Bentinck Tip and Void, Nottinghamshire

Invertebrate Survey and Assessment

October 2007
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Bentinck Tip & Void
Invertebrate survey 2007

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Introduction

Bentinck Tip and Void is a large and varied brownfield site. A substantial raised central area, of varied topography and containing several large water bodies, is occupied largely by bare and sparsely vegetated shale. Within this area there are localised patches of more established vegetation, including one moderately sized area of grassland with seasonal pools and areas of submerged, emergent and marginal vegetation around the water bodies. There is more established vegetation on slopes and lower-lying ground peripheral to the central waste. A quite high proportion of this is grassland, much quite recently established, of rather low general interest: floristically poor and indifferently or uniformly structured. There are, however, also substantial areas of legume-rich, open-structured, early successional open vegetation and grassland on slopes of varied aspects. There are better-established and well-vegetated pools on the lower peripheral ground, and throughout the site there are smaller seasonal pools, seepages of various size and degrees of permanence, and intermittent and permanent trickles and runnels.

The site has many features of potential value to invertebrates: the variety of habitats, the abundance of open-structured and early successional vegetation; the presence of multiple and varied wetland features, including well-established and well-vegetated seepages, seasonal pools and mossy pool margins; the large size of the site overall; and the very varied topography, all favour a substantial invertebrate fauna. Countervailing factors are that a large proportion of the site is either so bare or exposed that there are few obvious habitat opportunities for invertebrates, or is occupied by grassland of low intrinsic interest.

An invertebrate survey of Bentinck Void was carried out in 2002 by Andrew Godfrey, based on visits in late July to sample the terrestrial invertebrate fauna, and in September to sample the aquatic fauna. That survey recorded significant invertebrate interest. However, its timing, and the emphasis of the terrestrial survey on Diptera, meant that there was considerable scope for additional interest to be present. Further survey was commissioned in 2007, based on visits in spring and summer, to increase the seasonal spread of records and to place greater emphasis of groups, especially Coleoptera and Hemiptera, which were relatively under-represented in the previous survey. This report presents the complete results of the 2007 survey and combines them with the earlier records to provide a basis for assessment of the character and significance of the invertebrate fauna of the site.

Methods

Timing and circumstances of survey

Survey was undertaken over two visits, on 22 May and 10 July. The May visit was made in generally good and partly sunny weather, though with only moderate temperatures. The July visit was begun in overcast and cool conditions, changing to warm sunny weather later in the day, but rather too late to, for example, encourage significant aculeate activity. The July visit was also undertaken in a light wind, limiting the recording potential in more exposed areas.

Methods employed:

- sweep-netting of herbaceous vegetation and low foliage of woody vegetation;
- beating of woody vegetation;
- hand-search of important invertebrate niches, especially bare and partly vegetated ground and known invertebrate foodplants;
- observation of insects in flight and on flowers;
- suction sampling, using a petrol-driven garden leaf-blower modified according to the method of Stewart & Wright (1998), by taping a fine-meshed net in the inlet tube;
- plastic sieves (1 mm mesh and 0.5 mm mesh) to sample aquatic invertebrates in shallow water in flooded depressions, pond margins and small seepage pools.

Distribution of survey work

Whilst a large proportion of the site has been walked over, or at least seen clearly enough to judge its character, survey work has been concentrated in a small number of areas considered, on appearance and earlier reports, to be of relatively high potential. Some parts of the remainder have been separated as recording units. Almost the whole of the central area, including lakes, smaller pools, dry banks and areas of wetland, have been recorded as a single unit, chiefly because it was difficult to record any invertebrates at all from much of the area and subdivision would have been pointless. An exception has been made for a small area of relatively continuous grassland with many pools in shallow ruts, which has been separately recorded primarily for its aquatic invertebrates. A large part of the remainder of the site, including fairly varied grasslands, peripheral habitats and landscaping, have been relegated to a single “general” category for recording purposes. Features within this large area have been assessed initially on habitat characteristics, and sampled, chiefly by sweep-netting, only to an extent sufficient to confirm the broad expectations of faunal character.

The following recording compartments have been used, and are mapped on Map 1:

G1 grassland in the south, adjoining Annesley Woodhouse Quarry SSSI;
S1/G seepages and grassland on the east side of the southern Void lake;
S2/G seepages and grassland on the west side of the southern Void lake;
S3/G seepages and grassland on the northern side of the southern Void lake;
P1 ponds near the north-east corner of the southern lake (also known as Void Lagoons or Lagoons 2,3,4);
L the southern Void lake and its immediate fringes (excluding the area where seepages from the west side reach the lake, included in S2/G);
P2/G ponds and adjoining grassland and scrub in the north (also known as Tip Lagoons);
Pn/G grassland towards the northern edge of the site, and the margin of the adjoining plantation fringing the road;
P3/G small, mostly seasonal pools and dry and wet grassland in the central part of the site;
C the whole of the poorly-vegetated and open central area, including lakes, wetlands and dry shale (also known as Bentinck Tip and Tip Lakes);
Gen records from other parts of the site, mostly from lower quality grassland and tall herbs/scrub at the fringes, gathered by general observation and sweep-netting only.

Overlap with previous survey work

Though intended to complement the 2002 survey, there is a significant overlap in the methods employed and the species captured. There was deliberate repetition of aquatic sampling, concentrating on the marginal fauna. Previous aquatic survey was in September of a relatively dry year, and in view of the mossy margins and localised seepages around some ponds, and the presence of shallow seasonal waters, it was thought that some taxa might have been absent or difficult to record at the time of the earlier survey; additional aquatic survey in 2007 thus used small sieves to sample small shallow pools and the marginal fringe of larger pools. For the terrestrial fauna, general survey methods such as sweep-netting inevitably, especially in July, caught some of the same faunal elements as were sampled in the earlier survey, and these have been included if reasonably easily identified.

Constraints and limitations of the survey

The site is large and varied and its invertebrate fauna substantial and diverse. Though it has been possible to concentrate invertebrate survey in areas of high potential, and though some areas have now been examined quite intensively, the records remain only a sample of the overall fauna, albeit hopefully a representative one.

The selection of a small number of key areas for detailed survey on the basis of habitat characteristics inevitably leaves open the possibility of overlooking interest in areas of apparently low potential. This should not be a major issue: habitat features associated with high invertebrate interest in sites such as this are well-known, and though the extent of sampling in areas judged of low potential was limited, it covered all the major habitat types and features present and should have been sufficient to reveal any major disparities between initial assessment and actuality. However, it is the case that intensive survey even of unpromising areas can sometimes reveal uncommon and unexpected invertebrates, and there is a possibility that, even though substantial assemblages of uncommon invertebrates are unlikely, there may be individual uncommon species in some of these areas.

The indifferent weather at the time of survey, and perhaps more importantly during much of the summer, is likely to have affected the fauna significantly. This is especially the case with thermophilic species associated with drier parts of the site, and with diurnal species requiring sunshine for high activity, such as aculeate Hymenoptera. These species are likely to have been relatively difficult to record at the time of survey, and depressed in abundance and activity throughout the year. The records made should be regarded as likely to under-estimate the level of interest amongst such groups.

Nomenclature

Checklists and other sources used for names in this and in individual site reports have been selected as far as possible on the basis of easy availability, broad coverage, specific reference to the British fauna, of being reasonably recent, and of their availability in printed form. There are few occasions when all these criteria are met. The following sources have been used:

Mollusca	Anderson, 2005
Crustacea	Gledhill et al., 1993; Hopkin, 1991
Coleoptera	"The Coleopterist" website, November 2006
Diptera	Chandler, 1998
Ephemeroptera	Macadam, 2001
Auchenorhyncha	Le Quesne & Payne, 1981
Heteroptera	Aukema & Rieger, 1995-2006
Hymenoptera	Archer, 2004
Lepidoptera	Bradley, 1998
Mecoptera	Plant, 1997
Megaloptera	Plant, 1997
Neuroptera	Plant, 1997
Odonata	Merritt et al., 1997
Orthoptera	Haes & Harding, 1997
Plecoptera	Nilsson, 1996
Trichoptera	Edington & Hildrew, 1995; Wallace et al., 1990

In the lists, taxonomic arrangement of a sort governs the positioning of the highest taxa in the lists, with molluscs and worms preceding crustaceans, spiders, myriapods and insects. Otherwise, listing has been as far as possible alphabetical. Most records are of insects. Within this group, orders are arranged alphabetically, families alphabetically within orders, and species alphabetically within families. No groupings between family and order, or between genus and family, are used.

Nature Conservation Status

Each of the species recorded has been assigned at least one nature conservation status, based upon either the formal designation of a species, using published lists, or an informal status based upon published and unpublished sources and the author's knowledge and experience.

The better-known groups of invertebrates were assessed for formal conservation status in Red Data Books and National reviews from the mid-1980s onwards, using criteria from the IUCN for the rarest (Red Data Book) species, and defining species believed to occur in 100 or fewer 10-kilometres squares of the National Grid as Notable. The earlier IUCN criteria have been superseded, but only a fraction of the fauna has as yet been assessed, in published reviews, under the newer criteria.

