COMMENTS ON THE PLANNING APPLICATIONS (Y06/1647/SH AND Y06/1648/SH) FOR LYDD AIRPORT

prepared by

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1 INTRODUCTION

The applications (Y06/1647/SH and Y06/1648/SH) refer to a new terminal building and the extension of the runway at Lydd Airport.Our comments refer to both planning applications and particularly the implications for the invertebrate fauna. The proposed development would enable the airport to expand its passenger numbers from currently ca. 3000 p.a. to 500,000 p.a. short-term and 2 million by 2014 (see section 5.5.23 in 'terminal building Environmental Statement (ES)'). Lydd Airport is located directly beside the large area of shingle in Dungeness, 'one of the most important shingle sites in Europe' (Doody, 2003), 'where the geomorphology, plants, invertebrates and birds are all of international importance' (English Nature 1997). 'Shorelines dominated by clasts of the size considered to qualify as shingle are important mainly in high latitudes and in those parts of the temperate world that were affected by glaciation. The combination of sediment production and supply and the post-glacial storm wave climate have helped to create gravel beach concentrations ... The European distribution is predominantly found in the more exposed north west, especially in Great Britain (northwest Scotland and southeast England).' (Doody, 2003) According to the same source Great Britain 'supports a particularly high proportion of the total European resource' of shingle. Disturbance of shingle lowers its conservation value considerably and might even destroy it. See (Doody, 2003) 'The value of this state [disturbed or excavated shingle] immediately following the disturbance of excavation is generally seen as being negative for conservation, because the surface shingle is damaged or destroyed.'

Lydd Airport is located within the proposed new Dungeness, Romney Marsh and Rye Bay SSSI that is currently under consultation and reaches partly into one of the existing SSSIs. The new SSSI includes invertebrates in its designation.

When the importance of Dungeness for invertebrates is taken into account, any development proposal on the areas of conservation importance or adjacent to them must adequately assess the impact on invertebrate diversity and populations.

2 EXPERTISE

2.1 Joint Expertise

We are entomological consultants and have between us more than 35 years experience in ecology and taxonomy of invertebrates. We work together as entomological consultants, but are specialists on Diptera (True Flies). We both have extensive experience in sampling all major insect orders for environmental surveys. Furthermore, we are able to conduct scoping surveys for invertebrates. We have contributed to major studies on management for invertebrates, but also taught sampling techniques, identification skills and preparation techniques in the UK and abroad. Also, we have given expert advice on fly issues. We have published many papers on insects, in particular flies.

Our environmental surveys were conducted as part of Ecological Impact Assessments, but also as assessments of SSSIs or to provide information for management of conservation sites. We have extensive experience of working directly with clients or as subcontractors for larger ecological surveys. We can sample all invertebrate groups and after identification by experts in the field deliver a coherent report including suggestions for mitigation. We produce impartial reports based on survey and historical data. Our expertise is working on terrestrial invertebrates including species with aquatic larvae, but we have some experience with aquatic species as well and will therefore comment where appropriate.

Recent projects include a survey of the beetles and flies of Chigwell Row Wood for Epping Forest District Council, surveys of Salisbury Plain Training Area in 2002 / 03 for the invertebrate fauna and to assess different grazing regimes and monitoring waste and clean water facilities for mosquitoes and other flies.

In addition to our survey work, we conduct joint desk studies about conservation and management of sites for Diptera. A recent project was to assess the management needs of acalyptrate flies. A joint project by me, John Ismay, Peter Chandler and Steven Falk assessing the national status of Acalyptrate Diptera is almost finished and will be published later this year by JNCC. During the last two years, I, Barbara Schulten, have compiled the BAP Review of all Diptera with the help of numerous other dipterists.

3 CONSERVATION VALUE OF DUNGENESS AND ROMNEY MARSH FOR INVERTEBRATES

3.1 Introduction

The invertebrate report, by Andy Godfrey, in the two planning applications states that 'the site [beside the proposed runway extension] is clearly of high nature conservation value for its invertebrates.' Dungeness is famous among entomologists for the sparsely vegetated shingle, a habitat which is found on the airport. It is also known for its high populations of the protected species great crested newt and medicinal leech. These are associated with water bodies and have been recorded from the pond adjacent to the proposed runway extension. Despite the limitations of the invertebrate survey noted in this report, a number of other scarce invertebrates were recorded. The area is known to support many rare and BAP species and Species of Principal Importance (Section 74, CROW Act 2000), some of which are found only here in the UK.

3.2 Species only found in Dungeness

Some invertebrate species are found only in Dungeness, within the UK or in the world. These include:
Aphrodes duffieldi – this leafhopper (BAP and RDBK) is endemic to Dungeness (found nowhere else in the world).
Eilema pygmaeola pallifrons – this pygmy footman moth subspecies (RDB1) is endemic to Dungeness (found nowhere else in the world).
Lasiocampa trifolii flava – this grass eggar moth subspecies (RDB1) is endemic to Dungeness (found nowhere else in the world).
Thalera fimbrialis – the Sussex Emerald Moth (RDB1, Schedule 5 (Wildlife and Countryside Act 1981)) is only known from Dungeness in the UK.
Coleophora otitae – this case bearing moth is only known from Dungeness in the UK.
Polyodaspis sulcicollis – this grassfly (RDB1) is only known from Dungeness in the UK.
If these species become extinct they will be entirely lost either to the UK or to the world.

3.3 Protected sites

3.3.1 Sites of Special Scientific Interest (SSSI)

Lydd Airport is located within the proposed new SSSI that is currently under consultation (the Dungeness, Romney Marsh and Rye Bay SSSI) and reaches partly into one of the existing SSSIs. The new SSSI includes most of the area of eight former SSSIs, but also some additional terrain. This SSSI was mentioned in the ES of the planning application, but its invertebrate interest was not taken into account, although the notification was included in English Nature's consultation document published by English Nature on 16. August 2006. The invertebrate survey would have been comprehensive, covered a wider area and more habitats had it been considered. It could be argued that this SSSI is still under consultation, but we would argue that a thorough ES would have taken its boundaries into account and assessed the impact of the planned developments on the habitats and species / species assemblages mentioned in its designation. The designation of the SSSI includes invertebrates as follows below. (English Nature, 2006)

- endemic species and subspecies of invertebrates;
- populations of two invertebrate species listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended);
- populations of ten endangered, vulnerable and rare invertebrate species;
- assemblages of invertebrates occurring on 'dry' coastal habitats;
- assemblages of wetland invertebrates.

The notification for this SSSI includes invertebrates in more detail. The relevant paragraphs can be found in App. I of this document.

3.3.2 National Nature Reserve Dungeness (NNR)

The designation for this NNR includes invertebrates, which were not appropriately assessed in the invertebrate survey. The survey was conducted between July and September, while the peak activity time for many invertebrates, including water beetles, is May and early June. Our comments under section 3.2.1 also apply here.

3.3.3 Special Area of Conservation (SAC)

The SAC includes the NNR (see 3.2.2) and large areas of the new (enlarged) SSSI (see 3.2.1). It therefore includes many of the invertebrate species mentioned in the designations of these protected areas. The SAC extends up to the eastern boundary of the airport. Although the designation of the SAC does not mention invertebrates, the ES has not assessed whether the proposed development could damage the integrity of the SAC by damaging invertebrate biodiversity. Our comments under sections 3.2.1 and 3.2.2 also apply here.

