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Invertebrates and their habitats in Natural Areas

Volume 1 - Midland and Northern Areas

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Invertebrates and their habitats in Natural Areas

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This volume covers terrestrial Natural Areas numbered
1 - 61 and coastal areas numbered 98 - 105 and 117 - 120.

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Introduction

With about 30,000 species in Britain, invertebrates are an important element of our wildlife. Rather than ignore them as too large a problem to tackle, some way is needed of breaking the subject down to issues of manageable proportions and that can then be given the appropriate level of priority. The Biodiversity Action Plan (BAP) and Habitats and Species Directive (HSD) take one approach of simplifying the vastness by selecting a few of the threatened species for action (Biodiversity Steering Group, 1995; The Council of European Communities, 1992). Another approach has been attempted here which highlights the features of most importance to invertebrates at a local scale, thus helping to concentrate effort where is will have the greatest benefit. A bald list of priority features needs some explantation. This has been achieved by listing the key requirements and by providing examples of uncommon species that the feature supports.

As the BAP is now central to delivery of species conservation in Britain, listed species have also been included so their association with key features is apparent. It is not the intention of this report to produce another set of species lists - the names given here are examples only. It is hoped that action will be directed towards the maintenance of habitat features, and not to the individual species (apart from BAP species).

The framework for action at a local level within English Nature is the Natural Areas. These are parts of England with similar types of wildlife and natural features and often share similar landscapes. While it would be rash to describe the present work as profiles of invertebrates for each natural area, the tabulations are a simplification of a complex field and may make the task of conserving invertebrates more accessible to non-specialists.

The Tables

For each of the 120 natural areas tabulations were produced with the following structure.

Column 1. These are the habitat features identified by Local Teams (1996 listing). Other features of importance to invertebrates were added if the presence of assemblages of uncommon invertebrates suggested that important habitats were missing from Local Team's list.

Column 2. Important groups of invertebrates for the habitat feature. These almost invariably include the five big orders of insects (beetles, flies, moths, bugs and bees & wasps) for most habitats. Some division of these into smaller taxonomic or functional groups has sometimes been possible, for example water beetles or insects of dead wood.

Column 3. Examples of rare or scarce species, or those appearing in conservation lists, known from the natural area. BAP species are in bold type.

Species likely to be found in these habitat features were selected from the Invertebrate Site Register (see below) using species accounts and personal knowledge as a guide. It was obvious that not all species could be listed for well worked areas because most species names are meaningless to most readers. A subjective selection was made of species that met one or more of the following criteria:

- nationally notable or rare (although a few charismatic local species were included if they were particularly characteristic of an area)
- included on Schedule 5 of the Wildlife & Countryside Act, HSD or BAP short list and first revision (1997) of the middle list;
- representative of the habitat features;
- conspicuous, so they help to convey a message to non-specialists; small, dull and taxonomically obscure species and groups were usually left out unless they were particularly rare);
- recorded since 1970, so only moderately recent records are included (with a few exceptions among BAP species).

Nearly all the records were obtained from the Invertebrate Site Register (ISR). Some species were included on the recommendation of Local Teams or local entomologists. The source and validity of these records has not been checked, nor have they been entered into the ISR. No account was taken of the list presented by ENTEC (1997) as this contains a number of unchecked errors. Records of BAP species held in the ISR is almost certainly incomplete, especially for the more widespread species..

The scientific names used are those in the 1997 version of Recorder (a few have since been changed).

The national status of each species is given after the name. These follow (Key, 1994).

RDB - Red Data Book (with categories 1: endangered, 2: vulnerable, 3: rare; p = provisional for statuses that have been changed from those in Shirt (1987) or Bratton (1991), or not evaluated in these works.

N - Notable (divided for some orders into Na - thought to occur in 16-30 10km squares of the National Grid, and Nb - thought to occur in 31-100 10km squares.

Column 4. Specific needs of the majority of invertebrates living in the habitat. The key requirements are briefly summarised to help indicate features that need managing well. However, actual management has not been mentioned. This can be obtained from Kirby (1992) for most habitats.

Column 5. Significance of the feature for invertebrates, based on the quality of the assemblage of species known. Each author has subjectively assessed this from a national perspective as local, regional or national. It has not been possible to develop strict criteria to define each of the levels of significance because the data cannot support a pseudo-scientific rating. While an assessment of the importance of each feature *within* a Natural Area would also be desirable, the data are too sparse to make this evaluation.

Brief notes are sometimes given when there were obvious limitations to the data.

The Invertebrate Site Register was set up to hold records of nationally rare and scarce species (Ball, 1989, 1994a). It uses the Recorder database package (Ball, 1994b). Data from national recording schemes run under the auspices of the Biological Records Centre were not used because these are computerised for only a few groups, so while the picture for a few groups would be more detailed than provided by the ISR, it would lack breadth.

A full list of species within each area can be obtained from the ISR at Lowland Team, Northminster House, Peterborough. As the ISR contains about half a million records, it is inappropriate to print them here. Short species accounts can be obtained from any copy of Recorder.

Limitations of this analysis

There are limitations on the use of ISR to characterise areas.

- In most natural areas, many records come from a few well worked sites so those species may not be characteristic of the whole area.
- Since only rare and scarce species are included, it is not possible to comment on popular groups such as butterflies and dragonflies for which other data sets (e.g. BRC national recording schemes) would give a better indication of an area's importance.
- The database has not been systematically updated so much recent data were not available for this analysis.
- The sparseness of the data and the subjective selection of species is likely to have led to the omission of some species that may be well represented and therefore characteristic of a Natura Area. Conversely, some that have been recorded only rarely in an area may have crept in.
- Because of the vague grid references for some sites in the ISR (notably rivers), some records escaped being allocated to a Natural Area. Also, for unknown reasons, some coastal sites were not included in the coastal natural areas (although all sites on the coast should be included in the adjacent 'terrestrial' area).
- Five authors contributed to the analysis, each writing approximately the same number of areas (Table 1). This has led to some inconsistency, notably in the number of representative species selected and in rating the significance of each features.

National Context

While the tables give some measure of significance of individual features, it is helpful to have the overall interest in a Natural Area placed in a national context. The backdrop is given for BAP species and for nationally rare and scarce species. Because of the limitations of the ISR, the resulting maps should be taken to indicate broad trends and not as definitive statements about the interest in any particular area.

Biodiversity Action Plan Species

The distribution of records made since 1970 of BAP species shows, as expected, a marked concentration of records in the south of England (Figs. 1 & 2). Some areas have particularly dense representation, notably the Dorset Heaths, South Wessex Downs, New Forest and Cumbrian Fells & Dales. Other somewhat isolated areas have apparently high representation but this is usually the result of one species being well recorded within a limited range, for example the Durham Argus butterfly in the Durham Magnesian Limestone natural area. As with all summaries generated from the ISR, a lack of records may be due to inadequate data gathering or to a real trough of interest, so some care is needed in interpreting the maps. However, the overall implication of this distribution of records is that the southern counties, by and large, have the greatest responsibility for BAP species.

Nationally rare species

To gain an idea of the distribution of rare species within England, the Invertebrate Index was calculated for each Natural Area for records made since 1970. The index was developed to evaluate the interest of sites but there is no reason why it cannot be used for much larger areas, such as Natural Areas. It is the sum of points awarded to species as follows: 100 points for red data book species, and either 50 or 40 points for nationally scarce (notable) species which are subdivided into Notable A and Notable B (Key, 1994).

Cumulative indices such as the Invertebrate Index suffer the problem that more effort results in a higher value. An additional problem encountered here is that Natural Areas vary hugely in extent. To attempt to correct for this, the scores were divided by the size of each area and plotted as the quartiles (Fig. 3). Other attempts to correct for area included dividing by the number of records and by the number of sites, but neither produced a distribution of rarity that matched expectation (that is, some areas whose value is well understood by entomologists fell at the wrong end of the spectrum). The treatment is crude but is probably the simplest way of assessing rarity over England using the data available. The distribution for the index of the 'top 200' sites in England shows as much the concentration of effort as the true distribution of biodiversity hot-spots (Fig. 4).

The results, on the whole, show the expected concentration of 'rarity' in the south-east of England, and general paucity in the arable eastern lowland belt and in the Pennines where low recording as well as genuine scarcity contribute to the depression. Poor recording or failure to collate existing data account for some notable holes in the map, especially in south-west England. Some areas, for example those around Peterborough where NCC entomologists worked, appear better than expected because of assiduous collecting and data-inputting.

Acknowledgements

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Table 1. Author for the tabulation of each Natural Area (midland and northern)

		NATURAL AREA	AUTHOR
1		North Northumberland Coastal Plain	Mick Eyre
2		Border Uplands	Mick Eyre
3		Solway Basin	Martin Drake
4		North Pennines	Martin Drake
5		Northumbria Coal Measures	Peter Kirby
6		Durham Magnesian Limestone Plateau	Mick Eyre
7		Tees Lowlands	Peter Kirby
8		Yorkshire Dales	Peter Kirby
9		Eden Valley	Martin Drake
10		Cumbrian Fells and Dales	Martin Drake
11		West Cumbria Coastal Plain	Martin Drake
12		Forest of Bowland	Peter Kirby
13		Lancashire Plain and Valleys	David Gibbs
14		Southern Pennines	Peter Kirby
15		Pennine Dales Fringe	Peter Kirby
16		Vale of York and Mowbray	Mick Eyre
17		North York Moors and Hills	Peter Kirby
18		Vale of Pickering	David Gibbs
19		Yorkshire Wolds	David Gibbs
20		Holderness	David Gibbs
21		Humber Estuary	Peter Kirby
22		Humberhead Levels	Peter Kirby
23		Southern Magnesian Limestone	Peter Kirby
24		Coal Measures	Martin Drake
25		Dark Peak	Martin Drake
26		Urban Mersey Basin	David Clements
27		Mosses and Meres	Peter Kirby
28		Potteries and Churnet Valley	Peter Kirby
29		South West Peak	Martin Drake
30		White Peak	Martin Drake
31		Derbyshire Peak Fringe and Lower Derwent	Martin Drake
32		Sherwood	Martin Drake
33		Trent Valley and Rises	Peter Kirby
34		North Lincolnshire Coversands and Clay Vales	Peter Kirby
35		Lincolnshire Wolds	David Clements
36		Lincolnshire Coast and Marshes	Martin Drake
37		The Fens	Mick Eyre
38		Lincolnshire and Rutland Limestone	Martin Drake
39		Charnwood	David Clements
40		Needwood and South Derbyshire Claylands	David Clements
41		Oswestry Uplands	no data
42		Shropshire Hills	Peter Kirby
43		Midlands Plateau	Peter Kirby
44		Midland Clay pastures	Peter Kirby
45		Rockingham Forest	David Clements
46		Breckland	Martin Drake
47		North Norfolk	Peter Kirby
48		The Broads	Mick Eyre
49		Suffolk Coast and Heaths	David Gibbs
50		East Anglian Plain	Peter Kirby
51		East Anglan Chalk	Peter Kirby
52		West Anglian Plain	Peter Kirby
53		Bedfordshire Greensand Ridge	David Gibbs
54		Yardley-Whittlewood Ridge	Martin Drake

		NATURAL AREA	AUTHOR
55		Cotswolds	Peter Kirby
56		Severn and Avon Vales	Martin Drake
57		Malvern Hills and Teme Valley	Peter Kirby
58		Clun and North West Herefordshire Hills	David Gibbs
59		Central Herefordshire	David Gibbs
60		Black Mountains and Golden Valley	Martin Drake
61		Dean Plateau and Wye Valley	Martin Drake
98		Northumberland Coast	Mick Eyre
99		Tyne to Tees Coast	Mick Eyre
100		Saltburn to Bridlington	Mick Eyre
101		Bridlington to Skegness	Mick Eyre
102		The Wash	Mick Eyre
103		Old Hunstanton to Sheringham	Mick Eyre
104		Sheringham to Lowestoft	Mick Eyre
105		Suffolk Coast	Mick Eyre
117		Liverpool Bay	David Clements
118		Morecambe Bay	David Clements
119		Cumbrian Coast	David Clements
120		Solway Firth	David Clements

Natural Area: North Northumberland Coastal Plain (1)				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Coastal cliffs	Lepidoptera Coleoptera Hemiptera Hymenoptera Diptera		sparse and herb-rich flora; high proportion of exposed soil; natural erosion	local
Dune complexes	Lepidoptera Coleoptera Diptera Hemiptera	*Euxoa cursoria* Nb Coast Dart *Actebia praecox* Nb Portland Moth *Agrotis ripae* Nb Sand Dart *Mythimna litoralis* Nb Shore Wainscot *Sideridis albicolon* Nb White Colon *Photedes elymi* Na Lyme Grass *Crambus pratella* Nb a pyralid moth *Cleonus piger* Nb a weevil *Phthiria pulicaria* Notable a bee fly -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; herb-rich flora with structural diversity and bare sand patches; dune slacks with reliable winter water supply	regional
River systems and gill woodland	Coleoptera Diptera Lepidoptera Mollusca	- - **? *Dyscia fagaria* local Grey Scalloped Bar** -	wide variety of native trees and shrubs; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; seepages	local
Whin Sill outcrops	flying insects Hemiptera	- -	structural variety including open grassland and bare ground; nectar and pollen sources	local
Base rich fen	Lepidoptera Diptera Coleoptera Mollusca	***Epione parallelaria* RDB3 Dark Bordered Beauty** *Aphelia unitana* RDB2 a tortrix moth *Crambus uliginosus* Nb a pyralid moth *Stratiomys potamida* Notable a soldier fly *Orthonerva geniculata* Notable a hover fly - -	structural diversity with a mixture of vegetation heights and some bushes; herb-rich flora; high water table; reliable water supply in summer	regional
Mesotrophic grassland	flying insects Lepidoptera Hemiptera Coleoptera Diptera	-	structural variety including open grassland and bare ground; nectar and pollen sources	local
Saltmarsh	Lepidoptera Coleoptera Diptera	*Pediasia aridella* Nb a pyralid moth *Bembidion laterale* Nb a ground beetle *Ochthebius auriculatus* Nb, *O. marinus* Nb: a small water beetles *Lejogaster splendida* Notable a hoverfly	undisturbed vegetation; herb-rich flora; transitions to dry land and to freshwater	regional

Natural Area: Border uplands 2				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Rivers and streams	Coleoptera	*Deronectes latus* Nb a water beetle *Hydraena minutissima* Nb, *Ochthebius exsculptus* Nb: small water beetles *Riolus cupreus* Nb a riffle beetle	natural flow regime; clean water; a mixture of shaded and open banks; exposed gravelly sediments in normal low flows	regional
	Diptera	-		
	Mollusca	***Margaritifera margaritifera* Nb Pearl Mussel**		
	Crustacea	***Austropotamobius pallipes* local Crayfish**		
Riverine sediments	Coleoptera	***Bembidion testaceum* Nb,** *B. schueppeli* Na, *B. litorale* Nb: ground beetles *Negastrius sabulicola* RBD2 a click beetle *Georissus crenulatus* Na a scavenger water beetle *Stenus nigritulus* Nb, *Thinobius praetor* Notable: rove beetles	natural river flow regime; lack of impoundments, bank resectioning, sediment extraction; free from stock, especially cattle	national
	Diptera	***Cliorismia 'Psilocephala' rustica* RDB3 stilettofly** *Omiamina mollina* Na a weevil *Nephrotoma dorsalis* Nb a cranefly		
Standing water ponds etc.	Coleoptera	***Hydroporus rufifrons* RDB2 diving beetle** *Agabus unguicularis* Nb, *A. uliginosus* Nb, *Ilybius aenescens* Nb, *I. guttiger* Nb: diving beetles	moasaic of open and dense vegetation; shallow margins; relatively undisturbed surrounding land	regional
	Mollusca	*Lymnaea glabra* RDB2 a pond snail		
	Diptera	-		
Blanket bog	Lepidoptera	*Anartia melanopa* RDB3 Broad-bordered White Underwing ***Xestia alpicola alpina* Na Northern Dart** *Carsia sororiata anglica* Nb Manchester Treble-bar	high water table; natural vegetation in a mosaic with bare peat patches; pools; seepages	local
	Coleoptera	*Altica ericeti* Nb a leaf beetle *Hydroporus longicornis* Nb a water beetle		
	Diptera	-		
	Arachnida	-		
Raised bog border mires	Coleoptera	*Trechus rivularis* RDB3 a ground beetle *Agonum ericeti* Nb a ground beetle	high water table; natural vegetation, especially *Sphagnum*; pools; little impact of forestry or stock	national
	Lepidoptera	*Carsia sororiata anglica* Nb Manchester Treble-bar **? *Dyscia fagaria* local Grey Scalloped Bar**		
	Diptera	-		
	Hymenoptera	**? *Bombus distinguendus* Nb Great Yellow bumblebee**		

Moorland and upland	Coleoptera Diptera Homoptera	*Carabus nitens* Nb, *Pterostichus aethiops* Nb: ground beetles *Enochrus affinis* Nb a scavenger water beetle *Altica ericeti* Nb a leaf beetle - -	a mixture of heather, grassland and *Sphagnum* patches; some bare peat; not overgrazed	local
Heather communities	Coleoptera Lepidoptera	*Carabus nitens* Nb, *Miscodera arctica* Nb, *Bembidion nigricorne* Nb: ground beetles -	mosaic of patches with a range of heather ages; bare ground between heather plants; heather litter	local
Gorge woodland	Lepidoptera Diptera Coleoptera	*Furcula bicuspis* Nb Alder Kitten *Nemapogon wolffiella* Nb a micro-moth *Melangyna triangulifera* Nb a hover fly *Pterostichus cristatus* Nb a ground beetle	wide variety of native trees and shrubs; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; seepages	local

Natural Area: Solway Basin 3				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Saltmarsh Coast	Coleoptera	*Bembidion laterale* Nb, *B. lunatum* Nb, *Dyschirius nitidus* Na, *Agonum nigrum* Nb: ground beetles *Agabus conspersus* Nb, *Haliplus apicalis* Nb ,*Helophorus fulgidicollis* Nb: water-beetles *Polydrusus pulchellus* Nb sea-wormwood weevil	undisturbed and unpolluted sediments; natural tidal regime; saltmarsh communities and rhine systems; exposed mud; unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation, especially with *Aster* and *Limonium vulgare*; brackish and freshwater seepages	National
	Diptera	*Melieria cana* Nb picture-winged fly *Chersodromia cursitans* pRDB3 dance fly		
	Hemiptera	*Macrosteles sordidipennis* Nb leafhopper		
	Crustacea	-		
	Mollusca	-		
	soft-bodied invertebrates	-		
Dune and Shingle	Lepidoptera	*Adscita statices* Nb Forester moth *Aporophyla australis* Nb Feathered Brindle moth	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; herb-rich graasland with structural diversity; dune slacks with reliable winter water supply	local
	Coeloptera	*Amara lucida* Nb, *Asaphidion pallipes* Nb, *Pterostichus angustatus* Nb: ground beetles *Byrrus arietanus* Nb northern pill beetle *Agathidium marginatum* Nb round fungus-beetle *Cleonus piger* Nb, *Orthochaetes setiger* Nb, *Perapion affine* Na: weevils *Geotrupes vernalis* Nb dumbledor beetle		
	Diptera	*Chersodromia cursitans* pRDB3 dance fly		
	Hemiptera	-		

Mosses	Odonata Orthoptera Hemiptera Coeoptera Diptera Arachnida Lepidoptera	*Leucorrhinia dubia* Na White-faced Dragonfly *Metrioptera brachytera* Nb bog bush cricket *Micracanthia marginalis* Na shore bug *Paradelphacodes paludosus* Na plant hopper *Aphrodes trifasciatus* Nb, *Cicadula quinquenotata* Nb, *Cosmotettix panzeri* Nb, *Stroggylocephalus livens* Nb: leafhoppers *Acilius canaliculatus* pRDB3 water beetle *Agonum ericeti* Nb, *Cymindis vaporariorum* Nb: ground beetles *Enochrus affinis* Nb, *Hydrochus brevis* RDB3, *Hydroporus scalesianus* RDB2, *Ilybius guttiger* Nb: water beetles *Hydroporus obsoleus* Nb water beetle in springs *Hercostomus angustifrons* Nb dolichopodid fly *Sphareophoria virgata* Nb hoverfly *Centromerus levitarsis* RDB2, *Glyphesis cottonae* Na money spiders *Singa hamata* Nb orb spider ***Dyscia fagaria* local Grey Scalloped Bar**	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	national
Hay Meadows & Wet Grasslands	flying insects Lepidoptera Diptera Coleoptera	***Aricia artaxerxes* Nb Northern Brown Argus** ***Eurodryas aurinia* Nb Marsh Fritillary** - -	flowers as nectar and pollen sources; flower-heads and seed-heads as larval food; light grazing and trampling of permanent grassland; some winter flooding, no summer flooding; associated pools; strucutrally diverse sward and bare ground	regional
Open Water Open Water Marginal Vegetation Swamp	Coleoptera Diptera Mollusca Odonata Hemiptera	*Agabus unguicularis* Nb, *A. biguttatus* Nb, in springs, *Cercyon tristis* Nb, *Chaetarthria seminulum* Nb, *Enochrus ochropterus* Nb, *E. affinis* Nb, *Haliplus apicalis* Nb, *Helophorus griseus* Nb, *Hydroporus obsoletus* Nb, *Ilybius aenescens* Nb, *I. guttiger* Nb, *Sticticus lepidus* Nb, *Helochares punctatus* Nb: water beetles *Gyrinus minutus* Nb whirligig beetle *Hydronomus alismatis* Nb, *Phytobius comari* Nb: weevils *Neoascia geniculata* Nb hoverfly - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land	national

Running Water	Coleoptera Diptera Hymenoptera Ephemeroptera Plecoptera Trichoptera	*Agonum nigrum* Nb, *Bembidion litorale* Nb, *B. lunatum* Nb , *B. bipunctatum* Nb: ground beetles *Hilara albiventris* Nb dance fly ***Cliorismia 'Psilocephala' rustica* RDB3 stiletto fly** - - - -	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; sandy exposed banks	local
Woodland	Lepidoptera Coleoptera Diptera Mollusca	***Xestia rhomboidea* Nb Sqaure-spotted Clay** *Acalles ptinoides* Nb weevil *Magdalis phlegmatica* Na, *M. duplicata* Na: seed weevil s *Polydrusus flavipes* Nb weevil oak *Limnophila pulchella* Nb cranefly *Xylota coeruleiventris* Nb hoverfly dead wood -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees	local

Natural Area: North Pennines 4				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
acid grassland	Lepidoptera Homoptera Coleoptera Hymenoptera, aculeates	*Coenocalpe lapidata* RDB3 Slender-striped Rufus *Carsia sororiata* Nb Manchester Treble-bar - - -	structural variety including open grassland and bare ground; nectar & pollen sources	local
blanket bog [and moorland]	Lepidoptera Diptera Archnida Coleoptera	*Acronita euphorbiae* Na Sweet gale moth **? *Dyscia fagaria* local Grey Scalloped Bar** **? *Polia bombycina* local Pale Shining Brown** *Macrocera inversa* RDB2 fungus gnat *Hilaira nubigena* Na, *Macrargus carpenteri* Na: money spiders -	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, Myrica, sallow	local
flush and soligeneous mire	Diptera Mollusca Coleoptera Lepidoptera Trichoptera	*Oxycera pardalina* Nb, *O. dives* pRDB3: water soldierflies *Dicranota simula* RDB3, *Orimargo virgo* RDB3, *Tipula coerulescens* RDB3: craneflies ***Vertigo genesii* RDB1 whorl snail** - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	national
gorge woodland	Lepidoptera Coleoptera Diptera Mollusca	***Rheumatpera hastata* Nb Argent and Sable** **? *Hemaris tityus* Na Narrow-bordered Bee Hawk** *Perizoma taeniata* Na Barred carpet moth *Saperda scalaris* Na longhorn beetle *Pterostichus cristatus* Nb ground beetle *Tipula hortorum* RDB3, *T. limbata* RDB3: craneflies *Anatella dampfi* pRDB3, *Mycomya griseovittata* pRDB3, *M. ornata* RDB3: fungus gnats -	wide variety of native trees and shrubs; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; streams and seepages	local
hay meadow	flying insects	-	flowers as nectar and pollen sources; flower-heads and seed-heads as larval food	local
heather communities	Coleoptera Lepidoptera	*Carabus nitens* Nb ground beetle -	range of heather ages; sparse turf and bare ground among heather plants; heather litter;	local
juniper wood and scrub	Lepidoptera Hemiptera Coleoptera	*Thera juniperata* Nb Juniper carpet moth - -	living juniper trees; block and patches of bushes; associated grassland;	local

limestone grassland	Mollusca Coleoptera Lepidoptera Hemiptera Hymenoptera, aculeates Orthoptera	*Vitrea subrimata* Na glass snail - ***Aricia artaxerxes* Nb Northern Brown Argus** - - -	tussocky sward; patches of bare ground; shelter provided by hedges, scrub; flowers-rich sward	local
metalliferous sites and disused mines	Lepidoptera Coeleoptera Hemiptera	- - -	flooded quarry floor; ruderal plants; sparse turf; rocks and stones; sunny aspect; seepages	local
montane communities	Lepidoptera Coleoptera Diptera	***Xestia alpicola* Na Northern Dart** *Entephria flavicintata* Na Yellow-ringed Carpet *Pterostichus aethiops* Nb ground beetle -	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree; stones among sparse vegetation	local
quarries [and river sections] flooded quarries	Diptera Coleoptera Odonata	- - -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water	local
rushy pastures	Hemiptera Lepidoptera Coleoptera Diptera	? *Macrosteles alpinus* Nb leaf hopper - - -	high water table; mosaic structure of sward; tussocks; herb-rich sward;	local
streams and rivers	Coleoptera Diptera Arachnida	assemblage of river-shingle species including: *Bembidion schueppeli* Na ground beetle *Fleutiauxellus maritimus* Na click beetle *Dicranota simula* RDB3 cranefly *Caviphantes saxetorum* Na money spider species of upland streams: *Riolus subviolaceus* Nb riffle beetle *Oreodytes davisi* Nb diving beetle aquatic species of rivers: *Helophorus arvernicus* Nb crawling water beetle	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; sandy exposed banks	??local ?national
upland tarns	Coleoptera	*Macroplea appendiculata* RDB3 reed beetle	reliable hydrological regime; fringing emergent vegetation	local
Whin Sill				?

Natural Area: Northumbria Coal Measures 5				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific Needs**	**Significance in NA**
Northumberland Coast	snails bugs beetles moths flies bees, wasps and ants larger crustaceans spiders moss animals	- - *Bembidion pallidipenne* Nb, a ground beetle *Haliplus apicalis* Nb, a crawling water beetle *Ochthebius marinus*, Nb, a small water beetle *Trachyphloeus alternans* Nb, Cleonus piger Nb: weevils *Actebia praecox*, Nb, Portland moth *Photedes elymi*, Na, Lyme Grass *Euoxia cursoria* Nb Coasst Dart *Crambus pratella* Nb pyralid moth *Phthiria pulicaria* Nb bee-fly - - - -	dunes: natural physiographic processes leading to fore-dune; dune-ridge and grey lichen dune behind; bare sand in all zones of the dune system; undisturbed strandline litter and vegetation; herb-rich grassland with structural diversity; dune slacks with reliable winter water supply; grazing animals soft cliffs: natural erosion processes; bare and partly vegetated ground; seepages and trickles; nectar sources; recent slippages; bare dry faces hard cliffs: natural physiographic processes; undisturbed cliff-top vegetation; grazing of cliff-top grassland lagoons: unpolluted water; natural processes of seepage or saline intrusion saltmarsh: historically undisturbed vegetation; herb-rich vegetation, especially with *Aster* and *Limonium*; transitions to dry land and to freshwater seepages; shallow pools, especially in upper levels intertidal: natural processes of deposition and erosion swamp and inundation communities: regular regime of inundation and drying; plant litter; management infrequent or absent	regional
Neutral grasslands	snails beetles caddisflies moths flies	- *Mantura rustica*, Nb, a flea beetle *Oxystoma cerdo*, Nb, a seed weevil - *Crambus pratella*, Nb, a pyralid moth -	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or seasonal pools constant water supply to flushes; open structure to vegetation, with or without partial shading; pollen and nectar sources nearby	local

Lowland Heath	bugs beetles flies bees, wasps and ants moths spiders	*Cicadula quinquenotata*, Nb, a leafhopper - - - **? *Dyscia fagaria* local Grey Scalloped Bar** -	dry heath: structural variety including open grass heath, very short turf and bare ground; rabbit or other disturbance; nectar and pollen sources; arable weeds; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood wet heath and mire: constant water supply and high water table; varied and open vegetation structure, including small patches of bare wet peat; birch and sallow scrub; shallow pools; nectar sources nearby	local
Open water and marginal habitats	snails dragonflies bugs beetles moths flies spiders	*Gyraulus laevis*, Nb, smooth ramshorn *Coenagrion pulchellum*, Nb, variable damselfly - *Ilybius subaeneus* Nb, a water beetle *Grypus equiseti*, Nb, horsetail weevil *Eupithecia valerianata*, Nb, valerian pug *Stratiomys potamida*, N, a soldier fly *Platycheirus perpallidus*, N, a hoverfly *Colobaea bifasciella*, N, a snail-killing fly -	mosaic of open water and dense vegetation; shallow and gently-shelving margins; surrounding/bordering marshy zone; infrequent or small-scale management; well-structured transitions to other semi-natural habitats; reliable hydrological regime swamp: consistently high winter water levels; partial summer drying; plant litter; infrequent management alder woodland: closed canopy providing shade and high humidity; old trees and dead wood; high water table leading to saturated ground; organic-rich litter layer; seepages; shallow pools	local
Rivers and river banks	snails stoneflies mayflies beetles caddisflies moths flies spiders	- - - *Bembidion monticola* Nb, *B. saxatile* Nb, ground beetles *Aegialia sabuleti*, Nb, a dung beetle - - *Limonia trivittata* Nb, *Limnophila apicata* Nb: craneflies -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural habitats on bordering land; woodland with permanently wet areas, seepages; old trees and dead wood	local

Woodlands	snails and slugs lacewings bugs beetles moths flies ants	*Limax tenellus* Nb, lemon slug *Hemerobius perelegans* Nb, a brown lacewing - *Pterostichus cristatus*, Nb, a ground beetle *Triplax scutellaris*, RDB3, a shiny fungus beetle *Conopalpus testaceus*, Nb, a false darkling beetle *Saperda scalaris*, Na, a longhorn beetle *Tropiphorus elevatus*, Nb, a weevil *Eudonia delunella*, Nb, a pyralid moth ***Hydelia sylvata* Nb Waved Carpet** **? *Xylena exsoleta* Nb Sword-grass** *Dioctria oelandica*, N, a robber fly ***Formica lugubris* local Northern Wood Ant**	wide variety of native trees and shrubs; wide age range of woody species; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; well-developed ground flora; depressions with pools seasonal or permanent and undisturbed hydrology; well-structured transitions to other habitats; seepages	local
Lowland raised mire	snails bugs beetles caddisflies moths flies spiders	- - *Carabus nitens* Nb, a ground beetle *Agabus unguicularis*, Nb, a water beetle - - - -	high water table; natural and varied vegetation structure; small patches of bare peat; pools; scrub, especially of sallow and birch; swamps with consistently high winter water levels, partial summer drying, and plant litter	local

Notes

In the Microlepidoptera and Diptera particularly, discrepancies between the locations of the records and the stated distributions in the species accounts are rather numerous and considerable. I have erred on the side of caution, in the absence of detailed personal knowledge of the groups and not knowing the recorders, and not included these species.

The lack of personal knowledge of the locations and habitats of many of the recorded sites has made assessment of invertebrate information difficult on occasion, where the species have several habitats nationally, or where the known habitat of a species overlaps the boundaries of more than one of the key habitats in the NA profile coastal and non-coastal grassland, coastal and riverine, heathland and raised bog, raised bog and open water, etc.

The shortage of records of nationally scarce species from heathland and associated features seems to be genuine, and may imply under-recording.

Natural Area: Durham Magnesian Limestone 6				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Magnesian limestone grassland & quarries	Lepidoptera Coleoptera Arachnida Hemiptera	***Aricia artaxerxes salmacis* Nb Durham Argus** ***Scotopteryx bipunctaria cretata* Nb Chalk Carpet** *Platyptilia ochrodactyla* Nb a plume moth *Omiamima mollina* Na, *Brachysomus echinatus* Nb: weevils *Longitarsus suturalis* Nb a leaf beetle *Tapinocyboides pygmaeus* RDB3 a money spider -	varied structure with tussocks, herb-rich flora and patches of bare ground; some scrub	regional
Wooded coastal denes	Lepidoptera Coleoptera Diptera Mollusca	*Discoloxia blomeri* Nb Blomer's Rivulet *Hylecoetus dermestoides* Nb a timber beetle *Tipula nebeculosa* Notable a cranefly *Xylota florum* Notable, *Didea fasciata* Notable: hoverflies *Clausia dubia* Nb a door snail	wide variety of native trees and shrubs; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; seepages	national
Neutral grasslands	flying insects Lepidoptera Diptera Hymenoptera	-	structural variety including open grassland and bare ground; nectar and pollen sources	local
Coastal cliffs and shore platforms	Lepidoptera Coleoptera Hymenoptera Diptera	***Aricia artaxerxes salmacis* Nb Durham Argus** *Photedes captiuncula* RDB3 Least Minor *Adscita geryon* Nb Cistus Forester ***Scotopteryx bipunctaria cretata* Nb Chalk Carpet** *Barynotus squamosus* Nb, *Omiamima mollina* Na: weevils ***Bombus sylvarum* Nb Shrill Carder Bee** *Oxycera pygmaea* Nb soldierfly	sparse and herb-rich flora; high proportion of exposed soil; natural erosion	regional
Lowland heath	Lepidoptera Coleoptera Hemiptera flying insects	*Perizoma minorata ericetata* Nb Heath Rivulet - - -	structural variety including open grass heath, short turf, tussocks and bare ground; nectar and pollen sources from flower-rich sward; some scrub	local
Standing water ponds	Coleoptera Diptera Mollusca	*Agabus unguicularis* Nb, *Ilybius guttiger* Nb: water beetles - -	moasaic of open and dense vegetation; shallow margins; relatively undisturbed surrounding land	local
Streams	Coleoptera Diptera	*Hydroporus ferrugineus* Nb, *Agabus biguttatus* Nb, *Ochthebius bicolon* Nb: water beetles *Ochthephilus andalusia* Nb a rove beetle -	natural flow regime which is usually temporary; clean water; a mixture of shaded and open banks	local
Marshes	Coleoptera Diptera	*Agabus unguicularis* Nb, *Ilybius guttiger* Nb: water beetles *Colobaea bifasciella* Notable a snail-killing fly *Stratiomys potamida* Notable a soldier fly	shallow, well vegetated, permanent water with reliable hydrological regime; clean water	local

Natural Area: Tees Lowlands Area 7				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Teesmouth flats and marshes	beetles moths flies bees and wasps spiders	*Bembidion gilvipes* Nb, *B. clarki* Nb, *Amara lucida* Nb, *A. spreta* Nb: ground beetles *Haliplus apicalis*, Nb, a crawling water beetle *Coelambus parallelogrammus* Nb, *Agabus conspersus* Nb, *Ochthebius marinus*, Nb: water beetles *Helophorus fulgidicollis* Nb, *Enochrus bicolor* Nb: scavenger water beetles - - - *Philodromus fallax*, Nb, a running crab spider *Silometopus incurvatus*, Na, a money spider	dunes: natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; undisturbed strandline litter and vegetation; grazing animals; grassland herb-rich with structural diversity; dune slacks with reliable winter water supply; grazing animals saltmarsh: historically undisturbed vegetation; herb-rich vegetation, especially with *Aster* and *Limonium* transitions to dry land and to freshwater seepages; shallow pools, especially in upper levels swamps and margins: consistent patterns of inundation; partial summer drying; plant litter; varied vegetation structure at margins, including bare mud	regional
Escarpment and gill woodland	snails and slugs beetles moths flies spiders	- - - - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats; permanently damp areas; shallow pools	?
Tees and tributary woodland	snails and slugs beetles butterflies and moths flies spiders	- *Agabus chalconatus*, Nb, a water beetle *Strymonidia w-album*, Nb, white letter hairstreak - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats; permanently damp areas;	local

			shallow pools	
Coastal geological exposures	beetles flies bees and wasps	- - -	hard cliffs: natural physiographic processes; undisturbed cliff-face vegetation; grazing of cliff-top grassland soft cliffs: natural erosion processes; bare and partly vegetated ground; seepages and trickles; nectar sources; recent slippages; bare dry faces	?
Former fenlands of River Sker	snails, slugs and mussels dragonflies beetles moths flies spiders	***Segmentina nitida*, RDB2, a ramshorn snail ?extinct** *Pisidium pseudosphaerium*, RDB3, an orb mussel - *Agabus uliginosus* Nb, *Hydroporus scalesianus* RDB2: water beetle *Helophorus strigifrons* Nb, *Cercyon convexiusculus* Nb: scavenger water beetles - *Stratiomys potamida*, N, a soldier fly -	flushes: constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby water bodies: mixture of open water and dense vegetation; some emergent vegetation at margins; shallow margins, some well-vegetated; management by small-scale clearance, or on long rotation, or only as essential; well-structured bankside vegetation; semi-natural surrounding land; reliable hydrological regime marshy grassland: high water table; some winter flooding, no summer flooding; shallow permanent or temporary pools; structurally diverse and herb-rich sward; well-structured margins and transitions to other semi-natural habitats fens: high water table; varied vegetation structure, including bare mud, tussocks, tall fen vegetation, scrub and carr; reedbeds; small pools; flush swamp: consistently high winter water levels; partial summer drying; plant litter; infrequent management; standing water	?national

Notes

The NA profile lists two invertebrate species for the "former fenlands of the river Sker", *Segmentina nitida* and *Hydroporus scalesianus*. Neither is listed in the ISR printout. I have retained *S. nitida*, since the site is within the historic range and the frequent associate *Pisidium pseudosphaerium* is recorded: the record may simply be too old to have been included in the ISR printout, but if the sp. is still there, this is an important record and should not be missed. I have also retained *H. scalesianus*, on the basis of a dot in the right place on an oldish distribution map, but dithered rather longer before doing so, and worry that I may regret it

Invertebrate records are very limited and strongly biassed towards a small range of groups, especially water beetles, which may well give a distorted impression of the invertebrate fauna. The almost complete absence of records of scarce invertebrates from woodlands is genuine, Diptera seem scarcely to have been recorded, and it seems likely that most Coleoptera above ground level and out of the water are similarly neglected.