The following statuses and abbreviations from the older system are used in this report:

Red Data Book category 1 (RDB1) – Endangered
Taxa in danger of extinction in Great Britain and whose survival is unlikely if causal factors continue operating. Included are those taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are some taxa that are possibly extinct. Criteria are: species which are known or believed to occur as only a single population within one hectad of the National Grid; species which only occur in habitats known to be especially vulnerable; species which have shown a rapid or continuous decline over the last twenty years and are now estimated to exist in five or fewer hectads; species which are possibly extinct but have been recorded within the last century and if rediscovered would need protection.

Red Data Book category 3 (RDB3) – Rare
Taxa with small populations in Great Britain that are not at present Endangered or Vulnerable, but are at risk. These taxa are usually localised within restricted geographical areas or habitats

or are thinly scattered over a more extensive range. Included are species which are estimated to exist in only fifteen or fewer hectads. This criterion may be relaxed where populations are likely to exist in over fifteen hectads but occupy small areas of especially vulnerable habitat.

Red Data Book category Extinct (X)
Taxa which formerly had wild breeding populations in Great Britain but which are now believed to have died out. Lack of records since the beginning of the twentieth century has been applied as a criterion.

Nationally Scarce category B (Nb)
Taxa which do not fall within RDB categories but which are nonetheless uncommon in Great Britain and are thought to occur in between 31 and 100 hectads of the National Grid or, for less well-recorded groups, between eight and twenty vice-counties.

Nationally Scarce (N)
For some less well-recorded groups and species, it has not been possible to determine which of the Notable categories (A or B) is most appropriate for scarce species. These species, believed to occur in between 16 and 100 hectads of the National Grid, are assigned to an undivided Nationally Scarce category.

The following status category included in the more recent IUCN definitions apply to water beetles and some flies recorded by this survey:

Lower Risk (LR)
A taxon is Lower Risk where it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the LR category can be separated into four subcategories.

1. **Conservation Dependent (LRcd).** Taxa, which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
2. **Near Threatened (LRnt).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable - in Britain, defined as occurring in 15 or fewer hectads but not Critically Endangered, Endangered or Vulnerable.. The absolute count of hectads is, in this review, considered subordinate to evidence of decline on an extent not qualifying the species for Critically Endangered, Endangered or Vulnerable.
3. **Nationally Scarce (LRns).** Taxa which do not qualify for Conservation Dependent or Near Threatened - in Britain defined as species occurring in 16 to 100 hectads but not CR, EN or VU. Nationally Scarce species are usually divided into lists A (**LRnsA** 16-30 hectads) and B (**LRnsB** 31-100 hectads) as in the previous system. This subcategory associates a level of threat with rarity status, whereas the previous National Scarcity listings were based solely on rarity. Those species, the populations of which occasionally occupy more than 30 or 100 hectads as LRnsA and LRnsB respectively, can still be listed if it is thought that their baseline populations frequently fall below these thresholds, or if the habitats occupied are considered under threat.
4. **Least Concern (LRlc).** Taxa, which do not qualify for Conservation Dependent, Near Threatened or National Scarce subcategories - in Britain, this covers all species found on evaluation not to fit into any of the other categories.

Species in the “Least Concern” category, and others not falling into any of the conservation categories listed above are, for the purposes of this report, described as **local (l)** or **common (c)**. Neither of these terms has a precise definition, and they are used only to distinguish between species of wide distribution and either broad or very commonly met habitat requirements, and those which, because of more specialised habitat requirements, lesser mobility, or other cause, are of less frequent occurrence. These categories have been applied according to personal experience and the opinions of standard texts, and must be considered in part subjective.

Nationally Scarce and Red Data Book statuses have been assigned to the species recorded according to the most conveniently accessible and useful summary of the most recently published statuses, as follows:

Coleoptera	Hyman & Parsons 1992; Foster 2000
Diptera	Falk 1991; Falk & Crossley 2005
Hemiptera	Kirby 1992.

Two conventions have been used in the text in order to simplify technical terms and maintain uniformity. The first is made necessary by the fact that under the older grading system, there was a clear demarcation between Red Data Book and Nationally Notable species: only statuses higher than Nationally Notable were included in the Red Data Book, and all took the form of "Red Data Book category …"). Under the newer criteria, there is no unifying RDB prefix to Red Data Book categories, and the criteria extend down to Nationally Scarce species. For uniformity in reporting, a division is maintained between Nationally Scarce and higher statuses: only the latter are described here as Red Data Book species. The second convention is that although in this section a distinction is made between the Nationally Notable species defined under the older system and the Nationally Scarce species defined under the newer system, since the two categories are for all usual purposes almost identical they are combined under the name "Nationally Scarce" in assessment and discussion. The different abbreviations are, however, maintained in tables and lists of species, so that their origins are clear.

Shirt (1987) was the first publication to give definitive Red Data Book statuses to insects. Subsequent reviews proposed many changes to these statuses. Because the revised statuses were preceded by a "p" (for proposed) and not actually published in a Red Data Book, they have not been universally used as the formal status, the Shirt (1987) status being retained. Whatever the technicalities, the retention of a manifestly outdated status for a species where a formal published alternative exists is, for purposes of assessment, clearly unhelpful, and in this report the most recent published estimate of status is given, without the use of "p"s.

Different groups of invertebrates have been reviewed by different authors at various points over a 15 year period which has seen a huge increase in invertebrate recording and considerable change in the frequency of many species, and have been assessed on two different sets of criteria. This does not encourage uniformity or aid comparison. Further, it is becoming increasingly clear, first, that it is possible to be very wrong about the status of even an apparently quite well-known species in the absence of survey work aimed specifically at determining its frequency; second, that the frequency of a species can change a great deal faster than the reviewing mechanism for applying a formal status can follow; and third, that status at the Nationally Scarce level is a rather poor estimate of actual rarity. Nonetheless, these statuses provide the only means by which, in principle, a wide range of invertebrates can be assessed by uniform criteria, and are used as the chief basis for selection of key species in this report.

An important consequence of the fairly prolonged and variable process of status designation is that some species currently having Nationally Scarce (or Notable) or Red Data Book status are manifestly unworthy of it, and many more statuses are of dubious validity. Suggestions for revisions of statuses have been published by various authors for various individual species and groups. To avoid unnecessary complexity, these alternative statuses are not generally mentioned in this report, and certainly not included in tables, but species accounts for Red Data Book and Nationally Scarce species (Appendix 3) make brief mention of disparities between observed and formal status where these are considered sufficiently great to be significant for the meaning of records, and such disparities are taken into account in making an overall assessment of invertebrate interest.

A brief review of those species included on the Nottinghamshire Local Biodiversity Action Plan (http://www.nottsbag.org.uk/pdfs/ZAPA_000.pdf) and the UK Biodiversity Action Plan has been undertaken. The listings of invertebrate groups in the Notts LBAP principally comprise those species with a published conservation status, i.e. RDB or Nationally Scarce, that have previously been recorded in Nottinghamshire and this duplicate status is not repeated here. Where a species included on this list is considered to add to the overall assessment, it is mentioned in the text. LBAP and UK BAP status has not been included in Appendix 1.

Results

The 2007 survey has recorded a total of 517 species, of which one is Red Data Book (though undeserving), 22 are Nationally Scarce, and 57 are considered to be of local distribution. Appendix 1 lists all records from the 2007 survey. Appendix 2 provides notes on the Nationally Scarce and Red Data Book species recorded in 2007.

Assessment of invertebrate interest

Significant invertebrates recorded from the site

Table 1, below, lists species of particular note. This includes all Red Data Book and Nationally Scarce species captured by this survey, and also those from the 2002 survey by Andrew Godfrey. The latter survey used different recording areas, but for current purposes these have been amalgamated into those used in 2007.

The Nationally Scarce and Red Data Book species from the 2002 survey which are included here differ somewhat from those from the 2002 survey report. There are varied reasons for this:

- The 2002 survey report lists *Tetrix subulata* as a Nationally Scarce species; it is not, has always been a fairly common species in southern counties, and appears to be increasing in range and frequency. Though quite closely associated with very open structured vegetation with moss on poorly drained ground, it is of very little conservation significance, and is not included in Table 1.
- The water beetle *Hygrotus parallelogrammus* was listed in the 2002 report from one aquatic sample; though not unprecedented on inland secondary sites, the water bodies at Bentinck are not obviously suitable for this predominantly coastal species, and the report does not list *H. impressopunctatus*, which was found to be common in 2007. *H. parallelogrammus* is included in Table 1, but there is considered to be an element of doubt over its identity.
- The water beetle *Noterus crassicornis* is listed in the 2002 report from the southern lake, without further comment; this is a Nationally Scarce species, and not one expected from a large recent water body of this type. A misprint for *N. clavicornis*, frequent on the site, is suspected, and the species is not listed in Table 1.
- The fly *Platypalpus stabilis* has been demoted from Nationally Scarce status by a recent review, has been recorded quite widely in Britain, and does not have any obviously restrictive habitat requirements. It is not included in Table 1.
- The report lists *Tetanocera punctifrons* from one sample station, without further comment. This Nationally Scarce species was also captured in 2007 in the same area and is included in Table 1.

Only one species without formal conservation status is included in Table 1, the dingy skipper *Erynnis tages*. This species is listed on the Nottinghamshire BAP and the UK BAP. More local species could justifiably be added, on the grounds that they are at least as interesting and significant as some of the Nationally Scarce species in the table.

Table 1
Key species recorded

Area records based only on 2002 records are italicised.

