

PLANNING ACT 2008

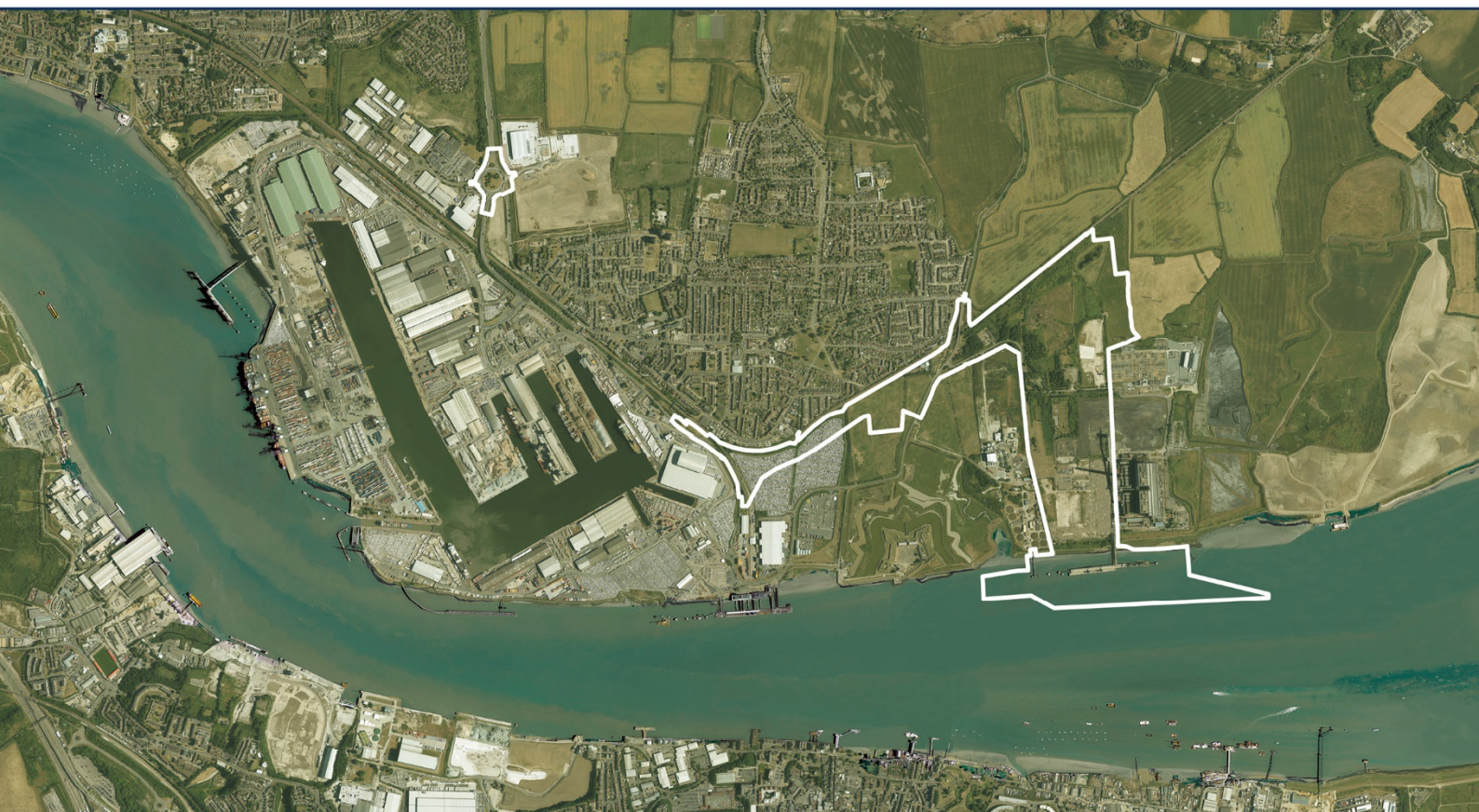
INFRASTRUCTURE PLANNING
(APPLICATIONS: PRESCRIBED FORMS AND PROCEDURE) REGULATIONS 2009

PROPOSED PORT TERMINAL AT
FORMER TILBURY POWER STATION

TILBURY2

TILBURY POWER STATION ESSEX, INVERTEBRATE SURVEY
REPORT (JUNE 2008). REPORT BY COLIN PLANT ASSOCIATES
(UK)

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Commissioned by
Bioscan (UK) Ltd
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TILBURY POWER STATION, ESSEX

INVERTEBRATE SURVEY

FINAL REPORT (incorporating analysis of aquatic assemblage)

JUNE 2008

Report number
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1 INTRODUCTION AND SCOPE OF THE SURVEY

1.1 Introduction

1.1.1 **Colin Plant Associates (UK)** were commissioned by **Bioscan (UK) Ltd** on behalf of RWE npower to undertake an assessment of invertebrate species at Tilbury Power Station between May and October 2007 inclusive. This document is the final report of that survey.

1.2 Terrestrial Invertebrate Survey methodology

1.2.1 The minimum survey effort recommended by Brooks (Brooks, 1993. 'Guidelines for invertebrate site surveys'. *British Wildlife* 4: 283-286) was taken as a basic requirement for the present survey. Daytime sampling of terrestrial invertebrate species was undertaken in all areas by direct observation, by sweep netting and by using a beating tray. In addition, a suction sampler was deployed and a number of pitfall and pan traps were set.

1.2.2 **Sweep-netting.** A stout hand-held net is moved vigorously through vegetation to dislodge resting insects. The technique may be used semi-quantitatively by timing the number of sweeps through vegetation of a similar type and counting selected groups of species. This technique is effective for many invertebrates, including several beetle families, most plant bug groups and a large number of other insects that live in vegetation of this type. However, it does not sample invertebrates that are confined to lower levels such as the litter layer, which were looked for by hand-searching and sieving litter over a white sheet.

1.2.3 **Beating trees and bushes.** A cloth tray, held on a folding frame, is positioned below branches of trees or bushes and these are sharply tapped with a stick to dislodge insects. Black or white trays are used depending upon which group of invertebrates has been targeted for search. Insects are collected from the tray using a pooter. This technique is effective in obtaining records of most arboreal species, including many beetle groups, bugs, caterpillars of Lepidoptera, spiders and others. It can be undertaken at any site where there are trees or bushes present although is rendered ineffective if the vegetation is wet or if the weather is windy.

1.2.4 **Pitfall trapping.** Vending-machine cups or similar are placed in the ground with the rim flush with, or slightly below, the surface. A fluid is added, containing ethylene glycol, sodium chloride and formalin with a little detergent to reduce surface tension. Traps may be covered or uncovered and are typically left in position for a month at a time. Holes made in the sides of the cups a couple of centimetres below the rim permit flood or rain water to drain without the traps over-flowing and the catch becoming lost. Invertebrates simply fall into the traps. Traps are typically set in pairs or in groups of three (at the points of an equilateral triangle, usually with a side of 1 metre) and may be positioned along a fixed transect to permit repetition. This is the single most effective means of recording ground beetles (Carabidae) but is also effective for rove beetles (Staphylinidae), some other beetle groups, spiders and most non-insect soil-dwelling arthropods. Unlike pan traps, pitfall traps can be left *in situ* for a couple of weeks before they need to be examined.

1.2.5 **Pan traps** are often also referred to as water traps. They consist of shallow (plastic) trays of liquid, which are placed either on the ground or in an elevated position. Insects are attracted to the traps and fall into the fluid. Most effective are yellow traps with white a close second. Most other colours do not work well. The fluid may be water, with a drop of detergent to reduce surface tension, if the traps are to be inspected within a couple of days. Alternatively formaldehyde solution, isopropyl alcohol or other fluids may be preferred if the traps are visited less frequently. These traps are extremely effective in collecting samples of solitary bees, solitary wasps, spider-hunting wasps, some beetles (especially Chrysomelidae and Cerambycidae), some spiders, hoverflies and other groups but work best when the sun is shining. Unfortunately, trapped material decomposes rapidly and so these traps need to be examined within a few days of being set.

1.2.6 **Suction Sampling** consists of using a converted leaf blower to collect samples from grass and other longer ground vegetation. The sample is then everted into a net bag and the invertebrates removed with a pooter. The advantage of suction sampling is that it catches species which do not fly readily or which live in deep vegetation. It is particularly productive for Coleoptera, some Diptera and Arachnida.

1.3 Aquatic survey methodology

1.3.1 Aquatic invertebrates were sampled using a standard pond net (GB Nets) with a mesh diameter of 0.5 millimetres. The net is initially moved through underwater habitats in much the same way as a sweep net is used on terrestrial vegetation. However, progress through dense submerged or emergent plants can be slow and so it is necessary to return the net several times through the swirl of water created so that invertebrates that were dislodged but not netted may now be captured.

1.3.2 Sampling also requires the net to be moved through the surface layers of the substrate, because several species of invertebrate reside in this physical zone.

1.3.3 In addition, samples of submerged vegetation were extracted using the net as a dredge and examined for invertebrates.

1.3.4 Net and dredge samples are initially tipped onto a white plastic sheet on the bankside and invertebrates are collected directly to a preservative solution using soft-bladed forceps. After approximately 30 minutes searching each sample was then bagged and returned for further sorting in the laboratory.

1.3.5 Laboratory sorting involves partially compacting the netted debris and leaving it to drain on a specially constructed platform with a raised centre and “gutters” on all four sides. The sample/platform is covered and over a period of several hours invertebrates crawl out of the debris and slide down to the water-filled gutters where they may be seen and collected.

1.4 Quality Assurance and acknowledgements

1.4.1 Three surveyors undertook the field surveys for this project. All three are experienced entomologists and each has a different area of specialist expertise; this has ensured that a fully representative cross-section of the invertebrate fauna has been sampled without any particular taxonomic bias.

1.4.2 The field surveyors were:

- Colin W. Plant (Senior Partner, Colin Plant Associates)
- Mr Peter Harvey (Associate)
- Mr Marcel Ashby (Associate)

1.4.3 Identification of most material was performed ‘in-house’ by Colin Plant Associates (UK) personnel. In addition, we employed the services of the following external experts for assistance in identifying some material collected during this survey:

Andrew Halstead	Senior Entomologist, Royal Horticultural Society	sawflies
Peter Hammond	Curator of beetles (retired) Natural History Museum	beetles
Norman Heal	Independent referee for weevils Maidstone	beetles
Peter Kirby	National authority on Hemiptera Peterborough	froghoppers and plant bugs
Del Smith	Essex Diptera Recorder	flies

Aberdeen

(other than Syrphidae)

- 1.4.4 Voucher specimens have been retained for all ‘critical’ species and may be viewed on our premises by reasonable appointment. We will retain these specimens for a minimum of one year.

2 RECORDING COMPARTMENTS

- 2.1 We have segregated species data into 17 recording compartments, which are illustrated at Figure 1 and described, in terms of their ecological characteristics, below.

Compartment 1. Mown grassland west of Energy and Environment Centre

This is an area of regularly mown grassland, but the grassland in the immediate vicinity of the traps was, by arrangement, left unmown during the survey to protect our pitfall traps and pan traps from damage.

Despite not presenting a particularly interesting invertebrate habitat, this lawn area turned up several rare species, including the rove beetle *Tachyporus scitulus* (in number, and for the first time in Essex), the tumbling flower beetle *Modellistena parvula* and the Scarce leaf beetle *Chrysolina marginata*, only the third modern county record.

Compartment 2. Energy and Environment Centre land and garden

This area is mostly dry grassland developed on sandy substrate, with areas of lichen heath. Some parts show a calcareous influence, perhaps from the concrete component of former building foundations. This is high quality habitat that supports many invertebrate species. The nationally rare beetle *Caenocara bovista*, associated with puffball fungi, was taken here in some numbers, the first modern record for Essex. The nationally vulnerable weevil *Glocianus pilosellus* was also found in this area.

At the northern end there is an area of vegetation that has become established on a PFA substrate; a bank here provides important ground nesting habitat for solitary bees and a sheltered area backed by *Populus* trees with sparse vegetation on sand and gravel with some drought stressed scrub and an area of gorse at the eastern end supports a wide range of thermophilic invertebrates.

Compartment 3. Lapwing Field

This is an area of sparsely-vegetated friable substrate with a raised disused railway siding on the eastern side. Lapwings were frequently seen and probably nest here – hence our unofficial name for this compartment. There is an abundance of Narrow-leaved Ragwort *Senecio inaequidens* and along the eastern edge a large amount of *Lotus glaber*, an important forage resource for workers of the UK Biodiversity Action Plan bumblebees *Bombus humilis* and *Bombus sylvarum*.

The area supports an extremely diverse invertebrate fauna, including several species not found elsewhere, such as the flea beetles *Longitarsus ochroleucus* and *Longitarsus fowleri*.

Compartment 4. The Lytag Site

The Lytag site was identified as a Local (County) Wildlife Site in a Thurrock review undertaken in 2006 on the basis of its acid grassland and reptile populations. It has now been shown to support an extraordinarily valuable habitat mosaic and associated invertebrate fauna. Component parts of this mosaic include:

Lichen heath area

One of the most important habitats at the Lytag site is the large area of lichen heath which has developed on the Lytag substrate. This habitat supports a variety of invertebrate species more usually associated with heathland, dry grassland and calcicolous grassland, and has developed over a substantial time period. These habitats also contain plants usually associated with calcicolous conditions, such as Common Centaury *Centaureum erythraea* and Yellow-wort *Blackstonia perfoliata*.

'Steppe'-like areas

Immediately to the south of a dry ditch crossing the site is a steppe-like area of clinker, providing another valuable habitat at the site. This is typical habitat for various scarce jumping spiders such as *Bianor aurocinctus* and *Talavera aequipes*, and was the location for the Scarce ground beetle *Notiophilus quadripunctatus*, the first definite Essex record since 1964.

Seasonally wet and saline areas

The Lytag site contains a number of seasonally wet lower areas, mostly in the northern part of the site, where in the north east corner, to the west of the PFA bund, they are clearly saline, with *Salicornia* and other salt-tolerant species. This is an important habitat for a variety of invertebrates such as the ground beetle *Dicheirotrichus obsoletus* and *Scybalicus oblongiusculus*.

Taller grassland and *Lotus* areas

There are extensive areas of taller grassland with abundant areas of Narrow-leaved Bird's-foot trefoil *Lotus glaber* to the north of the dry ditch dividing the Lytag site into north and south sections, as well as some Common Bird's-foot Trefoil *L. corniculatus* near and within the remains of foundations towards the western side of the site. Together with Red Bartsia *Odontites verna*, present at the north-eastern part of the site near the PFA bund, and Black Horehound *Ballota nigra*, present in small quantity near the entrance bund, these provide crucial forage for workers of the two UKBAP bumblebees *Bombus sylvarum* and *B. humilis*, both present in some numbers at the site. The taller open flower rich grassland areas within the area developed on Lytag substrate, as well as the taller remnant grazing marsh grasslands to the north and west of the Lytag, also provide suitable nesting habitat for these bumblebees.

Old foundation area

On the western side of the northern part of the site are the remains of old foundations. These are becoming vegetated and provide quite extensive areas of drought-stressed bramble, an important stem nesting resource for various species such as the Blue Carpenter Bee *Ceratina cyanea*, not recorded during this survey, but previously recorded in the vicinity of the Energy and Environment centre by Essex Ecology Services Ltd (EECOS — Tilbury Energy and Environment Centre. A terrestrial invertebrate survey. October 2000). There are extensive areas of *Lotus corniculatus* as well as a number of plants of Ploughman's Spikenard *Inula conyzae*, an Essex Red Data species. Areas of *Sedum album* probably provide valuable forage for various small mining bees.

Plantation areas

To the west and southwest of the Lytag site, on both sides of an old abandoned raised railway track, is an area that was identified as a SINC in a county site review undertaken over 12 years ago. When the Energy and Environment Centre at the power station was closely linked to the EWT, these areas were under their management, but this is no longer the case. In the past they have been planted with a variety of trees and have developed into a young plantation of very limited significance to invertebrates. These areas have been removed as part of the Local Wildlife Site in a review recently undertaken for Thurrock.

Compartment 4a. Lytag site – disused siding to the west

The disused railway siding immediately west of the Lytag site is an interesting habitat corridor, with dry grassland, sparsely vegetated areas and lichen heath. This is the only area where the Nationally Scarce ant *Myrmica schencki* was found in significant numbers.

Compartment 4b. Lytag site – northern grassland and scrub

Northern parts of the Lytag site, alongside the railway line, support a ranker, grassland habitat that is invaded by scrub to varying degrees. Though part of the Lytag site, we have maintained invertebrate records from here separately.

Compartment 4c. Lytag site – PFA embankments

A PFA bund runs north–south towards the eastern side of the Lytag site, divided into two sections and separated by an area of lichen heath. This provides a crucially important ground nesting habitat for aculeate Hymenoptera and other species such as the tiger beetle *Cicindela campestris*. For this reason, we have segregated the invertebrate species records.

Compartment 5. Field to east of main entrance alongside road

This is largely invaded by scrub vegetation and is more or less continuous with the northern scrub zone of the Lytag site. However, there are a few clear areas and in the early part of the survey a tethered horse was grazing (perhaps only temporarily so).

Compartment 6. Two small fields north of the railway line

These two fields lie one on each side of the road immediately north of the railway bridge. The western field is essentially a ruderal habitat with areas of scrub and this is reflected in a diverse invertebrate fauna entirely in keeping with expectations of a site of this nature in this geographical area. The eastern field was more open and was grazed by tethered horses for much of the year; it is perfect habitat for the Hornet Robber Fly (*Asilus crabroniformis*), a UK Biodiversity Action Plan species whose grubs prey on the larvae of dung beetles in horse manure. The insect is known to occur on other fields to the west of the present survey area (personal observations) and was recorded by CPA in recent years to the east at Goshem's Farm.

Compartment 7. Main ash field (south) – Area A2

This compartment was dominated by flower-rich herbaceous and tall ruderal vegetation with some areas of species-poor rough grassland to the east and centre, where the surface has a deeper covering of topsoil and an apparent higher nutrient status. In the first part of 2007 there were extensive areas of Wild Carrot (*Daucus carota*) and Narrow-leaved Bird's-foot Trefoil (*Lotus glaber*) at the southern end and in a very broad eastern band, with scattered plants elsewhere. There was also abundant Red Clover (*Trifolium pratense*) and White Clover (*Trifolium album*), Hawkweed Ox-tongue (*Picris hieracioides*), mayweeds, Goats-rue (*Galega officinalis*) and Fennel (*Foeniculum vulgare*) – all plants that have known associations with invertebrates.

On 16th August, topsoil was being placed on the surface of the ground adjacent to the southern end of Compartment 8; by 12th September the whole area had been levelled and no vegetation remained except along the edge. This has completely eliminated the invertebrate interest of this compartment, at least in the short term, and accordingly the data for this area are to be regarded as historical.

Compartment 8. Main ash field north – Area A3

This compartment is continuous with Compartment 7 and consists of tall flower-rich, herbaceous vegetation interspersed with smaller, sparsely-vegetated areas. The considerable diversity within the flora provides flowers, and hence pollen and nectar as a food source for invertebrates, throughout the year from spring to autumn. Yellow-flowering Cruciferae dominate and are joined by various yellow Asteraceae, areas of White and Red Clover, Goats-rue, large patches of Fodder Vetch (*Vicia villosa*), smaller areas dominated by Wild Parsnip, Ox-eye Daisy (*Leucanthemum vulgare*) and scattered mallows, buttercups and Grass Vetchling (*Lathyrus nissolia*).

Compartment 9. “Farmer’s Field”

This area, to the west of the ash disposal site, is ungrazed, species-poor, tall grassland, bounded by a ditch (compartment 15) on the western side. It is probably former grazing marsh grassland, but its low floral diversity renders it of low current invertebrate value and we found little of interest here. The only point of interest is the presence of Hoary Ragwort, a plant of older grasslands that provides a source of food for bees and solitary wasps later in the season. A limited area of herb-rich vegetation, dominated by Wild Carrot and Narrow-leaved Bird’s-foot Trefoil, at the south-eastern part of the site, to the south of small building, was stripped of vegetation during August 2007.

Compartment 10. Eastern ash field (Area B) (west of track)

The western and southern parts of ash disposal area B are, in general, bare or sparsely-vegetated and derived from recent disturbance; the youth of the habitat is reflected in its less diverse, though nevertheless extremely significant invertebrate fauna. Pitfall and pan traps were set in this area.

Compartment 11. Eastern ash field (Area B) (east of track)

The main eastern block of the ash disposal area B is evidently older, with better developed and taller herbaceous vegetation across the bulk of its area. It is generally similar to Compartment 8, but is floristically less diverse and with areas dominated by Spear Thistle (*Cirsium vulgare*) and Common Ragwort (*Senecio jacobaea*) and several large patches of Narrow-leaved Bird’s-foot Trefoil.