3.4 Detailed comments on invertebrate protection, habitat needs and rare species

3.4.1 Comments on Legal Regulations

The ES includes relevant legislation in several chapters. Beside others it mentions in Section 8.14 of the Planning Statement for the runway extension and in Appendix 10 under UK Legislation and Policies the 'Planning Policy Statement (PPS9): Biodiversity and Geological Conservation' and summarizes this planning policy guidance. This summary does mention some important facts that Local Planning Authorities (LPAs) have to take into account when considering a planning proposal. PPS 9 includes six key principles and although all of them are important, principle 6 in particular is not included in the summary mentioned above. We regard this as important for the consideration of this planning application:

> '(vi) The aim of planning decisions should be to prevent harm to biodiversity and geological conservation interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place. Where a planning decision would result in significant harm to biodiversity and geological interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused'.

Furthermore, the UK Biological Action Plan (BAP) is mentioned in Appendix 10 under Relevant Plans (National and Local), but we were astonished to see that the ODPM Circular 06/2005, which complements the guidance of PPS 9 and includes guidance for BAP species and habitats is not mentioned. This states in Part III A:

> ‘84. The potential effects of a development, on habitats or species listed as priorities in the UK Biodiversity Action Plan (BAP), and by Local Biodiversity Partnerships, together with policies in the England Biodiversity Strategy, are capable of being a material consideration in ... the making of planning decisions.’
> ‘85. ... In PPS9, the Government has indicated that local authorities should take steps to further the conservation of habitats and species of principal importance through their planning function (see PPS9 paragraphs 11 and 14). The lists of the habitat types and species subject to this duty were published by Defra in 2002 and comprise the list of species and habitats identified as priorities under the UK Biodiversity Action Plan. The lists are reproduced in Annex C.’

This clearly places a duty on LPAs to take BAP species and habitats into account including possible impacts on these. This includes inclusion of these species in surveys and mitigation measures. The same Circular gives further guidance how LPAs have to take protected species into account including obligations for surveys if the possibility of such a species present on site exists and that protective measures, through conditions and/or planning obligations, have to be in place before the planning permission is granted.

It is also not mentioned in the ES that some species and habitats as included in BAP now have a statutory basis under section 74 of the Countryside and Rights of Way Act 2000 and that Government Ministers, Departments and LPAs have a duty to support these objectives in carrying out their functions.

The medicinal leech (*Hirudo medicinalis*) and the brown carder bee (*Bombus humilis*) are both BAP species and species of principal importance. Furthermore, the medicinal leech has Lower Risk (Near Threatened) status worldwide (IUCN) and is listed in Appendix III of the Bern Convention. It is protected under Schedule 5 of the Wildlife and Countryside Act 1981 as amended by CROW Act 2000. Dungeness is known to support several other BAP species and the airport alone includes several BAP habitats. Conservation objectives for many of these are set out in their individual Species or Habitat Action Plans and need to be considered when assessing the impact of this development. However, many of these species are invertebrates and this highlights the need for a comprehensive survey of the area affected by the development for this important group.

3.4.2 Historic data

There are many sources which contain data on the invertebrates of the Dungeness area and this should already have been taken into account during the scoping phase of the ES. During this phase the extent and timing of further ecological work was determined. The historic data would have shown the importance of Dungeness for invertebrates and should have resulted in a more comprehensive survey. The invertebrates of Dungeness are clearly of international importance (Morris & Parsons (1991) and Philp & McLean (1985)) and although this is acknowledged in the ES and their sensitivity is rated as very high / high (10.4.62, chapter 10), the impact on this important group has not been properly assessed. The same chapter states that species data is included in App. 10.5, which could lead to the assumption that historic data is indeed presented there. However, this appendix only includes the status for medicinal leech and brown carder bee, but no historic data for invertebrates at all. This section on historic data gives an overview of the importance of the invertebrate interest of the area, but is by no means comprehensive. It is therefore essential that the historic data is thoroughly researched and the results taken into account when assessing the impact of the development on this important group. Morris & Parsons (British Wildlife) gives an overview of the subject. Morris & Parsons (1991) provide an inventory of shingle beaches at Dungeness, Morris & Parsons (1992) provide a survey of

invertebrate communities on the shingle at Dungeness and Philp & McLean (1985) considered the ecology and conservation of invertebrates at Dungeness.

Morris & Parsons (1991) list 2834 species of invertebrates recorded from the shingle beaches at Dungeness. This inventory also gives the status (i.e. RDB (= Red Data Book), Notable, common, migrant etc.) for most species. As this report was published before the Convention on Biodiversity (1992) and the subsequent UK response in form of the BAP process, BAP species were not included. We scanned this list for BAP species, but might have missed some due to name changes. It is therefore important to investigate which BAP species are included in this inventory and also if changes to the conservation status of some species might have occurred. We have counted the numbers of species in each category of conservation concern, i.e. RDB 1, 2, 3 and Notable as they were included in the report (for definitions of these categories see App. 10.2 F of the ES). Please note that Notable a and Notable b are lumped as not all groups are divided into Na and Nb. Table 1 shows the number of species in each category:

Table 1: Species of Conservation Concern on Dungeness shingle (based on Morris & Parsons 1991)

Category	**Number of species**
Notable	330
RDB 3	41
RDB 2	21
RDB 1	26
RDB K	3
Total:	421

The 421 species of invertebrates of conservation concern for Dungeness is significantly higher than on most or even all other sites in the UK. This report included at least 11 BAP species with recent records, of which 4 were bumblebees. The total number of species, 2834 (based on Morris & Parsons, 1991), the number of species of conservation concern and the number of BAP species are all exceptionally high. This means that the invertebrate interest of the site is at least of national importance, but most likely of international importance. The latter is supported by the presence of internationally important species on site, e.g. the medicinal leech and the leafhopper *Aphrodes duffieldi*. Furthermore, the area supports several endemic species or subspecies, i.e. species that occur worldwide only here - *Aphrodes duffieldi* and subspecies of the pygmy footman moth *Eilema pygmaeola pallifrons* and grass eggar moth *Lasiocampa trifolii flava*. This is one of the best sites in the UK for invertebrates and according to literature of international importance (Philp & McLean, 1985).

There are also data specifically for Lydd Airport, which have not been included in the invertebrate report. Morris & Parsons (1992) provide a list of 320 species from Lydd Airport Pits, shown on the map (p. 116) as the area east of the main runway. This data was almost entirely collected in 1989, some in 1990. It includes 1 RDB 1, 2 RDB 2, 5 Notable a, 16 Notable/Notable b and 62 local species. Although this data is some 15 years older than the recent work, it should have been identified during the scoping survey and used to focus the extent and scale of the invertebrate survey.

3.4.3 Habitat association

3.4.3.1 Introduction

There are several habitats on Dungeness which support invertebrates of conservation concern. The vegetated shingle is the best known, but there is also an interesting faunal component

associated with wetlands and dry grassland. These habitats are all represented within the proposed development, as well as ephemeral vegetation, scrub, swamp, margins of standing water, marshy grassland, semi-improved and unimproved, but managed grassland and bare shingle. While the habitat needs of some species are well understood, there are species for which these needs are not or only poorly understood. Therefore, changes to their microhabitat might have an adverse effect on the species.

