

Invertebrate Recording
on
Suffolk Breckland
Sites of Special Scientific Interest
during 1993 and 1994

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Introduction

Sites covered

Most of the best remaining examples of Breckland grass heath are Sites of Special Scientific Interest in Suffolk Breckland. There has been substantial recent interest in the management of these unusual heathlands. Current management prescriptions involve disturbance; either by rotivation or by heavy grazing of sheep or rabbits.

Invertebrates, especially ground beetles (Carabidae), can be very useful and readily sampled indicators in a wide range of terrestrial environments. A species-rich and specialised assemblage of ground beetles inhabits the extremely dry, sunny, sandy habitats which are frequent in Breckland. Frequent and intense disturbance is a key element of such habitats.

This survey aims to begin to assess the invertebrate faunas of a range of Suffolk Breckland grass heath SSSIs. These results provide some indication of the relative conservation value of the heaths surveyed for invertebrates.

Additional (non-SSSI) sites

In addition to the SSSIs in Suffolk Breckland, a number of other sites were sampled in more or less detail. One roadside verge has already been identified as of considerable conservation value (Eversham & Telfer, 1993), and its ecology has since been discussed in more detail (Eversham & Telfer 1994). Further sampling was undertaken at this roadside during 1994, and additional species of conservation value were found.

Casual recording of invertebrates at sites throughout Breckland in 1994 has not revealed any other non-SSSI sites of a quality approaching that of the existing SSSIs or of the above roadside. Some of the more important results of wider-ranging sampling are discussed under **Species studies and priorities**, below.

Timing of the survey

The fieldwork described in this report was carried out largely in March-October 1993 and March-November 1994. This season includes the whole of the period when the target groups for the survey are active and readily sampled. Winter fieldwork for invertebrates in parts of Breckland may be possible, but only a small part of the fauna will be active above the ground surface. The authors felt that the potential damage to sites caused by digging and soil-sifting would outweigh the benefits of additional species records. The winter period was instead used for microscope work, examining museum collections, reviewing the literature, and report writing.

A few sites (especially the roadside (Eversham & Telfer 1993) and Maidscross Hill) were studied in some detail during 1993, but the majority were visited for the first time in 1994. All pitfall results in this report are from 1994.

Sampling techniques

The main sampling technique used at most sites was direct-searching. Direct searching involves sifting the surface soil and vegetation by hand, working areas of approximately 0.5 m x 0.5 m at a time.

Pitfall trapping was carried out at 4 of the sites. In each case, 9 pitfall traps were placed in a square grid arrangement or in a line. The spacing between traps was 2m. Traps were polythene coffee cups with a mouth diameter of 87 mm. Each trap was filled with 70 % ethylene glycol (vehicle antifreeze) solution to which a few drops of detergent were added as a surfactant. All chemicals and materials were safely removed after use.

Taxonomic and sampling bias

It was not practicable to be absolutely comprehensive in the breadth of recording, and the emphasis was on species which could be identified accurately. Little material was collected in groups requiring elaborate preparation or lengthy microscopic examination. Those taxa with which the authors are not fluent were generally not collected.

The species recorded reflect a bias of sampling towards habitat features within the sites which are more disturbed. Thus at Deadman's Graves, pitfall traps were set within the warren, and at Eriswell Low Warren, traps were set along a plough furrow. The survey also reflects a personal bias toward ground-beetles (Coleoptera: Carabidae), the smaller insect orders, and soil macrofauna. Of the major orders, the Diptera and Hymenoptera were not thoroughly sampled. In these, and among the spiders, the Homoptera, and the other families of Coleoptera, the species logged are mainly the large and conspicuous ones encountered while searching for other taxa.

The following groups were thoroughly sampled, to the extent that all adult specimens which were encountered were identified, as far as practicable.

Isopoda	Chilopoda
Diplopoda	Orthoptera
Dermaptera	Heteroptera
Hymenoptera: Formicidae	Coleoptera: Carabidae
Coleoptera: Byrrhidae	Coleoptera: Coccinellidae
Arachnida: Opiliones	Mollusca: Gastropoda

Larval/nymphal identifications were generally restricted to the most obvious species in the Hemiptera, Orthoptera and Carabidae. A few of the molluscs were identified solely from empty shells; these are marked as such in the systematic list.

Species studies and priorities

More detailed studies have been carried out on two species of Breckland invertebrate during 1994, the tortoise-beetle *Cassida nebulosa* L. (Coleoptera: Chrysomelidae), and the ground-beetle *Amara fusca* (Coleoptera: Carabidae).

Cassida nebulosa is a small tortoise-beetle which is golden-bronze with blackish speckles when mature; the greenish individual illustrated in Harde (1984) may be somewhat teneral. Although not

listed in the Insects Red Data Book (Shirt, 1987), it has since been considered to merit inclusion by Hyman (1992), although its precise category is 'Indeterminate' due to insufficient information. There have been few records of *C. nebulosa* in recent years. Morris (1989) reported four records of *C. nebulosa*, one specimen from Icklingham, West Suffolk (TL77, 28.v.1962), and three records from Dorset. At the time, these were the only post-1950 British records. In the 1940s, several records of *C. nebulosa* were published, from Cornwall (Turk, 1942), Surrey (Dinnage, 1949; Buck, 1949) and Burwell, Cambridgeshire (Allen, 1950).

Given this background, the authors pleased to find several adults and many larvae of *C. nebulosa* in abundance at the roadside (described by Eversham & Telfer (1993, 1994) on 13.vi.1994. On subsequent visits to the roadside, *C. nebulosa* was extremely abundant; over 200 larvae and up to 40 adults were swept in 10 minutes from mixed Chenopodiaceae.

During July, August and September 1994, we found *C. nebulosa* at 22 sites, in eight 10km in West Suffolk and West Norfolk. Seven different foodplants were involved, and most sites were visited several times, in an attempt to establish the extent to which each foodplant was being used. The following table gives the localities, and an indication of the habitat at each site, and the potential host-plants present.

Grid ref.	Site	Host-plant
TL7274	Barton Mills, picnic site	<i>Atriplex patula</i>
TL7377	Foxhole Heath, roadside	<i>Chenopodium album</i>
TL7476	How Hill, beet field	<i>Chenopodium album</i>
TL7575	A11/B1112, beet field	<i>Chenopodium album</i> , <i>Atriplex patula</i>
TL7772	Icklingham, roadside	<i>Chenopodium album</i>
TL7282	Maidscross Hill, roadside	<i>Atriplex patula</i> , <i>Chenopodium rubrum</i>
TL7384	Wangford Fen, roadside	<i>Chenopodium album</i>
TL7488	Hockwold, roadside	<i>Chenopodium album</i> , <i>Atriplex littoralis</i>
TL7583	Lakenheath, roadside	<i>Chenopodium album</i> , <i>Atriplex patula</i>
TL7583	Wangford, set-aside	<i>Chenopodium album</i>
TL7785	Brandon industrial estate	<i>Chenopodium album</i> , <i>Chenopodium rubrum</i>
TL7989	Emily's Wood, picnic site	<i>Atriplex patula</i>
TL7597	Northwold, beet field	<i>Chenopodium album</i>
TL7894	Cranwich, beet field	<i>Atriplex prostrata</i> , <i>Chenopodium album</i>
TL8286	Thetford Lodge Fm, roadside	<i>Chenopodium album</i>
TL8194	Lynford Hall, roadside	<i>Chenopodium album</i>
TL8392	West Tofts, roadside	<i>Chenopodium album</i>
TF6906	Fincham Hall, roadside	<i>Chenopodium album</i>
TF7000	Stoke Ferry, beet field	<i>Chenopodium album</i> , <i>Atriplex littoralis</i>
TF7006	Broadland Farm, roadside	<i>Chenopodium album</i>
TF7408	Devil's Dyke, roadside	<i>Chenopodium album</i>
TF8202	Rowley Corner, roadside	<i>Chenopodium album</i>

A more detailed account of the status, distribution, and ecology of *C. nebulosa* is given by Eversham (1995). A resurvey of known sites for *C. nebulosa* is proposed for 1995.

Amara fusca is a medium-sized brownish black seed-eating ground-beetle, and is probably the most significant species of invertebrate recorded in the present survey. It is currently in Category 1 of the Red Data Book (Endangered; Hyman & Parsons 1992). Until its discovery at the roadside in 1993 (Eversham & Telfer, 1993; Telfer & Eversham, 1994), *A. fusca* had never been confirmed as

an established breeding species in Britain. There are isolated historical records from West Kent, Glamorgan, south-west Yorkshire and south Northumberland; almost all specimens in museum collections in Britain come from sand dunes on the south Wales coast in the 1860s. In this century, it is known only from a single specimen: one taken at Swanley, Kent in 1942. Another reputed record (Hyman & Parsons, 1992), on the coast of Co Durham in 1985, is now known to be erroneous (M.L. Luff, pers. comm.). Recorded habitats in Britain have included sandy heathland and dunes.