Compartment 12. Saltmarsh area

The saltmarsh adjoining the Thames to the south of the power station is a part of a nationally valuable coastal habitat continuum, which in the Thames Estuary area supports a large number of nationally rare and scarce species. Of particular interest from the power station saltmarsh was the nationally rare Green Malachite Beetle *Malachius vulneratus*, which is confined to the saltmarshes around the Thames estuary and Essex. A picture winged fly belonging to the genus *Melieria* collected during this survey does not adequately match known British species and its identity currently remains uncertain.

Compartment 13. Scirpus ditch and adjacent saline area (extreme east of site)

At the eastern boundary of ash disposal area B the PFA bank drops down to an old track and saline ditch on the original marshland levels. Here there are areas of Sea Aster which support foraging adults of the mining bees *Colletes halophilus* – a UK Biodiversity Action Plan species of which Britain has internationally important populations, all concentrated on east coast and in the tidal Thames area. Movements of adult bees suggest that they are likely to nest in the PFA banks of the Ashfields, though we have as yet not located the specific nesting area.

Adjacent to the saline *Scirpus* ditch is an old track with bare mud and Sea Aster. Here, another UK Biodiversity Action Plan species, the ground beetle *Anisodactylus poeciloides*, was found together with *Dyschirius chalceus*, a ground beetle recently recognised as a new British species.

Compartment 14. Entrance ditch

Entering the power station site the access road makes a sharp left turn and then runs parallel to a drainage ditch on its south side. The drainage ditch itself rests at the base of a rather deep cutting with steep and well-vegetated sides; the whole is crossed by the entrance track to the sewage works.

The terrestrial habitats on the embankment provide micro-climate control whilst the wet ditch is dominated by abundant emergent vegetation and supports a population of invertebrates including the nationally vulnerable Scarce Emerald Damselfly and several rare water beetles.

We expect this ditch to support populations of the nationally rare hoverfly *Lejops vittata*; our failure to encounter it during 2007 may reflect an absence, but is far more likely to reflect the poor 2007 weather conditions during the critical period of the calendar (June and July) when the adults fly.

Compartment 15. National Grid ditch (west edge of Farmer's Field)

This ditch separates the National Grid site from the Farmer's Field and is essentially choked with emergent reeds for its entire length and this provides ideal habitat for the Scarce Emerald Damselfly, which breeds here. The ditch also supports a wide range of invertebrate species characteristic of the coastal grazing marsh habitat that formerly occupied site before the first power station was constructed during the 1950's; these are characterised by the rich assemblage of water beetles, which include the nationally rare *Graptodytes bilineatus* and a number of other rare and scarce species with known coastal grazing marsh associations.

Compartment 16 Security Lodge insect trap

At the start of the survey, we collected the contents of the 'insect-o-cutor' trap inside the security gatehouse; this contained material that had accumulated over a period of several months and not all was identifiable. However, the gatehouse is well away from the margin of the surveyed area and so the trap contents must have come from the site. The sample included two examples of the horsefly *Hybomitra ciuriae* – a Red Data Book species known from coastal marshes but not found by any other method during the present survey.

Compartment 17. Remainder of the site

A self-explanatory categorisation, which includes the operational area (not specifically surveyed) and a very few historical records. The latter includes a report of the Hornet Robber-fly (*Asilus crabroniformis*) which is reported from an unknown part of the site in an earlier survey (EECOS 2000) and which is known to be present in the general area both to the west and to the east of the power station site. This species has two centres of population in the UK – in South Wales and on the Essex side of the Thames Estuary. It is known to be resident in the horse-grazed fields to the west of the power station site.

3 RECORDED INVERTEBRATE SPECIES

3.1 Summary

3.1.1 A total of 1445 species of terrestrial invertebrate were recorded during the survey. These comprise:

spiders and other arachnids	Arachnida	132 species
Bees, ants and solitary wasps etc	Aculeate Hymenoptera	177 species
Beetles	Coleoptera	466 species
Flies	Diptera	297 species
Butterflies and moths	Lepidoptera	182 species
Plant bugs	Hemiptera	124 species
Other insect groups	others	67 species

3.1.2 The list is presented as Appendix 1, and is annotated with National Status Codes (see Appendix 2 for explanation of terms) and with an indication of which recording compartment(s) produced each species.

3.2 Conservation status of recorded species

3.2.1 Several categories of invertebrates are of raised significance in an ecological assessment. These categories are now examined.

3.2.2 Specially Protected species

No invertebrate species that are afforded specific protection under any UK or European legislation were encountered during the survey.

3.2.3 Biodiversity Action Plan species (including species with attendant legal obligations)

Nine of the species recorded during the present survey are UK Biodiversity Action Plan species (UK Biodiversity Group, 1999). Five of these species (*Bombus humilis*, *B. sylvarum*, *Cerceris quadricincta*, *C. quinquefasciata* and *Anisodactylus poeciloides*) are also listed by the Government as of 'principal importance' to meeting the 'duty' to conserve biodiversity enshrined in the Countryside and Rights of Way Act 2000 (section 74) and the Natural Environment and Rural Communities Act 2006 (section 40). The hornet robber fly *Asilus crabroniformis*, reliably recorded from the site in the past and assumed to still be present, is also a species of 'principal importance'.

The ground beetle *Anisodactylus poeciloides* is about one centimetre in length and is generally green or brassy in colouration. Although it has a number of highly distinctive anatomical features, in the field it may easily be confused with other, much commoner, ground beetles of similar colour, such as *Harpalus affinis* or *Pterostichus cupreus*.

Objectives of the Biodiversity Action Plan for this species include the maintenance and enhancement of populations at all known sites. Proposed actions include ensuring that all occupied habitat is appropriately managed by 2008, through SSSI or agri-environment scheme management agreements, and that the habitat requirements of *Anisodactylus poeciloides* are taken into account in relevant development policies, plans and proposals.

The recently published Atlas of British ground beetles (Luff, 1998) gives post-1969 records for *A. poeciloides* for only three 10-km squares, all in North Kent. However, recent field surveys have shown this species to be present in a wider range of Thames-side localities in Kent and Essex. Although reputedly a denizen of salt-marshes *A. poeciloides* seems, in fact, to be more of a grassland and saltpan species. It is rarely found in saltmarshes proper, and apparently avoids exposure to tidal conditions. It seems to use both areas of relatively open and saline terrain and denser adjacent vegetation where the soil may not be at all saline. These conditions may be found, for example, in the vicinity of a saline or brackish pool or borrowdyke that has gently sloping edges as these dry out.

Asilus crabroniformis is a large and very striking, black and yellow fly about an inch long and in addition to being a UK BAP Priority species is also a Priority Species within the Thurrock Biodiversity Action Plan. Known as the Hornet Robber fly it takes that name partly from its physical similarity to a hornet and from its habit of ambushing passing grasshoppers, beetles, wasps and other large insect prey. Its own larvae are predatory on the larvae of dung beetles within the droppings of herbivores – especially horses, but also sheep, cattle and rabbits. Dung deposits with a ‘crust’ are usually selected as egg-laying sites.

This fly is now restricted to very few sites in South Wales, southern England and the Thames-side grazing marshes of South Essex, the latter representing the last remaining outpost of a formerly widespread East Anglian population. The advent of avermectins to treat internal parasites of cattle and horses has resulted in many cases in the creation of dung that is poisonous to both the fly and its dung beetle prey.

Bombus humilis This bumblebee is a national BAP species on the basis of major declines across Britain, especially inland. The East Thames Corridor region currently supports one of the most important remaining metapopulations in the UK, but many sites are already lost or under direct threat of development. It is considered Vulnerable in the county. Bumblebee populations appear to operate at a landscape scale and it is probable that viable individual populations require minimum ranges of between ten to twenty square kilometres of good matrix habitat within farmland.

Forage species need to be considered separately for queens and workers. The queens require nectar resources early in the season after their long winter hibernation to build up their reserves. They then need pollen resources for stocking cells in newly established nests to enable the first workers to develop. Workers also require nectar and pollen resources both for their own sustenance and to stock the developing nest. It appears that areas of fairly tall, open flower-rich grasslands providing areas of abundant forage are required to support populations of *Bombus humilis*, but it is more able to utilise suitable small areas within a landscape than Shril Carder Bee, another bumblebee with a nationally important metapopulation in the region. Observations suggest that large patches of flowers are used more frequently and are much more important than widely distributed resources. Observations also indicate that the availability of suitable forage (nectar and pollen) sources throughout the whole season from May to September is crucial. These resources need to be provided by an abundance of specific key forage sources, all of which significantly have very long flowering seasons as well as long corolla tubes which correspond to the long tongues of the bumblebees. Important plant species used in early summer by queens include Fodder Vetch, Red Clover and Broad-leaved Everlasting-pea *Lathyrus latifolius*. Workers forage on the flowers of species such as bird’s-foot trefoils *Lotus* spp., clovers, Black Horehound *Ballota nigra*, Lucerne *Medicago sativa* and Red Bartsia *Odontites verna*.

The UK Action Plan for the Brown-banded Carder Bee *Bombus humilis* states “Where possible ensure that all occupied and nearby potential habitat is appropriately managed by 2008, for example through SSSI or agri-environment scheme management agreements” and “Ensure that the habitat requirements of the species are taken into account in relevant development policies, plans and proposals.”

Bombus ruderarius is a nationally declining species which until quite recently was considered to be widespread but local in Essex. However current evidence suggests a drastic decline has occurred, with sites where the bumblebee used to occur in numbers a few years ago now apparently without populations. Like other declining bumblebees, the species requires extensive areas which support a variety of flowering plants, especially Fabaceae and Lamiaceae, and it is essential that suitable forage resources are available throughout the flight period of the colony. The nest is constructed of grass clippings and moss on or just above the ground among long vegetation, often using an old mouse nest as a foundation.

Bombus sylvarum is a national and local BAP species on the basis of major declines across Britain, with only four or five remaining metapopulations in England and south Wales, and the East Thames Corridor region currently supports one of the most important remaining metapopulations in the UK. Bumblebee populations appear to operate at a landscape scale and it is probable that viable individual populations require minimum ranges of between ten to twenty square kilometres of good matrix habitat within farmland. *B. sylvarum* seems to require much larger areas of good habitat than Brown-banded Carder Bee *B. humilis*.

As above, forage species need to be considered separately for queens and workers. The queens require nectar resources early in the season after their long winter hibernation to build up their reserves. They then need pollen resources for stocking cells in newly established nests to enable the first workers to develop. Workers also require nectar and pollen resources both for their own sustenance and to stock the developing nest. It appears that large areas of fairly tall, open flower-rich grasslands providing areas of abundant forage are required to support populations of *Bombus sylvarum*. As with the Brown-banded Carder Bee observations suggest that large patches of flowers are used more frequently and are much more important than widely distributed resources. Observations also indicate that the availability of suitable forage (nectar and pollen) sources throughout the whole season from May to September is crucial. These resources need to be provided by an abundance of specific key forage sources, all of which significantly have very long flowering seasons as well as long corolla tubes which correspond to the long tongues of the bumblebees. Important plant species used in early summer by queens include Fodder Vetch, Red Clover and Broad-leaved Everlasting-pea. Workers forage on a more restricted range of flowers than the Brown-banded Carder Bee, and in south Essex species such as bird's-foot trefoils *Lotus* spp. (but especially *L. glaber*), Red Clover, Black Horehound and Red Bartsia are the main resources.

Odynerus melanocephalus has been widely recorded in southern England, but post-1970 records are mostly from the coasts of Dorset, Kent, the Isle of Wight and the East Thames Corridor. The species is a new UKBAP species, added in a recent review (UK Biodiversity Group June 2007). It is especially associated with grassland and scrub on light, clayish soils, and has been found on soft rock cliffs and inland on heaths and disturbed areas. Nest burrows, with the protruding chimney characteristic of *Odynerus* species, are dug in level, exposed soil. Although the 1991 status review suggests that the nest cells are stocked with small larvae of Lepidoptera or Coleoptera, autecological work undertaken by Steve Falk in 2005 has shown the wasp collects the larvae of the weevil *Hypera postica*, (although other species may also be involved) associated with Fabiaceae. In particular at the site investigated the wasps were found on large, sheltered patches Black Medick *Medicago lupulina* damaged by larvae of *Hypera postica*.

Cerceris quadricincta (4-banded Digger Wasp) is a medium-sized yellow and black wasp which nests gregariously in areas of bare sand or sand-clay substrates in places exposed to the sun. It provisions its nest with adult weevils. It is Endangered (RDB category 1) in Britain. This wasp has historically been recorded from the Colchester area in Essex and several locations in Kent. There are few post-1970 records, and post-1990 records from only three sites in the Colchester area. Liverpool Museum have supplied data from the Dicker collection which includes records of the wasp in Kent at Ramsgate in 1979, Grain in 1979, Swanscombe between 1977 and 1983 and Upnor between 1979 and 1984. Specimens from Upnor and Ramsgate have been examined and confirmed. The continuing occurrence of the wasp at the two sites at Upnor and Ramsgate has been established, but the Swanscombe and Grain sites have probably been lost to development. The current record is the first for South Essex.

Autecological work has shown that prey weevils consist of widespread and common species, but the wasp may be associated with habitats where these occur in abundance, such as sporadically disturbed land waste ground and flower-rich edge areas of heath and acid grassland. Nesting seems to require hot south-facing conditions, and it is likely that climatic factors and local aspect are important. However the extreme rarity of the wasp is not properly understood. The UK Biodiversity Action Plan for the 4-banded Tailed Digger Wasp states "Maintain populations at all known sites", "Enhance the population size at all known sites by 2010", "Restore populations to suitable sites to maintain 10 viable populations within the historic range by 2010". The plan also states "Consider notifying sites supporting viable populations of *Cerceris quadricincta* as SSSIs, where this is necessary to secure their long-term protection and appropriate management" and "Where possible, ensure that all occupied and nearby potential habitat is appropriately managed by 2008, for example through SSSI or agri-environment scheme management agreements"; "Ensure that habitat requirements of *Cerceris quadricincta* are taken into account in relevant development policies, plans and proposals".

Cerceris quinquefasciata (5-banded digger wasp) is a medium-sized yellow and black wasp which nests gregariously in areas of bare sand in places exposed to the sun. It provisions its nest with adult weevils, and may occur in numbers at favourable sites. It is a national Biodiversity Action Plan species currently subject to research into its autecology. It is included in English Nature's Species Recovery Program because of a severe decline in its modern distribution. This is thought to be due to the loss of open areas of sandy ground for nesting and flower-rich sandy grasslands for foraging. Although the wasp has historically been recorded from 49 ten km squares in southern and eastern England, it has been found in rather few ten km squares (now probably totalling 17) since 1980, largely in south-eastern England with one isolated occurrence in Oxfordshire.

The main national metapopulation currently appears to be in the East Thames Corridor, but there are indications that other important centres survive in the Colchester, Ipswich and Breck areas. Many or most sites where the wasp is currently known or has recently been recorded are threatened or have already been lost to development, including most of the sites in the East Thames Corridor and the Colchester and Ipswich area. It appears crucial to make serious attempts to safeguard these core areas of population. Although the wasp appears to collect common and widespread weevils as prey to provision its larvae, the species is associated with sporadically disturbed land (including brown field land and 'waste ground') and the relatively unmanaged parts of heath edge or other sandy habitats. The restricted distribution of the wasp is probably partly climatic, but also reliant on an abundant prey supply associated with grasslands and scrub containing a diverse flower-rich vegetation with areas of bare ground and uncut stems, seeds, flower heads and fruit heads that support the weevil prey species.

The UK Biodiversity Action Plan for the 5-banded Digger Wasp *Cerceris quinquefasciata* states “Consider notifying sites supporting viable populations of *Cerceris quinquefasciata* as SSSIs, where this is necessary to secure their long-term protection and appropriate management” and “Where possible, ensure that all occupied and nearby potential habitat is appropriately managed by 2008, for example through SSSI or agri-environment scheme management agreements”; “Ensure that habitat requirements of *Cerceris quinquefasciata* are taken into account in relevant development policies, plans and proposals”.

Colletes halophilus is an endemic species of mining bee the southern part of the North Sea area, confined to the coastlines of eastern and southern England, south-west Germany, the Netherlands, Belgium and north-west France. In Britain most records are from the south-east and East Anglia. Britain holds internationally important populations of *C. halophilus* with the most important ones occurring in the Thames estuary and Essex coast. Females have a close association with flowers of Sea Aster (*Aster tripolium*), from which they collect pollen to provision their nest cells, and the species has a late season coinciding with the flowering of its forage plant. It nests, often in large aggregations, on bare sandy soil and south-facing sunny slopes in upper saltmarsh or situations close by. However the localities that support the largest populations are often where human intervention has extended the ‘upper saltmarsh’ habitat into more extensive areas on artificially produced substrates such as silt and pulverized fly ash (PFA) lagoons.

It has probably been lost from many sites through coastal development and the loss of upper saltmarsh in recent decades. The grazing of upper saltmarsh produces grass swards that contain little suitable forage. Rising sea levels are causing erosion of salt marshes in Essex and many of the Thames Marshes have been reclaimed for industrial development. Virtually all the remaining East Thames Corridor localities are under imminent threat of destruction or severe degradation.

3.2.4 Other Conservation Priority Species

An additional 39 species recorded during the survey are listed in the British Red Data Books (Shirt, 1987; Bratton, 1991) or have been elevated to the status of Nationally Endangered, Nationally Vulnerable or Nationally Rare by subsequent formal reviews.

3.2.5 Two such species are listed in Category 1 (Endangered) of the British Red Data Books:

Cistogaster globosa, was allocated RDB1 (Endangered) status by Shirt (1987) and Falk (1991) but a recent review in preparation has provisionally accorded the species RDB2 (Vulnerable) status. It is known from a few localities in Southern England, but is a distinctive species that is unlikely to be overlooked and so is probably genuinely rare. It parasitises heteropteran bugs: in Europe its usual host is the shieldbug *Aelia acuminata*, which is present in Britain. The egg is laid on the host's back and the hatchling burrows into the shield bug and eats it from within before leaving to pupate in the ground. The fly appears to favour dry grassland and has been seen nectaring on Wild Carrot elsewhere.

The ground beetle *Scybalicus oblongiusculus* was considered to be extinct in the UK until a single specimen was found at West Canvey in 2002 and another at West Thurrock PFA Lagoons in 2005. All previous records had been from the south coast of Dorset, where it was last recorded in 1926 with an unsubstantiated record from Portland Bill in 1951. Despite further work at the West Canvey site in 2003 no more specimens were found, and the discovery of the species in large numbers on Area A3 in particular means the ash disposal areas are clearly an important node for the species, and its population here deserves further research. It is probably a seed feeder, feeding on seeds of plants like Carrot and Fennel, and gathering these to provision for the larvae.

3.2.6 Seven other species is listed in Category 2 (Vulnerable) of the British Red Data Books:

Andrena nigrospina There are very few modern records of this mining bee *Andrena nigrospina*. It requires patches of bare, sandy soil or short turf in warm, sunny situations for nesting. It occurs sparingly in South Essex at West Thurrock but two other sites where it has been found in recent years have been lost to development.

Ero aphana is a spider that traditionally been restricted to a number of sites in Dorset, Hampshire and Surrey where it is found on dry heathland in the building and mature phases, with some patches of bare stony ground and *Ulex europaeus* and *Pinus sylvestris* present. However, it has recently been found in several places away from southern heathlands in Surrey, Essex, Berkshire and Hampshire and may be spreading after an original colonisation into southern England or due to climate change.

Glocianus pilosellus is very locally distributed weevil, recorded in southern England and South Wales. According to the review by Hymans & Parsons (1992) it had been recently recorded from only two sites. It is phytophagous, associated with lesser dandelion *Taraxacum laevigatum*. The larvae probably feed in the seed head and adults have been found under the leaves. Threats include the loss of habitat, including through urban development, as well as the degradation of habitat by excessive disturbance of the vegetation through activities such as motorbike access, horse-riding and human trampling. However, minor disturbance may be desirable to maintain the early successional botanical stages and prevent the invasion of scrub.

Lestes dryas is a metallic green damselfly that breeds in shallow ponds and lakes, overgrown canals, ditches and temporary pools, generally neutral to slightly alkaline and where there is an abundance of emergent vegetation, especially reeds. In grazing levels it will tolerate brackish conditions and may be found where sea club rush predominates. It was always a scarce species in southern and eastern England, and during the 1950s and 1960s it was lost from many of its known sites and it was feared extinct in the 1970s. It was rediscovered in Essex in 1983 and has subsequently been found in Essex, Kent and Norfolk. The majority of sites are coastal or estuarine marshes, in dykes or pools that are often choked with emergent vegetation. Sea Club-rush seems to be a common feature to these sites.

Philanthus triangulum, also known as the Bee Wolf, was considered to be one of the rarest British insects during the 1980s, with colonies only in sandy habitats on the Isle of Wight and Suffolk. It has since undergone an expansion in range, and is now locally common in a steadily increasing number of sites as far north as Yorkshire. In view of the expansion in range and the probability that this is climate driven, its status should be revised.