Natural Area: Yorkshire Dales Area 8				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Limestone pavement and grassland	snails bugs beetles butterflies and moths flies bees and wasps woodlice spiders	*Vertigo alpestris*, Na, a whorl snail *Abida secale*, Nb, a chrysalis snail *Vitrea subrimata*, Na, a glass snail *Clausilia dubia*, Nb, a door snail *Emelyanoviana contraria*, Na, a leafhopper - ***Aricia artaxerxes*, Nb, northern brown argus** *Entenephria flavicinctata*, Na, yellow-ringed carpet *Eupithecia distinctaria*, Nb, Nb, thyme pug *Photedes captiuncula*, RDB3, least minor *Dasyhelea saxicola*, RDB2, a biting midge - *Armadillidium pictum* RDB3, *A. pulchellum*, Nb: pill woodlice -	calcareous grassland: varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transition to other habitats; management by grazing pavement: tussocky, flower-rich sward;occasional scrub and small trees flushes: constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	national
Neutral grasslands	beetles moths	- -	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools	?local

Moorlands	bugs beetles moths flies bees and wasps spiders	- *Carabus nitens* Nb, *Miscodera arctica* Nb, *Pterostichus aethiops* Nb: ground beetles *Acalles ptinoides*, Nb, a weevil - - - *Hilaira nubigena*, Nb, *Lepthyphantes insignis*, Nb: money spiders	upland dry heath: structural variety including open grass heath, very short turf and bare ground; rabbit or other disturbance; nectar & pollen sources; arable weeds food plants of some rare species; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood upland wet heath: high water table; varied vegetation structure including small patches of bare peat; shallow pools; birch and sallow scrub; well-structured transitions to other habitats acid grassland: varied vegetation structure providing both bare ground and tussocky vegetation; availability of nectar sources; scrub; well-structured transitions ot other semi-natural habitats structural variety including open grassland and bare ground; nectar & pollen sources blanket bog: high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, Myrica, sallow	?local
Woodlands and scrub	snails and slugs beetles moths flies spiders ants	*Limax tenellus*, Nb, lemon slug *Malthodes guttifer*, Nb, a soldier beetle *Ctesias serra*, Nb, cobweb beetle *Orchesia minor*, Nb, a false darkling beetle *Synanthedon vespiformis*, Nb, yellow-legged clearwing ***Trichopteryx polycommata*** **Na Barred Tooth-stripe** *Tipula hortorum*, RDB3, *T. alpina*, RDB3; craneflies *Megasyrphus annulipes*, Nb, *Criorhina ranunculi*, N: hoverflies *Platyparea discoidea*, RDB2, a gall fly - ***Formica lugubris*** **local Northern Wood Ant**	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats	regional

Raised mire, fen and marsh	snails bugs beetles moths flies spiders	*Lymnaea glabra*, RDB2, mud snail *Deroceras agreste*, Nb, field slug *Oncodelphax pullulus*, Nb, a planthopper *Agonum ericeti*, Nb, a ground beetle *Hydroporus longulus*, Nb, *Acilius canaliculatus*, pRDB3: water beetles *Chaetarthria seminulum*, Nb, a scavenger water beetle *Hydrothassa hannoveriana*, RDB3, a leaf beetle - *Platycheirus podagratus* Nb, *Chrysogaster macquarti* N: hoverflies *Maro lepidus*, RDB3, a money spider	lowland raised bog: high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch flushes: constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby fen: high water table; varied vegetation structure, including bare mud, tussocks, tall fen vegetation, scrub and carr natural age structure and dead wood in wooded areas; reedbeds; small pools swamp : consistently high winter water levels; partial summer drying; plant litter; infrequent management	national
Rivers, streams and open water	snails and mussels stoneflies mayflies beetles caddisflies moths flies spiders crustacea	- *Rhabdiopteryx acuminata*, Nb, a stonefly ***Heptagenia longicauda* pRDB1 mayfly** *Bembidion fluviatile*, Nb, a ground beetle *Potamonectes griseostriatus* Nb, *Ochthebius exsculptus* Nb, water beetles *Dryops nitidulus*, pRDB3, a long-toed water beetle ***Synaptus filiformis* pRDB1 click beetle** *Rhyacophila septentrionis* Nb, *Agrypnia crassicornis* RDB1: caddis - *Limonia trivittata*, Nb, *Dicranota guerini*, Nb, *Dactylolabis sexmaculata*, Nb, *Molophilus corniger*, Nb: craneflies *Oxycera dives*, pRDB3, *O. pygmaea*, Nb: soldierflies *Chrysopilus erythrophthalmus*, RDB2, a snipe fly *Pteromicra glabricula*, Nb, a snail-killing fly - ***Austropotamobius pallipes* local Crayfish**	rivers and streams: natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land standing water: mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land marginal woodland: wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; areas with closed canopy providing shade and high humidity; alders, sallows; high water table leading to saturated ground; organic-rich litter layer; seepages; shallow pools	national
Metalliferous communities	beetles spiders	*Notiophilus aesthuans*, Nb, a ground beetle -	ruderal plants; sparse turf; rocks and stones; sunny aspect; seepages	local
Limestone geology, pavement and caves	-	-	caves: absence of disturbance, unpolluted water	-

Natural Area: Eden Valley 9				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
River Eden	Diptera Coleoptera Ephemeroptera Plecoptera	*Hilara albiventris* Nb dance fly *Lonchoptera meijeri* Nb, *L. nigrociliata* Nb: pointed-wing flies *Pilaria scutellata* Nb cranefly *Hydroporus ferrugineus* Nb water beetle - -	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; accumulations of flood litter	local
Basin Mires	Hemiptera Coleoptera Diptera Arachnida Lepidoptera Trichoptera Mollusca	*Cicadula quinquenotata* Nb, *Cosmotettix panzeri* Nb, *Stroggylocephalus livens* Nb: leafhoppers *Agabus uliginosus* Nb, *A. unguicularis* Nb, *Graptodytes granularis* Nb, *Hydroporus longulus* Nb, *Ilybius guttiger* Nb, *Laccornis oblongus* pRDB3: water beetles *Enochrus ochropterus* Nb scavenger water beetle *Notaris scirpi* Nb weevil *Dixella obscura* Nb meniscus midge *Erioptera nielseni* Nb, *Tipula Savtshenkia gimmerthali* pRDB3: craneflies *Hercostomus angustifrons* Nb dolichopodid fly cranefly *Semljicola caliginosa* Nb money spider *Sitticus caricis* Nb jumping spider - - -	constant water supply; open structure to vegetation; with or without partial shading; patches of carr woodland; pollen and nectar sources nearby;	national
Penrith Sandstones and Heaths	Hemiptera Coleoptera Hymenoptera Arachnida Diptera Lepidoptera Orthoptera	*Aphrodes trifasciatus* Nb leafhopper *Globiceps juniperi* Nb plantbug or grassbug *Pterostichus aethiops* Nb, *P. angustatus* Nb, *P. lepidus* Nb: ground beetles *Andrena humilis* Nb, *Lasioglossum pauxillum* Na solitary bees *Lepthyphantes insignis* Nb money spider - - -	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources; arable weeds food plants of some rare species; calcareous influence; flowering heather; patches of gorse +/or broom; dung	local

Lowland Grasslands	Lepidoptera Diptera Homoptera Coleoptera Hymenoptera, aculeates	***Eurodryas aurinia* Nb Marsh Fritillary** ***Aricia artaxerxes* Nb Northern Brown Argus** *Geomyza majuscula* Nb fly - - -	structural variety including open grassland and bare ground; nectar & pollen sources	local
Woodland	Lepidoptera Coleoptera Diptera Mollusca	*Clostera pigra* Nb Small Chocolate-tip *Agabus chalconatus* Nb, *A. melanarius* Nb: water beetles *Barynotus squamosus* Nb weevil *Beris fuscipes* Nb soldier fly *Limnophila Idioptera pulchella* Nb cranefly *Mycomya clavigera* RDB2, *M. ornata* RDB3: fungus gnats *Tetanocera freyi* RDB3snail-killing fly *Xylota coeruleiventris* Nb hoverfly -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; undisturbed hydrology	local

Natural Area: Cumbria Fells & Dales 10				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Limestone Pavement	Lepidoptera Coleoptera Diptera Isopoda Mollusca Hemiptera Hymenoptera, aculeates Orthoptera	*Hamearis lucina* Nb Duke of Burgundy Fritillary *Orthochaetes setiger* Nb weevil *Dasyhelea saxicola* RDB2 biting midge *Armadillidium pictum* RDB3, *A. pulchellum* Nb pill woodlouse *Abida secale* Nb chrysalis snail ***Vertigo angustior* RDB1**, *V. pusilla* Nb: Whorl snails, *Vitrea subrimata* Na glass snail - ***Osmia parietina* RDB3 Wall Mason bee** - -	tussocky, flower-rich sward;occasional scrub and small trees	national
Limestone Grassland	Lepidoptera Coleoptera Mollusca Hemiptera Hymenoptera, aculeates Orthoptera	*Adscita geryon* Nb Cistus Forester ***Aricia artaxerxes* Nb Northern Brown Argus** *Eupithecia distinctaria* constric Notable/Nb Thyme Pug ***Eurodryas aurinia* Nb Marsh Fritillary** *Hamearis lucina* Nb Duke of Burgundy Fritill *Photedes captiuncula* RDB3 Least Minor *Thera cognata* Nb Chestnut-coloured Carpet *Thera juniperata* Nb Juniper Carpet *Cryptocephalus bilineatus* Nb leaf beetle *Orthochaetes setiger* Nb weevil *Abida secale* Nb chrysalis snail *Clausilia dubia* Nb door snail *Vertigo pusilla* Nb whorl snail *Vitrea subrimata* Na glass snail - - -	tussocky sward; patches of bare ground; shelter provided by hedges, scrub including juniper; flower-rich sward	national

Limestone Scars, Scree & Quarries	Lepidoptera Coleoptera Mollusca Isopoda Hymenoptera Orthoptera	*Photedes captiuncula* RDB3 Least Minor *Thera cognata* Nb Chestnut-coloured Carpet *Thera juniperata* Nb Juniper Carpet *Abida secale* Nb chrysalis snail *Hydroporus ferrugineus* Nb water beetle in springs *Clausilia dubia* Nb door snail *Vertigo alpestris* Na, *Vertigo pusilla* Nb: whorl snails *Vitrea subrimata* Na glass snail *Armadillidium pictum* RDB3, *A. pulchellum* Nb pill wood oice - -	bare ground; ruderal plants; scrub including juniper	national
Streams & River	Coleoptera Diptera Mollusca Ephemeroptera Plecoptera Trichoptera	*Bembidion bipunctatum* Nb, *B. monticola* Nb, *B. stomoides* Nb: ground beetles *Stenelmis canaliculata* RDB2 riffle beetle *Lonchoptera meijeri* Nb, *L. nigrociliata* Nb: pointed-wing flies *Nephrotoma dorsalis* Nb cranefly *Succinea oblonga* RDB3 an amber snail ***Margaritifera margaritifera* Nb Freshwater Pearl Mussel** - - -	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and sandy shores and bars; accumulations of flood litter; exposed sandy banks	local
Meadow and Pasture	Lepidoptera Coleoptera Mollusca Hemiptera Hymenoptera, aculeates Orthoptera	***Argynnis adippe* RDB2 High Brown Fritillary** ***Aricia artaxerxes* Nb Northern Brown Argus** *Eriogaster lanestris* Nb Small Eggar ***Eurodryas aurinia* Nb Marsh Fritillary** *Ctenicera pectinicornis* Na click beetle *Clausilia dubia* Nb door snail - - -	tussocky flower-rich sward; patches of bare ground; shelter provided by hedges, patches of scrub	local

Woodland, Scrub & Parkland	Lepidoptera	***Argynnis adippe* RDB2 High Brown Fritillary** *Atolmis rubricollis* Nb Red-necked Footman ***Boloria euphrosyne* Nb Pearl Bordered Fritillary** *Discoloxia blomeri* Nb Blomer's Rivulet *Eupithecia expallidata* Nb Bleached Pug ***Eustroma reticulata* RDB2 Netted Carpet** ***Hydrelia sylvata* Nb Waved Carpet** ***Trichopteryx polycommata* Na Barred Tooth-stripe** ***Rheumatpera hastata* Nb Argent and Sable** *Hyppa rectilinea* Nb Saxon *Perizoma taeniata* Na Barred Carpet *Strymonidia w-album* Nb White Letter Hairstreak	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; scrub with blocks and patches of bushes; associated grassland or heath; flower-bearing species	national
	Coleoptera	*Calosoma inquisitor* Na Caterpillar-hunter *Byctiscus betulae* Nb Hazel Leaf Roller *Anthribus nebulosus* Nb fungus weevil *Aphodius nemoralis* Na dung beetle or chafer *Ampedus nigrinus* Nb, *A. pomorum* Nb: click beetles *Ancistronycha abdominalis* Nb Blue Soldier Beetle *Ceutorhynchus euphorbiae* Na weevil *Melandrya caraboides* Nb false darkling beetle *Dendroxena quadrimaculata* Nb sexton beetle *Dirhagus pygmaeus* RDB3 false click beetle *Pyrochroa coccinea* Nb Black-headed Cardinal beetle		
	Diptera	*Cheilosia nebulosa* RDB3, *C. asilica* Nb, *C. ranunculi* Nb, *Eumerus ornatus* Nb, *Megasyrphus annulipes* Nb: hoverflies *Ctenophora pectinicornis* Nb, *Tipula alpina* RDB3, *Tipula limbata*RDB3: craneflies *Dioctria oelandica* Nb robber fly *Keroplatus testaceus* Nb fungus gnat *Tetanocera freyi* RDB3 snail-killing fly		
	Hymenoptera	*Ectemnius ruficornis* Nb solitary wasp ***Formica lugubris* local Northern Wood Ant**		
	Mollusca	- *Abida secale* Nb chrysalis snail *Acicula fusca* Nb point snail *Vertigo alpestris* Na whorl snail		

Montane Habitat	Lepidoptera Coleoptera Arachnida Diptera	*Erebia epiphron* Na Mountain Ringlet *Leistus montanus* Na, *Miscodera arctica* Nb, *Nebria nivalis* Na, *Cymindis vaporariorum* Nb : ground beetles *Pardosa trailli* Nb wolf spider -	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree; stones among sparse vegetation	national
Sub-Montane Heath and Grasslands	Lepidoptera Coleoptera Arachnida Diptera	*Erebia epiphron* Na Mountain Ringlet *Hyppa rectilinea* Nb Saxon ***Rheumaptera hastata*** **Nb Argent and Sable** *Byrrhus arietinus* Nb Northern Pill-beetle *Carabus nitens* Nb, *Cymindis vaporariorum* Nb, *Pterostichus aethiops* Nb: ground beetles *Pardosa trailli* Nb wolf spider *Philodromus emarginatus* Nb running crab spider	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree; stones among sparse vegetation	local?
Raised Mire	Odonata Orthoptera Hemiptera Lepidoptera Coeoptera Diptera	*Leucorrhinia dubia* Na White-faced Dragonfly *Metrioptera brachyptera* Nb Bog Bush Cricket *Stroggylocephalus livens* Nb leafhopper *Selidosema brunnearia* Na Bordered Grey *Blethisa multipunctata* Nb ground beetle *Hydroporus longicornis* Nb, *Ilybius aenescens* Nb , *Agabus unguicularis* Nb: water beetles *Agonum ericeti* Nb ground beetle *Microdon mutabilis* Nb hoverfly	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	national
Fen and Flush	Lepidoptera Coleoptera	***Dyscia fagaria*** **local Grey Scalloped Bar** *Chilodes maritimus* Nb Silky Wainscot *Idaea muricata* Na Purple-bordered Gold *Synanthedon formicaeformis* Nb Red-tipped Clearwing *Helophorus strigifrons* Nb, *Laccobius atratus* Nb scavenger water beetles *Notaris scirpi* Nb weevil	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby; structurally mixed vegetation	national
Fen and Flush cont.	Diptera Mollusca Trichoptera	*Cheilosia pubera* Nb hoverfly *Cordilura picipes* pRDB3 dung fly *Limnophila pictipennis* pRDB2 cranefly *Opomyza lineatopunctata* Nb fly *Oxycera pygmaea* Nb, *Stratiomys potamida* Nb: soldier flies ***Catinella arenaria*** **RDB1Sandbowl Snail** ***Vertigo geyeri*** **RDB1,** *V. lilljeborgi* RDB3 whorl snails -		

Ledge Outcrop and Scree	Coleoptera Orthoptera	- -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals	?
Open Water, Lake, Tarn	Odonata Coleoptera Trichoptera Diptera Crustacea Mollusca Hirudinea Hemiptera	*Coenagrion pulchellum* Nb Variable Damselfly *Cordulia aenea* Nb Downy Emerald *Donacia aquatica* pRDB3, *D. obscura* Na leaf beetles *Gyrinus minutus* Nb whirligig *Haliplus heydeni* Nb crawling water beetle *Helophorus griseus* Nb scavenger water beetle *Stictonectes lepidus* Nb water beetle *Setodes argentipunctellus* RDB3 caddisfly *Dictya umbrarum* Nb snail-killing fly *Helius pallirostris* Nb cranefly *Sciomyza simplex* Nb snail-killing fly *Salmincola edwardsii* Nb copepod *Lymnaea glabra* RDB2 pond snail ***Hirudo medicinalis* RDB3 Medicinal Leech** -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; surrounding marshy zone; seasonal ponds	national
Mines and Minerals	Coleoptera Diptera Odonata	*Hydroporus ferrugineus* Nb, *H. obsoletus* Nb, *Stictonectes lepidus* Nb : water beetles - -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water	local
Natural Area: West Cumbria Coastal Plain 11				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Dune dry parts and shingle	Coleoptera Diptera Hymenoptera Isopoda Arachnida Hemiptera	***Cicindela hybrida* pRDB2**, *Amara lucida* Nb: ground beetles *Hypocaccus rugiceps* Na, *Baekmanniolus dimidiatus* Nb carrion beetles *Hippodamia variegata* Nb Adonis's ladybird *Phthiria pulicaria* Nb bee-fly ***Bombus humilis* local Brown-banded Carder bee** *Psen littoralis* RDB3 solitary wasp *Colletes cunicularius* RDB3 mining bee *Trichoniscoides saeroeensis* Nb, *Halophiloscia couchi* Nb, *Armidillidium album* Nb: woodlice *Philodromus fallax* Nb crab spider *Attulus saltator* Nb jumping spider -	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; undisturbed shingle where it exists beyond maritime influence; natural flora; scattered scrub and woodland on hinterland; shingle: unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation; brackish and freshwater seepages	national

Dune dry parts and shingle - herbivores	Lepidoptera Coleoptera Hemiptera	*Lasiocompa trifolii* Na Grass eggar moth *Euxoa cursoria* Nb Coast Dart moth *Agrotis ripae* Nb Sand Dart moth *Phibalapteryx virgata* Nb Oblique-striped moth *Actebia praecox* Nb Portland moth *Ceutorhyncus atomus* Na weevil on Iberia, Arabidopsis *Cryptocephalus aureolus* Nb leaf beetle *Cleonus piger* Nb, *Trachyphloeus laticollis* Na: weevils -	natural herb-rich flora	national
Poosl in dune slacks	Coleoptera water beetles Diptera	*Dryops striatellus* pRDB3 long-toed water beetle -	permanent and temporary pools; reliable winter water supply	local
Sea Cliffs	Lepidoptera Hymenoptera Coleoptera Isopoda Diptera	*Boloria euphrosyne* Nb Pearl-bordered fritillary butterfly *Bembicia muscaeformis* Nb Thrift Clearwing moth *Cucullia absinthii* Nb Wormwood shark moth *Eurrhypara terrealis* pRDB3 micromoth *Longitarsus plantagomaritimus* Nb leaf beetle *Barypeithes sulcifrons* Nb, *Brachysomus echinatus* Nb: weevils *Trichoniscoides albidus* Nb, ***Metatrichoniscoides celticus*** RDBk: woodlice -	natural erosion though not too fast; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	Regional
Saltmarsh	Coleoptera Lepidoptera Diptera	*Chaetocnema sahlbergi* Na leaf beetle *Dyschirius impunctipennis* Nb, *Bembidion laterale* Nb ground beetles *Ochthebius auriculatus* Nb water beetle *Phaedon concinnus* Nb leaf beetle on *Cochlearia* and *Triglochin* - -	historically undisturbed vegetation; herb-rich vegetation, especially with *Aster* and *Limonium vulgare* transitions to dry land and to freshwater seepages;	local
Grazing Marsh	Coleoptera Diptera aquatic invertebrates	*Dytiscus circumflexus* Nb diving beetle *Platycheirus immarginatus* Nb hoverfly -		local

Rivers - aquatic fauna	Coleoptera Diptera Hymenoptera Ephemeroptera Plecoptera Trichoptera	- - - - - -	natural flow regime; clean water; some shaded and some open banks; natural aquatic vegetation structure	?
Rivers - marginal fauna	Hemiptera Coleoptera Diptera Arachnids	*Saldula fucicola* Nb shore bug *Bembidion saxatile* Nb ground beetle - -	margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	local
Reservoirs & Lagoons	Coleoptera Diptera Odonata Hemiptera Mollusca	- - - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation	local
Mosses	Orthoptera Lepidoptera Diptera Coeoptera	*Metrioptera brachyptera* Nb Bog bush cricket ***Dyscia fagaria* local Grey Scalloped Bar** *Idaea muricata* Na Purple-borded gold moth on *Potentilla palustris* *Selidosema brunnearia* Na Bordered Grey moth on *Calluna* *Carsia sororiata anblica* Nb Manchester Treble-bar *Microdon mutabilis* Nb hoverfly -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch; anthills for Microdon	regional
Wet Grasslands	Diptera Coleoptera Lepidoptera	- - -	light grazing and trampling; some winter flooding, no summer flooding; associated pools; strucutrally diverse sward	local?
Acidic Grasslands	Homoptera Coleoptera	- -	structural variety including open grassland and bare ground; nectar & pollen sources	local?
Coastal Grasslands	Lepidoptera Coeloptera Hemiptera Diptera	*Phibalapteryx virgata* Nb Oblique Striped moth *Perapion affine* Na seed weevil *Trachyphloeus laticollis* Na weevil *Aphodius distinctus* Nb dung beetle - -	herb-rich with structural diversity;	local

Woodlands	Lepidoptera Coleoptera Diptera Mollusca	*Boloria euphrosyne* Nb Pearl-bordered Fritillary *Enargia paleacea* Nb Angle-striped Sallow moth *Tropidophorus obtusus* Na, *T. terricola* Nb, *Barynotus aquamosus* Nb: weevils on dogs mercury *Trachodes hispidus* Nb weevil in litter *Coeliodes ruber* Nb weevil on oak & hazel - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; birch woodland at margins of mire	local?
Iron Mining Limestone Quarries	Coleoptera Diptera Odonata	*Stictonectes lepidus* Nb water beetle inbase-poor waters - -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water	local

Natural Area: Forest of Bowland Area 12				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific Needs**	**Significance in NA**
Heather moorland	Mollusca Coleoptera Diptera Lepidoptera	*Vitrea subrimata*, Na, a glass snail *Agonum ericeti*, Nb, a ground beetle *Enochrus affinis*, Nb, a scavenger water beetle *Ilybius guttiger*, Nb, a water beetle *Limnophila fasciata*, RDB1, *Phalacrocera replicata*, N: craneflies *Coenonympha tullia*, local, large heath	Open mature heather stands; range of heather ages; Sphagnum flushes and pools; bare peat; mossy stream margins; scree; quarries with mosaic of vegetation structure, including bare ground with loose rocks, and sunny aspects; consistent light grazing pressure	Regional
Wooded valleys	Mollusca Coleoptera Diptera Lepidoptera	*Vitrea subrimata*, Na, a glass snail *Epurea angustula*, Nb, a pollen or sap beetle *Ctenophora nigricornis*, RDB3, a cranefly *Oxycera pardalina*, N, a soldierfly *Clostera pigra*, Nb, small chocolate-tip	Variety of native trees and shrubs; well-developed herb layer; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; small streams, trickles and seepages	Local
Hay meadows	Coleoptera Diptera Lepidoptera	- - -	flowers as nectar and pollen sources; flower-heads and seed-heads as larval food; well-structured margins and transitions to other semi-natural habitats; less intensively managed grassland at margins	local
Flush and rushy pasture	Coleoptera Diptera Lepidoptera Trichoptera	- - - -	Flushes: constant water supply; open structure to vegetation, with or without partial shading; pollen and nectar sources nearby Pasture: shallow permanent or temporary pools; structurally diverse sward; well-structured margins and transitions to other semi-natural habitats; consistent light to moderate grazing pressure	local
Upland streams	Coleoptera Diptera Ephemeroptera Neuroptera Plecoptera Trichoptera	*Bembidion fluviatile* Nb, *B. monticola* Nb, *B. stomoides* Nb: ground beetles *Lathrobium angusticolle*, Nb, a rove beetle - - *Sialis nigripes*, Nb, an alderfly - -	Natural flow regimes; clean water; well-structured margins; undisturbed exposed sediments	Local

Conifer plantations	Coleoptera Diptera Lepidoptera	- - -	sunny rides and glades with flowering herbs and scramblers; dry sunny banks; standing dead wood; impeded drainage and pools; varied age structure in trees	?

Notes:
A large proportion of the records of scarcer species, especially from Austwick Moss, are old. I have not included any of these pre-1970 records, not only because of their age alone, but also for consistency with other natural areas, since precious printouts of ISR data have, I think, not included records prior to the 1970 cut-off date.

There appear to be no records of BAP species in this natural area.

Natural Area: Lancashire Plain and Valleys 13				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Coastal Features	Lepidoptera Diptera Coleoptera	*Lycia zonaria* RDB3 Belted Beauty moth 1975 record [still there?] *Catarhoe rubidata* Nb Ruddy Carpet moth *Actebia praecox* Nb Portland moth *Platychirus immarginatus* Nb hoverfly *Phaedon concinnus* Nb leaf beetle	Herb-rich with structural diversity; patches of bare ground on sunny side; stabilized areas and slacks with creeping willow; herb-rich stable saltmarsh with transition to dry land	Local
Mosslands	Orthoptera Lepidoptera Hemiptera Diptera Coleoptera Arachnida	*Metrioptera brachyptera* Nb Bog Bush cricket ***Dyscia fagaria* local Grey Scalloped Bar** *Carsia sororiata anglica* Nb Manchester Treble-bar moth *Idaea muricata* Na Purple-boardered Gold moth *Perconia strigillaria* Nb Grass Wave moth *Cosmotettix caudatus* Na leafhopper *Stratiomys potamida* Nb, *Oxycera pardalina* Nb: soldier flies - -	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, Myrica, sallow, bilberry	local
Meadow and pasture	Lepidoptera Coleoptera Hymenoptera	***Aricia arthaxerxes* Nb Northern Brown Argus butterfly** ***Boloria euphrosyne* Nb Pearl Bordered Fritillary butterfly** - -	tussocky flower-rich sward; patches of bare ground; shelter provided by hedges, patches of scrub	Local
Woodlands	Lepidoptera Coleoptera Diptera	***Argynnis adippe* RDB2 High Brown Fritillary butterfly** *Strymonidia w-album* Nb White-letter Hairstreak butterfly - -	patchy scrub including elm; hot-spots; flowering shrubs; associated grassland or heath; flower-bearing species *Viola*;broom bushes host of some rare species	Local
Rivers and open water	Enoplida Diptera Coleoptera	***Prostoma jenningsi* RDBK endemic nemertine worm** *Stratiomys potamida* Nb soldier fly *Agonum nigrum* Nb, *Bembidion bipunctatum* Nb: ground beetles	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	Local

Natural Area: Southern Pennines 14				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Blanket bog	beetles moths flies spiders	- ***Xestia alpicola*, Na, Northern Dart** - -	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, Myrica, sallow	?local
Heather moorland	beetles flies	- -	open mature heather stands; *Sphagnum* flushes and pools; mossy stream margins; scree; high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, *Myrica*, sallow	?
Soligenous valley mires	snails bugs beetles moths flies spiders	- - - - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby; structurally mixed vegetation; scrub, especially of willow and birch, in larger sites; shallow pools	?
Acidic grassland	bugs beetles spiders	- - -	varied vegetation structure providing both bare ground and tussocky vegetation; availability of nectar sources; scrub; well-structured transitions ot other semi-natural habitats	?
Clough woodland	snails and slugs beetles moths flies ants	- *Ancistronycha abdominalis*, Nb, blue soldier beetle *Rhizophagus nitidulus*, Nb, a narrow bark beetle *Hylecoetus dermestoides*, Nb, a timber beetle *Dryocoetinus alni*, Na, a bark beetle *Curculio villosus*, Nb, a weevil - *Neolimnophila carteri*, Nb, a cranefly *Didea fasciata*, N, a hoverfly ***Formica lugubris* local Northern Wood Ant**	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats	local

Acidic flush	beetles caddisflies moths flies	- - - -	constant water supply; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	?
Basic flush	snails beetles caddisflies moths flies	- - - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	?
Inbye	beetles moths flies	- - -	dry grassland: mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools wet grassland: high water table;shallow permanent or temporary pools; structurally diverse and herb-rich sward; well-structured margins and transitions to other semi-natural habitats	?
Impounded water	snails and mussels dragonflies beetles caddisflies flies	- - - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation	?
Rivers and streams	snails and mussels stoneflies mayflies beetles flies spiders	- - - *Bembidion fluviatile*, Nb, a ground beetle *Bledius defensus*, pRDBK, a rove beetle *Aegialia sabuleti*, Nb, a dung beetle *Dicranota guerini* Nb, *Dicranota robusta* Nb, *Limnophila trimaculata* Nb: craneflies *Rhaphium fractum* Nb, *Rhaphium rivale* Nb: dolichopodid flies *Pherbellia brunnipes*, N, a snail-killing fly -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	?regional

Canals	snails and mussels dragonflies beetles caddisflies moths flies	*Pisidium pulchellum*, Nb, *P. moitesserianum*, Nb, pea mussels - - - - -	mosaic of open water and dense vegetation; well-structured bordering vegetation with a semi-natural component swamp: consistently high winter water levels; partial summer drying; plant litter; infrequent management fen: high water table; varied vegetation structure, including bare mud, tussocks, tall fen vegetation and scrub	?local

Notes

The number of records of scarce invertebrates is woefully small - not that many more species than there are key habitats to spread them between - and these are heavily concentrated on a small number of sites, so the invertebrate data gives a poor indication of invertebrate significance. Some of the recorded species may have originated in flushes, but these could not be recognised as such in the available information.

Xestia alpicola was included as an associated species of blanket bog in the area profile, but is not in the ISR data: I have kept it, not least because there would otherwise be no invertebrates in this habitat category.

A large proportion of the invertebrates placed in the running water category are associated with banks and exposed sediments, which seem not to be specifically considered in the area profile.

Natural Area: Pennine Dales Fringe 15				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Ancient woodland	snails and slugs beetles butterflies flies spiders	*Limax tenellus*, Nb, lemon slug *Calosoma inquisitor*, Na, caterpillar-hunter *Pterostichus cristatus*, Nb, a ground beetle *Rhagonycha translucida*, Nb, a soldier beetle *Platycis minuta*, Nb, a net-winged beetle *Rhizophagua nitidulus* Nb, *Rhizophagus picipes* Na: narrow bark beetles *Ischnomera cyanea*, Nb, a thick-legged flower beetle *Strymonidia w-album*, Nb, white-letter hairstreak *Neopachygaster meromelaena*, N, a soldier fly *Platyparea discoidea*, RDB2, a gall fly *Tipula hortorum*, RDB3, *Molophilus corniger*, N: craneflies -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats	regional
Copses, hedgerows and veteran trees	beetles moths flies spiders	- - - -	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; other associated semi-natural habitats; hedges managed on rotation; broad and tall hedges with well-developed transition to grassland	?

Rivers, streams and open water	snails and mussels stoneflies mayflies beetles caddisflies flies larger crustaceans	- - - *Bembidion obliquum*, Nb, *Bembidion schueppeli*, Na, ground beetles *Helophorus arvernicus*, Nb, a scavenger water beetle *Bledius defensus*, pRDBK, a rove beetle *Aegialia sabuleti*, Nb, a dung beetle *Macroplea appendiculata*, RDB3, a leaf beetle - *Limonia trivittata*, N, a cranefly *Oxycera pardalina*, N, *O. dives*, pRDB3: soldier flies ***Thereva lunulata*, RDB3, a stiletto fly** *Rhaphium rivale*, N, a dolichopodid fly *Eurygnathomyia bicolor*, RDB1, a fly ***Austropotamobius pallipes*, local, Atlantic stream crayfish**	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	regional
Neutral grassland	Coleoptera Lepidoptera	**? *Anostirus castaneus* RDB1 click beetle** -	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools	?
Marsh and fen	snails bugs beetles moths flies spiders	- - *Bembidion clarki*, Nb, a ground beetle - - -	high water table; varied vegetation structure, including bare mud, tussocks, tall fen vegetation, scrub and carr; light grazing and trampling; some winter flooding, no summer flooding; associated pools; structurally diverse sward	?local
Parkland	beetles moths flies	*Cis festivus*, Nb, a small fungus beetle *Ctesias serra*, Nb, cobweb beetle *Thymalus limbatus*, Nb, a domed fungus beetle - -	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees; other associated semi-natural habitats	?regional
Moorland	Coleoptera Diptera	- -	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; high water table; natural vegetation structure in wet areas; pools; seepages; scrub birch, *Myrica,* sallow	?

Arable	Coleoptera Lepidoptera	- -	conservation headlands; hedgerows; buffer zones by water courses; disturbed soil on waysides; ruderal and annual plants used as host plants and nectar and pollen sources	?

Notes

There are too few records of scarce invertebrates from this NA to do justice to the range of key habitats identified, and such records as exist with a strong bias to particular sites and habitats.

One important BAP middle-list species is not placed: the click beetle ***Anostirus castaneus*** **RDB1** deserves mention, but the habitat in this NA as described in the RDB "sandy areas between rocky outcrops at the top of gritstone crags" does not easily fit into the available key habitats in the area profile, and is a rather precise habitat to add, in the absence of personal knowledge of the surroundings.

Natural Area: Vale of York and Mowbray 16				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Rivers & streams	Megaloptera Mollusca Coleoptera Diptera Ephemeroptera Plecoptera Trichoptera	*Sialis nigripes* Nb an alderfly ***Pseudanodonta complanata*** **Nb a freshwater mussel** - - - - -	natural flow regime; clean water; a mixture of shaded and open banks	local
Riverine fringe & ings	Coleoptera Diptera Hymenoptera Lepidoptera	***Panagaeus cruxmajor*** **pRDB1,** *Agonum livens* Nb, *Blethisa multipunctata* Nb: ground beetles *Stenus europaeus* Nb a rove beetle *Agabus uliginosus* Nb, *Rhantus grapii* Nb: water beetles *Selatosomus nigricornis* RDB3 a click beetle *Chrysogaster macquarti* Notable a hoverfly - -	emergent vegetation margins; undisturbed and exposed sediments; accumulations of flood litter; mosaic of open water and dense vegetation; summer drawdown to expose bare edge	
Heathlands	Coleoptera Orthoptera Hymenoptera Diptera Lepidoptera	***Amara famelica*** **pRDB3,** *Calathus ambiguus* Nb, *Miscodera arctica* Nb: ground beetles *Helochares punctatus* Nb a scavenger water beetle *Hygrotus decoratus* Nb a water beetle *Metrioptera brachyptera* Nb Bog Bush Cricket *Methocha ichneumonides* Nb a solitary wasp *Nomada robertjeotiana* RDB3 a nomad bee -	structural variety with a mosaic of open grass heath, short turf and bare ground in the dry areas and pools and damp grass heath in the wetter areas; some scrub	
Gravel pits	Coleoptera Hymenoptera Diptera Odonata	*Bembidion litorale* Nb a ground beetle *Argogorytes fargei* Na a solitary wasp - -	shallow water; mosaic of bare sand or gravel margins, ruderal grassland, herb-rich swards and scrub	
Vale of Pickering quarries & cliffs	Coleoptera Lepidoptera Hemiptera Hymenoptera	- - - -	mosaic of bare ground, ruderal grassland, herb-rich sward and scrub	
Mire included to cover Askham Bog	Coleoptera	***Dromius sigma*** **Na ground beetle** ***Hydroporus rufifrons*** **RDB2 diving beetle**		
Wet woodland	Lepidoptera Diptera	***Epione paralellaria*** **RDB3 Dark Bordered Beauty**		

Notes

Mire was added to take Akshm Bog into account as this siteis one of the historically richest sites in the Natureal Area. Wet wood s were added to cover woodland on the wetter parts of heathland.

Natural area: North York Moors and Hills 17				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Moorland	bugs beetles flies bees and wasps spiders	*Cosmotettix panzeri*, Nb, a leafhopper *Carabus nitens*, Nb, *Miscodera arctica*, Nb, *Bembidion nigricorne*, Nb, *Pterostichus aethiops*, Nb, *P. lepidus*, Nb, *Agonum ericeti*, Nb, *Cymindis vaporariorum*, Nb: ground beetles *Helophorus tuberculatus*, RDB3, a scavenger water beetle *Acalles ptinoides*, Nb, a weevil ***Tipula serrulifera* RDB1 cranefly** - *Hilaira nubigena*, Na, a money spider	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree drier areas: structural variety including open grass heath, very short turf and bare ground; light to moderate grazing pressure; nectar & pollen sources; flowering heather; dung; patches of gorse; birch both as young scrub and older trees with dead wood wetter areas: high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, *Myrica*, sallow	regional
Spring-line fen and flush	snails dragonflies bush crickets beetles caddisflies moths flies spiders	***Vertigo geyeri*, RDB1, Geyer's whorl snail** *Coenagrion pulchellum*, Nb, variable damselfly *Metrioptera brachyptera*, Nb, bog bush cricket *Cryptocephalus biguttatus*, RDB2, a leaf beetle *Grypus equiseti*, Nb, horsetail weevil - - *Tipula holoptera*, Nb, *Tipula limbata*, RDB3, a cranefly *Oxycera morrisii*, N, *O. pardalina*, N, *O. pygmaea*, N, ***Odontomyia hydroleon*, pRDB1**, *Stratiomys potamida*, N: soldier flies *Neoascia obliqua*, N, a hoverfly *Pherbellia argyra*, RDB2, *Psacadina zernyi*, RDB2: snail-killing flies -	constant water supply; calcareous influence; open and varied structure to vegetation; with or without partial shading; pollen and nectar sources nearby	national

Semi-natural; woodlands and parkland	beetles butterflies and moths flies ants, bees and wasps spiders snails and slugs	*Aeletes atomarius*, RDB3, a carrion beetle *Quedius ventralis*, Nb, a rove beetle *Agrilus laticornis*, Nb, a jewel beetle *Ampedus pomorum*, Nb, *Selatosomus impressus*, Nb, click beetles *Melasis buprestoides*, Nb, a false click beetle *Ancistronycha abdominalis*, Nb, blue soldier beetle *Platycis minuta*, Nb, a net-winged beetle *Ctesias serra*, Nb, cobweb beetle *Thymalus limbatus*, Nb, a domed fungus beetle *Tillus elongatus*, Nb, a chequered beetle *Hylecoetus dermestoides*, Nb, a timber beetle *Triplax scutellaris*, RDB3, a shiny fungus beetle *Pyrochroa coccinea*, Nb, black-headed cardinal beetle *Melandrya caraboides*, Nb, a false darkling beetle *Ischnomera cinerascens*, RDB2, *Oedemera virescens*, pRDB2: thick-legged flower beetles *Leptura sexguttata*, RDB3, *Saperda scalaris*, Na: longhorn beetles *Byctiscus betulae*, Nb, hazel leaf roller ***Boloria euphrosyne* Nb Pearl Bordered Fritillary** *Strymonidia w-album*, Nb, white-letter hairstreak *Discoloxia blomeri*, Nb, Blomer's rivulet ***Xestia rhomboidea*, Nb, square-spotted clay** ***Xylena exsoleta* Nb Sword-grass** *Ctenophora pectinicornis*, N, *Tipula hortorum*, RDB3: craneflies *Rhingia rostrata*, RDB3, *Pocota personata*, RDB2, *Xylota xanthocnema*, N: hoverflies ***Formica lugubris* local Northern Wood Ant** *Sapyga clavicornis*, Nb, a solitary wasp *Crossocerus binotatus*, Na, a solitary wasp - *Acicula fusca*, Nb, a point snail	wide variety of native trees and shrubs; wide age range of woody species; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; well-developed ground flora; depressions with pools seasonal or permanent and undisturbed hydrology; retention of old trees pollards, ancient hulks, nectar sources in parklands; dead wood, new generations of trees	national
Neutral grasslands	beetles moths	*Ctenicera pectinicornis*, Na, a click beetle *Adscita statices*, Nb, forester	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools	local

Limestone pastures	snails beetles butterflies and moths flies bees and wasps spiders	- *Cryptocephalus aureolus*, Nb, a leaf beetle *Adscita geryon*, Nb, cistus forester ***Aricia artaxerxes*, Nb, northern brown argus** *Hamearis lucina*, Nb, Duke of Burgundy ***Scotopteryx bipunctaria*, Nb, chalk carpet** *Perizoma taeniata*, Na, barred carpet - - **? *Bombus distinguendus* Nb Great Yellow bumblebee**	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transition to other habitats; management by grazing	regional
River and river fringe	molluscs stoneflies mayflies alderflies beetles caddisflies flies crustacea	***Pseudanodonta complanata* Nb Depressed river mussel** pre-1975 *Rhabdiopteryx acuminata*, Nb, a stonefly - *Sialis nigripes*, Nb, an alderfly *Trechus discus*, Nb, *Bembidion litorale*, Nb, *B. monticola*, Nb: ground beetles *Ochthebius exsculptus*, Nb, a small water beetle ***Synaptus filiformis* pRDB1 click beetle** *Rhyacophila septentrionis*, Nb, *Tinodes dives*, Nb: caddis *Dicranota guerini*, N, *Paradelphomyia fuscula*, Nb, *Erioptera nigripalpis*, RDB3: craneflies *Oxycera dives*, pRDB3, a soldier fly ***Psilocephala rustica* RDB3 stilettofly** ***Austropotamobius pallipes* local Crayfish**	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	regional
Coniferous woodlands	beetles moths flies	- - *Xylota coeruleiventris*, N, a hoverfly	sunny rides and glades fire-breaks with flowering herbs and scramblers; sunny chalky banks; standing dead wood; impeded drainage and pools	local
Bracken	flies	-	-	?local
Quarries and cuttings	snails beetles spiders	- *Longitarsus dorsalis*, Nb, a flea beetle *Sitona ononidis*, Nb, a weevil -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water	?local

Notes (17)

ISR records include a number from coastal habitats e.g. *Nebria livida* from Hunt and Boulby Cliffs, *Aepus robini* from Robin Hood's Bay; since no mention of such habitats is made in the area profile, I have assumed their inclusion to be an error.