In Europe, *A. fusca* is mainly a steppe species, associated especially with field wormwood (*Artemisia campestris*), a rare Breck plant which occurred near the roadside until the late 1980s (Lindroth, 1985). The distribution of *A. fusca* in Scandinavia is almost exactly the same as *Harpalus froelichi* (another Breck specialist which was abundant at the roadside in 1993 and 1994) being confined to southernmost Sweden and northern Denmark (Lindroth, 1945). In addition to the large population of *A. fusca* found at the roadside, we have discovered this species at two other sites: the Brandon *Artemisia* reserve, and Maidscross Hill SSSI (a single specimen in 1993).

The roadside population (in excess of 50 individuals seen on one visit in 1993, but no more than 10 in 1994) appears to be the largest. However, the population here and at Brandon appeared to be much smaller in 1994 than in 1993. At the roadside, mechanical disturbance caused by road widening may be responsible. At the Brandon reserve, the causes are less clear, although the failure of most *Artemisia campestris* plants to produce seed, perhaps due to deer browsing, may have had an impact on *A. fusca*.

The authors propose to focus their future fieldwork on *A. fusca*, in an attempt to determine its current status, and to identify the factors which limit its distribution. Research into the conservation biology of *A. fusca* may be relevant to English Nature's Species Recovery Programme, because of its RDB1 status. Unlike many British Red Data Book invertebrates, *A. fusca* is apparently rare or scarce over most of western Europe (K. Desender, M. Dufrêne, H. Gruttke, pers. comms.). *A. fusca* is also particularly worthy of study because it is representative of the rich but declining Breckland beetle fauna, and solutions to habitat management problems which suit *A. fusca* are likely to safeguard the future of many other rare and threatened invertebrates.

Status of this report

This is an account of spare-time fieldwork carried out when time allowed. The results and opinions expressed are those of the authors, and do not necessarily represent the views of the organisations to which the authors are affiliated.

The authors

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Conservation evaluation

One or two seasons' fieldwork is not sufficient for a comprehensive evaluation of the conservation value and potential of a site for invertebrates, or the requirements of the invertebrate fauna for conservation management. All that can be done is to comment on the more unusual species which have been found. However, the high proportion of rare and scarce species which have been found is a reflection of very high 'site quality', and sensitive management of the habitats over many years.

Around 300 species have so far been identified from sites examined, about 80 of which are nationally or regionally rare (marked with a status code after the species name in the lists). Species are listed by subsite in the main body of this report. Annex 1 gives a combined list for the whole site, and Annex 2 provides details of the status and habitats of the less common species.

Given further surveys, appropriate management for enhancing invertebrate conservation value on individual sites could be suggested. As an interim suggestion, it is noted here that a considerable proportion of the rare and specialised invertebrate fauna of Breckland appears to require conditions of such heavy disturbance that their survival on nature reserves under current management regimes is extremely unlikely. The establishment of conservation areas specifically for Breckland invertebrates should be considered as a priority.

Systematic list of species by subsites

Notes on the format of the Systematic List

The records are arranged first by sampling site, within which all species are ordered by taxonomic group. A total list of all species recorded is then presented, as Annex 1. Species status is indicated, in the main list and in Annex 1, by a code after the species name, as follows:

RDB	=	Red Data Book species, nationally rare or endangered
Na	=	Nationally scarce species, grade a (likely to occur in 30 or fewer 10km squares of the O.S. grid)
Nb	=	Nationally scarce species, grade a (likely to occur in 31-100 10km squares of the O.S. grid)
L	=	Local or regionally scarce species

Notes on the biology and conservation status of the species in these three categories constitute Annex 2.

For some groups, identifications are not yet complete. If the genus is known, it is followed by 'sp.' (if a single unidentified species is present in the sample) or 'spp.' (if more than one unidentified species has been collected).

Brandon *Artemisia* Reserve

This small nature reserve was visited on several occasions in 1993 and 1994. It supports an important population of the Red Data Book 1 (endangered) ground-beetle, *Amara fusca*, which appears to be associated with the Breckland mugwort (*Artemisia campestris*) for which the reserve was set up. Because of the small size of the site, and the potential vulnerability of the *Artemisia*, only direct searching has been employed so far at the site. Hence, the list of species recorded so far is short.

Crustacea: Isopoda

Armadillidium vulgare
Philoscia muscorum
Porcellio scaber

Chilopoda

Lithobius forficatus

Diplopoda

Glomeris marginata
Ommatoiulus sabulosus

Orthoptera

Chorthippus albomarginatus
C. brunneus

Heteroptera: Pentatomidae

Podops inuncta L

Heteroptera: Lygaeidae

Drymus silvaticus
Graptopeltus lynceus Nb
Macrodema micropterum
Peritrechus lundii L
Plinthisus brevipennis L

Heteroptera: Tingidae

Acalypta parvula
Agramma laetum L

Heteroptera: Reduviidae

Coranus subapterus L

Heteroptera: Nabidae

Anaptus major
Nabis ferus

Heteroptera: Miridae

Chlamydatus pullus L
Monalocoris filicis

Hymenoptera: Formicidae

Formica fusca
Lasius niger
Leptothorax acervorum
Myrmica lobicornis
Myrmica rubra
Myrmica scabrinodis

Coleoptera: Carabidae

Amara aenea
A. convexior L
A. familiaris
A. fusca RDB1
A. lunicollis
A. tibialis
Bembidion lampros
Calathus ambiguus Nb
C. fuscipes
C. melanocephalus s.s.
Harpalus anxius L
H. rufitarsis L

Coleoptera: Elateridae

Agrypnus murinus
Agriotes obscurus
Prosternon holosericeus

Coleoptera: Byrrhidae

Byrrhus pustulatus L

Coleoptera: Coccinellidae

Micraspis 16-punctata L

Deadman's Graves SSSI

Rabbit warren at TL776743. Nine pitfalls from 24 May to 30 June 1994, of which only seven survived. A total of only 9 species was identified from these pitfalls. A few additional species were recorded during visits to the site.

Crustacea: Isopoda

Porcellio scaber

Orthoptera: Acrididae

Stenobothrus lineatus L

Omocestus viridulus

Myrmeleotettix maculatus

Lepidoptera: Satyridae

Maniola jurtina Meadow Brown

Coenonympha pamphilus Small Heath

Hymenoptera: Aculeata: Apidae

Bombus pascuorum

Coleoptera: Carabidae

Amara aenea

Calathus erratus

C. fuscipes

Cicindela campestris

Harpalus anxius L

Harpalus tardus

Coleoptera: Tenebrionidae

Melanimon tibialis

Cteniopus sulphureus L

Coleoptera: Nitidulidae

Glischrochilus olivieri

Coleoptera: Silphidae

Silpha tristis L

Eriswell Low Warren SSSI

Nine pitfall traps were set here running along the bottom of one of the experimental plough furrows in the middle of the heath at TL740793. As for the Deadman's Graves pitfalls, the traps were run from 24 May to 30 June 1994. Eight traps survived; 24 species were identified. A few further species were identified from direct searching on 24 May 1994.

Crustacea: Isopoda

Armadillidium vulgare

Philoscia muscorum

Porcellio scaber

Heteroptera: Lygaeidae

Plinthisus brevipennis L

Coleoptera: Carabidae

Agonum dorsale

Amara communis/convexior L

A. lunicollis

Bembidion lampros

Calathus fuscipes

Carabus problematicus

Cicindela campestris

Harpalus anxius L

H. rufitarsis L

H. tardus

Licinus depressus L

Metabletus foveatus

Pterostichus melanarius

Coleoptera: Silphidae

Silpha laevigata L

S. tristis L

Coleoptera: Elateridae

Agrypnus murinus

Agriotes obscurus

Prosternon holosericeus

Coleoptera: Byrrhidae

Byrrhus sp.

Coleoptera: Scarabaeidae

Aphodius sp.

Aphodius granarius

Onthophagus similis L

Foxhole Heath SSSI

This site appeared to be the most promising of those surveyed with a very tightly grazed sward. The large breeding and post-breeding densities of Stone Curlew *Burhinus oedicnemus* may indicate a large biomass of terrestrial invertebrates. The presence of Stone Curlew also restricted entomological activity on the site.

Pitfall traps were sited on an area in the middle of the heath, much favoured by post-breeding flocks of Stone Curlew. Traps were run continuously from 21 May until 5 October 1994, as follows:

21 May	- 19 August	6 traps survived
19 August	- 7 September	8 traps survived
7 September	- 5 October	9 traps survived

In total, 28 species were identified from the pitfalls at this site.