Polistichus connexus is a very rare ground beetle recently recorded from only four vice-counties, all in south-eastern England. Its typical habitat is the base of cliffs near water, but it has also been taken on clay by rivers, at the roots of trees and in damp patches on sandy heaths. Adults have been found in cracks and crevices in under-cliffs, but the beetle probably also occurs under stones.

The Soldier Fly *Stratiomys longicornis* is a species found in Britain in coastal situations from Norfolk to Hampshire, but with the strongest populations within the Thames Estuary. Like other soldier flies, it has aquatic larvae but this species requires saline or at least brackish ditches and so is a habitat indicator of coastal grazing marsh – itself a Priority Habitat within the UK Biodiversity Action Plan.

3.2.7 Fifteen species are listed in Category 3 (Rare) of the British Red Data Books:

The beetle *Caenocara bovistae* had a widely scattered distribution from southern England, north to Cumberland, but by the time of the review by Hymans & Parsons (1992) it had recently been recorded from just two counties and gravel extraction followed by the building of a marina was destroying one of these. Its status may need to be revised to Vulnerable. The beetle occurs in grassland and coastal shingle, in the puff-ball fungi *Lycoperdon bovista* and *Bovista plumbea*, and possibly in other puff-ball fungi. Threats include the loss of unimproved grassland through improvement by reseeded or by the application of fertilisers, or by conversion to arable agriculture.

The Blue Carpenter Bee (*Ceratina cyanea*) is confined to southern England, with most recent records from West Sussex, parts of Kent and South Essex, where it was rediscovered during 1993 after nearly 100 years absence. Several populations have subsequently been found in the East Thames Corridor on various post-industrial and other ruderal sites. Adults make nests in dead, broken bramble stems, so the presence of a certain amount of bramble scrub in open situations where dead stems are exposed to the sun is crucial to its survival. It is likely to prefer bramble growing in drought-stressed and mineral deficient situations. The bee collects pollen from a variety of flowers including yellow composites, knapweed and *Lotus*.

Graptodytes bilineatus is a water beetle that is associated with static water. Though almost always coastal, in the Humber, Thames and Dungeness areas of Britain, it is nevertheless a freshwater species. It was formerly known from the Somerset Levels, but may now be extinct there.

Hybomitra ciureai is largely confined to grazing marsh areas, but apparently in freshwater rather than brackish water sites. Its national distribution is centred on the Greater Thames and Suffolk with recent outposts in Sussex and Gwent. In Essex recent records have all come from the Colne/Blackwater estuaries apart from one in a greenhouse in Rochford in 1986. It appears to move inland relatively readily with Essex records from Dagnam Park (1977) and Brentwood (1946). The larvae probably develop in damp soil and the marginal zones of ponds and ditches.

Lygus pratensis is a widely polyphagous species which, in the last few years, has been widely recorded in the south-east, Hampshire to Kent to Essex to Berkshire. The scattered old colonies may have spread, or there may have been a secondary wave of continental immigration. It was formerly regarded as a woodland edge species but this seems not to be the case today.

Malachius vulneratus is a rare green malachite beetle confined to the saltmarshes around the Thames estuary and elsewhere in Essex. It has been recorded from East Kent and West Kent before 1970 and East Kent, West Kent, South Essex and North Essex from 1970 onwards. It is known from only a handful of Essex localities. It occurs in saltmarshes, tidal creeks and coastal grazing marshes. Adults are found on flowers; the larvae are probably predatory in saltmarsh litter. It is threatened by the loss of saltmarsh through reclamation and the construction of sea defences, as well as the overgrazing of saltmarshes.

The ant *Myrmica bessarabica* was first recorded in Britain from Sandwich, but is now known to be more widespread in warm coastal situations in Kent and Essex. It may be increasing in range, but identification of this and related *Myrmica* species is difficult and the ant had probably formerly been overlooked in its coastal Essex locations. It favours warm, sparsely vegetated ground in sunny situations, such as dunes, south-facing landslip grassland, south-facing terrace gravel grassland and more rarely on old sparsely vegetated post-industrial habitat.

Nomada fulvicornis is a cuckoo bee that has important populations in Essex along the East Thames Corridor and near Colchester. The species was formerly widely distributed in southern England, but it is today very scarce. It is cleptoparasitic on Nationally Scarce mining bees in the *Andrena carbonaria* group, here almost certainly *Andrena pilipes*, a bee that forages for example on yellow crucifers and bramble flowers.

Smicronyx reichi is a very local weevil and is recently recorded from very few places – mostly in calcareous grassland. Old records suggest that this species was formerly more widespread in southern England. It is a tiny blackish red phytophagous weevil associated with Common Centaury (*Centaureum erythraea*), Yellow-wort (*Blackstonia perfoliata*) and possibly Autumn Gentian (*Gentianella germanica*).

Trixagus elateroides is a rare south-eastern beetle with very few modern records. It is difficult to identify and may be confused with other members of the family. Consequently, the exact status of this species is hard to assess and it was not listed in the insect Red Data Book (Shirt, 1987). It has been predominantly recorded from coastal and estuarine habitats, including coastal shingle and saltmarsh, but also noted inland in pasture-woodland. Most records are from the roots of plants and grass tussocks (Hyman & Parsons, 1992).

Miltogramma germari is a flesh fly found in dunes, sandy heaths and chalk downland. The larvae are believed to feed on the food stores of mining bees and the adults are likely to occur in habitat which supports good colonies of such bees. It is recorded from south-west England and South Wales, but there are records from several sites in south Essex on the Thames and Middlewick Ranges in North Essex.

Hedychridium coriaceum is a ruby-tailed wasp recorded from open, sandy localities, especially heathland. This wasp is a parasitoid of larvae of the sphecid wasp *Lindenius albilabris*, a common species which nests in sunny areas of bare sand, but the *Hedychridium* has always been very much rarer than its host, with a handful of scattered sites in south and south-east England. In Essex it is usually restricted to a very few old commons and heathland sites. Adults are usually found near the nest burrows of the host but also visiting yellow composites and other flowers such as Yarrow (*Achillea millefolium*).

The ruby-tailed wasp *Hedychrum niemelai* is a cleptoparasite of the national Biodiversity Action Plan RDB3 *Cerceris quinquefasciata* and other *Cerceris* species. In the past the species was apparently locally common in southern England, from Cornwall to Norfolk, but now seems to be very scarce, with post-1970 information from only a handful of sites. It is known to inhabit open, sandy situations with nesting taking place in bare or sparsely vegetated sandy substrates fully exposed to the sun.

Lasioglossum pauperatum is a very local bee, recorded from several southern counties as far north as Essex and as far west as Devon, but with very few recent records except in south Essex near the Thames where it seems to be reasonably widespread. The bee is presumed to nest in light soils in sunny situations. Pollen sources are unknown, but flower visits include *Senecio* and *Crepis*.

Haematopota bigoti is a coastal horse fly, first recognised as British from specimens taken at Walton-on-the-Naze in 1907. It has been recorded more widely as far north as south-western Scotland. Although there are scattered coastal records in Essex, it is not commonly found.

3.2.8 Ten species are listed in Category K (Insufficient data) of the British Red Data Books:

The rove beetle *Aleochara verna* was only known from examples found in 1975 and 1976 from the Inner Hebrides and the Outer Hebrides respectively. The example found in 1963 at Spurn Head, south-east Yorkshire is now known to refer to *A. binotata*. The species had been recorded from the coast and found under rotting seaweed lying above the high tide mark. Two individuals were found in 1999 in Essex at an old railway marshalling yard in the Lea Valley.

The tumbling flower beetle *Mordellistena parvula* is widely distributed but rare on disturbed ground in southern England. The larvae probably develop in herbaceous plant stems and the adults appear to be associated with mugwort and yarrow. A number of *Mordellistena* species have been found in the East Thames Corridor in open unmanaged grasslands, especially on post-industrial sites where there is a continuity of stems throughout the season and from year to year.

The tumbling flower beetle *Mordellistena pseudoparvula* has only recently been recognised in Britain. There are now several published records in south-eastern England and it was first found in Essex in 2000. This is a difficult group, with many European species, some others of which have been recognised as British in recent years. Larvae probably develop in plant stems and the adults appear to be associated with flowers such as Carrot *Daucus carota*.

Olibrus flavicornis is only known from southern England and recorded as far north as Suffolk. It is relatively widespread in the East Thames Corridor. The beetle probably associated with grassland and coastal habitats, and on the continent is apparently associated with Autumn Hawkbit *Leontodon autumnnalis*, the larva probably developing in the flower head, while the adults feed on pollen (Hyman & Parsons 1992).

Orthoperus aequalis is difficult to identify and may be confused with other members of the genus. The beetle is found in ancient broad-leaved woodland and pasture-woodland, recorded under the bark of a freshly sawn beech, on beech logs, on the cut ends of felled oak trees and from loose bark of fire damaged sycamore. This habitat seems to be absent from Tilbury and it is clear that further ecological studies are called for to determine if the species has some other, currently unknown, ecological associations.

The plant hopper *Ribautodelphax imitans* is a surprising discovery at Tilbury. At the time of a national status review (Kirby, 1992) it was known in Britain only from old records from Dorset, but there is a recent record at Rammey Marsh, Middlesex in 2000. It has been recorded from calcareous and other types of dry grassland, such as at Rammey Marsh and Tilbury. The grass *Festuca arundinacea feras* is a known foodplant in France and Greece. This subspecies does not occur in Britain, but tall fescue *Festuca arundinacea arundinacea* could be a host. In any case the species is evidently part of a good dry grassland assemblage present at the site. Grassland management should be adjusted to a level at which a varied structure is maintained, including both short turf and taller tussocks and swards. Rabbit grazing produces the best structure, and rabbit populations should be maintained or encouraged wherever possible.

The weevil *Sitona cinerascens* was known from a single specimen, without data, in the Stephens Collection at the Natural History Museum and had been considered by coleopterists to be extinct in the UK. Then, during 2002, one was collected at Canvey Wick and it has subsequently been found at Bradwell Waterside and Fobbing Marshes. The biology and life cycle are unknown, but on the European mainland it is associated with species of *Lotus*; and *Lotus glaber* is the most likely species at its South Essex sites.

The rove beetle *Tachyporus scitulus* had previously been recorded from Glamorgan and Anglesey in the period since 1969. It is a little-understood species that is difficult to identify and can be confused with other members of the genus. The species seems to favour open sandy situations (often on or near the coast) where there is plenty of sun.

Tephritis matricariae has only been recorded from Kent and Essex. It was first collected in South Essex at Belton Hills in 2001, with further records from a number of other sites since. The species is quite widespread in the Mediterranean and up to central Germany, but almost absent more in the north. Its host plant is probably *Crepis vesicaria* ssp. *taraxacifolia* and *C. capillaris*.

Trypoxylon minus was formerly confused with *Trypoxylon. figulus*, which has now been split into three species. It is a fairly recent addition to the British list, known as British from a single female collected at Sittingbourne, East Kent in 1959, where it was probably nesting in a chestnut spike fence. The Tilbury specimen requires confirmation. The ecology is poorly known. Other members of this genus prey on small spiders and nest in various cavities, such as *Anobium* burrows in dead wood, cut stems, hollow roots, and rarely in small holes in vertical earth-faces. The cavities are divided into cells by mud divisions.

3.2.9 Five species are listed in the Appendix (Out of Danger) of the British Red Data Book.

Gymnosoma nitens is a parasite of the Nationally Scarce ground-dwelling shieldbug *Sciocoris cursitans*. This species is especially, but not exclusively, associated with chalk grassland and calcareous sand, and is always found on unshaded, well-drained and friable soils with a rather open vegetation structure and usually with a component of bare ground. Though believed to be phytophagous, there appear to be no certainly identified food plants, and it may be polyphagous. In Essex both species are known only from the Thames corridor where the majority of sites are either already lost to development or under immense development threat.

The Small Ranunculus moth *Hecatera dysodea* was formerly widely distributed, being very common in East Anglia and Greater London until about the year 1910 when it became extinct in Britain. It reappeared (probably as an immigrant) at Stone Marsh, Kent and is now re-established in the Thames Estuary, where its larvae feed on Prickly Lettuce (*Lactuca serriola*) and Great Lettuce (*Lactuca virosa*).

Litophasia hyalipennis is a parasitic fly recorded in 1887 from Sussex and believed to be extinct until rediscovered at Northfleet in Kent in 1987. In 1996 it was recorded at Grays in south Essex and has subsequently been found at further south Essex locations.

Stictopleurus abutilon is a large pale greenish brown bug found in dry open habitats. There were confirmed records for Kent, Surrey, Hampshire and Dorset, but until recently it was believed to be extinct in Britain, but was recorded from Essex in 1996 and from several locations in the south of England. It is now recorded widely in warm open flower rich grassland in the southeast, presumably in response to climate change, on 'waste ground' or other unmanaged and sporadically disturbed habitat, but the species seems far less common than *Stictopleurus punctatonervosus*.

Stictopleurus punctatonervosus This is a large pale greenish brown bug found in dry open habitats. There were nineteenth century records of this species from Surrey and Sussex, but until recently it was believed to be extinct in Britain. It is now recorded widely in warm open flower rich grassland in the southeast, presumably in response to climate change, on 'waste ground' or other unmanaged and sporadically disturbed habitat.

3.2.10 Nationally Scarce species

Thirty species that are formally placed in Nationally Notable category Na (see Appendix 2) are recorded.

Andrena labiata is recorded widely in England north to Warwickshire but very local. The bee has declined significantly and has apparently disappeared from many former parts of its range. It is generally very scarce in its former strongholds such as Devon, the London district and nearby Surrey Commons. It is known from a wide variety of habitats including heathland, grasslands, open woodland, coastal landslips and soft rock cliffs. There is a close and possibly obligate association with germander speedwell (*Veronica chamaedrys*), but other flowers are recorded, probably mostly as nectar resources. Nest burrows are dug in sandy banks and slopes in sunny situations. Large nesting aggregations appear to be unusual and the normal nesting habits are as isolated individuals or small groups. The species is the host of the RDB1 cleptoparasitic bee *Nomada guttulata*.

Andrena minutuloides was formerly widely recorded in southern England, but there are post-1970 records for only about 20 sites, mostly in Hampshire, Sussex and Kent. It is most often found on calcareous grassland and chalk heath, and was first recorded in Essex in 1993 from the chalk at Thurrock. Except at Grays Chalk Pit, it is now lost from its former Essex sites at Mill Wood Pit and Dolphin Pit, and is only otherwise known to occur at a small area of land by the Tank Hill Lane site and in small numbers at the north lagoon at West Thurrock PFA Lagoons, both designated for development in the new Deposit UDP.

Aphthona nigriceps is a very rare small black flea beetle, with few recent records from very scattered localities. It occurs in grassland, wetland, fens, river margins and parkland, and is phytophagous, associated with meadow crane's-bill (*Geranium pratense*), but other *Geranium* species must be used as well since *G. pratense* is rare in Essex and does not occur at the sites where the beetle is recorded.

The wasp-spider *Argiope bruennichi* was first recorded in Britain in 1922 at Rye, East Sussex and for many years, seemed to be restricted to a few areas close to the south coast in Sussex, Kent, Hampshire and Dorset. Since the 1970s, evidence suggests that the spider has been increasing its range, probably due to longer warmer summers and autumns. Although now widely recorded as far north as Lincolnshire, the species currently still warrants Nationally Scarce status. In Essex it was first recorded in 1997. It is currently frequent in suitable habitat the East Thames Corridor, but also now seems to be established in north-east and central Essex. The large orb webs are slung low down in the vegetation and the adult spider is easily hidden by the surrounding herbage. Grasshoppers form the main food item. The large urn shaped egg cocoon is positioned in the higher levels of vegetation and the eggs over-winter, hatching out in the following spring. Both sexes mature in the late summer, the females perhaps living on until October but the much smaller males living for only a short time. Any form of regular cutting of grassland will destroy the webs and the over-wintering egg cocoons, presumably explaining why large populations seem to be confined to unmanaged rough grassland and waste ground.

Most records of *Bianor aurocinctus* are from the south-eastern part of England, and the spider is most frequent in Britain in the East Thames Corridor. It is found on dry sparsely vegetated ground in a variety of habitats, but always among short vegetation or in stony areas.

Colletes marginatus is most typically associated with the semi-fixed mid dune area of coastal dunes but there are also inland records from the Brecks. This species apparently prefers looser sand than other *Colletes* species, and in any of these situations flower-rich areas are required for foraging. Confirmed records are almost exclusively from southern coasts from Camarthenshire to West Norfolk. In Essex the species is extremely rare, with records only from four other sites, one lost and one threatened by development.

The leaf beetle *Chrysolina marginata* is widespread but local. Old records suggest that this species formerly had a widely scattered distribution throughout Britain, but it has recently been recorded from only five, widely scattered, vice-counties. The beetle is found in well grazed, short-turf grassland, river margins and dry, sandy habitats. It is phytophagous, associated with yarrow *Achillea millefolium*, and also recorded from sea plantain *Plantago maritima* and wild mignonette *Reseda lutea*. Some disturbance, on a rotational basis, may be needed to maintain open conditions.

The pill beetle *Curimopsis setigera* is widely distributed and local, recorded from South Devon, north to Dumfriesshire in Scotland. It is found mainly on the coast, with records from undercliffs and brackish dykes. It probably occurs at the roots of plants in sandy places, though it is also found in grass tussocks. In areas of soft-rock cliff, occasional slippages are necessary to maintain habitat continuity. Large areas of unstable cliff are required so that the population does not become isolated and subsequently threatened by individual landslips.

Dyschirius chalceus is a ground beetle that has been confused until very recently with *Dyschirius nitidus*. In 2005 it was recorded at West Thurrock, Fobbing Marshes and Canvey Wick. Subsequent examination of museum material reveals specimens from Sheppey, Deal and the Isle of Wight). The habitat requirements appear to be identical to those of *Anisodactylus poeciloides*. *Dyschirius nitidus* is currently a Nationally Scarce species, but it is likely that it will warrant Red Data Book status.

The water beetle ***Helophorus alternans*** exhibits a curious dichotomy of habitat associations, being abundant in heathland pools in the New Forest, but otherwise known from brackish water ditches and pools in south east England as far north as the Wash, with the greatest concentration of records being around Romney Marsh, Kent.

Hylaeus cornutus is largely confined to the south-central and south-eastern counties of England, with about 30 post-1970 sites known, of which half are in Kent. In Essex the bee is mostly found near the Thames in post-industrial habitats and disused mineral extraction sites where Carrot or other white umbellifers occur in quantity. There is a close association with these flowers, especially Carrot, from which the bee collects pollen to provision its cells. Nesting is reported in herbaceous stems and the dead stems of bramble.

Hypomma fulvum occurs mainly in East Anglia and the extreme south-east of England. Coastal Essex is a national stronghold for this spider, where it is relatively frequent in brackish *Phragmites* near the coast. It occurs most frequently in fens and marshes, on *Phragmites* or in the litter beneath, sometimes in *Cladium* marshes. In Essex, it has been collected mainly in *Phragmites* marsh in borrowdykes, but also grazing marsh grassland, in saltmarshes and on the landward side of a sea wall in herb rich grassland.

Lasioglossum pauxillum is recorded from southern England, and Falk (1991b) describes it as an extremely local species with post-1970 records known for about twenty sites, mostly in Kent and Sussex but also sparingly in S. Hampshire and S. Essex. Recent years have seen the species become much more frequent, and it is much more frequently encountered and now of low nature conservation concern.

The mining bee ***Lasioglossum quadrinotatum*** is recorded widely in England, but is extremely scarce and has apparently declined. It is very rare in Essex. A male was collected at St Osyth in 1983 and it was found in numbers at Wormingford Mere in 1995, when it was foraging in numbers on buttercup flowers, at Alphamstone Pits (1996) and Stanway Hall Farm Pit (1998), all in North Essex.

Longitarsus fowleri was described new to science in 1967. It has only been recorded from a few localities in southern England, and recently recorded from eight vice-counties. It has been recorded from short-turf calcareous grassland, disturbed ground and coastal land-slips, where it favours warm, south-facing slopes. It is phytophagous, associated with teasel *Dipsacus*, mainly young teasel plants in the early spring and then dispersing as the plants grow larger. In areas of grassland, rotational disturbance may be needed to maintain open conditions.

The flea beetle *Longitarsus parvulus* is a member of the leaf-beetle tribe and is entirely vegetarian in habit. It appears to feed on a range of plant species and has become fairly widespread in the London area and other parts of the south-east in recent years, perhaps no longer deserving its nationally scarce status.