Because of ignorance of the contained habitats in some localities, and the multiple habitats present in many of the better-recorded localities in this region, I may occasionally have erred in my placement, especially in assigning species to the flush/fen category; some may in reality have originated from other wetland habitats, especially if these are not highlighted in the area profile and thus not obviously available for placement of species.

Natural Area:Vale of Pickering 18				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
River, riparian fringe & Ings	Diptera Lepidoptera Coleoptera	*Stratiomys potamida* Nb Soldier fly *Eriogaster lanestris* Nb Small Eggar moth -	closed canopy providing shade and high humidity; alders, sallows; high water table leading to saturated ground; organic-rich seepages litter layer; shallow pools	Local
Heathlands	Lepidoptera	***Noctua orbona* Na Lunar yellow underwing moth**	structural variety including open grass heath, very short turf and bare ground; arable weeds food plants of some rare species; calcareous influence	Local
Gravel pits	Diptera Odonata	*Stratiomys potamida* Nb Soldier fly -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water; bare sandy or gravelly margins to water bodies	Local
Vale of Pickering quarries & cliffs	-			

Natural Area:Yorkshire Wolds 19				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Chalk grassland, chalk pits & cuttings	Lepidoptera Coleoptera Hemiptera Hymenoptera	*Bembicia scopigera* Nb Six-belted clearwing moth *Adscita statices* Nb Forester moth *Adscita geryon* Nb Cistus Forester moth ***Aricia artaxerxes* Nb Northern Brown Argus butterfly** ***Scotopteryx bipunctaria cretata* Nb Chalk Carpet moth** *Licinus depressus* Nb ground beetle *Cryptocephalus aureolus* Nb leaf beetle -	tussocky flower-rich sward; patches of bare ground; shelter provided by hedges, patches of scrub, sunny hot-spots	Local
Flamborough Head	Hymenoptera Coleoptera Lepidoptera	*Andrena nigriceps* Nb solitary bee *Barpeithes sulcifrons* Nb a weevil *Platyderus ruficollis* Nb a ground beetle ***Scotopteryx bipunctaria crenata* Nb Chalk Carpet**	herb-rich flora; bare rocks with crevices; natural erosion, no sea defences; some patches of vegetation on ledges	Local?
Woodland and scrub	Diptera Coleoptera Lepidoptera	*Playtcheirus discmanus* Nb hoverfly *Limonia trivittata* Nb cranefly *Pterostichus angustatus* NB ground beetle *Scoparia ulmella* Na pyralid moth	block and patches of bushes; associated grassland or heath with dry sandy areas and sunny, sheltered spots; flower-bearing species	Local
Springline flushes	Coleoptera Diptera	*Bembidion gilvipes* Nb, *Lebia chlorocephala* Nb ground beetles *Graptodytes granularis* Nb diving beetle *Tetanocera phyllophora* Nb snail-killing fly	continuity of springs and seepages; herb-rich fen vegetation; structurally diverse fen vegetation; open turf at seepages and springs; muddy or gravelly fringes; associated scrub mainly sallow, young birch and alder; open shallow pools and hollows; reed-beds	Local
Verge and Green Lane grasslands				
Wolds Dry Valleys	Lepidoptera Coleoptera	*Pediasia contaminella* Nb pyralid moth *Aphodius distinctus* Nb dung beetle	structural variety including scrub, open grassland and bare sandy ground; nectar & pollen sources	Local

Natural Area:Holderness 20				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Humber Estuary	Lepidoptera Diptera Coleoptera	*Apamea oblonga* Nb Crescent striped moth - -	undisturbed vegetation; herb-rich vegetation, especially with *Aster* and *Limonium vulgare* transitions to dry land and to freshwater seepages; sand and shingle bars	Local?
River Hull & Riparian Fringes	Ephemeroptera Diptera Coleoptera	*Heptagenia fuscogrise* Nb mayfly - -	mud shores and bars; accumulations of flood litter; exposed sandy banks	Local
Open water, wetlands & meres	Coleoptera Lepidoptera Diptera	*Gyrinus aeratus* Nb whirligig *Rhantus suturalis* Nb diving beetle *Donacia clavipes* Nb leaf beetle *Silis ruficollis* Nb soldier beetle *Chilodes maritimus* Nb Silky Wainscot moth *Tipula peliostigma* Nb cranefly	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation	Local
Neutral grassland	Homoptera Coleoptera	- -	struvtural variety including open grassland and bare ground; nectar & pollen sources	Local
Woodland and scrub	Coleoptera Lepidoptera Diptera	*Anthribus nebulosus* Nb weevil *Strymondia w-album* Nb White-letter hairstreak butterfly -	block and patches of bushes; associated grassland or heath; flower-bearing species mature trees and dead wood	Local
Coastal soft cliffs	Coleoptera Diptera Hymenoptera	*Nebria livida* Na, *Amara fulva* Nb, *Harpalus schaubergerianus* Nb: ground beetles - -	natural erosion though not too fast; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	Local

Notes

No BAP species are recorded in this natural area.

Natural Area: Humber Estuary 21				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Dune and marsh	leafhoppers and planthoppers beetles flies bees and wasps moths grasshoppers and crickets	*Macrosteles sordidipennis*, Nb, a leafhopper *Bembidion lunatum*, Nb, a ground beetle *Donacia clavipes*, a reed beetle *Dromius longiceps*, Na, a ground beetle *Dytiscus circumflexus*, a water beetle *Haliplus apicalis*, Nb, *Helophorus fulgidicollis*, Nb: crawling water beetles *Limnichus pygmaeus*, Na, a tiny marsh beetle *Notaris bimaculatus*, Nb, a weevil *Platycheirus immarginatus*, N, *Sphaerophoria loewi*, RDB2: hoverflies *Paroxyna absinthii*, a gall fly *Melieria picta*, a picture-winged fly - *Chilodes maritimus*, Nb, silky wainscot *Metrioptera roeselii*, Nb, Roesel's bush cricket	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dune system; undisturbed strandline litter and vegetation; dune slacks with open vegetation structure; grazing animals historically undisturbed saltmarsh vegetation; herb-rich vegetation, especially with Aster and Limonium; transitions to dry land and freshwater seepages; shallow pools, especially in upper levels swamp with reliable hydrological regime, with gradation from fully emergent to occasionally flooded vegetation and with variable extent of litter build-up grassland with consistent moderate grazing pressure; damp or periodically flooded depressions; saline seepages	Regional
Blow-wells	moss animals beetles flies	***Lophopus crystallinus*, RDB3, a moss animal** *Scarodytes halensis*, Nb, a water beetle -	shallow water; vegetated margins with emergent plants including Phragmites stands; slightly brackish water	Local
Lagoons	sea anemones & hydroids worms moss animals crustaceans beetles flies	*Cordylophora caspia*, Nb - - - *Gyrinus paykulli*, Na, a whirligig beetle -	unpolluted water; natural processes of seepage or saline intrusion	Local

Notes:
I'm not clear that I have seen all the relevant ISR data: the Natural Area, so far as I can tell on the map I have, includes an extensive area north of the Humber, apparently including Spurn Head: the data I have is mostly, if not entirely, from south of the Humber: if Spurn is meant to be in and isn't, the data I have used might be a rather poor reflection of what is available.

Subdivision of the "dune and marsh" category is tempting, in order to more precisely place the species and associate them with specific habitat needs, but there are too few species especially for dunes to make this very feasible.

I am not entirely clear of the separation between lagoon and marsh habitats. I have included water beetles from brackish ditches in the marsh and dune category; likewise with species associated specifically with reedbeds, since this habitat is not listed for lagoons. However, aquatic species of large bodies of standing brackish water are listed for lagoons. While this seems logical on the basis of the habitat lists provided, I think it may have separated some rather closely associated species, and has left the exclusively lagoon list rather short.

Natural Area: Humberhead Levels 22				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Neutral grassland	beetles	*Bembidion clarki*, Nb, a ground beetle *Trachys scrobiculatus*, Na, ground-ivy jewel beetle *Fleutiauxellus quadripustulatus*, Na beetle *Selatosomus nigricornis*, pRDB3, a click beetle *Hypera diversipunctata*, RDB3, a weevil	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools; consistent pattern of flooding in winter-flooded grasslands	Regional
	bugs	*Capsus wagneri*, Nb, a plantbug		
	moths	*Adscita statices*, Nb, forester		
Lowland raised mire	beetles	*Carabus nitens*, Nb, ***Bembidion humerale*, RDB1**, *Agonum ericeti*, Nb: ground beetles *Ilybius aenescens*, Nb, a water beetle *Helophorus tuberculatus*, RDB3, a crawling water beetle ***Curimopsis nigrita*, RDB1, mire pill beetle** *Cryptocephalus parvulus*, Nb, a leaf beetle *Curculio betulae*, Nb, a weevil	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	National
	flies	*Phaonia jaroschewskii*, RDB2, a muscid fly		
	bugs	*Micracanthia marginalis*, Na, a shorebug *Delphacodes capnodes*, Nb, a planthopper		
	moths	**? *Noctua orbona* Na Lunar Yellow Underwing**		
	dragonflies	*Ceriagrion tenellum*, Nb, small red damselfly		
	grasshoppers and crickets	*Metrioptera brachyptera*, Nb, bog bush-cricket		
	caddisflies	-		

Fen	snails beetles flies bugs bees and wasps moths caddisflies spiders	- *Blethisa multipunctata*, Nb, *Pterostichus anthracinus*, Nb, *Agonum livens*, Nb, *Chlaenius nigricornis*, Nb, ***Dromius sigma* Na,** *Dromius longiceps*, Na: ground beetles ***Hydroporus rufifrons*, RDB2**, *Acilius canaliculatus*, pRDB3: water beetles *Cercyon convexiusculus*, Nb, a crawling water beetle *Cryptorhynchus lapathi*, Nb, willow beetle *Dorytomus salicis*, Na, a weevil *Erioptera meijeri*, RDB2, a cranefly *Beris clavipes*, N, *Stratiomys potamida*, Nb: soldierflies *Euphranta toxoneura*, N, a gall fly *Chamaemyia paludosa*, RDB2, a fly *Sciomyza simplex*, N, a snail-killing fly *Stenomicra cogani*, pRDB3, a fly *Phaonia atriceps*, N, a muscid fly *Saldula fucicola*, Nb, a shorebug *Paralimnus phragmitis*, Nb, a leafhopper *Pemphredon clypealis*, RDB3, a solitary wasp *Chilodes maritimus*, Nb, silky wainscot - -	high water table; varied vegetation structure, including bare mud, tussocks, tall fen vegetation, scrub and carr; natural age structure and dead wood in wooded areas; reeds; small pools	National
Ponds and lakes	snails beetles flies bugs dragonflies	- *Graptodytes bilineatus*, RDB3, *Ilybius fenestratus*, Nb, *I. subaeneus*, *Agabus chalconatus*, Nb, Nb: water beetles *Bledius occidentalis*, pRDBK, a rove beetle *Donacia cinerea*, Nb, a reed beetle - - *Sympetrum sanguineum*, Nb, ruddy darter	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land	Regional

Ditches and drains	snails beetles flies bugs moths dragonflies caddisflies	*Gyraulus laevis*, Nb, smooth ramshorn *Hydrochus elongatus*, RDB3, *Helochares lividus*, Nb, *Enochrus melanocephalus*, Nb: crawling water beetles ***Laccophilus obsoletus* RDB2,** *Agabus uliginosus*, Nb: water beetles *Notaris bimaculatus*, Nb, a weevil - *Cicadula ornata*, Nb, a leafhopper *Perizoma sagittata*, Na, marsh carpet *Coenagrion pulchellum*, Nb, variable damselfly -	mixture of open water and dense vegetation; some emergent vegetation at margins; shallow margins, some well-vegetated; management by small-scale clearance, or on long rotation, or only as essential; well-structured bankside vegetation; semi-natural surrounding land; reliable hydrological regime; surrounding/bordering marshy zone	Regional
Hedgerows	beetles moths	- -	rotational management; tall broad hedges; dead wood; conservation headlands; hedgerow trees	?
Rivers	snails and mussels crustaceans beetles flies mayflies dragonflies caddisflies	*Succinea oblonga*, RDB3, an amber snail - - - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	?Regional
Woodland and trees	slugs and snails beetles	- *Melasis buprestoides*, Nb, a false click beetle *Pyropterus nigroruber*, Na, a net-winged beetle *Megatoma undata*, Nb, a museum beetle *Ptinomorphus imperialis*, Nb, a wood-boring beetle *Hylecoetus dermestoides*, Nb, a timber beetle *Rhizophagus picipes*, Na, a narrow bark beetle *Eledona agricola*, Nb, *Corticeus unicolor*, RDB3: darkling beetles *Melandrya caraboides*, Nb, a false darkling beetle *Platyrhinus resinosus*, Nb, cramp-ball fungus weevil *Magdalis cerasi*, Nb, a weevil *Pityogenes quadridens*, Na, a bark or ambrosia beetle	old trees; standing and fallen dead wood; wet areas and carr with undisturbed hydrology; fungal fruiting bodies on or associated with trees; open sunny sheltered spaces; wide variety of woody and herbaceous vegetation; pollen and nectar sources; well-structured margins and transitions to other habitats; wide age range of trees	Regional

Woodland and trees (cont.)	flies	*Limonia trivittata*, N, a cranefly *Systenus leucurus*, N, a dolichopodid fly *Criorhina ranunculi*, N, a hoverfly		
	bugs	-		
	bees, wasps and ants	*Chrysura radians*, Na, a rubytail wasp		
	butterflies and moths	*Synanthedon culiciformis*, Nb, Large Red-belted Clearwing *Strymonidia w-album*, Nb, White-letter Hairstreak ***Rheumaptera hastata*, Nb, Argent and Sable** ***Xestia rhomboidea* Nb Square-spotted Clay** *Orgyia recens*, pRDB3, Scarce Vapourer *Enargia paleacea*, Nb, Angle-striped Sallow		
	spiders	-		

Notes:

The subdivision of species amongst ditches, ponds and fens has not been an easy one, and some of the decisions taken may be rather random. The divisions of habitats do not seem especially happy ones for invertebrates.

The ISR records include those from Skipwith Common, which I know has dry and wet heathland and mire which do not find obvious homes in the habitat categories listed in the area profile: the site appears to be at the edge of the NA, but on the scale of map I have it is not possible to tell whether it is truly in or out. I have assumed the latter, since it seems unlikely that a habitat as important as heathland would be missed from the profile, and have therefore included no species recorded exclusively from Skipwith, irrespective of their habitat affiliations. However, there may be implications for other sites whose locations and contained habitats I do not know. Even with this removal, the listed habitats are rather short of slots for species preferring dry sandy situations, which are under-represented in the selection of characteristic species as a whole.
I have added a section for woodland and trees: partly this contains records from sites which do not obviously fit into any of the habitat categories included in the area profile; partly it contains records from woody vegetation which, although associated with the listed habitats, is not necessarily an integral part of them: separation of the woody vegetation category seems to be in the spirit of subdivision used in the remainder of the profile categories. It has been particularly useful for saproxylic species, but several phytophages are also included; token species associated with younger woody vegetation have been included in the bog and fen categories.
I have not been able to add species to the "hedge" category: some of the woodland species may belong there as well, but none of the records are unambiguously applicable to hedges as opposed to other woody places.

Natural Area: Southern Magnesian Limestone 23

Key Habitats	Invertebrate groups	Associated or significant species	Specific Needs	Significance in NA
Ancient semi-natural woodland	slugs and snails	*Acicula fusca*, Nb, a point snail	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; wet areas; fungal fruiting bodies on or associated with trees; well-structured margins with transitions to other habitats	Regional
	centipedes	*Lithobius muticus*, Nb, a centipede		
	beetles	*Pterostichus oblongopunctatus*, Nb, a ground beetle *Melasis buprestoides*, Nb, a false click beetle *Pyropterus nigroruber*, Na, *Platycis minuta*, Nb: net-winged beetles *Ctesias serra*, Nb, cobweb beetle *Ptinomorphus imperialis*, Nb, a wood boring beetle *Anisoxya fuscula*, Na, a false darkling beetle *Melandrya caraboides*, Nb, a false darkling beetle *Cryptocephalus parvulus*, Nb, a leaf beetle *Platyrhinus resinosus*, Nb, cramp-ball fungus weevil *Tropiphorus terricola*, Nb, *Acalles roboris*, Nb: weevils		
	flies	*Tipula nubeculosa*, N, *Limonia masoni*, RDB3, *L. trivittata*, N, *Molophilus corniger*, N: craneflies *Xylota florum*, N, a hoverfly *Lonchaea peregrina*, N, a fly		
	bugs	-		
	bees and wasps	-		
	butterflies and moths	*Strymonidia w-album*, Nb, white-letter hairstreak		
	spiders	-		
Scrub	beetles	-	blocks and patches of bushes; warm sheltered areas; associated grassland or other semi-natural habitat, with well-structured transition; varied age structure of woody species; leaf litter	Local
	flies	*Goniglossum wiedemanni*, N, a gall fly		
	butterflies and moths	*Eupithecia insigniata*, Nb, pinion-spotted pug		

Unimproved limestone grassland	slugs and snails beetles flies bugs bees and wasps moths spiders	*Truncatellina cylindrica*, RDB2, a whorl snail *Amara lucida*, Nb, a ground beetle *Euheptaulacus villosus*, Na, a dung beetle *Chrysolina violacea*, Nb, a leaf beetle *Ceutorhynchus resedae*, Nb, a weevil *Opomyza punctella*, pRDB3, a fly *Symphoromyia immaculata*, N, a snipe fly - ***Bombus subterraneus* Na Short-haired bumblebee** *Bembecia scopigera*, Nb, Ssix-belted Clearwing *Pancalia leuwenhoekella*, Nb, a tortricoid moth *Eupithecia pimpinellata*, Nb, Pimpinel Ppug *Syedra gracilis*, Nb, a money spider	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; areas of bare ground; shelter provided by hedges or patches of scrub; well-structured transitions to other semi-natural habitats; grazing animals	Regional
Neutral grassland	beetles butterflies and moths	- -	mosaic structure including tussocks; shelter provided by hedges or scrub; low-lying damp hollows or temporary pools; well-structured transitions to other semi-natural habitats	?
Base-rich flush	snails beetles flies	- - *Stratiomys potamida*, N, a soldierfly	constant water supply; calcareous influence; open structure to vegetation, with or without partial shading; pollen and nectar sources nearby	?
Streams	snails and mussels crustaceans beetles flies mayflies dragonflies stoneflies caddisflies	*Pisidium pulchellum*, Nb, a pea mussel - *Trechus discus*, Nb, ***Bembidion testaceum* Nb,** *B. fluviatile*, Nb, *B. litorale*, Nb: ground beetles *Haliplus laminatus*, Nb, a crawling water beetle *Agabus biguttatus*, Nb, a water beetle *Bledius erraticus*, Nb, a rove beetle *Gonomyia abbreviata*, pRDB3, a cranefly - - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	Local

Ponds	snails and mussels beetles flies bugs sawflies moths dragonflies caddisflies	*Lymnaea glabra*, RDB2, mud snail *Succinea oblonga*, RDB3, an amber snail ***Bembidion testaceum* Nb,** *B. clarki*, Nb, *Agonum scitulum*, Na; ground beetles *Graptodytes granularis*, Nb, *Ilybius fenestratus*, Nb: water beetles *Philonthus atratus*, Na, a rove beetle - - *Dolerus bimaculatus*, pRDB3, a sawfly - - -	mixture of open water and dense vegetation; shallow margins, some well-vegetated; management by small-scale clearance, or on long rotation, or only as essential; well-structured bankside vegetation; semi-natural surrounding land; reliable hydrological regime; marshy zone	Regional
Arable	beetles moths	- -	conservation headlands; hedgerows; buffer zones by water courses; seasonally flooded hollows; ruderal and annual plants	?

Natural Area: Coal Measures 24

Key Habitats	Invertebrate group	Associated or significant species	Specific needs	Significance in NA
acid grassland/ heathland mosaic	Diptera Hymenoptera, aculeates Homoptera Coleoptera Lepidoptera	*Ctenophora nigricornis* RDB3 cranefly *Andrena ruficrus* RDB3 solitary bee - - ***Dyscia fagaria* local Grey Scalloped Bar**	structural variety including open grassland and bare ground, nectar & pollen sources,	local; low importance
neutral grassland			mosaic structure including tussocks	low
calcareous grassland	Coleoptera	*Euhepaulacus villosus* Na scarab beetle *Meligethes brevis* pRDBk pollen beetle		local
moorland and upland	Coleoptera Diptera	ground beetles, craneflies	open mature heather stands, *Sphagnum* flushes and pools, bare peat, mossy stream margins, scree	local, but insuffiently studied
marshes and marshy grassland	Diptera Coleoptera Lepidoptera	- - -	light grazing and trampling, some winter flooding, no summer flooding, associated pools, strucutrally diverse sward	local

valley and subsidence wetlands	Coleoptera Diptera Crustacea	*Dromius sigma* and *Acupalpus flavicollis* Na ground beetles *Macroplea mutica* Na reed beetle *Pherbellia grisescens* Na snail-killing fly *Aphaniosoma socium* RDB1 small fly *Parhelophilus consimilis* RDB2 hoverfly *Prionocera pubescens* pRDB2 cranefly *Cheirocephalus diaphanus* Schedule 5, RDB2 fairy shrimp ?extinct	steady hydrological regime lower water table in summer, mixed short herb-rich grassland and scrub, pools and ponds,	national
rivers and streams	Coleoptera Diptera Hymenoptera Crustacea	ground beetle assemblages of shingle shores *Spiriverpa lunulata* stilletto fly *Erioptera nigripalpis* cranefly *Argogorytes fargei* solitary wasp ***Austropotamobius pallipes* local Native Crayfish**	natural flow regime, clean water, some shaded and some open banks, some emergent vegetation, undisturbed shingle and mud shores and bars, accumulations of flood litter, sand banks	local
canals	Coleoptera Odonata Mollusca	- - -	mosaic of open water and dense vegetation	local
mixed agriculture				
woodland	Lepidoptera Coleoptera Diptera Mollusca Hymenoptera	*Strymonidia w-album* white letter hairstreak ***Rheumatpera hastata* Nb Argent and Sable** ***Pechipogon strigilata*, Na, Common Fanfoot** *Euplectus nanus* RDBI beetle *Dryocoetinus alni* Na wood-boring beetle *Saperda carcharias* Na longhorn beetle *Nephrotoma crocata* RDB3 tiger cranefly *Ena montana* RBD3 snail ***Formica lugubris* local Northern Wood Ant**	wide variety of native trees and shrubs, flowery open spaces, pollen and nectar sources, standing and fallen dead wood, carr	local
parkland	Diptera Coleoptera	*Callicera aenea* hoverfly -	retention of old trees pollards, ancient hunlks, nectar sources, dead wood, new generations of trees,	local
urban	Coleoptera Diptera Hymenoptera Molluscs	*Psylliodes attenuata* leaf beetle - - -	ruderal plants, rubble, bare ground	local
quarries	Hymenoptera Coleoptera	*Andrena tibialis* Na solitary bee *Dromius sigma* Na ground beetle	bare ground, ruderal plants	local

Natural Area: Dark Peak 25				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
unimproved neutral grassland			mosaic structure including tussocks	
marshy grassland	Diptera Coleoptera Lepidoptera	*Eristalis rupium* Nb hoverfly - -	light grazing and trampling; some winter flooding, no summer flooding; associated pools; strucutrally diverse sward	local
acidic grassland	Homoptera Coleoptera	- -	structural variety including open grassland and bare ground; nectar & pollen sources	
dry heath / acidic grassland mosaic	Lepidoptera Coleoptera Diptera Hymenoptera, aculeates Arachnida Hemiptera	*Synanthedon culiciformis* Nb large red-belted clearwing moth *Amara curta* Nb ground beetle *Aphodius fasciatus* Nb dung beetle *Byrrhus arietinus* Nb pill beetle *Calliphora loewi* Nb blow fly - - -	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources especially provided at "heath verge"; flowering heather; dung; pioneer and degenerating heather;	local
dry dwarf shrub heath	Lepidoptera Coleoptera Hymenoptera, aculeates Diptera Arachnida Hemiptera	*Lita virgella* ling Nb micro moth *Calmomicrus circumfusus* gorse, broom Na leaf beetle - - - -	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources especially provided at "heath verge"; flowering heather; dung; pioneer and degenerating heather;	local
wet dwarf shrub heath	Lepidoptera Coleoptera Diptera Arachnida Hemiptera	***Rheumaptera hastata* Nb Argent and Sable** - - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch; *Myrica*	local
bare peat	Diptera Coleoptera	- -	moist to wet surface	

acidic flush	Coleoptera Diptera Lepidoptera Trichoptera	*Bembidion obliquum* Nb ground beetle *Hydroporus longulus* Nb, *Ilybius aeneascens* Nb, *Enochrus affinis* Nb: water beetles *Tipula holoptera* Nb cranefly - -	constant water supply; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local
basic flush	Coleoptera Diptera Lepidoptera Trichoptera Mollusca	*Hydroporus ferrugineus* Nb, *Agabus biguttatus* Nb, *Enochrus affinis* Nb: water beetles *? Cerapheles terminatus* Na malachite beetle *Notaris bimaculatus* Nb weevil - - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local
blanket bog	Diptera Coleoptera Lepidoptera Archnida	*Tipula grisescens* RDB3 cranefly - - -	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, sallow	local
raised bog	Orthoptera Diptera Coeoptera Lepidoptera	*Leucorrhinia dubia* Na white-faced darter dragonfly - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	local
bracken	a few specialist herbivores			
coniferous plantation	Coleoptera Diptera Hymenoptera Lepidoptera	*Agabus melanarius* pools Nb water beetle *Rhizophagus nitidus* Nb narrow bark beetle *Xylota coeruleiventris* Nb hoverfly - -	sunny rides and glades fire-breaks with flowering herbs and scramblers; sunny banks; standing dead wood; impeded drainage and pools	local

semi-natural woodland	Lepidoptera Coleoptera Diptera Hymenoptera Mollusca	*Synanthedon culiciformis* Nb large red-belted clearwing moth *Agabus melanarius* pools Nb water beetle *Ancistronycha abdominalis* Nb blue soldier beetle *Rhabdocerus gabriele* Nb false weevil *Barynotus squamosus* Nb, *Tropidophorus terricola* Nb: weevils *Xanthandrus comptus* Nb hoverfly *Calicera aurta* RDB3 hoverfly *Ectemnius ruficornis* Nb solitary wasp ***Formica lugubris* local Northern Wood Ant** -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; well-developed ground flora inlcuding *Mercurialis*	local
dead wood in woodland and in isolated trees	Coleoptera Diptera	*Hylecoetus dermistoides* Nb timber beetle *Epurea angustula* Nb pollen beetle *Rhizophagus nitidulus* Nb narrow bark beetle ***Ernoporus caucasicus* RDB1 bark beetle** *Hallomenus binotatus* Nb, *Melandrya caraboides* Nb false darkling beetles *Saperda scalaris* Na longhorn beetle -	standing and fallen dead wood; fungal fruiting bodies on or associated with trees; ancient hulks	local
Gritstone edges and boulder slopes	Coleoptera Isopoda	*Miscodera arctica* Nb ground beetle *Byrrhus arietinus* Nb pill beetle *Armadillidium pulchellum* limestone scree Nb woodlouse	scree, loose stones; sparsely vegetated turf.	local
landslips				
reservoirs and other standing water	Coleoptera Diptera Odonata Hemiptera Mollusca	*Bembidion obliquum* Nb ground beetle *Plateumaris affinis* Nb leaf beetle *Notaris bimaculatus* Nb weevil *Eristalis rupium* Nb hoverfly - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation; bare sediments at water margins	local
rivers and streams	Coleoptera Diptera	*Oreodytes davisi* Nb water beetle -	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed and eroding banks	local

Natural Area: Urban Mersey Basin 26				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Coastal dune, heath & cliff	many groups, especially Lepidoptera Coleoptera Diptera Hymenoptera Hemiptera Isopoda	*Cucullia absinthii* Nb Wormwood moth *Lasiocampa trifolii* Na Grass eggar moth *Lycia zonaria* RDB3 Belted beauty moth ***Cicindela hybrida* pRDB2 tiger ground-beetle** *Aphodius brevis* RDB1 dung-beetle *Bagous lutosus* pRDB1 weevil *Cleonus piger* Nb Large thistle-weevil *Dryops griseus* RDB3 long-toed water-beetle *Cheilosia mutabilis* Nb hoverfly *Colletes cunicularius* RDB3 Vernal colletes bee *Cleptes nitidulus* Na ruby-tailed wasp *Arachnospila wesmaeli* Na spider-hunting wasp *Monosynamma sabulicola* Nb grassbug *Armadillidium album* Nb pill woodlouse	dunes: natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; dune grasslands; herb-rich with structural diversity; dune slacks with reliable winter water supply; scattered scrub and woodland on hinterland cliffs: natural erosion though not too fast; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	National
Estuary, foreshore & saltmarsh	Lepidoptera Coleoptera Diptera Hemiptera	*Chilodes maritimus* Nb Silky wainscot moth *Hypocaccus rugiceps* Na carrion beetle *Dystiscus circumcinctus* Na diving-beetle *Culiseta longiareolata* pRDBK mosquito *Macrosteles sordidipennis* Nb leafhopper	estuaries with unpolluted transition from fresh to salt water; saltmarsh communities and rhine systems; exposed mud; shingles and rocks; foredunes with strandline vegetation and debris; seepages with constant water supply; lack of coastal pollution; open sand	Regional
Lowland heath	Coleoptera Arachnida Hymenoptera Lepidoptera Diptera Hemiptera	*Pterostichus angustatus* Nb, *Amara lucida* Nb: ground-beetles *Mecopisthes peusi* Nb money spider - - - -	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources; flowering heather; dung; patches of scrub	Regional
Mosses	Lepidoptera Diptera Coleoptera Orthoptera	*Mompha langiella* Nb micro-moth *Dicranota guerini* Nb cranefly ***Cryptocephalus decemmaculatus* RDB2 leaf-beetle** *Agonum ericeti* Nb, *Carabus nitens* Nb: ground-beetles *Metrioptera brachyptera* Nb Bog bush-cricket	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; birch and willow scrub	Local

Open water, canal, swamp & fen	Diptera Coleoptera aquatic insects Mollusca Lepidoptera Crustacea	*Neoascia obliqua* Nb hoverfly *Stratiomys potamida* Nb soldierfly *Limnophila apicata* Nb, *Phalacrocera replicata* Nb: craneflies *Ilybius subaeneus* Nb water-beetle *Hydropsyche fulvipes* Nb caddisfly *Pisidium pseudosphaerium* RDB3 orb-mussel - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation; with or without partial shade; active management; constant unpolluted water supply	Local
Clough woodlands	Coleoptera Diptera	*Cercyon ustualtus* Nb scavenging water-beetle *Neoascia obliqua* Nb hoverfly	semi-natural woodland; damp, shady environment; exclusion of grazing stock; wet rocks and small waterfalls with mosses; dead wood; standing and fallen timber	Local
River sections & road cuttings	Diptera Coleoptera flying insects	*Triglyphus primus* Nb hoverfly *Ceutorhynchus constrictus* Nb weevil	rivers: natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks verges: semi-natural vegetation; unintensive management; periodic mowing in sections on hay-meadow rotation; no fertiliser/herbicide/insecticide exposure	Local
Meadows	many groups, especially Coleoptera Diptera Lepidoptera Hemiptera	*Ceutorhynchus campestris* Nb weevil	flowers as nectar and pollen sources; flower-heads and seed-heads as larval food; periodic mowing in sections on hay-meadow rotation; no fertiliser/herbicide/insecticide exposure	Local

Parklands & small ancient semi-natural woodlands	many groups, especially Lepidoptera Coleoptera Diptera Mollusca	*Strymonidia w-album* Nb White-letter hairstreak butterfly *Synanthedon culiciformis* Nb Large red-belted clearwing moth *Abraeus granulum* Na saproxylic beetle *Pediacus depressus* Na flat bark-beetle *Conopalpus testaceus* Nb false darkling-beetle *Ctesias serra* Nb Cobweb beetle *Euplectus bonvouloiri rosae* Nb short-winged mould-beetle *Anaglyptus mysticus* Nb, *Stenostola dubia* Nb: longhorn-beetles *Aphodius zenkeri* Nb dung-beetle - -	parkland: retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; unimproved pasture or meadow grassland generally: wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology	National

[Difficulty in assigning non-duneland species recorded only from dune systems ie some woodland/scrubland/heathland/meadow species. Added category for ancient woodlands not in parks]

Natural Area: Mosses & Meres 27				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Flashes	Mollusca Crustacea Coleoptera Hemiptera	*Gyraulus laevis* Nb water snail *Gammarus duebeni* freshwater shrimp *Dytiscus circumflexus* Na diving beetle *Sigara stagnalis* boatman	brackish water; recently formed pools	Local
Meres	Odonata Coleoptera Lepidoptera Diptera Trichoptera Araneae Mollusca	*Brachytron pratense* Nb Hairy dragonfly *Coenagrion pulchellum* Nb Variable damselfly *Noterus crassicornis* Nb, *Ilybius fenestratus* Nb, *I. guttiger* Nb, *Helochares lividus* Nb, *Hydroporus neglectus* Nb: water beetles *Gyrinus paykulli* Na whirligig *Synanthedon formicaeformis* Nb Yellow-legged Clearwing *Phalacrocera replicata* N cranefly *Anasimyia lunulata* N hoverfly *Tetragnatha striata* Nn long-jawed spider *Entelecara omissa* Na, *Hypomma fulvum* Na: money spiders ***Vertigo moulinsiana* RDB3 Desmoulins' Whorl snail**	clean water, continuous water supply, shallow well-vegetated margins including beds of emergents; surrounding semi-natural vegetation	National
Mosses	Odonata Orthoptera Hemiptera Coleoptera Trichoptera	*Leucorhinia dubia* Na White-faced darter *Cordulia aenea* Nb Downy emerald *Metrioptera brachyptera* Nb Bog Bush crickert *Micracanthia marginalis* Na shore bug *Acilius canaliculatus* Nb diving beetle *Agonum ericeti* Nb ground beetle ***Cryptocephalus decemmaculatus* RDB2 leaf beetle** *Lathrobium rufipenne* RDB2 rove beetle *Phacopteryx brevipennis* Nb *Hagenella clathrata* RDB1	varied vegetation structure including bare wet peat, tussocks and dwarf scrub; encroaching birch scrub and some old birch to provide dead wood habitat; shallow pools; high water table; birch and sallow scrub; well-structured transitions to other habitats; pools and old peat diggings with *Sphagnum*.	National

Mosses cont.	Lepidoptera Diptera Araneae	*Coenonympha tullia* Large Heath *Buckleria paludum* pRDB3 plume moth **Eilema sericea* RDB2 Northern Footman *Idaea murivcata* Na Purple-borderd Gold ***Rheumaptera hastata* Nb Sargent and Sable** ***Cyclophora pendularia* RDB3 Dingy Mocha** *Carsia sororiata* Nb Manchester Treble-bar ***Mythimna turca* Nb Double Line** in associated woodland ***Schrankia taenialis* Nb White-lined Snout** in associated woodland *Atolmis rubricollis* Nb Red-necked Footman *Hybomitra lurida* pRDB3 horsefly *Parhelophilis consimilis* RDB2, *Xylota florum* N hoverflies *Sitticus floricola* RDB3 jumping spider *Carorita limnaea* RDB1 money spider		
Clough woodland	Coleoptera Diptera Lepidoptera Araneae	*Pterostichus oblongopunctatus* Nb groudn beetle *Megatoma undata* Nb museum beetle *Anitys rubens* Nb wood-boring beetle *Cryptarcha strigata* Nb sap beetle *Rhizophagus nitidulus* Nb narrow bark beetle *Mycetophagus piceus* Nb hairy fungus beetle *Annomatus diecki* pRDBK cerylonid beetle *Melandrya caraboides* Nb false darkling beetle *Dryocoetinus alni* Na bark beetle *Sphindus dubius* Nb slime mould beetle - ***Agynnis adippe* RDB2 High Brown Fritillary extinct** ***Mythimna turca* Nb Double Line**	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure, including sunny open spaces rides; well-structured margins with transitions to other semi-natural habitats	Local

Parkland/ pasture woodland	Coleoptera Diptera Lepidoptera	*Prionocyphon serricornis* Nb marsh beetle *Agrilus laticornis* Nb, *Agrilus sinuatus* Na: click beetles *Ctesias sera* Nb cobweb beetle *Dorcatoma flvicornis* Nb, *Anitys rubens* N: wood boring beetles *Hylecoetus dermestoides* Nb timber beetle *Rhizophagus picipes* Na narrow bark beetle *Mycetophagus piceus* Nb hairy fungus beetle *Cis festivus* Nb small fungus beetle *Prionychus ater* Nb darkling beetle *Conopalpus testaceus* Nb false darkling beetle *Plegaderus dissectus* Nb, *Abraeus granulum* Na: carrion beetles *Notolaemus unifasciatus* Na flat bark beetle - -	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees	Local
Lowland heathland	Hemiptera Lepidoptera Orthoptera Coleoptera Diptera Aculeata Araneae	*Aphrodes trifasciatus* Nb leaf hopper ***Plebejus argus* Nb Silver-studded Blue** *Crambus pratella* Nb pyralid moth *Perconia strigillaria* Nb Grass Wave *Furcata bicuspidata* Nb Alder Kitten moth *Metrioptera brachyptera* Nb Bog Bush cricket *Ceutorhynchus atomus* Na weevil; *Enochrus isotae* RDB3 water beetle - - *Sitticus floricola* RDB3 jumping spider	structural variety including open grass heath, very short turf and bare ground, and mature heather; rabbit or other disturbance; nectar & pollen sources; flowering heather; dung; patches of gorse and/or broom; birch and/or sallow both as young scrub and older trees with dead wood; shallow pools	Local?
Marl pits and ponds	Coleoptera Mollusca Odonata Diptera	***Hydrochara caraboides* RDB1 Lesser Silver water beetle**; *Enochrus isotae* RDB3 water beetle; *Dyticsus circumflexus*, Nb; *Agabus unguicularis* Nb - diving beetles **Lymnaea glabra* RDB2 mud snail *Coenagrion pulchellum* Nb, Variable damselfly; *Brachytron pratense* Nb Hairy dragonfly; *Sypetrum sanguineum* Nb Ruddy Darter -	shallow margins; mosaic of open water and dense vegetation; surrounding semi-natural habitat; beds of emergents; management nil or small-scale and infrequent	National
Canals	Coleoptera Odonata	- **Brachytron pratense* Nb Hariy Dragonfly ; *Gomphus vulgatissimus* Nb Club-tailed dragonfly	mosaic of open water and dense vegetation; varied and well-structured bordering vegetation, including scrub and trees	Local

Rivers	Odonata Coleoptera Trichoptera Mollusca Crustacea Diptera Ephemeroptera Plecoptera	*Platycnemis pennipes* Nb White-legged damselfly *Bembidion litorale* Nb, *Trechus rubens* Nb ground beetles *Plectrocnemia brevis* Nb, *Hydropsyche fulvipes* Nb caddis - - - - *Isogenus nubecula* pRDB2 stonefly	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; semi-natural bordering land; margins with emergent vegetation; undisturbed exposed sediments; accumulations of flood litter	Local
Fen meadows	Mollusca Coleoptera Diptera Lepidoptera	- - - -	high water table; some winter flooding, no summer flooding; associated pools; structurally diverse sward; well-structured margins, preferably including transition to scrub or trees	Local?
Lowland grassland	Coleoptera Diptera Hemiptera Lepidoptera Araneae	- - - - -	varied vegetation structure providing patches of short turf and taller flower-rich grassland and tussocks; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	
Swamp	Mollusca Coleoptera Diptera Hemiptera Araneae	- - *Dixella filicornis* Nb meniscus midge - -	consistently high winter water levels; partial summer drying; plant litter; infrequent management	

Notes Mosses & Meres

* indicates species assigned to habitats on the basis of their inclusion on lists of characteristic/significant species provided by regional staff.

There is considerable variance between lists of characteristic and significant species provided by regional staff and the species listed on the ISR print-out. This is particularly true for Lepidoptera. Riley 1991 The butterflies and moths of Shropshire was consulted to provide a third opinion, but the chief result was to produce further inconsistencies. As a result of uncertainty over the true statuses of some species listed for the natural area, a number of potentially significant species have been avoided in the lists. A few such species have been included: *Cyclophora pendularia* RDB3 is listed by the ISR for Whixall Moss with records for 1987, 1990, and 1991, but is not mentioned by the region or by Riley 1991, and would be well beyond the range usually given for it - if the records are correct, and are simply too recent to have reached published texts, then this is an important species, but if the records are erroneous its inclusion would be regrettable.

A number of other species listed by the region as characteristic or significant have been omitted from the table because they are considered too common or too weakly associated with particular habitat types to warrant inclusion, or because of uncertainty over their accuracy.