3.4.3.2 Conservation needs of invertebrates

The conservation needs of invertebrates are varied and need careful consideration if populations of rare species are to be supported. Most of the species have annual life cycles and therefore need continuity of habitat; if the majority of their habitat is in unsuitable condition for one year (e.g. while construction is in progress) then the population will die out. If too large a proportion of their habitat is affected, this might have the same effect and even a smaller proportion could have a detrimental effect on an already vulnerable population. Many species need a combination of conditions – for example the rare brown carder bee, a BAP species, recorded in the development footprint needs suitable nesting sites in longer vegetation, but also a plentiful supply of flowering plants for much of the vegetative season, so the bees can collect pollen and nectar to feed larvae in the nest. These features must both be present in suitable condition to enable the species to survive. Invertebrates thus need a mosaic of habitats, often in different stages of ecological succession, such as the transition of bare shingle to vegetated shingle to scrub. They also may live in the edges of habitats, e.g. scrub edge or water margins, thus a mosaic of habitats are better than a large uniform area. Fragmentation of the habitat can lead to the best conditions for rare species being lost for a period, so the species becomes extinct. Thus size is important, and removing small parts of a large site can destroy its value, even if a large area of suitable habitat remains. The dispersal powers of different species vary greatly, with some being highly mobile and able to colonise suitable habitat quickly, while others (often the rare ones) have very poor powers of dispersal. Other species need sparsely vegetated areas, which could be shingle or grassland, where the lack of vegetation leads to higher daytime temperatures, the ground in this microhabitat is warmed by the sun. These species could not survive the cooler conditions associated with denser vegetation cover. Some species are endemic to Dungeness and these species may therefore become extinct if their habitat is disturbed.

Invertebrates form a most important link in the food chains in Dungeness. They form a large part of the food of the birds for which the site is renowned, they recycle nutrients from dead plants, dung, corpses etc and others live on plants or are parasites and predators of other faunal elements.

3.4.3.3 Vegetated shingle

The vegetated shingle supports a limited flora but high diversity of invertebrates. This may partly be due to microclimatic reasons, as mentioned in 5.2.4 of this report. Other factors are that the plant species are stressed by the poor nutrient levels, low water table and low rainfall. This may make them more susceptible to attack by invertebrates and allow species of invertebrates to survive on them, while in the rest of the UK conditions are not suitable. For example, the Sussex emerald moth (*Thalera fimbrialis*) is only known from Dungeness in the UK, yet its food plant, wild carrot, (which occurs on the development site) is common in Britain. The plant hopper *Aphrodes duffieldi* is endemic to Dungeness (found nowhere else in the world) and lives on grasses. The jumping spider *Pellenes tripunctatus* is currently known only from Dungeness in Britain. Other plants that support rare invertebrates on Dungeness include Nottingham catchfly, viper's bugloss and yellow toadflax, all of which occur on the broader development site (see Target notes from Phase 1 Habitat Survey). Morris & Parsons (1992) list some of the rarer

species on these hostplants from the airport site in 1989 – the case-bearing moth *Coleophora otitae* (RDB1) (feeds on Nottingham catchfly), the pyralid moth *Cynaeda dentalis* (RDB2) (feeds on viper's bugloss) and the weevil *Ceutorhynchus pumilio* (Notable a) (feeds on sheperds cress).

We note that Morris & Parsons (1992) list some species from the airport associated with older, more developed shingle ridges – the fly *Thereva plebeia*, Notable, and the moth *Synaphe punctalis,* Notable b, which feeds on mosses. This highlights the importance of a wider invertebrate survey, since increased air and road vehicle movements would have a greater effect on these species closer to the airport.

The impact of the proposed development on the vegetated shingle is twofold. Firstly there will be a loss of vegetated shingle due to disturbance. The good practice guide (Doody, 2003) states that disturbance almost always results in loss of vegetation and associated animals. Secondly the fauna and flora of vegetated shingle is dependent on low nutrient levels, so that increased nitrogen deposition and pollution from increased aircraft and car movements would have an effect on the resource beyond the development footprint.
The many moth species associated with vegetated shingle highlights the need for a moth survey of the airport and the surrounding area before any planning decisions are contemplated.

3.4.3.4 Lichens

A special feature of the Dungeness vegetated shingle is the extensive coverage of lichens, including many species of *Cladonia*. These lichens support a small but important fauna of invertebrates. The psychid moth *Dahlica lichenella* (Notable b) and the rare (RDB3) pygmy footman moth *Eilema pygmaeola pallifrons* feed on lichens as larvae. Lichens are particularly sensitive to atmospheric pollution and the deposition of nitrogen; hence the proposed development could seriously affect this community.

3.4.3.5 Wetlands

Wetland communities on Dungeness are also important for invertebrates and support a wide range of species. There are naturally occurring water bodies (the Open Pits) on the vegetated shingle and these support a wide range of invertebrates (Morris & Parsons, 1991). The gravel winning process (about 43% of the vegetated shingle has been disturbed) has resulted in many new water bodies. The margins of water bodies, including ponds and ditches, have marginal vegetation such as reedmace and reeds (these are found in the airport footprint). The hairy dragonfly, *Brachytron pratense*, an uncommon species currently extending its range, was recorded from the airport by Morris & Parsons (1991). Some rare moths (silky, twin-spotted and brown-veined wainscot moths), all Notable b, and flies (*Typhamyza bifasciata*, Notable) live on these plants (Morris & Parsons, 1991). Where water margins have fine sediments and are clear of vegetation the rare fly *Tachydromia terricola*, threatened – Vulnerable, has been found (Falk & Crossley, 2005). This species is known only from Dungeness in the UK.

3.4.3.6 Ditches

Ditches are another feature of the Dungeness area and have an interesting fauna. An extensive ditch system occurs on the airport and has been surveyed for great crested newt, but not for invertebrates. The medicinal leech, *Hirudo medicinalis*, has been mentioned earlier and the airport water bodies have important populations of this species. The great diving beetle *Hydrophilus piceus* is associated with ditches and is found at Dungeness. This species has a very restricted distribution in Britain and is known from the Thames marshes, Hampshire, Somerset,

south Wales and East Anglia. The ditches on Dungeness and Romney Marsh may have a variable saline influence, which increases invertebrate diversity.

Ditches need careful management because they are a dynamic system (Philp & McLean, 1985). They fill with emergent and marginal vegetation, which chokes the system. This needs to be removed periodically, but as part of a planned management plan incorporating all the ditches that are connected to each other. The object of the plan is to have some ditches at all stages of succession, so there is habitat for the special flora and fauna of each stage and the freshly cleared ditches can be recolonised without extinction of species. In the case of the ditches around the airport, it would seem that the ditches are owned by a number of landowners and organisations. Any drastic changes to use and management, for example using ditches to remove contaminated surface water from airport runways, would require extensive consultation and agreements with adjacent landowners. The ditch system is essentially one of interconnected ditches, so drastic changes and increased inputs, but also contamination with pollutants, i.e. antifreeze, into one part of the system (the airport drainage) could affect ditches on adjacent properties, leading to severe damage over a wider area than the airport footprint. This damage might lead to populations of rare species becoming extinct. The consultation and agreement must happen before the planning permission is granted and we see no evidence from the ES for the runway extension that this has been completed.

3.4.3.7 Dry grassland

Dry grassland, some semi-improved or unimproved but managed, is present on the airport site. Most data on rare invertebrates is from the habitats mentioned above probably due to the concentration of survey work. Morris & Parsons (1992) list some of the rarer species from the airport, including the leaf beetle *Chaetocnema arida,* Notable a, a grassland species. Dry grassland also has some other rare species associated with it, for example the small fly *Geomyza apicalis* and, therefore, needs to be included when assessing the impact on the invertebrate fauna.