Macrosteles quadripunctulatus is a greenish leafhopper with black markings. British records come from sand dunes, dry coastal grassland, inland acid grassland, chalk downland, and disturbed ground supporting ruderal vegetation. These habitats have in common that they support short, open, and often quite sparse vegetation on very well-drained substrates. The association with dry and well-drained habitats applies also to most records from mainland Europe. Rabbit grazing produces a close mosaic of short and long vegetation and should be maintained or encouraged wherever possible. The insect is known to be able to colonise ruderal sites, so a rotational regime of management, by either grazing or cutting, may be acceptable.

Meioneta simplicitarsis is a scarce money spider with nearly all Essex records from grazing marsh grasslands on the Colne, Crouch and along the East Thames Corridor. It has also been recorded in other counties from chalk grassland.

Mimesa bruxellensis is a scarce solitary wasp whose localised nature and possible preoccupation with tree foliage may make it prone to under recording. It occurs in reasonably open, sunny situations on sandy soils. British records cover a variety of habitats, including heathland, dry grassland, open woodland, coastal dunes and disturbed situations such as sandpits. Cicadellid bugs such as *Idiocerus* spp. are the prey of this wasp and, as these species are associated with woodland, trees and shrubs must provide important hunting areas. The wasp burrows into sand at the roots of grasses in reasonably open, sunny situations on sandy soils. Until this survey, the wasp was thought likely to be extinct in Essex, the only previous site at Mill Wood Pit having been lost to housing as part of the Chafford Hundred development.

Mimumesa (Psen) unicolor was only formally added to the British list in 1994, although the species was first taken in 1950. It is confined to South Hampshire, West Sussex, the Isle of Wight and the East Thames Corridor; the latter supports a nationally important metapopulation of which the Tilbury assemblage forms a part. The wasp is associated with *Phragmites* areas, and has been found visiting Carrot *Daucus carota* and Parsnip *Pastinaca sativa*.

Nigma walckenaeri is found mainly in the Thames valley in Essex, east Berkshire, Middlesex, Surrey (and London), but also in the Severn valley in Gloucestershire and Warwickshire. The species is found on bushes in gardens and parks often in suburban areas, but also on scrub in more natural habitats. The spider spins a small web and retreat on the upper surface of leaves of bushes. The leaves of lilac, Forsythia, holly and ivy are especially favoured but any leaves are used with a similar size and curved surface across which the web can be made. Adults are generally found in late summer and autumn with females persisting into the winter.

The bee *Nomada fucata* is a cleptoparasite of the local mining bee *Andrena flavipes*. It occurs in southern England, and was considered very local with most sites during the 1970s being on the south coast of Dorset. It has since spread to become an almost certain companion of the *Andrena* throughout much of its range, and is now widely distributed throughout southern England.

Platynaspis luteorubra is a very scarce ladybird, recorded from a few counties in southern England as far north as Nottinghamshire. It has been recorded at the roots of grass, by beating dead hedgerow shrubs and hawthorn blossom, from under broom bushes and, particularly in winter, from under the bark of firs and willows. There is a probable association with *Myrmica* species of ants.

Sphecodes longulus is a cuckoo bee cleptoparasitic on mining bees of the genus *Lasioglossum*, probably usually *L. minutissimum*. It is locally frequent in Kent and the East Thames Corridor, but is otherwise exceedingly scarce and has apparently declined with post-1970 records from single sites in South Hampshire, West Sussex and West Norfolk.

Sphecodes rubicundus is a cleptoparasite, almost certainly on the mining bee *Andrena labialis*. It is a widespread, but local southern species with post-1970 records for only about 20 sites, mostly in Kent and on the south coast of the Isle of Wight. A substantial decline seems to have occurred in many districts, especially inland. In Essex the host is currently widely distributed along the South Essex coast, with two isolated records in North Essex, but the cleptoparasite is practically confined to the East Thames Corridor.

Trichosirocalus rufulus This small dark red weevil is very local and recently recorded from only four vice-counties, all in south-eastern England. It occurs on disturbed ground, particularly on sandy and chalky soils, as well as long established grassland such as on coastal cliffs. The weevil is phytophagous, associated with species of plantain. Some disturbance, on a rotational basis, is needed to maintain open conditions and encourage early successional stages.

Tychius parallelus is a very local weevil. Old records suggest that this species was formerly more widespread, though had a disjunct distribution being recorded in southern England, and Elgin and Easternness in Scotland. The beetle occurs on grassland, woodland, roadside verges, coastal shingle and probably disturbed ground. It is phytophagous, associated with broom *Cytisus scoparius*. The larvae feed on unripe seeds in the pods. Disturbance may be needed to maintain open conditions.

Tychius tibialis is a very local weevil, only known from southern England and is primarily coastal, occurring in grassland, coastal habitats and probably disturbed ground, particularly on sandy soils. It is phytophagous and on the Continent has been associated with hop trefoil (*Trifolium campestre*) and knotted clover (*Trifolium striatum*). The Tilbury Power Station records are the first post-1970 reports for Essex, with older records for Southend, Mersea Island and Brightlingsea.

Zodarion italicum The centre of distribution of this spider in Britain is the East Thames Corridor in South Essex and northern Kent. The species is recorded from only 16 ten-kilometre squares in Britain, and many of its habitats are threatened by development. It is strongly associated with dry, warm, sunny open habitats containing a proportion of bare ground. It makes an 'igloo'-like retreat under stones or similar objects and feeds on ants.

The Pale Lemon Sallow Moth *Xanthia ocellaris* rare in Essex. The caterpillar feeds first in the catkins of Black Poplar but when these fall from the tree it transfers to various herbaceous plants. The origin of this Tilbury moth must be the poplar trees adjacent to the Energy and Environment Centre.

3.2.11 A total of 101 species that are formally placed in Nationally Notable category Nb (see Appendix 2) are recorded. These are as follows:

<i>Agathidium marginatum</i>	<i>Onthophagus vacca</i>
<i>Anacaena bipustulata</i>	<i>Ophonus schaubergerianus</i>
<i>Andrena bimaculata</i>	<i>Oxytoda lurida</i>
<i>Anthicus angustatus</i>	<i>Paralimnus phragmitis</i>
<i>Anthophora quadrimaculata</i>	<i>Peltodytes caesus</i>
<i>Anthraxus consputus</i>	<i>Phyllobius vespertinus</i>
<i>Aphodius plagiatus</i>	<i>Phytoecia cylindrica</i>
<i>Archanara sparganii</i>	<i>Ponera coarctata</i>
<i>Argenna patula</i>	<i>Protapion difforme</i>
<i>Athous campyloides</i>	<i>Pseudomalus violaceus</i>
<i>Auplopus carbonarius</i>	<i>Psylliodes chalcomera</i>
<i>Bathysolen nubilus</i>	<i>Raglius alboacuminatus</i>
<i>Berosus affinis</i>	<i>Rhantus dorsalis</i>
<i>Catapion pubescens</i>	<i>Rhantus suturalis</i>
<i>Cercyon convexiusculus</i>	<i>Sciocoris cursitans</i>
<i>Coelambus parallelogrammus</i>	<i>Sibinia arenariae</i>
<i>Cucullia asteris</i>	<i>Sitona waterhousei</i>
<i>Dasytes plumbeus</i>	<i>Sphecodes crassus</i>
<i>Demetrias imperialis</i>	<i>Sympetrum sanguineum</i>
<i>Dicheirotichus obsoletus</i>	<i>Tiphia minuta</i>
<i>Drymus latus</i>	<i>Tychius pusillus</i>
<i>Dytiscus circumflexus</i>	<i>Xerolycosa nemoralis</i>
<i>Elaphropus parvulus</i>	<i>Zilla diodia</i>
<i>Emblethis denticollis</i>	
<i>Enochrus bicolor</i>	
<i>Enochrus halophilus</i>	
<i>Euscelidius variegatus</i>	
<i>Gronops lunatus</i>	
<i>Haliphus apicalis</i>	
<i>Helophorus fulgidicollis</i>	
<i>Helophorus griseus</i>	
<i>Hyperaspis pseudopustulata</i>	
<i>Limnoxenus niger</i>	
<i>Longitarsus dorsalis</i>	
<i>Longitarsus ochroleucus</i>	
<i>Macrochilo cribrumalis</i>	
<i>Megachile leachella</i>	
<i>Megalonotus antennatus</i>	
<i>Megalonotus praetextatus</i>	
<i>Megalonotus sabulicola</i>	
<i>Melitta tricincta</i>	
<i>Metrioptera roeselii</i>	
<i>Microdynerus exilis</i>	
<i>Mutilla europaea</i>	
<i>Myrmica schencki</i>	
<i>Neoascia interrupta</i>	
<i>Notiophilus quadripunctatus</i>	
<i>Nyssus trimaculatus</i>	
<i>Ocypus fortunatarum</i>	
<i>Oliarus panzeri</i>	
<i>Olibrus pygmaeus</i>	

3.2.12 For some Diptera families, no subdivision into Notable A or Notable B classes is made, all species being listed formally as Nationally Notable (see Appendix 2). A total of eighteen were found in this survey.

Blaesoxipha plumicornis
Cheilosia velutina
Chorisops nagatomii
Colobaea punctata
Dicraeus raptus
Homoneura patelliformis
Lejogaster tarsata
Lispe loewi
Lonchaea palposa
Melieria picta
Meromyza westermanni
Oscinimorpha arcuata
Sarcophila latifrons
Siphonella oscinina
Thereva plebeja
Trachysiphonella scutellata
Trixoscelis marginella
Volucella zonaria

3.2.13 County Rare Species

An additional nine species are rare in Essex and are listed in the Essex Red Data Book. Of these one is Endangered in Essex, four are Threatened in the county and four are 'Rare' in the county.

ESSEX ENDANGERED

The ruby-tailed wasp *Pseudospinolia neglectus* is a parasitoid of larvae of the mason wasp *Odynerus spinipes* and possibly other *Odynerus* species, which builds distinctive nests in vertical sand faces. *P. neglecta* has been found in southern English counties. In Essex it is extremely rare.

ESSEX THREATENED

The wolf spider *Alopecosa barbipes* is widely distributed but scattered in much of Britain. It is rare in the agricultural lowlands of southern England e.g. in Leicestershire and Essex, and very rare in most of the north of Britain. *A. barbipes* occurs on heathlands and old and unimproved grasslands, especially where there are areas of sparsely vegetated ground, short turf and lichen heath.

Panurgus banksianus has a restricted distribution in southern Britain. In Essex it is very rare, restricted to several sites near the Thames and Wanstead Flats in the southern part of Epping Forest. It forages on yellow Asteraceae.

Lasioglossum lativentre is extremely rare in Essex, with records from only a handful of sites, usually of single individuals. It may be more widely distributed than present records suggest, but in very small numbers where a suitable habitat mosaic survives in the agricultural countryside. Unlike many other aculeate Hymenoptera in Essex, it does not seem to be associated with sporadically disturbed flower-rich brownfield sites. It is likely to be threatened by further decline in the countryside of suitable forage and nesting habitats.

Lamyctes fulvicornis is a centipede that seems to be more common nationally in upland and northern areas, and there are few records in Essex, all from sparsely vegetated habitats on poor substrate. The only previous records are from Temple Mills (Waltham Forest), now largely destroyed, and three sites in south Essex near the Thames.

ESSEX RARE

Cicindela campestris is widespread on open, dry heaths and moors throughout Britain, but is rare and threatened in Essex and neighbouring counties. It is an annual species, breeding early in spring, the larvae inhabiting vertical burrows in the soil. In Essex the only recent records appear to be from Walton-on-Naze and Colchester, a small area of Danbury Common and Linford Sand Pit (possibly now lost). There are earlier records from Epping Forest, Grays and Sandon.

Glocianus distinctus (*Ceutorhynchus marginatus*) is a local weevil with very few modern Essex records and one pre-1950.

Phasia barbifrons was discovered new to the British fauna in Kent in June 1999; it is presumed to parasitise Heteroptera. Its build and appearance resemble the common species *P. pusilla* with which it may have been confused in the field.

Andrena labialis has shown a marked decline nationally and for that reason is was a proposed UKBAP species in the latest review (although it did not make the final list). It is a mesotrophic meadow species with a strong association with legumes (Fabaceae), from which the females collect pollen. In Essex the bee is still widespread in the Thames Corridor and elsewhere near the coast, where there is an abundance of suitable forage.

4 AQUATIC INVERTEBRATES

- 4.1 Complete inventories of aquatic invertebrates are excessively time-consuming to produce yet are seldom necessary for site assessment; the large bulk of aquatic invertebrate species are widespread and common.
- 4.2 Aquatic invertebrate recording concentrates, therefore, on species targeted for their value in interpreting the habitats present. In order to qualify for selection, species groups must satisfy a number of criteria, including
- the group selected must contain a reasonably large number of species, though not be so large that it becomes impractical to take a representative sample of the species present in the time available;
 - the group selected must largely comprise relatively easy to identify species;
 - the life-histories and habitat requirements of identifiable species in the selected group must be adequately known and must include a good proportion which are directly related to the habitats under investigation;
 - collectable and identifiable life-cycle phases of the target species must be available at the time of year when surveying is to take place;
 - the group should contain a reasonable number of Nationally Rare or Nationally Scarce species.
- 4.3 In almost all situations, the target group of choice is water beetles and because of this a system of formal assessment of water beetle communities, called WETSCORE, has been developed (Foster & Eyre (1988)).
- 4.4 This is a scoring system for use in evaluating conservation interest of freshwater bodies. Beetle species are given a score on a geometric scale of 1 to 32, where common species score 1 and the rarest score 32. The scores are based on regional rarity derived from the national recording scheme for this group. The region used in the analysis of the water beetles from the marshes around Tilbury Power Station was 'Southern England' and the scores for this are given in Foster & Eyre (1988).
- 4.5 To evaluate a site, the scores are summed for all species caught to give the WETSCORE. This index rises with collecting effort, so to correct for this the *Species Quality Score* (SQS) is calculated by dividing the WETSCORE by the number of species used in its derivation. This gives an index that is almost independent of sampling effort.
- 4.6 Good sites for water beetles are signified by total scores of greater than 100 and an SQS of 2 or more .
- 4.7 A total of 42 qualifying species of water beetle is recorded at Tilbury Power station. Some of these cannot be assigned to specific water bodies as they were recorded in the pan traps and pitfall traps; their presence nevertheless reflects the background water beetle population of which the sampled ditches are representative and they are included in the "All" column of the results table.
- 4.8 The overall wetscore is 113 and the *overall* Species Quality Score is, therefore, 2.69. The species and the WETSCORE values are analysed in the following results table:

Species	Status	Wetscore in area			
		All	12	14	15
Agabus bipustulatus		1		1	1
Agabus conspersus		2		2	
Coelambus parallelogrammus	Nb	2		2	
Colymbetes fuscus		1		1	1
Copelatus haemorrhoidalis	Local	2		2	2
Dytiscus circumflexus	Nb	4			4
Graptodytes bilineatus	RDB3	16		16	16
Graptodytes pictus	Local	2		2	2
Hydroporus palustris		1			
Hydroporus planus		1			
Hydroporus pubescens		1			
Hygrotus inaequalis		1			
Ilybius ater		2			2
Ilybius fuliginosus		1			2
Laccophilus hyalinus		2		2	
Laccophilus minutus	Local	1			
Rhantus exoletus	Local	4			
Rhantus dorsalis	Nb	4		4	4
Rhantus suturalis	Nb	4		4	4
Gyrinus caspius	Local	2			2
Haliplus apicalis	Nb	4		4	4
Haliplus ruficollis		1		1	1
Peltodytes caesus	Nb	3		3	3
Anacaena bipustulata	Nb	4		4	
Anacaena limbata		4		4	
Berosus affinis	Nb	4	4	4	4
Cercyon convexiusculus	Nb	4			4
Cercyon marinus	Local	1		1	
Cymbiodyta marginellus	Local	2			2
Enochrus bicolor	Nb	2			
Enochrus halophilus	Nb	4		4	
Enochrus testaceus	Local	2			2
Helophorus aequalis		1			
Helophorus alternans	Na	1			1
Helophorus brevipalpis		1		1	1
Helophorus fulgidicollis	Nb	2			2
Helophorus griseus	Nb	4			
Helophorus minutus		1		1	1
Helophorus obscurus		1			1
Helophorus rufipes	Local	4			
Hydrobius fuscipes		1		1	1
Limnoxenus niger	Nb	8			8
42 qualifying species		113	4	64	75

5 DISCUSSION AND RECOMMENDATIONS

- 5.1 The invertebrate assemblage recorded during 2007 at the Tilbury Power Station site includes a total of nine national Biodiversity Action Plan species, including 6 with attendant legal obligations under the Countryside and Rights of Way Act 2000 and Natural Environment and Rural Communities Act 2006. Added to this are a further 39 included in the British Red Data Books, and a further 149 from the various sub-categories of 'Nationally Scarce'. The overall tally of noteworthy species is as follows:

UK BAP species	9
Red Data Book category 1 species	2
Red Data Book category 2 species	7
Red Data Book category 3 species	15
Red Data Book category K & Appendix species	15
Nationally Notable (Na) species	30
Nationally Notable (Nb) species	101
Nationally Notable (N) species	18

- 5.2 It is clear from this that the overall habitat mosaic at Tilbury Power Station supports an outstanding assemblage of invertebrates – both terrestrial and aquatic. This is in part supported by relict areas of the semi-natural habitats that were largely subsumed by the power station during the 1950s and 1960's, including saltmarsh and coastal grazing levels, but in far greater part is dependant upon the full range of artificial habitats associated with the power station itself.
- 5.3 A competent and experienced entomologist ought to be able to find a small number of Nationally Scarce invertebrates at almost any large site in the south-east of England. Thus, for a site to qualify as one that supports a significant assemblage of species the 'rarity component' needs to be significantly large.
- 5.4 Criteria for formal assessment invertebrate interest are under development and Colin Plant Associates (UK) is playing a major role in their definition; they are presented in Table 1, below. The information in the Table refers to Great Britain, including offshore islands, but excludes all parts of Ireland. In arriving at an allocation of significance level using these criteria, the site should always be considered in the context of other sites containing similar macro- and micro-habitats at the same geographical category level.
- 5.5 Criteria below those for National and International significance should be regarded as flexible; in particular, geographical variations in the distributions of species should be taken into account as should real and semi-permanent changes in status that have taken place since the publication of status codings. Sites that do not meet these criteria may nevertheless be significant at the level stated for other reasons. For example, geographical parameters may need to be altered significantly for sites on offshore islands. For these reasons, an assessment of invertebrate significance should always be performed by a qualified invertebrate specialist with adequate field experience and not by a general ecologist for whom entomology is not a primary discipline.
- 5.6 Within each of the geographical categorisations, the significance may be Moderate, High or Very High (there is no "Low Significance" category - such sites are already defined by the Evaluation Table).
- 5.7 The application of Moderate, High or Very High significance at each geographical level is based on a wide number of factors and does not sit well with a table of pre-defined rules. Additionally, within a site of particular geographical significance, different component parts may have differing levels of actual significance. The allocation of the level of significance should always be performed by, or subsequently approved by, a qualified entomologist.

Table 1: Criteria forming the basis of site-based invertebrate significance

Significance	Description	Minimum qualifying criteria
International	European important site	Internationally important invertebrate populations present or containing RDB 1 (Endangered) species or containing any species protected under European legislation or containing habitats that are threatened or rare at the European level (including, but not exclusively so, habitats listed on the EU <i>Habitats Directive</i>).
National	UK important site	Achieving SSSI invertebrate criteria (NCC, 1989) or containing viable populations of RDB2 (Vulnerable) or containing viable populations of RDB 3 (Rare) species or containing viable populations of any species protected under UK legislation or containing habitats that are threatened or rare nationally (Great Britain) or supporting sustainable populations of more than one UK BAP species.
Regional (for border sites, both regions must be taken into account)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in south-east England	Habitat that is scarce or threatened in the region or which has, or is reasonably expected to have, the presence of an assemblage of invertebrates including at least ten Nationally Notable species or at least ten species listed as Regionally Notable for the <i>English Nature</i> region in question in the Recorder database or elsewhere or a combination of these categories amounting to ten species in total or supporting sustainable populations of at least one UK BAP species.
County (for border sites, both counties must be taken into account)	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the county in question	Habitat that is scarce or threatened in the county and/or which contains or is reasonably expected to contain an assemblage of invertebrates that includes viable populations of at least five Nationally Notable species or viable populations of at least five species regarded as Regionally Scarce by the county records centres and/or field club.
District	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the administrative District	A rather vague definition of habitats falling below county significance level, but which may be of greater significance than merely Local. They include sites for which Nationally Notable species in the range from 1 to 4 examples are reasonably expected but not yet necessarily recorded and where this omission is considered likely to be partly due to under-recording.
Local	Site with populations of invertebrates or invertebrate habitats considered scarce or rare or threatened in the affected and neighbouring Parishes (except Scotland, where the local area may best be defined as being within a radius of 5 kilometres)	Habitats or species unique or of some other significance within the local area.
Low significance	—	Although almost no area is completely without significance these are the areas with nothing more than expected “background” populations of common species and the occasional Nationally Local species.