Natural Area: Potteries & Churnet Valley 28				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Ancent semi-natural woodland	Coleoptera Mollusca Diptera Hemiptera Lepidoptera Araneae	*Hylecoetus dermestoides* Nb timber beetle *Xyloterus signatus* Nb bark beetle *Rhizophagus nitidulus* Nb narrow bark beetle *Rhynchites cupreus* Nb leaf-roller weevil - - - - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure in woodlands, including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	Local?
Acidic grassland	Coleoptera Hemiptera Lepidoptera	- - -	Varied structure including tussocks and bare ground; maintenance by grazing; nectar sources and moderate scrub invasion advantageous	?
Neutral grassland	Coleoptera Lepidoptera	- -	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	?
Marsh/marshy grassland	Mollusca Coleoptera Diptera Hemiptera Lepidoptera Araneae	- - - - - -	light grazing and trampling; some winter flooding, no summer flooding; associated pools; structurally diverse sward	?
Heathland	Coleoptera Diptera Hemiptera Aculeata Lepidoptera Araneae	- - - - - -	structural variety including open grass heath, very short turf and bare ground, and mature heather; rabbit or other disturbance; nectar & pollen sources; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood	?

Rivers	Mollusca Crustacea Coleoptera Diptera Ephemeroptera Plecoptera Odonata Trichoptera	- ***Austropotamobius pallipes* local Crayfish** - - - - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; semi-natural bordering land; margins with emergent vegetation; undisturbed exposed sediments; accumulations of flood litter	Local?
Urban habitats: mine spoil and demolition sites	Coleoptera Diptera Hemiptera Aculeata Lepidoptera Araneae	- - - - - -	Varied physical and vegetation structure and substrate; varied age since last disturbance; presence of rabbits or other factors maintaining disturbance; avoidance of landscaping and flower-seeding	?

Notes

Characterisation of this area is rendered almost impossible by the dearth of records. It seemed that only two courses of action were possible - inclusion of all notable species recorded, or inclusion of none. I have opted for the former, because it is easier to remove information than to add it. However, it cannot honestly be said that the invertebrate records currently available accurately reflect anything other than the astonishing apparent lack of recording.

The listing of *Austropotamobius pallipes* is derived from regional lists.

Natural Area: South-west Peak 29				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Blanket mire	Diptera Coeoptera Lepidoptera Archnida	- - - -	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub birch, Myrica, sallow	local
Dwarf shrub heath wet?	Coleoptera Diptera Lepidoptera Arachnida Hemiptera	- - - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	local
Exposures of Namurian Millstone Grit		-		
Grassland	Homoptera Coleoptera	- -	structural variety including open grassland and bare ground; nectar & pollen sources	local
Soligenous/topogenous mires	Diptera Coleoptera Lepidoptera Trichoptera Mollusca	- - - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local
Streams and Rivers	Diptera Coleoptera Hymenoptera Ephemeroptera Plecoptera Trichoptera	*Neoascia obliqua* Nb hoverfly *Tetanocera punctifrons* Nb snail-killing fly - - - - -	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; sandy exposed banks	local
Woodland	Lepidoptera Diptera Coleoptera Mollusca	*Strymonidia w-album* Nb White Letter Hairstreak ***Argynnis adippe* RDB2 High Brown Fritillary extinct** *Swammerdamia compunctella* Nb small ermine moth *Beris fuscipes* Nb soldier fly - -	wide variety of native trees and shrubs; flowery open spaces; open spaces with bracken and violets; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; well-developed ground flora; depressions with marshy areas and pools seasonal or permanent	local
uncertain	Coleoptera	*Bromius obscurus* RDB1 a leaf beetle	rosebay willow-herb in possibly ruderal situations	
seasonal pools	Crustacea	old record: *Chirocephalus diaphanus* RDB2 Fairy shrimp	seasonal drying	local

Natural Area: White Peak 30				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Acidic grassland	Lepidoptera Homoptera Coleoptera	*Aethes piercei* Nb micro-moth - -	structural variety including open grassland and bare ground; nectar & pollen sources	local
Limestone grassland	Lepidoptera Coleoptera Hemiptera Hymenoptera Orthoptera	***Aricia artaxerxes* Nb Northern Brown Argus** *Aphelia unitana* pRBD2 tortrix moth *Adscita geryon* Nb Cistus Forester moth ***Scotopteryx bipunctaria cretata* Nb Chalk Carpet moth** *Eupithecia distinctaria constricta* Nb Thyme Pug moth ***Agrotis cinerea* Nb Light Feathered Rustic moth** *Ctenicera pectinicornis* Na click beetle *Licinus depressus* Nb ground beetle *Platydracus fulvipes* Nb rove beetle *Meligethes solidus* Nb pollen beetle *Brachysomus echinatus* Nb, *Orthochaetes setiger* Nb, *Ceutorhynchus trimaculatus* Nb: weevils *Drymus pilicornis* Nb ground bug - -	tussocky sward; patches of bare ground; shelter provided by hedges, scrub; flower-rich sward	?local
Neutral grassland, pastures and meadows	Coleoptera Lepidoptera Hemiptera Hymenoptera	*?Ctenicera pectinicornis* Na click beetle ?*Longitarsus ganglbarueri* Na leaf beetle *Platydracus fulvipes* Nb rove beetle - - *Psithyrus rupestris* Nb Hill Cuckoo bee	mosaic structure including tussocks	local
Heaths on limestone	Lepidoptera Coleoptera Hemiptera Hymenoptera, aculeates Orthoptera	*Aphelia unitana* RDB2 tortrix moth ***Agrotis cinerea* Nb Light Feathered Rustic moth** *Harpalus quadripunctatus* Na, *Amara curta* Nb, *Licinus depressus* Nb: ground beetles *Ceutorrhyncus atomus* Na leaf beetle *Brachysomus echinatus* Nb, *Orthochaetes setiger* Nb: weevils - - -	tussocky sward; patches of bare ground; shelter provided by hedges, scrub; flowers-rich sward	local

Limestone scrub	Coleoptera Diptera Lepidoptera	*Amara curta* Nb ground beetle *Orsodacne lineola* Nb leaf beetle *Limonia masoni* RDB3 crane fly *Cheilosia carbonaria* Nb, *Pipizella virens* Nb: hoverflies -	block and patches of bushes; associated grassland or heath; flower-bearing species	local
Limestone woodland	Lepidoptera Coleoptera Diptera Mollusca	*Strymonidia w-album* Nb White Letter Hairstreak *Ethmia funerella* pRDB3 micro-moth ?*Perizoma taeniata* Na Barred Carpet moth *Discoloxia blomeri* Nb Blomer's Rivulet moth *Altica brevicollis* Na flea beetle *Ancistronycha abdominalis* Nb Blue Soldier beetle *Malthodes fibulatus* Nb soldier beetle *Hylecoetus dermestoides* Nb timber beetle *Stenostola dubia* Nb longhorn beetle *Rhizophagus nitidulus* Nb narrow bark beetle *Enicmus brevicornis* Nb mould beetle *Platyparea discoidea* RDB2 picture-wing fly - on *Campanula* *Limonia masoni* RDB3, *Diogma glabrata* Nb: craneflies -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; well-developed ground flora including *Campanula latifolia*	?local
Damp woodland	Lepidoptera Coleoptera Diptera Mollusca	*Furcula bicuspis* Nb Alder Kitten moth *Acalles roboris* Nb weevil - *Limax tenellus* Nb Lemon Slug	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; well-developed ground flora; depressions with pools seasonal or permanent	local
Basic flush	Diptera Coleoptera Lepidoptera Trichoptera Mollusca	*Orimago virgo* Nb cranefly *Oxycera pardalina* Nb soldier fly; pre-1970 records *Agabus biguttatus* Nb diving beetle - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local
Limestone river and stream	Coleoptera Trichoptera Ephemeroptera Plecoptera Diptera Crustacea	*Bembidion monticola* Nb ground beetle - shaded running water riffle beetles including *Riolus subviolaceus* Nb *Tinodes dives* Nb, *Rhyacophila septentrionis* Nb: caddis - - *Limonia trivittata* Nb, *Dicranomyia ornata* Nb: craneflies ***Austropotamobius pallipes*** **local Crayfish**	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; accumulations of flood litter	local

Ponds	Coleoptera	water beeltes		
Limestone rock exposures	Lepidoptera Crustacea Mollusca	***Agrotis cinerea* Nb Light Feathered Rustic moth** *Armadillidium pulchellum* Nb pill woodlouse	sparse turf; limited scrub	local
Limestone scree	Lepidoptera Coleoptera Mollusca Crustacea	***Agrotis cinerea* Nb Light Feathered Rustic moth** *Harpalus quadripunctatus* Na ground beetle *Armadillidium pulchellum* Nb pill woodlouse -	limited scrub	local
Karst valley systems and tufa formations	Coleoptera Diptera	water beetles aquatic soldier flies	as for basic flushes	local

Natural Area: Derbyshire Peak Fringe & Lower Derwent Valley 31				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Aquatic and Swamp	Lepidoptera Coleoptera Diptera Mollusca Odonata Hemiptera	*Chilodes maritimus* Nb Silky Wainscot *Ochthebius bicolon* Nb small water beetle *Eristalis rupium* Nb hoverfly - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; surrounding marshy zone	local
Grassland limestone	Lepidoptera Orthoptera Coleoptera Hemiptera Hymenoptera, aculeates	*Adscita geryon* Nb Cistus Forester *Aricia artaxerxes* Nb Northern Brown Argus *Thera juniperata* Nb Juniper Carpet *Eupithecia distinctaria constricta* Nb Thyme Pug *Eupithecia pimpinellata* Nb Pimpinel Pug ***Scotopteryx bipunctaria cretica* Nb Chalk Carpet** - - - -	tussocky sward; flower-rich sward; patches of bare ground; shelter provided by walls and hedges; scrub including Juniper	local
Parkland	Coleoptera Hymenoptera Diptera	*Corticaria longicollis* pRDBK mould beetle ***Ernoporus caucasicus* RDB1 ambrosia beetle** *Mycetochara humeralis* Na, *Scaphidema metallicum* Nb, *Prionychus ater* Nb: darkling beetles *Xylostiba monilicornis* Nb a rove beetle *Ctesias serra* Nb Cobweb beetle *Dorcatoma flavicornis* Nb, *Anitys rubens* Nb: wood boring beetles *Thymalus limbatus* Nb domed fungus beetle *Hylecoetus dermestoides* Nb timber beetle *Rhizophagus nitidulus* Nb narrow bark beetle *Enicmus rugosus* Nb mould beetle *Mycetophagus piceus* Nb hairy fungus beetle *Conopalpus testaceus* Nb false darkling beetle *Stenostola dubia* Nb longhorn beetle *Crossocerus binotatus* Na solitary wasp -	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	national

Soligenous/topogenous mires	Diptera Coleoptera Lepidoptera Trichoptera Mollusca	- - ***Dyscia fagaria* local Grey Scalloped Bar** -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	
Woodland	Lepidoptera Coleoptera Diptera Hymenoptera Mollusca	*Ethmia funerella* pRDB3 micro-moth *Synanthedon vespiformis* Nb Yellow-legged Clearwing moth *Synanthedon culiciformis* Nb Large Red-belted Clearwing moth *Strymonidia w-album* Nb White Letter Hairstreak ***Rheumaptera hastata* Nb Argent and Sable moth** ***Xylena esoleta* Nb Sword-grass** *Discoloxia blomeri* Nb Blomer's Rivulet moth *Furcula bicuspis* Nb Alder Kitten moth *Mycetochara humeralis* Na darkling beetle *Stenostola dubia* Nb longhorn beetle *Epistophella euchroma* RDB3, *Xanthandrus comtus* Nb, *Didea fasciata* Nb, *Didea intermedia* Nb, *Melangyna guttata* Nb, *Melangyna triangulifera* Nb: hoverflies ***Formica lugubris* local Northern Wood Ant** *Limax tenellus* Nb Lemon Slug	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees	local ?national
Limestone outcrops	Isopoda Mollusca Coleoptera	*Armadillidium pulchellum* Nb pill woodlouse - -	scree, sparse turf	local

Natural Area: Sherwood 32				
Key Habitats	**Invertebrate group**	**Associated or significant species**	**Specific needs**	**Significance in NA**
ancient semi-natural woodland and wood pasture	saproxylic Coleoptera, Diptera and Arachnida	a large assemblage of rare and scarce saproxylic beetles including *Pyropterus nigroruber* Na net-winged beetle, *Corticeus unicolor* RDB3 darkling beetle, *Prionychus melanarius* RDB2 darkling beetle, *Saperda scalaris* Na longhorn beetle *Dendrochernes cyrneus* RDB3 false scorpion *Mastigusa macrophthalma* RDB3 cobweb spider	standing and fallen dead wood; ancient hulks; pollen and nectar sources; fungal fruiting bodies on or associated with trees	national
	other woodland groups: Lepidoptera Mollusca Diptera Coeloptera	A large assemblage of moths including: *Hemaris fuciformis* Nb Broad-bordered bee hawk moth *Enargia paleacea* Nb Angle-striped sallow moth *Synanthedon culiciformis* Nb Large red-belted clearwing moth *Boamoria roboraria* Nb Great oak beauty moth *Limax tenellus* Nb Lemon slug	wide variety of native trees, shrubs and ground flora; flowery open spaces; pollen and nectar sources; carr and damp woodland	local
caves	-			
dry heath and acidic grassland mosiac	Lepidoptera Coleoptera Hymenoptera, aculeates Arachnida	*Synanthedon vespiformis* Nb Yellow-legged clearwing moth *Perconia strigillaria* Nb Grass Wave moth *Clostera pigra* Nb Small Chocolate-tip moth *Actebia praecox* Nb Portland moth *Hippodamia variegata* Nb Adonis' ladybird *Tropidophorus terricola* Nb weevil *Pterostichus angustatus* Nb ground beetle *Ectemnius ruficornis* RDB3 solitary wasp *Zora silvestris* RDB2 ghost spider	structural variety including open grassland and bare ground; nectar & pollen sources; old sand-covered uprooted tree stumps	
open water	Coleoptera Crustacea Odonata Diptera Hemiptera aquatic insects	*Ilybius subaeneus* Nb diving beetle *Dytiscus circumflexus* Nb diving beetle ***Austropotamobius pallipes* local Crayfish** - -	rivers:- natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; sandy banks standing water:- mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land	

parkland	Coleoptera Diptera Arachnida	see woodland above	standing and fallen dead wood; ancient hulks; pollen and nectar sources; fungal fruiting bodies on or associated with trees	
wet dwarf shrub heath	none known			

Natural Area: Trent Valley and Rises 33				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Ancient semi-natural woodland	snails and slugs	-	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats	regional
	beetles	*Helophorus dorsalis*, Nb, a crawling water beetle *Plegaderus dissectus*, Nb, a carrion beetle *Platycis minuta*, Nb, a net-winged beetle *Hylecoetus dermestoides*, Nb, a timber beetle *Sphindus dubius*, Nb, a slime mould beetle *Orchesia minor*, Nb, a false darkling beetle *Ischnomera cyanea*, Nb, a thick-legged flower beetle *Magdalis carbonaria*, Nb, a weevil			
	butterflies and moths	*Strymonidia w-album*, Nb, white-letter hairstreak ***Boloria euphrosyne*, Nb, pearl-bordered fritillary** ***Agynnis adippe* RDB2 High Brown Fritillary extinct** ***Pechipogon strigilata*, Na, Common Fanfoot** *Enargia paleacea*, Nb, angle-striped sallow		
	flies	*Limonia trivittata*, Nb, a cranefly *Thaumastoptera calceata*, Nb, a cranefly *Cheilosia nebulosa*, RDB3, *Sphegina verecunda*, N, *Criorhina asilica*, N: hoverflies		
	spiders	-		

Parkland	beetles	*Quedius ventralis*, Nb, a rove beetle *Plectophloeus nitidus*, pRDB2, a short-winged mould beetle *Melasis buprestoides*, Nb, a false click beetle *Ctesias serra*, Nb, cobweb beetle *Dorcatoma serra*, Na, a wood boring beetle *Tillus elongatus*, Nb, a chequered beetle *Hylecoetus dermestoides* Nb, *Lymexylon navale* RDB2:timber beetles *Mycetophagus populi*, Na, a hairy fungus beetle *Helops caeruleus*, Nb, *Prionychus ater*, Nb, *Mycetochara humeralis*, Na: darkling beetles *Conopalpus testaceus*, Nb, a false darkling beetle *Scraptia testacea*, pRDB3, a tumbling flower beetle *Aderus oculatus*, Nb, an aderid beetle *Cryptocephalus querceti*, RDB2, a leaf beetle ***Ernoporus caucasicus*, RDB1, a bark beetle**	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees; other associated semi-natural habitats	national
Parkland cont.	moths flies false scorpions spiders	- *Metasyrphus latilunulatus*, N, *Psilota anthracina*, RDB2, *Xylota tarda*, N: hoverflies *Allochernes wideri*, RDBK, a false scorpion *Mastigusa macrophthalma*, RDB2, a cobweb spider *Lepthyphantes midas*, RDB2, a money spider		
Neutral grassland	bugs beetles moths flies spiders	- *Carabus monilis*, Nb, *Bembidion gilvipes*, Nb, *B. clarki*, Nb: ground beetles *Fleutiauxellus quadripustulatus*, Na, *Ctenicera pectinicornis*, Na, *Selatosomus nigricornis*, pRDB3: click beetles *Aphthona nigriceps*, Na, a flea beetle *Adscita statices*, Nb, forester ***Tyta luctuosa*, RDB3, four-spotted** - -	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools wet grasslands: light grazing and trampling; some winter flooding, no summer flooding; associated pools; structurally diverse sward	regional

Calcareous grassland	snails bugs beetles moths flies bees, wasps and ants spiders	- - *Longitarsus dorsalis*, Nb, a flea beetle *Squamapion cineraceum*, Na, a seed weevil *Trachyphloeus asperatus*, Nb, *Orthochaetes setiger*, Nb, *Rhynchaenus pratensis*, Nb: weevils *Ethmia dodecea*, Nb, a micro-moth *Philereme vetulata*, Nb, brown scallop ***Scotopteryx bipunctaria*, Nb, chalk carpet** *Eupithecia pimpinellata*, Nb, pimpinel pug ***Agrotis cinerea*, Nb, light feathered rustic** - - -	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transition to other habitats; management by grazing	local
Heathland	bugs beetles caddisflies moths flies spiders	- - - ***Noctua orbona* Na Lunar Yellow Underwing** - -	dry heathland: structural variety including open grass heath, very short turf and bare ground; rabbit or other disturbance; nectar & pollen sources; arable weeds food plants of some rare species; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood wet heathland: high water table; varied vegetation structure including small patches of bare peat; shallow pools; birch and sallow scrub; well-structured transitions to other habitats raised bog: high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	?

Standing water	snails and mussels dragonflies beetles caddisflies moths flies spiders	- *Coenagrion pulchellum*, Nb, variable damselfly *Sympetrum sanguineum*, Nb, ruddy darter *Agonum scitulum*, Nb, *Acupalpus consputus*, Nb: ground beetles *Haliplus heydeni*, Nb, a crawling water beetle *Noterus crassicornis*, Nb, *Graptodytes granularis*, Nb, *Ilybius fenestratus*, Nb, *I. subaeneus*, Nb, *Rhantus grapii*, Nb, *R. suturalis*, Nb, *Dytiscus circumflexus*, Nb: water beetles *Hydrochus carinatus*, RDB3, *Hydrochus elongatus*, RDB3, *Helophorus nanus*, Nb, *Anacaena bipustulata*, Nb, *Helochares lividus*, Nb, *Berosus signaticollis*, Nb: scavenger water beetles *Dryops similaris*, pRDB3, a long-toed water beetle *Platystethus nodifrons*, a rove beetle *Donacia dentata*, Na, a leaf beetle - *Phalonidia alismana*, Nb, a tortrix moth *Pilaria scutellata*, Nb, a cranefly -	mixture of open water and dense vegetation; some emergent vegetation at margins; shallow margins, some well-vegetated; management by small-scale clearance, or on long rotation, or only as essential; well-structured bankside vegetation; semi-natural surrounding land; reliable hydrological regime; surrounding/bordering marshy zone	regional
Moving water	snails and mussels dragonflies mayflies stoneflies beetles flies crustaceans	- *Platycnemis pennipes*, Nb, White-legged damselfly - - *Scarodytes halensis*, Nb, *Hydraena nigrita*, Nb, *Limnebius nitidus*, Nb, *Limnebius papposus*, Nb: water beetles *Aromia moschata*, Nb, musk beetle *Rhaphium rivale*, N, a dolichopodid fly ***Austropotamobius pallipes*** **local Crayfish**	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	local

Swamp	snails bugs beetles moths flies spiders	- - *Blethisa multipunctata*, Nb, *Bembidion fumigatum*, Nb, *Pterostichus anthracinus*, Nb, *P. gracilis*, Nb, *Agonum livens*, Nb: ground beetles *Cercyon convexiusculus*, Nb, *Cercyon tristis*, Nb: scavenger water beetles *Notaris bimaculatus*, Nb, a weevil *Senta flammea*, Na, flame wainscot *Colobaea bifasciella*, N, a snail-killing fly -	consistently high winter water levels; partial summer drying; plant litter; infrequent management	regional
Arable	beetles moths	- -	conservation headlands; hedgerows; buffer zones by water courses; seasonally flooded hollows; ruderal and annual plants; old trees; replacement generations of trees	?local

Notes

A number of suggestions for associated and significant invertebrates were included in the area profile data supplied. The lists produced above overlap with these, but are based on ISR data for the most part: only two species have been included which were included in profile data but not on the ISR: the moths *Philereme vetulata* and *Scotopteryx bipunctaria* on calcareous grassland.

There is potential difficulty in assigning invertebrate species to habitat categories, especially amongst wetlands water margin /swamp for example : I suspect in some cases the decision could only have been made with confidence at the time the record was made.

No species have been included in the arable category, though the profile data supplied suggested *Strymonidia w-album* as a "declining/extinct" species; a number of species recorded from the area could easily occur in hedgerows and hedgerow trees *Platyrhinus resinosus*, *Eriogaster lanestris*, for example but appear not in practice to have been recorded from such situations or, possibly, records relating to these habitats have not reached the ISR, because they do not readily fall into "sites".

Natural Area: North Lincolnshire Coversands and Clay Vales 34				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Limewoods on clay	Coleoptera Lepidoptera Diptera Araneae	[1]*Trachys minuta* RDB2 jewel beetle [1]*Bytiscus betulae* Na Haxel Leaf-roller weevil **[1]*Ernoporus tiliae* RDB1, [1]*Ernoporus caucasicus* RDB1: bark beetles** [1]*Pyropterus nigroruber* Na net-winged beetle [1]*Leptura sexguttata* RDB3 longhorn *Thecla betulae* Nb Brown Hairstreak [2]*Eupithecia egenaria* RDB3 Pauper Pug *Photedes fluxa* Na Mere Wainscot *Photedes extrema* RDB3 Concolorous - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; active lime coppice; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure , including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	National
Oak & alder woods on fen-edge gravels	Aculeata Mollusca Coleoptera Diptera Lepidoptera Araneae	*Formica rufa* wood ant - - - - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure , including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats; carr; steady water table	Local?
Plantation woods on former heathland	Coleoptera Lepidoptera Araneae	?*Pityogenes quadridens* Na ambrosia beetle - -	Well-structured margins and transitions wityh other habitats; retention of some dead wood; sheltered open spaces; wide age range of trees	Local?
Ancient semi-natural woodland on coversands	Coleoptera Lepidoptera Diptera Araneae	*Pterostichus oblongopunctatus* Nb ground beetle **[1]*Cryptocephalus coryli* RDB1 leaf beetle** *Enargia paleacea* Nb Angle-striped Sallow *Hemaris fuciformis* Nb Broad-borderd Bee Hawk *Clostera pigra* Nb Small Chocolate-tip *Orgyia recens* pRDB3 Scarce vapourer *Tipula livida* N cranefly -	old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure, including sunny open spaces and well-spaced trees; well-structured margins with transitions to other semi-natural habitats	National

Gravel pits and flooded quarries	Odonata Coleoptera Diptera Hemiptera	*Coenagrion pulchellum* Nb Variable damselfly *Brachytron pratense* Nb Hairy dragonfly *Hydroglyphus pusillus* Nb, *Noterus crassicornis* Nb, *Graptodytes granularis* Nb, *Scarodytes halensis* Nb, *Ilybius fenestratus* Nb, *Laccobius sinuatus* Nb: diving beetles *Phalacrocera replicata* N cranefly -	clean water; early successional stages; mixture of bare and vegetated water margins; shallow margins; well-structured margins, including swamp, scrub and trees; small pools; seasonally flooded hollows and damp depressions; varied vegetation structure on dry land, including bare ground, sparse herbaceous vegetation, tussocks and scrub; abundant nectar plants	Local
Neutral grasslands	Coleoptera Lepidoptera	- -	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	Local?
Cultivated/ disturbed land: arable	Coleoptera Lepidoptera	- -	conservation headlands; hedgerows; ruderal and annual plants; regular management	?
Limestone grassland including quarries	Coleoptera Lepidoptera Diptera Hemiptera Aculeata Araneae Mollusca	*Hemitrichapion reflexum* Na weevil *Ceutorhynchus geographicus* Nb leaf beetle **Lampyris noctiluca* Glow-worm *Bembecia scopigera* Nb Six-belted clearwing ***Scotopteryx bipunctaria* Nb Chalk carpet** - - - - -	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; bare ground; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	Local
Limestone grass heath	Diptera Mollusca Coleoptera Hemiptera Aculeata Araneae	*Trixoscelis marginella* N, *Meonura neglecta* RDB3, *M. freta* RDBK small flies *Phthiria pulicaria* N bee-fly *Urophora solstitialis* RDB3 picture-winged fly - - - - -	mosaic of vegetation structure, including bare ground, sparse herbaceous vegetation, areas of mos and lichen domination, and tussocky grassland; rabbit grazing and digging	Local?

Calcareous flush	Diptera Mollusca Coleoptera	*Oxycera pardalina* - -	constant water supply; open-structured vegetation; pollen and nectar sources nearby	Local?
Drains and ditches	Coleoptera Mollusca Diptera Odonata	*Haliplus mucronatus* Na, *Hygrotus quinquelineatus* Nb, *Laccobius sinuatus* Nb, *Limnebius nitidus* Nb, *Limnebius papposus* Nb: water beetles - - -	mixture of open water and dense vegetation; some emergent vegetation at margins; shallow margins, some well-vegetated; management by small scale clearance, or on long-term rotation, or only as essential; well-structured bankside vegetation	Local
Running water	Coleoptera Trichoptera	*Oulimnius rivularis* Na, *Riolus cupreus* Nb, *Riolus subviolaceus* Nb: riffle beetles *Rhyacophila septentrionis* Nb		
Dry heath/acid grassland mosaic	Coleoptera Diptera Hemiptera Lepidoptera Aculeata Araneae	*Orthocerus clavicornis* Nb beetle *Nephrotoma crocata* RDB3 tiger cranefly *Globiceps juniperi* Nb grass bug *Adscita statices* Nb Forester moth *Pachynemia hippocastanaria* Nb Horse Chestnut moth - -	structural variety including open grass heath, very short turf and bare ground, and mature heather; rabbit or other disturbance; nectar & pollen sources; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood	Local
Wet heathland & valley mire	Orthoptera Coleoptera Diptera Hemiptera Lepidoptera Araneae	*Metrioptera brachyptera* Nb Bog bush cricket *Agabus uliginosus* Nb, *Acilius canaliculatus* pRDB3: diving beetles *Enochrus affinis* Nb, *E. ochropterus* Nb: scavenger water beetles - - - -	varied vegetation structure including bare wet peat, tussocks and dwarf scrub; shallow pools; high water table; birch and sallow scrub; well-structured transitions to other habitats	Local

Notes

ISR data includes records from Wansford Pastures. There is a Wansford Pastures in Cambridgeshire, with which the records seem consistent. The placement of this site in area 34 has been assumed to be erroneous wrong grid referencing, TF for TL, could account for wrong positioning.

A significant number of recent records from this area do not appear in the ISR print-out. Some of these appear inthe lists of characteristic/significant species supplied by the Region, and many of these can be traced to published sources. To confirm and enhance the data provided, therefore, a small number of publications have been consulted: Key 1996 The Lincolnshire Naturalist 241, 1-17; Waring 1997 Entomologist's Record 1091-2, 1-9; Godfrey 1994 Transactions of the Lincolnshire Naturalists' Union 233, 170-179.

A number of characteristic/significant species listed by the region have not been listed, either because they are not considered sufficiently scarce, because they are not sufficiently restricted to the habitat under consideration, or because other species on the ISR listing are considered to provide more suitable substitutes.

There is ambiguity/duplication in the key conservation features as listed in the spreadsheets: the heath/grassland mosaic includes habitat codings for wet heath and valley mire; but wet heath is also listed as a separate key feature, without the inclusion of valley mire. In the present table, dry heath/acid grassland has been separately listed from wet heath & valley mire. This adds a third combination, and potentially increases confusion, but appears logical from an invertebrate viewpoint.

"Limestone grassland" has been extended to cover quarries, not explicitly the case in the spreadsheet data provided.

The separation of "ancient semi-natural woodlands on coversands" makes the separation of species associated with heathland scrub difficult, and so makes it more difficult to bring out the value of scrub on heathland. I have not felt able to change this, on the available data, without abolishing the heathland/woodland distinction, which has seemed unwise without knowing more of the reason for their separation. However, the value of transitional and intermediate states is not fully brought out at present and the effective separation of all species associated with larger woody plants from those associated with open heathland effectively diminishes the perceived importance of heathland as a whole in the natural area. The assignment of species to the coversand woodland category has followed regional listings, though the species involved are mostly on the ISR listing also. From an invertebrate viewpoint alone, I feel the two habitat categories would be better amalgamated.

The species listed for "Limestone grass heath" tend to belong to rather obscure groups, and their inclusion rather flies in the face of the instructions which came with the contract. However, they are rare species, they have so far only been recorded in the natural area from the key habitat in question, and there are no species from better-known groups with which to replace them at present. The choice is therefore to leave the key habitat almost devoid of listed species, or to include species of relative obscurity. I have opted for the latter: if thought too obscure, the species can be easily erased.

Natural Area: Lincolnshire Wolds 35				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Signifi-cance in NA**
Chalk grassland	Mollusca Hemiptera Coleoptera Lepidoptera Hemiptera Hymenoptera, aculeates Orthoptera	*Helix pomatia* Nb Roman Snail *Agallia brachyptera* Nb a leafhopper - - - - -	tussocky flower-rich sward; patches of bare ground; shelter provided by hedges, patches of scrub	
Acid grassland	Homoptera Coleoptera Hymenoptera, aculeates	- - -	structural variety including open grassland and bare ground; nectar & pollen sources	
Neutral grassland	Diptera Coleoptera Lepidoptera	- - -	mosaic structure including tussocks	
Calcareous marshes and flushes	Coleoptera Diptera Lepidoptera Trichoptera Mollusca	*Cercyon ustulatus* Nb a scavenger water beetle *Tropiphorus terricola* Nb a weevil *Gnophomyia viridipennis* Nb cranefly *Vanoyia tenuicornis* Nb soldier fly - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	
Chalk streams	Coleoptera Diptera Hymenoptera Ephemeroptera Plecoptera Trichoptera	*Riolus cupreus* Nb riffle beetle - - - - -	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; accumulations of flood litter	
Arable farmland	Lepidoptera	-	conservation headlands; hedgerows; buffer zones by water courses; disturbed soil on waysides; ruderal and annual plants used as host plants and nectar and pollen sources	

Wold-edge woods	Coleoptera Lepidoptera Diptera Mollusca	*Pyropterus nigroruber* Na a net-winged beetle *Strymonidia w-album* Nb White Letter Hairstreak *Hemaris fuciformis* Nb Broad-bordered Bee Hawk - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees;	
Lower Cretaceous exposures and Arctic fossil faunas				
Chalk Wolds and Glacial Exposures				

Natural Area: Lincolnshire Coast and Marshes 36				
Key Habitats	**Invertebrate group**	**Associated or significant species**	**Specific needs**	**Significance in NA**
arable	Lepidoptera		conservation headlands; hedgerows; buffer zones by water courses	local
blow-wells and clay pits	Coleoptera Bryozoans Diptera	*Gyrinus paykulli* Na whirligig beetle *Macroplea mutica* Na reed beetle *Dromius longiceps* Na ground beetle several scarce water beetles of brackish water e.g. *Haliplus apicalis, Helophilus fulgidicollis, Agabus conspersus* ***Lophopus crystallinus* RDB3 moss animal** -	shallow water; vegetated margins with emergent plants including *Phragmities* stands; slightly brackish water	regional
intertidal mud and sand		*Bembidion ephippium* Na, *Dicheirotrichus obsoletus* Nb: Ground beetles	open substrate with vegetated edges; some shallow pools	local
neutral grassland		-	mosaic structure including tussocks	low
rivers, streams and ditches	Coleoptera Diptera	*Oulimnius major* Na riffle beetle - -	natural flow regime; clean water; some shaded and some open banks, some emergent vegetation; undisturbed mud shores and bars; accumulations of flood litter; representation of all stages of hydrosere in ditch systems;	local
lagoons	Amphipoda Coleoptera	***Gammarus insensibilis* RDB3 Lagoon sand shrimp** -	shallow brackish water	national
saltmarsh	Coleoptera Diptera Hymenoptera Lepidoptera	*Pogonus littoralis* Nb, *P. luridipennis* pRDB3, *Dicheirotrichus obsoletus* Nb: ground beetles *Agabus conspersus* Nb, *Helophorus fulgidicollis* Nb, *Enochrus bicolor* Nb: water beetles *Bledius bicornis* Na, *Carpelimus foveatus* Nb:a rove beetles *Dolichosoma lineare* Nb a malachite beetle *Platycheirus immarginatus* Notable a hoverfly *Colletes halophilus* Na a mining bee *Pediasia aridella* Nb a pyralid moth ***Cuculia asteris* Nb Star-wort** *Eupethicia extensaria* RDB3 Scarce Pug moth	historically undisturbed vegetation; herb-rich vegetation, especially with *Aster tripolium* and *Limonium vulgare*; transitions to dry land and to freshwater seepages;	regional

sand dune grassland	Coeloptera Hemiptera Diptera Lepidoptera	- - - -	herb-rich with structural diversity;	local
wet dune slacks	Odonata Coleoptera Diptera Lepidoptera	*Brachytron pratense* Nb Hairy dragonfly *Coenagrion pullchellum* Nb Variable damselfly *Sympetrum sanguineum* Nb Ruddy Darter ***Panagaeus cruxmajor* pRDB1,** *Dromius longiceps* Na: ground beetles *Limonia ventralis* Notable a cranefly ***Athetis palustris* RDB3 Marsh Moth**	dune slacks with reliable winter water supply	
sand dune scrub	Lepidoptera	*Gelechia hippophaella* pRDB2 micro-moth ***Xestia rhomboidea* Nb Square-spotted Clay**	Scrub, especially Hippophae	local
open sand dunes and gravel ridges	Lepidoptera Diptera Coleoptera Hemiptera	*Platytes alpinella* pRDB3, *Cynaeda dentalis* pRDB3, *Gymnancyla canella* Na, *Crambus pratella* Nb: micro-moths *Eilema pygmaeola* RDB3 Pigmy footman moth *Agrotis ripae* Nb Sand Dart *Photedes elymi* Na Lyme grass moth *Salticella fasciata* RDB2 snail-killing fly *Cleonus piger* Nb weevil -	natural physiographic processes leading to fore-dune, dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system	national
sea-bank grassland	Diptera Hymenoptera Coleoptera Hemiptera	*Sphaerophoria loewi* RDB2 hoverfly *Colletes halophilus* Na mining bee *Panagaeus bipustulatus* Nb a ground beetle *Macrosteles sordipennis* Notable a leafhopper	herb-rich with structural diversity; patches of bare ground on sunny side	regional
Wold-edge woods	Lepidoptera Coleoptera Diptera Mollusca	***Pechipogon stigilata* Na Common fan-foot moth** - - -	wide variety of native trees and shrubs, flowery open spaces, pollen and nectar sources, standing and fallen dead wood	local
habitat?	Coleoptera	***Panageus crux-major* RDB1 ground beetle**	[SALTFLEETBY-THEDDLETHORPE]	local
fenland, carr	Lepidoptera	*Pelosia muscerda* RDB3 Dotted footman moth ***Athetis pallustris* RDB3 Marsh moth**		local

Notes

Xestia rhomboidea Nb Square-spotted Clay BAP middle list is a woodland species found at Saltfleetby, not in Wold-edge woods.

Natural Area: The Fens 37				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Topogenous fen `true fenland'	Coleoptera Diptera Lepidoptera Odonata Hemiptera Arachnida Mollusca	*Dytiscus dimidiatus* RDB3, *Agabus undulatus* RDB3, *Enochrus ochropterus* Nb: water beetles *Blethisa multipunctata* Nb a ground beetle ***Obera oculata* RDB1 longhorn** *Pherbellia dorsata* Notable a snail-killing fly *Odontomyia tigrina* Notable a soldier fly *Perizoma sagittata* Na Marsh Carpet *Photedes fluxa* Nb Mere Wainscot *Coenagrion pulchellum* Nb Variable Damselfly *Microvelia buenoi umbricola* RBD3 a water cricket *Agnocoris reclairei* Notable a plant bug - -	constant water supply with high water table; structural diversity; mixture of vegetation age with cut or grazed areas; some scrub including willows; mosaic of open and shaded areas; variety of water bodies	national
Wet heath	Coleoptera Diptera Lepidoptera Hemiptera Arachnida	*Bembidion fumigatum* Nb a ground beetle *Anacaena bipustulata* Nb a scavenger water beetle *Colobaea punctata* Notable a snail-killing fly *Neoascia geniculata* Notable a hoverfly - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub especially birch	regional
Grasslands	Diptera Lepidoptera Coleoptera Hymenoptera flying insects	- **? *Heliophobus reticulatus* Nb Bordered Gothic** **? *Cucullia lychnitis* Na striped lychnis** - -	flower-rich sward with nectar and pollen sources; mosaic of structure from bare ground to tussocks; some shelter provided by hedges or scrub	local
Swamp	Diptera Coleoptera Lepidoptera Mollusca	*Neoascia geniculata* Notable a hoverfly *Colobaea bifasciella* Notable a snail-killing fly *Blethisa multipunctata* Nb a ground beetle *Rhantus grapii* Nb, *Ilybius fenestratus* Nb: water beetles *Chaetarthria seminulum* Nb a scavenger water beetle - -	steady hydrological regime, probably with lower water table in summer; some open water with a mosaic of different structures of emergent and submerged vegetation	regional

Woodland	Coleoptera Hemiptera Diptera Lepidoptera Mollusca	*Ampedus quercicola* Nb a click beetle *Cryptorhynchus lapathi* Nb a weevil *Diaperis boleti* RDB2 a darkling beetle **? *Rhynchaenus testaceus* pRDB2 weevil** on alder *Edwardsiana alnicola* Nb a leafhopper - ***Cuculia asteris* Nb Star-wort** ***Cosmia diffinis* Na White-spotted Pinion** -	variety of native trees and shrubs; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; carr; seepages	regional
Ditches and open water	Coleoptera Diptera Odonata Mollusca Hemiptera	*Haliplus heydeni* Nb a crawling water beetle *Graptodytes bilineatus* RDB3, *Scarodytes halensis* Nb: water beetles *Gyrinus distinctus* RDB3 a whirligig *Neoascia interrupta* Notable a hoverfly *Sympetrum sanguineum* Nb Ruddy Darter *Libellula fulva* RDB3 Scarce Chaser *Valvata macrostoma* RDB2 a valve snail ***Segmentina nitida* RDB1 Shining Ramshorn snail** -	mosaic of open water to dense vegetation; shallow margins; variable flow rates in ditches; variation in ditch managment	regional
Soligenous fen	Coleoptera Diptera Lepidoptera Odonata Hemiptera Mollusca	*Gymnetron villosulum* Na a weevil *Pherbellia brunnipes* Notable a snail-killing fly *Macrochilo cribrumalis* Nb Dotted Fan-foot *Sympetrum sanguineum* Ruddy Darter *Agnocoris reclairei* Notable a plant bug -	constant water supply with high water table; calcareous influence; structural diversity with a mixture of vegetation age; mosiac of open and shaded aeas; variety of water bodies	regional
Upper Jurassic clays with fossils Upper Jurassic fossil-rich limestones		-		
Holocene deposits of fenland		-		

Dry heath	Coleoptera Diptera Hymenoptera Lepidoptera Hemiptera Arachnida	*Brachinus crepitans* Nb a ground beetle *Ceutorhynchus punctiger* Nb a weevil *Cheilosia cynocephala* Notable a hoverfly *Thereva plebeia* Notable a stiletto fly *Argogorytes fargei* Na a solitary wasp *Hylaeus signatus* Nb a yellow-faced bee ***Bombus ruderatus* Nb Large Garden Bumblebee** - - -	structural variety including open grass heath, short turf and bare ground; some grazing and disturbance by rabbits; nectar and pollen sources; some scrub	regional
Arable	flying insects Lepidoptera Hymenoptera Coleoptera	- - - -	conservation headlands; hedgerows; buffer zones by water courses; nectar and pollen sources; some bare ground	local

Notes

Gammarus insensibilis RDB3 Lagoon Sand Shrimp BAP middle list occurs on the coast.