4 POLLUTION AND NITROGEN DEPOSITION

Pollution from developments such as this airport extension can come from many sources. Both the aircraft and the increased road traffic associated with large developments produce nitrogen deposition, which is known to affect biodiversity. There is also a risk from oil spillage and deposition of de-icing chemicals from aircraft during periods of severe winter weather. Although the thresholds for nitrogen deposition are currently exceeded within this area according to the ES, the species recorded are evidently able to survive these levels. It is unlikely that they could survive the impact of increased aircraft movement and the pollution from 3000 to 500,000 passenger movements per year. An even larger increase to 2 million passengers per year would have a larger impact. One of the threats for medicinal leeches is eutrophication of the water-bodies they are found in as this would lead to a loss of submerged vegetation (Ausden et al, 2002).

As mentioned under 3.3.3.3, the flora of the vegetated shingle and the fauna associated with it is dependent on low nutritional inputs. This stresses the plants and the low level of cover allows the microclimate to attain higher temperatures than denser vegetation would allow. More dense vegetation from higher nitrogen deposition would destroy this community, causing extinction of the invertebrates dependent on high temperatures (thermophilic species). This loss would be permanent, as this is the only site in Britain for some of these species.

High nitrogen levels would also cause changes in the flora, by some rare plants dependent on low nutrient levels, being out competed by species adapted to high nutrient levels (e.g. stinging nettles). Any invertebrates dependent on these rare plants would also die out.

Another form of pollution can occur in the form of increased light levels. This is covered in 5.2.5.

5 COMMENTS ON THE ASSESSMENT OF THE IMPACT OF THE PROPOSED DEVELOPMENT ON INVERTEBRATES

The comments below refer to the assessment of the impact of the planning applications on invertebrates. This assessment was in both the planning applications based on an 'Invertebrate survey of Lydd Airport, Kent', by Andy Godfrey, dated September 2005. The planning applications are inconsistent in stating who conducted the invertebrate survey (see 1.6.1 – Humphries Rowell and 10.3.2 A. Godfrey), however, the Invertebrate Survey report identifies A. Godfrey as the specialist ecologist used. In the comments below, this report is referred to as the invertebrate survey and the comments refer to both planning applications.

5.1 Scoping for invertebrates

This part of the ES, which is only summarised in Chapter 1, should have included a desk study of the invertebrates recorded from the site or the area that might be impacted on by this development. It should have been conducted by Parsons Brinkerhoff Ltd as part of their scoping exercise. According to IEEM guidelines a desk study should be conducted before a field survey to identify the scope of the field study. This should include data from Local Records Centres and literature including site designations available for the area possibly affected by the development (IEEM, 2005). A wide range of literature and data from other sources, e.g. Local Records Centres (in this case Maidstone Local Record Centre, see Philp & McLean in Ferry & Waters, 1985), is available on the invertebrates of Dungeness, which would provide lists of the species that might be expected to occur on the proposed site of development or in the area affected by this. Furthermore, this data could have been used to determine the time of year during which the invertebrate survey should have been conducted. As no historic invertebrate data is included in the ES, this desk study was obviously not conducted (see Table 10.1). Also, such a desk study would have resulted in the invertebrate survey being designed differently. Hence, the applicant is contradicting his own statement that the EIA was conducted according to international and national guidelines.

5.2 Invertebrate Survey

The Scoping Report for the Terminal Building (see App. 1.1, section 7.2.6) includes a much wider remit for the invertebrate survey including a wider area, more habitats and a wider brief to be included in the survey for invertebrates than was included in the final invertebrate report, which is the basis of the impact assessment on invertebrates.

5.2.1 Briefing of the specialist surveyor

In the introduction the brief for the survey mentioned that the 'airport would like to fill in the pond and an associated ditch in order to comply with new regulations relating to the safety of runways'. The planning applications (Y06/1647/SH and Y06/1648/SH) refer to extending the runway by a considerable distance and increasing the number of passengers serviced by the airport from currently 3000 to 500,000 passengers per year (paragraph 1.1.2, chapter 1 terminal building). Mid-term planning is to increase numbers of passengers to 2 million p.a. (Non-technical summary, runway extension, S.5.3 and paragraph 1.1.2, chapter 1 terminal building) and a note in British Wildlife **18** (3), page 222 gives a final number of 6 million passengers p.a. This represents a considerable difference in possible impacts on invertebrate species and assemblages.

Both planning applications claim that the EcIA was conducted according to national and international guidelines. The guideline for invertebrate and other ecological surveys by the

Institute of Ecology and Environmental Management (IEEM) states that the surveyor should 'Ensure all necessary information has been provided to undertake the survey'. The English Nature leaflet 'Organising surveys to determine site quality for invertebrates' states that the surveyor will need 'Clear instructions on what the survey is intending to achieve'. As the brief to Andy Godfrey (the invertebrate specialist and surveyor) did not include the full extent of the planned development, these guidelines have not been followed.

5.2.2 Survey area

In order to assess the impact on the surrounding areas as well as the proposed work on the runway area, the area surveyed for invertebrates should have been much larger. Soil deposition, movements of heavy vehicles and Portacabins as well as deposition of pollutants – including nitrogen – would most likely have an impact on the invertebrate fauna present. The great crested newt survey, for example, was conducted over a much larger area. The bird survey covered an even larger area. Furthermore, the Scoping Report when defining the geographical scope of this project (App. 1.1, section 2.3.8) states that 'Impacts are also likely beyond the airport boundary, especially under the aircraft flight path and on road access routes.' Invertebrates are affected by increased pollution including nitrogen deposition along road access routes as soon as the vegetation of these areas changes or as soon as they are disturbed.

5.2.3 Timing

The survey was conducted from July to September 2005 (see section 10.2 F, Invertebrate Report), although several sections of both planning applications state that they were conducted from May to September 2005. The timing of invertebrate surveys is crucial, since surveys for most species must be conducted during the time of adult activity. There is a sequence of emergence of species throughout the season. For most terrestrial and many species with aquatic larvae, this emergence peaks in May and June. The English Nature leaflet 'Organising surveys to determine site quality for invertebrates' suggests three to seven days of fieldwork between March and October, plus time for identification and report writing. In this case it is essential that additional field work is undertaken in mid May and early June on the sites already surveyed to assess the quality of the invertebrate fauna. Complete surveys at least four times during the season have to be conducted in additional areas (see 5.2.2 and 5.2.4 of this report).

5.2.4 Habitats covered

The survey covered only the main pond and an area close to it. However, the habitat types in Dungeness where rare and scarce invertebrates are found include the interconnected ditches, other wet areas, but also very xeric areas and grassland. The importance of Dungeness for invertebrates is based on its large extent of sparsely vegetated shingle, with its low level of plant cover and a high level of bare shingle. This microhabitat is maintained by low nutrient levels. The extensive bare areas result in the ground being warmed by the sun, enabling invertebrate species adapted to these conditions to thrive. These include many threatened species. In more vegetated biotopes the greater ground cover results in lover ambient temperatures and a different invertebrate community is present. Additionally, the sparsely vegetated shingle supports a unique plant community and some invertebrates are associated with particular plant species. Several of these species were recorded from the airport by Morris & Parsons (1992) (see section 3.3.3.3). Taking the importance of the surrounding areas for invertebrates into account including the large number of rare and protected species and the inclusion of invertebrates in site designations, a survey to assess the impact of the planned development needs to be conducted in all major habitat types known to be of interest to invertebrates within the area affected by the proposal (see also 5.2.2 of this report).