Taxon	Status	02	07	Areas	Habitat type
Coleoptera					
Apionidae					
Catapion pubescens	Nb		+	S2/GPn/G	Open dry habitats
Coccinellidae					
Hippodamia variegata	Nb		+	P2/G	Open dry habitats
Curculionidae					
Gymnetron veronicae	Nb		+	S1/G	Wetland
Microplontus campestris	Nb		+	S1/GP2/GPn/G	Open dry habitats
Dytiscidae					
Hydroglyphus geminus	LRnsB	+	+	*S1/G*, P1,P2/G	Aquatic
(*Hygrotus parallelogrammus*)	LRnsB	+		*S1/G*	
Rhantus suturalis	LRnsB		+	P1	Aquatic
Erirrhinidae					
Grypus equiseti	Nb		+	S1/G	Wetland
Notaris scirpi	Nb		+	S1/G	Tall wetland
Hydraenidae					
Hydraena testacea	LRnsB		+	P1	Aquatic
Limnebius nitidus	LRnsB		+	S1/GP1	Aquatic
Hydrophilidae					
Chaetarthria seminulum	LRnsB		+	P2/G	Aquatic/seepage
Scirtidae					
Scirtes hemispahericus	local		+	L	Aquatic/emergents
Diptera					
Chloropidae					
Lipara rufitarsis	N		+	L	Wetland; reed
Siphonella oscinina	N	+		*G1,S1/G,S2/G*	Uncertain
Chyromyidae					
Aphaniosoma socium	RDB1	+		*S2/G*	Uncertain
Dolichopodidae					
Syntormon monile	local		+	S2/G	Wetland
Syntormon spicatum	local	+		*S1/G*	Wetland
Thrypticus nigricauda	N		+	S2/G	Wetland
Sciomyzidae					
Colobaea bifasciella	N	+		*S2/G*	Wetland
Psacadina verbeckei	N	+	+	S1/GS2/GS3/G	Wetland
Tetanocera punctifrons	N	+	+	S1/GS2/G	Wetland
Stratiomyidae					
Nemotelus pantherinus	local		+	S2/G	Wetland
Oxycera morrisii	N	+	+	S1/GS2/GS3/G	Wetland/seepage
Oxycera pardalina	N		+	S2/G	Headwaters
Oxycera pygmaea	N		+	S1/GS2/G	Seepage
Stratiomys potamida	N		+	P2/G	Wetland/seepage
Vanoyia tenuicornis	N		+	S1/GS2/GP1	Wetland/seepage
Tephritidae					
Merzomyia westermanni	N	+		*G1,S1/G*	Tall ruderal
Myopites inulaedyssentericae	RDB3	+		*S1/G*	Wetland/damp grass
Hemiptera					
Cicadellidae					

Taxon	Status	02	07	Areas	Habitat type
Agallia brachyptera	Nb		+	S1/GS2/GP2/G	Open grassland
Cixiidae					
Trigonocranus emmeae	Nb		+	P2/G	Open habitats
Miridae					
Hoplomachus thunbergi	local		+	P2/G	Dry grassland
Rhopalidae					
Chorosoma schillingi	l	+	+	P2/G, *S2/G*, *Gen*	Dry grassland
Stictopleurus punctatonervosus	X		+	P2/G,Gen	Ruderal vegetation
Lepidoptera					
Hesperiidae					
Erynnis tages	local		+	S1/G, S2/G	Dry grassland

Many of the formal statuses of the scarcer recorded species are open to question. However, only one must be dismissed as devoid of significance – the bug *Stictopleurus punctatonervosus*, now a common species though a large area of England and undemanding in its habitat requirements. Though the current status of most of the remaining species with formal conservation status is perhaps questionable, all remain local species of value in site assessment

UK and Nottinghamshire Biodiversity Action Plan Species

The following Lepidoptera are included in the most recent listing of UK BAP priority species:

- cinnabar *Tyria jacobeae*;
- latticed heath *Chiasmia clathrata*;
- dingy skipper *Erynnis tages*;
- small heath *Coenonympha pamphilus*, and
- wall *Lasiommata megera*.

Four species, without formal conservation status, are included in the Nottinghamshire Local BAP:

- dingy skipper;
- black-tailed skimmer *Orthetrum cancellatum*;
- slender groundhopper *Tetrix subulata*, and
- common groundhopper *Tetrix undulata*.

Of these species, only the dingy skipper is included in Table 1 and is considered a key species in the context of the site and invertebrate conservation. The remaining national BAP Lepidoptera species observed at the site, though they have declined in frequency, remain common or at most somewhat local. Collectively, they form part of the overall assemblage of species associated with open dry habitats, but they are no more special or indicative of such habitats than many other common and local species on the list, and are not considered worthy of special note in site assessment.

The black-tailed skimmer has been increasing in frequency and range in Britain for some decades, and has particularly benefited from mineral workings. It is considered now to be characteristic of such sites, rather than a species deserving special consideration. The two groundhoppers are cryptic ground-dwelling species prone to under-recording, and it is considered likely that this is the chief cause of their apparent scarcity in the county. It is possible also that *T. subulata* is increasing in frequency in the county and the wider area. In surveys of nature reserves and other sites in Nottinghamshire between 1998 and 2003, the present author recorded each of these species from eight sites, out of a total of eighteen examined, which suggests that they are not especially infrequent in the county. Nationally, both are common, and not sufficiently demanding in their habitat requirements to be worthy of special note.

Characterisation and localisation of invertebrate interest

Recorded interest is rather heavily concentrated in the aquatic and wetland fauna, and in particular in the fauna associated with seepages and the margins of smaller water bodies. Because of the high importance of aquatic beetles and wetland flies, the records of uncommon species made in 2007,

despite the aim of complementing the previous survey, have in substantial measure added to the ecological and taxonomic groups already noted as of importance; in particular, the number of water beetle species recorded has doubled, to 46 (assuming both the questioned identities from the 2002 survey to be correct), including at least five and possibly up to seven Nationally Scarce species, and the number species of wetland soldier flies now stands at eleven, of which five are Nationally Scarce.

The seepages and ponds around the southern Void lake (especially S1/G, S2/G, P1) are particularly important. These are currently very well-structured, with a mix of vegetation from almost bare or thinly mossy ground to tall wetland, with scattered scrub providing shelter. The fauna of these seepages, the nearby ponds and the fringe of the lake can be taken as the highest representation of the wetland element of the fauna.

Though pools and other wetland features are widespread over the site, few are of high invertebrate potential. Water bodies in the largely bare central area (Bentinck Tip) are too poorly vegetated and exposed; some smaller marginal ponds are too abruptly edged, and others have too high a sediment load to support high interest; and the bigger waterbodies throughout the site are too large for very high interest to be likely, at least until such time as extensive marginal swamp develops. Seepages and trickles over most of the site seem too recent, too small, too intermittent or on too unstable a substrate to hold significant interest. Though there is scope for some interest in various other parts of the site, the only area, apart from that around the southern lake, where evidence of a substantial wetland assemblage was found was around ponds and grassland in the north (P2/G).

The drier areas of legume-rich and early successional grassland , well-developed locally around the fringe of the central bare area and on the slopes of the southern lake, support very large populations and a wide range of invertebrates, but little of great interest has been recorded. To some extent this is a general feature of such grasslands, which, because they are impressive by virtue of the high density of flowers, can appear to have higher potential than is actually the case. This is enhanced in this particular case by the rather poor-draining substrate over much of the site; invertebrates associated with such open-structured habitats tend to be favoured by friable well-drained soils. Even the commoner species associated with such conditions tend, at Bentinck, to be rather locally distributed, found on occasional banks and mounds. Specific search of such relatively open and dry areas has failed to reveal an assemblage of great interest, however, and areas which combine well-drained ground with well-structured vegetation are perhaps too small for significant interest.

The assessment of relatively low interest in the drier habitat elements of the site must come with the caveat that, in 2007, the fauna of such areas may have been under-estimated because of the unusually wet summer and the imperfect conditions at the time of the summer survey. It is noteworthy, for example, that the value of the site for aculeates remains almost unknown, because so few individuals or species were seen during survey. However, in view of the general findings of the survey, it seems unlikely that ground-nesting species are well-represented or of high interest, and the habitats on the site do not obviously indicate that stem-nesting species will be especially favoured.

Land around the southern lake provides, in additional to its high-quality wetland features, a substantial area of drier open-structured grassland of reasonable quality. The best dry ground fauna, however, is found on slopes and banks in the vicinity of the northern ponds (P2/G, Pn/G).

Areas of high-quality grassland occupy only a small fraction of the site. Most of the grassland is poorly-structured, with a fairly tall dense sward over an indifferent substrate, and much is floristically poor. These areas of grassland are considered to be of low potential for invertebrates, and sampling has produced no evidence of interest.

The bare and poorly-vegetated central area of the site is impressively poor in invertebrates; in the terrestrial areas this is not unduly surprising, as large areas are devoid of any habitat that might be exploited, and the remainder is very exposed. However, the virtual absence of detectable invertebrate fauna from the lakes and their margins, even where there is well-established vegetation (including emergent reed, marginal wet grassland, and beds of common stonewort) is slightly more surprising. A significant factor limiting the fauna in these lakes, and a major one in some of the smaller peripheral pools of the site, is the instability of the surrounding substrate and the high load of silt and larger particles being swept into the water; they are almost certainly too unstable for a breeding fauna to establish. Interestingly, though the exposed sediments of the lakes contained scarcely any of the ground

beetle fauna which might be hoped for; that which was found was dominated by the local *Bembidion stephensii*, a usually coastal species.