Natural Area: Lincolnshire and Rutland Limestone 38				
Key Habitats	**Invertebrate group**	**Associated or significant species**	**Specific needs**	**Significance in NA**
arable	Lepidoptera	-	conservation headlands; hedgerows; buffer zones by water courses	low
calcareous clay woodlands	Lepidoptera Coleoptera Diptera Pseudoscoipones	*Epiblema grandaevana* pRDB1 micro-moth *Strymonidia pruni* RDB4 Black Hairstreak *Photedes extrema* RDB3 Concolorous moth *Procraeus tibialis* pRDB3 click beetle *Helophorus dorsalis* Nb water beetle *Trachys minuta* pRDB2 jewel beetle *Trachys scrobiculatus* Na ground-ivy jewel beetle *Osphya bipuncata* RDB3 false darkling beetle *Nephrotoma crocata* RDB3 tiger cranefly *Tipula hortorum* RDB3, *Limonia masoni* RDB3: craneflies *Cheilosia chrysocoma* RDB3 hoverfly *Dendrochernes cyrneus* RDB3 false scorpian	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; damp areas within openings; shallow pools	national
calcareous flush	Diptera Mollusca Coleoptera	*Oxycera analis* RDB2, *O. terminata* RDB2: soldierflies ***Vertigo moulinsiana* RDB3 Desmoulins' Whorl snail** -	open short-fen with wet hollows; active springs; tall *Carex* tussocks	local
calcareous scrub	Diptera Coleoptera Lepidoptera	*Limonia masoni* RDB3 cranefly *Epitrix atropae* Nb Belladona flea beetle-	patchy scrub; hot-spots; flowering shrubs	local
calcareous streams		-	natural flow regime, clean water; some shaded and some open banks, some emergent vegetation; accumulations of flood litter	local
flooded quarries	Coleoptera Diptera Odonata	*Hydrochus carinatus* RDB3, *H. ignicollis* RDB3: water beetles - -	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water	local
limestone grass heath	Coleoptera Lepidoptera Hemiptera Hymenoptera, aculeates Orthoptera	***Harpalus parallelus* pRDB3,** *H. azureus* Nb, *Platyderus ruficollis* Nb:ground beetles - - - -	tussocky sward; patches of bare ground; shelter provided by hedges, scrub; flowers-rich sward	local

limestone grassland	Lepidoptera Coleoptera Diptera Hemiptera Hymenoptera, aculeates Orthoptera	*Tyta luctuosa* RDB3 Four-spotted moth *Meligethes bipunctatus* pRDBK tumbling flower beetle *Smicronyx reichi* pRDB3, *Miarus graminis* Nb, *Miarus plantarum* pRDB3, *Brachysous echinatus* Nb: weevils *Apion astragali* Nb seed weevil *Brachinus crepitans* Nb Bombardier beetle *Machimus rusticus* RDB2 robberfly *Urophora solstitialis* pRDB3 picture-wing fly - - -	tussocky sward; patches of bare ground; shelter provided by hedges, scrub; flowers-rich sward	local
Lincolnshire Limestone		-		
marshes and marshy grassland	Coleoptera Diptera Lepidoptera	*Longitarsus dorsalis* Nb leaf beetle - -	light grazing and trampling, some winter flooding, no summer flooding, associated pools, strucutrally diverse sward	local
neutral grasslands		-	mosaic strucutre including tussocks	low
ponds	Coleoptera Odonata	*Hydrochus elongatus* RDB3 water beetle *Scarodytes halensis* Nb diving beetle -		local
parkland [GRIMSTHORPE?]	Coleoptera	-	standing and lying dead wood; ancient hulks; nectar and pollen sources; continuity of trees	local

Natural Area: Charnwood 39				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Ancient semi-natural woodland & parkland	many groups, especially Lepidoptera Coleoptera Diptera Mollusca	*Thecla betulae* Nb Brown hairstreak butterfly *Strymonidia w-album* Nb White-letter hairsteak butterfly *Photedes fluxa* Nb Mere wainscot moth ***Pechipogo strigilata* Na common fan-foot moth** *Ctesias serra* Nb Cobweb beetle *Aphodius zenkeri* Nb dung beetle *Anaglyptus mysticus* Nb longhorn beetle *Prionocera subserricornis* pRDB2 cranefly *Xylota tarda* Nb hoverfly -	generally: wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology parkland: retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; unimproved pasture or meadow grassland	National
Acidic grassland/ heathland mosaics	Lepidoptera Coleoptera Homoptera Hymenoptera, aculeates	*Idaea sylvestraria* Nb Dotted-border wave moth *Caenopsis fissirostris* Nb weevil *Bradycellus distinctus* Na, *Pteristichus angustatus* Nb: ground beetles *Scymnus femoralis* Nb ladybird - -	structural variety including open grassland and bare ground; nectar & pollen sources	Regional
Neutral grasslands	Coleoptera Lepidoptera	*Ctenicera pectinicornis* Na click beetle *Adscita statices* Nb Forester moth	mosaic structure including tussocks	Local
Standing water & streams	Odonata Coleoptera Diptera Trichoptera Hemiptera Hymenoptera Ephemeropter Plecoptera Mollusca Crustacea	*Sympetrum sanguineum* Nb Ruddy darter dragonfly *Hydroglyphus pusillus* Nb, *Scarodytes halensis* Nb, *Ilybus subaeneus* Nb water beetles *Helochares lividus* Nb scavenging water-beetle *Bembidion fumigatum* Nb ground beetle *Dixella filicornis* Nb meniscus midge *Tinodes pallidulus* pRDB1 caddisfly - - - - - ***Austropotamobius pallipes* local Crayfish**	standing: mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land streams: natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	Local

Deep river gorges	Coleoptera Diptera Lepidoptera Mollusca	- - - -	wide variety of native trees and shrubs; pollen and nectar sources; carr woods; streams and seepages; unimproved grasslands; open rock exposures and screes	Local
Natural and artificial rock exposures	Hymenoptera Coleoptera	- -	Open rock surfaces and screes; varied shade and aspect; scattered scrub	Local

Natural Area: Needwood & South Derbyshire Claylands 40				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Lowland grassland	Lepidoptera flying insects	*Thera juniperata* Nb Juniper carpet moth	tussocky, flower-rich sward; occasional scrub and small trees; calcareous grasslands with small areas of bare ground and light grazing; conserve juniper bushes	Regional
Semi-natural woodlands, including carr woods and old parklands	Many groups, especially Lepidoptera Coleoptera Diptera Mollusca	*Strymonidia w-album* Nb White-letter hairstreak butterfly *Furcula bicuspis* Nb Alder kitten moth ***Schrankia taenialis* Nb White-lined snout moth** ***Cryptocephalus decemmaculatus* RDB1 leaf beetle** *Saperda scalaris* Na longhorn beetle *Ampedus pomorum* Nb click beetle *Mycetochara humeralis* Na darkling beetle *Ctenophora atrata* Nb feathered cranefly -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology parkland: retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	Regional
Reservoirs and gravel pits	Odonata Coleoptera Diptera Hemiptera Mollusca	*Sympetrum sanguineum* Nb Ruddy darter dragonfly - - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation	Local
Subsidence mires and heathland	Odonata Coleoptera Tichoptera Diptera Lepidoptera aquatic insects	*Leucorrhinia dubia* Na White-faced darter dragonfly *Hyperaspis pseudopustulata* Nb ladybird *Enochrus affinis* Nb scavenging water-beetle *Hagenella clathrata* RDB1 caddisfly - - -	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; scrub	Regional
Swamp	aquatic insects	-	constant water supply; occasional scrub; areas of open water	Local
Inland saltmarshes	Diptera Coleoptera	*Neobisium maritimum* Nb pseudoscorpion -	herb-rich vegetation; transitions to dry ground; brackish and freshwater seepages	Local
Agricultural land	Lepidoptera Coleoptera	- -	hedgerows and trees; small streams and drains; patches of species-rich grassland; small ponds and marshy areas; conservation headlands in arable land	Local

[Notes: included mention of parklands, also heathland, carr woods and gravel pits. Difficult to know how to assign the Chartley Moss 'bog' fauna]

Natural Area: Shropshire Hills 42				
Key habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Broadleaved woodland	beetles	*Cantharis obscura*, Nb, a soldier beetle *Ctesias serra*, Nb, cobweb beetle *Pyrochroa coccinea*, Nb, black-headed cardinal beetle *Conopalpus testaceus*, Nb, a false darkling beetle *Stenostola dubia*, Nb, a longhorn beetle *Rhynchites olivaceus*, Na, a leafroller weevil	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology; well-structured margins with transitions to other habitats; wet areas with high water table; closed canopy over some wet areas; shallow pools	regional
	butterflies	*Leptidea sinapis* Nb Wood White ***Boloria euphrosyne*, Nb, pearl-bordered fritillary**		
	moths	*Parascotia fuliginaria*, Nb, waved black		
	flies	-		
	spiders	-		
	molluscs	-		
Moorland and heathland	snails	-	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree dry heath: structural variety including open grass heath, very short turf and bare ground; rabbit or other disturbance; nectar & pollen sources; arable weeds food plants of some rare species; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood wet heath: high water table; varied vegetation structure including small patches of bare peat; shallow pools; birch and sallow scrub; well-structured transitions to other habitats flushes and mires: constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby; structurally mixed vegetation; scrub, especially of willow and birch	?local
	bugs	-		
	beetles	*Hydroporus longulus*, Nb, a water beetle		
	caddisflies	-		
	moths	-		
	flies	-		
	spiders	-		

Semi-natural grassland	snails bugs beetles butterflies and moths flies bees and wasps woodlice spiders	- - - - - - *Armadillidium pulchellum*, Nb, a pill woodlouse -	neutral: varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transition to other habitats; management by grazing calcareous: varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transition to other habitats; management by grazing	?local
Rivers and streams	snails and mussels dragonflies stoneflies mayflies beetles caddisflies flies larger crustaceans	- *Platycnemis pennipes*, Nb, white-legged damselfly - - *Hydroporus ferrugineus*, Nb, a water beetle - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	?local

Notes

Interpretation has been hampered by a dearth of records. The total ISR list for the area seems roughly the quantity of scarce species that might be hoped for in a single day's fieldwork at one site for one person, and must surely indicate further untapped information sources. All listed ISR species have been included and one, *Leptidea sinapis,* added from the area profile provided.

Natural Area: Midlands Plateau 43				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Signifi-cance in NA**
Broadleaved woodland	Molusca	*Limax tenellus* Nb Lemon slug	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure in woodlands, including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	National
	Coleoptera	*Pterostichus oblongopunctatus* Nb ground beetle *Dendoxena quadrimaculata* Nb *Agrilus laticornis* Nb jewel beetle ***Gnorimus nobilis* pRDB2 chafer** *Hylecoetus dermestoides* Nb *Pyrhochroa coccinea* Nb cardinal beetle *Oncomera femorata* Nb *Phytodecta decemnotata* Nb *Strangalia nigra* Na longhorn *Curculio villosus* Nb weevil		
	Trichoptera	*Eniocyla pusilla* RDB3 caddis		
	Lepidoptera	*Leptidea sinapis* Nb Wood White *Synanthedon vespiformis* Nb *Strymonidia w-album* Nb White-letter Hairstreak ***Boloria euphrosyne* Nb Pearl-bordered Fritillary** ***Agynnis adippe* RDB2 High Brown Fritillary extinct** *Furcula bicuspis* Nb *Enagia paleacea* Nb ***Pechipogon strigilata* Na Common Fan-foot** *Sciota hostilis* pRDB1 ***Trichopteryx polycommata* Na Barred-toothstripe moth** ***Rheumatpera hastata* Nb Argent and Sable** ***Minoa murinata* Nb Drab Looper** ***Cosmia diffinis* Na White-spotted Pinion**		
	Diptera	*Laphria marginata* N robberfly *Ferdinandea ruficornis* Nb, *Sphegina verecunda* N, *Chalcosyrphus eunotus* RDB2, *Criorhina asilica* Nb, *Xylota abiens* Nb, X. *florum* Nb, X. *tarda* Nb, X. *xanthocnema* Nb: hoverflies		
	Hemiptera	-		
	Aculeata	-		
	Araneae	-		

Parkland	Coleoptera Diptera Lepidoptera	Likely to share a large proportion of the saproxylic species found in ancient woodland, and seapartion of the species from the two habitats far from clear.	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees	?
Acid grassland	Coleoptera Hemiptera Araneae	- - -	varied vegetation structure providing both bare ground and tussocky vegetation; availability of nectar sources; scrub; well-structured transitions to other semi-natural habitats	Local at most
Neutral/calcareous grassland	Coleoptera Lepidoptera Diptera Hemiptera Araneae Mollusca	*Ctenicera pectinicornis* Na click beetle *Bembecia scopigera* Nb Six-belted Clearwing mth *Pancalia luwenhoekella* Nb *Eupithecia pimpinellata* Nb Pimpinel Pug *Catarhoe rubidata* Nb Ruddy Carpet *Scopula ornata* Na Lace Border *Idaea sylvestraria* Nb Dotted-border Wave ?* ***Asilus crabroniformis*** **Nb Hornet Robberfly** - - -	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	Local
Dry heathland	Coleoptera Lepidoptera Diptera Hemiptera Aculeata Araneae	*Cryptocephalus parvulus* Nb, ***C. coryli*** **RDB!:** leaf beetles *Synanthedon culiciformis* Nb Large red-belted clearwing *Synanthedon spheciformis* Nb White-barred clearwing *Perconia strigillaria* Nb Grass wave moth ***Noctua orbona*** **Na Lunar yellow underwing** *Crambus hamella* Nb pyralid micro-moth *Thereva plebeja* N stiletto fly ***Bombylius discolor*** **Nb bee-fly** - - -	structural variety including open grass heath, very short turf and bare ground, and mature heather; rabbit or other disturbance; nectar & pollen sources; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood	Local

Post-industrial sites & urban commons	Coleoptera Diptera Aculeata Hemiptera Araneae	*Amara fulva* Nb, *A. praetermissa* Nb: ground beetles *Hippodamia variegata* Nb Adonis' ladybird *Paroxyna absinthii* Nb picture-winged fly *Pipizella virens* N hoverfly *Oxycera morrisii* N, *Vanoyia tenuicornis* N: water soldierflies *Tachytrechus consobrinus* N dolichopodid fly *Colobaea punctata* N, *Pherbellia brunnipes* N, *P. dorsata* N snail-killing fly *Hylaeus signatus* Nb Large yellow-face bee *Andrena tibialis* Na solitary bee *?Nomada lathburiana* RDB3, *?N. pleurosticta* Na: nomad bees - -	varied vegetation structure; ruderal plants; bare ground; rubble; shelter provided by scrub, excavations or structures; abundant flowering plants; varied times since last disturbance; well-drained substrates; varied topography; shallow temporary or permanent pools	Local
Marshy grassland	Mollusca Coleoptera Diptera Hemiptera Lepidoptera Araneae	- - - - - -	light grazing and trampling; some winter flooding, no summer flooding; associated pools; structurally diverse sward	?
Wet heath	Orthoptera Coleoptera Lepidoptera Diptera Hemiptera Araneae	*Metrioptera brachyptera* Nb Bog bush cricket *Helophorus tuberculatus* RDB3 water beetle *Crambus uliginosellus* Nb grass moth - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch; transitions to other semi-natural habitats	?Local
Swamp	Coleoptera Diptera Hemiptera Araneae Mollusca	*Donacia obscura* Na, *D. thalassina* Na: reed beetles *Anthomyza bifasciata* N mining fly *Neoascia geniculata* N hoverfly *Phaonia atriceps* N muscid fly - - -	consistently high winter water levels; partial summer drying; plant litter; infrequent management	Local
Valley bog	Diptera Coleoptera Hemiptera Araneae	*Chrysogaster macquarti* N hoverfly - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	?Local

Lakes & ponds	Odonata Mollusca Coleoptera Diptera	*Coenagrion pulchellum* Nb Variable damselfly *Sympetrum sanguineum* Nb Ruddy darter - - -	mosaic of open water and dense vegetation; shallow margins; reliable hydrological regime; semi-natural surrounding land	Local
Canals	Crustacea Coleoptera Odonata	***Austropotamobius pallipes* Crayfish** - -	mosaic of open water and dense vegetation; well-structured bordering vegetation with a semi-natural component	Local
Rivers	Crustacea Odonata Neuroptera Trichoptera Diptera Coleoptera Ephemeroptera Plecoptera	***Austropotamobius pallipes* Crayfish** *Gomphus vulgatissimus* Nb Club-tailed dragonfly *Platycnemis pennipes* Nb White-legged dragonfly *Sisyra terminalis* Nb Sponge lacewing *Oxypoda riparia* PRDBK rove beetle *Hydropsyche fulvipes* N caddis *Limnophila apicata* N cranefly - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; semi-natural bordering land; margins with emergent vegetation; undisturbed exposed sediments; accumulations of flood litter	?Local

Notes

Separation of invertebrate species into habitat categories has been difficult. This has been particularly true for woodland/parkland species, and for species associated with various categories of wetland, but also for woodland/heathland species. There are particular difficulties because a number of important sites have multiple habitats, because some of the habitats have many species in common, because the habitat categories already applied are not mutually exclusive "urban commons" could include anything and because for a number of sites not known to me it is not immediately apparent, either from their names or from the species recorded from them, what habitat or combination of habitats is present. I am inclined to wonder whether in this, perhaps more than any other natural area for which I have examined data, the subdivision of habitats reflects the importance of their character for invertebrates. The fact that important invertebrate sites often contain a mix of habitats and transitions is not brought out. Perhaps it would be difficult to do so, but subdivision of major sites into multiple component habitats runs the risk of apparently belittling the their overall importance.

Lists of characteristic and significant species provided by regional staff include a considerable number of invertebrates. There is considerable overlap between those in the present table and those in the pre-existing lists, but a number of spoecies have been omitted because they were considered too common or too poorly associated with the the feature in question to warrant inclusion, and also on a number of occasions because they are members of relatively obscure groups which do not carry significance beyond that also provided by better-known species. There are a number of species on the regional lists which do not appear on the ISR, and though there is no reason to doubt any of the records, there has been a general tendency when slimming down lists of species to preferentially remove those species without ISR backup.

* Records of *Asilus crabroniformis* and *Austropotamobius pallipes* are based on lists of characteristic species from regional staff.

Natural Area: Midland Clay Pastures 44				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific Needs**	**Significance in NA**
Ancient broadleaved woodland & parkland	slugs and snails	-	woodland: wide variety of native trees and shrubs; flowery open spaces; well-developed stands of scrub of varied ages; pollen and nectar sources; old trees; standing and fallen dead wood; wet areas and carr; fungal fruiting bodies on or associated with trees; well-developed ground flora; well-structured margins with transitions to other habitat parkland: retention of old trees; nectar sources; new generations of trees; good supply of dead wood in a wide variety of sizes and positions; non-intensively managed grassland between trees; other associated habitats	Regional
	beetles	*Pterostichus oblongopunctatus*, Nb, a ground beetle *Plegaderus dissectus*, Nb, a carrion beetle *Dendroxena quadrimaculata*, Nb, a sexton beetle *Quedius ventralis*, Nb, a rive beetle *Agrilus laticornis*, Nb, a jewel beetle *Melasis buprestoides*, Nb, a false click beetle *Hylecoetus dermestoides*, Nb, a timber beetle *Prionychus ater*, Nb, a darkling beetle *Ischnomera cyanea*, Nb, a thick-legged flower beetle *Grammoptera variegata*, Na, *Stenostola dubia*, Nb: longhorn beetles *Phytodecta decemnotata*, Nb, a leaf beetle *Altica brevicollis*, Na, a flea beetle *Rhynchites cavifrons*, Nb, a leafroller weevil		
	flies	*Curculio villosus*, Nb, a weevil *Ctenophora pectinicornis*, N, a cranefly *Laphria marginata*, N, a robber fly ***Bombylius discolor* Nb bee-fly** *Platycheirus discimanus*, N, *Cheilosia nebulosa*, RDB3, *Eumerus ornatus*, N, *Criorhina asilica*, N: hoverflies		
	bugs	-		
	sawflies	*Periclista pubescens*, pRDB3, a sawfly		
	bees and wasps	-		
	butterflies and moths	*Boarmia roboraria*, Nb, great oak beauty **? *Boloria euphrosyne* Nb Pearl Bordered Fritillary** **? *Agynnis adippe* RDB2 High Brown Fritillary** extinct *Leptidea sinapis*, Nb, wood white *Photedes fluxa*, Nb, mere wainscot		
	spiders	*Strymonidia w-album*, Nb, white-letter hairstreak ***Trichopteryx polycommata*, Na, barred tooth-striped** ***Rheumatpera hastata* Nb Argent and Sable**		
		-		

Ponds, marsh and wet grassland	snails and mussels beetles flies bugs moths dragonflies caddisflies spiders	*Lymnaea glabra*, RDB2, mud snail *Pterostichus gracilis*, Nb, a ground beetle *Graptodytes granularis*, Nb, a water beetle *Ilybius fenestratus*, Nb, a water beetle *Gyrinus aeratus*, Nb, a whirligig beetle *Hydrochus elongatus*, RDB3, *Cercyon bifenestratus*, Na, *Helochares lividus*, Nb, *Berosus luridus*, Nb: scavenger water beetles *Platystethus nodifrons*, Nb, a rove beetle *Donacia thalassina*, Nb, a reed beetle *Phytobius comari*, Nb, a weevil *Stratiomys potamida*, N, a soldierfly *Platycheirus perpallidus*, N, a hoverfly *Dioxyna bidentis*, N, a gall fly - *Synanthedon formicaeformis*, Nb, red-tipped clearwing *Sympetrum sanguineum*, Nb, ruddy darter - -	ponds: mixture of open water and dense vegetation; shallow margins, some well-vegetated; emergent vegetation; management by small-scale clearance, on long rotation, or only as essential; well-structured bankside vegetation; marshy zone; reliable hydrological regime marsh and grassland: light to moderate grazing and trampling; reliable hydrological regime; no summer flooding; associated pools; structurally diverse sward	Regional
Calcareous grassland and scrub, including ruderal communities in quarries	slugs and snails beetles flies bugs bees and wasps butterflies and moths spiders	- *Harpalus ardosiacus*, Nb, *Harpalus rupicola*, Nb: ground beetles *Hippodamia variegata*, Nb, Adonis' ladybird *Cryptocephalus aureolus*, Nb, a leaf beetle *Rhynchaenus pratensis*, Nb, a weevil *Cheilosia barbata*, N, a hoverfly *Icterica westermanni*, N, a gall fly - ***Bombus ruderatus* Nb Large Garden bumblebee** *Osmia bicolor*, Nb, Two-coloured mason bee *Odynerus melanocephalus,* Na, Black-headed mason wasp *Bembecia scopigera*, Nb, Six-belted Clearwing **? *Eurodryas aurinia*, Nb, Marsh Fritillary** *Pancalia leuwenhoekella*, Nb, a tortricoid moth ***Scotopteryx bipunctaria*, Nb, Chalk Carpet** -	grassland with varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transitions to other semi-natural habitats; grazing animals quarries with a mosaic of vegetation structure including bare ground, sparse herbaceous vegetation and tussocks; south-facing slopes; rocks and stones; damp and seasonally flooded hollows	Local

Streams and rivers	snails and mussels crustaceans beetles flies mayflies bugs dragonflies caddisflies	- ***Austropotamobius pallipes* local Crayfish** *Donacia impressa*, Na, a reed beetle - - - *Platycnemis pennipes*, Nb, white-legged damselfly -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land	Local
Neutral grassland	beetles - moths	*Ctenicera pectinicornis*, Na, a click beetle *Cneorhinus plumbeus*, Nb, a weevil -	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other semi-natural habitats; low-lying damp hollows or temporary pools	Local

Notes

The habitat categories are entirely of my own devising: they are rather large and all-inclusive, but reflect the general absence of divisions between wetland and water and between ruderal and grassland found especially in the records from this Area, but also more widely .

Natural Area: Rockingham Forest 45				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Ancient semi-natural woodland, including parklands	many groups, especially Lepidoptera Diptera Coleoptera Hymenoptera Pseudoscorpi Mollusca	*Apatura iris* Nb Purple emperor butterfly *Leptidea sinapis* Nb Wood white butterfly *Strymonidia pruni* RDB4 black hairstreak butterfly *Strymonidia w-album* Nb White-letter hairstreak butterfly ***Trichopteryx polycommata* Na Barred tooth-striped moth** *Platypalpus aeneus* pRDB3 dance fly *Cheilosia chrysocoma* RDB3 hoverfly *Tipula vestiplex* RDB3 cranefly *Molorchus umbellatarum* Na longhorn beetle *Altica brevicollis* Na leaf-beetle ***Ernoporus caucasicus* RDB1 bark beetle** *Osphyia bipunctata* RDB3 false darkling-beetle *Osmyia pilicornis* Na Fringe-horned mason-bee *Dendrochernes cyrneus* RDB3 false scorpion -	woodlands: wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology parkland: retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; unimproved pasture or meadow grassland	National
Calcareous grassland, especially limestone quarries & road verges	many groups, especially Lepidoptera Diptera Coleoptera Arachnida Mollusca Hymenoptera Hemiptera Orthoptera	*Lysandra coridon* Nb Chalkhill blue butterfly *Hamearis lucina* Nb Duke of Burgundy butterfly ***Tyta luctuosa* RDB3 Four-spotted moth** *Machimus rusticus* RDB2 robber fly *Cheilosia soror* Nb hoverfly *Urophora solstitialis* pRDB3 large fruit-fly ***Harpalus parallelus* pRDB3 ground beetle** *Agrilus sinuatus* Na jewel-beetle *Pseudoprotapion astragali* Na seed weevil *Smicronyx reichi* pRDB3 weevil *Euheptaulacus villosus* Na dung beetle *Maso gallicus* Na money spider *Helix pomatia* Nb Roman snail - - -	tussocky flower-rich sward; varied sward length; patches of bare ground; patches of scrub Open rock surfaces and screes; varied shade and aspect; scattered scrub road verges: semi-natural vegetation; unintensive management; periodic mowing in sections on hay-meadow rotation; no fertiliser/herbicide/insecticide exposure	Regional
Neutral grassland & marshland	Coleoptera Hemiptera Lepidoptera	*Oxystoma cerdo* Nb seed weevil *Longitarsus dorsalis* Nb leaf beetle *Drymus latus* Nb ground beetle *Agallia brachyptera* Nb leafhopper *Megamelodes lequesnei* Nb planthopper	varied structure including grass tussocks; pasture grazing regime; poached wet ground; tall marshy grassland cut on hay meadow rotation	Local

Streams, lakes & ponds	Odonata Diptera Coleoptera Crustacea Lepidoptera aquatic insects Mollusca	*Brachytron pratense* Nb Hairy dragonfly *Coenagrion pulchellum* Nb Variable damselfly *Sympetrum sanguineum* Nb Ruddy darter dragonfly *Oxycera analis & O terminata* RDB2 soldier-flies *Donacia impressa* Na leaf beetle *Coelambus nigrolineatus* Na water beetle *Hydrochus elongatus* RDB3 scavenging water-beetle *Austropotamobius pallipes* Crayfish - - -	flowing: natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks still: mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; fringes of emergent vegetation; with or without partial shade; active management; constant unpolluted water supply	Regional
Wetlands, including fen, reedbed & carr wood	Lepidoptera Diptera Coleoptera Hemiptera Arachnida Mollusca aquatic insects Crustacea	*Photedes extrema* RDB3 Concolorous *Chilodes maritimus* Nb Silky Wainscot *Nephrotoma crocata* RDB3 cranefly *Hydroglyphus pusillus* Nb water beetle *Longitarsus curtus* Na leaf beetle *Phytodes muricatus* Na weevil ***Melanapion minimum* pRDB2 seed weevil** *Eurysula lurida* Na planthopper *Syangales venator* Na ant-spider ***Vertigo moulinsiana* RDB3 Desmoulins' whorl-snail** - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; with or without partial shade; active management; constant unpolluted water supply	Regional
Other quarries, workings & exposures	Coleoptera Lepidoptera Hymenoptera Hemiptera	*Hippodamia variegata* Nb Adonis' ladybird *Harpalus vernalis* Na ground beetle *Psammodius asper* Na dung beetle *Epiblema grandaevana* pRDB1 tortrix moth	Open rock surfaces and screes; varied shade and aspect; scattered scrub	Local
Agricultural land	Coleoptera flying insects	*Magdalis barbicornis* Na pear weevil	hedgerows and trees; small streams and drains; patches of species-rich grassland; small ponds and marshy areas; conservation headlands in arable land; orchards	Local

Natural Area: Breckland 46				
Key Habitats	**Invertebrate group**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Breck heath and grasslands	Lepidoptera	A vast number of rare heathland species. Examples that are characterisitc of the Breck include: *Ortholmus punctipennis* RDB3 ground bug ***Noctua orbona* Na Lunar yellow underwing moth** *Scopula rubiginata* RDB3 Tawny Wave moth *Lithostege griseata* RDB3 Grey Carpet moth *Heliothes viriplaca* RDB3 Marbled Cover moth ***Coleophora tricolor* pRDB1 micro-moth** ***Cyclophora pendularia* RDB3 Dingy Mocha** **? *Trichopteryx polycommata* Na Barred Tooth-stripe**	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources; arable weeds food plants of some rare species; calcareous influence; flowering heather; dung; wet heath	national
	Coleoptera	***Harpalus froelichi* pRDB2 ground beetle** *Odonteus armiger* Na dung beetle *Cionus longicollis* Na, *Ceutorhynchus pulvinatus* Na: weevils *Lycoperdina succinata* RDB2 false ladybird ***Psylliodes sophiae* RDB3 leaf beetle**		
	Diptera	*Eutolmus rufibarbis* pRBD3 robberfly *Dolichopus migrans* RDB3 fly *Myopa strandi* RDB3 bee parasite fly		
	Hymenoptera, aculeates	*Podalonia affinis* RDB3 mud wasp		
	Arachnida	-		
	Orthoptera	-		
	Hemiptera	-		
		A suite of coastal species that are rare inland, e.g.: *Oxybelus mandibularis* Na Silver spiny digger wasp, *Broscus cephalotes* local ground beetle, *Phthiria pulicaria* Nb beefly *Nabis pseudoferus* Nb damsel bug *Chorosoma schillingi* local plant bug		
Scots pine belts	Diptera	*Neocnemodon latitarsis* Nb, *N. verrucula* Nb: hoverflies	old trees; dead wood; aphids as food for hoverflies	local
	Lepidoptera	-		
	Coleoptera	-		

arable and waysides	Lepidoptera Coleoptera	*Lithostege griseata* RDB3 Grey carpet moth ***Tyta luctuosa* RDB3 Four-spotted** *Ceutorhynchus* spp, weevils ***Psilliodes sophiae* RDB3 leaf beetle** This habitat is also used by some species found on sparsely vegetated sandy ground that occurs on grass-heath.	conservation headlands; hedgerows; buffer zones by water courses; disturbed soil on waysides; ruderal and annual plants e.g. flixweed, used as host plants and nectar and pollen sources	regional
conifer plantations and associated open spaces	Coleoptera Lepidoptera	a large assemblage of moths but these are associated with the open spaces, not the conifers per se. *Pitogenes trepanatus* Na bark beetle *Ptinus dubius* ?rare spider beetle; *Leptura rubra* naturalised alien, previously RDB3, longhorn beetle -	sunny rides and glades fire-breaks with flowering herbs and scramblers; sunny chalky banks	local
fen carr and valley fen alderwoods	Diptera Coleoptera Lepidoptera Mollusca?	*Prionocera subserricornis* pRDB2 cranefly - - -	closed canopy providing shade and high humidity; alders, sallows; high water table leading to saturated ground; organic-rich litter layer; seepages; shallow pools	local
glacial sand and gravel deposits	Coleoptera Orthoptera Hymenoptera	- - -	bare ground; short sparse turf	local?
open freshwater bodies	Coleoptera Diptera Odonata Hemiptera Mollusca	- - - - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land	local

pingos and fluctuating meres	Coleoptera Odonata Diptera Mollusca microcrustace Bryozoa	many rare water beetles, including ***Bidessus unistriatus* RDB1,** *Laccornis oblongus* pRDB3, *Agabus undulatus* pRDB3, *Hydroporus scalesianus* RDB2: diving beetles: *Hydraena palustris* RDB 2 *Hydrochus brevis* RDB2, *H. ignicollis* RDB2: crawling water beetles *Lestes dryas* RDB2 Scarce emerald damselfly, *Odontomyia angulata* RDB1 soldierfly *Pherbellia argyra, Antichaeta brevipennis* RDB2, *Psacadina zernyi* RDB2: snail-killing flies ***Segmentina nitida* RDB1 Shining ramshorn snail** *Cypris bispinosa* Nb ostracod *Dunhevidia crassa* Nb water flea ***Lophopus crystallinus* RDB3 moss animal, bryozoan**	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological supply	national
rivers	Coleoptera Diptera	- -	natural flow regime; clean water; some shaded and some open banks; some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; sandy banks	local
scrub	Coleoptera Lepidoptera Diptera many flying insects	*Cryptolestes spartii* Na flat bark beetle on broom *Dryophilus anobiodes* pRDB3 wood boring beetle on broom - -	block and patches of bushes; associated grassland or heath; flower-bearing species; broom bushes host of some rare species	local
spring-fed wetlands	Lepidoptera Coleoptera Arachnida Mollusca Diptera Hemiptera	*Senta flammea* Na Flame wainscot moth ***Crypocephalus exiguus* RDB1 leaf beetle** water beetles, e.g. *Hydraena palustris* RDB2, *Hydrochus brevis, H. carinatus* & *H. elongatulus* all RDB3 *Marpissa radiata* Na jumping spider *Neon valentulus* RDB2 jumping spider *Hydrolycosa rubrofasciata* Na wolf spider ***Vertigo moulinsiana* RDB3 Desmoulin's whorl snail** ***Vertigo angustior* RDB1 Narrow-mouthed whorl snail** - -	continuity of springs and seepages; herb-rich fen vegetation; structurally diverse fen vegetation; open turf at seepages and springs; associated scrub mainly sallow, young birch; open shallow pools and hollows; reed-beds	national
valley wet grassland	Lepidoptera Coleoptera Diptera	- - -	high water table; no summer flooding; mosaic structure of sward; herb-rich sward;	local

Natural Area: North Norfolk 47				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Signifi-cance in NA**
Dry Heathland	Hemiptera Coleoptera Lepidoptera Diptera Hymenoptera Aculeata Araneae	*Megalonotus sabulicola* Nb ground bug ***Harpalus punctulatus*** **Na,** *Pterostichus angustatus* Nb, *Amara praetermissa* Nb: ground beetles *Porcinolus murinus* Nb pill beetle *Altica ericeti* Nb flea beetle *Adscita statices* Nb Forester moth *Eutolmus rufibarbis* pRDB3 robberfly *Methoca ichneumonoides* Nb flightless waasp *Crabro scutellaris* Na solitary wasp - -	structural variety including open grass heath, very short turf and bare ground, and mature heather; rabbit or other disturbance; nectar & pollen sources; flowering heather; dung; patches of gorse and/or broom	Local
Wet Heathland & Valley Mires	Orthoptera Araneae Coleoptera Lepidoptera Diptera Hemiptera Odonata	*Metrioptera brachyptera* Nb Bog bush cricket *Marpissa radiata* Na jumping spider *Hydroporus neglectus* Nb, *Enochrus isotae* RDB3: water beetles *Idaea muricata* Na Purple-bordered Gold *Buckleria paludum* pRDB3 micro-moth *Erioptera nielseni* Nb, *Tipula yerburyi* Nb: craneflies *Psacadina vittigera* RDB2 snail-killing fly - -	varied vegetation structure including bare wet peat, tussocks and dwarf scrub; shallow pools; high water table; birch and sallow scrub; well-structured transitions to other habitats	National

Pingos	Mollusca Odonata Coleoptera Diptera Hemiptera Araneae	***Vertigo moulinsiana* RDB3 Desmoulins' whorl snail** *Lestes dryas* RDB2 Scarce Emerald damselfly *Dryops anglicanus* RDB3 water beetle *Hydroporus glabriusculus* RDB3, *Hydroporus scalesianus* RDB2, *Laccornis oblongus* pRDB3: diving beetles *Hydrochus brevis* RDB3, *Enochrus isotae* RDB3, *Hydraena palustris* RDB2: water beetles *Prionocera subserricornis* pRDB2 cranefly *Oxycera analis* RDB2, *O. leonina* pRDB1, *Odontomyia angulata* RDB1: water soldierflies *Colobaea pectoralis* RDB2, *Antichaeta analis* pRDB3, *Psacadina zernyi* RDB2: snail-killing flies - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological supply	National
Pasture Woodlands & Ancient Coppice with Standards	Diptera Coleoptera Mollusca Lepidoptera Araneae	*Prionocyphon serricornis* Nb cranefly ***Callicera spinolae* RDB1**, *Xylota xanthocnema* Nb: hoverflies *Agrilus sinuatus* Na jewel beetle *Eledona agricola* Nb darkling beetle *Ctesias serra* Nb cobweb beetle - ***Xestia rhomboidea* Nb Square-spotted Clay** -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure in woodlands, including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	Local
Chalk Grassland	Coleoptera Diptera Hemiptera Aculeata Lepidoptera Araneae Mollusca	*Harpalus rupicola* Nb ground beetle *Platypalpus infectus* pRDB3 dance fly - - - - -	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	Local
Shingle	Crustacea Coleoptera Aculeata Araneae	- - - -	low levels of disturbance; bare and partly vegetated shingle; jetsam at upper levels	?

Soft Cliffs	Coleoptera Diptera Hymenoptera Crustacea	*Asaphidion pallipes* Nb, *Dyschirius obscurus* pRDB2, *Nebria livida* Na, *Notiophilus quadripunctatus* Nb: ground beetles *Bledius filipes* RDB1 rove beetle *Oxycera morrisii* Nb, *Stratiomys potamida* Nb: water soldierflies *Podalonia hirsuta* Nb Hairy Sand Wasp *Eiluma purpurascens* Nb	natural erosion processes; bare and partly vegetated ground; seepages; nectar sources; recent slippages; bare dry faces	National
Brackish lagoons	Crustacea Anthozoa Annelida Bryozoa Coleoptera Diptera	***Gammarus insensibilis* RDB3** - - - *Panagaeus bipustulatus* Nb, *Harpalus vernalis* Na, *Masoreus wetterhalli* Na: ground beetles *Polydrusus pulchellus* Nb a weevil -	unpolluted water; natural processes of seepage or saline intrusion, and those leading to shingle deposition; bare areas with some flower-rich ruderal vegetation	?National
Rivers	Diptera Plecoptera Crustacea Mollusca Ephemeropter Coleoptera Trichoptera	*Erioptera meijeri* RDB3 cranefly *Hilara primula* pRDBK dance fly *Rhabdiopteryx acuminata* Nb stonefly - - - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; semi-natural bordering land; margins with emergent vegetation; undisturbed exposed sediments; accumulations of flood litter	Local
Grazing Marsh	Coleoptera Diptera Hemiptera	*Haliplus apicalis* Nb, *Enochrus bicolor* Nb, *Ochthebius marinus* Nb, *O. nanus* Nb: water beetles *Erioptera bivittata* RDB2 cranefly -	wide salinity range; gently shelving margins; well-vegetated shallow water; wide range of successional stages; land grazed grassland	?Local

Sand dune	Crustacea Coleoptera Lepidoptera Diptera Aculeata Hemiptera Araneae	*Armadillidium album* Nb woodlouse ***Cicindela maritima* Nb tiger beetle** *Demetrias monostigma* Nb: ground beetles *Baeckmanniolus dimidiatus* Nb histerid beetle *Malachius barnevillei* RDB3 malachite beetle *Cardiophorus asellus* Nb a click beetle *Crypticus quisquilius* Nb darkling beetle *Phyllobius vespertinus* Nb a weevil ***Heliophobus reticulatus* Nb Bordered Gothic** *Platytes alpinella* pRDB3 pyralid micro-moth *Cymnocyla canella* Na *Agrotis ripae* Nb Sand dart moth *Sideridis albicolon* Nb White Colon *Mythimna litoralis* Nb Shore Wainscot *Photedes elymi* Na Lyme Grass *Actebia praecox* Nb Portland Moth *Phthiria pulicaria* Nb bee-fly *Colletes marginatus* Na Margined Colletes bee *Podalonia affinis* RDB3 a solitary wasp *Nabis pseudoferus* Notable a damsel bug -	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system	National
Saltmarsh	Crustacea Mollusca Coleoptera Lepidoptera Diptera Hemiptera Aculeata Araneae	*Trichoniscoides saeroeensis* Nb woodlouse *Assiminea grayana* Nb sentinel snail *Bembidion ephippium* Nb, *Dicheirotrichus obsoletus* Nb, *Pogonus litoralis* Nb, *Pogonus luridipennis* pRDB3: ground beetles *Enochrus halophilus* Na a scavenger water beetle *Bledius tricornis* Nb rove beetle *Dolichosoma lineare* Nb, *Malachius barnevillei* RDB3: malachite beetles *Phaedon concinnus* Nb, *Crepidodera impressa* Na: leaf beetles *Pseudoplemonus limonii* Nb, *Mecinus collaris* Nb: weevils *Eupithecia extensaria* pRDB3 Scarce Pug *Mythimna favicolor* Na Mathew's Wainscot *Atylotus latistriatus* pRDB3 horsefly *Melieria picta* Nb picture-winged fly - *Colletes halophilus* Na a solitary bee -	historically undisturbed vegetation; herb-rich vegetation, especially with *Aster* and *Limonium vulgare* transitions to dry land and to freshwater seepages; shallow pools, especially in upper levels	National

Reedbeds	Lepidoptera Coleoptera Diptera Hemiptera Araneae	*Chilodes maritimus* Nb Silky Wainscot *Senta flammea* Na Flame Wainscot *Simyra albovenosa* Nb Reed Dagger *Dromius longiceps* Na a ground beetle - *Paralimnus phragmitis* Notable a leafhopper *Chloriona vasconica* Notable a planthopper -	Standing stems remaining for several years; active invasive fronts; ground predominantly flooded only in winter; bare mud between stems; litter of dead leaves and stems; transition to dry land or other wetland habitats	?Local
Intertidal mud	Mollusca Annelida	- -	Natural deposition processes	?