In addition, some direct searching was carried out on several dates during 1994, mostly at the time when pitfalls were being set or collected. While Stone Curlews were present at the site, such visits were limited to 30 minutes on any one day.

Crustacea: Isopoda

Armadillidium vulgare
Philoscia muscorum
Platyarthrus hoffmannseggii
Porcellio scaber

A. tibialis
A. consularis Nb
Bradycellus verbasci
Calathus ambiguus Nb

C. cinctus
C. erratus
C. fuscipes
C. melanocephalus

Diplopoda

Ommatoiulus sabulosus

Cicindela campestris
Cymindis axillaris Na

Orthoptera: Acrididae

Chorthippus brunneus
Chorthippus parallelus
Myrmeleotettix maculatus

Dromius linearis
Harpalus affinis
H. anxius L
H. rufitarsis L

Dermaptera

Forficula auricularia

Metabletus foveatus
Notiophilus germinyi L

Lepidoptera: Noctuidae

Agrotis vestigialis Archer's Dart
Hada nana The Shears
Cucullia umbratica The Shark

Coleoptera: Silphidae

Silpha atrata

Hymenoptera: Aculeata: Formicidae

Formica fusca
Lasius fuliginosus L
Lasius niger
Myrmica scabrinodis

Coleoptera: Elateridae

Agriotes obscurus
Agrypnus murinus

Coleoptera: Coccinellidae

Coccinella 7-punctata
Micraspis 16-punctata L

Coleoptera: Carabidae

Amara aenea
A. aulica

Coleoptera: Scarabaeidae

Anomala dubia L
Aphodius sp.

A. contaminatus

A. cf. rufus

A. cf. sordidus

Onthophagus joannae L

O. nuchicornis Na

Typhaeus typhoeus L

Mollusca: Gastropoda: Arionidae

Arion intermedius

Mollusca: Gastropoda: Limacidae

Deroceras reticulatum

How Hill Track SSSI

This relatively tiny site was visited fairly briefly on one date: 24 May 1994. Little invertebrate interest was anticipated or found.

Invertebrate interest could be enhanced by removal or thinning of the wind-break pines west of the track to reduce shading. More sensitive management of the boundary between the SSSI and the adjoining arable field, combining disturbance and a ruderal flora would provide an attractive habitat for invertebrates.

Crustacea: Isopoda

Armadillidium vulgare

Philoscia muscorum

Coleoptera: Carabidae

Amara communis/convexior L

Bembidion lampros

Calathus fuscipes

Metabletus truncatellus L

Coleoptera: Scaphidiidae

Scaphidium 4-maculatum

Coleoptera: Anthribidae

Platystomos albinus Nb

Icklingham Plains SSSI ('Icklingham Triangle')

Icklingham Plains SSSI is one of the larger SSSI's in Suffolk Breckland. Access was restricted due to the presence of Stone Curlew. Consequently, effort was concentrated on a tiny disjunct part of the SSSI which contains some floristically rich heath: Icklingham Triangle TL767734. Uniquely among the sites surveyed, this area includes the herb-rich margin of a flax field. A line of pitfall traps was set along this margin and run continuously from 30 June to 2 October.

Direct searching at this site included sweep-netting of the ruderal vegetation along the field margin.

On a very brief visit to another part of the SSSI at TL74-73- on 21 May 1994, three beetle species were recorded under the bark of a willow: Scarabaeidae: *Dorcus parallelepipedus* and *Sinodendron cylindricum*; Histeridae: *Paromalus (Microlomalus) flavicornis*.

Crustacea: Isopoda

Armadillidium vulgare
Philoscia muscorum
Porcellio scaber

Orthoptera

Chorthippus albomarginatus
C. brunneus
Myrmeleotettix maculatus
Omocestus viridulus
Leptophyes punctatissima

Dermaptera

Forficula auricularia

Heteroptera: Cydnidae

Legnotus limbosus L
Sehirus bicolor
Sehirus luctuosus L
Thyreocoris scarabaeoides L

Heteroptera: Pentatomidae

Podops inuncta L
Aelia acuminata L
Dolycoris baccarum

Heteroptera: Coreidae

Syromastus rhombeus L

Heteroptera: Rhopalidae

Chorosoma schillingi L

Heteroptera: Lygaeidae

Graptopeltus lynceus Nb
Heterogaster urticae
Plinthinus brevipennis L
Stygnocoris fuliginosus
Trapezonotus desertus

Heteroptera: Berytinidae

Neides tipularius L

Heteroptera: Reduviidae

Coranus woodroffeii L

Heteroptera: Nabidae

Nabis rugosus

Heteroptera: Cimicidae

Anthocoris nemorum

Heteroptera: Miridae

Calocoris roseomaculatus
Leptopterna ferrugata
Lygus maritimus
Lygus rugulipennis
Orthotylus flavosparsus
Phytocoris varipes
Plagiognathus chrysanthemi

Lepidoptera: HesperIIDae

Thymelicus sylvestris Small Skipper

Lepidoptera: Pieridae

Artogeia rapae Small White

Lepidoptera: Lycaenidae

Lycaena phlaeas Small Copper

Lepidoptera: Vanessidae

Inachis io Peacock
Aglais urticae Small Tortoiseshell

Lepidoptera: Satyridae

Maniola jurtina Meadow Brown
Coenonympha pamphilus Small Heath

- Lepidoptera: Arctiidae
Tyria jacobaeae Cinnabar
- Lepidoptera: Noctuidae
Autographa gamma Silver Y
- Hymenoptera: Aculeata: Formicidae
Formica fusca
Lasius alienus L
L. flavus
L. niger
Leptothorax acervorum
Myrmica ruginodis
M. rubra
M. scabrinodis
- Coleoptera: Carabidae
Amara apricaria
A. bifrons
A. consularis Nb
A. fulva Nb
A. tibialis L
Bembidion properans
Bradycellus harpalinus
Calathus ambiguus Nb
C. cinctus
C. erratus
C. fuscipes
C. melanocephalus
Dromius linearis
Harpalus affinis
H. froelichi
H. rufibarbis
H. rufipes
H. smaragdinus Nb
H. tardus
Laemostenus terricola L
Licinus depressus Nb
Masoreus wetterhalli Na
Metabletus foveatus
Notiophilus germيني L
- Coleoptera: Silphidae
Nicrophorus humator
N. interruptus Nb
N. investigator
N. vestigator
N. vespillo
Thanatophilus sinuatus
- Coleoptera: Catopidae
- Coleoptera: Staphylinidae
Platydracus stercorarius
- Coleoptera: Oedemeridae
Oedemera lurida
- Coleoptera: Elateridae
Agrypnus murinus
Athous bicolor
Athous hirtus
Cardiophorus asellus Nb
Prosternon tessulatum
- Coleoptera: Coccinellidae
Coccinella 7-punctata
Psyllobora 22-punctata
Micraspis 16-punctata
Subcoccinella 24-punctata
- Coleoptera: Anthicidae
Anthicus floralis
Notoxus monoceras L
- Coleoptera: Cerambycidae
Phytoecia cylindrica Nb
- Coleoptera: Lagriidae
Lagria hirta
- Coleoptera: Tenebrionidae
Crypticus quisquilius Nb
Cteniopus sulphureus L
Melanimon tibialis L
Phylan gibbus L
- Coleoptera: Scarabaeidae
Aphodius contaminatus
Onthophagus joannae
O. similis
- Coleoptera: Chrysomelidae
Cassida nebulosa RDBi
Galeruca tanaceti L
Psylloides sophiae RDB3
Sermylassa halensis
- Arachnida: Opiliones
Lophopilio palpinalis

Opilio saxatilis L
Paroligolophus agrestis
Phalangium opilio

Arachnida: Araneae: Thomisidae
Xysticus cristatus
Xysticus kochi L
Tibellus oblongus L

Arachnida: Araneae: Salticidae
Euophrys frontalis

Arachnida: Araneae: Lycosidae
Xerolycosa miniata L
Arctosa perita

Arachnida: Araneae: Pisauridae
Pisaura mirabilis

Arachnida: Araneae: Agelenidae
Agelena labyrinthica
Tegenaria agrestis L

Arachnida: Araneae: Theridiidae
Enoplognatha ovata
Steatoda albomaculata Nb

Arachnida: Araneae: Tetragnathidae
Tetragnatha montana

Arachnida: Araneae: Araneidae
Agelenatea redii (all three forms) Nb
Araneus diademus
Araneus quadratus
Neoscona adianta Nb

Mollusca: Gastropoda: Valloniidae
Vallonia excentrica

Mollusca: Gastropoda: Arionidae
Arion intermedius

Mollusca: Gastropoda: Limacidae
Deroceras reticulatum

Mollusca: Gastropoda: Helicidae
Candidula intersecta
Cerņuella virgata

Lakenheath Warren SSSI

This large and diverse site was visited on several occasions in 1994, and considerable effort was expended on direct searching. Limited time was also spent sweeping. The densities of ground-dwelling invertebrates recorded were rather low, but the nature of the soil and vegetation made sampling difficult. The site is a priority for pitfall trapping in future.