- 5.8 It is unequivocally clear that Tilbury Power Station supports an invertebrate assemblage that is outstandingly significant at a national (British Isles) level; almost no other site in Britain that has been afforded an equivalent level of appropriate survey supports such a high number of UK Biodiversity Action Plan species.
- 5.9 A very high proportion of the artificially maintained interest lies within areas that have recently or historically been used for ash disposal, but it is by no means confined to these areas. Particularly high interest has been recorded at the Lytag site, and this has already been reported to RWE npower by Colin Plant Associates (UK) through Scott Wilson. These areas provide, in particular, feeding grounds for species that are breeding in association with the ash embankments.
- 5.10 The multiple habitat requirements of a great many invertebrate species recorded in the present survey are of significance in the assessment of the wider area of the power station site. For example, a number of rare and scarce bees that are now known to create nesting burrows in the ash disposal areas at Tilbury are also recorded by us foraging at flowers in the improved grassland areas near the gatehouse. Inside the gatehouse itself, the electrocution trap that is established to reduce the nuisance caused by flies generated only records of the horsefly *Hybomitra ciureai* – a rare species associated with the coastal marshland off site. The rare Scarce Emerald Damselfly, whilst breeding in the vegetation-choked ditches was also noted hunting its prey in the area around the Energy and Environment Centre. It is the overall mosaic of both semi-natural and man-made habitats that provides the basic biotope within which specialist species can thrive in specific habitat zones.
- 5.11 The existing ecological interest of the ash disposal areas was reduced, at least in the short term, by the resumption of ash disposal on Area A2 (compartment 7) during 2007 which removed the developing habitats there. To avoid significant denudation of the invertebrate interest of the site as a whole it is strongly recommended that any expansion or further re-activation of ash disposal operations into ‘dormant’ or non-operational areas is carried out in a ‘phased’ manner, with the areas currently being used for ash-disposal being given time to recover and/or develop habitat characteristics of value to the key components of the invertebrate assemblage before operations are extended into other currently undisturbed parts of the ash disposal area.
- 5.12 Recently placed areas of PFA are potentially important habitats ‘in waiting’. At the completion of disposal operations (e.g. as part of a phased restoration scheme for the site) consideration should be given to shaping the end topography to create raised areas and associated steep slopes – especially south-facing slopes. The deliberate creation of a varied topography would be extremely positive. It is crucial that adjacent areas are not lost to alternative uses until the fauna in the new areas has become established, which may take a period of years.
- 5.13 In order to allow their interest to develop, ‘restored’ areas should be managed by complete neglect in the short to medium term. The continuing presence of rabbits is highly desirable. In the longer term (e.g. +15 years), some scrub removal and or disturbance might be necessary to maintain the early successional stages and bare areas favoured by many of the important invertebrate species that currently use the site.
- 5.14 In terms of the aquatic invertebrate assemblage, Foster and Eyre (1988) considered that the best sites for water beetles are signified by total ‘WETSCORE’ values of greater than 100 and an SQS value of 2 or greater. At Tilbury Power station, the overall ‘WETSCORE’ is 113 and the overall Species Quality Score is 2.69. This suggests a raised significance in the aquatic invertebrate fauna – a revelation that is unsurprising given the location of the site in the Thames Estuary.
- 5.15 The semi-natural components of the habitat mosaic are the saltmarsh, the drainage ditches (including any not examined) and the low-lying grazing marsh habitat to the east. These should all be preserved and subjected to an appropriate conservation management plan.

6 REFERENCES

6.1 The following references have been used in the preparation of this report.

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APPENDIX 1: LIST OF RECORDED INVERTEBRATE SPECIES

National status codes are explained in Appendix 2.

1	mown grassland west of Energy and Environment Centre	8	Main ash field north
2	Energy and Environment Centre land and garden	9	Farmer's Field
3	Lapwing Field	10	Eastern ash field (west of path)
4	Lyttag site – general records, including trap samples	11	Eastern ash field (grassland and embankment east of path)
4a	Lyttag site – disused siding to the west	12	Saltmarsh area
4b	Lyttag site – northern grassland and scrub	13	Scirpus ditch and adjacent saline area (extreme east of site)
4c	Lyttag site – PFA embankments	14	Entrance ditch (2 section son south of access road)
5	Field to east of main entrance alongside road	15	National Grid ditch (west edge of Farmer's Field)
6	Two small fields north of the railway line	16	Security Lodge insect trap
7	Main ash field (south)	17	Non-specified area of the site

Group / species	National status	Compartment where each species was found during 2007																	
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15

ANNELIDA: HIRUDINEA

Erpobdellidae

Erpobdella octoculata

x x x

Glossiphoniidae

Theromyzon tessulatum

x x

Hemiclepsis marginata

Local

x x

Helobdella stagnalis

x x

Piscicolidae

Piscicola geometra

x

ARACHNIDA: ARANEAE

Agelenidae

Agelena labyrinthica

x x x

Tegenaria agrestis

Local

x x x x

Tegenaria gigantea

Local

x

Araneidae

Agalenatea redii

Local

x x x

Araneus diadematus

x x x x

Araneus quadratus

x x x x

Araniella cucurbitina sens. str.

x x

Araniella opisthographa

Local

x x x

Argiope bruennichi

Na

x x x

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Hypsosinga pygmaea</i>	Local		x		x																	
<i>Larinioides cornutus</i>			x					x					x			x	x					
<i>Neoscona adianta</i>	Local		x		x			x			x	x	x			x	x					
<i>Zilla diodia</i>	Nb		x	x																		
<i>Zygiella atrica</i>																x						
<i>Zygiella x-notata</i>					x			x					x									
Clubionidae																						
<i>Cheiracanthium erraticum</i>					x																	
<i>Cheiracanthium virescens</i>	Local				x			x					x									
<i>Clubiona neglecta sens. str.</i>	Local				x							x			x	x						
<i>Clubiona phragmitis</i>	Local																				x	
<i>Clubiona subtilis</i>	Local					x																
Dictynidae																						
<i>Argenna patula</i>	Nb					x																
<i>Argenna subnigra</i>	Local	x	x		x																x	
<i>Dictyna arundinacea</i>				x	x	x		x					x									
<i>Dictyna latens</i>	Local		x	x	x			x				x	x								x	
<i>Dictyna uncinata</i>			x		x			x					x								x	
<i>Nigma walckenaeri</i>	Na					x																
Dysderidae																						
<i>Dysdera crocata</i>			x	x	x									x	x						x	
Gnaphosidae																						
<i>Drassodes cupreus</i>	Local					x							x									
<i>Drassodes lapidosus</i>				x		x							x			x						
<i>Drassyllus pusillus</i>		x	x			x							x									
<i>Haplodrassus signifer</i>	Local	x	x			x							x									
<i>Micaria pulicaria</i>		x	x	x		x							x									
<i>Trachyzelotes pedestris</i>	Nb	x				x						x	x									
<i>Zelotes apricorum</i>	Local			x									x								x	
<i>Zelotes latreillei</i>	Local			x			x															
Hahniidae																						
<i>Antistea elegans</i>	Local																					x
<i>Hahnia nava</i>	Local	x					x															

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Linyphiidae																					
Bathyphantes gracilis		x		x	x												x				x
Bathyphantes parvulus		x																			x
Centromerita bicolor					x																
Centromerita concinna					x																
Cnephalocotes obscurus	Local				x																
Diplostyla concolor			x		x							x									x
Dismodicus bifrons	Local				x																
Eperigone trilobata		x																			
Erigone atra		x	x	x	x							x		x	x						x
Erigone dentipalpis		x	x	x	x							x									x
Erigone longipalpis	Local															x					
Hypomma fulvum	Na																				x
Lepthyphantes tenuis		x	x	x	x						x	x		x		x	x				
Meioneta rurestris		x		x	x							x									
Meioneta simplicatarsis	Na	x	x		x																
Microlinyphia pusilla			x		x							x		x							
Microneta viaria			x																		
Milleriana inerrans	Local				x																
Oedothorax apicatus	Local	x	x	x	x							x		x	x						
Oedothorax fuscus		x	x	x								x									x
Oedothorax gibbosus																					x
Oedothorax retusus		x		x	x							x		x							
Pelecopsis parallela	Local	x	x	x	x																
Pocadicnemis juncea																					x
Porrhomma microphthalmum	Local		x	x	x		x							x							
Prinerigone vagans	Local	x																			
Stemonyphantes lineatus					x																
Tapinocyba praecox	Local				x																
Troxochrus scabriculus	Local	x																			
Typhochrestus digitatus	Local				x																
Walckenaeria antica			x		x																
Walckenaeria vigilax	Local				x							x									

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Liocranidae																					
Agroeca proxima					X																
Phrurolithus festivus			X		X							X				X	X				
Lycosidae																					
Alopecosa barbipes					X							X									
Alopecosa cuneata	Local				X																
Alopecosa pulverulenta		X	X		X							X									
Arctosa leopardus	Local				X											X	X				
Arctosa perita	Local				X	X								X							
Pardosa agrestis	Nb		X	X	X							X		X							
Pardosa amentata																					X
Pardosa nigriceps					X							X									
Pardosa palustris		X	X		X							X			X						
Pardosa prativaga		X	X	X	X							X		X	X		X				X
Pardosa pullata		X	X		X							X									
Pardosa purbeckensis	Local																X				
Pirata piraticus	Local																				X
Trochosa robusta	Nb				X							X			X						
Trochosa ruricola		X	X	X	X							X			X		X				X
Trochosa terricola					X							X									
Xerolycosa nemoralis	Nb				X	X															
Mimetidae																					
Ero aphana	RDB2		X																		
Philodromidae																					
Philodromus aureolus			X																		
Philodromus cespitum			X		X		X					X	X								
Tibellus oblongus		X	X		X		X					X	X			X					
Pisauridae																					
Pisaura mirabilis					X	X						X									
Salticidae																					
Ballus chalybeius			X		X																
Bianor aurocinctus	Na		X		X																
Euophrys frontalis			X		X	X										X					

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Heliophanus cupreus			x									x										
Heliophanus flavipes			x	x	x																	
Pseudeuophrys lanigera	Local		x																			
Salticus scenicus			x									x				x						
Talavera aequipes	Local		x	x	x																	
Tetragnathidae																						
Metellina segmentata sens. str.			x																			
Pachygnatha clercki																						x
Pachygnatha degeeri						x						x			x							x
Tetragnatha extensa						x											x					
Tetragnatha montana	Local							x					x									
Tetragnatha nigrita	Local		x																			
Theridiidae																						
Enoplognatha latimana	Local		x	x	x						x	x					x					
Enoplognatha ovata sens. str.						x																
Enoplognatha thoracica	Local	x	x	x	x	x																
Episinus angulatus	Local					x																
Neottiura bimaculata			x		x							x										
Robertus arundineti	Local					x																
Simitidion simile			x	x				x														
Theridion sisyphium						x																
Theridion varians						x																
Thomisidae																						
Misumena vatia			x		x							x										
Ozyptila sanctuaria	Local	x	x	x	x							x										
Ozyptila simplex	Local	x	x	x	x							x			x							
Xysticus cristatus		x	x		x	x						x										
Xysticus kochi	Local	x		x	x							x										
Zodariidae																						
Zodarion italicum	Na		x		x	x								x		x						
Zoridae																						
Zora spinimana						x																

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Leiobunidae																					
Dicranopalpus ramosus	Local				x																
Leiobunum rotundum					x																
Nemastomatidae																					
Nemastoma bimaculatum			x																		x
Phalangiidae																					
Mitopus morio					x																
Odiellus spinosus	Local				x																
Oligolophus tridens																					x
Opilio saxatilis			x		x						x			x	x		x				x
Paroligolophus agrestis																					x
Phalangium opilio		x	x	x	x						x			x	x		x				x
COLEOPTERA																					
Anobiidae																					
Anobium punctatum					x																
Caenocara bovistae	RDB3		x																		
Stegobium paniceum			x													x					
Anthicidae																					
Anthicus angustatus	Nb			x																	
Anthicus antherinus	Local			x	x									x	x						
Anthicus constrictus	Local				x																
Notoxus monoceros	Local				x																
Apionidae																					
Acanephodus onopordi			x		x																
Aspidapion aeneum																					x
Aspidapion radiolus																					x
Catapion pubescens	Nb				x																
Ceratapion carduorum	Local				x					x				x							x
Ceratapion gibbirostre										x	x										
Diplapion confluens	Local				x																
Eutrichapion vorax	Local		x																		
Exapion fuscirostre	Local		x																		
Exapion ulicis			x																		

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Ischnoptera pion loti			x		x																	
Oxystoma cracca	Local		x																			
Oxystoma pomonae			x		x												x					
Protapion apricans			x																			
Protapion assimile													x									
Protapion difforme	Nb		x																			
Protapion fulvipes			x										x									
Protapion nigrirtarse			x																			
Protapion trifolii		x	x																		x	
Pseudapion rufirostre			x																			
Bruchidae																						
Bruchidius villosus			x																			x
Bruchus loti							x															
Bruchus rufimanus	Local						x														x	
Bruchus rufipes	Local						x															
Byrrhidae																						
Byrrhus pilula		x	x																			x
Curimopsis setigera	Na						x															
Cytilus sericeus	Local						x															
Simplocaria semistriata			x	x	x																	x
Cantharidae																						
Cantharis cryptica													x									x
Cantharis decipiens																						x
Cantharis lateralis	Local						x															x
Cantharis pallida	Local																					x
Cantharis rufa			x																			x
Cantharis rustica							x	x	x													x
Malthodes marginatus							x															
Rhagonycha fulva			x				x															x
Carabidae																						
Agonum marginatum	Local						x															
Amara aenea		x	x	x	x																	x
Amara apricaria							x															

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Amara bifrons	Local											x		x								
Amara communis	Local			x								x										
Amara convexior	Local			x																		
Amara eurnota	Local			x								x		x	x							
Amara familiaris			x			x						x										
Amara lunicollis	Local			x																		
Amara montivaga	Local											x										
Amara ovata				x								x		x								
Amara plebeja			x																			
Amara similata			x									x		x	x		x					
Amara tibialis	Local		x	x		x										x						
Anchomenus dorsalis												x			x							
Anisodactylus binotatus	Local					x															x	
Anisodactylus poeciloides	UKBAP																				x	
Anthracus consputus	Nb					x																
Asaphidion curtum						x																
Badister bullatus				x									x									
Bembidion femoratum	Local					x																
Bembidion lampros						x																x
Bembidion lunulatum								x														
Bembidion minimum				x																		x
Bembidion normannum	Local																					x
Bembidion obtusum								x					x									
Bembidion properans			x		x	x					x	x										
Bembidion varium																						x
Brachinus crepitans	Nb		x	x		x						x		x	x							
Bradycellus verbasci					x		x									x						x
Calathus ambiguus	Nb							x				x		x								
Calathus cinctus	Local		x	x	x	x						x		x	x							x
Calathus erratus															x							
Calathus fuscipes			x	x	x	x						x		x	x							x
Calathus melanocephalus			x	x		x									x	x						x
Carabus violaceus			x	x		x							x		x	x						x

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Cicindela campestris</i>	Local				x			x				x										
<i>Curtonotus aulicus</i>		x	x	x	x							x			x							
<i>Curtonotus convexiusculus</i>	Local			x		x						x		x								
<i>Demetrias atricapillus</i>						x						x										
<i>Demetrias imperialis</i>	Nb																					x
<i>Dicheirotichus gustavii</i>	Local																x					
<i>Dicheirotichus obsoletus</i>	Nb			x			x															
<i>Dyschirius luedersi</i>	Local																					x
<i>Dyschirius chaldeus</i>	Na																					x
<i>Elaphropus parvulus</i>	Nb					x																
<i>Harpalus affinis</i>		x	x	x	x							x		x	x							x
<i>Harpalus attenuatus</i>	Local	x	x			x						x		x	x							
<i>Harpalus rubripes</i>	Local	x	x			x						x			x							
<i>Harpalus rufipes</i>				x	x	x						x		x	x							x
<i>Harpalus serripes</i>	Nb						x					x										
<i>Harpalus tardus</i>	Local	x				x						x										
<i>Laemostenus terricola</i>	Local					x									x							
<i>Leistus spinibarbis</i>	Local																					x
<i>Loricera pilicornis</i>												x										x
<i>Microlestes maurus</i>				x			x								x		x					
<i>Microlestes minutulus</i>		x	x	x	x							x		x								
<i>Nebria brevicollis</i>							x					x		x								
<i>Nebria salina</i>							x							x								
<i>Notiophilus biguttatus</i>						x	x					x		x								
<i>Notiophilus germinyi</i>	Local																					
<i>Notiophilus palustris</i>	Local											x										
<i>Notiophilus quadripunctatus</i>	Nb																					x
<i>Notiophilus substriatus</i>	Local	x	x	x	x																	
<i>Olisthopus rotundatus</i>	Local						x															
<i>Ophonus ardosiacus</i>	Nb	x	x									x	x		x							
<i>Ophonus azureus</i>	Nb			x			x							x								
<i>Ophonus puncticeps</i>	Local											x	x									
<i>Ophonus rufibarbis</i>		x	x	x																		

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Ophonus schaubergerianus	Nb		x																			
Oxypselaphus obscurus	Local	x																				
Panagaeus bipustulatus	Nb		x									x										
Paradromius linearis			x				x					x	x					x				
Philorhizus melanocephalus		x										x										
Poecilus cupreus	Local				x							x		x	x			x				
Polistichus connexus	RDB2											x										
Pterostichus macer	Local				x									x								
Pterostichus madidus		x	x	x	x									x								
Pterostichus melanarius				x	x							x		x	x			x				
Scybalicus oblongiusculus	RDB1	x	x		x							x		x								
Stenolophus mixtus	Local				x													x				
Stomis pumicatus	Local				x																	
Syntomus foveatus		x	x	x	x	x						x		x								
Syntomus obscuroguttatus	Local											x										
Synuchus vivalis	Local													x								
Trechus quadristriatus		x	x	x	x									x								
Cerambycidae																						
Agapanthia villosoviridescens	Local												x									
Phytoecia cylindrica	Nb																		x			
Pseudovadonia livida	Local												x						x			
Strangalia melanura																			x			
Chrysomelidae																						
Altica lythri															x						x	
Altica palustris					x	x						x										
Aphthona euphorbiae	Local		x	x	x													x			x	
Aphthona nigriceps	Na	x																				
Aphthona nonstriata	Local		x																			
Cassida vibex	Local				x																	
Chaetocnema hortensis		x	x	x	x									x								
Chrysolina banksi	Local		x									x										
Chrysolina hyperici	Local		x	x	x																	
Chrysolina marginata	Na	x																				

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Crepidodera aurea			x																			
Crepidodera plutus	Local	x	x																			
Cryptocephalus fulvus	Local	x	x	x	x							x										
Cryptocephalus hypochaeridis	Local				x																	
Cryptocephalus moraei	Local		x	x																		
Cryptocephalus pusillus	Local		x																			
Longitarsus dorsalis	Nb		x		x																	
Longitarsus exoletus	Local		x																			
Longitarsus flavicornis		x	x	x	x		x				x	x	x		x		x					
Longitarsus fowleri	Na				x																	
Longitarsus melanocephalus		x	x									x										
Longitarsus ochroleucus	Nb	x		x																		
Longitarsus parvulus	Na			x	x																	
Longitarsus pellucidus	Local	x										x										
Longitarsus pratensis		x	x	x	x							x			x							
Longitarsus succineus		x	x	x																		
Longitarsus suturellus		x	x																			
Neocrepidodera ferruginea		x																				
Neocrepidodera transversa					x																	
Oulema rufocyanea																						x
Phyllotreta atra	Local	x		x	x									x								x
Phyllotreta consobrina	Local	x	x		x																	
Phyllotreta cruciferae	Nb													x								
Phyllotreta diademata	Local																					x
Phyllotreta nigripes			x	x	x						x											
Phyllotreta undulata					x	x																
Podagrica fuscicornis	Nb		x									x	x									
Psylliodes affinis					x																	
Psylliodes chalcomera	Nb				x																	
Psylliodes chrysocephala	Local				x							x										
Psylliodes dulcamarae	Local		x		x																	
Sphaeroderma testaceum			x	x	x						x	x		x	x							

