge and furrow grassland of high botanical interest. Ardley Cutting and Quarry SSSI, designated for both its geological and biological interest including limestone grassland, scrub, ancient woodland and wetland habitat as well as a rich invertebrate fauna, lies approximately 4.5 km to the northwest of the site; Long Herdon Meadow SSSI, lies approximately 5km southeast of the site is an alluvial meadow subject to winter and spring flooding which supports diverse mesotrophic (MG4) wet grassland; Wendlebury Meads and Mansmoor Closes SSSI, 5.8 km southwest, supports diverse lowland mesotrophic grassland communities on ridge and furrow subject to occasional flooding.

Local Nature Reserves (LNR)
Sites designated for their nature conservation interest in close proximity to the site include Bure Park Local Nature Reserve (LNR) which lies 1.5km west of the site and comprises meadowland, broadleaved woodland and scrub habitats.

Local Wildlife Sites (LWS)
Local wildlife sites are defined on the TVERC website as 'areas which include important and rare habitats and species. 'LWS are protected from harmful development through the planning system'.
http://www.tverc.org/cms/content/local-wildlife-sites

The following LWS were recorded within the TVERC search area for the purpose of this project:

- Gavray Drive Meadows LWS includes the survey site and an additional compartment to the southeast separated by Charbridge Lane;
- Meadows northwest of Blackthorn Hill LWS (lowland meadows BAP priority habitat) lies 1km southeast of the site;
- Bicester Airfield LWS (comprises deciduous woodland, grassland and scrub) lies 1.25km north of the site;

- Graven Hill LWS (comprises deciduous woodland BAP priority habitat) 1.7km south of the site.

Conservation Target Areas (CTA)
Gavray Drive Meadows forms part of the Ray Conservation Target Area (CTA). BBOWT *et al* (2014) describe CTAs as areas which 'identify the most important areas for wildlife conservation in Oxfordshire, where targeted conservation action will have the greatest benefit.'

Summary

Whilst the designated sites listed above which lie outside of the site are not considered to be at risk of adverse impact from the proposed development of the site, these designated sites lie within the flying distance of many of the moth species recorded and may be important in terms of supporting metapopulations in the wider landscape. These designated sites, in combination with land at Gavray Drive, provide habitat 'stepping stones' in the context of the wider landscape.

Historic moth records

Records of moth species listed within a data search conducted by Thames Valley Environmental Records Centre (TVERC) for EDP for the purpose of the EIA are included in Appendix 1, Table 4.

Protected Species
No moth species were included as priority species within the original Oxford LBAP, however, there are recent records from a site north of Oxford (within approximately 15km of the site) Oxfordshire for the extremely rare Barberry Carpet *Pareulype berberata* which is fully protected in the UK under Schedule 5 of the Wildlife and Countryside Act (1981). Barberry Carpet is classified as Nationally Endangered in the using pre-1994 IUCN criteria and is included as a Species of Principal Importance under the NERC Act, Section 41.

There are no records of the foodplant Barberry *Berberis vulgaris* on site and therefore, the likelihood of the species occurring on site is negligible.

TVERC Data search
All but one of the TVERC species records were recorded in June, 2004 from Bicester Airport, with 12 species records from approximately 1.5km north of the Gavray Drive Meadows LWS. The remaining record was for adult Cinnabar Moth *Tyria jacobaeae,* recorded from habitat immediately to the east of the Gavray Drive Meadows site, from which it is separated by Charbridge Lane. However, no moth records were reported from the study site itself within the TVERC data provided.

The species listed are all listed as Species of Principal Importance under Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2007. All species are listed within the 'Research Only' category of the NERC Act (2007). No species included within the TVERC list are protected under any other UK or International legislation or are classed as Red Data Book (RDB) or Nationally Scarce in the UK.

Colin Plant Associates (2013) moth records
29 species of moth were recorded on site in a general entomological survey conducted for the purpose of the current project by Plant (2013).

Of the moths recorded four species are included as Species of Principal Importance within S41 of the NERC Act. Three of these species, namely Shaded Broad-bar *Scotopteryx chenopodiata*, Blood-vein *Timandra comae* and Mother Shipton *Callistege mi* have been added as 'Research Only' category of the NERC Act (2007), whilst the remaining species, the Forester Moth *Adscita statices* was originally included on the now