Crustacea: Isopoda	<i>Heterogaster urticae</i>
<i>Armadillidium vulgare</i>	<i>Peritrechus nubilus</i> L
<i>Philoscia muscorum</i>	<i>Plinthisus brevipennis</i> L
<i>Porcellio scaber</i>	<i>Raglius alboacuminatus</i> Nb
Chilopoda	<i>Scolopostethus affinis</i>
<i>Lithobius forficatus</i>	<i>Stygnocoris rusticus</i>
<i>Lithobius crassipes</i>	<i>Stygnocoris sabulosus</i>
Diplopoda	Heteroptera: Nabidae
<i>Cylindroiulus latestriatus</i>	<i>Aptus mirmicoides</i>
<i>Ommatoiulus sabulosus</i>	<i>Nabis ferus</i>
<i>Glomeris marginata</i>	<i>Nabis rugosus</i>
Orthoptera: Acrididae	Heteroptera: Cimicidae
<i>Chorthippus albomarginatus</i>	<i>Anthocoris nemorum</i>
<i>Myrmeleotettix maculatus</i>	Heteroptera: Miridae
<i>Stenobothrus lineatus</i> L	<i>Leptopterna ferrugata</i>
Dermaptera (Earwings)	<i>Liocoris tripustulatus</i>
<i>Forficula auricularia</i>	<i>Lygus rugulipennis</i>
Heteroptera: Acanthosomatidae	<i>Phytocoris varipes</i>
<i>Acanthosoma haemorrhoidale</i>	<i>Plagiognathus albipennis</i> L
Heteroptera: Cydnidae	<i>Polymerus unifasciatus</i> L
<i>Legnotus limbosus</i> L	<i>Stenodema calcaratum</i>
<i>Sehirus bicolor</i>	<i>Stenodema laevigatum</i>
<i>Thyreocoris scarabaeoides</i> L	Hymenoptera: Formicidae
Heteroptera: Pentatomidae	<i>Formica fusca</i>
<i>Aelia acuminata</i> L	<i>Lasius alienus</i> L
<i>Dolycoris baccarum</i>	<i>Lasius fuliginosus</i> L
<i>Picromerus bidens</i>	Coleoptera: Carabidae
Heteroptera: Coreidae	<i>Amara aenea</i>
<i>Arenocoris falleni</i> Nb	<i>A. consularis</i> Nb
Heteroptera: Rhopalidae	<i>A. lucida</i> Nb
<i>Chorosoma schillingi</i> L	<i>A. equestris</i> Nb
<i>Myrmus miriformis</i>	<i>Calathus melanocephalus</i>
Heteroptera: Lygaeidae	<i>Harpalus anxius</i> L
	<i>Harpalus attenuatus</i> L
	<i>Licinus depressus</i> Nb
	<i>Metabletus truncatellus</i> L
	Coleoptera: Coccinellidae

Adalia bipunctata
Coccinella 7-punctata
Micraspis 16-punctata L
Propylea 14-punctata
Psyllobora 22-punctata

Coleoptera: Tenebrionidae
Cteniopos sulphureus L

Coleoptera: Cerambycidae
Alosterna tabacicolor
Leptura livida L
Leptura rubra L
Strangalia melanura L

Coleoptera: Chrysomelidae
Crioceris asparagi
Timarcha goettingensis L.

Arachnida: Araneae: Salticidae
Marpissa muscosa L
Salticus scenicus
Salticus cingulatus L

Arachnida: Araneae: Dysderidae
Harpactea hombergi L

Maidscross Hill SSSI

This site was visited on several occasions in 1993 and on three dates in 1994. Considerable effort was expended on direct searching. On one visit, sweeping was used to considerable success.

Crustacea: Isopoda

Armadillidium vulgare
Oniscus asellus
Philoscia muscorum
Porcellio scaber
Trichoniscus pusillus

Chilopoda

Lithobius forficatus
Brachygeophilus truncorum
Schendyla nemorensis

Diplopoda

Cylindroiulus britannicus L
Ommatoiulus sabulosus

INSECTA

Orthoptera: Tettigoniidae

Leptophyes punctatissima

Orthoptera: Acrididae

Chorthippus albomarginatus
Chorthippus brunneus
Myrmeleotettix maculatus
Omocestus viridulus

Dermaptera

Forficula auricularia

Heteroptera: Cydnidae

Legnotus limbosus L
Sehirus bicolor
Sehirus luctuosus L
Thyreocoris scarabaeoides L

Heteroptera: Scutelleridae

Eurygaster testudinaria L

Heteroptera: Pentatomidae

Podops inuncta L
Aelia acuminata L
Dolycoris baccarum

Heteroptera: Coreidae

Syromastus rhombeus L
Coriomeris denticulatus L
Arenocoris falleni Nb

Heteroptera: Rhopalidae

Chorosoma schillingi L
Myrmus miriformis

Heteroptera: Lygaeidae

Drymus brunneus
Graptopeltus lynceus Nb
Heterogaster urticae
Macrodema micropterum
Megalonotus chiragra L
Nysius ericae
Peritrechus nubilus L
Plinthisus brevipennis L
Scolopostethus affinis
Scolopostethus thomsoni
Stygnocoris fuliginus
Trapezonotus desertus

Heteroptera: Berytinidae

Gampsocoris puncticeps
Neides tipularius L

Heteroptera: Tingidae

Tingis ampliata
Tingis cardui

Heteroptera: Reduviidae

Coranus woodroffeii L

Heteroptera: Nabidae

Aptus mirmicoides
Anaptus major
Nabis ferus
Nabis rugosus

Heteroptera: Cimicidae

Anthocoris nemorum
Anthocoris nemoralis

Heteroptera: Miridae

- Calocoris norvegicus*
Calocoris roseomaculatus
Capsus ater
Deraeocoris ruber
Heterotoma planicornis
Leptopterna dolabrata
Leptopterna ferrugata
Liocoris tripustulatus
Lygus rugulipennis
Megaloceraea recticornis
Megalocoleus molliculus
Notostira elongata
Orthops campestris
Orthops kalmi
Phytocoris varipes
Pithanus maerkeli
Plagiognathus albipennis L
Plagiognathus arbustorum
Plagiognathus chrysanthemi
Stenodema calcaratum
Stenodema laevigatum
Stenotus binotatus
- Lepidoptera: Hesperiiidae
Ochlodes venata Large Skipper
Thymelicus sylvestris Small Skipper
- Lepidoptera: Pieridae
Artogeia rapae Small White
- Lepidoptera: Lycaenidae
Lycaena phlaeas Small Copper
- Lepidoptera: Vanessidae
Inachis io Peacock
Vanessa atalanta Red Admiral
Aglais urticae Small Tortoiseshell
- Lepidoptera: Satyridae
Pyronia tithonus Gatekeeper
Maniola jurtina Meadow Brown
Coenonympha pamphilus Small Heath
- Lepidoptera: Zygaenidae
Adscita statices Common Forester L
- Hymenoptera: Aculeata: Formicidae
Formica fusca
Lasius flavus
L. fuliginosus L
L. niger
- Leptothorax acervorum*
Myrmica rubra
M. scabrinodis
- Coleoptera: Carabidae
Agonum dorsale
Amara aenea
A. bifrons
A. consularis Nb
A. convexior
A. fusca RDB1
A. similata
Calathus cinctus
C. erratus
C. fuscipes
Cymindis axillaris Na
Dromius linearis
Harpalus rufibarbis
H. tardus
Leistus ferrugineus
Metabletus foveatus
Metabletus truncatellus L
Notiophilus biguttatus
N. rufipes L
N. substriatus L
Olisthopus rotundatus L
- Coleoptera: Silphidae
Silpha atra
Silpha laevigata
- Coleoptera: Lampyridae
Lampyris noctiluca Glow-worm L
- Coleoptera: Oedemeridae
Oedemera lurida
- Coleoptera: Cantharidae
Rhagonycha fulva
- Coleoptera: Byrrhidae
Byrrhus pustulatus L
Cytilus sericeus
- Coleoptera: Coccinellidae
Adalia bipunctata
Adonia variegata Nb
Coccinella 7-punctata
Micraspis 16-punctata L
Psyllobora 22-punctata

Coleoptera: Anthicidae
Notoxus monoceras L

Enoplognatha ovata
Theridion bimaculatum

Coleoptera: Lagriidae
Lagria hirta

Arachnida: Araneae: Tetragnathidae
Pachygnatha degeeri
Tetragnatha montana

Coleoptera: Tenebrionidae
Crypticus quisquilius Nb
Cteniopus sulphureus L
Scaphidema metallicum Nb