Longer-term potential

Poor drainage, a tendency to produce temporary and seasonal pools and small areas of wetland, and at least periodic seepage areas, are widespread over the site and suggest the possibility of development of further interest with time and successional change. This is especially true in the extensive area which is currently largely bare shale. However, some peripheral pools and wetland areas, currently of limited potential because of substrate instability and high silt load, may well also develop much greater interest as further vegetation develops and stabilises the substrate. There is also a possibility of enhancement of the dry ground fauna as finer material is washed out of banks and mounds towards the lower-lying wetlands; it is likely that, in the currently open areas of the site, natural processes would lead to greater potential in the physical structure.

Notwithstanding the long-term potential of various parts of the site, the seepage areas around the southern lake are outstanding and unlikely to be equalled in quality whatever else happens on the site. Here, there is a possibility of declining interest, at least without appropriate management. In places, there is potential for rapid scrub growth, especially where there are alders, which could alter the character of the site quite quickly. Other areas are not obviously undergoing rapid change, and rabbit grazing may hold succession in check over substantial areas. If so, there is scope for further accumulation of species over time.

Overall assessment

The overall total of invertebrates with formal conservation status recorded in 2007 – 23 species – is substantial, though not exceptional for such a degree of survey effort; the total of 29 such species recorded by the 2002 and 2007 surveys combined, with the addition of a number of other local and uncommon species, argues for a site of significant value. The concentration of these records in species associated with wetland and water margins, argues for a high nature conservation value of these habitat components. Overall, the invertebrate fauna recorded is considered as of Regional importance.

The assemblage of species recorded from the seepages and well-vegetated shallow water can be regarded as typical and characteristic of such areas with base-rich water. The assemblage of soldier flies is particularly noteworthy, but even amongst this group no individual species is of great rarity, and assemblages of similar composition are known elsewhere in Midland counties both in secondary sites on quarried land and in sites of greater historical continuity. However, the presence of *Oxycera pygmaea* seems relatively unusual in a secondary site, and the list of wetland soldier-flies is arguably almost as large as it could possibly be in this part of the country in these habitats. On these grounds, it is considered that the wetland invertebrate assemblage is sufficiently outstanding that it could reasonably be regarded as of Regional importance.

The fauna of the drier elements of the site is regarded as merely of supporting interest: current records include no very rare species; the Nationally Scarce species recorded are for the most part doubtfully worthy of their status and increasing, and the overall assemblage is not large. It is doubtful whether significance at the county level could be justified on current records, but due to the likelihood of under-recording in the poor summer of 2007, a precautionary assessment of county value is taken as a useful default position.

Known invertebrate interest at the site is localised. High interest has been recorded from a substantial area around the southern lake, and a smaller area in the north of the site. There is further potential in pools, banks and other features around the lower slopes of the central Bentinck Tip area and elsewhere towards the periphery of the site, but large areas of species-poor grassland and largely bare ground are currently of very low potential. In the medium to longer term, successional changes may lead to an increase in the invertebrate value of terrestrial habitats; but may also lead to a decline in interest in wetland and aquatic habitats in the absence of appropriate management.

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Map 1
Locations of specified sampling areas

Explanations of abbreviations
in Appendix 1

Appendix 1
Complete list of recorded species 2007

Dates:
May 22 May 2007
July 10 July 2007

Locations:
G1 grassland in south adjoining Annesley Woodhouse Quarry SSSI
S1/G seepages and grassland on the east side of the southern lake
S2/G seepages and grassland on the west side of the southern lake
S3/G seepages and grassland on the northern side of the southern lake
P1 ponds near the north-east corner of the southern lake
L the southern lake and its immediate fringes (excluding the area where seepages from the west side reach the lake, included in S2/G to the lake margin)
P2/G ponds and adjoining grassland and scrub in the north
Pn/G grassland towards the northern side of the site, and the edge of the adjoining plantation fringing the road
P3/G small, mostly seasonal pools and dry and wet grassland in the central part of the site
C the whole of the poorly-vegetated and open central area, including lakes, wetlands and dry shale
Gen records from other parts of the site, mostly from lower quality grassland and tall herbs/scrub at fringes, gathered by general observation and sweep-netting

Taxon	**Status**	**Dates**		**Locations**										
		May	**July**	**G1**	**S1/G**	**S2/G**	**S3/G**	**P1**	**L**	**P2/G**	**Pn/G**	**P3/G**	**C**	**Gen**
Mollusca														
Cochlicopidae														
Cochlicopa lubrica	c	+								+				
Hydrobiidae														
Potamopyrgus antipodarum	c	+						+		+				
Lymnaeidae														
Galba truncatula	c	+			+		+					+		
Lymnaea stagnalis	c	+						+						
Radix balthica		+						+		+				
Sphaeriidae														
Pisidium sp.		+						+						
Vertiginidae														

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Vertigo pygmaea	l		+							+				
Crustacea														
Asellidae														
Asellus aquaticus	c	+						+						
Crangonyctidae														
Crangonyx pseudogracilis	c	+						+						
Gammaridae														
Gammarus pulex	c	+			+	+								
Oniscidae														
Oniscus asellus	c	+								+	+			
Philosciidae														
Philoscia muscorum	c	+			+					+	+	+		
Trichoniscidae														
Trichoniscus pusillus	c	+			+									
Coleoptera														
Apionidae														
Apion frumentarium	c		+				+							+
Betulapion simile	c		+								+			
Catapion pubescens	Nb		+			+					+			
Catapion seniculus	c	+								+				
Ceratapion gibbirostre	c		+	+			+							+
Ceratapion onopordi	c	+		+										+
Eutrichapion ervi	c	+								+	+			+
Eutrichapion viciae	c	+	+							+				
Exapion ulicis	c	+	+							+				
Holotrichapion pisi	c	+				+				+	+			
Ischnopterapion loti	c	+	+	+	+	+				+	+			+
Ischnopterapion virens	c	+	+	+	+	+					+			+
Oxystoma pomonae	c	+												
Oxystoma subulatum	c		+			+				+				
Perapion curtirostre	c	+			+	+	+							+
Protapion apricans	c	+	+	+	+	+				+	+			

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Protapion assimile	c	+								+				
Protapion fulvipes	c	+	+		+	+				+	+			+
Protapion nigritarse	c	+	+	+	+	+								+
Protapion trifolii	c		+			+				+				
Stenopterapion meliloti	c		+							+				
Stenopterapion tenue	c		+		+	+				+	+			
Byrrhidae														
Simplocaria semistriata	c	+			+									
Byturidae														
Byturus tomentosus	c		+								+			+
Cantharidae														
Cantharis lateralis	c		+							+				+
Cantharis nigra	c		+			+	+							+
Cantharis nigricans	c	+												+
Cantharis pellucida	c	+		+							+			+
Cantharis rufa	c	+		+							+			+
Cantharis rustica	c	+		+	+	+				+	+	+		+
Rhagonycha fulva	c		+	+	+	+	+				+	+		+
Rhagonycha limbata	c	+				+				+	+			
Carabidae														
Acupalpus dubius	c		+		+		+							
Bembidion biguttatum	c	+			+			+		+				
Bembidion lampros	c	+	+		+					+				+
Bembidion stephensii	l	+											+	
Calathus fuscipes	c		+			+								
Curtonotus aulica	c		+			+								+
Demetrias atricapillus	c	+								+				
Harpalus affinis	c	+			+								+	
Harpalus latus	c												+	
Harpalus rubripes	c	+								+				
Nebria brevicollis	c	+											+	
Notiophilus biguttatus	c	+			+					+	+			+

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Ocys harpaloides	c		+											
Paradromius linearis	c	+			+	+					+			+
Pterostichus madidus	c	+												+
Stenolophus mixtus	c	+						+						
Syntomus foveatus	c		+								+			
Cerambycidae														
Agapanthia villosoviridescens	l		+								+			
Chrysomelidae														
Altica sp.		+			+		+							
Bruchus loti	c	+	+	+	+	+								
Bruchus rufimanus	c		+								+			
Cassida rubiginosa	c	+					+							+
Chaetocnema concinna	c	+		+		+								
Crepidodera aurea	c		+								+			
Crepidodera fulvicornis	c	+			+	+					+			
Cryptocephalus fulvus	l		+								+			
Cryptocephalus labiatus	c		+								+			
Hippuriphila modeeri	c		+		+	+								
Neocrepidodera transversa	c		+	+		+	+					+		+
Oulema obscura	c	+		+										+
Phaedon cochleariae	c	+			+									
Phaedon tumidulus	c	+									+			+
Phratora vulgatissima	c		+			+								
Coccinellidae														
Adalia bipunctata	c		+	+										+
Adalia 10-punctata	c		+			+								
Anisosticta 19-punctata	l	+	+				+	+		+		+		
Calvia 14-guttata	c										+			
Coccidula rufa	c	+	+	+			+					+		
Coccinella 7-punctata	c	+	+	+	+	+	+			+	+	+		+
Exochomus quadripustulatus	c		+									+		
Hippodamia variegata	Nb		+							+				