Notes

There are additions to the supplied list of habitats: dry heathland has been split from wet heathland and valley mires; pingos are a new category.

Only for soft cliffs is more than a single invertebrate species listed as characteristic in the information suppplied by regional staff. The list given in the present table overlaps considerably with that list, but differs in detail. Some species have been added; a small number has been omited, because they are considered either too common, or too weakly associated with the feature, to warrant inclusion.

A record of *Dicheirotrichus obsoletus* from Ringstead Downs in the ISR printout has been assumed to be erroneous.
Hirudo medicinalis BAP short list is now extinct at its only known Norfolk site.

Natural Area: The Broads 48				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Alder carr	Diptera Coleoptera Lepidoptera Mollusca	*Limnophila verralli* Nb, *Pilaria scutellata* Nb: craneflies *Pherbellia brunnipes* Notable a snail-killing fly *Rhynchites longiceps* Nb a leafroller beetle *Furcula bicuspis* Nb Alder Kitten *Clostera pigra* Nb Small Chocolate Tip **? *Noctua orbona* Na Lunar Yellow Underwing** **? *Xestia rhomboidea* Nb Square-spotted Clay** **? *Cuculia asteris* Nb Star-wort** **? *Schrankia taenialis* Nb White-lined Snout** -	canopy providing shade and high humidity; alders, sallows; high water table leading to saturated ground; organic-rich litter layer; seepages; shallow pools	national
Grazing marsh	Coleoptera Diptera Lepidoptera Hemiptera Odonata Hymenoptera Arachnida Mollusca	*Hydrophilus piceus* RDB3 Great Silver Water Beetle *Peltodytes caesus* Nb a crawling water beetle *Litodactylus leucogaster* Nb a weevil *Helius pallirostris* Notable a cranefly *Schoenobius gigantelae* Nb a pyralid moth *Perizoma sagittata* Na Marsh Carpet *Simyra albovenosa* Nb Reed Dagger *Pelosia obtusa* RDB2 Small Dotted Footman *Delphacodes capnodes* Notable a planthopper *Brachytron pratense* Nb Hairy Dragonfly *Coenagrion pulchellum* Nb Variable Damselfly *Macropis europaea* Na a mining bee *Clubiona juvenis* RDB2 a foliage spider ***Anisus vorticulus* RDB2 Little Whirlpool Ramshorn snail** ***Segmentina nitida* RDB1 Shining Ramshorn snail**	light grazing and trampling; some winter flooding, no summer flooding; associated pools; structurally diverse sward; ditches with different management regimes	national

Heath/fen transition on valley sides	Coleoptera Diptera Lepidoptera Hemiptera Arachnida	*Oodes helopioides* Nb, *Odocantha melanura* Nb: ground beetles *Hydrochus megaphallus* RDB2 a scavenger water beetle *Limnebius aluta* RDB3 a small water beetle *Donacia clavipes* Nb a leaf beetle *Helius pallirostris* Notable a cranefly *Colobaea bifasciella* Notable a snail-killing fly *Monochroa conspersella* RDB3 a micro-moth *Delphacodes capnodes* Notable a planthopper *Clubiona juvenis* RDB2 a foliage spider *Hypomma fulvum* Na a money spider	high water table; reliable water supply in summer; structural diversity with a mixture of vegetation rich in herbs and some bare ground; some scrub; seepages; pools	national
Open mixed fen, reed fen and swamp	Coleoptera Diptera Lepidoptera Odonata Hymenoptera Hemiptera Arachnida Mollusca	*Oodes helopioides* Nb, *Dromius longiceps* Na: ground beetles *Agabus striolatus* RDB2, ***Bidessus unistriatus* RDB1**: diving beetles *Hydrochus brevis* RDB3 a scavenger water beetle *Stenus argus* Nb a rove beetle *Plateumaris braccata* Na a leaf beetle ***Melanapion minimum* pRDB2 seed weevil** *Prionocera subserricornis* RDB2, *Erioptera meijerei* RDB2: craneflies *Psacadina zernyi* RDB2 a snail-killing fly *Phragmataecia castanea* RDB2 Reed Leopard *Simyra albovenosa* Nb Reed Dagger *Photedes brevilinea* RDB3 Fenn's Wainscot **? *Heliophobus reticulatus* Nb Bordered Gothic** *Brachytron pratense* Nb Hairy Dragonfly *Passaloecus clypealis* RDB3, *Rhopalum gracile* RDB2: solitary wasps *Macropis europaea* Na a mining bee ***Hydrometra gracilentis* RDB1 water measurer** *Paralimnus phragmitis* Notable a leafhopper *Clubiona juvenis* RDB2 a foliage spider *Hypomma fulvum* Na a money spider -	high water table with reliable water supply in summer; structural diversity with vegetation of different types, including some scrub, a product of site management; some open water with a variety of submerged and emergent vegetation	national

Broads and dykes system	Coleoptera Diptera Odonata Lepidoptera	*Hydrophilus piceus* RDB3 Great Silver Water Beetle *Odacantha nelanura* Nb a ground beetle *Stenus palustris* Nb a rove beetle *Colobaea bifasciella* Notable a snail-killing fl *Orthonerva geniculata* Notable a hoverfly *Aeshna isosceles* RDB1 Norfolk Hawker *Coenagrion pulchellum* Nb Variable Damselfly *Brachytron pratense* Nb Hairy Dragonfly *Papilio machon* RDB2 Swallowtail *Phragmataecia castanea* RDB2 Reed Leopard *Pelosia muscerda* RDB3 Dotted Footman *Photedes brevilinea* RDB3 Fenn's Wainscot *Archanara algae* RDB3 Rush Wainscot *Senta flammea* Na Flame Wainscot	mosaic of open water to dense vegetation with a variety of submerged and emergent vegetation; shallow margins; a variety of management procedures leading to structural differences, including open, bare areas	national
Broads and dykes system cont.	Hymenoptera Hemiptera Arachnida Mollusca	*Passaloecus clypealis* RDB3, *Rhopalum gracile* RDB2: solitary wasps *Microvelia buenoi umbratica* RDB3 a water cricket *Clubiona juvenis* RDB2 a foliage spider *Hypomma fulvum* Na a money spider ***Anisus vorticulus* RDB2, *Segmentina nitida* RDB1: ramshorn snails** *Valvata macrostoma* RDB2 a valve snail ***Vertigo moulinsiana* RDB3 Desmoulins' whorl snail** ***Vertigo angustior* RDB1 Narrow-mouthed whorl snail**		
Rivers	Mollusca Crustacea Coleoptera Diptera	*Valvata macrostoma* RDB2 a valve snail ***Peudoanodonta complanata* Nb Depressed river mussel** *Corophium lacustre* RDB3 a sand louse *Leptocheirus pilosus* Notable an amphipod - -	natural flow regime; clean water; a mixture of shaded and open banks; a variety of margin with some emergent vegetation; open, bare shingle, sand and mud sediments	regional

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Natural Area: Suffolk Coast and Heaths 49				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Ancient oak woods & parkland	Lepidoptera	*Lampronia fuscatella* pRDB3 longhorn moth *Sesia apiformis* Nb Hornet Clearwing moth *Strymondia w-album* Nb White-letter Hairstreak butterfly *Boloria* ***euphrosyne*** **Nb Pearl Bordered Fritillary butterfly** *Cossus cossus* Nb Goat Moth *Cyclophora annulata* Nb Mocha moth *Euphyia biangulata* Nb Cloaked Carpet moth *Boarmia roboraria* Nb Great Oak Beauty *Orgyia recens* pRDB3 Scarce Vapourer moth *Atolmis rubricollis* Nb Red-necked Footman moth *Eilema sororcula* Nb Orange Footman moth *Meganola albula* Nb Kent Black Arches moth *Herminia tarsicrinalis* RDB3 Shaded Fan-foot moth *Paracolax* ***tristalis*** **Na Clay Fan-foot moth** ***Trisateles emortualis*** **RDB3 Olive Crescent moth**	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; well-developed ground flora; depressions with pools seasonal or permanent and undisturbed hydrology dead decaying heart-rot; ancient hulks; standing dead timber preferably on living trees; rot holes at all levels from ground level upwards; nectar and pollen sources nearby	Local
	Coleoptera	*Phymatodes alni* Nb longhorn beetle *Prionus coriarius* Na Sawyer Longhorn Beetle *Trox sabulosus* Na hide beetle *Aphodius zenkeri* Na dung beetle *Melasis buprestoides* Nb false click beetle *Prionychus melanarius* RDB2 darkling beetle		
	Diptera	*Volucella inanis* Nb hoverfly *Xylota xanthocnema* Nb hoverfly		
Conifer plantations	Lepidoptera	*Archips oporana pRDB1 tortrix moth* *Hemaris fusciformis* Nb Broad-boardered Bee Hawkmoth *Hemaris* ***tityus*** **Na Narrow-boardered Bee Hawkmoth**	sunny rides and glades fire breaks with flowering herbs and scramblers; sunny banks; flowery verges that provide nectar and poolen sources; standing dead wood; impeded drainage and pools	Local
	Hymenoptera	*Lassioglossum breviconre* RDB3 solitary bee *Podalonia affinis* RDB3 Mud wasp *Ammophila pubescens* local Heath Sand Wasp		

Sandlings heaths	Hymenoptera Diptera Lepidoptera Coleoptera Neuroptera	a large assemblage of wasps and bees, including: *Dasypoda altercator* Nb, *Lassioglossum brevicorne* RDB3: mining bees *Crabro scutellatus* Na, *Diondontus insidiosus* RDB3: solitary wasps *Nomada fulvicornis* RDB3 Six-banded Nomad bee *Podalonia affinis* RDB3 Mud Wasp *Philanthus triangulum* RDB2 Bee Wolf solitary wasp *Conops vesicularis* Nb big-headed fly ***Plebejus argus* Nb Silver-studded Blue butterfly** *Perconia strigillaria* Nb Grass Wave moth *Idaea sylvestraria* Nb Dotted-boarder Wave moth ***Heliophobus reticulatus* Nb Bordered Gothic** ***Xestia rhomboidea* Nb Square-spotted Clay moth** ***Xylena esoleta* Nb Sword-grass** *Sideridis albicolon* Nb White Colon moth *Agonum gracilipes* Na ground beetle *Euroleon nostras* pRDB2 ant lion	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources; arable weeds food plants of some rare species; calcareous influence; flowering heather; dung; patches of gorse +/or broom; bare sandy areas and sunny banks	Nationally important
Grazing marshes and dykes	Mollusca Orthoptera Lepidoptera Coleoptera Diptera	*Pseudamnicola confusa* RDB1 spire snail *Metrioptera roeselii* Nb Roesel's Bush-cricket *Pediasia contaminella* Nb pyralid moth *Archanara algae* RDB3 Rush Wainscot moth *Archanara sparganii* Nb Webb's Wainscot moth *Spilosoma urticae* Nb Water Ermine moth *Haliplus apicalis* Nb, *Peltodytes caesus* Nb: water beetles *Rhantus suturalis* Nb, *Agabus conspersus* Nb: diving beetles *Bembidion fumigatum* Nb a ground beetle *Lithodactylus leucogaster* Nb a weevil *Erioptera bivittata* RDB2 cranefly *Stratiomys potamida* Nb, *Odontomyia tigrina* Nb, *Vanoyia tenuicornis* Nb: soldier flies *Haematopota grandis* RDB3 horsefly *Lejogaster splendida* Nb hoverfly *Antichaeta analis* RDB3, *Antichaeta brevipennis* RDB2: snail-killing fly	light grazing and trampling; some winter flooding, no summer flooding, stablewater levels; associated pools and dykes; strucutrally diverse sward and aquatic flora; slight brackish influence	Regional

Reedbeds	Lepidoptera Coleoptera Diptera Hemiptera Aranaea	*Schoenobius gigantella* Nb pyralid moth *Deltote bankiana* RDB3 Silver Barred moth *Chilodes maritimus* Nb Silky Wainscot *Simyra albovenosa* Nb Reed Dagger *Photedes brevilineata* RDB3 Fenn's Wainscot moth *Photedes fluxa* Nb Mere Wainscot moth *Archanara neurica* RDB3 White-mantled Wainscot moth *Senta flammea* Na Flame Wainscot moth *Macrochilo cribrumalis* Nb Dotted Fan-foot moth *Odacantha melanura* Nb, *Dromius longiceps* Na: ground beetles *Silis ruficollis* Nb soldier beetle good assemblage of scarce craneflies and fungus gnats, e.g.*Erioptera meijerei* RDB2 a cranefly *Stratiomys singularior* Nb soldier fly good assemblage of scarce snail-killing flies good assemblage of scarce leafhoppers and planthoppers, e.g. *Paralimnus phragmitis* Nb, *Chloriona dorsata* Nb *Hypomma fulvum* Na money spider	old reed with dense litter layer; diverse structure; reed growing on gradient from dry ground to shallow water	Nationally important
Brackish lagoons	Actiniaria Anthozoa Coleoptera Crustacea Diptera	*Cordylophora caspia* Nb colonial hydroid ***Nematostella vectensis* RDB3 Starlet sea anemone** *Blethisa multipunctata*Nb ground beetle *Hydrovatus clypealis* Na, *Dytiscus circumflexus* Nb: diving beetles; *Enochrus halophilus* Na, *E. bicolor* Nb: scavenger water beetles; *Haliplus apicalis* Nb crawling water beetle ***Gammarus insensibilis* RDB3 Lagoon sand shrimp** -	shallow brackish water on mud; all stages of succession including almost dry areas with dense litter; long rotation cutting; some scrub invasion; stable summer water levels	National

Shingle structures	Mollusca Araneae Lepidoptera Coleoptera Orthoptera	*Monacha cartusiana* RDB3 snail ***Vertigo angustior* RDB1 Narrow-mouthed whorl snail** assemblage of rare spiders, including *Clubiona similis* RDB3 foliage spider *Pima boisduvaliella* pRDB3, *Platytes alpinella* pRDB3: pyralid moths ***Idaea ochrata cantiata* RDB2 Bright Wave moth** *Scopula rubiginata* RDB3 Tawny Wave *Euxoa cursoria* Nb Coast Dart moth ***Agrotis cinerea* Nb Light Feathered Rustic moth** *Agrotis ripae* Nb Sand Dart moth *Aporophyla australis* Nb Feathered Brindle moth *Earias clorana* Nb Cream-boardered Green Pea moth *Photedes elymi* Na Lyme Grass moth ***Lionychus quadrillum* RDB3,** *Cymindis axillaris* Na: ground beetles *Malachius marginellus* Nb malachite beetle *Cardiophorus ascellus* Nb click beetle *Playcleis albopunctata* Nb Grey Bush Cricket	natural physiographic processes leading to shingle deposition; bare ground with sparse flower-rich ruderal vegetation	National
Intertidal mud and sand	Crustacea Oligochaetes	*Ochthebius marinus* Nb small water beetle -	open mud or sand with vegetation edge; some pools	local
Saltmarsh	Lepidoptera Diptera Hemiptera Coleoptera	*Malacosoma castrensis* RDB3 Ground lackey moth ***Cucullia asteris* Nb Star-wort moth** *Apamea oblongata* Nb Crescent striped moth *Limonia complicata* Nb cranefly *Saldula opacula* Nb shore bug *Helophorus fulgidicollis* Nb, *Enochrus halophilus* Na: scavenger water beetles; *Ochthebius marinus* Nb a small water beetle *Dolichosoma lineare* Nb a malachite beetle *Crepidodera impressa* Na a leaf beetle *Pseudaplemonus limonii* Nb a seed weevil	undisturbed herb-rich vegetation; some pools and mud; transitions to dry land and to freshwater seepages	Regional
Pliocene/Pleistocene deposits		-		

Natural Area: East Anglian Plain 50				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific Needs**	**Significance in NA**
Ancient coppice woods	slugs and snails	-	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; wet area s; fungal fruiting bodies on or associated with trees; well-structured margins with transitions to other habitats	Regional
	beetles	*Agabus chalconatus*, Nb, a water beetle *Agrilus angustulus*, Nb, a jewel beetle *Anobium inexspectatum*, Nb, *Dorcatoma serra*, Na, *Ptinomorphus imperialis*, Nb: wood-boring beetles *Byctiscus betulae*, Nb, hazel leaf roller *Cerylon fagi*, Nb, a cerylonid beetle *Helophorus dorsalis*, Nb, a scavenger water beetle *Mordellistena humeralis*, pRDBK, a tumbling flower beetle *Platycis minuta*, Nb, a net-winged beetle *Megamerina dolium*, N, a fly		
	flies	*Volucella inflata*, N, *Xylota florum*, N, *Xylota tarda*, N: hoverflies		
	bugs	-		
	bees and wasps	-		
	butterflies and moths	*Coleophora curucipenella*, pRDB3, a micro-moth ***Boloria euphrosyne* Nb Pearl Bordered Fritillary** *Pechipogon strigilata*, Na, Common Fan-foot *Ptilophora plumigera*, Na, Plumed Prominent *Strymonidia w-album*, Nb, White-letter Hairstreak ***Xestia rhomboidea*, Nb, Square-spotted Clay** **? *Polia bombycina* local Pale Shining Brown**		
	spiders	***Pechipogon strigilata*, Na, Common Fanfoot** *Archaearanea simulans*, Nb, a comb-footed spider *Philodromus albidus*, Nb, *Philodromus praedatus*, Nb: crab spiders *Porhomma oblitum*, Nb, a money spider *Tetragnatha pinicola*, Nb, a long-jawed spider		
hay meadows	beetles	-	flowers as pollen and nectar sources; flower-heads and seedheads as larval food; damp hollows	?
	moths	-		

valley fens	snails and mussels	*Valvata macrostoma*, RDB2, a valve snail ***Vertigo angustior*, RDB1, Narrow-mouthed whorl snail** ***Vertigo moulinsiana*, RDB3, Desmoulin's whorl snail**	high water table; varied vegetation structure, including bare mud, tussocks, tall fen vegetation, scrub and carr; management by rotational cutting and grazing; natural age structure and dead wood in wooded areas; reedbeds; small pools	National
	beetles	*Dryops anglicanus*, RDB3, a long-toed water beetle *Enochrus isotae*, RDB3, *Hydrochus brevis*, RDB3, *Hydrochus carinatus*, RDB3: scavenger water beetles *Haliplus mucronatus*, Na, a crawling water beetle *Hydraena palustris*, RDB2, *Laccornis oblongus*, pRDB3, *Limnebius aluta*, pRDB3, water beetles *Silis ruficollis*, Nb, a soldier beetle		
	flies	*Antichaeta brevipennis*, RDB2, a snail-killing fly *Erioptera meijeri*, RDB2, a cranefly *Odontomyia argentata*, RDB2, a soldierfly *Pherbellia argyra*, RDB2, *Psacadina vittigera*, RDB2, a snail-killing fly *Psacadina zernyi*, RDB2, a snail-killing fly *Sciomyza simplex*, N, a snail-killing fly *Stratiomys potamida*, N, a soldierly *Thaumastoptera calceata*, N, a cranefly		
	bugs	*Capsus wagneri*, Nb, a plant bug *Cicadella lasiocarpae*, Na, a leafhopper *Cosmotettix costalis*, pRDBK, a leafhopper *Rhopalus maculatus*, Nb, a bug *Paradelphacodes paludosus*, Na, a planthopper *Stenocranus fuscovittatus*, Nb, a planthopper		
	sawflies	*Brachythops flavens*, N, a sawfly		
	bees and wasps	*Macropis europaea*, Na, a solitary bee *Passaloecus clypealis*, RDB3, a solitary wasp *Rhopalum gracile*, RDB2, a solitary wasp		
	moths	*Chilodes maritimus*, Nb, silky wainscot *Nascia cilialis*, Na, a pyralid moth		
	stoneflies	*Nemoura dubitans*, Nb, a stonefly		
	caddisflies	-		
	spiders	***Dolomedes plantarius*, RDB1, fen raft spider** *Entelecara omissa*, Na, a money spider *Hygrolycosa rubrofasciata*, Na, a wolf spider Hypomma fulvum, Na, a money spider Marpissa radiata, Na, a jumping spider Sitticus caricis, Nb, a jumping spider		

river valleys	snails and mussels beetles flies bugs moths dragonflies caddisflies	*Oxyloma sarsi*, RDB2, an amber snail ***Vertigo moulinsiana*, RDB3, Desmoulin's whorl snail** *Selatosomus nigricornis*, pRDB3, a click beetle *Telmatophilus schoenherri*, pRDBK, a silken fungus beetle - - *Macrochilo cribrumalis*, Nb, dotted fan-foot *Platycnemis pennipes*, Nb, white-legged damselfly -	natural flow regime; clean water; well-structured and varied bankside vegetation; reliable hydrological regime; seasonally flooded marsh and wet grassland; emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; marginal trees including willow pollards	Regional?
ponds and reservoirs	snails and mussels beetles flies bugs moths dragonflies caddisflies spiders	***Segmentina nitida* RDB1 Shining Ramshorn snail** *Ilybius subaeneus*, Nb, a water beetle *Platycheirus immarginatus*, N, a hoverfly - *Archanara sparganii*, Nb, Webb's wainscot *Sympetrum sanguineum*, Nb, ruddy darter - -	mosaic of open water and dense vegetation; shallow margins, some well-vegetated; reliable hydrological regime; emergent vegetation; semi-natural surrounding land; management by small-scale clearance, or on long rotation, or only as essential; associated marsh and wet grassland	Local
bat caves	beetles flies bugs	- - -	-	-
arable	beetles moths	- -	conservation headlands; sympathetically managed hedgerows; buffer zones by water courses; disturbed soil on waysides; ruderal and annual plants	?
hedges	snail beetles earwigs butterflies and moths	*Ena montana*, RDB3, mountain bulin ***Malachius aeneus*, RDB3, a false soldier beetle** *Apterygida media*, Nb, an earwig *Idaea vulpinaria*, Nb, least carpet ***Pareulype berberata*, RDB1, barberry carpet**	tall broad hedges; management on long-term rotation; mixture of shrub species; undisturbed hedge bottom; transitions to bordering grassland; hedgerow trees; dead wood; conservation headlands	National

parks and pasture-woodlands	beetles	*Aderus oculatus*, Nb, an aderid beetle *Anitys rubens*, Nb, a wood-boring beetle *Aplocnemus nigricornis*, Na, a malachite beetle *Ctesias serra*, Nb, cobweb beetle *Ernoporus fagi*, Na, a bark beetle *Ischnodes sanguinicollis*, Na, a click beetle *Ischnomera cyanea*, Nb, a thick-legged flower beetle *Leptura scutellata*, Na, a longhorn beetle ***Lucanus cervus*, Nb, Stag beetle** *Prionocyphon serricornis*, Nb, a marsh beetle *Prionus coriarius*, Na, sawyer beetle *Procraerus tibialis* pRDB3, *Selatosomus bipustulatus* Nb: click beetles	retention of old trees pollards, ancient hulks; nectar sources; dead wood; new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees; other associated semi-natural habitats	National
	flies	*Eupachygaster tarsalis*, N, a soldierfly		
	ants	*Xylota abiens*, N, a hoverfly		
	moths	*Lasius brunneus*, Na, brown ant		
		-		
Sand pits etc	beetles	*Amara consularis*, Nb, *Amara fulva*, Nb, *Dyschirius obscurus*, pRDB2, *Nebria livida*, Na: ground beetles *Cercyon bifenestratus*, Na, a scavenger water beetle *Heterocerus hispidulus*, RDB3, a mud beetle *Olibrus pygmaeus*, Nb, a smut beetle *Gronops lunatus*, Nb, *Otiorhynchus raucus*, Nb, *Sibinia primitus*, Nb: weevils	mosaic of vegetation structure including bare ground, sparse herbaceous vegetation and tussocks; south-facing slopes with bare sand; regular disturbance, especially by rabbits; damp and seasonally flooded hollows; rocks and stones	National?
	flies	-		
	bugs	-		
	bees and wasps	-		
	moths	-		
	spiders	-		

Notes:
I have added the category "sand and gravel pits", to accommodate species associated with early successional stages in such habitats and not catered for elsewhere. All the species listed are in fact from a sand pit, but it has seemed sensible to add gravel pits to the category. I have assumed permanent flooded pits of this kind to belong in the "ponds and reservoirs" category, but in practice few records of species definitively recorded from such situations are included in the ISR printout.

Natural Area: East Anglian Chalk 51				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Signifi-cance in NA**
Ancient semi-natural woodland & Parkland	Diptera	***Callicera spinolae* RDB1 hoverfly** *Chrysopilus laetus* RDB1 snipefly *Systenus bipartitus* N, *Systenus leucurus* N dolichopodid flies	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure in woodlands, including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	National?
	Mollusca	-		
	Coleoptera	-		
	Aculeata	-		
	Lepidoptera	***?Xestia rhomboidea* Nb Square-spotted Clay**		
	Araneae	-		
Beech plantations	Coleoptera	-	old trees; dead wood	?
	Lepidoptera	-		
Chalk scrub	Lepidoptera	*Eucosma pauperana* pRDB3, *Pammene agnotana* pRDB1 tortricid micro-moths	varied age structure; mosaic structure with unimproved grassland	National
	Coleoptera	-		
	Hemiptera	-		
	Aculeata	-		
Chalk grassland	Hemiptera	*Ulopa trivia* Nb leaf-hopper	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; bare ground; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	?Local
	Coleoptera	*Harpalus puncticolis* pRDB3 ground beetle *Hemitrichapion reflexum* Na, *Trachyphloeus alternans* Nb, *Trachyphloeus spinimanus* Nb, *Miarus graminis* Nb: weevils *Chrysolina sanguinolenta* Na, *Longitarsus parvulus* Na: leaf beetles		
	Lepidoptera	***Polia bombycina* local Pale Shining Brown** ***Heliophobus reticulatus* Nb Bordered Gothic** *Philabapteryx virgata* Nb Oblique-striped moth		
	Diptera	*Lysandra coridon* Chalk-hill Blue *Zodion cinereum* N cone-headed fly *Urophora cuspidata* N picture-winged fly		
	Aculeata	*Pherbellia knutsoni* pRDB3 snail-killing fly		
	Araneae	-		
	Mollusca	-		
		-		

Acid/chalk mosaic	Mollusca Coleoptera Diptera Hemiptera Aculeata Lepidoptera Araneae	None known. Despite theoretical importance of this habitat for many groups, the remaining example of this habitat is managed wholly inappropriately for invertebrates, and there is no evidence of surviving interest	varied vegetation structure providing patches of short turf, tussocky flower-rich sward and patches of bare ground; scrub; well-structured transitions to other semi-natural habitats	None?
Arable	Crustacea Coleoptera Lepidoptera	*Chirocephalus diaphanus* RDB2 - -	regular management; seasonally flooded hollows; conservation headlands; hedgerows; ruderal and annual plants	National
Breck	Coleoptera Diptera Hemiptera Lepidoptera Araneae	*Panagaeus bipustulatus* Nb ground beetle *Aphodius distinctus* Nb dung beetle *Apion rubiginosum* pRDB3, *Hypera dauci* Nb, *Gronops lunatus* Nb, *Ceutorhynchus geographicus* Nb: weevils *Cleonus piger* Nb large thistle weevil - - - -	Regular disturbance, mechanical or by rabbits; varied vegetation structure,m including bare ground	Local
Marsh/marshy grassland	Hemiptera Diptera Coleoptera Lepidoptera Araneae	*Florodelphax paryphasma* Na, *Stroggylocephalus livens* Nb: leaf-hoppers *Erioptera meijerei* RDB2 cranefly - - -	light grazing and trampling; some winter flooding, no summer flooding; associated pools; structurally diverse sward; well-structured margins, preferably including transition to scrub or trees	Local
Chalk springs	Tricladida Trichoptera	*Crenobia alpina*, *Polycelis felina:* flatworms	Clean water; constant flow	Local

Valley fens	Odonata	*Brachytron pratense* Nb Hairy dragonfly	High water table; varied structure, including bare mud, tussocks, tall fen vegetation , scrub and carr; management by rotational cutting and by grazing; natural age structure and dead wood in wooded areas; reedbeds	National
	Plectopera	*Nemoura dubitans* Nb stonefly		
	Coleoptera	*Dromius longiceps* Na ground beetle		
		Ilybius guttiger Nb, *Hydaticus seminiger* Nb: diving beetles		
		Haliplus mucronatus Na, *Enochrus isotae* RDB3: water beetles		
		Silis ruficollis Nb soldier beetle		
		Cerapheles terminatus Na malachite beetle		
	Lepidoptera	*Phragmatecia castaneae* RDB2 Reed Leopard		
		Ethmia funerella pRDB3 micro-moth		
		Senta flammea Na Flame Wainscot		
		Deltote bankiana RDB3 Silver Barred		
		Nascia cilialis Na pyralid micro-moth		
		Perizoma sagittata Na Marsh Carpet		
		Anticollix sparsata Na Dentated Pug		
		Macrochiolo cribrumalis Nb Dotted Fan-foot		
	Diptera	*Odontomyia angulata* RDB2, *Oxycera analis* RDB2: water soldierflies		
		Orthonevra geniculata Nb hoverfly		
		Vidalia cornuta RDB3 picture-winged fly		
		Antichaeta analis pRDB3, *Psacadina vittigera* RDB2: snail-killing flies		
	Aculeata	*Liparis similis* RDB2 reed fly		
	Araneae	*Passaloecus clypealis* RDB3 solitary wasp		
		***Clubiona rosserae* RDB1** foliage spider		
		Marpissa radiata Na jumping spider		
	Hemiptera	*Hygrolycosa rubrofasciata* Na wolf spider		
	Plecoptera	*Hypomma fulvum* Na, *Entelecara omissa* Na: money spiders		
	Trichoptera	-		
		-		
		-		

Notes

The ancient semi-natural woodland category has been expanded to include parkland; the two could be separately considered in principle, but the records from the natural area are too few to justify it at present.

"Breck" is an additional habitat feature. Only a single site, Chippenham Gravel Pit, provides invertebrate records from tbis habitat. It should, logically, be included with Breckland. Perhaps this is so, and the inclusion of this site within the East Anglian Chalk is an error.

A number of species listed by regional staff significant or characteristc have been omitted from the present table because they are considered too common or not sufficiently strogly associated with the feature in question to be included. There is no question as to the authenticity of the records involved.

Crenobia alpina and *Polycelis torva*, listed as significant species for springs, are well-known from the region and included in the data from the region, but are too common to be included on ISR printouts. They are retained because of the absence of known scarcer species which might serve to characterise the habitat

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Natural Area: West Anglian Plain 52				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Ancient wet clay woodlands and parkland	Coleoptera	*Helophorus dorsalis* Nb water beetle *Ampedus quercicola* Nb click beetle *Osphya bipunctata* RDB3 melandryid beetle *Aderus populneus* Nb beetle *Mordellistena humeralis* pRDBK tumbling flower beetle *Ischnomera cyanea* Nb beetle *Anaglyptus mysticus* Nb longhorn beetle *Platyrhinus resinosus* Nb Cramp-ball Fungus wevil *Platystomos albinus* Nb fungus weevil	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure in woodlands, including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	National
	Lepidoptera	*Leptidea sinapis* Nb Wood White *Strymonidia w-album* Nb White-letter Hairstreak *Strymonidia pruni* RDB4 Black Hairstreak *Archiearis notha* Nb Light Orange Underwing *Photededes fluxa* Nb Mere Wainscot ***Cosmia diffinis* Na White-spotted Pinion** ***Pechipogon strigilata* Na Common Fan-foot** ***Trichopteryx polycommata* Na Barred Tooth-stripe** ***Epione paralellaria* RDB3 Dark Bordered Beauty** ***Noctua orbona* Na Lunar Yellow Underwing** ***Xestia rhomboidea* Nb Square-spotted Clay** **?*Polia bombycina* local Pale Shining Brown** **?*Heliophobus reticulatus* Nb Bordered Gothic**		
	Diptera	*Ctenophora pectinicornis* N cranefly *Spania nigra* N snipe fly *Brachyopa pilosa* N, *Myolepta luteola* N: hoverflies *Antichaeta obliviosa* pRDB2 snail-killing fly		
	Mollusca	-		
	Hemiptera	-		
	Aculeata	-		
	Araneae	-		
Unimproved neutral grasslands	Coleoptera	*Tanymecus palliatus* Nb, *Rhynchaenus pratensis* Nb: weevils	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or of scrub; well-structured transitions to other semi-natural habitats	Local
	Lepidoptera	-		

Areas of open water	?	-		Nil
Brickpits	Coleoptera Diptera Araneae Odonata Orthoptera Hemiptera Aculeata Lepidoptera Odonata	*Gyrinus paykulli* Na whirligig beetle *Laccobius sinuatus* Nb, *Chaetarthria seminulum* Nb, *Berosus affinis* Nb, *B. luridus* Nb, *Ochthebius pusillus* RDB3, *Limnebius nitidus* Nb, *L. papposus* Nb: water beetles *Oulimnius major* Na rifflebeetle *Limonia danica* pRDB3 cranefly *Synageles venator* Na ant-spider - - - - - -	clean water; early successional stages; mixture of bare and vegetated water margins; shallow margins; emergent vegetation; small pools; seasonally flooded hollows and damp depressions; varied vegetation structure on dry land, including bare ground, sparese herbaceous vegetation, tussocks and scrub; abundant nectar plants	?National
Chalk pits	Aculeata Mollusca Coleoptera Diptera Hemiptera Lepidoptera Araneae	*Sphecodes ferrugatus* Nb, *Lasioglossum xanthopum* Nb, *Hylaeus signatus* Nb: solitary bees *Nysson trimaculatus* Nb solitary wasp - - - - - -	mosaic of vegetation structure including bare ground, sparse herbaceous vegetation, tussocks and scrub; south-facing slopes; abundant nectar plants; rocks and stones; damp and seasonally flooded hollows	Local
Flood meadows	Coleoptera Diptera Hemiptera Lepidoptera	*Carabus monilis* Nb ground beetle *Helius pallirostris* N, *Limnophila pictipennis* RDB2: craneflies *Urophora solstitialis* pRDB3 picture-winged fly *Sciomyza dryomyzina* RDB2 snail-killing fly - -	regular hydrological regime; absence of summer flooding; damp depressions foring pools in early summer; well-structured river margin; bordering hedges and scrub providing shelter; abundant flowering plants; areas not managed for hay	?National

Gravel pits	Odonata Hemiptera Coleoptera Lepidoptera Diptera Aculeata Araneae	*Brachytron pratense* Nb Hairy dragonfly *Libellula fulva* RDB2 Scarce Chaser *Coenagrion pulchellum* Nb Variable damselfy *Agnocoris reclairei* Nb mirid bug *Ilybius fenestratus* Nb diving beetle *Hydrochus carinatus* RDB3, *Hydrochus ignicollis* RDB3: water beetles *Demetrias imperialis* Nb ground beetle *Macroplea appendiculata* RDB3, *Donacia cinerea* Nb: reed beetles *Schoenobius gigantellus* Nb pyralid micro-moth *Phalacrocera replicata* N, *Limonia ventralis* N: craneflies *Oxycera morrisii* N water soldierfly *Hercostomus fulvicaudis* pRDB3 dolichopodid fly *Colobaea bifascuiella* N, *C. pectoralis* RDB2, *C. punctata* N, *Pherbellia brunnipes* N, *P. dorsata* N, *P. grisescens* N, *P. nanus* : snail-killing flies ***Dorycera graminum* RDB3 picture-winged fly** - -	clean water; early successional stages; mixture of bare and vegetated water margins; shallow margins; well-structured margins, including swamp, scrub and trees; small pools; seasonally flooded hollows and damp depressions; varied vegetation structure on dry land, including bare ground, sparse herbaceous vegetation, tussocks and scrub; abundant nectar plants	National
Ditches & ponds	Mollusca Coleoptera Diptera Odonata	*Valvata macrostoma* RDB2 water snail *Tachys scutellaris* Na ground beetle *Rhantus grapii* Nb, *Rhantus suturalis* Nb, *Agabus undulatus* pRDB3: diving beetles *Noterus crassicornis* Nb, *Hydroglyphus pusillus* Nb, *Hydrochus carinatus* RDB3, *Hydrochus elongatus* RDB3, *Helophorus longitarsis* RDB3, *Helophorus nanus* Nb, *Helochares lividus* Nb, *Enochrus melanocephalus* Nb, *Enochrus halophilus* Na: water beetles *Anasimyia interpuncta* RDB3 hoverfly -	mixture of open water and dense vegetation; some emergent vegetation at margins; shallow margins, some well-vegetated; management of ditches by small scale clearance, or on long-term rotation, or only as essential; well-structured bankside vegetation; proximity of semi-natural vegetation	National

Rivers and margins	Odonata Coleoptera Hymenoptera Crustacea Mollusca Ephemeroptera Diptera Trichoptera	*Libellula fulva* RDB3 Scarce Chaser *Platycnemis penipes* Nb White-legged damselfy *Bembidion clarcki* Nb, *Agonum scitulum* Na: ground beetles *Gyrinus distinctus* pRDB3 whirligig beetle *Stenelmis canaliculata* RDB2 riffle beetle *Donacia impressa* Na, *D. spaganii* Na, *D. clavipes* Nb: reed beetles *Cossonus parallelepipedus* Nb weevil *Aromia moschata* Nb Musk beetle *Spilomena vagans* RDB3, *Pemphredon morio* Nb: solitary wasps - - - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; semi-natural bordering land; margins with emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; pollard willows	Local
Ancient fens	Coleoptera Lepidoptera Diptera Aculeata	*Demetrias monostigma* Nb, *Oodes helopoides* Nb: ground beetles *Agabus uliginosus* Nb, *Agabus undulatus* pRDB3, *Hydaticus seminiger* Nb, *Dytiscus dimidiatus* pRDB3: diving beetles *Hydrochus carinatus* RDB3, *Hydrochus elongatus* RDB3 , *Limnoxenus niger* Nb, *Enochrus isotae* RDB3: water beetles *Silis ruficollis* Nb soldier beetle *Cerapheles terminatus* Na malachite beetle *Plateumaris braccata* Na reed beetle ***Lycaena dispar* extinct Large Copper** ***Athetis palustris* RDB3 Marsh Moth** *Ethmia funerella* Nb micro-moth ***Idaea dilutaria* pRDB3 Silky Wave** *Perizoma sagittata* Na Marsh Carpet *Photedes extrema* RDB3 Concolorous ***Xylena esoleta* Nb Sword-grass** *Phalacrocera replicata* Nb cranefly *Xylota xanthocnema* Nb hoverfly *Lipara similis* RDB2 reed fly *Passaloecus clypealis* RDB3 solitary wasp *Macropis europaea* Na solitary bee	high water table; varied vegetation structure including bare wet ground, dense herbaceous vegetation and scrub; carr; small pools, dammed ditches	National

Ancient fens cont.	Araneae Hemiptera Odonata Trichoptera Mollusca	*Pardosa paludicola* RDB3, *Hygrolycosa rubrofasciata* Na: wolf spiders - - - -		

Notes

Records from Woodwalton Fen are included in the ISR data for this area. It seems logical that this site should be in Fenland, and curious that fen is not included amongst the key habitats in the other Area 52 data. "Ancient fen" has been added to the habitats to cover the Woodwalton data. If its presence in the ISR data is inappropriate, the habitat category can be removed: no other sites contribute data to it.