Arachnida: Araneae: Araneidae
Agalenatea redii (all three forms) Nb
Araneus diademus
Araneus quadratus
Neoscona adianta Nb

Coleoptera: Scarabaeidae
Anomala dubia L
Aphodius distinctus Nb
A. prodromus

Mollusca: Pupillidae
Pupilla muscorum

Coleoptera: Cerambycidae
Leptura livida L
Phytoecia cylindrica Nb

Mollusca: Gastropoda: Helicidae
Arianta arbustorum
Candidula intersecta
Cepaea nemoralis
Helix aspersa

Coleoptera: Chrysomelidae
Crioceris asparagi L
Galeruca tanacetii L

Arachnida: Opiliones
Lophopilio palpinalis
Paroligolophus agrestis
Phalangium opilio

Arachnida: Araneae: Dysderidae
Dysdera crocata

Arachnida: Araneae: Thomisidae
Xysticus cristatus
Tibellus maritimus L

Arachnida: Araneae: Salticidae
Euophrys frontalis
Marpissa muscosa L
Salticus scenicus

Arachnida: Araneae: Lycosidae
Arctosa perita

Arachnida: Araneae: Pisauridae
Pisaura mirabilis

Arachnida: Araneae: Agelenidae
Agelena labyrinthica

Arachnida: Araneae: Theridiidae

Wangford Warren SSSI

This site was visited by both authors on a number of occasions between July 1993 and September 1994. The species listed below were all found by direct searching. Effort was concentrated on disturbed features within the reserve, such as the dunes, the rotovated area and a warren area. A surprising feature of this site was the prevalence of dead invertebrates. These appeared to have accumulated in footprints, rabbit scrapes and other depressions in the sand. Species found only as corpses are marked '†' in the following listing.

A few species were identified from outside the Suffolk Wildlife Trust reserve, but within the SSSI boundary. These are marked '**' in the following listing.

Several flowering Wild Privet *Ligustrum vulgare* bushes on the reserve were searched for visiting insects in both years, and these species are included in the listing also.

Orthoptera

Chorthippus brunneus
Myrmeleotettix maculatus
Omocestus viridulus

Calocoris norvegicus
Deraeocoris ruber
Leptopterna ferrugata
Liocoris tripustulatus
Lygus maritimus

Dermaptera

Forficula auricularia

Lygus rugulipennis
Phytocoris varipes
Pilophorus perplexus L
Plagiognathus chrysanthemi
Stenodema calcaratum

Heteroptera: Acanthosomatidae

Acanthosoma haemorrhoidale

Heteroptera: Pentatomidae

Aelia acuminata L
Dolycoris baccarum

Neuroptera: Chrysopidae

Cunctochrysa carnea

Heteroptera: Coreidae

Syromastus rhombeus L
Arenocoris falleni Nb

Lepidoptera: HesperIIDae

Thymelicus lineola Essex Skipper
Thymelicus sylvestris Small skipper

Heteroptera: Rhopalidae

Chorosoma schillingi L
Rhopalus subrufus L

Lepidoptera: Pieridae

Artogeia rapae Small White

Heteroptera: Lygaeidae

Heterogaster urticae
Macrodemia micropterum
Nysius ericae
Scolopostethus thomsoni
Trapezonotus desertus

Lepidoptera: Lycaenidae

Lycaena phlaeas Small Copper

Heteroptera: Cimicidae

Anthocoris nemorum
Orius niger

Lepidoptera: Vanessidae

Inachis io Peacock
Cynthia cardui Painted Lady

Heteroptera: Miridae

Lepidoptera: Satyridae

Maniola jurtina Meadow Brown
Coenonympha pamphilus Small Heath

Hymenoptera: Aculeata: Formicidae

Formica fusca
Lasius alienus L

- Lasius niger*
Leptothorax acervorum
Myrmica rubra
Myrmica ruginodis
- Coleoptera: Carabidae
Amara aenea
*A. apricaria**
*A. bifrons**
A. equestris † Nb
A. eurynota †
*A. fulva**
A. plebeia
A. tibialis
Broscus cephalotes L
Calathus ambiguus Nb
Calathus cinctus
Calathus erratus
C. mollis † L
Carabus problematicus
Cicindela campestris †
*Harpalus affinis**
H. anxius L
H. attenuatus † L
H. servus † Nb
H. vernalis † Na
Harpalus tardus †
Metabletus foveatus
Nebria salina
- Coleoptera: Staphylinidae
Staphylinus olens
S. ophthalmicus RDB3
- Coleoptera: Cantharidae
Rhagonycha fulva
- Coleoptera: Malachiidae
Malachius bipustulatus
- Coleoptera: Elateridae
Agrypnus murinus †
- Coleoptera: Byrrhidae
Byrrhus cf. pilula †
Cytilus sericeus
Simplocaria semistriata
- Coleoptera: Coccinellidae (Ladybirds)
Adalia bipunctata
Coccinella 7-punctata †
- Micraspis 16-punctata* † L
- Coleoptera: Tenebrionidae
Cteniopus sulphureus † L
Melanimon tibiale L
- Coleoptera: Scarabaeidae
*Aphodius granarius**
Typhaeus typhoeus † L
- Coleoptera: Cerambycidae
Alosterna tabacicolor
Strangalia melanura L
Strangalia quadrifasciata L
- Arachnida: Opiliones
Paroligolophus agrestis
Phalangium opilio
- Mollusca: Gastropoda: Cochlicopidae
Cochlicopa lubricella
- Mollusca: Gastropoda: Valloniidae
Vallonia costata
- Mollusca: Gastropoda: Arionidae
Arion ater ater
Arion intermedius
- Mollusca: Gastropoda: Helicidae
Candidula intersecta

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Annex 1: Total list of species recorded

Crustacea: Isopoda (Woodlice)

Armadillidium vulgare
Oniscus asellus
Philoscia muscorum
Platyarthrus hoffmannseggi L
Porcellio scaber
Trichoniscus pusillus

Chilopoda (Centipedes)

Brachygeophilus truncorum
Lithobius forficatus
Lithobius crassipes
Schendyla nemorensis

Diplopoda (Millipedes)

Cylindroiulus latestriatus
Cylindroiulus britannicus
Ommatoiulus sabulosus
Glomeris marginata

INSECTA

Orthoptera: Tettigoniidae (Bush-crickets)

Leptophyes punctatissima

Orthoptera: Acrididae (Grasshoppers)

Chorthippus albomarginatus
Chorthippus brunneus
Chorthippus parallelus
Myrmeleotettix maculatus
Omocestus viridulus
Stenobothrus lineatus L

Dermaptera (Earwings)

Forficula auricularia

Heteroptera: Acanthosomatidae (Shieldbugs)

Acanthosoma haemorrhoidale

Heteroptera: Cydnidae (Shieldbugs)

Legnotus limbosus L
Sehirus bicolor
Sehirus luctuosus L
Thyreocoris scarabaeoides L

Heteroptera: Scutelleridae (Shieldbugs)

Eurygaster testudinaria L

Heteroptera: Pentatomidae (Shieldbugs)

Podops inuncta L
Aelia acuminata L
Dolycoris baccarum
Picromerus bidens L

Heteroptera: Coreidae (Squashbugs)

Syromastus rhombeus L
Coriomeris denticulatus L
Arenocoris falleni Nb

Heteroptera: Rhopalidae

Chorosoma schillingi L
Myrmus miriformis
Rhopalus subrufus L

Heteroptera: Lygaeidae (Groundbugs)

Drymus brunneus
Drymus sylvaticus
Graptopeltus lynceus Nb
Heterogaster urticae
Macrodera micropterum
Megalonotus chiragra L
Nysius ericae
Peritrechus lundi L
Peritrechus nubilus L
Plinthisus brevipennis L
Raglius alboacuminatus Nb
Scolopostethus affinis
Scolopostethus thomsoni
Stygnocoris fuliginosus
Stygnocoris rusticus
Stygnocoris sabulosus
Trapezonotus desertus

Heteroptera: Berytinidae (Stiltbugs)

Gampsocoris puncticeps
Neides tipularius L

Heteroptera: Tingidae (Lacebugs)

Acalypta parvula
Agramma laetum L
Tingis ampliata
Tingis cardui

Heteroptera: Reduviidae (Assassinbugs)