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Nephus redtenbacheri	c		+		+									
Propylea 14-punctata	c		+	+		+						+		+
Psyllobora 22-punctata	c		+								+			+
Rhyzobius litura	c	+	+		+	+				+	+	+		
Scymnus femoralis	l		+											
Scymnus frontalis	c		+											
Subcoccinella 24-punctata	c	+		+	+	+				+	+	+		+
Tytthaspis 16-punctata	c	+	+	+	+	+				+	+	+		+
Cryptophagidae														
Telmatophilus caricis	c		+					+	+	+				
Telmatophilus typhae	c	+	+		+			+	+	+		+		
Curculionidae														
Anthonomus rubi	c	+			+									
Archarius salicivorus	c		+			+		+						
Barypeithes pellucidus	c		+								+			
Ceutorhynchus pallidactylus	c		+											+
Ceutorhynchus typhae	c	+												+
Cionus hortulanus	c	+			+	+								
Cionus scrophulariae	c	+			+	+								
Datonychus melanostictus	l	+			+			+						
Glocianus distinctus	c	+		+	+									
Gymnetron veronicae	Nb	+			+									
Hadroplontus litura	c		+				+			+				
Hylastinus obscurus	l	+			+					+				
Hypera nigrirostre	c	+	+		+	+				+	+			
Hypera plantaginis	c	+	+		+	+								
Hypera pollux	c	+										+		
Hypera postica	c	+	+	+	+	+				+	+	+		
Hypera rumicis	c	+			+		+							
Mecinus pascuorum	c	+	+	+	+	+				+	+	+		+
Mecinus pyraster	c	+		+	+						+			
Microplontus campestris	Nb	+			+					+	+			

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Nedyus quadrimaculatus	c	+		+										+
Otiorhynchus singularis	c		+								+			
Phyllobius pomaceus	c	+									+			+
Phyllobius roboretanus	c	+		+										+
Rhamphus pulicarius	c	+			+	+				+				
Sitona hispidulus	c		+							+				
Sitona lepidus	c	+			+									
Sitona lineatus	c	+		+	+	+					+			
Sitona regensteinensis	c		+							+				
Sitona striatellus	c		+							+				
Sitona sulcifrons	c		+							+				
Tanysphyrus lemnae	c	+						+						
Trichosirocalus troglodytes	c	+		+		+				+				
Tychius meliloti	c		+							+				
Tychius picirostris	c	+			+	+				+				
Dryopidae														
Dryops luridus	c	+						+						
Dytiscidae														
Agabus bipustulatus	c	+						+		+		+		
Agabus nebulosus	c	+						+						
Agabus sturmii	c	+						+						
Colymbetes fuscus	c	+						+						
Dytiscus marginalis	c	+								+				
Graptodytes pictus	c	+						+						
Hydroglyphus geminus	LRnsB	+						+		+				
Hydroporus incognitus	l	+								+				
Hydroporus memnonius	c	+								+		+		
Hydroporus palustris	c	+						+		+				
Hydroporus planus	c	+						+		+		+		
Hydroporus pubescens	c	+								+				
Hydroporus tessellatus	c	+						+		+		+		
Hygrotus impressopunctatus	l	+						+		+				

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Hygrotus inaequalis	c	+						+		+				
Hyphydrus ovatus	c	+						+						
Ilybius ater	l	+						+						
Ilybius fuliginosus	c	+						+						
Ilybius quadriguttatus	c	+						+						
Rhantus suturalis	LRnsB	+						+						
Elateridae														
Adrastus pallens	c		+			+					+			
Agriotes obscurus	c	+		+			+				+			
Agriotes sputator	c	+		+						+		+		
Athous haemorrhoidalis	c	+		+							+			
Erirrhinidae														
Erirrhinus nereis	l	+						+						
Grypus equiseti	Nb		+		+									
Notaris acridulus	c		+						+					
Notaris scirpi	Nb		+		+									
Haliplidae														
Haliplus confinis	c	+						+						
Haliplus lineatocollis	c	+			+									
Haliplus ruficollis	c	+						+						
Helophoridae														
Helophorus aequalis	c	+								+		+		
Helophorus brevipalpis	c	+					+			+		+		
Helophorus grandis	c	+								+				
Helophorus minutus	c	+										+		
Helophorus obscurus	c	+					+			+		+		
Hydraenidae														
Hydraena testacea	LRnsB	+						+						
Limnebius nitidus	LRnsB	+			+			+						
Hydrophilidae														
Anacaena globulus	c	+					+	+						
Anacaena limbata	c	+					+	+		+		+		

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Anacaena lutescens	c	+						+		+				
Chaetarthria seminulum	LRnsB	+								+				
Coelostoma orbiculare	l	+						+						
Enochrus testaceus	l	+						+						
Helochares lividus	l	+						+		+				
Hydrobius fuscipes	c	+						+		+		+		
Laccobius bipunctatus	c	+						+						
Laccobius minutus	c	+			+			+		+				
Kateretidae														
Kateretes rufilabris	c		+			+								
Melyridae														
Axinotarsus marginalis	c		+								+			
Mordellidae														
Mordellistena pumila	l	+	+							+				
Noteridae														
Noterus clavicornis	l	+						+						
Oedemeridae														
Oedemera lurida	c	+	+		+	+	+			+	+	+	+	+
Phalacridae														
Olibrus aeneus	c	+	+			+				+			+	+
Scirtidae														
Cyphon coarctatus	c	+			+					+				
Cyphon sp.		+								+				
Scirtes hemisphaericus	l		+						+					
Scraptiidae														
Anaspis maculata	c		+								+			
Anaspis pulicarius	c		+								+			
Staphylinidae														
Carpelimus rivularis	c	+			+									
Stenus cicindeloides	c	+			+	+	+		+					
Stenus clavicornis	c		+	+			+			+				
Stenus flavipes	c		+			+								

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Stenus latifrons	c	+			+									
Stenus nitidiusculus	c	+	+	+	+	+	+			+				
Stenus ossium	c	+	+	+	+	+				+		+		
Stenus picipennis	c		+							+				
Tenebrionidae														
Lagria hirta	c		+	+		+					+			
Diptera														
Asilidae														
Leptogaster cylindrica	c	+	+	+	+	+				+	+	+		+
Chloropidae														
Lipara rufitarsis	N		+						+					
Conopidae														
Physocephala rufipes	c		+			+								
Sicus ferrugineus	c		+	+			+				+			+
Dixidae														
Dixella autumnalis	c	+					+			+				
Dolichopodidae														
Achalcus flavicollis	c		+		+	+								
Argyra leucocephala	c		+		+	+	+			+				
Dolichopus griseipennis	c		+	+	+		+	+	+	+		+		
Dolichopus plumipes	c	+	+	+	+	+	+							
Dolichopus ungulatus	c		+	+		+			+	+				
Hydrophorus balticus	l		+							+				
Micromorphus albipes	l		+		+	+				+				
Poecilobothrus nobilitatus	c		+					+	+	+				
Rhaphium appendiculatum	c	+			+									
Rhaphium caliginosum	c		+	+	+	+	+	+	+	+				
Scellus notatus	c	+	+		+	+				+	+	+		
Sympycnus desoutteri	c	+	+	+				+						
Syntormon denticulatus	c	+	+	+	+	+								
Syntormon monilis	l		+			+								
Syntormon pallipes	c		+		+	+	+	+						

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Syntormon pumilus	l		+		+	+	+							
Tachytrechus notatus	l	+	+			+			+					
Teucophorus spinigerellus	l		+			+	+							
Thrypticus nigricauda	LRns		+			+								
Empididae														
Chelifera pectinicauda	l		+						+					
Chelifera precatoria	c		+						+					
Empis livida	c	+	+	+	+	+	+			+	+	+	+	+
Empis tessellata	c	+		+							+			
Hilara maura	c	+							+					
Limoniidae														
Dicranomyia morio	l		+			+								
Gonomyia sp.			+			+								
Helius flavus	l		+		+	+	+							
Molophilus bifidus	l		+			+	+							
Molophilus griseus	c		+	+	+	+	+							
Molophilus obscurus	c	+			+									
Paradelphomyia senilis	c		+			+								
Pseudolimnophila lucorum	c	+	+		+	+	+							
Pseudolimnophila sepium	c		+		+	+	+							
Symplecta hybrida	c		+		+									
Symplecta stictica	c		+		+		+							
Opomyzidae														
Geomyza tripunctata	c	+		+	+					+				+
Opomyza florum	c	+				+								+
Opomyza germinationis	c		+											+
Pediciidae														
Tricyphona immaculata	c	+			+		+							
Psilidae														
Loxocera albiseta	c		+		+	+	+			+				
Ptychopteridae														
Ptychoptera contaminata	c	+	+		+		+							

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Ptychoptera sp.		+						+						
Rhagionidae														
Chrysopilus cristatus	c		+	+	+	+	+							
Rhagio scolopacea	c	+		+	+						+			
Rhagio tringarius	c		+	+						+				
Scathophagidae														
Cordilura albipes	c	+			+									
Scathophaga stercoraria	c	+		+										+
Sciomyzidae														
Coremacera tristis	l		+	+						+	+			
Euthycera fumigata	l		+		+									
Hydromya dorsalis	c		+					+						
Ilione albiseta	c		+			+		+	+	+				
Limnia unguicornis	c	+		+	+	+			+					
Pherbellia cinerella	c	+		+	+	+				+	+	+	+	+
Pherbina coryleti	c	+	+		+	+	+	+	+					
Psacadina verbeckei	N	+			+	+	+							
Sepedon sphegea	c		+					+	+					
Tetanocera elata	c	+		+	+		+	+						
Tetanocera ferruginea	c		+			+	+	+						
Tetanocera punctifrons	N		+		+	+								
Sepsidae														
Themira lucida	c		+						+					
Themira superba	l		+						+					
Stratiomyidae														
Beris geniculata	c		+	+	+	+			+	+	+			
Beris vallata	c	+	+	+	+	+		+	+					
Chloromyia formosa	c		+	+			+			+	+			+
Chorisops tibialis	c		+	+	+					+	+			
Nemotelus nigrinus	l	+		+	+		+							
Nemotelus pantherinus	l		+			+								
Oplodontha viridula	l	+	+		+	+	+	+	+	+		+		