The boundaries of this area around Peterborough seem a little curious. Thus Spencer's Hurbn appears to be in this area, but Grimeshaw Wood is not. Yet these are prevented from being a single site only by a cycleway and Sainsbury's car park, a surprising boundary marker for the edge of a natural area. Area 52 also on ISR data lays claim to one end of the Nene Washes, which logic decrees should all be in the same area, and to some of the brickpits, whose distinctive character might lead one to hope that all would be dealt with under a single area heading.

One pre-exitsing heading has been subdivided: "River valleys with flood meadows, other riparian habitats, gravel pits" has been split into "Rivers and margins", "Flood meadows", "Gravel Pits" and "Ditches & ponds" which need not be, but in practice are to a considerable extent, close to rivers. "Margins" is perhaps not a sufficiently precise or generous word to include the range of features which might be highlighted here, but in fact most of the records of interest are fairly tightly localised on marginal features.

The "Quarries & Brickpits" category has been split. In general, the ISR records which fall into this broad category come from either the brickpits around Peterborough or in much smaller numbers the Cherry Hinton cement works. The two are so distinctive that it would be more misleading than helpful to retain them in the same category, and the two heading used are "Brickpits" and "Chalk pits". Logic suggests that the latter category should fall within the East Anglian Chalk. If it does so, now or in the future, the chalk-pits category goes with it.

Natural Area: Bedfordshire Greensand Ridge 53				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Ancient woodland	Mollusca Coleoptera Lepidoptera Hymenoptera Diptera	*Phenacolimax major* Na glass snail *Hypulus quercinus* RDB2 false darkling beetle *Strangalia aurulenta* Na longhorn beetle *Synanthedon vespiformis* Nb Yellow-legged Clearwing moth *Leptidea sinapis* Nb Wood White butterfly *Strymondia w-album* Nb White-letter Hairstreak butterfly *Cyclophora annulata* Nb Mocha moth *Cepphis advenaria* Nb Little Thorn moth *Archiearis notha* Nb Light Orange Underwing moth ***Xylena exsoleta* Nb Sword-grass moth** *Xanthia ocellaris* Na Pale-lemon Sallow moth ***Pechipogon strigilata* Na Common Fan-foot moth** ***Scotopteryx bipunctaria cretica* Nb Chalk Carpet** *Pamphilius gyllenhali* pRDB3 sawfly *Dipogon bifasciatus* RDB3 spider-hunting wasp -	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; wide sunny rides and clearings	Local
Lowland heath and acid grassland	Coleoptera Lepidoptera Hymenoptera Araneae	*Pterostichus angustatus* Nb ground beetle *Amara infirma* Na ground beetle *Strophosoma faber* Nb weevil ***Noctua orbona* Na Lunar Yellow Underwing moth** *Pachycnemia hippocastanaria* Nb Horse Chestnut moth - -	structural variety including open grass heath,very short turf and bare ground; rabbit disturbance; nectar & pollen sources; arable weeds food plants of some rare species; flowering heather; dung; patches of gorse +/or broom; Araneae bare sandy areas.	Local
Acid mire, marsh, wet woodland	Lepidoptera Coleoptera Diptera	*Photedes fluxa* Nb Mere wainscot moth *Chilodes maritimus* Nb Silky wainscot moth *Rhantus grapii* Nb diving beetle *Hydaticus seminiger* Nb diving beetle *Zeugophora flavicollis* RDB2 leaf beetle *Psacadina verbekei* Nb snail-killing fly	high water table; natural vegetation structure; small patches of bare peat; pools; seepages; closed canopy alders and sallow carr providing shade and high humidity; organic-rich litter layer; shallow pools with emergent flora	Local
Sand and clay pits	Lepidoptera Coleoptera	*Calamotropha paludella* Nb pyralid moth *Bembidion pallipipenne* Nb ground beetle	mosaic of structures from bare ground to scrub; herb-rich swards; ruderals; shallow water	Local
Farmland	Coleoptera	*Carabus monilis* Nb ground beetle	conservation headlands; hedgerows; buffer zones by water courses	Local
Calcareous grassland	Lepidoptera	***Polia bombycina* local Pale Shining Brown** ***Scotopteryx bipunctaria cretica* Nb Chalk Carpet**		

Notes:

Calcareous grassland was added to accomodate species from Old Warden on the natural area's boundary.

Natural Area: Yardley Whittlewood Ridge 54				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Signifi-cance in NA**
Ancient wet clay woods	Coleoptera	large association of dead wood beetles including *Abdera quadrifasciata* Na, *Conopalpus testaceus* Nb: false darkling beetles, *Agrilus laticornis* Nb jewel beetle, *Ampedus quercicola* Nb click beetle, *Mycetophagus piceus* Nb hairy fungus beetle, *Grammoptera variegata* Na, *Anaglyptus mysticus* Nb, *Strangalia nigra* Na : longhorn beetles, *Ischnomera cyanea* Nb Thick-legged flower beetle	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; carr; undisturbed hydrology	Regional
	Lepidoptera	*Apatura iris* Nb Purple Emperor *Leptidea sinapis* Nb Wood White *Satyrium pruni* RDB4 Black Hairstreak *Satyrium w-album* Nb White Letter Hairstreak *Dicylca* oo RDB3 Heart Moth *Eupithecia irriguata* Nb Marbled Pug ***Pechipogon strigilata* Na Common Fan-foot** *Hypomecis roboraria* Nb Great Oak Beauty *Photedes extrema* RDB3 Concolous *Photedes fluxa* Nb Mere Wainscot		
	Diptera	*Limonia masoni* RDB3 cranefly *Criorhina asilica* Nb, *Volucella inflata* Nb: hoverflies		
	Mollusca	-		
Wood pasture	Coleoptera	assemblage of dead-wood species including *Abdera biflexuosa* Nb false darkling beetle, *Anthribus nebulosus* Nb fungus weevil, and several of the species also found in woodland above	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	regional
	Diptera	-		
Unimproved neutral grassland	Lepidoptera	*Bembecia scopigera* Nb Six-belted Clearwing ? *Tyta luctuosa* RDB3 Four-spotted	structural variety including open grassland and bare ground; nectar & pollen sources; mosaic structure including tussocks	local
	Coleoptera	-		
	Hemiptera	-		
Wetland and ponds	Coleoptera	*Gymnetron beccabungae* Na weevil *Helophorus dorsalis* Nb scavenger water beetle	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; shallow shaded pools and ruts in woodlands for *Helophorus dorsalis*.	local
	Orthoptera	*Sympetrum sanguineum* Nb Ruddy Darter		
	Diptera	-		

Natural Area: Cotswolds Area 55				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific Needs**	**Significance in NA**
Arable	beetles moths	- -	conservation headlands; hedgerows; buffer zones by watercourses; ruderal and annual plants	?
Bat roosts and hibernacula	beetles flies bugs	- - -	-	?
Calcareous grasslands	snails beetles	*Abida secale*, Nb, a chrysalis snail *Helix pomatia*, Nb, Roman snail *Agrilus sinuatus*, Na, *Trachys scrobiculatus*, Na: jewel beetles *Aphodius sordidus*, Na, a dung beetle ***Cryptocephalus primarius* RDB1**, *C. aureolus* Nb, *C. bilineatus* Nb, *C. bipunctatus* Nb: leaf beetles *Pilemostoma fastuosa*, Na, a tortoise beetle *Epitrix atropae*, Nb, a flea beetle *Harpalus puncticollis*, pRDB3, a ground beetle *Meloe rugosus*, RDB3, an oil beetle	varied vegetation structure providing patches of short turf in a tussocky flower-rich sward; patches of bare ground; shelter provided by hedges or patches of scrub; well-structured transitions to other semi-natural habitats; grazing animals	National
	flies bugs bees and wasps butterflies and moths grasshoppers spiders	*Oxyna nebulosa*, pRDB3, *Urophora solstitialis*, pRDB3: gall flies *Catoplatus fabricii*, Nb, a lacebug *Sehirus dubius*, Nb, a burrower bug *Osmia bicolor*, Nb, Two-coloured mason bee *Adscita geryon*, Nb, Cistus Forester *Adscita globulariae*, Na, Scarce Forester *Bembecia scopigera*, Nb, Six-belted Clearwing *Digitivalvia perlepidella*, Na, a small ermine moth ***Eurodryas aurinia*, Nb, Marsh Fritillary** *Hamearis lucina*, Nb, Duke of Burgundy *Leioptilius carphodactyla*, Nb, a plume moth ***Hesperia comma*, RDB3, silver-spotted skipper** ***Lysandra bellargus*, Nb, Adonis blue** *Lysandra coridon* local Chalkhill Blue, *Cupido minimus* local Small Blue *Setina irrorella*, Na, Dew moth ***Tyta luctuosa* RDB3 Four-spotted** *Gomphocerippus rufus,* Nb, Rufous grasshopper *Trachyzelotes pedestris*, Nb, a ground spider		

Neutral grassland	beetles moths flies	- - **?*Asilus crabroniformis* Nb Hornet Robberfly**	mosaic structure including tussocks; shelter provided by hedges or scrub; well-structured transitions to other habitats; low-lying damp hollows or temporary pools	?
Ancient woodland	slugs and snails beetles flies bugs bees and wasps spiders	*Acicula fusca*, Nb, a point snail *Ena montana*, RDB3, mountain bulin *Macrogastra rolphii*, Nb, a door snail *Phenacolimax major*, Na, a glass snail *Agrilus laticornis*, Nb, a jewel beetle *Chalcoides nitidula*, Nb, a flea beetle *Ischnomera cyanea*, Nb, a thick-legged flower beetle *Platycis minuta*, Nb, a net-winged beetle *Melasis buprestoides*, Nb, a false click beetle *Osphya bipunctata*, RDB3, a false darkling beetle *Rhagonycha translucida*, Nb, a soldier beetle *Variimorda villosa*, Nb, a tumbling flower beetle ***Bombylius discolor* Nb bee-fly** *Cheilosia nigripes*, RDB3, *Criorhina asilica*, N, *Brachyopa insensilis*, N, *Sphegina verecunda*, N, *Volucella inflata*, N,: hoverflies *Ctenicera pectinicornis*, N, *Ctenophora flaveolata*, pRDB2: craneflies *Paracusia tigrina*, RDB2, a fly *Psilocephala melaleuca*, RDB1, a stiletto fly - - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; standing and fallen dead wood; wet areas; fungal fruiting bodies on or associated with trees; well-structured margins with transitions to other habitats	National
Ancient woodland cont.	butterflies and moths	*Alcis jubata*, Nb, Dotted Carpet *Apoda limacodes*, Nb, The Festoon ***Boloria euphrosyne*, Nb, Pearl-bordered Fritillary** *Discoloxia blomeri*, Nb, Blomer's Rivulet ***Hemaris tityus*, Na, Narrow-bordered Bee Hawk** *Leptidea sinapis*, Nb, Wood White ***Mythimna turca*, Nb, Double Line** ***Hydelia sylvata* Nb Waved Carpet** ***Minoa murinata* Nb Drab Looper** ***Xylena esoleta* Nb Sword-grass** *Ptilophora plumigera*, Na, Plumed Prominent *Strymonidia w-album*, Nb, White-letter Hairstreak		

Rivers and riparian habitats	molluscs crustaceans beetles flies bugs moths alderflies dragonflies caddisflies spiders	*Gyraulus acronicus*, RDB2, a ramshorn snail ***Austropotamobius pallipes*, local, Crayfish** *Ochthebius bicolon*, Nb, a small water beetle *Riolus subviolaceus*, Nb, a riffle beetle *Beris clavipes*, N, a soldierfly *Tetanocera punctifrons*, N, a snail-killing fly - - *Sialis nigripes*, Nb, an alderfly - - -	natural flow regime; clean water; well-structured and varied bankside vegetation; shaded and unshaded stretches; margins with some emergent vegetation; undisturbed exposed sediments; accumulations of flood litter; semi-natural bordering land; seasonally flooded marsh and grassland	National?
Parklands	beetles flies moths false scorpions	*Agrilus sinuatus*, Na, a jewel beetle *Anitys rubens*, Nb, a wood-boring beetle *Cicones variegatus*, Na, a narrow timber beetle *Ctesias serra*, Nb, cobweb beetle *Diplocoelus fagi*, Nb, a biphyllid beetle *Dirhagus pygmaeus*, RDB3, a false click beetle *Eledona agricola*, Nb, *Prionychus ater*, Nb: darkling beetles *Ischnomera sanguinicollis*, Nb, a thick-legged flower beetle *Lymexylon navale*, RDB2, a timber beetle *Mycetophagus piceus*, Nb, a fungus beetle *Platyrhinus resinosus*, Nb, cramp-ball fungus weevil *Plectophloeus nitidus*, pRDB2, a short-winged mould beetle *Prionocyphon serricornis*, Nb, a marsh beetle *Pyrochroa coccinea*, Nb, black-headed cardinal beetle *Selatosomus bipustulatus*, Nb, a click beetle *Limonia quadrimaculata*, pRDB2, a cranefly *Aplota palpella*, pRDB1, a micro-moth *Dendrochernes cyrneus*, RDB3, a false scorpion	retention of old trees pollards, ancient hulks; nectar sources; dead wood; new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees; other associated semi-natural habitats	National
Cotswolds scarp slope and clay vales	-	-	-	-
Seepages and small wetlands	snails beetles flies	- *Donacia cinerea*, Nb, a reed beetle *Haliplus heydeni*, Nb, a crawling water beetle *Telmatophilus brevicollis*, pRDB3, a silken fungus beetle *Oxycera analis*, RDB2, *O. morrisii*, N, *O. pardalina*, N: soldierflies *Psacadina verbeckei*, N, a snail-killing fly	continuity of springs and seepages; herb-rich wetland vegetation; structurally diverse vegetation; predominantly open structure with or without partial shading; light grazing	Regional?

Notes:

"Rivers and riparian habitats" has been assumed to include small streams.
"Seepages and small wetlands" has been added to include a small number of nonetheless significant species which do not seem likely to be covered by the existing habitat categories: ignorance of the exact character of the habitats from which the records were made prohibits greater precision in defining the habitats; further subdivision would make sense, but would leave rather small categories.
Austropotamobius pallipes has been taken from the Area Profile information provided: it was not included in the ISR printout

Natural Area: Severn and Avon Vales 56				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Grassland: neutral, unimproved and semi-improved	Coleoptera Lepidoptera Hempitera		mosaic structure including tussocks	?
Grassland: marsh/marshy grassland	Coleoptera Diptera Lepidoptera	*Selatosomus nigricornis* pRBD3 click beetle *Dolichopus cilifemoratus* Nb dolichopodid fly ***Eurodryas aurinia*, Nb, Marsh Fritillary**	light grazing and trampling; some winter flooding, no summer flooding; associated pools; strucutrally diverse sward	local
Fen: flood plain	Lepidoptera Coeoptera Diptera Archnida	*Synanthedon formicaeformis* Nb red-tipped clearwing *Chilodes maritimus* Nb Silky Wainscot moth *Ceutorhynchus viduatus* Nb leaf beetle on *Stachys palustris* *Notaris bimaculatus* Nb weevil on Carex & Juncus *Pherbellia dorsata* Nb snail-killing fly -	structural diversity; mixture of derelict and cut or lightly grazed vegetation; reed beds or patches of reed; rich in herbs; high water table; reliable water supply in summer; occasional bushes;	local
Open water: eutrophic running water: aquatic fauna	Odonata Mollusca Coleoptera Diptera Ephemeroptera Plecoptera Trichoptera Crustacea	*Platycnemis pennipes* Nb White-legged damselfly ***Pisidium tenuilineatum* RDB3 pea mussel** - - - - - ***Austropotamobius pallipes* local Crayfish**	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	local
Open water: eutrophic running water: marginal fauna	Coleoptera Diptera Hymenoptera	*Bembidion semipunctatum* Na ground beetle - -	margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	local

Ponds, pools, canals and ditches on floodplains	Odonata Coleoptera Diptera Hemiptera Mollusca	*Coenagrion pulchellum* Nb Variable damselfly *Sympetrum sanguineum* Nb Ruddy darter *Badister unipulstulatus* Nb ground beetle several notable water beetles e.g. *Noterus crassicornis* Nb; *Agabus undulatus* pRDB3 diving beetle *Paederus fuscipes* Nb rove beetle *Aromia moschata* Nb Longhorn beetle *Plateumaris braccata* Na reed beetle *Odontomyia tigrina* Nb, *Stratiomys singularior* Nb: aquatic soldierflies - -	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; surrounding marshy zone; emergent vegetation reed for Plateumaris; "buffer" zone of unimproved vegetation; occasional trees and pollards willows for Aromia	local
Tall herb and fern: other, tall ruderal		-		?
Woodland: broadleaved, semi-natural	Lepidoptera Trichoptera Diptera Mollusca Coleoptera	*Synanthedon vespiformis* Nb Yellow-legged Clearwing moth *Synanthedon andrenaeformis* Nb Orange-tailed Clearwing moth *Leptidea sinapis* Nb Wood white *Thecla betulae* Nb Brown Hairstreak *Strymonidea w-album* Nb White-letter Hairstreak ***Boloria euyphrosyne* Nb Pearl-bordered Fritillary** ***Argynnis adippe* RDB2 High Brown Fritillary** ***Minoa murinata* Nb Drab Looper** ***Noctua orbona* Na Lunar Yellow Underwing** ***Cosmia diffinis* Na White-spotted Pinion** ***Pechipogon strigilata*, Na, Common Fanfoot** *Enoicyla pusilla* RDB3 terrestrial caddis *Volucella inflata* Nb hoverfly *Phenacolimax major* Na snail *Limax tenellus* Nb slug -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology;	national

Woodland and hedgerows: - dead wood accociates	Coleoptera Diptera	*Playcis minuta* Nb net-winged beetle *Trinodes hirtus* RDB3 "larder" beetle *Rhizophagus oblongicollis* RDB1 beetle *Prionychus melanarius* RDB2 darkling beetle *Phloeophagus truncorum* Na boring weevil *Tipula selene* pRDB3 cranefly *Limonia uniserata* pRDB3 cranefly *Solva marginata* Nb wood soldierfly *Sphegina verucunda* Nb, *Criorhina asilica* Nb, *Criorhina ranunculi* Nb: hoverflies *Paraclusia tigrina* RDB2 dead-wood fly	large trees with heart-rot; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; isolated hedgerow trees with dead wood and / or fungi	national
Woodland: associated water bodies - pools, streams	Coleoptera Diptera	*Bembidion clarki* Nb, *Agonum livens* Nb: ground beetles *Oxycera analis* RDB2 aquatic soldierfly *Chalcosyrphus eunotus* RDB2 hoverfly	undisturbed hydrology; shaded water; dead wood in ponds and streams; leaf litter	local
Woodland: coniferous	Lepidoptera Coleoptera Hymenoptera	- - -	sunny rides and glades fire-breaks with flowering herbs and scramblers; sunny chalky banks; standing dead wood; impeded drainage and pools	?
Carr woodland	Diptera Coleoptera Lepidoptera Mollusca?	- - - -	closed canopy providing shade and high humidity; alders, sallows; high water table leading to saturated ground; organic-rich litter layer; seepages; shallow pools	?
Orchards and parklands	dead wood beetles, flies and moths	*Synanthedon myopaeformis* Nb Red-belted clearwing *Egira conspicillaris* Na Silver Cloud moth ***Lucanus cervus* Nb Stag beetle** ***Gnorimus nobilis* pRDB2 scarab beetle** ***Ampedus rufipennis* RDB2, Procraerus tibialis pRDB3: click beetles** ***Limoniscus violaceus* RDB1 Violet click beetle** ***Gastrallus immarginatus* RDB1 boring beetle** *Axinotarsus pulicarius* RDB1 false soldier beetle *Prionychus melanarius* RDB2 darkling beetle *Pyrochroa coccinea* Nb Cardinal beetle *Ischnomera cyanea* Nb thick-legged flower beetle	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	national

Woods, orchards and parkland - fungal associates	Coleoptera Lepidoptera	- -	fungal fruiting bodies, especially bracket fungi	national
Commons	Coleoptera	-	hedges and bushes, especially hawthorn, blackthorn; rough grassland with partial grazing; tall flowering herbs	local

Natural Area: Malvern Hills & Teme Valley 57				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Signifi-cance in NA**
Acid grassland/acid heath	Coleoptera Lepidoptera Araneae	- **Hipparchia semele* Grayling *Thisanotia chrysonuchella* Nb pyralid micro-moth -	structural variety including open grass heath, very short turf and bare ground, and mature heather; rabbit or other disturbance; nectar & pollen sources; flowering heather; dung; patches of gorse and/or broom; birch both as young scrub and older trees with dead wood	Local
Ridge & Dingle Woods	Lepidoiptera Diptera Coleoptera	**Leptidea sinapis* Nb Wood White *?Eupithecia denotata* Na Campanula Pug **?*Trichopteryx polycommata* Na Barred Tooth-stripe** **Chalcosyrphus eunotus* RDB2 hoverfly *?Enoicyla pusilla* RDB3 caddis	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; old trees; wide age range of woody species; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; varied structure, including sunny open clearings or rides; well-structured margins with transitions to other semi-natural habitats	Local
River Teme & tributaries	Crustacea Odonata Coleoptera Diptera Plecoptera Trichoptera	****Austropotamobius pallipes* Crayfish** **Platycnemis pennipes* Nb White-legged damselfly *Bembidion semipunctatum* Na ground beetle *Macronychus quadrituberculatus* RDB3, *Normandia nitens* RDB2, *Oulimnius major* Na, *Oulimnius troglodytes* Nb, *Riolus cupreus* Nb, *Riolus subviolaceus* Nb: riffle beetles *Pomatinus substriatus* Na water beetle - - -	Clean water; continuos flow; natural structure with pools and riffles; semi-natural vegetation at margins; exposed sediments.	National
Neutral grasslands	Coleoptera Lepidoptera	- -	Varied structure; management by grazing; transitions to other semi-natural habitats	Local?
Commons	Lepidoptera Coleoptera Diptera Araneae	***Argynnis adippe* RDB2 High Brown Fritillary** **Hipparchia semele* Grayling - - -	habitat mosaic; natural ageing of trees; retention of dead wood; management by grazing; varied structure of grassland and herbaceous vegetation; well-structured transitions between vegetation types	Nat?

Parklands	Coleoptera Lepidoptera Diptera	*Agrilus sinuatus* Na jewel beetle *Acleris umbrana* pRDB1 totrix moth ***Argynnis adippe* RDB2 High Brown Fritillary** ***Boloria euphrosyne* Nb Pearl Bordered Fritillary** **Furcula bicuspis* Nb Alder Kitten **Lithophane socia* Nb Pale Pinion **Volucella inflata* Nb hoverfly	retention of old trees pollards, ancient hulks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees; non-intensively managed grassland between trees	Local
Precambrian & Cambrian rock exposures	-	-	-	-
Folded Siluria of the Malvern Hills & Abberley Hills	-	-	-	-

Notes

A number of species have been taken from the list of significant/characteristic species provided by Regional staff but which are not included in the ISR data. These are indicated by asterisks. That of *Argynnis adippe* for parkalnds has been included because its omission, if the species is still extant, would be a serious error. Its absence from the ISR, however, implies that it requires confirmation. Other species on the lists from the region have not been included, because they are considered either not considered sufficiently scarce or not sufficiently habitat-specific to be suitable. The accuracy of the records has not been questioned: there appears to be a significant body of records available to the region which has not reached the ISR database.

Some species have been assigned to Ridge and Dingle Woods on the basis of likelihood of association rather than certainty: these are indicated by interrogation marks.

Natural Area: Clun and North West Herefordshire Hills 58				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Woodland	Mollusca Lepidoptera Coleoptera	*Limax tenellus* Nb Lemon slug ***Argynnis adippe* RDB2 High Brown Fritillary butterfly** *Leptidea sinapis* Nb Wood White butterfly *Satyrium w-album* Nb White-letter Hairstreak *Discoloxia blomeri* Nb Blomer's Rivulet moth *Atolmis rubricollis* Nb Red-necked Footman moth *Enargia paleacea* Nb Angle-striped Sallow moth ***Hydelia sylvata* Nb Waved Carpet** *Tetheella fluctuosa* Nb Satin Lutestring ***Minoa murinata* Nb Drab Looper** *Cerastis leucographa* Nb White-marked good assemblage of dead wood beetles *Dorcatoma serra* Na wood boring beetle *Hylecoetus dermestoides* Nb timber beetle *Pyrochroa coccinea* Nb Black-headed Cardinal Beetle	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology	Local
Parkland	Coleoptera Diptera	good assemblage of dead wood beetles *Abraeus granulum* Na carrion beetle *Lymexylon navale* RDB2 timber beetle *Pyrrhidium sanguineum* RDB2 longhorn beetle *Brachypalpus laphriformis* Nb hoverfly	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	Local
Commons & heaths	Lepidoptera Coleoptera Hymenoptera	***Boloria euphrosyne* Nb Pearl Bordered Fritillary** *Satyrium w-album* Nb White-letter Hairstreak *Euphyia biangulata* Nb Cloaked Carpet moth *Acalles ptinoides* Nb weevil -	natural vegetation structure; small patches of bare peat and sand; pools and dammed ditches; young scrub at margins especially birch; sunny banks and hot spots	
Rivers	Mollusca Odonata Coleoptera Crustacea	***Pisidium tenuilineatum* RDB3 orb mussel** *Gomphus vulgatissimus* Nb Club-tailed dragonfly *Donacea thalassina* Nb leaf beetle ***Austropotamobius pallipes* local Crayfish**	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed mud shores and bars; accumulations of flood litter; exposed sandy banks	Local
Ponds	Mollusca Coleoptera	*Lymnaea glabra* RDB2 mud snail -	Shallow water; fluctuating water level; lightly trampled margins	Local
Moorland	Coleoptera	*Geotrupes vernalis* Nb dumbledor beetle	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree	Local

Unenclosed upland grassland	Coleoptera Lepidoptera	scarce ground beetles -	structural variety including open grassland and bare ground; nectar & pollen sources	Local
Lowland grassland	Lepidoptera Coleoptera	*Elachista dispunctella* Nb micro-moth *Platydracus fulvipes* Nb rove beetle *Cantharis obscura* Nb soldier beetle	mosaic structure including tussocks; light grazing; nectar sources; marshy areas	Local
Rock exposures	Isopoda	*Armadillidium pulchellum* Nb pill woodlouse	absence of excess scrub encroachment	Local

Natural Area: Central Herefordshire 59				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Oligotrophic-mesotrophic rivers	Megaloptera Coleoptera Diptera Ephemeroptera Plecoptera Trichoptera	*Sialis nigripes* Nb Alderfly - - - - -	natural flow regime; clean water; some shaded and some open banks;	local
River margins	Coleoptera Diptera Hymenoptera	*Agonum versutum* Nb ground beetle - -	margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	local
Rivers on sandstone, mudstone & hard limestone	Coleoptera Diptera Ephemeroptera Plecoptera Trichoptera	*Riolus subviolaceus* Nb riffle beetle *Hilara woodi* Nb dance fly - - -	Shallow streams; undisturbed and partially shaded margins	local
Clay rivers		-		local
Alder woodland	Lepidoptera Diptera Coleoptera Mollusca	*Caloptilia falconipennella* pRDB3 micro-moth *Endothenia ustulana* pRDB3 tortrix moth *Limonia lucida* Nb cranefly *Thaumastoptera calceata* Nb cranefly *Pilaria fuscipennis* Nb cranefly *Beris fuscipes* Nb soldierfly - -	closed canopy providing shade and high humidity; alders, sallows; high water table leading to saturated ground; organic-rich litter layer; seepages; shallow pools, seepages and small boggy streams	local

[Dingle] Woodlands	Trichoptera Lepidoptera Mollusca Coleoptera Diptera	*Enoicyla pusilla* RDB3 terrestrial caddis *Egira conspicillaris* Na Silver Cloud moth ***Pechipogon strigilata* Na Common Fan-foot moth** ***Minoa murinata* Nb Drab Looper** *Leptidea sinapis* Nb Wood White butterfly *Strymonidia w-album* Nb White Letter Hairstreak *Cepphis advenaria* Nb Little Thorn moth *Acicula fusca* Nb snail *Limax tenellus* Nb Lemon slug - -	wide variety of native trees and shrubs; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; streams and seepages	regional
Parklands and woodlands - dead wood fauna	Lepidoptera Coleoptera Diptera	*Synanthedon vespiformis* Nb Yellow-legged clearwing moth *Xyletinus longitarsis* pRDB2 wood boring beetle *Molorchus umbellatarum* Na, *Stenosola dubia* Nb: longhorn beetles *Pyrochroa coccinea* Nb Cardinal beetle *Melandrya caraboides* Nb flase darkling beetle *Ischnomera sanguicollis* Nb thick-legged flower beetle *Ctenophora pectinicornis* Nb cranefly *Criorhina asilica* Nb hoverfly	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	local
Woodland and hedgerows - tree-feeding species	Lepidoptera Coleoptera	*Archiearis notha* Nb Light Orange Underwing moth *Rhynchites olivaceus* Na oak leafroller weevil *Rhynchites cavifrons* Nb oak leafroller weevil *Orsodacne lineola* Nb, *Phytodecta decemnotata* Nb, *Chalcoides nitidula* Nb: leaf beetles	oak, aspen, poplar, hawthorn	local
Marshy grasslands mainly fen and water margin habitat	Coleoptera Diptera Lepidoptera	*Chlaenius nigricornis* Nb ground beetle *Beris clavipes* Nb, *Vanoyia tenuicornis* Nb: soldierflies *Pscadina verbekei* Nb snail-killing fly -	high water table; no summer flooding; mosaic structure of sward; herb-rich sward;	local
Marshes - seepages	Diptera Coleoptera	*Oxycera pygmaea* Nb, *Stratiomys potamida* Nb: soldierflies -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local

Natural Area: Black Mountains and Golden Valley 60				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Upland moorland:dry dwarf shrub heath, dry heath/acid grassland mosaic	Coleoptera Diptera	- *Hercostomus angustifrons* Nb dolichopodid fly	open mature heather stands; *Sphagnum* flushes and pools; bare peat; mossy stream margins; scree	local
Upland hay meadows	flying insects	-	flowers as nectar and pollen sources; flower-heads and seed-heads as larval food	local
Streams and rivers	Diptera many of these are associated with river gravels Coleoptera Hymenoptera Ephemeroptera Plecoptera Trichoptera	*Oxycera terminata* RDB2 soldierfly *Tachydromia woodi* RDBI; *Hilara media* Nb, *H. albiventris* Nb, *H. woodi* Nb, *Chelifera aperticauda* Nb, *Hemerodromia laudatoria* Nb: dance flies *Dolichopus argyrotarsis* Nb, *Rhaphium penicillatum* Nb: dolichpodid flies *Lonchoptera meijeri* Nb pointed-wing fly *Limonia ornata* Nb cranefly *Agabus biguttatus* Nb diving beetle - - - -	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; stands of Butterbur *Limonia ornata*; accumulations of flood litter; exposed sandy banks;	national
Seepages	Diptera Coleoptera Lepidoptera Trichoptera Mollusca	*Oxycera pardalina* Nb soldierfly *Pilaria fuscipennis* Nb cranefly - - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local

Ponds	Hirundinea Mollusca Coleoptera Diptera	***Hirudo medicinalis* RDB3 Medicinal leech** *Pisidium pseudosphaerium* RDB3 pea mussel *Bembidion clarki* Nb, *Pterostichus gracilis* Nb, *Acupalpus consputus* Nb: ground beetles *Graphoderus cinereus* RDB3, *Hydrochus elongatus* RDB3, *Helochares obscurus* RDB3: water beetles *Notaris bimaculatus* Nb weevil *Odontomyia tigrina* Nb water soldierfly	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; surrounding marshy zone; summer drawdown to expose bare shore-line	regional?
Commons: unimproved acid and neutral grassland, bracken, dry heath/acid grassland mosaic	Homoptera Coleoptera Hymenoptera, aculeates	- *Altica ericeti* Nb leaf beetle -	structural variety including open grassland and bare ground; nectar & pollen sources	national
Woodlands: semi-natural and plantation broadleaved, conifer plantations	Diptera Coleoptera Lepidoptera Mollusca	*Pilaria fuscipennis* Nb cranefly seepage in carr *Sphegina verucunda* Nb, *Cheilosia chrysocoma* RDB3: hoverflies *Pherbellia annulipes* Nb snail-killing fly - - -	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; carr; fungal fruiting bodies on or associated with trees; undisturbed hydrology	

Parklands: broadleaved and mixed woodland	Coleoptera Diptera	very large assemblage of dead wood species beetles *Plecophloeus nitidus* pRDB2 short-winged mould beetle *Agrilus laticornis* Nb jewel beetle ***Ampedus rufipennis* RDB2**, *A. cardinalis* RDB2, *A. laticornis* Nb, *Procraerus tibialis* pRDB3: click beetles *Ctesias serra* Nb Cobweb beetle *Xyletinus longitarsis* pRDB2 wood boring beetle ***Hypebaeus flavipes* RDB1 Moccas beetle** *Lymexylon navale* RDB2 Timber beetle *Pyrochroa coccinea* Nb Black-headed Cardinal beetle *Abdera quadrifasciata* Na darkling beetle *Ischnomera cinerascens* RDB2, *I. caerulea* pRDB3, *I. sanguinicollis* Nb: thick-legged flower beetles *Pyrrhidium sanguineum* RDB2 Longhorn beetle ***Ernoporus caucasicus* RDB1 bark beetle** *Neopachygaster meromelaena* Nb dead wood soldierfly *Brachyopa bicolor* pRDB3, *B. insensilis* Nb: sap-run hoverflies *Brachypalpus laphriformis* Nb dead wood hoverfly	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; sap runs; fungal fruiting bodies on or associated with trees; some specific tree species including Lime, Oak, Poplar	
Parklands:neutral and marsh/marshy grassland; bracken				

Natural Area: Dean Plateau and Wye Valley 61				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Woodlands, broadleaved semi-natural	Lepidoptera - a large assemblage of butterflies and moth	*Apatura iris* Nb Purple Emperor ***Boloria euphrosyne* Nb Pearl Bordered Fritillary** *Leptidea sinapis* Nb Wood White *Strymonidia w-album* Nb White Letter Hairstreak *Archiearis notha* Nb Light Orange Underwing *Furcula bicuspis* Nb Alder Kitten *Lampronia fuscatella* pRDB3 longhorn moth ***Minoa murinata* Nb drab looper** ***Rheumaptera hastata* Nb Argent and Sable** ***Schrankia taenialis* Nb White lined snout** *Synanthedon vespiformis* Nb Yellow-legged Clearwing ***Trichopteryx polycommata* Na Barred Tooth-striped**	wide variety of native trees and shrubs; flowery open spaces; pollen and nectar sources; standing and fallen dead wood; fungal fruiting bodies on or associated with trees; undisturbed hydrology; carr; shaded seepages	national
	Coleoptera	*Pterostichus oblongopunctatus* Nb ground beetle *Coccinella magnifica* Na Scarce Seven-spot Ladybird *Altica brevicollis* Na leaf beetle *Curculio betulae* Nb weevil *Rhynchites cavifrons* Nb leafroller weevil ? *Epitrix atropae* Nb Belladonna Flea Beetle **? *Gnorimus nobilis* pRDB2 dung beetle or chafer**		
	Diptera	*Cheilosia chrysocoma* RDB3, *Rhingia rostrata* RDB3, *Eumerus ornatus* Nb, *Neocnemodon verrucla* Nb, *Volucella inflata* Nb, *Xylota coeruleiventris* Nb, *X. florum* Nb: hoverflies *Ctenophora pectinicornis* Nb, *Gonomyia alboscutellata* pRDB1, *Scleroprocta pentagonalis* RDB3, *Tipula* nubeculosa Nb: craneflies *Dioctria cothurnata* pRDB3 robber fly		
	Mollusca	*Tetanocera phyllophora* Nb snail-killing fly *Ena montana* RDB3 bulin snail *Limax tenellus* Nb lemon slug *Phenacolimax major* Na glass snail		
Broadleaved plantation				

Coniferous plantation	Coleoptera Diptera Lepidoptera	*?Ampedus nigrinus* Nb click beetle *?Neocnemodon pubescens* Nb, *? N. verrucula* Nb: hoverflies -	sunny rides and glades with flowering herbs and scramblers	local
Parkland	Coleoptera - a large assemblage of dead wood species Hymenoptera Diptera	*Ampedus cinnabarinus* RDB3, *A. pomorum* Nb: click beetles *Anthribus nebulosus* Nb fungus weevil *Prionychus ater* Nb, *Pseudocistela ceramboides* Nb: darkling beetles *Conopalpus testaceus* Nb, *Melasis buprestoides* Nb, *Phloiotrya vaudoueri* Nb : false darkling beetles *Diplocoelus fagi* Nb biphyllid beetle *Ischnomera sanguinicollis* Nb thick-legged flower beetle *Platycis minuta* Nb net-winged beetle *Platypus cylindrus* Nb Oak Pin-hole Borer *Plegaderus dissectus* Nb carrion beetle *Pyrochroa coccinea* Nb Black-headed Cardinal beetle *Rhizophagus nitidulus* Nb narrow bark beetle *Thymalus limbatus* Nb domed fungus beetle *Tillus elongatus* Nb chequered beetle *Xyloterus signatus* Nb bark or ambrosia beetl *Crossocerus binotatus* Na, *C. walkeri* Nb, *Ectemnius ruficornis* Nb, *E. sexcinctus* Nb: solitary wasps *Lasius brunneus* Na Brown Ant -	retention of old trees pollards, ancient hunlks, nectar sources; dead wood, new generations of trees; fungal fruiting bodies on or associated with trees	national
Standing waters	Odonata Coleoptera Mollusca	*Cordulia aenea* Nb Downy Emerald *Sympetrum sanguineum* Nb Ruddy Darter *Donacia sparganii* Na, *Donacia thalassina* Nb: leaf beetles *Enochrus ochropterus* Nb, *Helochares punctatus* Nb: scavenger water beetles *Haliplus heydeni* Nb crawling water beetle *Noterus crassicornis* Nb The Smaller Noterus water beetle ***Pisidium tenuilineatum* RDB3 orb mussel**	mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; surrounding marshy zone; summer drawdown to expose bare shore-line	local
Seeapges	Odonata Diptera	*Ischnura pumilio* Nb Scarce Blue-tailed Damselfly -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby	local

Rivers and streams; including the gorges and meanders of the River Wye	Odonata Coleoptera Diptera Hymenoptera Ephemeroptera Plecoptera Trichoptera	*Gomphus vulgatissimus* Nb club-tailed dragonfly *Platycnemis pennipes* Nb *Bembidion monticola* Nb ground beetle *Riolus subviolaceus* Nb riffle beetle *Atrichops crassipes* RDB3 snipe fly *Hilara media* Nb, *Hilara woodi* Nb: dance flies *Limonia Dicranomyia omissinervis* RDB2 cranefly *Lonchoptera meijeri* Nb, *L. nigrociliata* Nb: pointed-wing flies *Oxycera terminata* RDB2 soldier fly - - ***Brachyptera putata* Nb stonefly** -	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks; seepages on stream and river banks	local?
Hedgerows and scrub	Lepidoptera Coleoptera	*Egira conspicillaris* Na Silver Cloud *Euphyia biangulata* Nb Cloaked Carpet ***Schrankia taenialis* Nb White lined Snout** *Strymonidia w-album* Nb White Letter Hairstreak ***Trichopteryx polycommata* Na Barred Tooth-striped** *Magdalis cerasi* Nb weevil *Orsodacne lineola* Nb leaf beetle	Hedges: old unkempt hedges; tall or lightly grazed grassland beside hedge; hawthorn and blackthorn forming a large proportion of shrubs; Scrub: block and patches of bushes; associated grassland or heath; flower-bearing species; broom bushes (host of some rare species)	local
Mires	Diptera Coleoptera Lepidoptera Trichoptera Mollusca	- - - - -	constant water supply; calcareous influence; open structure to vegetation; with or without partial shading; pollen and nectar sources nearby; structurally mixed vegetation	
Grasslands, neutral unimproved	Dictyoptera Coleoptera	*Ectobius lapponicus* Nb Dusky Cockroach *Psylliodes chalcomera* Nb leaf beetle	mosaic structure including tussocks	local
Grasslands acid, unimproved	Dictyoptera Homoptera Coleoptera Hymenoptera, aculeates	*Ectobius lapponicus* Nb Dusky Cockroach - - -	structural variety including open grassland and bare ground; nectar & pollen sources	local