Coccinellidae

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Adalia 2-punctata			x		x					x			x								x
Adalia 10-punctata			x							x			x			x					x
Adonia variegata	Nb	x		x	x							x									
Anisosticta 19-punctata	Local																x	x	x		x
Coccinella 7-punctata		x	x	x	x		x			x		x	x								x
Harmonia axyridis											x						x				x
Hyperaspis pseudopustulata	Nb				x																
Platynaspis luteorubra	Na		x		x			x													
Propylea 14-punctata			x	x	x				x	x		x				x					x
Psyllobora 22-punctata		x	x		x		x					x	x		x	x	x				x
Rhyzobius litura				x	x						x	x				x		x			
Scymnus frontalis		x	x	x	x																
Subcoccinella 24-punctata			x		x	x								x	x						x
Tytthaspis sedecimpunctata	Local	x			x										x		x				
Corylophidae																					
Corylophus sublaevipennis	Local		x																		
Orthoperus aequalis	RDBK		x																		
Sericoderus lateralis			x																		
Cryptophagidae																					
Atomaria atricapilla																					x
Atomaria fuscata					x																
Atomaria linearis			x																		
Cryptophagus pilosus																x	x				
Cryptophagus setulosus					x																
Ephistemus globulus			x																		
Micrambe villosus	Local		x																		
Curculionidae																					
Anthonomus rubi			x		x																
Barypeithes pellucidus					x						x										
Ceutorhynchus assimilis					x																
Ceutorhynchus assimilis	Local				x																
Ceutorhynchus contractus					x									x	x						
Ceutorhynchus floralis			x		x																

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Ceutorhynchus obstrictus</i>			x									x										
<i>Ceutorhynchus pallidactylus</i>				x	x							x				x						
<i>Ceutorhynchus picitarsis</i>	Local		x																			
<i>Ceutorhynchus pyrrhorhynchus</i>	Local			x																		
<i>Glocianus distinctus</i>	Local											x										
<i>Glocianus pilosellus</i>	RDB2		x																			
<i>Gronops lunatus</i>	Nb			x	x																	
<i>Gymnetron pascuorum</i>					x							x			x							
<i>Hadroplontus litura</i>				x												x						
<i>Hypera nigrirostris</i>		x										x										
<i>Hypera plantaginis</i>					x							x										
<i>Hypera postica</i>		x	x									x	x									
<i>Hypera punctata</i>												x			x							
<i>Hypera rumicis</i>			x																			
<i>Hypera venusta</i>		x																				
<i>Mecinus pyrae</i>		x	x																			
<i>Microplontus rugulosus</i>	Local				x							x										
<i>Otiorhynchus ovatus</i>	Local	x																				
<i>Otiorhynchus raucus</i>	Nb				x									x			x					
<i>Otiorhynchus sulcatus</i>					x																	
<i>Pelenomus quadrituberculatus</i>				x																		
<i>Phyllobius roboretanus</i>						x						x	x									
<i>Phyllobius vespertinus</i>	Nb					x																
<i>Phyllobius viridiaeris</i>										x			x									
<i>Sibinia arenariae</i>	Nb			x																		
<i>Sitona cinerascens</i>	RDBK				x																	
<i>Sitona cylindricollis</i>	Local		x											x								
<i>Sitona hispidulus</i>		x	x	x	x							x										
<i>Sitona humeralis</i>	Local		x		x							x				x						
<i>Sitona lepidus</i>					x										x							
<i>Sitona lineatus</i>			x		x		x					x	x	x	x							
<i>Sitona puncticollis</i>	Local	x	x				x					x	x	x								
<i>Sitona regensteinensis</i>			x																			

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Sitona sulcifrons		x	x									x			x							
Sitona suturalis					x									x								
Sitona waterhousei	Nb				x																	
Smicronyx reichi	RDB3				x																	
Trachyphloeus angustisetulus	Local	x	x		x																	
Trachyphloeus bifoveolatus		x																				
Trichosirocalus rufulus	Na	x																				
Trichosirocalus troglodytes		x	x	x																		
Tychius junceus	Local		x		x																	
Tychius parallelus	Na		x																			
Tychius picirostris					x						x											
Tychius pusillus	Nb	x																				
Tychius tibialis	Na	x	x																			
Dermeestidae																						
Anthrenus fuscus	Local		x																			
Anthrenus verbasci			x									x									x	
Attagenus pelli																					x	
Dytiscidae																						
Agabus bipustulatus					x											x	x	x				
Agabus conspersus																x						
Coelambus parallelogrammus	Nb															x						
Colymbetes fuscus			x													x	x					
Copelatus haemorrhoidalis	Local		x													x	x	x				
Dytiscus circumflexus	Nb																x					
Graptodytes bilineatus	RDB3															x	x	x				
Graptodytes pictus	Local															x	x	x				
Hydroporus palustris																					x	
Hydroporus planus			x																		x	
Hydroporus pubescens					x																	
Hygrotus inaequalis																					x	
Ilybius ater																					x	
Ilybius fuliginosus																					x	
Laccophilus hyalinus																x						

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Laccophilus minutus	Local		x																		x	
Rhantus exsoletus	Local		x																			
Rhantus dorsalis	Nb																x	x				
Rhantus suturalis	Nb																x	x				
Elateridae																						
Agriotes lineatus					x								x									
Agriotes sputator		x	x		x							x										
Agrypnus murinus	Local	x	x		x							x					x					
Athous campyloides	Nb		x																			
Hemicrepidius hirtus	Local				x																	
Kibunea minuta	Local							x														
Gyrinidae																						
Gyrinus caspius	Local		x																		x	
Haliplidae																						
Haliplus apicalis	Nb																x	x	x			
Haliplus ruficollis																	x	x	x			
Peltodytes caesus	Nb																x	x				
Heteroceridae																						
Heterocerus fenestratus																					x	
Histeridae																						
Kissister minimus		x	x		x																	
Margarinotus neglectus	Local				x																x	
Margarinotus purpurascens	Local				x																	
Saprinus aeneus					x																	
Saprinus semistriatus					x																	
Hydraenidae																						
Ochthebius minimus			x		x																	
Hydrophilidae																						
Anacaena bipustulata	Nb																	x			x	
Anacaena limbata																		x				
Berosus affinis	Nb														x		x	x	x			
Cercyon convexiusculus	Nb																				x	
Cercyon marinus	Local																				x	

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Cercyon pygmaeus			x																			
Cymbiodyta marginellus	Local		x															x				
Enochrus bicolor	Nb		x																			
Enochrus halophilus	Nb																x					
Enochrus testaceus	Local																		x			
Helophorus aequalis			x		x																	
Helophorus alternans	Na		x	x	x													x		x		
Helophorus brevipalpis					x												x	x	x			
Helophorus fulgidicollis	Nb		x															x				
Helophorus griseus	Nb				x																	
Helophorus minutus			x														x	x	x			
Helophorus nubilus	Local		x																			
Helophorus obscurus			x																x			
Helophorus porculus					x																	
Helophorus rufipes	Local		x		x						x		x									
Hydrobius fuscipes			x	x							x						x	x	x			
Limnoxenus niger	Nb																		x			
Megasternum concinnum			x	x	x																	
Latridiidae																						
Aridius bifasciatus																					x	
Aridius nodifer			x		x																	
Corticaria impressa			x																			
Corticaria punctulata			x																			
Corticarina fuscula					x						x											
Cortinicara gibbosa																					x	
Enicmus histrio																					x	
Enicmus transversus			x		x	x																
Melanophthalma suturalis					x																	
Leiodidae																						
Agathidium marginatum	Nb		x	x																		
Catops coracinus	Local							x														
Catops grandicollis																					x	
Catops morio																					x	

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Choleva agilis</i> sens. lat.					x																	
<i>Choleva angustata</i>					x																	
<i>Leiodes rufipennis</i>	Local	x	x	x	x																	
<i>Liocyrtusa vittata</i>	Local	x			x																	
<i>Nargus velox</i>			x		x																	
<i>Ptomaphagus medius</i>		x	x																			
<i>Ptomaphagus subvillosus</i>		x			x																	
<i>Sciodrepoides watsoni</i>																	x					
Melyridae																						
<i>Anthocomus rufus</i>	Local				x						x						x					
<i>Dasytes plumbeus</i>	Nb		x																			
<i>Malachius bipustulatus</i>																					x	
<i>Malachius viridis</i>	Local		x		x						x					x	x					
<i>Malachius vulneratus</i>	RDB3															x						
Mordellidae																						
<i>Mordellistena parvula</i>	RDBK	x	x	x																		
<i>Mordellistena pseudoparvula</i>	RDBK			x							x											
<i>Mordellistena pumila</i>	Local																x					
Nitidulidae																						
<i>Meligethes aeneus</i>			x	x	x						x	x				x						
<i>Meligethes carinulatus</i>			x		x																	
<i>Meligethes nigrescens</i>			x		x																	
<i>Meligethes ruficornis</i>	Local				x						x											
<i>Pocadius ferrugineus</i>			x																			
Oedemeridae																						
<i>Nacerdes melanura</i>	Local				x												x					
<i>Oedemera lurida</i>	Local		x	x	x	x					x						x				x	
<i>Oedemera nobilis</i>		x	x		x						x						x				x	
Phalacridae																						
<i>Olibrus corticalis</i>	Local				x																	
<i>Olibrus flavicornis</i>	RDBK		x		x						x	x										
<i>Olibrus pygmaeus</i>	Nb				x																	
<i>Phalacrus fimetarius</i>												x	x									

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Stilbus testaceus			x																			
Rhynchitidae																						
Rhynchites aequatus							x						x			x						
Scarabaeidae																						
Aphodius contaminatus			x																			
Aphodius erraticus			x																			
Aphodius foetidus						x																
Aphodius plagiatus	Nb				x																	
Aphodius sphaclatus					x																	
Hoplia philanthus	Local				x																	
Onthophagus coenobita	Local	x																				
Onthophagus joannae	Local		x		x									x		x						
Onthophagus vacca	Nb				x																	
Scirtidae																						
Cyphon coarctatus			x	x	x								x									
Cyphon phragmiticola	Local		x														x		x			
Scraptiidae																						
Anaspis garneysi					x																	
Anaspis pulicaria													x									
Anaspis regimbarti			x																			
Silphidae																						
Nicrophorus humator																x						
Nicrophorus interruptus	Nb											x				x						
Silpha atrata					x							x										
Silpha laevigata	Local	x	x	x	x							x										
Silpha tristis	Local				x							x		x	x				x			
Thanatophilus sinuatus					x										x				x			
Staphylinidae																						
Acrotona muscorum				x																		
Aleochara bipustulata		x	x	x	x							x		x						x		
Aleochara curtula		x			x							x			x					x		
Aleochara lata														x								
Aleochara verna	RDBK			x																		

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Aloconota gregaria</i>					x																
<i>Amischa analis</i>				x																	
<i>Amischa decipiens</i>	Local											x									
<i>Anotylus inustus</i>		x												x							
<i>Anotylus rugosus</i>					x							x									
<i>Anotylus sculpturatus</i>		x		x	x																
<i>Astenus lyonessius</i>		x																			
<i>Atheta triangulum</i>	Local				x																
<i>Bledius limicola</i>	Local																				x
<i>Callicerus obscurus</i>					x																
<i>Cypha longicornis</i>					x																
<i>Dimetrota atramentaria</i>					x																
<i>Dinaraea angustula</i>	Local				x																
<i>Drusilla canaliculata</i>			x		x									x							x
<i>Falagrioma thoracica</i>	Local			x	x																
<i>Gnypeta rubrior</i>	Local		x																		
<i>Ischnosoma splendidum</i>					x																
<i>Lathrobium fulvipenne</i>												x									
<i>Lesteva sicula</i>					x																
<i>Megalinus glabratus</i>		x	x									x		x		x					
<i>Metopsia clypeata</i>	Local	x																			
<i>Microdota amicula</i>					x																
<i>Mocyta clientula</i>	Local	x	x																		
<i>Mocyta fungi</i>		x	x	x	x																
<i>Mycetoporus lepidus</i>												x									
<i>Mycetoporus longulus</i>		x																			
<i>Mycetota laticollis</i>		x																			
<i>Ocypus aeneocephalus</i>	Local				x									x							
<i>Ocypus fortunatarum</i>	Nb	x			x																
<i>Ocypus olens</i>		x	x		x							x		x		x					x
<i>Omalium oxyacanthae</i>					x																
<i>Omalium rivulare</i>					x																
<i>Othius laeviusculus</i>	Local	x	x	x	x																

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Oxypoda brachyptera	Local	x																				
Oxypoda lurida	Nb				x																	
Paederus littoralis		x	x		x																	
Paederus riparius	Local	x																				
Philhygra palustris		x	x																			
Philhygra volans					x																	
Philonthus carbonarius		x	x		x																	
Philonthus cognatus		x	x		x							x		x								
Philonthus intermedius												x										
Philonthus laminatus														x								
Philonthus succicola	Local											x			x					x		
Platydracus stercorarius	Local	x	x		x							x			x					x		
Platystethus alutaceus	Local	x																				
Platystethus cornutus	Local				x																	
Quedius boops		x	x		x																	
Quedius curtipennis				x																		
Quedius humeralis	Local			x																		
Quedius levicollis		x	x		x							x		x	x							
Quedius molochinus				x	x										x							
Quedius nitipennis					x										x							
Quedius persimilis					x																	
Quedius picipes					x																	
Quedius schatzmayri	Local				x																	
Quedius semiaeneus		x	x		x							x			x							
Quedius semiobscurus		x	x									x		x								
Quedius simplicifrons	Local				x	x											x			x		
Rugilus orbiculatus															x							
Scopaeus sulcicollis	Local				x																	
Sepedophilus marshami					x																	
Sepedophilus nigripennis					x												x					
Stenus brunnipes					x																x	
Stenus fulvicornis			x																			
Tachinus signatus															x							

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Tachyporus atriceps	Local		x																			
Tachyporus hypnorum		x	x	x	x							x										
Tachyporus nitidulus		x	x	x	x							x	x		x							
Tachyporus pusillus		x	x	x	x																	
Tachyporus scitulus	RDBK	x																				
Tachyporus solutus					x	x																
Tachyporus tersus	Local	x	x		x																	
Tasgius ater				x	x											x	x					
Tasgius globulifer														x								
Tasgius melanarius												x						x				
Tasgius winkleri					x																	
Tinotus morion			x																			
Xantholinus jarrigei	Local		x	x	x							x			x							
Xantholinus linearis		x	x	x	x							x		x	x							
Xantholinus longiventris		x	x		x																	
Tenebrionidae																						
Isomira murina					x	x											x					
Lagria hirta					x																	
Throscidae																						
Trixagus elateroides	RDB3				x																	
CRUSTACEA: AMPHIPODA																						
Gammaridae																						
Crangonyx pseudogracilis																						x
Gammarus pulex																	x	x				x
Gammarus salinus																	x					x
CRUSTACEA: ISOPODA																						
Armadillidiidae																						
Armadillidium nasatum	Local		x	x	x							x										
Armadillidium vulgare		x	x	x	x							x		x	x		x					x
Asellidae																						
Asellus aquaticus																					x	x
Oniscidae																						
Oniscus asellus				x	x																	x

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Philosciidae																					
Philoscia muscorum			x	x	x							x					x				x
Platyarthridae																					
Platyarthrus hoffmannseggi			x																		
Porcellionidae																					
Porcellio scaber		x	x	x	x																
DERMAPTERA																					
Forficulidae																					
Forficula auricularia		x	x	x	x										x						
Forficula lesnei	Nb										x	x									
DIPTERA																					
Agromyzidae																					
Cerodontha denticornis												x									
Chromatomyia nigra					x	x															
Phytomyza rufipes			x	x	x																
Asilidae																					
Asilus crabroniformis	UKBAP																				x
Dioctria baumhaueri	Local		x				x			x											
Dioctria rufipes	Local						x		x	x						x					
Leptogaster cylindrica			x				x		x	x	x	x	x	x	x	x	x	x	x	x	x
Machimus atricapillus										x		x			x						
Machimus cingulatus	Local	x	x		x				x	x		x			x						
Bibionidae																					
Bibio johannis					x																
Dilophus febrilis			x			x					x										
Dilophus femoratus					x	x															
Bombyliidae																					
Bombylius major					x																
Calliphoridae																					
Calliphora vicina		x	x	x								x									
Cynomya mortuorum																					x
Lucilia sericata			x	x								x									
Melinda viridicyanea																					x

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Pollenia angustigena			x	x																		
Pollenia pediculata		x	x	x								x										
Pollenia rudis			x		x							x			x							
Pollenia viatica		x										x										
Camillidae																						
Camilla glabra					x																	
Chamaemyiidae																						
Chamaemyia herbarum					x																	
Chloropidae																						
Aphanotrigonum femorellum	Local																					x
Camarota curvipennis	Local				x																	
Chlorops pumilionis			x		x							x			x							
Dicraeus fennicus	Local																					x
Dicraeus raptus	N											x										
Dicraeus vagans				x																		
Lipara lucens							x															
Meromyza zachvatkini	Local			x																		
Oscinella frit							x															
Oscinella hortensis		x																				
Oscinimorpha arcuata	N		x	x	x							x										
Siphonella oscinina	N											x										
Thaumatomyia glabra					x							x										
Thaumatomyia hallandica		x	x	x								x										x
Thaumatomyia notata				x								x										
Trachysiphonella scutellata	N		x																			
Conopidae																						
Physocephala rufipes	Local						x															
Sicus ferrugineus	Local											x										x
Thecophora atra	Local				x							x	x									
Culicidae																						
Ochlerotatus detritus				x																		
Diastatidae																						
Diastata adusta							x															

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Dixidae																						
Dixella attica	Local		x																			
Dolichopodidae																						
Argyra vestita	Local											x										
Campsicnemus armatus	Local																x					
Campsicnemus curvipes			x		x																	
Campsicnemus loripes			x																			
Campsicnemus picticornis	Local		x	x																		
Chrysotus blepharosceles	Local											x										
Chrysotus gramineus		x		x								x										
Chrysotus pulchellus	Local					x																
Dolichopus diadema	Local		x	x								x				x		x				
Dolichopus griseipennis			x	x	x							x			x							
Dolichopus latilimbatus	Local		x		x																	
Dolichopus nubilus			x	x	x							x			x					x		
Dolichopus strigipes	Scarce																			x		
Dolichopus ungulatus			x		x																	
Hydrophorus oceanus	Local																			x		
Hydrophorus praecox	Local				x																	
Medetera flavipes	Local	x	x	x								x										
Medetera jacula																						
Medetera pallipes	Local																					
Medetera saxatilis	Local	x	x	x	x							x			x							
Medetera truncorum			x	x	x							x			x							
Poecilobothrus chrysozygos	Local				x							x										
Poecilobothrus nobilitatus			x	x								x										
Poecilobothrus principalis	Local		x	x	x							x			x		x		x			
Rhaphium caliginosum												x										
Rhaphium consobrinum	Local																			x		
Scellus notatus	Local				x	x						x										
Sciapus platypterus					x																	
Syntormon denticulatum	Local					x						x										
Syntormon pallipes			x	x	x							x			x							

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Drosophilidae																					
Lordiphosa andalusiaca				x																	
Scaptomyza flava			x	x	x																
Scaptomyza flava			x	x	x																
Scaptomyza pallida				x	x							x	x								
Empididae																					
Clinocera stagnalis																					x
Empis caudatula	Local		x																		
Empis livida																					x
Empis tessellata							x														
Hilara anglodanica	Local				x																
Hilara subpollinosa	Local				x																x
Ephydriidae																					
Coenia palustris				x																	
Ephydra macellaria			x	x	x																x
Ephydra riparia			x	x	x																x
Hydrellia griseola			x	x	x																x
Linnellia quadrata																					x
Paracoenia fumosa			x		x																
Pelina aenea			x	x	x																
Philotelma nigripenne							x														
Philygria interstincta				x																	
Philygria picta			x	x	x	x															
Philygria vittipennis			x	x	x																
Psilopa nitidula																					x
Scatella paludum							x														
Fanniidae																					
Fannia canicularis			x		x																x
Heleomyzidae																					
Suillia variegata			x																		x
Hybotidae																					
Platypalpus longiseta			x		x																
Platypalpus optivus	Local						x														

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Platypalpus palliventris		x																			
Tachydromia umbrarum				x																	
Keroplastidae																					
Macrocera phalerata				x																	
Lauxaniidae																					
Calliopum aeneum					x																
Homoneura patelliformis	N										x										
Minettia fasciata (=rivosa)			x	x							x	x			x						
Sapromyza quadripunctata			x									x			x					x	
Limoniidae																					
Symplecta stictica						x															x
Lonchaeidae																					
Lonchaea palposa	N			x																	
Lonchopteridae																					
Lonchoptera bifurcata			x													x					
Lonchoptera lutea			x	x								x				x					x
Micropezidae																					
Micropeza corrigiolata	Local				x	x						x									
Muscidae																					
Azelia trigonica	Local											x									
Coenosia antennata	Local																				x
Coenosia lacteipennis							x														
Coenosia tigrina			x	x																	
Helina evecta						x															
Helina lasiophthalma					x	x										x					
Helina reversio		x	x	x	x						x	x			x						
Hydrotaea aenescens			x																		
Hydrotaea dentipes			x																		
Lispe loewi	N		x																		
Lispe tentaculata			x	x								x									
Morellia aenescens			x									x									
Muscina levida				x	x							x									
Neomyia cornicina				x																	