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Oxycera morrisii	N	+	+		+	+	+							
Oxycera nigricornis	l		+		+	+	+			+				
Oxycera pardalina	N		+			+								
Oxycera pygmaea	N		+		+	+								
Oxycera rara	l	+								+				
Oxycera trilineata	l	+	+		+	+		+	+	+				
Pachygaster atra	c		+	+	+				+		+			
Pachygaster leachii	c		+								+			
Stratiomys potamida	N	+								+				
Vanoyia tenuicornis	N	+	+		+	+		+						
Syrphidae														
Anasimyia contracta	l		+		+	+		+	+	+				
Cheilosia bergenstammi	c	+			+									
Cheilosia pagana	c		+	+						+				
Chrysotoxum bicinctum	l		+	+	+		+			+				
Chrysotoxum festivum	l		+		+									
Episyrphus balteatus	c		+	+	+	+	+			+	+	+	+	+
Eristalis tenax	c		+			+					+			
Eupeodes corollae	c		+	+										
Helophilus pendulus	c		+	+	+	+	+	+	+		+			
Melanostoma mellinum	c		+	+	+	+	+			+	+	+		+
Melanostoma scalare	c		+	+							+			+
Neoascia tenur	c	+			+		+	+						
Paragus haemorrhous	c	+	+	+	+	+				+	+	+	+	
Pipizella viduata	c	+		+	+	+				+				+
Platycheirus albimanus	c	+	+	+	+		+			+	+			+
Platycheirus clypeatus	c	+	+		+	+	+							
Platycheirus rosarum	l		+			+								
Rhingia campestris	c		+								+			+
Scaeva pyrastri	c		+											+
Sphaerophoria scripta	c		+	+	+	+				+	+	+		+
Syritta pipiens	c		+	+		+				+	+	+		+

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Trichopsomyia flavitarsis	l	+			+					+				
Xylota segnis	c		+											
Tabanidae														
Chrysops caecutiens	c		+	+		+								
Haematopota pluvialis	c		+		+		+			+				
Tachinidae														
Phasia pusilla	c	+				+					+	+		
Tephritidae														
Chaetorellia jaceae	c		+		+					+				
Chaetostomella cylindrica	c		+	+	+									
Tephritis neesii	c	+		+	+					+	+			+
Tephritis vespertina	c	+			+					+				+
Urophora cardui	c	+	+				+					+		
Urophora quadrifasciata	c		+											
Urophora stylata	c	+		+	+	+	+			+		+		+
Xyphosia miliaria	c		+								+			+
Therevidae														
Thereva nobilitata	c		+							+				+
Tipulidae														
Nephrotoma appendiculata	c	+		+	+	+								
Nephrotoma quadrifaria	c		+		+					+				
Tipula fascipennis	c		+											
Tipula lateralis	c	+	+	+	+	+	+			+				
Tipula oleracea	c	+			+									
Tipula vernalis	c	+			+									
Ulidiidae														
Herina longistylata	l		+	+	+	+		+		+				
Ephemeroptera														
Baetidae														
Cloeon dipterum	c	+						+						
Hemiptera-Auchenorhyncha														
Cercopidae														

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Aphrophora alni	c		+							+	+			
Neophilaenus campestris	c		+	+	+	+				+	+	+	+	+
Neophilaenus lineatus	c		+	+		+	+			+				
Philaenus spumarius	c		+	+	+	+	+				+			
Cicadellidae														
Adarrus ocellaris	c	+	+							+				
Agallia brachyptera	Nb		+	+	+	+				+				
Agallia consobrina	c		+							+				
Agallia ribauti	c		+	+	+	+				+	+			
Aphrodes albifrons	c		+			+	+					+		
Aphrodes makarovi	c		+								+			
Arthaldeus pascuellus	c		+	+	+					+		+		
Cicadella viridis	c		+		+	+	+	+		+		+		
Cicadula quadrinotata	c		+		+									
Conosanus obsoletus	c		+			+	+							
Deltocephalus pulicaris	c		+							+		+	+	
Doratura stylata	c		+			+				+				
Eupelix cuspidata	c		+							+				
Eupteryx aurata	c		+			+	+							
Eupteryx urticae	c		+											+
Eupteryx vittata	c		+		+									
Eurhadina pulchella	c		+								+			
Euscelis incisus	c		+	+	+	+				+	+	+	+	+
Idiocerus albicans	c		+								+			
Idiocerus confusus	c		+	+	+	+				+	+			
Macropsis cerea	c		+							+				
Macropsis prasina	c		+							+				
Macrosteles horvathi	l		+						+				+	
Macrosteles sexnotatus	c		+	+					+					
Macrosteles viridigriseus	c		+				+		+			+		
Macustus grisescens	c	+			+									
Megophthalmus scabripennis	c		+		+	+				+	+	+	+	+

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Psammotettix confinis	c		+			+				+		+	+	
Ribautiana tenerrima	c		+											
Typhlocyba quercus	c		+											
Zyginidia scutellaris	c		+	+										
Cixiidae											+			
Cixius nervosus	c		+			+				+				
Trigonocranus emmeae	Nb		+							+				
Delphacidae														
Conomelus anceps	c		+		+	+				+		+		
Criomorphus albomarginatus	c	+		+			+				+			
Eurybregma nigrolineata	l	+			+									
Javesella pellucida	c	+	+	+						+				
Stenocranus minutus	c	+												+
Hemiptera-Heteroptera														
Acanthosomatidae														
Elasmucha grisea	c	+	+						+		+			
Anthocoridae														
Anthocoris nemoralis	c		+		+						+			+
Anthocoris nemorum	c		+	+	+	+	+			+	+	+		+
Orius niger	c		+	+	+	+	+			+				+
Orius vicinus	c		+								+			
Berytidae														
Berytinus signoreti	c		+							+				
Coreidae														
Coriomeris denticulatus	c	+	+		+					+	+			
Gerridae														
Gerris lacustris	c	+	+					+	+	+			+	
Hydrometridae														
Hydrometra stagnorum	c	+			+			+	+				+	
Lygaeidae														
Cymus glandicolor	c	+	+	+	+	+				+				
Cymus melanocephalus	c	+	+	+	+	+	+	+		+		+	+	

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Drymus sylvaticus	c	+									+			
Gastrodes grossipes	c		+								+			
Ischnodemus sabuleti	c	+						+	+					
Kleidocerys resedae	c	+	+						+		+			
Scolopostethus affinis	c		+								+			
Stygnocoris fuligineus	c		+	+	+	+				+				+
Stygnocoris rusticus	c		+		+	+								
Stygnocoris sabulosus	c		+							+				
Miridae														
Adelphocoris lineolatus	l		+							+				
Amblytylus nasutus	c		+	+	+					+	+			+
Asciodema obsoletum	c		+							+				
Capsus ater	c		+	+	+	+				+		+		+
Closterotomus norwegicus	c		+				+				+			+
Deraeocoris ruber	c		+								+			+
Dicyphus epilobii	c		+						+	+				+
Dicyphus errans	c		+			+				+				
Heterotoma planicornis	c		+							+	+			+
Hoplomachus thunbergi	l		+							+				
Leptopterna dolabrata	c	+	+	+	+	+	+			+	+			+
Leptopterna ferrugata	c	+	+		+	+						+	+	+
Liocoris tripustulatus	c	+					+							+
Lopus decolor	c		+							+			+	+
Lygocoris contaminatus	c		+								+			
Lygocoris pabulinus	c		+	+			+				+			+
Lygocoris spinolai	c		+				+				+			
Megaloceraea recticornis	c		+	+						+	+			+
Notostira elongata	c		+	+		+	+			+	+	+		+
Orthocephalus saltator	c		+	+	+	+				+				
Orthops campestris	c						+							
Orthotylus marginalis	c		+		+	+				+	+			
Pithanus maerkeli	c		+							+				+

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Plagiognathus arbustorum	c		+	+	+	+	+			+	+	+		+
Plagiognathus chrysanthemi	c		+	+	+	+				+	+	+	+	+
Stenodema laevigatum	c	+		+			+			+				+
Stenotus binotatus	c		+	+	+	+				+		+		+
Sthenarus rotermundi	c		+								+			
Trigonotylus coelestialium	c		+							+				
Tytthus pygmaeus	l		+				+							
Nabidae														
Himacerus apterus	c		+		+					+	+			
Naucoridae														
Ilyocoris cimicoides	l	+						+						
Notonectidae														
Notonecta glauca	c	+						+						
Pentatomidae														
Dolycoris baccarum	l		+							+				
Piezodorus lituratus	c	+	+							+				
Podops inuncta	c										+			
Pleidae														
Plea minutissima	l	+						+		+				
Rhopalidae														
Chorosoma schillingi	l		+							+				
Stictopleurus punctatonervosus	X	+	+							+				+
Saldidae														
Chartoscirta cincta	c		+				+		+					
Saldula saltatoria	c		+		+	+			+				+	
Tingidae														
Acalypta parvula	c	+	+	+						+				
Dictyonota strichnocera	c		+							+				
Tingis ampliata	c	+	+		+		+							+
Tingis cardui	c	+												+
Veliidae														
Microvelia reticulata	c	+						+						