5.2.5 Moths and light pollution

No moth trapping was conducted during this survey. The invertebrate report states that this was due to problems with access across the main runway and the lack of airport staff at night. However, the great crested newt surveyors were allowed access at night (in May/June 2004, July 2005 and April 2006). According to the IEEM guidelines for EIAs limitations of the ES should be mentioned and explained. However, these are not mentioned in the ES and no explanations were given despite the importance of Dungeness for invertebrates. Furthermore, such limitations might induce the use of the precautionary principle, i.e. it has to be assumed that more important moth species are present on site.

Evidence from the species list from Dungeness (Morris et al, British Wildlife), site designations and JNCC lists indicate that there is a potential for moth species of conservation concern on the site. Several species of high conservation status and BAP species are known to occur in Dungeness. For some of the species this is the only site they are found in the UK. Morris & Parsons (1992) record two rare moths, *Coleophora otitae* and *Cynaeda dentalis* from within the airport (see section 3.3.3.3). The plant survey (ES section 10.4.21) states that the vegetated shingle close to the planned runway extension supports broom scrub. Under these conditions at Dungeness broom supports 'a nationally important insect fauna' (Philp & McLean in Ferry & Waters, 1985) It includes *Lasiocampa trifolii* subspecies *flava*, which is endemic to Dungeness. It is bewildering that no specialist moth survey was conducted as part of this application. Therefore, moth surveys (at least four times during the season) are essential to assess the impact of the planned development.

This planning proposal will also increase the amount of light pollution produced by the airport. Currently, the airport is only operating during daytime, but the proposed increase in passenger numbers is likely to extend the operating times into the evening. Furthermore, passengers will travel to the airport by car and increased car movements in the evening or at night will increase the light pollution. Moths are attracted to light and will be adversely affected. At best, populations will only be reduced as individuals are attracted away from their natural habitat. Dungeness is important for migrating birds and also for migrating moths. The light pollution from a large airport and a significant increase in car traffic at night would certainly attract migrating moths and prevent them from continuing on their travels. We therefore believe that this could have a significant impact on the moth populations not just on site but also in the wider surroundings. This could impact on moth species of various conservation status recorded from Dungeness including one species, the Sussex emerald moth, included in Schedule 5 of the Wildlife and Countryside Act 1981 as amended.

5.2.6 Invertebrate groups included in the survey

We are certain that Andrew Godfrey would have included further groups of invertebrates in his survey and analysis if he had been given a complete brief. Dungeness / Romney Marsh area is known to support many rare and scarce Aculeate Hymenoptera (bees, wasps and ants), Hemiptera (true bugs) and Arachnida (spiders) (see Doody, 2003 and Morris & Parsons 1991). All these groups and the ones mentioned elsewhere must also be included in a survey aiming to assess the impact of a major development in this area. The advice of the invertebrate expert should have been sought to determine which species to include.

5.2.7 Identifications

The invertebrate surveyor who conducted the work, Andrew Godfrey, is a valued colleague and we have every confidence in his competence. The material obtained was sampled by a variety of methods, but the report states that only a small number of the specimens were identified. The remaining material, particularly the samples from the Malaise traps and the water traps, need to be identified and the results incorporated into the report. This work is an essential part of the assessment of the impact of the planned proposal on the invertebrate fauna of the area. During the scoping phase English Nature requested the inclusion of Malaise Trap sampling in the Invertebrate survey. However, this request has not been actioned as the samples were not identified. The majority of invertebrates cannot be identified in the field and need to be sampled and subsequently identified. These identifications are time-consuming and from the report it appears as if the specialist had insufficient time to complete this work.

5.2.8 Medicinal Leech

The medicinal leech was recorded during the invertebrate survey from the main pond adjacent to the runway. However, the great crested newt survey covered fourteen water-bodies and recorded medicinal leech from ditches 5 and 7, which are located to the east of the runway. The great crested newt survey recommended that medicinal leech should be surveyed further on the airport site. Please refer to great crested newt survey, July 2006, section 3.2.3 page 6, which also includes the conservation details for medicinal leech. This species has Lower Risk (Near Threatened) status worldwide (IUCN) and is listed in Appendix III of the Bern Convention. It is protected under Schedule 5 of the Wildlife and Countryside Act 1981 as amended by CROW Act 2000. Furthermore, this species is a BAP species. The Dungeness area and Romney Marsh supports by far the largest UK populations of this species. The majority of the leeches found during other surveys in Dungeness were found in the interconnected ditch system (Ausden et al, 2002). Furthermore, one of the major threats for this species is unsympathetic ditch management, as this species had shown a strong preference for water-bodies with high cover of submerged vegetation. As the ditches on site are planned to be used as drainage ditches, they need to be maintained with a rather low amount of submerged vegetation. This will very likely have a significant effect on the leech population present on site.

The planning application states that further surveys will be conducted and mitigation measures agreed on for this species. However, in order to assess the impact of the development on this internationally protected species, these surveys need to be conducted before any conclusions about the magnitude of impact can be drawn. As these surveys have not been conducted the precautionary principle needs to be applied to comply with the guidelines of the IEEM. This means that the impact on this species has to be assumed to be of high magnitude. This would imply that mitigation measures have to be taken for this species. However, no detailed mitigation proposals have been included in the planning proposals. The impact on the species cannot be assessed without detailed mitigation proposals, which must be provided before a decision is made. The assessment of the impact on this species does not comply with the guidance for ES provided by the IEEM, therefore, it is likely that this is a breach of good practice. According to these guidelines mitigation measures, their likely success, the funding for these and if necessary their monitoring must be included in the ES to enable LPAs to consider the planning application appropriately. We believe that the populations of medicinal leech on the airport site are likely to be important for the overall populations on Dungeness and should be retained.

5.2.9 Assessment of Impact on Invertebrates

The assessment of the impact of the proposed development is flawed by several factors. The areas designated for their ecological significance include the 8 SSSI's which now form part of the single, larger Dungeness, Romney Marsh and Rye Bay SSSI. This includes the airport footprint and would therefore increase the impact of the development. This larger SSSI should have been the basis for the assessment of impact. Furthermore, the impact is assessed as moderate (see 10.6.4), but the impact on one of the groups, the invertebrates, included in the designation has not been assessed properly as the survey was flawed. Under Mitigation (section 6 of this report) it is shown that the mitigation proposed does not fulfil the current guidelines and, for some species, is entirely lacking. As the mitigation is intended to compensate for residual effects, the impact cannot be satisfactorily assessed until proper mitigation proposals are put forward. Under the precautionary principle the scale of the impact is currently significant.

In Table 5 in Chapter 10 of the runway extension ES the importance of the vegetated shingle is given as National/County, but Doody (2003) and other sources, quoted in the Introduction, clearly value it as of international importance. This is supported by (Doody, 2003), which states that: 'The range of vegetation and associated animals, notably birds and invertebrates is considerable and help to make this a significant nature conservation resource.' 'It still has the most diverse and most extensive examples of stable vegetated shingle in Europe, including the best representation of scrub on shingle, notably prostrate forms of broom *Cytisus scoparius* and blackthorn *Prunus spinosa*. A feature of the site, thought to be unique in the UK, is the small depressions formed within the shingle structure, which support fen and open-water communities.' and 'The most important site in the UK is Dungeness which despite the major losses still supports a significant invertebrate fauna (Shardlow 2001).' in (Doody, 2003). The water bodies in the vegetated shingle are also important: 'The natural freshwater pits amongst the extensive shingle ridges of Dungeness are unique in the British Isles. This is true of both the geomorphology of the habitats and the communities of plants and animals that they support. The pits display various stages of the succession from open water through to fen vegetation.' (English Nature, 2006). The vegetated shingle cannot be replaced quickly once lost (Doody, 2003) and any disturbance of this habitat during construction or development is not acceptable. The sensitivity of the vegetated shingle is given as High/Medium, due to the lower level of importance. Taken the international importance into account (see above) this should be Very High. This would raise the overall level of the impact of the development. The invertebrate fauna of the airport includes two species which are associated with more mature (older) shingle (see 3.3.3.3 above). Any increase in nitrogen levels will affect them more severely, particularly since one of them (*Synaphe punctalis*) feeds on mosses.