Coranus subapterus L

- Coranus woodroffeii* L
- Heteroptera: Nabidae (Damselbugs)**
Aptus mirmicoides
Anaptus major
Nabis ferus
Nabis rugosus
- Heteroptera: Cimicidae (Flowerbugs)**
Anthocoris nemoralis
Anthocoris nemorum
Orius niger
- Heteroptera: Miridae (Capsid bugs)**
Calocoris norvegicus
Calocoris roseomaculatus
Capsus ater
Chlamydatus pullus L
Deraeocoris ruber
Heterotoma planicornis
Leptopterna dolabrata
Leptopterna ferrugata
Liocoris tripustulatus
Lopus decolor
Lygus maritimus
Lygus rugulipennis
Megaloceraea recticornis
Megalocoleus molliculus
Monalocoris filicis
Notostira elongata
Orthops campestris
Orthops kalmi
Orthotylus flavosparsus
Phytocoris varipes
Pilophorus perplexus L
Pithanus maerkeli
Plagiognathus albipennis L
Plagiognathus arbustorum
Plagiognathus chrysanthemi
Polymerus unifasciatus
Stenodema calcaratum
Stenodema laevigatum
Stenotus binotatus
- Neuroptera: Chrysopidae (Green lacewings)**
Cunctochrysa carnea
- Lepidoptera: Hesperiiidae (Skippers)**
Ochlodes venata Large skipper
Thymelicus lineola Essex Skipper L
- Thymelicus sylvestris* Small skipper
- Lepidoptera: Pieridae (Whites)**
Artogeia rapae Small white
- Lepidoptera: Lycaenidae (Coppers, hairstreaks and blues)**
Lycaena phlaeas Small copper
- Lepidoptera: Vanessidae (Tortoiseshells etc)**
Cynthia cardui Painted Lady
Inachis io Peacock
Vanessa atalanta Red admiral
Aglais urticae Small tortoiseshell
- Lepidoptera: Satyridae (Browns)**
Pyronia tithonus Gatekeeper
Maniola jurtina Meadow brown
Coenonympha pamphilus Small heath
- Lepidoptera: Zygaenidae**
Adscita staticis Common Forester L
- Lepidoptera: Arctiidae**
Tyria jacobaeae Cinnabar
- Lepidoptera: Noctuidae**
Agrotis vestigialis Archer's Dart
Hada nana The Shears
Cucullia umbratica The Shark L
- Hymenoptera: Aculeata: Formicidae (Ants)**
Formica fusca
Lasius alienus L
Lasius flavus
Lasius fuliginosus L
Lasius niger
Leptothorax acervorum
Myrmica lobicornis
Myrmica rubra
Myrmica ruginodis
Myrmica scabrinodis
- Coleoptera: Carabidae (Ground-beetles)**
Agonum dorsale
Amara aenea
Amara apricaria
Amara aulica
Amara bifrons

Amara communis L
Amara consularis Nb
Amara convexior L
Amara equestris Nb
Amara eurynota L
Amara familiaris
Amara fulva Nb
Amara fusca RDB1
Amara lucida Nb
Amara lunicollis
Amara plebeja
Amara similata
Amara tibialis
Bembidion lampros
Bembidion properans
Bradycellus harpalinus
Bradycellus verbasci
Broscus cephalotes L
Calathus ambiguus Nb
Calathus cinctus
Calathus erratus
Calathus fuscipes
Calathus melanocephalus s.s.
Calathus mollis L
Carabus problematicus
Cicindela campestris
Cymindis axillaris Na
Dromius linearis
Harpalus affinis
Harpalus anxius L
Harpalus attenuatus L
Harpalus froelichi RDB2
Harpalus rufibarbis
Harpalus rufipes
Harpalus rufitarsis L
Harpalus servus Nb
Harpalus smaragdinus Nb
Harpalus tardus
Harpalus vernalis Na
Laemostenus terricola L
Leistus ferrugineus
Licinus depressus Nb
Masoreus wetterhalli Na
Metabletus foveatus
Metabletus truncatellus L
Nebria salina
Notiophilus biguttatus
Notiophilus germinyi L
Notiophilus rufipes L
Notiophilus substriatus L
Olisthopus rotundatus L

Pterostichus melanarius

Coleoptera: Histeridae

Paromalus flavicornis

Coleoptera: Silphidae (Carrion-beetles)

Nicrophorus humator
Nicrophorus interruptus Nb
Nicrophorus investigator
Nicrophorus vespillo
Nicrophorus vestigator
Silpha atrata
Silpha laevigata L
Silpha tristis L
Thanatophilus sinuatus

Coleoptera: Scaphidiidae

Scaphidium quadrimaculatum

Coleoptera: Lampyridae

Lampyris noctiluca (Glow-worm) L

Coleoptera: Catopidae

Catops sp.
Choleva sp.

Coleoptera: Staphylinidae (Rove-beetles)

Platydracus stercorarius L
Staphylinus olens
Staphylinus ophthalmicus RDB3

Coleoptera: Cantharidae (Soldier-beetles)

Rhagonycha fulva

Coleoptera: Oedemeridae

Oedemera lucida

Coleoptera: Malachiidae

Malachius bipustulatus

Coleoptera: Elateridae (Click-beetles)

Agriotes obscurus
Agrypnus murinus
Athous bicolor
Athous hirtus
Cardiophorus asellus Nb
Prosternon tessulatum

Coleoptera: Byrrhidae (Pill-beetles)

Byrrhus cf *pilula*
Byrrhus pustulatus L

Cytilus sericeus
Simplocaria semistriata

Coleoptera: Coccinellidae (Ladybirds)

Adalia bipunctata
Adonia variegata Nb
Coccinella 7-punctata
Micraspis 16-punctata
Propylea 14-punctata
Psyllobora 22-punctata
Subcoccinella 24-punctata

Coleoptera: Anthicidae

Anthicus floralis
Notoxus monoceras L

Coleoptera: Cerambycidae (Longhorn beetles)

Alosterna tabacicolor
Leptura livida L
Leptura rubra L
Phytoecia cylindrica Nb
Strangalia melanura L

Coleoptera: Lagriidae

Lagria hirta

Coleoptera: Tenebrionidae (Darkling-beetles)

Crypticus quisquilius Nb
Cteniopus sulphureus L
Melanimon tibialis L
Phylan gibbus L
Scaphidema metallicum L

Coleoptera: Nitidulidae

Glischrochilus olivieri

Coleoptera: Scarabaeidae (Dung-beetles and chafers)

Anomala dubia L
Aphodius contaminatus
Aphodius distinctus Nb
Aphodius granarius
Aphodius prodromus
Aphodius rufus
Aphodius sordidus
Dorcus paralelepipedus
Onthophagus joannae L
Onthophagus similis L
Onthophagus nuchicornis Na

Sinodendron cylindricum
Typhaeus typhoeus L

Coleoptera: Chrysomelidae (Leaf-beetles)

Cassida nebulosa RDBi
Crioceris asparagi L
Galeruca tanaceti L
Psylloides sophiae RDB3
Sermylassa halensis
Timarcha goettingensis L

Coleoptera: Anthribidae (Short-nosed weevils)

Platystomos albinus Nb

Arachnida: Opiliones (Harvest-spiders)

Lophopilio palpinalis
Opilio saxatilis L
Paroligolophus agrestis
Phalangium opilio

Arachnida: Araneae: Dysderidae

Dysdera crocata
Harpactea hombergi L

Arachnida: Araneae: Thomisidae (Crab spiders)

Xysticus cristatus
Xysticus kochi L
Tibellus maritimus L
Tibellus oblongus

Arachnida: Araneae: Salticidae (Jumping spiders)

Euophrys frontalis
Marpissa muscosa L
Salticus scenicus
Salticus cingulatus L

Arachnida: Araneae: Lycosidae (Wolf-spiders)

Xerolycosa miniata L
Arctosa perita

Arachnida: Araneae: Pisauridae

Pisaura mirabilis

Arachnida: Araneae: Agelenidae

Agelena labyrinthica
Tegenaria agrestis L

Arachnida: Araneae: Theridiidae

Enoplognatha ovata
Steatoda albomaculata Nb
Theridion bimaculatum

Arachnida: Araneae: Tetragnathidae

Pachygnatha degeeri
Tetragnatha montana

Arachnida: Araneae: Araneidae (Orb-web spiders)

Agalenatea redii (all three forms) Nb
Araneus diademus
Araneus quadratus
Neoscona adianta Nb

Mollusca: Gastropoda: Cochlicopidae (Glass-snails)

Cochlicopa lubricella

Mollusca: Gastropoda: Pupillidae

Pupilla muscorum

Mollusca: Gastropoda: Valloniidae

Vallonia costata
Vallonia excentrica

Mollusca: Gastropoda: Arionidae (Round-backed slugs)

Arion ater ater
Arion intermedius

Mollusca: Gastropoda: Limacidae (Keeled slugs)

Deroceras reticulatum

Mollusca: Gastropoda: Helicidae

Arianta arbustorum
Candidula intersecta
Cepaea nemoralis
Cernuella virgata
Helix aspersa

Annex 2: Notes on the biology and status of scarcer species

The following notes provide descriptions and information about the ecology and natural history of all the Red Data Book and Nationally Scarce species, and on selected local or regionally scarce species.