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Velia caprai	c	+				+								
Hymenoptera														
Apidae														
Apis mellifera	c		+											+
Bombus lapidarius	c	+	+		+	+				+	+			+
Bombus lucorum	c	+	+											+
Bombus pascuorum	c	+	+		+	+	+			+	+	+		+
Bombus terrestris	c	+								+				+
Pompilidae														
Anoplius nigerrimus	c	+			+									
Vespidae														
Odynerus spinipes	c	+			+									
Vespula rufa	c		+		+					+				
Lepidoptera														
Arctiidae														
Tyria jacobeae	c		+							+				
Geometridae														
Chiasmia clathrata	c	+	+				+			+	+			
Hesperiidae														
Erynnis tages	l	+			+	+								
Ochlodes venata	c		+		+		+							
Thymelicus sylvestris	c		+		+	+	+			+	+			+
Lycaenidae														
Polyommatus icarus	c	+		+	+	+				+				
Noctuidae														
Cucullia verbasci	c		+		+									
Nymphalidae														
Aglais urticae	c		+								+			+
Aphantopus hyperanthus	c		+	+	+		+			+				+
Coenonympha pamphilus	c		+		+	+				+				
Maniola jurtina	c		+	+	+	+					+	+		+
Inachis io	c	+												+

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Lasiommata megera	l	+											+	
Pararge aegeria	c	+								+				
Pyronia tithonus	c		+	+						+	+			
Vanessa atalanta	c		+											+
Pieridae														
Anthocharis cardamines	c	+			+									
Pieris brassicae	c	+												+
Pieris rapae	c		+											+
Pyralidae														
Cataclysta lemnata	c		+					+	+					
Zygaenidae														
Zygaena trifolii	c		+		+	+	+			+				
Mecoptera														
Panorpidae														
Panorpa communis	c		+							+	+			
Megaloptera														
Sialidae														
Sialis lutaria	c	+						+	+	+				
Odonata														
Aeshnidae														
Aeshna grandis	c		+					+						
Anax imperator	l		+					+	+					
Coenagriidae														
Coenagrion puella	c	+						+	+	+		+		
Enallagma cyathigerum	c	+	+		+	+		+	+					
Ischnura elegans	c	+			+	+	+	+	+	+		+		
Pyrrhosoma nymphula	c	+						+		+		+		
Lestidae														
Lestes sponsa	c		+		+	+								
Libellulidae														
Libellula sp.		+								+				
Orthetrum cancellatum	l		+						+					

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Sympetrum striolatum	c		+					+	+			+		
Sympetrum sp.		+						+		+				
Orthoptera														
Acrididae														
Chorthippus albomarginatus	c		+	+	+	+	+			+				+
Chorthippus brunneus	c		+	+	+	+				+	+	+	+	+
Chorthippus parallelus	c		+		+									
Omocestus viridulus	c		+		+		+							
Tetrigidae														
Tetrix subulata	c	+	+	+	+	+	+	+	+	+		+		
Tetrix undulata	c	+			+					+				
Plecoptera														
Nemouridae														
Nemoura cinerea	c	+			+									
Nemurella picteti	c		+			+								
Trichoptera														
Beraeidae														
Beraea pullata	c	+			+	+	+							
Hydropsychidae														
Hydropsyche angustipennis	c	+	+			+								
Hydroptilidae														
Agraylea multipunctata	c		+						+					
Leptoceridae														
Leptocerus tineiformis	c		+						+					
Mystacides azurea	c		+						+					
Mystacides longicornis	c		+						+					
Triaenodes bicolor	c	+						+						
Polycentropidae														
Plectrocnemia conspersa	c	+			+	+								
Psychomyiidae														
Lype phaeopa	c	+				+								
Tinodes waeneri	c	+							+					

Taxon	Status	Dates		Locations										
		May	July	G1	S1/G	S2/G	S3/G	P1	L	P2/G	Pn/G	P3/G	C	Gen
Limnephilidae														
Limnephilus affinis	c		+				+			+		+		
Limnephilus flavicornis	c		+					+		+				
Limnephilus lunatus	c	+	+					+	+	+				
Limnephilus rhombicus	c	+							+					

Appendix 2
Notes on Nationally Scarce and Red Data Book species recorded in 2007

Agallia brachyptera **(Cicadellidae)**
Nationally Scarce category B
A small leafhopper, short-winged and flightless, found amongst grassy vegetation of low to moderate length in calcareous grasslands, grazed and mown fen, disused mineral workings and other unshaded sites with open-structured vegetation. The foodplants are unknown. In mainland Europe, nymphs have been observed to feed on a range of common herbaceous plants, and the British habitat range suggests polyphagy. The distribution is somewhat unusual. It is absent from the extreme south-east, but has been recorded from a broad band of counties from Dorset and Wiltshire through central southern and midland counties to Yorkshire and Northumberland, and extending east into Suffolk.

Catapion pubescens **(Coleoptera, Apionidae)**
Nationally Scarce category B
A small seed weevil whose larvae develop in stem-galls in small, yellow-flowered species of *Trifolium*. It is recorded from grassland, dunes, and other open habitats. It is widespread but very local in England and Wales, but there are no confirmed records from Scotland.

Chaetarthria seminulum **(Coleoptera, Hydrophilidae)**
IUCN Lower Risk (Nationally Scarce list B)
Formerly Nationally Scarce category B
C. seminulum lives in shallow water with sand, mud or moss. Thus it may be found in cliff face seepages, on muddy banks of streams and in moss carpets in basin mires and in mesotrophic and base-rich valley mires. It is usually associated with exposed conditions in lowlands. It is often caught in pitfall traps in wet areas but is not easily taken with the pond net, being most easily detected when it floats to the surface after disturbance. Adults are regarded as nocturnal, staying in their burrows during the day. The bimodal occurrence of adults, with the main peak in April/May, indicates overwintering as adults which breed in the spring. There are recent records for South and North Somerset, East Sussex, East Kent, East Suffolk, East and West Norfolk, Northamptonshire, East and West Gloucester, Carmarthen, Pembroke, Cardigan, Merioneth, Anglesey, Leicestershire, Derbyshire, Mid-west Yorkshire, Westmorland, Cumberland, Kirkcudbrightshire, Dumfriesshire, Berwickshire, Midlothian, Stirlingshire, Forfar, East Inverness, West Sutherland, Shetlands Islands, Skomer, Islay, Raasay, Rum, Muck, and South Uist. This species cannot be considered under threat as it is widely distributed and occupies a wide range of macrohabitats. A second species of *Chaetarthria*, previously confused with *seminulum*, has recently been recognised in Britain, and the status of each of the two species is uncertain.

Grypus equiseti **(Coleoptera, Curculionidae)**
Nationally Scarce category B
A predominantly black, brown and cream weevil which feeds on horsetails *Equisetum* spp. Most records are from field horsetail *E. arvense* or marsh horsetail *E. palustre*, but this may reflect no more than the relative abundance of these hostplants. It is recorded from almost as wide a habitat range as its host plants, including dry and wet grassland, field margins, marsh and other open wetland, and carr. Substantial populations seem to occur most often in damp habitats, and it appears to be tolerant of occasional or seasonal flooding. It is a widely distributed species, occurring through much of England, Wales and Scotland, and though generally local appears relatively frequent in some districts.

Gymnetron veronicae **(Coleoptera, Curculionidae)**
Nationally Scarce category B
A small weevil which feeds on several species of wetland speedwell, but especially brooklime *Veronica beccabunga*, and is also occasionally recorded from figwort *Scrophularia* sp. Larvae feed in galls on flowers and flowerheads. It can occur in a wide range of wetlands, including the margins of streams, ponds and ditches, and in wet grassland. It is widely distributed but local in England, and has also been recorded from Wales and south-west Scotland.

***Hippodamia variegata* (Coleoptera, Coccinellidae)**
Nationally Scarce category B
Adonis' ladybird. A distinctively marked red, black and white ladybird found in low open-structured vegetation on dry ground. It has been recorded from heathland, dry grassland, parkland, sand dunes, riverbanks, ruderal vegetation in mineral workings, and derelict and setaside arable land. It is widespread but local in southern and eastern England, much more local further north and west, recorded from south Wales but not known from Scotland. Though in the past especially associated with coastal sites, there are many inland records and it appears to be increasing inland, especially in post-industrial sites. The Nationally Scarce status currently applied to this species cannot be justified.

***Hydraena testacea* (Coleoptera, Hydraenidae)**
IUCN Lower Risk (Nationally Scarce list B)
Formerly Nationally Scarce category B
This species is found in stagnant water in association with a well-developed marginal vegetation line, but it also occurs in slow-moving water in canals and streams, being found in the moist zone just above the main water line. The seasonal occurrence of adults is strongly bimodal, with peaks in June and September. There are recent published records for East Cornwall, North Somerset, West and East Sussex, East and West Kent, Surrey, East Suffolk, East and West Norfolk, Huntingdonshire, Northamptonshire, East Gloucester, Monmouth, Pembroke, Leicestershire, Derbyshire, South-west Yorkshire, Westmorland, and Ayrshire. Despite some evidence of contraction in range, this species is not under threat.