Grasslands calcareous, unimproved	Dictyoptera Lepidoptera Diptera Isopoda Coleoptera Hemiptera Hymenoptera, aculeates Orthoptera	*Ectobius lapponicus* Nb Dusky Cockroach *Adscita geryon* Nb Cistus Forester *Bembecia scopigera* Nb Six-belted Clearwing *Eupithecia pimpinellata* Nb Pimpinel Pug *? Synanthedon andrenaeformis* Nb Orange-tailed Clearwing *? **Trichopteryx polycommata*** **Na Barred Tooth-striped** *Cheilosia soror* Nb hoverfly *Armadillidium pictum* RDB3 pill woodlouse - - - -	tussocky flower-rich sward; patches of bare ground with stones; shelter provided by hedges, patches of scrub	local
Grasslands marsh/marshy grassland	Coleoptera Diptera Lepidoptera	*Carabus monilis* Nb ground beetle *Notaris bimaculatus* Nb weevil *Selatosomus nigricornis* pRDB3 click beetle - -	light grazing and trampling; some winter flooding, no summer flooding; associated pools; strucutrally diverse sward	local
Heaths dry dwarf shrub heath, acid dry heath/acid grassland mosaic	Dictyoptera Coleoptera Diptera Hymenoptera, aculeates Lepidoptera Arachnida Orthoptera Hemiptera	*Ectobius lapponicus* Nb Dusky Cockroach *Pterostichus angustatus* Nb ground beetle *Ctenophora atrata* Nb cranefly - - - - -	structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources; arable weeds food plants of some rare species; calcareous influence; flowering heather; dung; birch scrub and dead birch	local
Heaths, wet heath/acid grassland mosaic	Coleoptera Diptera Lepidoptera Arachnida Hemiptera	- - - - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	
Mires	Diptera Coeoptera Lepidoptera	- - -	high water table; natural vegetation structure; small patches of bare peat; pools and dammed ditches; young scrub at margins especially birch	

Natural Area: Northumberland Coast 98				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Coastal cliffs	Coleoptera Lepidoptera Hymenoptera Diptera Hemiptera	- - - - -	sparse and herb-rich flora; high proportion of exposed soil; natural erosion	local
Inter-tidal and saltmarsh	Lepidoptera Coleoptera Diptera	*Pediasia aridella* Nb a pyralid moth *Bembidion laterale* Nb a ground beetle *Ochthebius auriculatus* Nb, *O. marinus* Nb: small water beetles *Lejogaster splendida* Notable a hoverfly	undisturbed vegetation; herb-rich flora; transitions to dry land and to freshwater	regional
Offshore islands	Lepidoptera Coleoptera Diptera Hemiptera	*Actebia praecox* Nb Portland Moth *Agrotis ripae* Nb Sand Dart *Sideridis albicolon* Nb White Colon *Mythimna litoralis* Nb Shore Wainscot *Tachyphloeus laticollis* Na a weevil - -	herb-rich flora with structural diversity; some bare ground and sand patches	regional
Dune complexes	Lepidoptera Coleoptera Diptera Hemiptera	*Euxoa cursoria* Nb Coast Dart *Photedes elymi* Na Lyme Grass *Crambus pratella* Nb a pyralid moth *Actebia praecox* Nb Portland *Agrotis ripae* Nb Sand Dart *Sideridis albicolon* Nb White Colon *Mythimna litoralis* Nb Shore Wainscot *Cleonus piger* Nb a weevil *Phthiria pulicaria* Nb a bee fly -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; herb-rich flora with structural diversity and bare sand patches; dune slacks with reliable winter water supply	regional

Natural Area: Tyne to Tees Coast 99				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Tyne to Wear rocky shore	Lepidoptera Coleoptera Diptera	- - -	herb-rich ruderal vegetation providing nectat and pollen sources and food plants	local
Maritime limestone grasslands	Lepidoptera Coleoptera Hemiptera Arachnida	***Aricia artaxerxes salmacis* Nb Durham Argus** *Scotopteryx bipunctaria cretata* Nb Chalk Carpet *Omiamima mollina* Na a weevil - -	herb-rich flora with diverse structure of bare ground to tussocks; some scrub	regional
Coastal cliffs and shore platforms	Lepidoptera Coleoptera Diptera Hymenoptera Hemiptera	***Aricia artaxerxes salmacis* Nb Durham Argus** *Photedes captiuncula* RDB3 Least Minor *Adscita geryon* Nb Cistus Forester ***Scotoptyeryx bipunctaria cretata* Nb Chalk Carpet** *Barynotus squamosus* Nb, *Omiamima mollina* Na: a weevils *Oxycera pygmaea* Notable a soldier fly ***Bombus sylvarum* Nb Shrill Carder Bee** -	sparse and herb-rich flora; high proportion of exposed soil; natural erosion	regional
Dune slack	Coleoptera Diptera Lepidioptera Hemiptera	*Bembidion clarki* Nb a ground beetle *Pherbellia grisescens* Notable a snail-killing fly - -	reiable winter water supply; structural diversity with some bare patches	regional
Dune grassland	Lepidoptera Coleoptera Arachnida Diptera Hemiptera Hymenoptera	*Photedes elymi* Na Lyme Grass *Amara lucida* Nb, *A. spreta* Nb ground beetles *Calathus ambiguus* Nb a ground beetle *Phyllobius vespertinus* Nb a weevil *Philodromus fallax* Nb a running crab spider - - -	herb-rich flora with structural diversity; some bare sand patches	regional
Dune scrub	Coleoptera Diptera Lepidoptera Hemiptera	- - - -	patchy scrub, especially Hippophae	local

Open dune	Coleoptera Arachnida Diptera Lepidoptera Hemiptera Hymenoptera	*Amara lucida* Nb, *A. spreta* Nb ground beetles *Trichohydnobius suturalis* RDBK a round fungus beetle *Leiodes ciliaris* Notable a fungus beetle *Diglotta submarina* Notable a rove beetle *Philodromus fallax* Nb a running crab spider - - - -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; areas of bare sand	regional
Swamp	Coleoptera Diptera Lepidoptera	- - -	constant water supply giving high water table; some open water; a variety of emergent and submerged vegetation	local
Standing open water	Coleoptera Diptera Lepidoptera Mollusca	*Haliplus apicalis* Nb a crawling water beetle *Ilybius subaeneus* Nb a water beetle - - -	mosaic of open water to dense vegetation; shallow margins	local
Marsh/marshy grassland	Coleoptera Diptera Lepidoptera Hemiptera	*Bembidion clarki* Nb a ground beetle *Cercyon tristis* Nb a scavenger water beetle *Tetranocera punctifrons* Notable a snail-killing fly - -	some winter flooding, no summer flooding; some pools; structurally diverse sward; a litter layer	local
Dense continuous saltmarsh	Coleoptera Diptera Lepidoptera	*Enochrus bicolor* Nb, *Helophorus fulgidicollis* Nb: scavenger water beetles; *Ochthebius marinus* Nb, *Coelambus parallelogrammus* Nb: water beetles *Aepus marinus* Nb a ground beetle	herb-rich vegetation, especially with *Aster* and *Limonium vulgare*; shallow pools with bare mud substrate; transitions to dry land and to freshwater seepages	regional
Scattered saltmarsh	Coleoptera Diptera Lepidoptera	*Enochrus bicolor* Nb, *Ochthebius marinus* Nb: water beetles *Helophorus fulgidicollis* Nb a scavenger water beetle - -	herb-rich vegetation; shallow pools with bare mud substrate; transitions to dry land and to freshwater seepages	regional
Spoil	flying insects Coleoptera Diptera Lepidoptera Hymenoptera	- - - - -	mostly bare ground with some flower-rich ruderal vegetation; mailnly well drained areas with some damp patches and temporary winter water	local

Natural Area: Saltburn to Bridlington 100				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Flamborough Head	Coleoptera Lepidoptera Hemiptera Diptera	*Barpeithes sulcifrons* Nb a weevil *Platyderus ruficollis* Nb a ground beetle ***Scotopteryx bipunctaria crenata* Nb Chalk Carpet** - -	varied grassland structure from open ground to tussocks; herb-rich flora; bare rocks with crevices; natural erosion, no sea defences	local
Sea cliffs north of Flamborough	Lepidoptera Coleoptera Diptera	***Scotopteryx bipunctaria crenata* Nb Chalk Carpet** *Bembecia scopigera* Nb Six-belted Clearwing - -	natural erosion ; some patches of vegetation on ledges	local?
Rocky shore and chalk reefs	Coleoptera Diptera	*Aepus robini* Nb a ground beetle -	natural erosion	local
Soft cliffs of boulder clay	Coleoptera Hymenoptera Araneae Isopoda Lepidoptera Diptera Hemiptera	*Nebria livida* Na, *Bembidion saxitile* Nb: ground beetles *Byrrhus arietinus* Nb Northern Pill Beetle *Mutilla europaea* Nb Large Velvet Ant *Donacochara speciosa* Na a money spider *Armadillidium pulchellum* Nb a pill woodlouse - - -	natural erosion; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	regional
Sublittoral sediment				
Open sea				

Natural Area: Bridlington to Skegness 101				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Humber estuary	Lepidoptera Diptera Coleoptera	*Apamea oblonga* Nb Crescent striped moth - -	undisturbed vegetation; herb-rich vegetation, especially with *Aster* and *Limonium vulgare* transitions to dry land and to freshwater seepages; sand and shingle bars	local?
Soft cliffs	Coleoptera Hymenoptera Lepidoptera Diptera Hemiptera	*Nebria livida*Na, *Bembidion saxitile* Nb, *Amara fulva* Nb, *Harpalus schaubergerianus* Nb: ground beetles - - - -	natural erosion; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	regional
Saline lagoon	Coleoptera Diptera	*Haliplus apicalis* Nb a crawling water beetle *Agabus conspersus* Nb a water beetle *Helophorus fulgidicollis* Nb, *Enochrus bicolor* Nb: scavenger water beetles -	shallow water	local
Intertidal mud and sand	Coleoptera Diptera	*Bembidion lunatum* Nb, *B. ephippium* Na, *Dicheirotrichus obsoletus* Nb: ground beetles *Ochthebius marinus* Nb a scavenger water beetle -	open substrate with vegetated edges; some shallow pools	regional
Saltmarsh	Coleoptera Diptera Hymenoptera Lepidoptera Hemiptera	*Pogonus littoralis* Nb, *P. luridipennis* pRDB3, *Dicheirotrichus obsoletus* Nb: ground beetles *Agabus conspersus* Nb, *Helophorus fulgidicollis* Nb, *Enochrus bicolor* Nb: water beetles *Bledius bicornis* Na, *Carpelimus foveatus* Nb:a rove beetles *Dolichosoma lineare* Nb a malachite beetle *Platycheirus immarginatus* Notable a hoverfly *Colletes halophilus* Na a mining bee *Pediasia aridella* Nb a pyralid moth ***Cuculia asteris* Nb Star-wort** *Eupethicia extensaria* RDB3 Scarce Pug moth -	undisturbed vegetation; herb-rich flora, especially with *Aster* and *Limonium vulgare*; shallow pools with mud; trandsitions to dry land and to freshwater seepages	regional

Open sand dune and gravel ridges	Coleoptera Lepidoptera Diptera Arachnida Hymenoptera Hemiptera	*Calathus ambiguus* Nb a ground beetle *Crypticus quisquilius* Nb a darkling beetle *Cleonus piger* Nb a weevil *Crambus pratella* Nb a pyralid moth *Agrotis ripae* Nb Sand Dart *Salticella fasciata* RDB2 a snail-killing fly *Baryphyma maritimum* Nb a money spider - -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; herb-rich vegetation; bare sand patches	regional
Sand dune grassland	Coleoptera Lepidoptera Diptera Hemiptera Hymenoptera Arachnida	*Calathus ambiguus* Nb a ground beetle *Cleonus piger* Nb a weevil *Platytes alpinella* pRDB3, *Cynaeda dentalis* pRDB3, *Gymnancyla canella* Na: micro-moths *Eilema pygmaeola* RDB3 Pigmy footman moth *Photedes elymi* Na Lyme grass moth *Agrotis ripae* Nb Sand Dart *Mythimna litoralis* Nb Shore Wainscot *Sideridis albicolon* Nb White Colon *Sphaerophoria loewi* RDB2 hoverfly *Phthiria pulicaria* Notable a bee fly *Trigonotylus psammaecolor* Notable a plant bug *Nysson trimaculatus* Nb a cuckoo wasp -	herb-rich flora with structural diversity; bare sand patches	regional
Sand dune scrub	Coleoptera Lepidoptera Diptera Hemiptera Hymenoptera	- **?*Xestia rhomboidea* Nb Square-spotted Clay** *Gelechia hippophaella* pRDB2 micro-moth - - -	scrub, especially Hippophae	local

Dune wetlands	Coleoptera Odonata Diptera Lepidoptera Hemiptera	***Panagaeus cruxmajor* pRDB1,** *Dromius longiceps* Na: ground beetles *Stenus carbonarius* Nb a rove beetle *Brachytron pratense* Nb Hairy Dragonfly *Sympetrum sanguineum* Nb Ruddy Darter *Coenagrion pulchellum* Nb Variable Damselfly *Limonia ventralis* Notable a cranefly *Psacadina verbekei* Notable a snail-killing fly ***Athetis palustris* RDB3 Marsh Moth** -	reliable winter water supply; bare sand patches; structurally diverse vegetation	regional
Sea-bank grassland	Coleoptera Hymenoptera Orthoptera Hemiptera Arachnida Diptera Lepidoptera	*Panagaeus bipustulatus* Nb a ground beetle *Colletes halophilus* Na a mining bee *Metrioptera roeselii* Roesel's Bush Cricket *Macrosteles sordipennis* Notable a leafhopper *Baryphyma maritimum* Nb a money spider- - -	herb-rich flora with structural diversity; patches of bare ground	regional

Notes

Xestia rhomboidea Nb Square-spotted Clay BAP middle list is a woodland species found at Saltfleetby, not in Wold-edge woods.

Natural Area: The Wash 102				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Intertidal mudflats and sandflats	Coleoptera Diptera	- -	open substrate with vegetated edges; some shallow pools	local
Saltmarsh	Coleoptera Diptera Hemiptera Hymenoptera Lepidoptera	*Pogonus littoralis* Nb a ground beetle *Enochrus halophilus* Na a scavenger water beetle *Phaedon concinnus* Nb a leaf beetle *Stratiomys longicornis* RDB2 a soldier fly *Macrosteles sordipennis* Notable a leafhopper *Colletes halophilus* Na a solitary bee- ***Cuculia asteris* Nb Star-wort**	undisturbed vegetation; herb-rich flora, especially with *Aster* and *Limonium vulgare*; some pools with mud; transitions to dry land and to freshwater seepages	regional
Shingle	Coleoptera Diptera Lepidoptera	*Cymindis axillaris* Na a ground beetle *Crypticus quisquilius* Nb a darkling beetle *Polydrusus pulchellus* Nb a weevil- - -	natural physiographic process leading to shingle deposition; open areas with some flower-rich ruderal vegetation	regional
Chalk and Greensand cliffs	Coleoptera Lepidoptera Diptera Hymenoptera Hemiptera	- - - - -	natural erosion; high proportion of exposed rock and soil; sparse and herb-rich vegetation; seepages with constant water supply	regional
? Fen	Lepidoptera	***Athetis palustris* RDB3 Marsh Moth**		
Sand dune	Coleoptera Diptera Lepidoptera Hymenoptera Hemiptera Arachnida	*Calathus ambiguus* Nb a ground beetle *Malachius barnevillei* RDB3 a malachite beetle *Crypticus quisquilius* Nb a darkling beetle *Phyllobius vespertinus* Nb a weevil *Salticella fasciata* RDB2 a snail-killing fly - - - -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; herb-rich vegetation; bare sand patches	regional
Lagoons	Coleoptera Diptera Crustacea	*Enochrus halophilus* Na, *E. bicolor* Nb: scavenger water beetles - ***Gammarus insensibilis* RDB3 Lagoon Sand Shrimp**	shallow brackish water with mud; moderate cover of aquatic vegetation.	local

Natural Area: Old Hunstanton to Sheringham 103				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Grazing marsh	Coleoptera	*Silis ruficollis* Nb a soldier beetle	some winter flooding, no summer flooding; light grazing and trampling; pools and dammed ditches; structurally divese sward	regional
		Cypha pulicaria Notable a rove beetle		
	Diptera	*Erioptera bivittata* RDB2 a cranefly		
		Vanoyia tenuicornis Notable a soldier fly		
		Psacadina verbekei Notable a snail-killing fly		
	Lepidoptera	-		
	Hemiptera	-		
Sand dune	Coleoptera	*Malachius barnevillei* RDB3 a malachite beetle	natural physiographic processes leading to fore-dune; dune ridge and grey dune; herb-rich vegetation; bare sand throughout	national
		***Cicindela maritima* Nb Dune Tiger beetle**		
		Harpalus servus Nb, *Demetrias monostigma* Nb: ground beetles		
		Cardiophorus asellus Nb a click beetle		
		Phyllobius vespertinus Nb a weevil		
	Lepidoptera	*Photedes elymi* Na Lyme Grass		
		Actebia praecox Nb Portland Moth		
		Sideridis albicolon Nb White Colon		
	Diptera	*Phthiria pulicaria* Notable a bee fly		
	Hymenoptera	*Podalonia affinis* RDB3 a solitary wasp		
		Colletes marginatus Na Margined Colletes		
	Hemiptera	*Nabis pseudoferus* Notable a damsel bug		
	Isopoda	*Armadilidium album* Nb a pill woodlouse		
Saltmarsh	Coleoptera	*Bembidion ephippium* Na, *Pogonus littoralis* Nb: ground beetles	undisturbed vegetation; herb-rich sward, especially with *Aster* and *Limonium vulgare*; shallow pools with mud; transitions to dry land and to freshwater seepages	national
		Enochrus halophilus Na a scavenger water beetle		
		Malachius barnevillei RDB3 a malachite beetle		
		Crepidodera impressa Na a leaf beetle		
		Mecinus collaris Nb a weevil		
		Colletes halophilus Na a solitary bee		
	Hymenoptera	-		
	Diptera	-		
	Lepidoptera	-		
	Hemiptera			

Shingle structures	Coleoptera Diptera Lepidoptera	*Panagaeus bipustulatus* Nb, *Harpalus vernalis* Na, *Masoreus wetterhalli* Na: ground beetles *Polydrusus pulchellus* Nb a weevil - -	natural physiographic processes leading to shingle deposition; bare areas with some flower-rich ruderal vegetation	regional
Reedbeds	Coleoptera Hemiptera Diptera Lepidoptera	*Dromius longiceps* Na a ground beetle *Paralimnus phragmitis* Notable a leafhopper *Chloriona vasconica* Notable a planthopper - -	Standing stems remaining for several years; active invasive fronts; ground predominantly flooded only in winter; bare mud between stems; litter of dead leaves and stems; transition to dry land or other wetland habitats	regional
Intertidal mud and sand	Coleoptera Diptera	*Dicheirotrichus obsoletus* Nb a ground beetle *Ochthebius viridis* Nb a small water beetle *Bledius tricornis* Nb, *Diglotta submarina* Nb: rove beetles -	bare mud with a vegetation edge, some shallow pools	local
Brackish lagoons	Coleoptera Crustacea Diptera	*Haliplus apicalis* Nb a crawling water beetle *Coelambus parallelogrammus* Nb, *Ochthebius marinus* Nb, *O. viridis* Nb: water beetles ***Gammarus insensibilis*** **RDB3 Lagoon Sand Shrimp** -	brackish water with natural innundation by the sea; shallow water with bare mud	regional
Soft cliffs	Coleoptera Hymenoptera Lepidoptera Diptera Hemiptera Crustacea	*Asaphidion pallipes* Nb, *Dyschirius obscurus* pRDB2, *Nebria livida* Na, *Notiophilus quadripunctatus* Nb: ground beetles *Bledius filipes* RDB1 rove beetle - *Podalonia hirsuta* Nb Hairy Sand Wasp *Oxycera morrisii* Nb, *Stratiomys potamida* Nb: water soldierflies - *Eiluma purpurascens* Nb woodlouse	natural erosion; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply; nectar sources; recent slippages; bare dry faces	national

Natural Area: Sheringham to Lowestoft 104				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
North Denes sand dunes	Coleoptera Lepidoptera Diptera Hymenoptera Hemiptera Isopoda	*Amara consularis* Nb a ground beetle *Crypticus quisquilius* Nb a darkling beetle *Anthicus bimaculatus* Na an antlike beetle *Pediasia fascelinella* RDB2 a pyralid moth *Photedes elymi* Na Lyme Grass *Agrotis ripae* Nb Sand Dart *Mythimna litoralis* Nb Shore Wainscot *Phthiria pulicaria* Nb a bee fly - - -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; herb-rich vegetation; bare sand throughout	regional
Mobile soft cliffs	Coleoptera Diptera Isopoda Lepi doptera Hymenoptera Hemiptera	*Nebria livida* Na, *Asaphidion pallipes* Nb: ground beetles *Bledius filipes* RDB1 a rove beetle *Oxcera morrisii* N, *Vanoyia tenuicornis* N: soldierflies *Eulma purpurascens* Nb a pill woodlouse - - -	natural erosion; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	national
Intertidal mud/sand	Coleoptera Diptera	*Ochthebius marinus* Nb a small water beetle -	open mud/sand with vegetation edge; some pools	local
Saltmarsh	Coleoptera Diptera Lepidoptera Hemiptera	*Ochthebius marinus* Nb a small water beetle - ***Cuculia asteris* Nb Star-wort** -	herb-rich vegetation; some pools; transition to dry land and freshwater seepages	local
Sand dunes	Coleoptera Lepidoptera Diptera Hymenoptera Hemiptera Isopoda	*Amara consularis* Nb a ground beetle *Crypticus quisquilius* Nb a darkling beetle *Anthicus bimaculatus* Na an antlike beetle *Pediasia fascelinella* RDB2 a pyralid moth *Eilema pygmaeola* RDB3 Pygmy Footman *Photedes elymi* Na Lyme Grass *Agrotis ripae* Nb Sand Dart *Mythimna litoralis* Nb Shore Wainscot *Phthiria pulicaria* Nb a bee fly - - -	natural physiographic processes leading to fore-dune; dune ridge and grey dune behind; herb-rich vegetation; bare sand throughout	regional

Natural Area: Suffolk Coast 105				
Key Habitats	**Invertebrate groups**	**Associated or significant species**	**Specific needs**	**Significance in NA**
Grazing marshes and dykes	Mollusca Orthoptera Lepidoptera Coleoptera Diptera	*Pseudamnicola confusa* RDB1 spire snail *Metrioptera roeselii* Nb Roesel's Bush-cricket *Pediasia contaminella* Nb pyralid moth *Archanara algae* RDB3 Rush Wainscot moth *Archanara sparganii* Nb Webb's Wainscot moth *Spilosoma urticae* Nb Water Ermine moth *Haliplus apicalis* Nb, *Peltodytes caesus* Nb: water beetles *Rhantus suturalis* Nb, *Agabus conspersus* Nb: diving beetles *Bembidion fumigatum* Nb a ground beetle *Lithodactylus leucogaster* Nb a weevil *Erioptera bivittata* RDB2 cranefly *Stratiomys potamida* Nb, *Odontomyia tigrina* Nb, *Vanoyia tenuicornis* Nb: soldier flies *Haematopota grandis* RDB3 horsefly *Lejogaster splendida* Nb hoverfly *Antichaeta analis* RDB3, *Antichaeta brevipennis* RDB2: snail-killing fly	light grazing and trampling; some winter flooding, no summer flooding, stablewater levels; associated pools and dykes; strucutrally diverse sward and aquatic flora; slight brackish influence	Regional

Reedbeds	Lepidoptera Coleoptera Diptera Hemiptera Aranaea	*Schoenobius gigantella* Nb pyralid moth *Deltote bankiana* RDB3 Silver Barred moth *Chilodes maritimus* Nb Silky Wainscot *Simyra albovenosa* Nb Reed Dagger *Photedes brevilineata* RDB3 Fenn's Wainscot moth *Photedes fluxa* Nb Mere Wainscot moth *Archanara neurica* RDB3 White-mantled Wainscot moth *Senta flammea* Na Flame Wainscot moth *Macrochilo cribrumalis* Nb Dotted Fan-foot moth *Odacantha melanura* Nb, *Dromius longiceps* Na: ground beetles *Silis ruficollis* Nb soldier beetle good assemblage of scarce craneflies and fungus gnats, e.g.*Erioptera meijerei* RDB2 a cranefly *Stratiomys singularior* Nb soldier fly good assemblage of scarce snail-killing flies good assemblage of scarce leafhoppers and planthoppers, e.g. *Paralimnus phragmitis* Nb, *Chloriona dorsata* Nb *Hypomma fulvum* Na money spider	old reed with dense litter layer; diverse structure; reed growing on gradient from dry ground to shallow water	Nationally important

Brackish lagoons	Actiniaria Anthozoa Coleoptera Crustacea Diptera	*Cordylophora caspia* Nb colonial hydroid ***Nematostella vectensis* RDB3 Starlet sea anemone** *Blethisa multipunctata*Nb ground beetle *Hydrovatus clypealis* Na, *Dytiscus circumflexus* Nb: diving beetles; *Enochrus halophilus* Na, *E. bicolor* Nb: scavenger water beetles; *Haliplus apicalis* Nb crawling water beetle ***Gammarus insensibilis* RDB3 Lagoon sand shrimp** -	shallow brackish water on mud; all stages of succession including almost dry areas with dense litter; long rotation cutting; some scrub invasion; stable summer water levels	National

Shingle structures	Mollusca Araneae Lepidoptera Coleoptera	*Monacha cartusiana* RDB3 snail ***Vertigo angustior* RDB1 Narrow-mouthed whorl snail** *Clubiona similis* RDB3 foliage spider *Pima boisduvaliella* pRDB3, *Platytes alpinella* pRDB3: pyralid moths ***Idaea ochrata cantiata* RDB2 Bright Wave moth** *Scopula rubiginata* RDB3 Tawny Wave *Euxoa cursoria* Nb Coast Dart moth ***Agrotis cinerea* Nb Light Feathered Rustic moth** *Agrotis ripae* Nb Sand Dart moth *Aporophyla australis* Nb Feathered Brindle moth *Earias clorana* Nb Cream-boardered Green Pea moth *Photedes elymi* Na Lyme Grass moth ***Lionychus quadrillum* RDB3,** *Cymindis axillaris* Na: ground beetles *Malachius marginellus* Nb malachite beetle *Cardiophorus ascellus* Nb click beetle	natural physiographic processes leading to shingle deposition; bare ground with sparse flower-rich ruderal vegetation	National
Intertidal mud and sand	Crustacea Oligochaetes	*Ochthebius marinus* Nb small water beetle -	open mud or sand with vegetation edge; some pools	local

Saltmarsh	Lepidoptera Diptera Hemiptera Coleoptera	*Malacosoma castrensis* RDB3 Ground lackey moth ***Cucullia asteris* Nb Star-wort moth** *Apamea oblongata* Nb Crescent striped moth *Limonia complicata* Nb cranefly *Saldula opacula* Nb shore bug *Helophorus fulgidicollis* Nb, *Enochrus halophilus* Na: scavenger water beetles; *Ochthebius marinus* Nb a small water beetle *Dolichosoma lineare* Nb a malachite beetle *Crepidodera impressa* Na a leaf beetle *Pseudaplemonus limonii* Nb a seed weevil	undisturbed herb-rich vegetation; some pools and mud; transitions to dry land and to freshwater seepages	Regional
Cliffs soft	Coleoptera Hymenoptera Orthoptera Isopoda Diptera Lepidoptera Hemiptera	*Hypera dauci* Nb, *Ceutorhynchus terminatus* Nb: weevils *Andrena nigriceps* Nb a solitary bee *Metrioptera roeselii* Nb Roesel's Bush Cricket *Trichoniscoides saeroeensis* Notable a woodlouse - - -	natural erosion; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	national

Natural Area: Liverpool Bay 117				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Sand dune	many groups, especially Coleoptera Lepidoptera Diptera Hymenoptera Hemiptera Orthoptera Isopoda	*Aegalia rufa* RDB1 chafer *Aphodius brevis* RDB1 dung beetle ***Cicindela hybrida* pRDB2 tiger-beetle** *Lasiocampa trifolii* Na Grass eggar moth *Lycia zonaria* RDB3 Belted beauty moth *Cucullia absinthii* Nb Wormwood moth *Nephrotoma quadristriata* pRDB2 cranefly *Cleptes nitidulus* Na ruby-tailed wasp *Arachnospila wesmaeli* Na spider-hunting wasp *Podalonia affinis* RDB3 mud wasp *Colletes cunicularius* RDB3 solitary wasp *Monosynamma sabulicola* Nb grassbug - *Armadillidium album* Nb pill woodlouse	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; dune grasslands; herb-rich with structural diversity; dune slacks with reliable winter water supply; structural variety including open grass heath, very short turf and bare ground; rabbit disturbance; nectar & pollen sources; flowering heather; dung; scattered scrub and woodland on hinterland	National

Estuary, foreshore & saltmarsh	many groups, especially Coleoptera Lepidoptera Diptera Hemiptera	 *Dryops griseus* RDB3 long-toed water-beetle *Dystiscus circumcinctus* Na diving-beetle *Hypocaccus rugiceps* Na carrion beetle *Gabrius keysianus* Nb rove beetle *Chilodes maritimus* Nb Silky wainscot moth *Culiseta longiareolata* pRDBK mosquito *Macrosteles sordidipennis* Nb leafhopper *Trigonotylus psammaecolor* Nb grass-bug	estuaries with unpolluted transition from fresh to salt water; saltmarsh communities and rhine systems; exposed mud; shingle and rock; unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation; brackish and freshwater seepages	Regional
Soft and hard cliff	many groups, especially Lepidoptera Coleoptera Diptera Hymenoptera	 - - - -	natural erosion though not too fast; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	Local
Supralittoral shingle	Crustacea Coleoptera	*Armadillidium album* Nb pill-woodlouse -	unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation; brackish and freshwater seepages	Local
Neutral grassland	Coleoptera Lepidoptera Hemiptera	*Ceutorhynchus campestris* Nb weevil - -	varied structure including grass tussocks; grazing by stock	Local
Acid grassland	Homoptera Coleoptera Hymenoptera, aculeates	*Eupithecia plumbeolata* Nb Lead-coloured pug - -	structural variety including open grassland and bare ground; nectar & pollen sources	Local

Freshwater marsh & swamp	Coleoptera Diptera Lepidoptera Hemiptera Mollusca Crustacea	*Bagous lutosus* pRDB1, *B. limosus* Nb , *B lutulentus* Nb: weevils *Helius pallirostris* Nb cranefly - - - *Lathonura rectirostris* Nb water-flea	poached wet ground; small pools and wet hollows; mosaic of open water and dense vegetation; shallow margins; semi-natural surrounding land; reliable hydrological regime; active management; constant unpolluted water supply	Local
Conifer plantation	Diptera Lepidoptera Coleoptera	*Didea intermedia* Nb hoverfly - -	sunny rides and glades fire-breaks with flowering herbs and scramblers; sunny chalky banks; standing dead wood; impeded drainage and pools	Local

Excluded the Stocktons Wood ancient woodland fauna - assumed this was included by accident?

Combined the various dune habitats into one category, as elsewhere.

Combined the hard and soft cliffs - no available records anyway!

Assumed 'Acid grassland' was intended to be separate from 'shingle'

Deleted some of the obvious duplication in the categories provided.

'Stretched' the Ainsdale/Formby dune fauna in order to get some names in other, non-dune habitat categories.

Natural Area: Morecambe Bay 118				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Strandline, shingle & sand dune	many groups, especially Lepidoptera Diptera Coleoptera Hymenoptera	*Lycia zonaria* RDB3 Belted beauty moth *Phibalepteryx virgata* Nb oblique-striped moth *Euxoa cursoria* Nb Coast dart moth *Lampronia pubicornis* Nb longhorn moth *Scrobipalpa artemisiella* Nb micromoth *Pamponerus germanicus* pRDB3 robberfly *Trachyphloeus laticollis* Na, *Orthochaetes setiger* Nb: weevils -	foredune: unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation; brackish and freshwater seepages dune: natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; dune grasslands; herb-rich with structural diversity; dune slacks with reliable winter water supply; scattered scrub and woodland on hinterland	Regional
Coastal cliffs	Lepidoptera Coleoptera Isopoda Hymenoptera Diptera	? *Argynnis adippe* RDB2 High brown fritillary butterfly *Aricia ataxerxes* Nb Northern brown argus butterfly *Boloria euphrosyne* Nb Pearl-bordered fritillary butterfly *Photedes captiuncula* RDB3 Least minor moth *Anania funebris* Na micromoth *Longitarsus plantagomaritimus* Nb leaf beetle *Armadillidium pulchellum* Nb pill-woodlouse - -	natural erosion though not too fast; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	Regional
Coastal woodlands	Lepidoptera Diptera Coleoptera Mollusca Hymenoptera	*Phyllonorycter muelleriella* Nb micromoth *Cheilosia nebulosa* RDB3 hoverfly *Ctenophora pectinicornis* Nb feathered cranefly *Malthinus balteatus* Nb soldier beetle *Acicula fusca* Nb point-snail -	semi-natural woodland; damp, shady environment; exclusion of grazing stock; wet rocks and small waterfalls with mosses; dead wood; standing and fallen timber; sunlit clearings; areas of dry, bare ground	Local
Estuarine salt/fresh water transitions	many groups, especially Coleoptera Lepidoptera Diptera	*Bembidion bipunctatum* Nb, *Agonum nigrum* Nb: ground beetles *Polydrusus pulchellus* Nb sea-wormwood weevil *Chilodes maritimus* Nb Silky wainscot moth *Platycheirus immarginatus* Nb hoverfly *Melieria cana* Nb picture winged fly	estuaries with unpolluted transition from fresh to salt water; saltmarsh communities and rhine systems; exposed mud; shingles and rocks	Regional
Coastal lagoon	Coleoptera Lepidoptera Diptera	*Octhebius marinus* Nb water beetle - -	mildly to strongly brackish water; natural inundation by sea; gradient from unstable to stable and vegetated shingle	Local

Intertidal mud & sand Shallow sub-tidal saltmarsh	Coleoptera Crustacea Mollusca soft-bodied invertebrates	*Phaedon concinnus* Nb leaf beetle - - -	undisturbed and unpolluted sediments; natural tidal regime; saltmarsh communities and rhine systems; exposed mud; unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation; brackish and freshwater seepages	Local

Generally excluded the Arnside/Arnside Knot fauna, as I assume this to be outside the coastal area: if not, then need to add a calc grassland/woodland category.

Ditto some of the Roundsea Wood, Heathwaite, Middlebarrow Plain and some other sites, unless the fauna is obviously 'coastal'.

Natural Area: Cumbrian Coast 119				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Dune dry parts and shingle	Coleoptera Diptera Hymenoptera Isopoda Arachnida Hemiptera	***Cicindela hybrida* pRDB2**, *Amara lucida* Nb: ground beetles *Hypocaccus rugiceps* Na, *Baekmanniolus dimidiatus* Nb carrion beetles *Hippodamia variegata* Nb Adonis's ladybird *Phthiria pulicaria* Nb bee-fly ***Bombus humilis* local Brown-banded Carder bee** *Psen littoralis* RDB3 solitary wasp *Colletes cunicularius* RDB3 mining bee *Trichoniscoides saeroeensis* Nb, *Halophiloscia couchi* Nb, *Armidillidium album* Nb: woodlice *Philodromus fallax* Nb crab spider *Attulus saltator* Nb jumping spider -	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; undisturbed shingle where it exists beyond maritime influence; natural flora; scattered scrub and woodland on hinterland; shingle: unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation; brackish and freshwater seepages	national
Dune dry parts and shingle - herbivores	Lepidoptera Coleoptera Hemiptera	*Lasiocompa trifolii* Na Grass eggar moth *Euxoa cursoria* Nb Coast Dart moth *Agrotis ripae* Nb Sand Dart moth *Phibalapteryx virgata* Nb Oblique-striped moth *Actebia praecox* Nb Portland moth *Ceutorhyncus atomus* Na weevil on Iberia, Arabidopsis *Cryptocephalus aureolus* Nb leaf beetle *Cleonus piger* Nb, *Trachyphloeus laticollis* Na: weevils -	natural herb-rich flora	national
Poosl in dune slacks	Coleoptera water beetles Diptera	*Dryops striatellus* pRDB3 long-toed water beetle -	permanent and temporary pools; reliable winter water supply	local

Sea cliffs	Lepidoptera Hymenoptera Coleoptera Isopoda Diptera	*Boloria euphrosyne* Nb Pearl-bordered fritillary butterfly *Bembicia muscaeformis* Nb Thrift Clearwing moth *Cucullia absinthii* Nb Wormwood shark moth *Eurrhypara terrealis* pRDB3 micromoth *Longitarsus plantagomaritimus* Nb leaf beetle *Barypeithes sulcifrons* Nb, *Brachysomus echinatus* Nb: weevils *Trichoniscoides albidus* Nb, ***Metatrichoniscoides celticus*** RDBk: woodlice -	natural erosion though not too fast; high proportion of exposed soil; sparse and herb-rich vegetation; seepages with constant water supply	Regional
Salt & grazing marsh	Coleoptera Isopoda Lepidoptera Diptera Hemiptera Mollusca	*Dytiscus circumflexus* Nb diving beetle *Chaetocnema sahlbergi* Na, Phaedon concinnus Nb: leaf beetle *Bembidion laterale* Nb, *Dyschirius impunctipennis* Nb: ground beetles *Armadillidium album* Nb, pill-woodlouse - *Platycheirus immarginatus* Nb hoverfly - -	saltmarsh: herb-rich vegetation; transitions to dry ground; brackish and freshwater seepages marsh: poached wet ground; tall marshy grassland cut on hay meadow rotation; differential mowing; scattered scrub and trees; small pools and wet hollows	Local
Rivers & lagoons	Coleoptera Diptera Lepidoptera aquatic insects Crustacea	*Bembidion saxatile* Nb ground beetle *Stictonectes lepidus* Nb, *Hydrochus angustatus* Nb: water beetles *Notaris bimaculatus* NB weevil - - - -	natural flow regime; clean water; some shaded and some open banks; margins with some emergent vegetation; undisturbed shingle and mud shores and bars; accumulations of flood litter; exposed sandy banks	Local
Intertidal coastal grassland [taken to be grazed saltmarsh]	Coleoptera Hemiptera Diptera Crustacea Mollusca	*Octhebius subinteger* Nb water beetle *Trigonotylus psammaecolor* Nb grass bug - - -	natural tidal regime; absence of pollution; small pools and creeks	Local

Natural Area: Solway Firth 120				
Key Habitats	**Invertebrate Groups**	**Associated or Significant Species**	**Specific Needs**	**Significance in NA**
Intertidal flats & saltmarsh	Coleoptera	*Bembidion laterale* Nb, *B. lunatum* Nb, *Dyschirius nitidus* Na, *Agonum nigrum* Nb: ground beetles *Agabus conspersus* Nb, *Haliplus apicalis* Nb ,*Helophorus fulgidicollis* Nb: water-beetles *Polydrusus pulchellus* Nb sea-wormwood weevil	undisturbed and unpolluted sediments; natural tidal regime; saltmarsh communities and rhine systems; exposed mud; unpolluted and undisturbed beach debris; transitions to dry ground; herb-rich vegetation, especially with *Aster* and *Limonium vulgare*; brackish and freshwater seepages	National
	Diptera	*Melieria cana* Nb picture-winged fly *Chersodromia cursitans* pRDB3 dance fly		
	Hemiptera	*Macrosteles sordidipennis* Nb leafhopper		
	Crustacea	-		
	Mollusca	-		
	soft-bodied invertebrates	-		
Dune & shingle	Lepidoptera	*Adscita statices* Nb Forester moth *Aporophyla australis* Nb Feathered Brindle moth	natural physiographic processes leading to fore-dune; dune ridge and grey lichen dune behind; bare sand in all zones of the dunes system; herb-rich graasland with structural diversity; dune slacks with reliable winter water supply	local
	Coeloptera	*Amara lucida* Nb, *Asaphidion pallipes* Nb, *Pterostichus angustatus* Nb: ground beetles *Byrrus arietanus* Nb northern pill beetle *Agathidium marginatum* Nb round fungus-beetle *Cleonus piger* Nb, *Orthochaetes setiger* Nb, *Perapion affine* Na: weevils *Geotrupes vernalis* Nb dumbledor beetle		
	Diptera	*Chersodromia cursitans* pRDB3 dance fly		
	Hemiptera	-		