Conservation status categories

The conservation agencies in Britain have published a range of Red Data Books and National Reviews of invertebrates, which use a hierarchy of categories of rarity or threat, as follows:

Red Data Book (RDB): the RDB contains the rarest and most threatened of species, which are generally found in fewer than 15 of the 10km squares of the O.S. grid. RDB species are subdivided into three categories:

RDB 1 : **Endangered**, i.e. likely to become extinct in Britain if pressures continue

RDB 2 : **Vulnerable**, likely to become endangered if pressures continue

RDB 3 : **Rare**, not yet in imminent danger of extinction, but found in so few places, or in such low numbers, or subject to pressures, which make its long term survival unlikely unless action is taken

Nationally Notable: Species which are not included in the RDB, but which are of national significance for nature conservation. Nationally Notable is subdivided into A and B, as follows:

Notable A : Occurring in 15-30 10km squares of the O.S. grid

Notable B : Occurring in 31-100 10km squares of the O.S. grid

Local: a less formal category, used for those species which, while not meriting inclusion in any of the above, are not common, and will not be present at the majority of sites.

Annotated list of Red Data Book, Notable and Local species

Notes are provided on the ecology and distribution of all Red Data Book and Nationally Scarce species, and for a selection of Local species.

Woodlice - Crustacea: Isopoda

Platyarthrus hoffmannseggi L

A small white woodlouse living within ants' nests. Local but widespread.

Millipedes - Diplopoda

Polydesmus gallicus L

A large, chestnut-brown flat-backed millipede

Grasshoppers - Orthoptera: Acrididae

Stenobothrus lineatus L

The stripe-winged grasshopper, a medium-sized grasshopper, usually predominantly green in colour. Prefers dry localities, either sandy or chalky. A south-eastern distribution, at the edge of its range in Breckland.

Shieldbugs - Heteroptera: Cydnidae

Legnotus limbosus L

An uncommon shieldbug, black with white margins, usually found in dry, sandy places, feeding on bedstraws (*Galium* spp.).

Sehirus luctuosus L

A black ground-dwelling shieldbug which feeds on forget-me-nots.

Thyreocoris scarabaeoides L

A shiny blackish shieldbug which burrows into light, sandy soil in well-drained grassland. It is mainly coastal in Britain, but with a few sites in the Breck of Norfolk and Suffolk.

Shieldbugs - Heteroptera: Scutelleridae

Eurygaster testudinaria L

A tortoise-bug, large, almost globular, and patterned in pale and dark brown. Usually found in damp places in tall, rank vegetation. It was surprisingly abundant at the roadside in July. Mainly southern, but frequent in the Fens and Broads.

Odontoscelis lineola Nb

A southern species, recorded from the coasts of Norfolk, Kent, Sussex, Hants, Devon and Cornwall, and inland in Suffolk and Surrey. Associated with stork's-bill (*Erodium cicutarium*) on sand. Found among sparse vegetation where there is some disturbance, especially from rabbit

grazing and digging. Absent from many apparently suitable sites.

Shieldbugs - Heteroptera: Pentatomidae

Aelia acuminata L

The Bishop's-mitre bug, a pale brown striped shieldbug living in calcareous grasslands. Local and mainly southern.

Picromerus bidens L

A large predatory shieldbug with a sharp spine on either side of the pronotum.

Podops inuncta L

A small shieldbug characteristic of dry sandy or calcareous grassland, this species is at the northern limit of its range in Norfolk.

Squashbugs - Heteroptera: Coreidae

Arenocoris falleni Nb

A local ground-dwelling bug associated with stork's-bill (*Erodium cicutarium*). Found mainly on coastal dunes, from Norfolk southward, with few inland sites away from the Breck.

Coriomeris denticulatus L

A spiny squashbug feeding on various trefoils and clovers in dry, well-drained, often sandy places.

Syromastus rhombeus L

A distinctive bug, golden-brown and with a sharply diamond-shaped abdomen. Found in dry, sandy locations, including early succession and woodland rides. Feeds on sandworts and spurreys (Caryophyllaceae). Widely scattered, at the northern edge of its range in Suffolk.

Heteroptera: Rhopalidae

Chorosoma schillingi L

A long, thin bug, rather resembling a stick-insect, found in dry grassland, largely confined to southern coasts, from Norfolk to Lancashire, but also characteristic of the Breck, and known from a few other inland sandy areas.

Rhopalus subrufus L

An orange-brown bug typical of dry sandy grassland and sand dunes.

Groundbugs - Heteroptera: Lygaeidae

Graptopeltus lynceus Nb

A large and boldly-patterned groundbug which feeds mainly on viper's bugloss (*Echium vulgare*) in dry, open, sunny situations. Occasionally found on forget-me-nots (*Myosotis* spp.). Norfolk is its northern limit in Britain, which extends from Cornwall to Oxfordshire and Kent. Reduction in grazing pressure and disturbance, leading to coarser grassland and less bare ground, is

suggested as a cause of its decline.

Megalonotus chiragra L

A black and pale-brown groundbug, found on dunes, in sandy grassland in an quarries over much of southern England. Locally abundant.

Peritrechus lundi L

A widespread but local grey-brown groundbug found mainly in open habitats such as dunes, heaths and quarries. A rapid coloniser of ruderal habitats.

Peritrechus nubilus L

A widespread but local groundbug, found in a range of habitats including fens, saltmarshes, and dry grassland. Mainly coastal.

Plinthisus brevipennis L

A small, fast-running, shiny black bug, confined to southern and eastern England, found in dry, sandy places with low, sparse vegetation.

Raglius alboacuminatus Nb

A distinctive black-and-yellowish shiny groundbug. Found in a wide range of habitats, from woodland clearings to waste ground and gardens. Often found with black horehound (*Ballota nigra*), and may require densely tufted plants growing over bare ground. Recorded patchily from Norfolk to Cornwall.

Stiltbugs - Heteroptera: Berytinidae

Neides tipularius L

A large stiltbug, with long legs and thickened knees, found on sandhills and dry heathland. Widespread but local.

Assassin-bugs - Heteroptera: Reduviidae

Coranus subapterus and *Coranus woodroffeii* L

The heath assassin-bug has recently been shown to comprise a pair of closely-related species. The 'heathland' species, *C. subapterus*, is found among heather (*Calluna*) quite close to the roadside; the individuals found on the roadside itself have so far been the sand-dune form, *C. woodroffeii*, which seems to be the rarer of the pair.

Ants - Hymenoptera: Aculeata: Formicidae

Lasius alienus L

A small, pale-brown ant associated with dry sandy grasslands, and found mainly on the coast. Very local.

Lasius fuliginosus L

A very shiny black ant, nesting in dead wood and foraging in grassland. Local, and scarce in eastern England.

Leptothorax nylanderi **Nb**

A very small dark-red ant, forming small colonies in twigs and small pieces of wood, usually in warm, sunny situations. Very scarce, and at the northern edge of its range in Breckland.

Ground-beetles - Coleoptera: Carabidae

Amara convexior **L**

A bright metallic oval ground-beetle, feeding on seeds, confined to well-drained, usually sandy soils. Widespread but very local and usually scarce.

Amara consularis **Nb**

An oval, black seed-eating ground-beetle, found on heaths, dunes, calcareous grassland and gravel pits, as well as in arable land. Gregarious. Widespread but very local throughout England and southern Scotland.

Amara equestris **Nb**

A glossy black-brown oval beetle, confined to dry habitats in heathland and sparsely-vegetated calcareous or sandy grassland. Its habitats are under threat both by development and by natural succession.

Amara eurynota **Nb**

One of the largest seed-eating ground-beetles, found mainly on sandy soils. Very local, although it is occasionally found on farmland.

Amara fulva **Nb**

A flat, yellow-brown beetle with a greenish metallic lustre. Found in a range of early-successional habitats, including heathland, sand dunes, sand and gravel pits, soft-rock cliffs and river shingle. Widespread but very local throughout Britain.

Amara fusca **RDB1**

A medium-sized black-brown seed-eating ground-beetle. Until its discovery in Breckland in 1993 (Eversham & Telfer 1993, Telfer & Eversham 1994) *A. fusca* had never been confirmed as an established breeding species in Britain. There are isolated nineteenth-century records from West Kent, Glamorgan, south-west Yorkshire and south Northumberland. In this century, it was known only from a single specimen: taken at Swanley, Kent in 1942. Recorded habitats in Britain have included sandy heathland and dunes. In Europe, it is mainly a steppe species, associated especially with field wormwood (*Artemisia campestris*). The distribution of *A. fusca* in Scandinavia is almost exactly the same as *Harpalus froelichi*, another rare Breck specialist, being confined to southernmost Sweden and northern Denmark (Lindroth, 1945). For further information, see the section on Species studies and priorities in the Introduction.