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Phaonia perdita					x																
Phaonia rufipalpis												x			x						
Phaonia tuguriorum		x	x		x							x									
Polietes domitor											x										
Schoenomyza litorella				x	x																
Opomyzidae																					
Geomyza tripunctata		x	x	x								x			x						
Opomyza germinationis			x																		
Phoridae																					
Phora atra				x																	
Pipunculidae																					
Dorylomorpha anderssoni	Local																				x
Platystomatidae																					
Rivellia syngenesiae	Local				x																
Rhinophoridae																					
Melanophora roralis			x																		
Phyto discrepans				x																	
Phyto melanocephala				x											x						
Rhinophora lepida			x								x	x				x				x	
Sarcophagidae																					
Blaesoxipha plumicornis	N				x																x
Metopia argyrocephala	Local			x																	
Miltogramma germari	RDB3		x												x						
Miltogramma punctata			x																		
Ravinia pernix		x	x	x	x							x									
Sarcophaga carnaria				x	x							x			x						
Sarcophaga crassimargo					x							x			x						x
Sarcophaga filia	Local		x	x	x							x			x						
Sarcophaga hirticrus					x																
Sarcophaga incisilobata		x	x	x	x							x			x						
Sarcophaga melanura	Local				x							x									
Sarcophaga nigriventris		x	x	x	x							x			x						
Sarcophaga subvicina			x												x						

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Sarcophaga teretirostris</i>	Local				x							x					x					
<i>Sarcophaga variegata</i>		x	x		x							x										
<i>Sarcophila latifrons</i>	N	x	x	x	x							x										
<i>Senotainia conica</i>	Local											x										
<i>Norellisoma spinimanum</i>												x										
<i>Scathophaga stercoraria</i>		x	x	x	x	x										x						
Scatopsidae																						
<i>Reichertella geniculata</i>																					x	
Sciomyzidae																						
<i>Colobaea punctata</i>	N			x																		
<i>Coremacera marginata</i>	Local				x							x				x						
<i>Dichetophora obliterated</i>	Local					x																
<i>Pherbellia cinerella</i>		x	x	x	x	x						x				x						
<i>Tetanocera ferruginea</i>													x									
Sepsidae																						
<i>Saltella sphondylii</i>			x	x	x																	
<i>Sepsis cynipsea</i>			x									x										
<i>Sepsis fulgens</i>												x										
<i>Sepsis thoracica</i>	Local			x		x																
<i>Themira minor</i>				x																		
<i>Themira putris</i>		x																				
Sphaeroceridae																						
<i>Coproica ferruginata</i>						x																
<i>Copromyza equina</i>				x																		
<i>Copromyza nigrina</i>																					x	
<i>Copromyza stercoraria</i>						x															x	
<i>Leptocera nigra</i>		x	x										x								x	
<i>Lotophila atra</i>						x																
<i>Minilimosina vitripennis</i>						x																
<i>Pseudocollinella humida</i>				x		x							x									
<i>Rachispoda cryptochaeta</i>						x																
<i>Rachispoda limosa</i>						x																
<i>Spelobia clunipes</i>																					x	

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Telomerina pseudoleucoptera	Local		x																		
Stratiomyidae																					
Beris chalybata			x														x	x	x	x	
Beris vallata				x									x				x	x	x	x	
Chloromyia formosa		x	x	x	x												x	x	x	x	
Chorisops nagatomii	N																				x
Chorisops tibialis			x	x	x			x													x
Microchrysa flavicornis		x	x																		
Microchrysa polita																					
Nemotelus notatus	Local		x	x	x						x						x	x	x		
Nemotelus pantherinus	Local																x	x	x		
Nemotelus uliginosus	Local				x											x	x	x	x		
Oplodontha viridula													x				x	x			
Oxycera trilineata	Local		x										x				x	x	x	x	
Pachygaster atra										x								x			
Pachygaster leachii										x											
Stratiomys longicornis	RDB2																x				
Syrphidae																					
Anasimyia lineata																			x		
Cheilosia bergenstammi				x					x	x											
Cheilosia pagana					x				x												x
Cheilosia velutina	N										x										
Cheilosia vernalis																				x	
Chrysotoxum bicinctum			x	x	x				x	x			x							x	
Chrysotoxum festivum																				x	
Chrysotoxum verralli	Local								x	x											x
Epistrophe eligans			x		x																x
Episyrphus balteatus		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Eristalinus aeneus	Local																			x	
Eristalinus sepulchralis	Local				x				x	x								x	x		
Eristalis arbustorum		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Eristalis interruptus																		x	x		
Eristalis pertinax		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Eristalis tenax			x	x	x								x								x	
Eumerus funeralis					x																	
Eupeodes corollae									x	x			x			x	x	x				
Eupeodes latifasciatus									x				x			x	x	x				
Eupeodes luniger			x						x	x												
Helophilus hybridus	Local															x					x	
Helophilus pendulus			x				x		x	x						x	x	x	x		x	
Helophilus trivittatus	Local			x											x							
Lejogaster tarsata	N				x																	
Melanostoma mellinum		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Melanostoma scalare		x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Meliscaeva auricollis									x	x												
Myathropa florea			x		x	x	x			x			x			x	x	x		x		
Neoascia interrupta	Nb															x	x	x				
Neoascia podagrica									x	x			x									
Neoascia tenur	Local					x										x	x	x				
Paragus haemorrhous	Local		x		x											x						
Pipiza austriaca	Local										x											
Pipizella viduata			x				x		x	x		x										
Pipizella virens	Nb					x			x	x		x				x	x					
Platycheirus albimanus		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Platycheirus angustatus												x				x	x	x				
Platycheirus clypeatus s. str.			x									x				x	x	x				
Platycheirus fulviventris	Local												x			x	x	x				
Platycheirus granditarsa													x			x	x	x				
Platycheirus manicatus					x																	
Platycheirus peltatus									x	x						x						
Platycheirus scutatus s. str.							x		x	x												
Rhingia campestris							x		x	x			x									
Scaeva pyrastris					x																	
Sphaerophoria rueppellii	Local	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sphaerophoria scripta		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Syrirta pipiens		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Syrphus ribesii</i>																						X
<i>Syrphus vitripennis</i>																						X
<i>Tropidia scita</i>	Local				X		X										X	X	X			
<i>Volucella bombylans</i>			X						X	X												
<i>Volucella pellucens</i>									X	X												
<i>Volucella zonaria</i>	N									X												X
<i>Xanthogramma pedissequum</i>	Local				X				X	X			X									X
Tabanidae																						
<i>Haematopota bigoti</i>	RDB3				X							X										
<i>Haematopota pluvialis</i>									X	X						X						
<i>Hybomitra ciureai</i>	RDB3																					X
<i>Tabanus autumnalis</i>	Local		X						X	X		X				X						X
Tachinidae																						
<i>Cistogaster globosa</i>	RDB				X																	
<i>Dinera griseescens</i>		X	X	X	X							X			X							
<i>Eriothrix rufomaculata</i>			X	X	X										X		X					
<i>Gastrolepta anthracina</i>	Local		X																			
<i>Gonia picea</i>	Local				X																	
<i>Gymnosoma nitens</i>	RDB X		X		X																	
<i>Litophasia hyalipennis</i>	RDB		X														X					
<i>Medina luctuosa</i>				X																		
<i>Meigenia mutabilis</i>			X																			
<i>Ocytata pallipes</i>			X																			
<i>Pales pavida</i>				X																		
<i>Phania funesta</i>						X																
<i>Phasia barbifrons</i>												X										
<i>Phasia obesa</i>	Local											X										
<i>Phasia pusilla</i>	Local		X		X							X										
<i>Siphona geniculata</i>					X																	
<i>Triarthria setipennis</i>			X																			
<i>Trixa conspersa</i>												X										
Tephritidae																						
<i>Euleia heraclei</i>	Local		X																			

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Meromyza westermanni	N						x						x									
Sphenella marginata	Local		x	x																		
Tephritis formosa	Local			x						x	x											
Tephritis leodontidis																x						
Tephritis matricariae	RDBK		x	x	x							x										
Terellia ruficauda			x		x																	
Therevidae																						
Thereva nobilitata			x		x					x	x									x		
Thereva plebeja	N				x					x	x											
Tipulidae																						
Nephrotoma appendiculata			x		x							x										
Nephrotoma cornicina	Local				x																	
Nephrotoma flavescens			x	x	x							x										
Nephrotoma quadrifaria			x																			
Tipula oleracea																						x
Tipula paludosa			x																			x
Tipula vernalis						x																
Trixoscelidinae																						
Trixoscelis marginella	N			x																		
Ulidiidae																						
Ceroxys urticae	Local																x					x
Melieria omissa	Local			x																		x
Melieria picta	N			x													x					x
HETEROPTERA																						
Alydidae																						
Alydus calcaratus	Local			x																		
Berytinidae																						
Berytinus montivagus				x		x																
Cymus clavicularis						x																
Cimicidae																						
Anthocoris nemorum																						x
Cardiastethus fasciventris	Local			x																		
Orius niger																						x

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Coreidae																					
Bathysolen nubilus	Nb																				X
Coreus marginatus																					X
Coriomerus denticulatus												X									X
Syromastes rhombeus	Local				X																
Legnotus limbosus																					X
Corixidae																					
Callicorixa praeusta																					X
Corixa affinis	Local																			X	X
Corixa punctata	Local																			X	X
Hesperocorixa linnei																			X		
Hesperocorixa sahlbergi																				X	X
Sigara concinna																				X	
Sigara dorsalis																					X
Sigara lateralis																				X	
Lygaeidae																					
Drymus latus	Nb																				X
Drymus sylvaticus			X		X																X
Emblethis denticollis	Nb	X																			
Heterogaster urticae																					X
Ischnodemus sabuleti					X																X
Kleidocerys resedae					X																
Megalonotus antennatus	Nb		X		X																
Megalonotus chiragra			X																		
Megalonotus emarginatus	Local	X			X																
Megalonotus praetextatus	Nb	X	X		X																
Megalonotus sabulicola	Nb		X																		
Metopoplax ditomoides																					X
Nysius ericae					X																
Nysius senecionis				X	X			X				X	X								
Nysius thymi								X					X								
Raglius alboacuminatus	Nb				X																
Scolopostethus affinis			X		X																

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		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Scolopostethus thomsoni</i>						x																
<i>Stygnocoris fuliginus</i>															x							
Miridae																						
<i>Adelphocoris lineolatus</i>			x		x		x				x		x									
<i>Amblytylus nasutus</i>			x	x	x										x							
<i>Atractotomus mali</i>					x																	
<i>Calocoris norvegicus</i>			x		x						x			x	x							
<i>Heterocordylus tibialis</i>					x																	
<i>Leptopterna dolabrata</i>																				x		
<i>Leptopterna ferrugata</i>			x												x	x						
<i>Lygocoris populi</i>	Local		x																			
<i>Lygus maritimus</i>															x							
<i>Lygus pratensis</i>	RDB3		x		x		x															
<i>Lygus rugulipennis</i>			x													x						
<i>Miridius quadrivirgatus</i>	Local																					
<i>Notostira elongata</i>							x						x									
<i>Orthocephalus coriaceus</i>	Local				x																	
<i>Orthocephalus saltator</i>			x								x											
<i>Orthotylus flavosparsus</i>															x							
<i>Phytocoris varipes</i>			x		x		x							x								
<i>Plagiognathus chrysanthemii</i>			x																			
<i>Stenodema calcarata</i>					x																	
<i>Stenotus binotatus</i>															x							
Nabidae																						
<i>Himacerus myrmicoides</i>					x																	
<i>Nabis ferus</i>					x										x		x					
Naucoridae																						
<i>Ilyocoris cimicoides</i>																					x	
Notonectidae																						
<i>Notonecta glauca</i>																		x	x		x	
<i>Notonecta marmorea</i>																		x				
Pentatomidae																						
<i>Aelia acuminata</i>	Local		x		x	x	x							x								

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Dolycoris baccarum			x																			
Eurydema oleracea	Local					x									x							
Eysarcoris fabricii			x																			
Palomena prasina											x											
Piezodorus lituratus			x																			
Podops inuncta		x			x										x							
Sciocoris cursitans	Nb	x	x		x																	
Piesmatidae																						
Piesma quadratum					x																	
Rhopalidae																						
Brachycarenum tigrinus			x																			
Chorosoma schillingi	Local														x							
Stictopleurus abutilon	RDB X		x		x	x	x					x										
Stictopleurus punctatonervosus	RDB X				x							x	x			x						
Saldidae																						
Saldula orthochila					x																	
Tingidae																						
Kalama tricornis	Local	x	x		x										x							
Tingis ampliata					x																	
Tingis cardui											x											
HOMOPTERA																						
Cercopidae																						
Neophilaenus campestris			x		x			x						x								
Neophilaenus lineatus			x		x			x						x	x							
Philaenus spumarius			x	x	x									x							x	
Cicadellidae																						
Agallia ribauti	Local	x	x		x									x								
Aphrodes albifrons					x									x								
Aphrodes makarovi			x											x								
Aphrodes serratulae		x	x		x									x								
Arthaldeus pascuellus		x			x																	
Deltocephalus pulicaris					x																	
Doratura stylata			x		x																	

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Empoasca decipiens</i>				x	x																	
<i>Eupelix cuspidata</i>						x																
<i>Eupteryx aurata</i>				x	x																	
<i>Eupteryx melissae</i>				x																		
<i>Euscelidius variegatus</i>	Nb												x									
<i>Euscelis incisus</i>		x	x	x	x		x						x	x								
<i>Euscelis lineolatus</i>			x	x									x									
<i>Idiocerus distinguendus</i>			x																			
<i>Macropsis scutellata</i>									x					x								
<i>Macrosteles laevis</i>			x																			
<i>Macrosteles quadripunctulatus</i>	Na				x																	
<i>Macustus grisescens</i>														x								
<i>Megophthalmus scanicus</i>			x																			
<i>Mocydia crocea</i>					x	x	x							x								
<i>Mocydiopsis parvicauda</i>	Local				x																	
<i>Paralimnus phragmitis</i>	Nb																				x	
<i>Paramesus obtusifrons</i>	Local																					x
<i>Psammotettix cephalotes</i>			x											x								
<i>Psammotettix confinis</i>			x	x	x									x								
<i>Psammotettix nodosus</i>			x		x																	
<i>Recilia coronifera</i>					x																	
<i>Ribautiana tenerrima</i>			x																			
<i>Streptanus aemulans</i>					x									x								
<i>Zyginidia scutellaris</i>		x		x	x																	
Cixiidae																						
<i>Oliarus panzeri</i>	Nb				x																	
<i>Tachycixius pilosus</i>					x																	
Delphacidae																						
<i>Eurybregma nigrolineata</i>	Local				x	x	x							x								
<i>Eurysa lineata</i>	Local	x	x			x																
<i>Javesella pellucida</i>					x																	
<i>Ribautodelphax imitans</i>	RDBK				x																	
<i>Stenocranus minutus</i>							x															

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Xanthodelphax stramineus	Local				x																
Membracidae																					
Gargara genistae	Local		x																		
HYMENOPTERA: ACULEATA																					
Andrenidae																					
Andrena bicolor			x		x																
Andrena bimaculata	Nb		x	x	x																
Andrena chrysoseces	Local		x		x		x					x	x								
Andrena dorsata	Local	x	x	x	x							x									
Andrena flavipes	Local		x		x							x	x		x						
Andrena haemorrhoa			x		x																
Andrena humilis	Nb											x									
Andrena labialis	Local		x		x							x	x					x			
Andrena labiata	Na		x		x																
Andrena minutula		x	x	x	x						x										
Andrena minutuloides	Na										x										
Andrena nigroaenea				x	x																
Andrena nitida					x																
Andrena ovatula			x	x	x																
Andrena pilipes sens. lat.	Nb		x		x							x									
Andrena pilipes sens. str.	Nb				x						x	x		x	x						
Andrena praecox	Local				x																
Andrena scotica			x																		
Andrena semilaevis					x																
Andrena synadelpha	Local				x																
Andrena thoracica					x																
Andrena wilkella					x							x	x								
Panurgus banksianus	Local		x		x						x	x									
Panurgus calcaratus	Local										x	x									
Andrena nigrospina	pRDB2				x																
Anthophoridae																					
Anthophora bimaculata	Local		x		x																
Anthophora quadrimaculata	Nb		x																		

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Epeolus variegatus	Local				x																	
Nomada fabriciana					x							x										
Nomada flava			x		x																	
Nomada flavoguttata					x							x										
Nomada fucata	Na		x		x																	
Nomada fulvicornis	RDB3		x		x																x	
Nomada goodeniana			x		x																	
Nomada marshamella			x		x																	
Apidae																						
Apis mellifera			x		x																	x
Bombus hortorum			x									x										
Bombus humilis	UKBAP		x		x			x				x										x
Bombus lapidarius			x		x							x	x	x								x
Bombus lucorum			x		x							x	x									
Bombus pascuorum			x		x							x	x									x
Bombus ruderarius	UKBAP												x									
Bombus sylvarum	UKBAP					x							x									x
Bombus terrestris			x	x		x							x									x
Bombus vestalis				x									x									
Bethylidae																						
Bethylus fuscicornis	Local													x								
Epyris niger			x	x	x	x							x									x
Holepyris sylvanidis						x																
Chrysididae																						
Chrysis ignita agg.				x																		
Hedychridium ardens						x																
Hedychridium coriaceum	RDB3					x							x									
Hedychrum niemelai	RDB3			x		x							x									
Omalus aeneus	Local												x									
Pseudomalus auratus																						x
Pseudomalus violaceus	Nb					x																
Pseudospinolia neglecta	Local													x								
Colletidae																						

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Colletes daviesanus			x													x						
Colletes fodiens			x	x																		
Colletes halophilus	UKBAP							x									x					
Colletes marginatus	Na				x																	
Colletes similis	Local		x																			
Hylaeus annularis	Local		x		x																	
Hylaeus communis	Local				x											x						
Hylaeus cornutus	Na		x								x											
Hylaeus hyalinatus	Local															x						
Eumenidae																						
Ancistrocerus gazella			x													x						
Gymnomerus laevipes	Local		x																			
Microdynerus exilis	Nb		x																			
Odynerus melanocephalus	UKBA										x											
Odynerus spinipes								x								x						
Formicidae																						
Formica cunicularia	Local	x	x	x	x			x			x	x					x					
Lasius flavus		x	x	x	x											x					x	
Lasius mixtus	Local				x										x							
Lasius niger sens. lat.			x																		x	
Lasius niger sens. str.		x	x	x	x	x					x				x	x	x					
Leptothorax nylanderi	Local		x																			
Myrmecina graminicola	Local	x		x	x																	
Myrmica bessarabica	RDB3	x	x					x														
Myrmica ruginodis		x		x	x									x								
Myrmica sabuleti	Local	x	x	x	x						x		x	x								
Myrmica scabrinodis		x	x		x			x			x	x		x			x					
Myrmica schencki	Nb	x			x	x																
Ponera coarctata	Nb		x		x																	
Halictidae																						
Halictus rubicundus											x											
Halictus tumulorum					x						x											
Lasioglossum lativentre											x			x								

Group / species	National status	Compartment where each species was found during 2007																					
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17		
Lasioglossum leucopus	Local		x		x																		
Lasioglossum leucozonium					x	x						x											
Lasioglossum malachurum	Nb	x	x		x						x	x	x		x	x							
Lasioglossum minutissimum		x	x	x	x						x	x		x									
Lasioglossum morio			x	x	x		x							x									
Lasioglossum pauperatum	RDB3	x	x	x	x			x			x	x			x								
Lasioglossum pauxillum	Na	x	x		x						x	x			x					x			
Lasioglossum punctatissimum	Local				x							x											
Lasioglossum puncticolle	Nb		x									x											
Lasioglossum quadrinotatum	Na				x																		
Lasioglossum villosulum						x					x	x		x	x	x							
Lasioglossum zonulus					x																		
Sphecodes crassus	Nb				x																		
Sphecodes ephippius					x	x					x	x			x					x		x	
Sphecodes Geoffrellus			x		x							x											
Sphecodes gibbus					x																		
Sphecodes longulus	Na				x						x												
Sphecodes monilicornis	Local				x							x											
Sphecodes puncticeps			x		x							x	x			x							
Sphecodes rubicundus	Na		x	x	x								x										
Megachilidae																							
Anthidium manicatum			x																				
Hoplitis claviventris			x																				
Hoplitis spinulosa	Local		x																				
Megachile centuncularis	Local																					x	
Megachile leachella	Nb		x											x									
Megachile maritima			x																				
Megachile versicolor	Local		x													x							
Megachile willughbiella			x		x																		
Osmia caerulea			x									x										x	
Melittidae																							
Dasypoda hirtipes	Nb				x							x	x			x							
Melitta leporina	Local				x																		