The rough grassland/arable grassland that is proposed for development into the runway extension (see 10.6.2 of ES) has not been assessed properly for invertebrates (see above). The grassland may well be important for invertebrates that use it for part of their life cycle (e.g. brown carder bee, or the amphibian great crested newt). It is probably the habitat for several rare species, including the brown carder bee (see 6.2 below), but the invertebrate survey is unclear on this point. The precautionary principle must be used and therefore there must be an assumption that there will be a significant effect on this BAP species. Future management of the grassland on the airport runway will be more severe, because of the CAA regulations concerning the landing/takeoff of larger aircraft. This would be detrimental to many invertebrate species due to loss of nesting habitat, flower-rich grassland and the elimination of plants by cutting seed heads. Generally, any interruption in the life cycles of invertebrates is detrimental (see 3.3.3.2) and may lead to extinction, and loss of continuity of habitat is detrimental to genetic flow between sub populations of species.

The assessment is based on the 300,000 passenger movements per year, for which planning permission exists, but should have been based on the current usage of 3000 passengers per year. There should also be an impact assessment on the longer term proposals to increase usage to 2 million passengers. The impact of the further infrastructure of this increase, in terms of roads, parking, accommodation etc must also be assessed.

This proposal will result in the loss of 1020m of drainage ditches, construction of new drainage and a considerable increase in the flow of water (because of the increase in hard standing). Even allowing for some mitigation effects, this must be a considerable impact on the habitat available for medicinal leech, a protected species. Yet no concrete mitigation proposals have been made.

5.2.10 Conclusions on invertebrate survey

We regard the invertebrate survey as unsound because it is based on a proposal to fill in one pond and alter some ditches, but it is included in a proposal to extend a runway, rebuild a terminal building and increase passenger numbers by several orders of magnitude. It is, in effect, answering the wrong question. An invertebrate survey to determine the impact of extending the runway and greatly increasing the passenger capacity of the airport would have to be much more comprehensive, i.e. include many more taxonomic groups of invertebrates and all habitats important for these and should be conducted over a much larger physical area as well as during the correct time periods of the year. Baseline data on the invertebrates of the area needs to be taken into account to determine the area and the habitats in need of surveying. The data in Morris & Parsons (1992) also need to be incorporated into a new, larger, invertebrate survey. It is essential that all samples taken during the survey by A. Godfrey for this ES are identified, in particular the Malaise trap samples, which were requested by English Nature (now Natural England), and their results taken into account. Furthermore, it is necessary that all ditches connected on site or connected with the site and other water bodies affected by the development are surveyed for medicinal leeches, a species of international conservation importance and a protected species.

6 MITIGATION

6.1 General comments

The mitigation measures in the planning applications are only proposals and as such do not commit the developer to anything. Furthermore, they are rather incomplete. It is suggested that some further surveys will be conducted for medicinal leech and an appropriate mitigation strategy devised (see 10.8.9 of the runway ES) and a bee bank (see 10.9.3 of the runway ES) constructed to mitigate against loss of habitat for bees. The ES should have contained concrete measures for mitigation that commit the developers to specific actions within a timescale.

The IEEM guidelines (IEEM, 2006) are clear that mitigation measures should be included in an ES as a commitment by the developer before development is approved, stating 'A shopping list of 'proposed mitigation' at the end of an EcIA is of very little value as it requires the competent authority to enter into discussion with the proponent to agree what will be implemented. An EcIA is effectively meaningless if it provides an assessment of the significance of the residual impacts of a scheme based on the proposed mitigation measures being implemented even though these measures have not been agreed by the developer'. Thus the competent authority needs to be aware of what the developer commits to and not what he proposes to do: the extent of the mitigation measures in detail including plans etc, the costs and a timescale, and also whether future monitoring (including funding) to assess the efficacy of mitigation is included.

6.2 Bee Banks and Brown Carder Bee (UKBAP & Kent BAP)

The proposal (not commitment) to create bee banks is an excellent idea and we fully support construction of such banks where there is a known aculeate (bees and wasps) interest, as in this case. However, it will do little to mitigate against loss of habitat for the UKBAP and Kent BAP species and species of principal importance brown carder bee *Bombus humilis*. This species constructs nests 'Almost invariably on the surface in tall, but not rank, grassland with the top of the nest open to the sun.' (Edwards & Jenner, 2005). It does not nest in sandy banks. It forages for nectar and pollen in flowers, including legumes (clovers), labiates, knapweeds and red bartsia. The bees seek out scattered flowers within the taller grassland, rather than visiting large stands growing in the open (Edwards & Jenner, 2005). Thus the scrub clearance with loss of associated edge habitats in the runway construction would remove potential nesting sites in the area proposed for development, while the reduction in the semi-improved grassland would remove feeding areas for the bee and make its survival less assured. The proposed future management of the runway edges, basically keeping them short to comply with CAA regulations, would also have an adverse effect on this species. Note also that Edwards & Jenner (2005) state that 'rarer bumblebees require large areas of suitable habitat; this is likely to be in excess of ten square kilometres for any population to be viable.' Thus specific mitigation measures for this species need to be proposed, taking the above facts into account.

6.3 Medicinal Leech

No specific mitigation measures are included in the ES and the populations have not been properly assessed (see 5.2.8 above). Based on a comprehensive survey and subsequent detailed assessment of impacts, detailed mitigation measures must be proposed for this species of international conservation concern. This needs to include commitment from the developer.

7 DISCUSSION

We found many detailed problems with the two applications and in this report have indicated ways in which further data are necessary to come to a decision. The baseline data for the invertebrate survey were not searched adequately and as a result the survey was misdirected. It was not conducted at the optimal time for invertebrates. Besides these points, there are some general comments which can be made.

The Shepway District Local Plan (see 8.21) seeks to protect special nature conservation areas unless there is an exceptional need for the development, or measures will be taken to minimise impacts and compensate for adverse effects. We cannot see an exceptional need: London already has Heathrow, Gatwick, Luton and Stansted airports. While the national Government has allowed airports to develop according to perceived need until recently, the current emphasis on reducing carbon emissions has led to proposals to reduce air travel. The compensation for residual effects in the applications are very unclear and do not address all the problems, let alone those which may emerge when the invertebrate survey has been satisfactorily completed.

Much of the assessment of impact depends on the small area of the sensitive habitats which will be lost to the development. It is clear that the protected habitats are very sensitive and so far have high value because they are large areas. Also, even removing small areas could have a significant impact. There is clear evidence that, if allowed, this development will be only the first of several, sequentially increasing the size and impact of the airport on the protected areas. These protected areas are a source of income for the local economy and if they are devalued, local jobs will be lost. Lydd Airport is not the only entity which may bid for development. The Dungeness Power Station may also wish to develop further and there are other local amenities such as leisure parks, golf courses etc which could try to erode the protected areas. Thus there is a matter of principle involved - how protected are protected areas?