Amara lucida **Nb**

A small, very shiny, brassy beetle. Predominantly coastal, most often found on dunes and shingle. Rather rare in Breckland. Scattered throughout England and Wales.

Calathus ambiguus **Nb**

A fast-running, long-legged dark brown ground-beetle. Associated with early-successional vegetation, particularly on heaths and dunes. Widespread but very local.

Calathus mollis **L**

A mid-brown fast-running beetle with pale legs, this is almost exclusively coastal. It is ubiquitous in sand dunes all round Britain, but has only seldom been found in the Breck and at inland sand pits.

Cymindis axillaris Na

A medium-sized reddish brown carabid with pale cream shoulder spots. Found in dry calcareous sites in Breckland and very locally on coastal sand and shingle.

Harpalus anxius L

Mainly coastal, occurring on sand dunes north to Cumbria. It has been found at a few inland heathy sites, in southern England, including the Breck.

Harpalus attenuatus L

A black, seed-eating ground-beetle found mainly on sandy or chalky grassland, especially on dunes, in the south of Britain.

Harpalus froelichi RDB2

A very convex, broadly oval somewhat shiny black beetle, with conspicuous long bristles on its underside and legs. Found in heathland and open ground on sandy soils, and formerly on calcareous grassland. Formerly known from Dorset, Essex, Suffolk, Norfolk and Yorkshire, but the species has always been rare: it is absent from most museum collections. The only post-1970 records are from West Suffolk. Heathland fragmentation, conversion to arable and forestry, and urban development are all cited as causes of its decline. The loss of early successional habitats through cessation of management and conversion of mobile sands to coarse grassland is likely to be the main factor in Breckland.

Harpalus rufitarsis L

A black ground-beetle with reddish feet. Common in the extreme south but local in East Anglia and further north, on dry sandy soils, especially heaths and dunes.

Harpalus servus Nb

A medium-sized pale brown seed-eating ground beetle, confined to a few sites in Breckland and on coastal dunes.

Harpalus smaragdinus Nb

An attractive carabid, the male a bright steel-blue, the female shiny black, both with red legs. Found in sand pits, on heathland and in sandy fields. Widespread, but very local and declining, in southern England, and prone to the loss of early successional habitats.

Harpalus vernalis Na

A 5-6mm dull-black oval beetle, a characteristic Breck species, found mainly on south-facing sandy and gravelly slopes in Norfolk and Suffolk, with only a handful of former sites elsewhere in Britain. It may well now be extinct outside the Breck and north Norfolk coast. It is dependent on early succession, and the maintenance of bare sand by grazing or scraping.

Laemostenus terricola L

A large, agile, long-legged, blue-black ground-beetle, usually living in or near rabbit burrows on sandy soil. Also occasionally found in cellars or outhouses.

Licinus depressus Nb

A medium-sized, dull black ground-beetle, found in dry grassland on calcareous soils, in the southern half of England. A snail feeder as both larva and adult.

Masoreus wetterhalli Na

A small shiny dark-brown beetle with a purplish-red spot on each shoulder. Found on sand dunes, coastal cliffs and shingle, and on sparsely-vegetated sand and gravel, often with a covering of mosses. Scattered from Cornwall to Norfolk, but with very few modern records outside the Breck. Intolerant of scrub encroachment, and absent from coarse grassland.

Notiophilus germinyi L

A small bronze ground-beetle found on open ground, especially on heaths and moors.

Notiophilus rufipes: a small, metallic ground-beetle, found mainly among dry leaves in woodland or scrub. Local.

Olisthopus rotundatus: a widespread but local shiny brown ground-beetle, characteristic of dry heaths, dunes and sandy grassland.

Rove-beetles - Coleoptera: Staphylinidae

Staphylinus ophthalmicus RDB3

A large, metallic blue rove-beetle found in very dry sandy sites as far north as Lincolnshire.

Burying-beetles - Coleoptera: Silphidae

Nicrophorus interruptus Nb

A black and orange carrion-beetle, probably not habitat-specific, likely to be highly mobile and opportunistic. Found in a pitfall trap with a dead small mammal at the roadside. Widespread in England and Wales, but very local and possibly declining.

Silpha laevigata L

An uncommon convex black carrion-beetle.

Silpha tristis L

A flat black carrion beetle which is local, and mostly found in heathy and moorland areas.

Click-beetles - Coleoptera: Elateridae

Cardiophorus asellus Nb

A medium-sized blackish click-beetle, found mainly on coastal sand dunes with significant amounts of moss and lichen. Less common on heathland and inland sandy areas. Scattered in the southern half of England. Disturbance to dunes is considered desirable for this species.

Darkling-beetles - Coleoptera: Tenebrionidae

Crypticus quisquilius Nb

A dull black beetle, almost exclusively coastal, on sand dunes, heaths and in sand-pits. Found among plant roots and crawling over bare ground. Widespread but very local along the coast,

with few inland sites. Some disturbance may be desirable to maintain the early successional stages the species needs.

Cteniopus sulphureus L

The sulphur-beetle, a delicate, brilliant-yellow beetle, with a short adult season during which it is locally very abundant. Mainly southern, and mostly found on coastal dunes.

Melanimon tibialis L

A small matt-black burrowing beetle, usually found on dry sandy soils, local and mainly coastal, but with several sites in the Breck.

Dung-beetles & chafers - Coleoptera: Scarabaeidae

Anomala dubia L

A very variable chafer, with green and purple-metallic colour forms. Local, and confined to dry, sandy areas.

Aphodius distinctus Nb

A tiny, brightly-marked black and yellow dung-beetle, found mainly on sandy soils, especially on unimproved grazing land. Likely to be associated with rabbit dung at the roadside. Widely scattered but very local.

Onthophagus joannae L

A small black dung-beetle which is locally common on dry sandy soils.

Onthophagus nuchicornis Na

A small, rounded, pale brown dung-beetle found on sand dunes and sandy areas inland. Likely to be feeding on rabbit dung at the roadside. Very local, and possibly declining, with recent records only from Glamorgan, Devon, Sussex, Suffolk and Norfolk.

Onthophagus similis L

A small, rounded, pale brown dung beetle. Local and usually scarce, associated with a range of dung types, including rabbit.

Longhorn beetles - Coleoptera: Cerambycidae

Phytoecia cylindrica Nb

A slender, parallel-sided grey long-horn beetle, found along hedgerows, roadsides and woodland edges. The larvae feed in the stems of a range of umbellifers including cow-parsley and hogweed. On the roadside, a large population is thriving in bur-parsley (*Anthriscus caucalis*). Widely scattered but rarely seen. Seldom found in climax vegetation.

Pill-beetles - Coleoptera: Byrrhidae

Byrrhus pustulatus L

A large pill-beetle, found in or on mosses, upon which both adults and larvae feed. Widespread but seldom common.

Flower-beetles - Coleoptera: Anthicidae

Notoxus monoceras L

A conspicuous reddish-brown, yellow and black flower-beetle with a large horn on the front margin of the pronotum. Generally distributed on sand dunes around the coast, but of note when found inland.

Leaf-beetles - Coleoptera: Chrysomelidae

Cassida nebulosa RDB

A small bronze-green tortoise-beetle. See section on Species studies and priorities in the Introduction for details and references.

Ladybirds - Coleoptera: Coccinellidae

Adonia variegata Nb

A brick-red ladybird with irregular black spots. Found on heathland, dunes and grassland, mainly coastal until recently; it may be expanding its range at present.

Blunt-nosed weevils - Coleoptera: Anthribidae

Platystomos albinus Nb

A large and attractive black and white weevil, with long, striped antennae, feeding on fungi in dead wood.

ARACHNIDA

Harvest-spiders - Opiliones

Opilio saxatilis L

A local harvestman found mainly on heathland, dry grassland, and sand dunes.

Crab-spiders - Araneae: Thomisiidae

Xysticus kochi L

An uncommon dark grey-brown soil-dwelling crab-spider.

Tibellus maritimus L

A long, thin fawn-coloured spider associated with long grass. Uncommon.

Tibellus oblongus L

A long, thin fawn-coloured spider associated with long grass. Uncommon.

Orbweb spiders - Araneae: Theridiidae

Steatoda albomaculata Nb

A small black spider marked with rather square white or pink spots on the abdomen. Found mainly on stony, sparsely vegetated dry heathland and coastal shingle. Restricted to central southern England and East Anglia.

Orbweb spiders - Araneae: Argiopidae

Agalenatea redii (all three forms) Nb

An orb-web spider with a wide range of pattern and colour forms, most of which occur on the roadside. Widely scattered but very local.

Neoscona adianta Nb

A large orb-web spider, attractively marked in golden-yellow and white, most often found on heaths and in rough grassland near the coast. May be spreading.