***Hydroglyphus geminus* (Coleoptera, Dytiscidae)**
IUCN Lower Risk (Nationally Scarce list B)
Formerly Nationally Scarce category B
This species is most characteristic of recently created still water sites with a clay or mud substratum, but it is also typical of the shallow rhyne systems of the Somerset Levels, and will occur amongst shallowly flooded moss. It is often recorded in flight and can occur in atypical sites in years of abundance. There are recent published records for North Somerset, South Wiltshire, Dorset, North Hampshire, East Sussex, East and West Kent, Berkshire, Huntingdonshire, Northamptonshire, East Gloucester, Monmouth, Warwickshire, Glamorgan, Radnor, Leicestershire, and Derbyshire. The northernmost record is for Gosforth, South Northumberland, where the species no longer occurs despite an abundance of apparently suitable habitats provided by subsidence ponds. Dispersal in hot summers accounts for the widespread occurrence of this species. It is not under threat, but its British population probably contracts to pockets in southern England when there is a succession of severe winters.

***Limnebius nitidus* (Coleoptera, Hydraenidae)**
IUCN Lower Risk (Nationally Scarce list B)
Formerly Nationally Scarce category B
L. nitidus lives on moist clay or silt beds at the edges of ponds, ditches, slow streams, canals and rivers. In the west of Scotland, it appears to be narrowly confined to the coast, occurring in small streams and in small springfed mires. There are recent published records for South and North Somerset, South Wiltshire, East Sussex, East and West Kent, Surrey, East Suffolk, Huntingdonshire, Monmouth, Leicestershire, Derbyshire, South-west Yorkshire, Durham, Cumberland, South and North Northumberland. There is evidence of decline in west Wales and south-west England. *L. nitidus* cannot be considered under threat.

***Lipara rufitarsis* (Diptera, Chloropidae)**
Nationally Scarce
A rather undistinguished, fairly small brownish fly whose larvae develop in “cigar galls” on the stems of common reed *Phragmites australis*, usually where there are substantial stands of the host plant. It is a local species, but widely distributed in southern England, mostly south of the Wash-Bristol Channel line.

***Microplontus campestris* (Coleoptera, Curculionidae)**
Nationally Scarce category B
A small patterned weevil which feeds on ox-eye daisy *Leucanthemum vulgare*, growing in grassland, disturbed ground and field margins. Though widespread in England and recorded from parts of Wales, this is a local species. It seems likely, however, that its current status over-estimates its rarity.

***Notaris scirpi* (Coleoptera, Curculionidae)**
Nationally Scarce category B
A weevil of wetlands, found in fens, marshes and at pond and ditch margins. It is phytophagous and has been found in association with greater bulrush *Typha latifolia* and lesser pond-sedge *Carex acutiformis*, though it may well have other foodplants. It is widely distributed, but local, in England and Wales.

***Oxycera morrisii* (Diptera, Stratiomyidae)**
Nationally Scarce
A small and predominantly black soldier fly whose larvae develop in wet soil, moss etc., in wetland situations including seepages and marshes. It can occur quite commonly in recently-created habitats, is apparently able to colonise such sites over a considerable distance, and may be adapted to pioneer conditions on wet soils and seepages. It occurs quite regularly in disused quarries and gravel pits, as well as in older habitats such as seepages on soft-rock coastal cliffs. It can sometimes be common in such situations. It also occurs, usually in smaller numbers, in more heavily vegetated habitats, including ditches with shallow water. *O. morrisii* is widespread in lowland areas of England and Wales, and has been recorded from south-west Scotland.

***Oxycera pardalina* (Diptera, Stratiomyidae)**
Nationally Scarce
A fairly small black soldier fly with white markings, prominent in the female. Larvae typically develop in wet moss by calcareous springs and small streams in hilly country, in places sheltered by scrub or woodland. However, it is also found by springs in open grassland, at seepages on coastal soft-rock cliffs, and in seepages and spring-fed trickles with little vegetation in marshes. This species is most frequent in parts of northern England, but also occurs locally in Wales and elsewhere in England, predominantly in western counties. The range extends to northern Scotland, but Scottish records are few.

***Oxycera pygmaea* (Diptera, Stratiomyidae)**
Nationally Scarce
A small black and yellow soldier fly whose larvae develop in saturated moss and sediments in seepages and beside small trickles with base-rich water. Typical habitats have small seepages with short or sparse vegetation in open situations, such as seepage-fed fen on hillsides, or coastal landslips. Though particularly frequent in chalk and limestone districts, it can be found on a much wider range of rocks, including basalt and other basic igneous rocks. This is a widespread species, with scattered records across much of England, Wales and Scotland, but is very local throughout its range. It may be to some extent overlooked, since it is small and unobtrusive, but is certainly scarcer than some other species of similar size and habits found in the same habitats.

***Psacadina verbeckei* (Diptera, Sciomyzidae)**
Nationally Scarce
A snail-killing fly found in a wide variety of wetlands, including fens, damp heaths, riversides and dune slacks. The larvae are parasitoids of aquatic snails, probably at water margins. It is widespread in England as far north as the Humber, and there are scattered records throughout Wales.

***Rhantus suturalis* (Coleoptera, Dytiscidae)**
IUCN Lower Risk (Nationally Scarce list B)
Formerly Nationally Scarce category B
R. suturalis occurs in exposed lowland ponds and ditches amongst vegetation. It overwinters as an adult.. The development time of 33 days at ca 20ºC from egg laying to adult eclosion is short compared to 52 days for the common *Agabus bipustulatus* under similar conditions. This species is often attracted to light at night and readily takes to flight. Creation of new ponds will be beneficial to this species. Recent published records are for South and North Somerset, Dorset, East Sussex, East and West Kent, Hertfordshire, East and West Norfolk, Huntingdonshire, Northamptonshire, Monmouth, Leicestershire, Derbyshire, Cheshire, Durham, and South Northumberland.

***Stratiomys potamida* (Diptera, Stratiomyidae)**
Nationally Scarce
A large yellow and black soldier fly, the adults of which often sit conspicuously on umbellifer flowers. The larvae are amphibious, living mainly in shaded seepages at stream margins, in woods and on valley

sides, and also in heavily vegetated ponds and ditches. This is a widely distributed species in England and Wales, but is most frequent in the south-east. It has increased considerably in frequency in recent years.

***Stictopleurus punctatonervosus* (Hemiptera, Rhopalidae)**
Extinct
A glazier bug, which feeds on composites growing in at least moderately tall but open-structured vegetation on well-drained soils. The official status is no longer appropriate. Though seemingly established in southern England in the past this species almost certainly became extinct as a British species in the nineteenth century. It has re-colonised in recent years, however, and over the past decade has become widely distributed and reasonably frequent in south-eastern England north to Peterborough, occurring especially in brownfield sites and fallow arable land.

***Tetanocera punctifrons* (Diptera, Sciomyzidae)**
Nationally Scarce
A moderately-sized orange-brown snail-killing fly found in a range of wetlands, including damp woodland, damp heathland, coastal marshes and riversides. Larvae are believed to be predators or parasitoids of gastropod molluscs, in common with related species, but the preferred species are not known, nor is it certain whether they are aquatic or terrestrial species. The British range is wide, including England, Scotland and Wales and extending from southern coastal counties to Elgin, but records are quite widely scattered. The reasons for this apparently very localised distribution are not clear.

***Thrypticus nigricauda* (Diptera, Dolichopodidae)**
IUCN Lower Risk (Nationally Scarce)
A small shining green fly whose larvae mine leaves and stems of monocotyledonous plants. It is known from a range of wetlands, including fens, coastal marshes, and the margins of lakes, ponds and rivers. It is a southern species, the recorded distribution extending north to Anglesey, Northamptonshire and Cambridgeshire.

***Trigonocranus emmeae* (Hemiptera, Cixiidae)**
Nationally Scarce category B
A small planthopper found on dry sparsely vegetated ground. The nymphs are subterranean, probably feeding on plant roots, and it is possible that adults, too, spend a substantial amount of time at ground level or in the surface layers of the soil. This is a very poorly known species. It was not added to the British list until 1964, though specimens have since been found dating back to 1925. Records are widely scattered in Britain, as they are in the rest of the species' European range. They known British range extends from Kent to Lancashire and Yorkshire, and west to the Welsh coast: it is apparently unrecorded from the south-west of England, but this may well represent under-recording rather than genuine absence. It has been found on limestone pavement, a coastal cliff, a disused railway line, quarries, coastal shingle and dry well-drained grassland on gravelly soil. Most records are from chalk or limestone areas. The extent of under-recording is difficult to estimate, but the few and widely spaced records of what is a reasonably distinctive insect suggest that it is genuinely scarce.

***Vanoyia tenuicornis* (Diptera, Stratiomyidae)**
Nationally Scarce
A small black and yellow soldierfly whose larvae develop amongst moss and decaying vegetation at water margins or on wet ground with water films, and recorded from seepages, fens, wet meadows, pond and ditch margins. It is found mainly in the lowlands of southern England and Wales, occurring north to south Yorkshire.