8 CONCLUSIONS

As stated above, this area is of international importance for invertebrates and we believe that the proposed development (including further expansions of passenger numbers) will have a negative significant impact on the large number of rare and scarce species found in the area. Some of the designations of the protected sites affected by this development include invertebrates, while others include them in their general description.

In our opinion the whole invertebrate survey was based on the wrong assumptions and is therefore invalid. A decision should not be made without a comprehensive survey being conducted, i.e. with at least four visits during the season, starting in mid May, using all the trapping methods already employed, identifying all samples, a minimum of four moth trapping sessions during the season and separate surveys for medicinal leeches in all ditches on site or connected with it and all other water bodies. It is important that all habitat types known to support rare and / or protected species in the area are surveyed, but also that light pollution and changes in flora due to increased nitrogen inputs are taken into account (see section 9). Without this data the precautionary approach recommended by the IEEM needs to be used, i.e. an impact of high magnitude on the invertebrates including the presence of protected species needs to be assumed.

Given the extreme sensitivity and importance for Nature Conservation of the Dungeness / Romney Marsh system and taking our comments into account, we consider that the precautionary principle should be applied and the application rejected.

9 RECOMMENDATIONS

- **Supply specialist surveyor with full brief**
  According to IEEM (Institute of Ecology and Environmental Management) guidelines for Environmental Statements the specialist surveyor must be supplied with a full brief of the planned development. This is essential for identifying the extent of the survey area and the groups of invertebrates that need to be sampled. It will also assist with the assessment of the planned project. According to the Invertebrate Survey report by A. Godfrey a full brief was not given to him (see Appendix, Section 10.2 F, Summary and Introduction). Therefore, the survey was inadequate and should be repeated. He should also be informed of historic data to assist the adequate assessment of the impact on the invertebrate fauna present on site. This data was not provided.

- **Identify remaining material**
  English Nature required the inclusion of two Malaise traps in the survey. This material and also large amounts of the remaining material were not identified at all (see summary of survey report by A. Godfrey – included in both planning applications). This material must be identified before attempting to assess the impact of the planned development on invertebrates.

- **Survey wider range of habitats**
  All habitats important for invertebrates on and preferably around the airport, but affected by an increased nitrogen deposition, need to be surveyed for invertebrates. These habitats include bare and vegetated shingle, unimproved / semi-improved grassland, sandy areas, scrub, marshy areas, wetlands including all interconnected ditches and ponds. This list is not exhaustive and the specialist surveyor should be consulted on this.

- **Survey wider area of airport**
  The invertebrate survey was only conducted over a very small area affected by the proposed development. In order to assess the impact of the proposed projects including the increase in nitrogen deposition on the invertebrates, at least the area of the airport, but preferably a wider area needs to be surveyed.

- **Survey wider area of ponds and ditches for medicinal leech, *Hirudo medicinalis***
  The most important habitats for medicinal leech are ditches with a large amount of vegetation, but also ponds. Therefore, all ditches and ponds that might be affected by the development (including increased nitrogen deposition) need to be surveyed to assess the impact on this species. One of the major threats to this species is eutrophication of their habitat, i.e. ponds or ditches. This species is included in the IUCN list of species of conservation concern; hence it has an international status. Furthermore, it is classified as Vulnerable in the UK, listed under Appendix III of the Bern Convention, Appendix II of the Convention on International Trade in Endangered Species (CITES), Annex V of the Habitats Directive, and protected in the UK under Schedule 5 of the Wildlife and Countryside Act, as amended.

- **Invertebrate survey earlier in the year**
  The invertebrate survey missed the peak occurrence times of many species of conservation concern known from the area. Thus a complete survey of all important habitats for invertebrates needs to be carried out earlier in the year. Ideally, the survey should be carried out in mid May, early June, late June / early July and early to mid September. This might need to be adjusted by one or two weeks depending on season.

- **Moth survey**
  Many rare moth species are known from the area affected by the development, including one species only known from Dungeness. It is therefore essential that at least four moths surveys are carried out during the season, starting in late April / early May, continuing in early June, followed by late June and mid to end September. These surveys were not conducted before due to problems with access to the airport site at night. However, access at night was possible for surveys of great crested newts. This moth survey should consist of at least two components, one night trapping with MV traps, but also a focussed survey of the foodplants of the rare species which have or might be found on the site, looking for characteristic signs of damage. Many of these foodplants are known from the site but the moth species associated with them have not been found there.

- **Input of pollutants**
  The input of pollutants, including nitrogen and lighting, needs to be assessed to determine the extent of its effect on the flora and hence the invertebrates dependent on these plants. Also, the possibility of increase in vegetation and thus decrease in open, unshaded areas for thermophilic (warmth loving) invertebrates needs to be assessed.

- **Supply further detail of mitigation measures**
  The mitigation measures suggested for invertebrates are inadequate. More detailed proposals for all species of principal importance, including those found in the more comprehensive surveys, should be supplied. Mitigation for the brown carder bee, which will be affected by the planned cutting of the runway verges, is a priority, as is mitigation for the medicinal leech.

- **Reassess impact on invertebrates**
  Once the above points have been met, the assessment of the impact needs to be reassessed as detailed in 5.2.9 above.

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11 APPENDIX I: EXCERPT FROM NOTIFICATION FOR A NEW SSSI, ENGLISH NATURE 2006:

- **Endemic species and subspecies of invertebrates**

Dungeness supports an 'endemic pool' of species and subspecies that are not known from any other sites in the world. This includes the leafhopper *Aphrodes duffieldi*, the grass-fly *Polyodaspis sulcicollis*, and subspecies of the pygmy footman moth *Eilema pygmaeola pallifrons* and grass eggar moth *Lasiocampa trifolii flava*.

- **Populations of two invertebrate species listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)**

The SSSI contains populations of two Schedule 5 invertebrate species. The range of shallow, well-vegetated waterbodies provide ideal conditions for medicinal leeches *Hirudo medicinalis*. The Sussex emerald moth *Thalera fimbrialis* is restricted as a British resident to Dungeness, where larval populations of the species occur mostly on areas of disturbed shingle within and around the perimeter fence encircling Dungeness Nuclear Power Stations, and at Lydd-on-Sea.

- **Populations of ten endangered, vulnerable and rare invertebrate species**

The SSSI supports nationally important populations of ten species of invertebrate that have been listed (or provisionally listed) as endangered, vulnerable or rare in the Red Data Books for Great Britain. Seven of these species (three moths, three spiders and a flea beetle) are associated with the shingle beaches, whilst the marsh mallow moth *Hydraecia osseola hucherardi* occurs on grazing marshes, the ground beetle *Omophron limbatum* is found in damp sand at the margins of fresh waterbodies, and the click beetle *Melanotus punctolineatus* breeds in areas of sparsely vegetated coastal

- **Assemblages of invertebrates occurring on 'dry' coastal habitats**

The shingle beaches, sand dunes, stabilised sand deposits and dry grasslands in the SSSI support rich assemblages of Red Data Book and nationally scarce invertebrates. These include assemblages chiefly associated with early successional coastal shingle and dunes, herb-rich neutral grassland and early successional calcareous conditions.