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Melitta tricincta	Nb				x																	
Mutillidae																						
Mutilla europaea	Nb				x																	
Smicromyrme rufipes	Nb				x							x										
Pompilidae																						
Agenioideus cinctellus	Local		x		x							x										
Anoplius infuscatus	Local		x	x	x							x									x	
Anoplius nigerrimus	Local																					x
Arachnospila anceps	Local	x	x	x	x			x				x		x	x							
Arachnospila minutula	Nb				x	x		x				x										
Arachnospila trivialis	Local				x	x						x										
Auplopus carbonarius	Nb		x																			
Caliadurgus fasciatellus	Local																					x
Episyron rufipes	Local		x											x	x						x	
Evagetes crassicornis	Local				x	x		x				x										
Priocnemis agilis	Nb											x										
Priocnemis exaltata	Local					x						x										
Priocnemis gracilis	Nb	x				x						x										
Priocnemis parvula	Local	x	x	x	x							x		x								
Priocnemis perturbator	Local					x																
Priocnemis pusilla	Local					x	x					x			x							
Sphecidae																						
Ammophila sabulosa	Local		x			x						x			x						x	
Astata boops	Local		x																			
Cerceris arenaria			x			x						x										
Cerceris quadricincta	UKBAP											x										
Cerceris quinquefasciata	UKBAP		x			x						x	x		x							
Cerceris rybyensis	Local		x	x	x							x			x						x	
Crabro cribrarius	Local											x										x
Crossocerus elongatulus			x																			
Crossocerus podagricus			x																			
Crossocerus pusillus						x	x						x									
Crossocerus tarsatus																						x

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Diodontus luperus</i>	Local												x									
<i>Diodontus minutus</i>					x		x	x														
<i>Diodontus tristis</i>	Local													x								
<i>Dryudella pinguis</i>	Local			x																		
<i>Ectemnius continuus</i>							x						x									
<i>Ectemnius dives</i>	Local		x																			
<i>Ectemnius rubicola</i>	Local		x																			
<i>Entomognathus brevis</i>	Local		x										x									
<i>Harpactus tumidus</i>	Local			x									x									
<i>Lindenius albilabris</i>													x									
<i>Mellinus arvensis</i>			x	x																		
<i>Mimesa bruxellensis</i>	Na		x																			
<i>Mimumesa unicolor</i>	Na										x	x				x						
<i>Nysson trimaculatus</i>	Nb				x																	
<i>Oxybelus uniglumis</i>													x									
<i>Passaloecus singularis</i>					x											x						
<i>Pemphredon lethifera</i>			x																			
<i>Philanthus triangulum</i>	RDB2				x																	
<i>Rhopalum clavipes</i>	Local		x																			
<i>Tachysphex pompiliformis</i>	Local		x	x	x																	
<i>Trypoxylon attenuatum</i>			x	x	x							x	x									
<i>Trypoxylon medium</i>				x	x							x	x									
<i>Trypoxylon minus</i>	RDBK		x																			
Tiphidae																						
<i>Myrmosa atra</i>	Local			x	x							x	x									
<i>Tiphia femorata</i>	Local		x	x	x																	
<i>Tiphia minuta</i>	Nb		x																			
Vespidae																						
<i>Vespula germanica</i>			x										x		x		x					x
<i>Vespula vulgaris</i>			x										x									x
Xylocopidae																						
<i>Ceratina cyanea</i>	RDB3		x																			

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Chalcididae																					
Brachymeria minuta	Nr																				
HYMENOPTERA: SYMPHYTA																					
Argidae																					
Arge ochropus																					
Arge pagana																					
Cephidae																					
Calameuta filiformis																					
Calameuta pallipes																					
Cephus cultratus																					
Cephus pygmaeus																					
Tenthredinidae																					
Athalia cordata																					
Athalia liberta																					
Athalia rosae																					
Macrophya montanata																					
Rhogogaster chlorosoma																					
LEPIDOPTERA																					
Arctiidae																					
Arctia villica																					
Eilema lurideola																					
Phragmatobia fuliginosa																					
Spilosoma lubricipeda																					
Tyria jacobaeae																					
Bucculatricidae																					
Bucculatrix cristatella																					
Bucculatrix maritima																					
Coleophoridae																					
Coleophora alcyonipennella																					
Coleophora alticolella																					
Coleophora artemisicolella																					
Coleophora serratella																					
Elachistidae																					

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Elachista argentella</i>													x									
<i>Elachista maculicerusella</i>										x	x	x			x							
Gelechiidae																						
<i>Chrysoesthia sexguttella</i>																x						
Geometridae																						
<i>Cabera pusaria</i>																						x
<i>Campaea margaritata</i>																						x
<i>Camptogramma bilineata</i>													x									x
<i>Chloroclysta truncata</i>																						x
<i>Cidaria fulvata</i>																						x
<i>Crocallis elinguaris</i>																						x
<i>Epirrhoe alternata</i>													x									x
<i>Eupithecia centaureata</i>																						x
<i>Eupithecia exigua</i>																						x
<i>Eupithecia icterata</i>																						x
<i>Eupithecia succenturiata</i>																						x
<i>Hemithea aestivaria</i>																						x
<i>Idaea aversata</i>																						x
<i>Idaea dimidiata</i>																						x
<i>Idaea fuscovenosa</i>	Local																					x
<i>Idaea rusticata</i>	Local																					x
<i>Idaea subsericeata</i>																						x
<i>Opisthograptis luteolata</i>																					x	x
<i>Pelurga comitata</i>																						x
<i>Peribatodes rhomboidaria</i>																						x
<i>Scopula marginepunctata</i>	Local																					x
<i>Scotopteryx chenopodiata</i>																						x
<i>Semiaspilates ochrearia</i>	Local										x	x		x	x							x
<i>Xanthorhoe fluctuata</i>																						x
Gracillariidae																						
<i>Leucospilapteryx omisella</i>			x				x		x	x												
<i>Parornix anglicella</i>			x				x															
<i>Phyllonorycter oxyacanthae</i>			x				x															

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Phyllonorycter coryli			x																		
Phyllonorycter salicicolella							x		x												
Hepialidae																					
Hepialus lupulinus																					x
Hepialus sylvina																					x
Thymelicus lineola	Local		x																		
Thymelicus sylvestris					x																
Lycaenidae																					
Aricia agestis	Local		x		x																
Polyommatus icarus			x		x	x						x			x						
Lymantriidae																					
Euproctis chrysorrhoea	Local																				x
Euproctis similis							x			x											
Lyonetiidae																					
Lyonetia clerkella							x			x						x				x	
Momphidae																					
Mompha epilobiella										x											
Mompha raschkiella										x											
Nepticulidae																					
Ectoedemia occulta			x																		
Stigmella anomalella			x							x											
Stigmella aurella			x							x											
Stigmella salicis			x																		
Stigmella ulmifoliella			x																		
Noctuidae																					
Abrostola tripartita																					x
Acronicta rumicis																					x
Agrotis exclamationis																					x
Agrotis puta																					x
Amphipyra pyramidea																				x	x
Amphipyra tragopoginis																					x
Apamea crenata																					x
Apamea lithoxylaea																					x x

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Apamea monoglypha																				X	X
Apamea remissa																					X
Aporophyla nigra																					X
Archanara sparganii	Nb																X	X		X	
Arenostola phragmitidis	Local																	X		X	
Atethmia centrago										X											X
Autographa gamma																				X	X
Axylia putris																				X	X
Callistege mi													X								
Catocala nupta																				X	
Cerastis rubricosa																					X
Cosmia trapezina																				X	
Cryphia domestica																				X	X
Cucullia asteris	Nb															X					X
Diachrysia chrysitis																				X	X
Diarsia mendica																					X
Diarsia rubi																					X
Discestra trifolii																					X
Eremobia ochroleuca																					X
Hecatera dysodea	RDB								X	X										X	
Hoplodrina alsines																					X
Hoplodrina ambigua																					X
Hydraecia micacea																					X
Hypena proboscidalis																					X
Lacanobia oleracea																					X
Lacanobia suasa																X					
Luperina testacea																					X
Macrochilo cribrumalis	Nb																	X			X
Mamestra brassicae																					X
Mesapamea secalis																					X
Mesoligia furuncula																					X
Mythimna comma																				X	
Mythimna ferrago																					X

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Mythimna impura																					X
Mythimna obsoleta	Local																X		X		
Mythimna pallens																			X	X	
Noctua comes																					X
Noctua fimbriata																					X
Noctua interjecta																			X		
Noctua interjecta																					X
Noctua janthe																			X	X	
Noctua pronuba																			X	X	
Nonagria typhae																X	X	X	X	X	
Ochroleuca plecta																					X
Oligia latruncula																			X		
Oligia strigilis																					X
Orthosia cerasi																					X
Orthosia cruda																					X
Orthosia gothica																					X
Orthosia incerta																					X
Orthosia populeti	Local																				X
Phlogophora meticulosa																					X
Scoliopteryx libatrix																					X
Thalpophila matura																					X
Tholera decimalis																					X
Xanthia aurago																					X
Xanthia ocellaris	Na																			X	
Xestia c-nigrum																					X
Xestia xanthographa																					X
Xylocampa areola																					X
Notodontidae																					
Notodonta dromedarius																					X
Pterostoma palpina																					X
Ptilodontella cucullina	Local																				X
Nymphalidae																					
Inachis io			X									X								X	

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Coenonympha pamphilus					x	x						x			x							
Pyronia tithonus		x			x																	
Vanessa atalanta									x	x	x	x	x	x	x	x					x	
Oecophoridae																						
Agonopterix alstromeriana									x	x											x	
Carcina quercana												x									x	
Pieridae																						
Colias croceus		x			x										x							
Pieris brassicae		x									x		x									
Pieris napi		x										x				x		x				
Pieris rapae		x			x							x	x		x							
Pterophoridae																						
Stenoptilia zophodactylus	Local				x																	
Pyralidae																						
Agriphila geniculea					x																	
Agriphila tristella																					x	
Cataclysta lemnata																					x	
Chrysoteuchia culmella		x			x	x	x	x	x	x	x	x	x	x	x		x	x		x		
Crambus lathoniellus		x			x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		
Crambus pascuella		x			x	x	x	x	x	x	x	x	x	x	x		x	x		x		
Crambus perlella		x			x	x	x	x	x	x	x	x	x	x	x						x	
Eurrhpara hortulata																					x	
Homoeosoma sinuella																						
Myelois circumvoluta																						
Ostrinia nubilalis																						
Parapoynx stratiotata																					x	
Sitochroa verticalis	Local																				x	
Udea olivalis																					x	
Saturniidae																						
Saturnia pavonia																						x
Sesiidae																						
Bembecia ichneumoniformis	Nb	x																				
Sphingidae																						

Group / species	National status	Compartment where each species was found during 2007																				
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17	
Deilephila elpenor										X												X
Tischeriidae																						
Emmetia marginata		X							X													
Tortricidae																						
Agapeta hamana										X												X
Agapeta zoegana										X			X									
Argyrotaenia ljugiana										X												
Bactra furfurana																	X					
Bactra lancealana																			X			
Celypha lacunana		X							X	X		X	X			X						
Cochylinomorpha straminella									X	X			X			X						
Cochylys hybridella																X						X
Cochylys roseana		X																				
Cydia compositella													X									
Endothenia gentianaeana		X							X	X												
Endothenia marginana		X																				
Epiblema cynosbatella		X																				
Epiblema uddmanniana		X																				
Eucosma campoliliana										X												
Eucosma cana										X												
Eucosma pupillana																X						
Lobesia littoralis												X										
Pandemis cerasana																						X
Tortrix viridana																						X
Zygaenidae																						
Zygaena filipendulae				X						X			X									
Zygaena lonicerae				X						X			X									
MECOPTERA																						
Panorpidae																						
Panorpa communis								X					X									
Panorpa germanica																X						
MEGALOPTERA																						
Sialidae																						

Group / species	National status	Compartment where each species was found during 2007																			
		1	2	3	4	4a	4b	4c	5	6	7	8	9	10	11	12	13	14	15	16	17
Lestidae																					
Lestes dryas	RDB2																x	x	x		
Libellulidae																					
Libellula depressa			x																		
Orthetrum cancellatum	Local		x																		
Sympetrum sanguineum	Nb																x		x		
Sympetrum striolatum			x																		
ORTHOPTERA																					
Acrididae																					
Chorthippus albomarginatus	Local		x		x				x	x		x		x	x		x				
Chorthippus brunneus		x	x	x	x		x		x	x		x					x				
Chorthippus parallelus		x	x		x							x		x			x				
Gryllidae																					
Acheta domesticus			x																		
Tettigoniidae																					
Conocephalus dorsalis	Local				x						x						x				
Leptophyes punctatissima			x		x																
Metrioptera roeselii	Nb		x		x		x		x	x			x			x	x		x		
Pholidoptera griseoptera					x		x		x												
Tettigonia viridissima	Local																x		x		
Tetrigidae																					
Tetrix subulata	Local				x																
Tetrix undulata				x	x																

APPENDIX 2: EXPLANATION OF NATIONAL STATUS CODES USED IN THE SPECIES LIST

NATIONALLY RARE species are those falling within the Status categories defined in the *British Red Data Books* (Bratton, 1991; Shirt, 1987). These are internationally recognised species listed in the various *Red Data Books* published by, or under the auspices of, the International Union for the Conservation of Nature (IUCN). Species included may not be informally removed or transferred between categories. There are four categories as follows:

RDB 1 – “Endangered”. Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. These include Species known from only a single locality since 1970, species restricted to habitats which are especially vulnerable species which have shown a rapid and continuous decline in the last twenty years and are now estimated to exist in five or fewer localities and species believed extinct but which would need protection if re-discovered.

RDB 2 “Vulnerable”. Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. These include species declining throughout their range, species in vulnerable habitats and species whose populations are low.

RDB 3 “Rare”. Taxa with small populations which are not at present endangered or vulnerable but which are at risk. These are species which are estimated to occur in fifteen or fewer localities.

RDB K. “Unknown” Taxa suspected to fall within the RDB categories but which are at present insufficiently known to enable placement.

RDB X. “Appendix”. Taxa formerly in Red Data Book categories but now regarded as being “out of danger”.

NATIONALLY SCARCE species are those falling within the Nationally Notable categories introduced by Ball (1986). They are species which are estimated to occur within the range of 16 to 100 ten-kilometre squares of the British National Grid system since 1970. The specific categorisations of species have been revised since their inception for a number of taxa; those revisions are taken into account in the present report.

Notable species are subdivided as follows:

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

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

N: Diptera falling in the Nationally Notable categories are not subdivided.

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

Remaining species have either been formally declared “Common” or else are listed as “Unknown” where insufficient data is available to assign a species to any category.

SITE PHOTOGRAPHS

2007

Compartment 2. Energy and Environment Centre land and garden

This area is mostly dry grassland developed on sandy substrate, with areas of lichen heath.



Compartment 3. Lapwing Field

An area of sparsely-vegetated friable substrate with a raised disused railway siding on the eastern side.



Lytag site: 'Steppe'-like area

Immediately to the south of a dry ditch crossing the site is a steppe-like area of clinker, providing another valuable habitat at the site.



Lyttag site: Seasonally wet area

The site contains a number of seasonally wet lower areas, mostly in the northern part of the site, where in the north east corner, to the west of the PFA bund; they are clearly saline, with *Salicornia* and other salt-tolerant species.



Lytag site: *Lotus glaber* area to the north of the dry ditch



Lytag site: *Lotus corniculatus* areas near the old foundations



Remnant grasslands to north of Lytag site



Old foundation area

On the western side of the northern part of the site are the remains of old foundations. These are becoming vegetated and provide quite extensive areas of drought-stressed bramble, an important stem nesting resource for various species such as the Blue Carpenter Bee *Ceratina cyanea*, not recorded during this survey, but previously recorded in the vicinity of the Energy and Environment centre by EECOS. There are extensive areas of *Lotus corniculatus* as well as a number of plants of Ploughman's Spikenard *Inula conyzae*, an Essex Red Data species. Areas of *Sedum album* probably provide valuable forage for various small mining bees.



Disused railway track north of Lytag site and remnant grasslands

Between the remnant grassland and the active railway line is a disused railway track. This supports reasonably diverse and flower rich vegetation and is likely to be a valuable addition to the invertebrate habitats found on the Lytag site itself.



4a Lytag site: the disused siding to the west

The disused railway siding immediately west of the Lytag site is an interesting habitat corridor, with dry grassland, sparsely vegetated areas and lichen heath.



4c Lytag site – PFA embankments

This provides a crucially important ground nesting habitat for aculeate Hymenoptera and other species such as the tiger beetle *Cicindela campestris*.



Compartment 12. Saltmarsh area

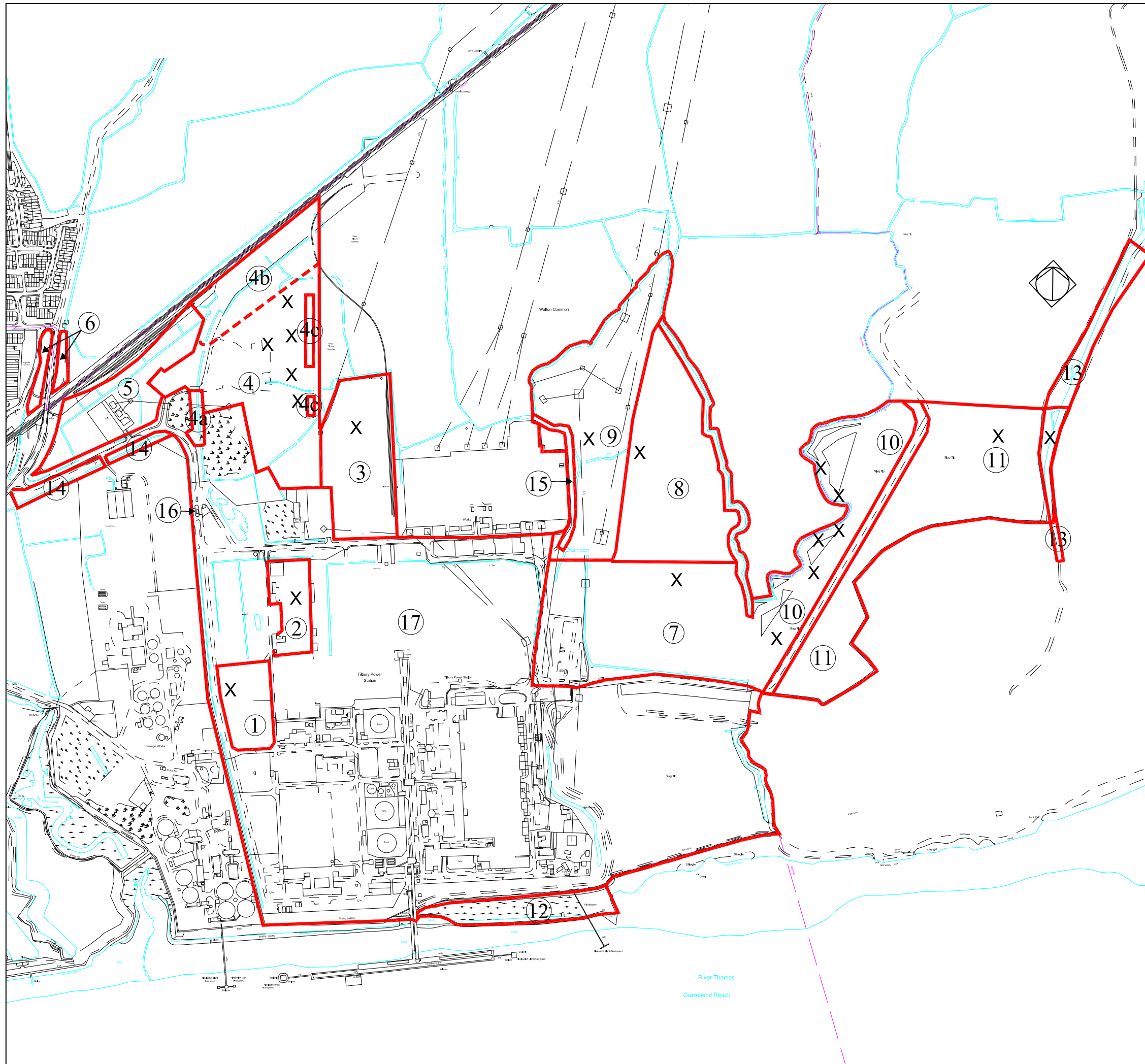
The saltmarsh on next to the Thames to the south of the power station is a part of a nationally valuable coastal habitat continuum, which in the Thames Estuary area supports a large number of nationally rare and scarce species.



Compartment 13. Scirpus ditch and adjacent saline area (extreme east of site)

At the eastern boundary of the survey area the PFA bank drops down to an old track and saline ditch on the original marshland levels.





Key

- Study boundary
- Invertebrate survey compartments
- X Pan and pitfall trap locations

Invertebrate Survey

Figure 1

Tilbury Power Station

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