- **Assemblages of wetland invertebrates**

Dungeness, Romney Marsh and Rye Bay is permeated by a complex network of wetland habitats including saltmarsh, natural freshwater pits, fens, ponds, gravel pits, and ditches. They support a number of assemblages of Red Data Book and nationally scarce invertebrates; particularly assemblages of species chiefly associated with the following five types: rich fen, vegetated water margins, open water on disturbed mineral sediments (as well as species representative of water's edge habitats, such as damp sand and silt), upper saltmarsh (including species associated with transitional saltmarsh, freshwater seepages over saltmarsh, brackish lagoons and brackish ditches) and, to a lesser extent, tussock fen with moss edges.

12 APPENDIX II. NATIONAL STATUS AND BIODIVERSITY ACTION PLAN CATEGORIES

12.1 Assessment of conservation status (Red lists or RDBs) before 1994

The following definitions were used before 1994 for the assessment of the conservation status of species and are based on Falk (1991). Since 1994, new categories have been used (see section 2). Newly established categories are *Extinct in the wild* (EW), and *Critically Endangered* (CR). Whilst the names *Endangered* (EN) and *Vulnerable* (VU) have been maintained, they are now differently defined, and species in one of these threat categories in the old system will not necessarily be in the same category in the new. However, not all species or species groups have been assessed using these new categories, therefore, the old terms are still in use for these groups. The definitions for the old terms are given below.

Red Data Book 1 (RDB1) - Endangered. Species in danger of extinction and whose survival is unlikely if the causal factors continue to operate. These include:
Species only known from a single locality
Species restricted to habitats which are especially vulnerable
Species which have shown a rapid and continuous decline in the last 20 years and are now estimated to exist in 5 or fewer localities.

Red Data Book 2 (RDB2) - Vulnerable. Species believed likely to move in to the "Endangered" category in the near future if the causal factors continue to operate. These include:
Species declining throughout their range.
Species in vulnerable habitats.
Species whose populations are low.

Red Data Book 3 (RBD3) - Rare. Species with small populations that are not at present endangered or vulnerable but which are at risk. These include:
Species estimated to occur in 15 or fewer 10km squares.

Red Data Book K (RDBK). Species suspected to fall within the RDB categories but with too little information to allow assignment to any of the previous categories.

Notable, N – estimated to occur in 16-100 10km squares (Diptera only).
Notable A, Na – estimated to occur in 16-30 10km squares.
Notable B, Nb – estimated to occur in 31-100 10 km squares.

The following categories are not based on Falk (1991), but are generally used.

Local – occurring in more than 100 10km squares, but thinly distributed over the country, or common only within a very restricted area or habitat type.

Migrant – species that are known to migrate to the British Isles, but which do not normally survive the winter. (Note that some resident species are also known to be migratory).

12.2 Assessment of conservation status (Red lists or RDBs) based on IUCN Criteria – in use since 1994

The following definitions have been used since 1994 for the assessment of the conservation status of species. These are based on the IUCN threat categories (IUCN 1994) as published in Falk & Chandler (2005). The IUCN is now called the World Conservation Union (WCU)

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

EXTINCT IN THE WILD (EW). A species is *Extinct* in the wild when it is known to survive only in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A species is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual) throughout its range have failed to record an individual. Surveys should be over a time frame appropriate to the species's life cycle and life form.

CRITICALLY ENDANGERED (CR). A species is *Critically Endangered* when it is facing an extremely high risk of extinction in the wild in the immediate future, as detailed by any of the criteria A to E. *

ENDANGERED (EN). A species is *Endangered* when it is not *Critically Endangered* but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria A to E. *

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

Species listed as *Critically Endangered, Endangered* or *Vulnerable* are defined as Threatened (Red List)
species. For each of these threat categories there is a set of five main criteria A-E (an additional subcriterion for the *Vulnerable* category), any one of which qualifies a species for listing at that level of threat. The qualifying thresholds within the criteria A-E differ between threat categories. They are summarised in Table 1.

Table 1 Summary of the thresholds for the IUCN Criteria

Criterion	Main thresholds		
	Critically Endangered	*Endangered*	*Vulnerable*
A. Rapid decline	>80% over 10 years or 3 generations in past or future	>50% over 10 years or 3 generations in past or future	>20% over 10 years or 3 generations in past or future
B. Small Range - fragmented, declining or fluctuating	extent of occurrence <100 km^2 or area of occupancy <10 km^2 (<1 x 10 km^2)	extent of occurrence <5,000 km^2 or area of occupancy <500 km^2 (<5 x 10 km^2)	extent of occurrence 20,000 km^2 or area of occupancy <2,000 km^2 (<20 x 10 km^2)
C. Small population and declining	<250 mature individuals, population declining	<2,500 mature individuals, population declining	<10,000 mature individuals, population declining
D1. Very small population	<50 mature individuals	<250 mature individuals	<1,000 mature individuals
D2. Very small range			<100 km^2 or < 5 locations
E. Probability of extinction	>50% within 10 years	>20% within 20 years	>10% within 100 years

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

- **Conservation Dependent (cd)**. Species which are the focus of a continuing species-specific or habitat-specific conservation programme targeted towards the species in question, the cessation of which would result in the species qualifying for one of the threatened categories above within a period of five years.
- **Near Threatened (nt)**. Species which do not qualify for *Lower Risk (conservation dependent)*, but which are close to qualifying for *Vulnerable*.
- **Least Concern (lc)**. Species which do not qualify for *Lower Risk (conservation dependent)* or *Lower Risk (near threatened)*.

DATA DEFICIENT (DD). A species is *Data Deficient* when there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status. A species in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. *Data Deficient* is therefore not a category of threat or Lower Risk. Listing of species in this category indicates that more information is required and acknowledges the possibility that future research will show that a threatened category is appropriate.

LOWER RISK (NEAR THREATENED). Species occurring in 15 or fewer hectads (formerly termed 10 km squares), but which are not threatened (*i.e.* not qualifying as *Critically Endangered, Endangered* or *Vulnerable*).

LOWER RISK (NATIONALLY SCARCE). Species which are not included within the IUCN threat categories and are estimated to occur in 16 - 100 hectads of the Ordnance Survey national grid in Great Britain (formerly termed "Nationally Notable" by Falk 1991). Nationally Scarce is not a threat category, but rather a measure of the extent of distribution of these species.

12.3 Biodiversity Action Plan Lists

The UK Biodiversity Action Plan (UK BAP) was published in 1994 as part of the UK response to the Convention on Biological Diversity signed at Rio in 1992. The UK BAP helps coordinate and drive conservation work at national and local levels through identifying priorities for action and setting biological targets for the recovery of species and habitats. Species which are included in the BAP list are referred to as BAP species. Under the plan there are 436 costed and targeted national action plans
for our most threatened habitats and species in the UK, and these are supported by approximately 150 Local biodiversity action plans (LBAPs), often at County level. More detailed information is available at www.ukbap.org .

BAP IN THE PLANNING PROCESS

- BAP now have a statutory basis under section 74 of the Countryside and Rights of Way Act 2000, which means that Government Ministers, Departments and LPAs have a duty to support the conservation objectives, as set out in individual Species or Habitat Action Plans, in carrying out their functions.
- The ODPM Circular 06/2005 (Part III A: sections 84 and 85), which complements the guidance of PPS 9, includes guidance for BAP species and habitats. It places a duty on LPAs to take BAP species and habitats into account when assessing a development proposal.
- In PPS9, the Government has indicated that local authorities should take steps to further the conservation of habitats and species of principal importance through their planning function (see PPS9 paragraphs 11 and 14). The lists of the habitat types and species subject to this duty were published by Defra in 2002 and comprise the list of species and habitats identified as priorities under the UK Biodiversity Action Plan.